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Exploring the extent of private digital copying exception as a "friendlier" deterrent to illegal downloading: Evidence from four industries

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Abstract

Technological advances such as digitalisation, file sharing technologies and Internet broadband have increased the possibilities to copy and distribute copyrighted products. Substantial research has examined the relationship between unauthorized copying of copyrighted material and lost sales by the relevant industry. However, little research has been conducted on how copyright industries have dealt with the problem of unauthorized copying, apart from referring to the range of civil and criminal penalties. Against a prevalent belief that illegal downloading is hurting copyright industries, this paper aims to explore what new business models have been introduced to deal with this illicit activity. We focus on the measure of a private copying permission and explore if this measure has an impact on product prices. Evidence for this study is based on extensive and original data about selling conditions and prices of four copyright industries (music, films, books and software) in the UK. We find that these industries have implemented some form of sanctioned private copying, either by providing users with more copies of the product or by permitting them to make additional copies. These permissions, however, significantly differ across industries; in some cases they are reflected in product prices, while in other cases they offer a complimentary service as an incentive to buy legitimate copies. Our analysis suggests that these measures are implemented for two reasons. The first is to help recapture the revenues apparently lost to

illegal copies; the second is to grant users with additional services as an incentive to deter illegal downloading.

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1. Introduction

Since the advent of digitization, making a copy of information goods has become significantly easier and cheaper. The proliferation of new and sophisticated portable devices able to reproduce digital content, the widespread use of file sharing and peer-to-peer technologies and the diffusion of Internet broadband have expanded these possibilities. These, in turn, have helped to facilitate wide scale, digital piracy, defined as unauthorized replication of digital content, and have confronted content-producing industries and policy makers with problems on how to prevent and deal with such felonious activity.

Illegal downloading (making an unauthorised copy) via the Internet using peer-to-peer (P2P) and file sharing technologies¹ epitomizes digital piracy. Since Napster, the first file sharing service for music recordings, such technologies have proliferated. According to (Envisional, 2011), 23.76% of traffic was estimated to be infringing across all areas of the Internet in 2010. BitTorrent traffic (one of the most popular form of peer-to-peer technology) approximately accounted for 17.9% of all Internet traffic. Nearly two-thirds of this traffic was estimated to be copyrighted content shared illegitimately (63.7% of all BitTorrent traffic or 11.4% of all Internet traffic) (Envisional 2011, 51).

The fears of digital piracy decimating the digital copyright industries from the mid-1980s have caused fear among the copyright industries on the perceived revenue losses from the blatant and cavalier copying of their digital content via the pervasive use of these Internet-enabled technologies. The reaction against digital piracy has involved a variety of initiatives, including stronger laws and regulations, the criminalisation of these activities, technological measures, and lawsuits against P2P networks, facilitators, and single users.

Several studies have focused on the impact of file sharing, which have tried to establish a relationship between file sharing and the decline in legitimate sales of copyrighted products. The majority of these studies have shown that the impact of copying has had a deleterious effect on the sales of music and movies, including television productions (see for example: Liebowitz, 2006, 2008; Zentner, 2006; Rob and Waldfogel, 2006). However, other studies have refuted these results, arguing that there is no relationship between file sharing and the sales of copyrighted products (see for instance: Bhattacharjee et al., 2007; Oberholzer-Gee and Strumpf, 2007; Smith and Telang, 2010). Yet others have argued that file sharing may have a positive effect on sales (Gopal et al., 2006; Andersen and Frenz, 2008).

¹ These technologies allow a computer to search and access files on the hard drives of other computers connected to the Internet. The “members” of this file sharing network, who are unknown to each other, can then make available any file to other members. These files are copies of digital content that the member has downloaded, legally or illegally.

Another stream of literature has concentrated on the emergence of new businesses models that use the Internet as a channel to sell and deliver legitimate copies of copyrighted products. Here authors have claimed that illegal file sharing has been a source of innovation for these industries, and has had the direct or indirect effect of spurring these new business models, which have helped to recover part of the sales lost through file sharing (Vaccaro and Cohn, 2004; Choi and Perez, 2007; Bustinza et al., 2013).

Yet all these studies have not distinguished between copying for personal use (private and non-commercial) and copying for commercial purposes or non-private use. A private copy is a copy of digital content for personal use; any other purpose, for instance, a copy for another person or for commercial use is not a private copy². (More on a private copy below.) It is worth noting here that an implicit anticipation that private copies will be made has been dealt with through a government-mandated levy on blank media, commonly referred to as a private copying levy in many countries since the early 2000s.³ Yet the extant literature on illegal downloading and its apparent effect on lost sales imply that this levy has been rather ineffective in deterring this activity.

Liebowitz (2006) who has researched extensively on the negative effects of file sharing on the recording industry suggests “[w]ith a technology this young, and markets changing this fast, it would be most unwise to claim too much given the risk that the future may prove a current conclusion to be incorrect” (p. 25). Pertinently, have some copyright industries adopted *direct* measures to allow some form of private copying to deter illegal downloading and to recapture rents that have been argued to have been lost through this illicit file sharing? If so, what may they be? We argue that this issue has been inadequately addressed in the economics literature on the effects of illegal file sharing. To address what direct measures may have been implemented, we examine it through the *private copying permission* (and *not* the private copying levy as noted above).

The aim of the paper is to examine how the recording, film, publishing, and software industries have (or not) adopted measures to permit digital private copies, and on whether these copying permissions have an impact on product prices. The analysis adopts a mixed-method approach, which combines comparative case studies with statistical analysis, the latter of which is based on original data collected on the four industries as part of the evidence for the UK Government’s intention to introduce a Private Copying Exception.

The main results of the analysis are: (1) the four industries under study have implemented some form

² There has been a number of lawsuits by the Recording Industry Association of America from 2003 against individual downloaders, the most notorious one being a suit taken against a 12 year old, who apparently did it for her own private use.

³ Copyright levies are taxes imposed upon the manufacture and importation of reproduction equipment (e.g., video recorders and MP3 players) and/or blank recording media (e.g., recordable CDs and DVDs) as an equitable or fair compensation for copyright holders. Levy systems exist in most Member States but vary considerably with regard to tariff and scope (Helberger and Bernt-Hugenholtz, 2007, p. 1064).

of private copying permission; (2) there are different forms of permitted use of these copies; and (3) the impact of copying permissions on product price is industry-specific. This paper concludes that these copying permissions are implemented for two main reasons. First of all, they represent an attempt to regain the apparent lost revenues incurred by illegal downloading, or to provide an additional avenue for revenue generation. Secondly, they represent another countermeasure against digital piracy. This is because these copying permissions could be used as a way to offer more rich and differentiated products, which may mitigate the number of or deter illegal downloads by making legitimate products more appealing than illegitimate ones.

2. Background literature

File sharing and sales of copyrighted products

The last decade has produced a plethora of literature focusing on the apparent loss of revenues suffered by copyright industries as a result of the pervasive use of file sharing and peer-to-peer technologies on digitized copyrighted products. Much of this literature has attempted to test the hypothesis that there is a negative causal relationship between digital piracy and copyright industries' sales and profits. Oberholzer-Gee and Strumpf (2010) and Tschmuck (2010) who have reviewed and written several articles on this issue, have argued that while a majority of these studies appear to confirm this hypothesis, the overall the impact of file sharing on industry revenues remains contentious.

The literature supporting a negative economic impact has based its argument primarily on a displacement effect on music and video sales (see, for example: Hong, 2004; Hui and Png, 2003; Liebowitz, 2006, 2008; Peitz and Waelbroeck, 2004, 2006a; Rob and Waldfogel, 2006, 2007; Zentner, 2006). In most of the cases, the underlying hypothesis is the presence of a substitution effect, i.e. the high substitutability between originals and copies reduces the incentives to purchase original products with the effect of displacing their sales. Liebowitz (2008) found that the record sales displacement was above 100% and concludes: "*[t]he decline [in record sales] due to file sharing appears to be larger than the measured decline—the regression results indicate that file -sharing not only reduced sales but also vitiated an increase that otherwise would have occurred.*" (p. 29).

