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Poort, J.; Weda, J.

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Elvis Is Returning to the Building: Understanding a Decline in Unauthorized File Sharing

Joost Poort

Institute for Information Law, University of Amsterdam, the Netherlands

Jarst Weda

SEO Economic Research, Amsterdam, the Netherlands

A set of representative consumer surveys shows that in the Netherlands unauthorized file sharing of music has declined substantially between 2008 and 2012. It decreased slightly for games, but almost doubled for films and TV series. Overall, file sharing dropped from 38% to 27% of the population. The empirical evidence presented supports the hypothesis that adequate legal services for downloading and streaming music helped to reduce file sharing, whereas a lack of good digital audiovisual services made consumers turn to illegal alternatives.

There is ongoing debate in media and politics about the relationship between file sharing and the development of legal digital content services.¹ Proponents of antipiracy legislation and strong copyright enforcement claim that legal digital services, either paid-for or advertisement-sponsored free services, will never fully succeed as long as people engage in file sharing.² On the other hand, opponents and skeptics tend to argue that a lack of adequate legal digital services is an important cause of file sharing. They assert that bringing the legal offer up to

Joost Poort is an associate professor at the Institute for Information Law, University of Amsterdam, the Netherlands. Jarst Weda is a senior researcher at the Financial Markets & Finance section of SEO Economic Research, Amsterdam, the Netherlands.

Correspondence should be addressed to Joost Poort, Institute for Information Law, Korte Spinhuissteeg 3, 1012 CG, Amsterdam, the Netherlands. E-mail: poort@uva.nl

¹The term *file sharing* is used henceforth for the online exchange of copyright-protected material without the consent of the copyright holder, also referred to as “unauthorized file sharing,” “illegal file sharing,” and “online piracy”.

²Content industries traditionally point at file sharing in order to explain the decline in recorded media sales since the turn of the century (e.g., Motion Picture Association of America, 2011).

the mark is a more effective strategy to reduce file sharing than the legal pursuit of those who engage in it or facilitate it (e.g., Tassi, 2012).

Currently, there is a substantial difference between the availability (and uptake) of online services for music and for audiovisual content in the Netherlands as well as most other Western countries. Legal services to download music, such as iTunes, have been around since the beginning of the century. Streaming music services, such as Spotify, Google Play, and Deezer, are relatively younger. They offer an easy to use celestial jukebox at a flat monthly rate of typically € 5~10. Apart from such major brands that cater for mainstream consumers, there are also niche players for specific genres (e.g., Beatport for the electronic music genre). Although territorial fragmentation of copyright and neighboring rights makes it costly and complicated to roll out pan-European—let alone global—music services, several firms have succeeded in doing so. There is general consensus that there are various digital music services that meet the critical consumer requirements: complete and up-to-date title/album catalogues, user-friendly file types and software (lack of restrictive Digital Rights Management, or DRM), and affordably priced, in some cases even free of charge (i.e., “freemium” ad-sponsored services such as Spotify Free, MOG FreePlay, and Rdio Free). In other words, digital music offerings appear to have reached a phase of maturity. In the Netherlands, this was marked in 2013 by a first year of turnover growth for the music industry since 12 years (+1.1%), thanks to a 113.5% growth for digital streaming. Turnover from physical album sales declined by 19.2% and even digital downloads declined by 5.5% (Nederlandse Vereniging van Producenten en Importeurs van beeld-en geluidsdragers [NVPI], 2014).

Meanwhile, the market for audiovisual services is still in decline. Despite a 22.9% growth for online video services, the market reported a 10.9% overall decline in 2013. The perception is that the legal supply of audiovisual content lags behind the music industry. The industry’s strategy of deliberately postponing digital availability of films and series by sequential distribution windows, which often results in titles being digitally available from illegal sources way ahead of legal services, as well as the trouble of clearing rights, are important determinants of a fragmented, incomplete, and dated supply of digital titles (Bangma, 2011; Engelfriet, 2009). However, this may change when online video services are rolled out that meet the demands of consumers in terms of repertoire, timeliness, quality, and price. Netflix has proven an enormous success in the United States, and the experiences since it set foot in the Netherlands in September 2013 have been promising (Postma, 2014), despite its catalogue that has been limited thus far (De Volkskrant, 2013). There is clearly a high demand for digital video services. In 2012, 80% of consumer spending on video rental in the Netherlands concerned digital formats (International Video Federation, 2013, p. 74) and the only segment of the audiovisual market that grew in 2013 was that of digital video-on-demand services.

This article investigates the development of file sharing in the Netherlands between 2008 and 2012 and its relationship with the perceived supply and adequacy of legal sources for content. To this end, three representative consumer surveys have been conducted, which enables a comparison of the development of file sharing over the past few years between music, audiovisual content (films and series), games, and books. Also, a comparison is made between four distribution channels: (1) purchasing physical formats in an offline or online store, (2) paid-for downloading or streaming from a legal source, (3) free or add-sponsored downloading or streaming from a legal source, and (4) downloading or streaming from an illegal source. Building on these surveys, the following questions are addressed:

1. How have file sharing and legal media consumption developed over time, at an individual level and within the general population?
2. How do these developments differ between content types?
3. What is the link between these developments and the perceived adequacy of legal services?

The rest of this article is structured as follows: First, a brief overview is given of the literature on the interaction between file sharing and legal media consumption and on various strategies to reduce file sharing. Then, the surveys used for data collection are described, followed by an analysis of the results of these surveys with respect to the research questions, and a conclusion.

LITERATURE

The effect of file sharing on legal media sales has been studied extensively over the past 10 years, albeit to no general consensus. In theory, file sharing can have opposing effects on legal sales and the sales of related products and services. Van Eijk, Poort, and Rutten (2010) distinguished nine different interactions. Perhaps the most obvious, and certainly the one that is stressed most by copyright holders, is substitution: File sharing may substitute for the online or offline purchase of recorded music, films or series, books, games, or for cinema visits. Opposing this is the so-called sampling effect: File sharing may introduce consumers to works, artists, and genres increasing their demand for these works or other works by the same artists or in the same genre. Another positive effect may be an increased demand for related products or services, such as concerts or merchandise (e.g., Dewenter, Haucap, & Wenzel, 2012; Mortimer, Nosko, & Sorensen, 2012). Neutral effects with respect to sales occur when file sharing meets demand of consumers with insufficient willingness to pay, or who have demand for a work (or a work in a specific technical quality or file type) that is not on offer.

This variety of different and opposing interactions is one of the reasons why the effect of file sharing on sales is hard to determine empirically. Early contributions in this field focus on the music industry, for example, Peitz and Waelbroeck (2004), Rob and Waldfogel (2006), Zentner (2006), Liebowitz (2006), and Oberholzer-Gee and Strumpf (2007). A smaller number of studies deal with the effect for movies, for example, Bounie, Bourreau, and Waelbroeck (2006), Hennig-Thurau, Henning, and Sattler (2007), and Rob and Waldfogel (2007). In literature reviews (e.g., Handke, 2012; Smith & Telang, 2012; Watson, Zizzo, & Fleming, 2014), it is observed that there are hardly any studies concerning other markets such as games, books, and software. Smith and Telang (2012) concluded that “the vast majority of the literature [...] finds evidence that piracy harms media sales.” Note, however, that this evidence generally suggests a much smaller effect than a one-to-one displacement of sales by illegal copies. The effect is also substantially smaller than the loss of revenues from recorded music that the industry has experienced since the late 1990s.³

³Moreover, some studies find indications that more popular musicians and albums (Blackburn, 2004; Mortimer et al., 2012) and blockbuster movies (Peukert, Claussen, & Kretschmer, 2013) suffer more from the substitution effect, although less well-known productions may even benefit as the opposing sampling effect prevails. However, some studies find an opposite effect (Bhattacharjee, Gopal, Lertwachara, Marsden, & Telang, 2007; Hammond, 2013). Thus, the effect of file sharing may vary between works or genres.