In contrast some studies have demonstrated that this conclusion is debatable. Oberholzer-Gee and Strumpf (2007) have shown that the amount of displacement (3.5 percent) from file sharing of music is small. Similarly the same authors (Strumpf and Oberholzer-Gee, 2010) have argued that in the case of the movies, for instance, using the example of the blockbuster movie "X-Men Origins: Wolverine" the displacement effect of movie theatre sales by file sharing was estimated to be only 10%. The authors also explained that a decline in DVD sales (which formed a sizeable portion of the movie industry's revenues) in late 2000 may not be reliably attributed to file sharing because part of the growth in DVD sales in the early 2000s was fueled by home consumers starting up a library of the

new format (DVD). With the maturation of this format and the introduction of movie rental channels, such as Netflix, DVD revenues declined (Strumpf and Oberholzer-Gee, 2010.); (Tanaka, 2004; Bhattacharjee et al., 2007; Oberholzer-Gee and Strumpf, 2007; Smith and Telang, 2010).

Other works have demonstrated empirically (Gopal et al., 2006; Andersen and Frenz, 2008) and theoretically that copyright holders could benefit from file sharing. In particular, the potential positive impact of file sharing on copyright industries has been modelled in three ways (Cho and Ahn, 2010). The first is through network externalities in which the value of a product increases with an increase in the number users (Conner and Rumelt, 1991; Takeyama, 1994; Shy and Thisse, 1999). The potential profit for copyright owners comes from these network externalities – illegitimate copies have the potential to enlarge the number of users and customers' willingness to pay for legitimate ones. The second mechanism is indirect appropriability (Liebowitz, 1985; Besen and Kirby, 1989; Bakos et al., 1999). Copyright owners can benefit from copying since consumers are willing to pay more for products that can be copied or shared with others. If copyright owners can monitor the potential volume of copies that originates from each legal purchase, they could charge a higher price for the originals, and therefore be able to indirectly appropriate some of these revenues that would otherwise be lost. The last mechanism is sampling (Takeyama, 2003; Chellappa and Shivendu, 2005; Peitz and Waelbroeck, 2006b). In many cases, copyrighted products are experience goods, whose real characteristics and value are difficult to be observed in advance. Also, file-shared copies may inform other users about the existence of the product or may help them familiarize with it, which may ultimately foster the diffusion of the product itself.

Despite competing arguments, the aforementioned body of literature has addressed a common issue, i.e. how detrimental has file sharing been for the revenues of copyright industries? Furthermore, notwithstanding the merit of these studies, we posit that they have inadequately considered the emergence of new business models involving private copying permission as a *direct* measure to counteract illegal downloading/copying.

File sharing and the emergence of new business models

Although most of the studies noted above have been based on data collected in the 2000s (when online sales models existed), the majority of them focussed on traditional formats such as CD or DVD, and less so on other digital formats and digital distribution channels. However there is a growing body of work that argues that there is a relationship between file sharing and the emergence of new business models in copyright industries. These include, for instance, the use of P2P networks as low cost distribution channels (Gayer and Shy, 2003); changes to the supply-chain, with a shift from a vertically-integrated model to a more flexible network structure (Graham et al., 2004); new pricing strategies, such as the adoption of a pay-per-track model for music (Elberse, 2010).

Choi and Perez (2007) have shown that music piracy contributed to the creation of new business

models in several ways. For instance, digital piracy catalysed the adoption of new technologies, such as music compression. It also signaled the existence of a vast market for online music, customised compilations, and access to older recordings. The authors concluded that notwithstanding the losses that the copyright industries may have suffered, piracy has had the direct or indirect effect of spurring new business models. Vaccaro and Cohn (2004), focusing on the music industry as well, studied the different business models that emerged before, during and after the advent of file sharing. They also examined the strategies that characterized each of these business models, in terms of productivity, place, price, promotion, and other dimensions. In doing so, they described how the music industry evolved from a *traditional* business model mainly focused on the production and distribution of physical goods, to a *renegade* model mainly based on illegal exchange of copyrighted files, and eventually to a *new* business model, based on legitimate online sales. Bustinza et al. (2013) using data from a large-scale international survey shows that these new business models can help the music industry to “recover” a portion of illegitimate users, and hence part of the revenues lost through file sharing, and also to increase their revenues by acquiring new customers who may currently be non-buyers.

Private copying: a neglected issue in the economics literature

We have observed that extant literature on the effects of illegal file sharing has made no reference to private copying. Yet one must consider that not all copies of digital products that users can make are necessarily illegitimate since some of them may be for personal and non-commercial use (private copying). The distinction between private and other kinds of copies has also been neglected in the economic literature dealing with private copying.

Most of the academic work on private copying has been dealt with by legal scholars and has been treated as a specific aspect of the general copyright law in creative industries (mainly music, see for example Albinsson (2013) or in its relationship with the notions of fair use and fair compensation (among others, Grodzinsky and Bottis, 2007; Kretschmer, 2011). The legal literature on private copying has the merit of defining clearly what private copying is, and distinguishes it from other kinds of copies made by the user for purposes other than for its own use. In the legal literature this distinction is clear both for the digital and the pre-digital eras. We have adopted this definition. Davies (1983) defines that: “*Private copying is the term which has come to be widely used to describe the non-commercial practice whereby individuals make unauthorised copies of phonograms or videogames for domestic use. Private copying is non-commercial in the sense that the reproduction is not made for commercial gain or profit, being normally undertaken in the privacy of the home by individuals for their own pleasure and that of their families. [...] (pp. 10-11).*

Scholars treating private copying from an economics perspective make little distinction between copies made by a single user for her private use and copies done for other purposes (usually to share

them). Generally it has been assumed that if a user makes a copy, it will be shared, see for example Besen (1986) or more recently Kinokuni (2003).

Against this argument, we provide a brief narration on the increasing number of laws and regulations formulated by national and supranational policy makers to forestall rampant illegal copying. They will help to shed some additional light on the importance of distinguishing between private copies and other kinds of copies.

3. A snapshot of legislative responses to digital copying

The copyright industries – music, movie, software and book publishing in particular – have been the vanguard for measures to prohibit or limit illegal copying, even for non-commercial purposes.

Lawrence Lessig (1999) declared in his provocative book *Code and Other Laws of Cyberspace*: “*Not only does the Net promise perfect copies of digital originals at practically no cost, but it also threatens to impose an almost impossible task on law enforcers tracing and punishing copyright violators [...]. For the holder of the copyright, cyberspace appears to be the worst of both worlds – a place where the ability to copy could not be better, and where the protection of law could not be worse [...] Talk like this gave birth to the panic of copyright holders, who wanted to see legislative changes made to better protect the copyright*” (p. 125).

This panic has indeed given rise to a rash of digital copyright laws aimed at prohibiting illegal copying. This charge began in the U.S. with the No Electronic Theft, 1997, to the complex and draconian Digital Millennium Copyright Act (DMCA) 1999,⁴ and ending with the currently proposed Stop Online Privacy Act (SOPA) and the PROTECT IP Act (PIPA). Under these laws, illegal copying is treated as a felony.

Not to be left behind, the European Commission, the legislative arm of the European Union (EU), introduced an “Information Society Directive” in 2001 (EU Copyright Directive 29/EC), which as with the DMCA, was rigorously aimed at, among other things, preventing the circumvention of anti-copying devices and digital rights management systems, measures to prevent illegal copying. Member States of the EU have since adopted this Directive, although some of them have implemented additional laws to strengthen anti-digital piracy measures, such as the Hadopi law, implemented in France in late 2009, and the UK’s Digital Economy Act (DEA) in 2010. According to these laws, Internet Service Providers could be asked to collaborate in order to identify suspected and persistent copyright infringers, with potential actions ranging from simple notification to suspension of Internet connection.

The European Commission also added a rule on private copying in article 5(2)(b) of the Information

⁴ For a discussion of these legislative measures, see (Tang, 2005)).

Society Directive.⁵ This article allows Member States to create an exception to copyright for “reproductions on any medium made by a natural person for private use and for ends that are neither directly nor indirectly commercial” (p. 19). According to (Helberger and Hugenholtz, 2007): “*The rationale of a private copying exception is informed, at least in part, by the idea of protecting the end user’s private sphere. [...] If copyright is supposed to promote culture [...] the law of copyright must also allow prospective authors “to stand on the shoulders of giants” and freely engage in transformative uses of works of authorship. Private copying is an essential first step in this process of follow-on creation*” (Helberger and Hugenholtz, 2007, pp. 1069–70). As each Member State of the EU has the discretion to adopt the Directive in its entirety, this private copying clause remains unharmonised.

The majority of aforementioned legislative measures are still in force, yet unauthorised copying of digital content remains a worrisome issue to copyright industries, if we were to accede to SOPA, PIPA, Hadopi and DEA as examples of this nettlesome issue. In a survey of European consumers, Dufft et al. (2006) had found that the right to private copying remained a concern among European consumers of information, largely stemming from the wide use of Digital Rights Management (DRM) technologies. Furthermore, despite these measures, there continues to be a mantra against illegal downloading from the creative industries, yet as we will discuss below, they have taken measures to address this matter.

Hargreaves and UK copyright reform: focusing on private copying exceptions

Here, we have added a note on the UK IP legislative scene because the data used in this article was based on a study commissioned by the UK Intellectual Property Office (UKIPO) to help them gather preliminary evidence and data for the UKIPO’s impact assessment of a private copying exception. The aim of this study was to collect data on what and whether four selected copyright industries (music, film, book publishing and software) have (or not) adopted private copying measures for their products. The evidence was aimed to further elucidate the “state of the art” of private copying measures that copyright industries have (or not) implemented. The IPO also sought to use the data to provide a further basis for Government’s consideration to introduce a private copying exception. Such a measure, if or when implemented, will constitute a step toward reforming UK copyright.

Private copying remains unlawful in the UK; neither does the country impose a private levy,⁶ although a certain amount of private copying is already priced into retail purchases, such as through allowing

⁵ For a comprehensive account on the history and development of private copying in the European Union, see Helberger and Hugenholtz (2007).

⁶ Ireland, Malta and Luxembourg are the only Member States that do not impose copyright levies. Australia, however, since 2006 has allowed private copying for oneself only and does not impose copyright levies. Elsewhere, such as the U.S., Canada and Switzerland, these levies are imposed for the purpose of private copying for oneself. See Kretschmer (2011) for a complete list of countries that impose levies.

format-shifting. So what has motivated the British Government to reform its copyright regime to address specifically digital copying?

In November 2010, UK Prime Minister David Cameron announced, during a speech to an audience of high tech businesses and entrepreneurs that a review of the UK Intellectual Property framework would be undertaken to examine how the Intellectual Property system can better drive growth and innovation. The aim of this independent review, led by Professor Ian Hargreaves, was underpinned by the Government's ambition to *"build on the UK's great strengths in all these areas by making it easier to use IP to create value across the economy and across our society..."* (IPO, 2010). Among others, a main theme of this review was to examine the *"barriers to new Internet-based business models, including the costs of obtaining permissions from existing rights-holders"* (ibid), particularly with respect to copyright. One of the key copyright issues was to explore a limited private copying exception without compensation. In conjunction with this Review, UK IPO also conducted extensive consultations on copyright with a large range of copyright holders, see for instance, *Consultation on Copyright* (HM Government, 2011).

The Hargreaves Review noted: *"As right holders are well aware of consumers' behaviour in this respect [of making private copies], our view is that the benefit of being able to do this is already factored into the price that right holders are charging. A limited private copying exception which corresponds to the expectations of buyers and sellers of copyright content, and is therefore already priced into the purchase, will by definition not entail a loss for right holders"* (Hargreaves, 2011, p. 30)

An internal Impact Assessment on the effects of a private copying exception prepared by the UK Intellectual Property Office UKIPO) also reflected that: *"[m]ost consumers already copy content they have bought, and believe this is legal. But such copying is illegal under copyright law without permission from copyright owners. In the UK (but not in many other countries) firms are deterred from developing new consumer technology and services that use private copying. Amending the law to permit private copying [...] will remove barriers to innovative businesses providing new technology and services, delivering new benefits to consumers, as well as legalising what most already consider to be reasonable behaviour. The exception needs to be broad enough to meet consumer expectations but narrow enough to have no significant impact on commercial sales and incentives to creators. The 'time-shifting' exception (1988), which allows people to record TV programmes, created similar benefits for consumers and allowed new technologies (e.g. video) to flourish"* (IPO, 2012).

4. Method and Data

To reiterate, the aim of the paper is to examine how the recording, film, publishing, and software industries have (or not) adopted measures to permit digital private copies, and on whether these copying permissions have an impact on product prices. The analysis adopts a mixed-method approach

combining comparative case studies and statistical analysis based on two original sets of data.

The first one comprises an in-depth overview of the private copying permissions in the four industries. First, for each of the four industries we identified a number of stores selling these kinds of digital products in the UK⁷, with the aim to include all the existing online services, or at least a representative sample of them. Second, for each store, we collected several kinds of information, such as the types of products sold (digital files, physical media), the format in which they were sold, whether the digital files embedded any kind of copy protection, and the copying conditions of the products. By copying conditions we mean whether, and under what circumstances, the purchaser may make copies of the products, i.e. how many copies are allowed, for whom (personal use, household, anybody else) and to which kind of devices these copies may be copied. Such data was systematically and carefully collected from each seller's Terms of Sales⁸, Frequently Asked Questions, and support pages, which were then analysed. In some cases, the analysis was supplemented using other kind of sources, such as the seller's press releases, or articles in specialist magazines. The collection and analysis were conducted between April 2012 – October 2012.

The second dataset is a combination of quantitative and qualitative information about the four industries. We collected for each industry data about price and number of copies allowed for a series of products (a music album, an eBook, a film, or a piece of software), in addition to a series of other information specific to each sector (for example, for the music sector, the number of tracks in the album). In some cases, we also gathered information about non-digital products (e.g. paper books) to allow comparison between the different formats. All the data were collected from online retailers or directly from the producer's web stores. In total, the database⁹ includes 23,540 observations, the majority of them on the music sector (17,292), followed by the film sector (3,169), the book sector (2,071) and finally the software sector (1,008).

These two datasets allowed us to obtain data on to what extent and under what forms the four UK copyright industries are offering private copying permission to their customers. They also facilitated a testing of whether a relationship exists between these copying possibilities and the product price.

5. Analysis of private copying in four industries

5.1. Music industry

The music industry was the first to introduce digital media, audio compression codecs, and portable

⁷ Other players in the market offer online streaming services, or subscription fee based services. In these cases, digital content is not transferred to users, but it is delivered online or licensed to the users until they subscribe to the service. For this reason, these kinds of service have not been included in the analysis.

⁸ Sellers' Terms and Conditions are subject to changes over time. A snapshot of the webpages including relevant information about copying conditions has been taken, and could be made available upon request.

⁹ This is a subsample of the data collected for the IPO project, which includes only digital files or media relevant to the analysis carried out in this paper.

digital music players. It was also one of the first to face the onslaught of online P2P file sharing. At the end of the 1990s, when P2P networks such as Napster made their threatening presence, the only way to legally acquire a digital copy was to rip it from a purchased CD and converting it into MP3 (format shifting). This was then illegal in several countries, including the UK.