Over the years, the entertainment industry pursued a variety of strategies to combat unauthorized file sharing. One is to put a lock on their own supply: the use of DRM technology to prevent users from sharing legally acquired content. For the music industry, this strategy proved to be counterproductive and was abandoned (Sinha, Machado, & Sellman, 2010; Vernik, Purohit, & Desai, 2011) although for audiovisual products, e-books, and games the use of DRM is still common. A more controversial strategy involves the pollution or poisoning of file sharing networks with useless decoys (Christin, Weigend, & Chuang, 2005).

Legal actions are another strategy. These can be distinguished in actions against individual file sharers, that is, the demand side of the illegal market, and actions against the supply side (i.e., platforms that accommodate unauthorized file sharing). For a discussion of the literature on the effects of such interventions, see Poort et al. (2014), who find no impact of blocking access to The Pirate Bay (a popular website for file sharing trackers) on the percentage of the Dutch population downloading from illegal sources. All in all, legal actions tend to have only a short-term effect on file sharing, that is, until illegal supply and demand have found other platforms to meet.

Another strategy is to offer adequate legal digital alternatives. Although it is often claimed that online services, such as iTunes, Spotify, and Netflix, can help to combat file sharing,⁴ empirical academic literature on this matter is scarce. In a theoretical article, Thomes (2013) concluded that a free, ad-sponsored music streaming service can be effective against file sharing, given a certain level of copyright enforcement. Another theoretical article by Halmenschlager and Waelbroeck (2014) concluded that the freemium model can help fight piracy without a need for stricter enforcement, as long as restrictions on the free version are limited. Danaher et al. (2010) studied the effect of the removal of NBC content from the iTunes Store in December 2007 and its restoration in September 2008 on BitTorrent file sharing and DVD sales on Amazon. They associate the removal with an 11.4% increase in BitTorrent file sharing of NBC content. This amounts to about 48,000 downloads, which is roughly twice the digital sales of NBC content in the iTunes store prior to removal. No significant effects on DVD sales were found, nor on file sharing levels after the content was restored. Similarly, Danaher et al. (in press) find a decline in piracy levels after ABC started streaming their television content at Hulu.com in July 2009.

Two articles by Aguiar and Martens (2013) and Nguyen, Dejean, and Moreau (2013) are also of interest. Aguiar and Martens (2013) studied the effect of free streaming music services on legal downloads and find a small but significant positive effect, which suggests these legal channels are complements rather than substitutes. Nguyen et al. (2013) studied the effect of free streaming services on CD purchases and live music attendance. They find no effect on the former and a positive effect on the latter.

This article adds to this literature in various ways. Use is made of three representative surveys, covering both music, films/series, games, and books, and four different consumption channels are distinguished. This allows for a comparison across content types and channels, and for studying developments over time. With the use of respondents' rating of these channels on title availability, price and technical quality, the link between these developments and the perceived adequacy of legal offers can be studied.

⁴For a partisan but well-documented report on the effect of Spotify along these lines, see Page (2013).

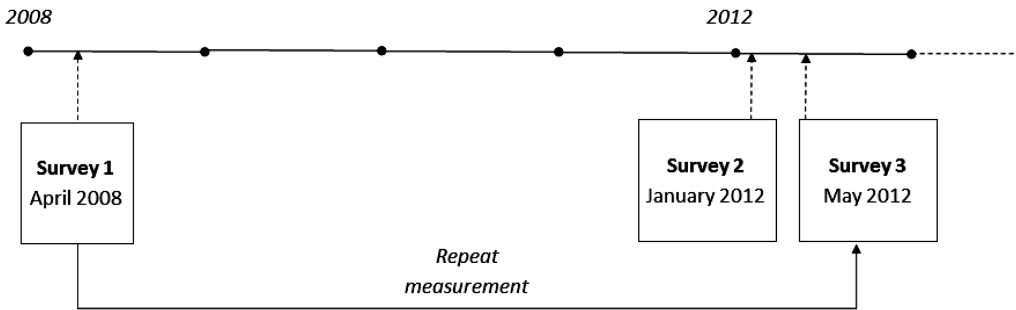


FIGURE 1 Timeline media consumption surveys.

METHOD

Survey Design

This article combines the results of three online surveys on media consumption that were held among Dutch consumers in 2008 and 2012 (see Figure 1). All surveys cover the online and offline consumption of music, films, and games, whereas the last two surveys also cover TV series and books.