Pioneering legal online music

Besides some earlier unsuccessful attempts, the first company that effectively started to sell digital music files was Apple, through the iTunes Store. iTunes, which originally began as a software-based application that enabled the downloading and management of music files into Apple's iPods, became an online store of digital music in 2003. Since then, it has progressed to offering a wide range of products (music, films, TV shows, and eBooks).

Following iTunes, many competitors entered the market to sell digital music on the Internet. Some of them were already established online stores, such as Amazon.com, some others were high street stores, such as HMV (UK), and others included new startups, such as 7Digital. At the time of the analysis, we found twenty-one online stores selling digital music in the UK. We also found four additional stores owned by mobile phone operators; however, their services were restricted to their mobile service subscribers. For these reasons we have excluded them from the analysis.

The reviewed stores have different characteristics. For instance, some of them are purely online stores, while others are traditional high street stores that use online channels as well. These twenty-one online stores also differ quite significantly in the type of music they sell. While the majority of them are generalists, some of them specialise in certain music genres or sell music only produced by small, independent music labels.

The music formats also differ even though the most frequently adopted is MP3 since the majority of audio hardware and software are still backward compatible with it. Some stores only sell digital products with others selling physical products (e.g. vinyl discs, and CDs) alongside the digital versions. Finally, there are different ways in which these files are made available, which include file downloads, cloud services or use of dedicated - and often proprietary - software, as in the case of iTunes.

Private copying permission

All music sold by the iTunes Store was initially protected by a DRM called Fairplay. A DRM is a technology that can limit the use of a digital product by prohibiting some kinds of uses, such as making digital copies, or limiting the number of copies. In particular, Apple's Fairplay allowed up to five (originally three) computers or portable devices on which copies could be played. Apple allowed five copies for private use (but not for sharing).

However, iTunes' DRM engendered much discontent among its user communities particularly

because iTunes' DRM-protected music was available from P2P networks. Furthermore Steve Jobs was opposed to DRMs, and had published an open letter entitled '*Thoughts on Music*' on Apple website inviting music labels to allow iTunes to sell music without any DRMs. As a consequence, Apple gradually abandoned DRM, first, by selling DRM-free songs for a premium price and eventually completely removing protected music from their catalogue in 2009.

Despite the variability between the 21 reviewed stores selling digital music, their Terms of Sales look very similar. We scrutinized the Terms of Sales to find out the conditions for private copying permission. All the stores adopt a pay-per-track model, which allows users to buy a single song or an entire album (with some discount for an entire album). In addition, songs are largely DRM-free with the exception of one store, which sells DRM music in a limited portion of its catalogue.

Regarding the copying permissions as identified in the Terms of Sales, our research found that while stores disallow any kind of file transfer or file sharing, they however grant permission to users to make copies for their private use. Out of the 21 online stores, 19 of them allow private copying, while two of them do not provide any information on this matter. Out of these 19, eight stores do not explicitly state private copying conditions, yet they are implied in their Support site and Frequently Asked Questions pages. Here these stores advise customers on how they can transfer the purchased music into portable devices and how it may be copied into a CD.

Remarkably, all the stores do not limit the number of copies allowed, instead, they only restrict the copies to private use. This, in effect, implies that the number of copies could be potentially unlimited. Equally interesting, format shifting is explicitly allowed. All the stores allow users to copy their music into portable devices (e.g. MP3 players), plus over 70 per cent of the stores also specifically allow users to burn the digital songs into a CD.

In addition to these arrangements, music stores have recently implemented other forms of private copying, as exemplified by Amazon AutoRip. This is a service launched in January 2013 that offers a complimentary MP3 copy of the CDs or vinyl discs purchased through Amazon (among a list of eligible albums), which is instantaneously made available through a cloud service. This service is particularly interesting since it does not only apply to newly purchased discs, but includes all eligible albums that have been acquired since 1998.

Relationship between copy permission and product price

We also tried to find a relationship between private copy permissions and product price based on the quantitative data we collected. Our dataset includes 17,272 albums in CD and digital formats¹⁰. First

¹⁰ We obtained this data by downloading the list of the bestselling albums and artists in the UK in the period 2000-2010, and then searching for these albums and for all the albums made by these artists in four UK online music stores (7Digital, Amazon, HMV and iTunes Store). For each album we identified several characteristics

of all, we compared the price of CD albums with the price of digital ones (see Table 1). While users can make copies of their digital music, they are not allowed to make a copy of the CD albums they purchase, or to transfer them into a portable device. However, here we found that the prohibition to copy CDs or shift format is not reflected in the CD price as one would expect, given that CDs are embedded in a physical medium, which are likely to cost more than a pure intangible digital copy. However, when we considered the average price per track, we found no significant differences between CDs and digital music. This is notable as it implies that digital music stores do not charge for additional copies. This observation is also supported by the absence of a price hike by the iTunes store after it abandoned DRM, and other offers, such as from Amazon AutoRip.

Table 1. Average price and average price per track between CDs and digital albums

	Average price	Average price per track
Audio CD	£7.88	£0.58
Digital Music (MP3)	£6.22	£0.59
Significantly different (t-test prob.)	Yes (0.00)	No (0.221)

To further test above result, we conducted regression analysis, using the album price as the dependent variable and the number of copies plus other controls as explanatory variables. However, despite the size of our dataset, the analysis produced indeterminate results (for more information, see (Camerani et al., 2013)). The problem arises from the lack of variability in the number of allowed copies among our observations, since all the four retailers considered (as well as all the other stores operating in the UK, as noted above) allow unlimited number of copies for personal use.

To summarise, online music stores have increasingly adopted new business models as a means to deal with illegal music file sharing. Implementation of a private copying permission, however, distinctly differs from the previous models, as discussed above. Among some of these prior models is the adoption of DRM. Our analysis, however, suggests that the earlier adoption of DRMs has been ineffective in countering the onslaught of illegal file sharing; instead, companies have learnt that one way to beat this illicit activity at its own game is to permit private copies.

However, the lack of variability in our data regarding the number of allowed copies for private use has limited the use of regression analysis techniques we could have otherwise performed to further test the relationship between price and number of allowed copies. Notwithstanding these limitations, we believe the results presented above do not suggest that online stores are charging consumers for digital copies.

including price, type of file, number of tracks (and discs when appropriate), types of devices on which it could be copied and the number of allowed copies.

5.2. The Book industry

Although the first attempts to digitize books date back to the beginning of the 1970s¹¹, digital books (or electronic books, eBooks) started to diffuse during the mid 2000s, thanks to the development of dedicated compact and portable devices such as the eBook readers (Gibson and Gibb, 2011). The first eBook reader was launched by Sony in 2004, after which, many other companies entered in this market, a preeminent one being Amazon's Kindle in 2007. Since the beginning of the 2010s other kinds of portable devices have been introduced, such as tablets and they too can be used as an e-book reader.

Our research found 19 online stores selling eBooks in the UK; the majority of which also sell print copies. The eBook market is extremely fragmented in terms of digital formats, DRM technologies and kinds of compatible devices. Some of the main eBook stores in the UK are Amazon, Apple's iTunes iBookstore, and Google Play store.

There are three widely used e-Book formats: PDF, ePub (electronic Publication, which is a free and open standard), and Kindle's formats¹². Some stores adopt only one of these standards while others opt for a multi-format strategy. For instance, Amazon only sells eBooks in the Kindle format, nine stores only sell ePub eBooks, and the remaining nine stores sell eBooks in multiple formats. The choice of one or more formats is will be of particular concern to final users since these formats are often compatible only with certain eBook readers¹³.

Private copying permission

With regard to copying possibilities, the online eBook market is similar to online music retailing. It offers a range of private copying. However, unlike the online music stores that give total freedom for copying for private use to their customers, the eBook stores impose a number of restrictions for copying through the implementation of DRM technologies. All the stores reviewed sell DRM protected eBooks, with the only exception of one, which is a small store (around a 1,000 titles offered) specialising in science fiction and fantasy eBooks.