Survey 1 was conducted by Synovate in 2008 in a sample representative of the Dutch Internet using population aged 15 years and older. Surveys 2 and 3 were conducted in 2012 in the CentERpanel, an online household panel representative of the entire Dutch population aged 16 years and older.⁵ Demographic and other background variables are available for all panel members.

The questionnaires kept close to day-to-day language so as to achieve a true and accurate picture of consumers' activities and motives. The term *file sharing*, for instance, was avoided in Dutch in favor of *downloading*, which in pretesting the 2008 survey proved to have the right connotations for Dutch consumers.⁶ Examples of content types and acquisition channels and explanations for technical terms (e.g., for *streaming* and *on-demand services*) were provided to ensure the correct framing of questions.

Special care was taken to prevent social desirability bias. First of all, in the introduction to the questionnaire it was emphasized that the anonymity of the information was guaranteed at all times. Next, the surveys were not introduced as being about file sharing or online piracy but more generally as being about media consumption. Emotionally charged concepts, such as piracy, infringement, and theft, were not used.

⁵In the CentERpanel, households can only participate on invitation, based on random sampling from Dutch address registers (probability sample). Households without Internet access receive necessary support from CentERdata, resulting in a highly representative panel, both observed and unobserved characteristics. For representativeness figures, see <http://www.centerdata.nl/en/about-centerdata/what-we-do/data-collection/centerpanel/centerpanel-representativity-figures-may>

⁶Many consumers are unaware of the techniques they use for downloading and of the legal status of their actions. This is why the questionnaires preferred phrasing questions to match consumer perceptions over using legally correct terminology (e.g., unlawful distribution).

Response Characteristics

A total of 1,500 people fully completed the first questionnaire. The second and third surveys had 2,031 and 2,009 respondents, respectively. Measurements in the CentERpanel are treated as independent cross-sections to keep the information of one-time participants.

The three samples are highly comparable in terms of age distribution, gender, educational level and income. As file sharing behavior differs among age and other demographic characteristics, Table 1, Figure 2 and Figure 3 (and accompanying text) have been weighted to arrive at a representative picture of the Dutch population.⁷ No weights have been used in the subsequent data analysis.

Analysis

The statistical analysis presented in this article draws mainly on the third survey. The first survey contains a subset of questions similar to the third and is used to study some key developments over a four-year time span, which for this topic one could venture to call “long-term developments.” The second survey primarily serves the purpose of learning which features are most crucial for choosing the channel to consume a certain type of content.

For questions about media consumption through various channels and for various content types ordered scales were used for the last consumption for this content type and channel. These scales ranged from *less than a week ago* to *never* in seven steps.⁸ For questions about the perceived audio/video quality, availability and pricing of various channels, and content types ordered 5-point scales were used ranging from 1 (*very bad*) to 5 (*very good*) or 1 (*very low*) to 5 (*very high*) in case of prices.

RESULTS

Development of Digital Media Consumption Over Time

The surveys offer two ways to assess how the consumption of legal and illegal digital media has developed over time: at an individual level (i.e., self-reported change in download behaviour per 2012) and at a population level (i.e., comparison between 2008 and 2012 measurement).

Self-reported development. When assessing their own digital content consumption over time, the group that reports downloading less than when it first started downloading from illegal sources is larger than the group that said it downloaded more (Figure 2). This applies

⁷This concerns weighting on sociodemographic characteristics, such as age and gender, to translate sample outcomes for the entire Dutch population. Moreover, in 2008, a considerable part of the Dutch population (around 13%) did not yet have Internet access. Therefore, the survey findings of 2008 were extrapolated to the entire Dutch population using Internet adoption statistics from the International Telecommunication Union. See also Footnote 10.

⁸Intermediate steps were “more than a week ago, but less than a month”; “between 1 and 3 months ago”; “between 3 and 6 months ago”; “between 6 and 12 months ago”; and “more than a year ago.”

Do you now download/stream more or less than you did when you first started downloading/streaming?