The eBooks copying permission depends on two factors. The first is in how many kinds of devices to which the eBooks could be copied. The second is the total number of copies allowed. Regarding the first factor, we found that there are four kinds of devices in which the eBooks store allow users to read their eBooks: eBook readers, tablets, smartphones, and Personal Computers (PC or MAC). In particular, we found that around 80% of the stores explicitly allow users to copy their eBooks into all these four kinds of devices, while the rest only allow copying on a more limited range of compatible

¹¹ One of the first initiatives in this sense was 'Project Gutenberg' that started in 1971.

¹² Kindle devices are compatible with Mobipocket and KF8 formats.

¹³ As with MP3 for music players, in general most of the eBook readers are compatible with unprotected PDF files, however, not all DRM protected PDFs are compatible with all reading devices.

devices. In some cases (the Kindle by Amazon, Sony Reader by the Sony Reader store, Kobo eReader by Kobo, and iOS tablets and smartphones by Apple’s iBookstore) the store also owns a proprietary eBook reading device, and therefore does not make their eBooks compatible with other readers.

The second factor is regard to the number of copies allowed and this is controlled by the use of DRMs. Here, the online stores analysed do not apply a common DRM. The three most used DRMs are the Kindle DRM, which is associated with the Kindle format; Fairplay, which is the DRM used by iTunes and the Adobe DRM, which is embedded in the majority of ePub and PDF books. The choice of a DRM determines the permitted number of default copies. For instance, Kindle and Adobe DRMs allow six copies, while Fairplay permits five copies.

This default number of copies is a preselected option established by the DRM manufacturer, which, at least in principle, could be altered by the book publisher, which may specify a different number of copies. This means that the exact number of copies could potentially differ from book to book. In addition to this, these DRMs do not just limit the number of copies and the kinds of devices in which the eBook could be read but could virtually regulate many other aspects of its use. For instance, a DRM could limit the possibility of copying a portion of the text, or prohibit printing of the book, or imposing a maximum number of pages that could be printed in a certain period of time. These additional copying limitations are technically feasible and are offered by the DRM producers (e.g. Adobe DRM). However, our analysis of each store's terms and conditions has found that these copying limitations do not seem to be widely adopted by the online stores.

Relationship between copying permission and the product price

As with the music sector, we tested the hypothesis for a positive relationship between price and the number of allowed copies. The book database includes 2,071 observations, including 534 books, and 1,537 eBooks¹⁴. For each observation we collected a series of variables concerning: price, format (e.g. hardcover or paperback, ePub, Kindle, and PDF for eBooks), DRM (Kindle DRM, Fairplay, Adobe, DRM), number of compatible devices and the number of copies allowed (the default number of copies allowed by each kind of format).

Table 2. Average price by format (books vs eBooks)

	Average price
Book	£12.90
eBook	£6.43
Significantly different (t-test prob.)	Yes (0.00)

In our attempt to test the relationship between the number of private copies and price through

¹⁴ We collected the data, first by obtaining a list of the UK bestselling books for the period 1998-2011, and then looked for these books from five online stores: Amazon (the only store in our sample selling both books and eBooks), GooglePlay, iTunes, Kobo and Waterstones.

regression analysis, we faced the same problem we encountered in the music sector – the scarce variability in our explanatory variable. eBook stores adopt different DRMs, which come with different number of allowed copies (five for ePub-FairPlay eBooks, and six for Kindle and ePub-Adobe eBooks). However, these differences are too small to result in significant regression coefficients. For this reason as also found in the case of music, the analysis yielded indeterminate results. Therefore, we performed a series of tests to assess the differences in the average price according to different formats (Table 2) and different copying privileges (Table 3).

Table 3. Average price by copy privilege (5-copies vs 6 copies) – only eBooks

	Average price
5 copies (and 2-devices)	£6.33
6-copies (and 4-devices)	£6.46
Significantly different (t-test prob.)	No (0.47)

Table 2 reflects a significant price difference between book and eBooks, which is not surprising with the higher cost and distribution of books. However with closer inspection of Table 3, there is in effect no significant difference in the average price between eBooks that can be copied five times on two devices and those that can be copied six times on a maximum of four devices. These results do not, therefore, indicate a positive relationship between price and private copies.

5.3. Film industry

The large-scale commercialization of digitized films began at the end of the 1990s when a storage medium capable of accommodating an entire digital film was introduced – the DVD, to be followed by Blu-ray discs. Similar to the music industry, all these formats have fallen victim to illegal file sharing¹⁵. Digital films require much more storage space than music or books. It is for the same reason that video compression plays an even more crucial role in this industry. Since the 1990s, many video compression algorithms have been developed, which have facilitated the easy transfer via the Internet of films copied from these digital media. The diffusion of increasingly faster broadband connections further fostered this process and P2P networks were able to transfer films and TV shows.

Accompanying this facility was the development and commercialisation of many new portable devices, such as portable media players, smartphones, tablets, and ultra-portable laptops, all able to play digital films.

In brief, despite some differences in the technical characteristics and in their timing of development, the recent history of the film industry regarding digitization and the use of file sharing in this industry is not too distant from the one experienced by the music industry. However, these two industries differ

¹⁵ Almost all commercially produced DVDs embedded a DRM that prevented any copying of its content, and imposed other restriction (such as regional codes). However, this protection was eventually broken and so illegal copies of DVD contents became available online and distributed through P2P networks. Furthermore, DVD players that could play multiple regional codes became also available on the market.

in the way they approach private copying.

Private copying permission

In the case of films, we found that copying permissions are more elaborate than in the other industries, which apply to a mix of physical and digital copies. For this reason the market overview we conducted involved the analysis of the sales conditions of different actors, including stores selling digital films, other stores selling films in traditional formats (e.g. DVD and Blu-Ray), and major movie producers.

In particular, we found that private copying in this industry is implemented in four ways. The first kind of copying permission is the one applied to digital films. Despite the feasibility of online sales and downloads of films, we found only two online stores selling digital films in the UK¹⁶: iTunes Store and Blinkbox (now owned by Tesco). However, at the time of the analysis, the latter still had a very limited catalogue of films that could be purchased. The films purchased from these stores come with five allowed copies and with the possibility to copy them onto several kinds of devices (such as personal computer, tablet, smartphone). In particular, these copying permissions are enforced and regulated by the use of DRMs.

The second kind copying permission is found in a combination of physical and digital formats, and it is enabled by the offer of a digital downloadable copy in combination with the purchase of a film in a traditional medium. We analysed the terms of sales of some of the major worldwide film producers, and found that a digital copy is most often made available by including a unique code in a DVD or Blu-Ray Disc package. Users can redeem this code using a web service and download a digital copy of the film they purchase. These copies are not downloaded from a single source since different film publishers opt for different systems (or have outsourced this service to another provider – in some cases, the iTunes Store). The download of these digital films can therefore be considered as an additional copy itself. However, as reported in terms of sales of film producers, very often these digital versions can, in turn, be copied a number of times and into different kinds of devices.

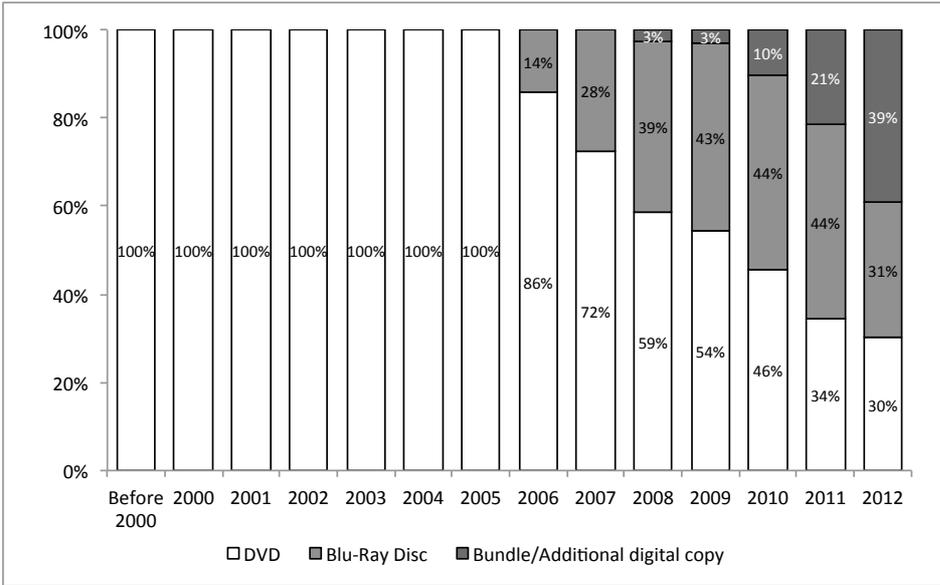
The third type of copying permission involves the sale of bundles of products. In general, films embedded in traditional physical media are sold with a license that does not allow any duplication of the film, the transformation into another format or the copying to other kinds of device. However, the industry has found a way to allow for more copies by including two or more copies of the physical media in the same package (e.g. DVD, Blu-Ray Disc, Blu-Ray 3D). Therefore, each disc included in the bundle can be considered as an additional copy for the users.

The additional digital download and the product bundles are often combined with each other. In some

¹⁶ Similar to music, digital downloads of movies are possible via streaming services and online film rentals. Movies streaming allows users to watch a film online, while online rentals expire after a certain period. Users, therefore, are unable to retain a permanent copy and in principle to make a duplicate of it. For this reason, we have excluded these services from the analysis.

cases the films are sold in bundles containing one or more physical media and the possibility of downloading a digital copy. The industry is increasingly making use of these kinds of deals. According to our data, 8.1% of the films in the sample included a digital copy or more than one physical media. However, if we consider the year of release of the film, we find that the relevance of these bundles, compared to other traditional formats, is steadily increasing, and that in 2012 these bundles have been the most frequent kind of offering in our sample, as indicated by Figure 1.

Figure 1. Type of format sold by year of release



Based on 2,312 films for which we found the release year and excluding pure digital films.

The fourth type of copy permission involves the use of new hybrid licensing systems, such as UltraViolet (UV). This is a very inclusive licensing system that allows users to obtain a digital copy of the films they purchase through streaming and/or downloading to virtually all the devices they own, and to share these copying permissions with other people in their household. This licensing system is particularly sophisticated and comprehensive, especially considering that it extends the copying permissions to other household’s members, and does not limit it to the purchaser. The use of these forms of licensing is still limited (less than 1% in our sample), but it represents a very innovative opportunity for all content industries.

Relationship between private copying and the product price

Statistical analysis supports the hypothesis that giving more and differentiated copies have a positive influence on price. The film database contains 3,169 observations¹⁷, and includes a series of variables, such as: release date, number of films included in the package (some products include multiple films,

¹⁷ We selected the top 500 films by box office movies from the Internet Movies Database (www.imdb.com), and searched for these films in three online stores: Amazon, iTunes, and Tesco.

e.g. a movie trilogy), format (DVD, Blu-Ray Disc, downloadable digital films, and bundles), bundle details (for each bundle, we have details about what kinds of additional copies are offered among: DVD, Blu-Ray Disc, Blu-Ray 3D, additional digital copy downloadable, UltraViolet copy), price, and number of copies allowed¹⁸.

We performed regression analysis on these data to estimate the effect of copying permissions (explanatory variables) on product price (dependent variable). In particular, we estimated two models (see Table 4). The first model used as an explanatory variable the number of copies allowed and controls for the number of films in the package and medium of the films (using a dummy variable "digital film"). We found that digital films are, *ceteris paribus*, less expensive than films sold in physical media. More significantly, we found that the coefficient of the number of copies allowed is positive and highly significant, indicating that each additional copy is associated with an increase in product price.

The second model we employed to test the effect of copy permissions on the price. This involved using five dummy variables, one for each kind of additional copy that could be made available to users (DVD, Blu-Ray, Blu-Ray 3D, Digital copy, UltraViolet).

Table 4. Film sector regression analysis – Dependent variable: price

	Model (1)		Model (2)	
	Coefficient	Std. Err.	Coefficient	Std. Err.
Number of copies allowed	3.643***	.410		
Bundle - DVD			-1.676	1.185
Bundle - Blu-Ray			3.609***	1.373
Bundle - Blu-Ray 3D			5.602***	1.684
Bundle - Digital copy			3.576**	1.404
Bundle - UltraViolet digital copy			3.828*	2.237
Number of films in the package	4.346***	.137	4.342***	.137
Digital film	-16.613***	1.678	-2.024***	.570
Constant	1.847***	.569	5.476***	.306
R2	.263		.267	
F-test sig.	.000		.000	

* significant at 0.1 level; ** significant at 0.05 level; *** significant at 0.01 level

With the exception of DVDs, all these dummy variables have a positive and statistically significant coefficient, which means that there is a price increase by adding each of these types of additional copies to the bundle. Also in this case we controlled for the number of films and pure digital products. The result is still significant and with the expected sign. We therefore conclude that there is a positive

¹⁸ This variables is different according to the format of the product considered: for Blu-ray discs and DVDs the number of copies allowed is one; for digital films is five. In the case of bundles, the number of copies is equal to the number of items included in the bundle; for instance, if the bundle contains a Blu-Ray and a digital copy, the number of allowed copies is two. If the bundle contains a DVD, a Blu-Ray disc, and a Blu-Ray 3D, the number of allowed copies is four, and so on.

relationship between the number of copies (be they digital, physical or both) allowed in a purchased film and its price. This suggests that private copying may represent a potentially relevant source of income for film stores and producers.

5.4. Software industry

The software sector is inherently digital and different from the other three industries analysed here. The software industry has been traditionally subject to piracy (Jenner, 2011). We will use this industry as a benchmark for the other industries mainly because software is primarily sold directly by their producers, while digital music films and books are mostly sold by retailers. For this reason we collected the data, which was mainly from the producers' website.

Private copying permission

Software purchasers are explicitly asked for the number of additional private copies they require. Private copying permission here is more extensive than the other three industries studied above. For instance, purchased software can be installed not only on the computer of the purchaser, but also on other computers within the household. In addition, similar arrangement can also apply to small private businesses (e.g. family owned firms), or even large enterprises.

A notable aspect of the software sector is that private copying is directly embedded in the pricing systems. These characteristics make the software sector an interesting case to test our hypothesis of a positive relationship between price and number of copies. Our database involved observations on products in the most common software categories for private users. We collected 1,008 observations, mainly from producers' websites and two from web stores (Amazon and Apple store). For each observation we gathered: software name; publisher; type of product; type of version (full or upgrade); delivery method (direct download, direct download plus backup disc, or physical disc); price; and number of copies.

Using these variables we estimated a first model where price (expressed in natural logarithm) is the dependent variable and number of copies the independent variable, plus some dummies to control for product characteristics. Then we also estimated a second model with the same variables as the first one, but here we added the squared number of copies to check if there is a decreasing or increasing marginal effect of the number of copies on price. The results are reported in Table 5.

Table 5. Software sector regression analysis – Dependent variable: Natural Log of price

	Model (1)		Model (2)	
	Coefficient	Std. Err.	Coefficient	Std. Err.
Number of copies	.010***	.001	.032***	.002
Number of copies squared			-.00005***	.000
Physical disc	-.100	.080	-.062	.074
Download + Backup disc	-.061	.156	-.023	.146
Retailer	-.472***	.098	-.443***	.082
Upgrade	-.566***	.081	-.551***	.075
Type - Productivity	-.128	.147	-.130	.138
Type - Utilities	-1.325***	.142	-1.426***	.133
Type - Design & Publishing	.935***	.138	.945***	.129
Type - Photography	.190	.171	.191	.158
Type - Others	.384*	.225	.347	.209
Constant	5.442***	.142	5.372***	.132
R2	.544		.606	
F-test sig.	.000		.000	

* significant at 0.1 level; ** significant at 0.05 level; *** significant at 0.01 level

Looking at model 1, the coefficient of number of copies is significant and positive, providing some support to the hypothesis of a significant and positive impact of the number of copies on price. In addition, upgrade versions are cheaper than full version of software, the delivery method does not seem to affect the price (coefficients not significant), while software purchased from a store is, on average, cheaper than those directly bought from the producers' websites.

Model 2 shows that the coefficient of number of copies is also significant and positive. Here the coefficients of the squared number of copies is significant but with a negative sign. This indicates that the effect of the number of copies on price is positive, but decreasing. In other words, producers charge users for additional copies but this increment in price is less evident as the number of copies increases. Considering the two models together, the analysis confirms that software producers do charge for additional copies but the price decreases with the increase in the number of copies. This is a distinctly different relationship between permitted private copies and price from the three industries analysed above.

6. Discussion

Laws and regulations on private copying exception are still not implemented worldwide and the effects of illegal downloading continue to exercise the interests of scholars and policymakers. We believe that our analysis can go some way to assuaging these concerns with evidence of the common practice of private copying permission in the four industries we analysed. Table 6 summarises the different forms.

Table 6. Different approaches to copy permissions

	Music	Books	Films	Software
Main approach to private copying	Completely open	Technology/DRM	Product bundles	Fully licensed
Number of copies	Unlimited	Limited		
Copying recipients	Private use			Private, household, enterprise use
Who decides the number of copies	User	Store/publisher		User (at a price)
Impact on product price	Not determined		Positive	Positive with quadratic effect

The music industry is the most open to private copying (no limitations established) while it is highly specified in software products. Books and films lie somewhere in the middle with the former relying on DRMs to regulate private copies and the latter offering additional copies mainly through product bundling. Regarding the copies for music, books and films, they are strictly limited to private and personal use (with the only exception of UltraViolet for films, which allows some forms of household sharing). On the contrary, software can be copied by members of the household or work colleagues, if expressly permitted by the license. Another difference between these industries is who decides the number of copies. For music the users can decide on the number of copies they wish to have. In software, users can decide on the number of additional copies, but they are charged for them. Conversely, in the case of books and films, the online store and the publisher have controlling power over the number of copies allowed.

There are also differences in the relationship between permitted copies and product prices. We found a positive relationship between the permitted additional copies and product price for film and software (with a quadratic effect in this latter case). We could not find evidence of a positive relationship for music and books because of the lack of variability, as explained above.

Such a differentiation of private copying permissions arguably depends upon the inherent technical characteristics of the product. Still, other factors can help to explain the differences, such as time. If we exclude software which has been traditionally subject to piracy, music is the first industry to offer digitised products and which also became the first “victim” of illegal P2P file sharing. Furthermore it is also the first to launch online services for the sale of digital files, to experiment the use (and then the abandonment) of DRMs, and importantly to implement some forms of copying permissions. It took the music industry several years to develop and implement this business model while this adoption accelerated with film and publishing. Despite evident technical differences, the film and publishing industries went through a similar process as that of the music industry. The different ways in which they have approached private copying suggest that these industries have somewhat learned from the experience of the music industry but have implemented different models for it.

However, the main question that arises from this variegated ensemble of copying permissions is: why

is it occurring? In the absence of a national or supranational legislation obliging content industries to implement it, private copying is somehow counterintuitive for a business model, especially in industries that the economic literature has portrayed to have been significantly harmed by file sharing, and who are also firmly opposed to any form of copying. Furthermore, while the benefits of private copying for consumer welfare are apparent, the advantages for the supply side are much less clear.

There are two plausible explanations for this apparent paradox. The first is that private copying could generate a source of additional revenues. In some cases, we have demonstrated that copyright owners are able to charge a higher price for additional copies (software and films). However, in the cases in which we did not find this direct relationship between price and copies, private copying could be seen as a form of indirect appropriability. Briefly, indirect appropriability suggests that the control over the number of copies by copyright owners could provide them with a possibility to exploit the users' potentially higher propensity to pay a higher price for products that can be copied, with the effect of indirectly recovering some revenues from copying (Bakos et al., 1999; Besen and Kirby, 1989; Liebowitz, 1985). With the exception of music, copyright owners are able to control the number of copies in different ways (e.g. DRMs, bundles, etc.). This leads to a win-win situation in which users can legally copy and sellers are able to charge a price for copying.

The second explanation is that private copying could be a mechanism against piracy. Our analysis has shown the four copyright industries have gone beyond just allowing users to make a certain number of copies for private use. Instead, private copying is now part of the selling conditions by which these copyright products are sold and distributed through the Internet. In all these cases, private copying is an integral component of the Terms of Sale for digital products. These copying permissions, which suggest a new business model, enable firms to differentiate their own products, segment their customers and arguably incentivise users to buy legitimate products.

7. Conclusions and policy implications

This paper has investigated the private copying permissions of digital products in four industries in the UK using a mixed-method of analysis and two original sets of data. The main result is that all these industries have implemented different forms of private copying as part of their new business model. We suggest that the main reasons for their implementation lie in: (1) the difficulty they are encountering from digital advances in replication and distribution, so "if you can't beat them, why not join them"; (2) a recognition that allowing private copies could provide a direct or indirect source of revenue and so to recapture the revenues lost to illegal copies; and (3) may be used as a deterrent to proliferating illegal downloads by granting users the right to make private copies. Furthermore, it is worth noting that these new models of business to try and deal with the scourge of rampant copying (via P2P technologies) have been introduced with little intervention from legislators, particularly as copyright producers are known to champion for stricter legislative measures against this activity.

This paper has also demonstrated that private copying is more than a copyright issue. Its introduction indicates a new paradigm for the sale, distribution and consumption of digital products. As laws and regulations scramble to keep up with digital piracy, the implementation of private copying permissions commend that copyright industries have begun to keep abreast of technological advances after several years of indecision in which technological advantages such as digitisation, compression, and Internet distribution were treated as exogenous factors.

This paper advances two original contributions to the literature focusing on the relationship between file sharing and copyrighted digital products. Firstly it provides a comparison across industries whereas most of the literature solely concentrates on a single sector, most frequently music or audiovisual. Secondly, despite its widespread use, private copying has received very little attention from the economics and management literature on copyright industries, which has not differentiated between legitimate copying permission and illegal file sharing. This paper sheds light on how private copying is implemented in copyright industries and its potential role in tackling illegal downloads.

We conclude with a note on the UK Government's intended implementation of a private copying exception. This Exception is part of a set of intended measures to reform the UK Intellectual Property framework, evidence and consultation for which have been collected under the Hargreaves Review. After two years of evidence gathering for this law to be rolled out in June 2014, the proposal is now to be further deliberated by the House of Lords who is concerned with the inadequate consideration of reimbursement to the creators from private copying. However these senior lawmakers may want to consider that (1) even without implementing private copying exception, private copying (via illegal downloading) is taking place; (2) levies as a means of compensating content creators have apparently not deterred illegal downloading and, instead, could be argued to have initially helped to engender prolific digital content marauding; and (3) copyright industries are already sanctioning private copying¹⁹ and in the case of the music industry, with little impact on price. Finally, while there may be a justification for a continued imposition of levies, legislators may want to revisit the justification for it. To impose levies for the purpose of private copying may now be harder to rationalise since private copying is already regulated (in some countries) and more importantly, included in the terms of sales that consumers have to abide by when they make a purchase of music, films, ebooks and software. These industries, with perhaps the exception of ebooks, have been serious victims of flagrant illegal downloading.

¹⁹ For a recent robust debate on the House of Lord's committee to deliberate on the private copying exception, see <http://ipkitten.blogspot.co.uk/2014/05/two-copyright-exceptions-missing-did.html?m=1>

References

- Albinsson, S., 2013. The Resilience of Music Copyrights: Technological Innovation, Copyright Disputes and Legal. *Culture Unbound* 5, 401–424.
- Andersen, B., Frenz, M., 2008. The impact of music downloads and P2P file-sharing on the purchase of music in Canada.
- Bakos, J.Y., Lichtman, G., Brynjolfsson, E., 1999. Shared information goods. *Journal of Law and Economics* 42, 117–56.
- Besen, S.M., 1986. Private copying, reproduction costs, and the supply of intellectual property. *Information Economics and Policy* 2, 5–22.
- Besen, S.M., Kirby, S.N., 1989. Private copying, appropriability, and optimal copying royalties. *Journal of Law and Economics* 32, 255–80.
- Bhattacharjee, S., Ram, D.G., Lertwachara, K., Marsden, J.R., Telang, R., 2007. The Effect of Digital Sharing Technologies on Music Markets: A Survival Analysis of Albums on Ranking Charts. *Management Science* 53, 1359–74.
- Bustinza, O.F., Vendrell-Herrero, F., Parry, G., Myrthianos, V., 2013. Music business models and piracy. *Industrial Management & Data Systems* 113, 4–22.
- Camerani, R., Grassano, N., Chavarro, D., Tang, P., 2013. Private Copying. An independent report commissioned by the Intellectual Property Office. IPO, UK.
- Chellappa, R.K., Shivendu, S., 2005. Managing piracy: Pricing and sampling strategies for digital experience goods in vertically segmented markets. *Information Systems Research* 16, 400–417.
- Cho, W.-Y., Ahn, B.-H., 2010. Versioning of information goods under the threat of piracy. *Information Economics and Policy* 22, 332–40.
- Choi, D.Y., Perez, A., 2007. Online piracy, innovation, and legitimate business models. *Technovation* 27, 168–178.
- Conner, K.R., Rumelt, R.P., 1991. Software piracy: an analysis of protection strategies. *Management Science* 37, 125–139.
- Davies, G., 1983. The private copying of sound and audio-visual recordings. A study requested by the commission of the European Communities.
- Dufft, N., Bohn, P., Stiehler, A., Wichmann, T., 2006. Digital Video Usage and DRM. Results from a European Consumer Survey. A Report prepared for the INDICARE project.
- Elberse, A., 2010. Bye-Bye Bundles: The Unbundling of Music in Digital Channels. *Journal of Marketing* 74, 107–123.
- Envisional, 2011. Technical report: An Estimate of Infringing Use of the Internet. Cambridge, UK.
- Gayer, A., Shy, O., 2003. Internet and peer-to-peer distributions in markets for digital products. *Economics Letters* 81, 197–203.
- Gibson, C., Gibb, F., 2011. An evaluation of second-generation ebook readers. *Electronic Library*, The 29, 303–319.
- Gopal, R.D., Bhattacharjee, S., Sanders, G.L., 2006. Do Artists Benefit from Online Music Sharing? *Journal of Business* 79, 1503–1533.
- Graham, G., Burnes, B., Lewis, G.J., Langer, J., 2004. The transformation of the music industry supply chain: A major label perspective. *International Journal of Operations & Production Management* 24, 1087–1103.
- Grodzinsky, F.S., Bottis, M.C., 2007. Private use as fair use: is it fair? *ACM SIGCAS Computers and Society* 37, 11–24.
- Hargreaves, I., 2011. Digital Opportunity: A Review of Intellectual Property and Growth. IPO, UK.
- Helberger, N., Hugenholtz, P.B., 2007. No place like home for making a copy: private copying in European copyright law and consumer law. *Berkeley Technology Law Journal* 22, 2012–35.
- HM Government, 2011. Consultation on copyright. Available at <http://www.ipo.gov.uk/consult-2011-copyright.pdf>.
- Hong, S.H., 2004. The Effect of Napster on Recorded Music Sales: Evidence from the Consumer Expenditure Survey.
- Hui, K.-L., Png, I., 2003. Piracy and the legitimate demand for recorded music. *Contributions in Economic Analysis & Policy* 2.

- IPO, 2010. Ian Hargreaves to lead independent review into IP and growth. IPO, UK
- IPO, 2012. Copyright Exception for Private Copying. IPO, UK
- Jenner, P., 2011. Copyright in the Digital Age; Benefiting Users and Creators? (SSRN Scholarly Paper No. ID 2024579). Social Science Research Network, Rochester, NY.
- Kinokuni, H., 2003. Copy-protection policies and profitability. *Information Economics and Policy* 15, 521–536.
- Kretschmer, M., 2011. Private Copying and Fair Compensation: An empirical study of copyright levies in Europe. IPO, UK.
- Lessig, L., 1999. Code and other laws of cyberspace. Basic books.
- Liebowitz, S.J., 1985. Copying and Indirect Appropriability: Photocopying of Journals. *Journal of Political Economy* 93, 945–57.
- Liebowitz, S.J., 2006. File sharing: creative destruction or just plain destruction? *Journal of Law and Economics* 49, 1–28.
- Liebowitz, S.J., 2008. Testing File Sharing's Impact on Music Album Sales in Cities. *Management Science* 54, 852–859.
- Oberholzer-Gee, F., Strumpf, K., 2007. The Effect of File Sharing on Record Sales: An Empirical Analysis. *Journal of Political Economy* 115, 1–42.
- Oberholzer-Gee, F., Strumpf, K., 2010. File sharing and copyright, in: *Innovation Policy and the Economy*, Volume 10. University of Chicago Press, pp. 19–55.
- Peitz, M., Waelbroeck, P., 2004. The Effect of Internet Piracy on CD Sales: Cross-Section Evidence. CESifo Working Paper No. 1122.
- Peitz, M., Waelbroeck, P., 2006a. Piracy of digital products: A critical review of the theoretical literature. *Information Economics and Policy* 18, 449–76.
- Peitz, M., Waelbroeck, P., 2006b. Why the music industry may gain from free downloading - The role of sampling. *International Journal of Industrial Organization* 24, 907–13.
- Rob, R., 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, 29–62.
- Rob, R., Waldfogel, J., 2007. Piracy on the silver screen. *The Journal of Industrial Economics* 55, 379–395.
- Shy, O., Thisse, J.-F., 1999. A Strategic Approach to Software Protection*. *Journal of Economics & Management Strategy* 8, 163–190.
- Smith, M.D., Telang, R., 2010. Piracy or promotion? The impact of broadband Internet penetration on DVD sales. *Information Economics and Policy* 22, 289–298.
- Strumpf, K., Oberholzer-Gee, F., 2010. The Impact of File Sharing on Movies. Working Paper, Northwestern.
- Takeyama, L.N., 1994. The welfare implications of unauthorized reproduction of intellectual property in the presence of demand network externalities. *The journal of industrial economics* 155–166.
- Takeyama, L.N., 2003. Piracy, asymmetric information and product quality, in: Gordon, W.J., Watt, R. (Eds), *The Economics of Copyright: Developments in Research and Analysis*. Edward Elgar.
- Tanaka, T., 2004. Does file sharing reduce music CD sales? A case of Japan. IIR Working Paper WP#05-08.
- Tang, P., 2005. Digital copyright and the “new” controversy: Is the law moulding technology and innovation? *Research Policy* 34, 852–871.
- Tschmuck, P., 2010. The Economics of Music File Sharing—A Literature Overview. Vienna music business research days. Vienna: University of Music and Performing Arts. (June 9-10).
- Vaccaro, V.L., Cohn, D.Y., 2004. The evolution of business models and marketing strategies in the music industry. *International Journal on Media Management* 6, 46–58.
- Zentner, A., 2006. Measuring the effect of file sharing on music purchases. *Journal of Law and Economics* 49, 63–90.