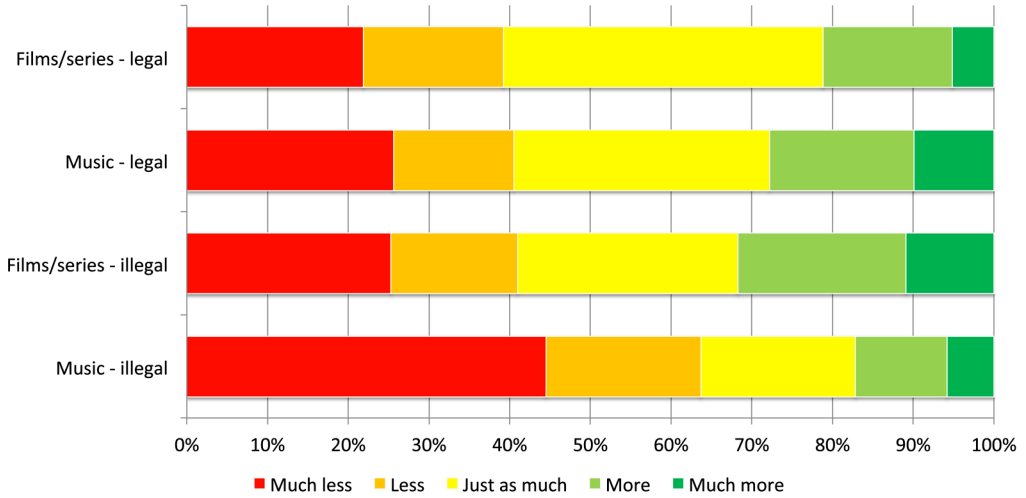


FIGURE 2 Self-reported development of legal and illegal download behavior.

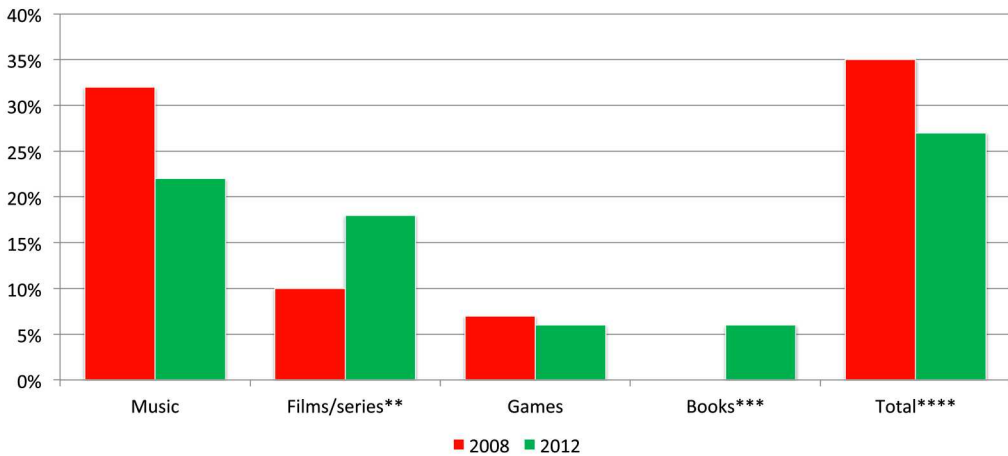


FIGURE 3 Percentage of the Dutch population (>=15 yrs*) that had downloaded from an illegal source in the past year. Overall, unauthorized file sharing decreased, despite an increase for films and series. *16 years and older in 2012 measurement. **Excluding series in 2008. ***Not measured in 2008. ****Excluding series and books in 2008.

to both legal and illegal sources and to both music and films and series, which tallies with the phenomenon that media consumption decreases with age. In fact, the econometric models in Table 6 and Table 7 confirm this phenomenon.

Nevertheless, there is a sharp contrast between music and films and series: About two-thirds of music downloaders state they download or stream less or much less from illegal sources now than they used to do, against 40% from legal sources. Conversely, the group that downloads more music from illegal sources is considerably smaller than the group that downloads more from legal sources: 17% and 28%, respectively. The opposite is the case for films and series. The group that now downloads and streams less is about the same for both legal and illegal sources: 39% and 41%, respectively. However, the group that consumes more from illegal sources is considerably larger than for legal sources (32% vs. 21%).

These individual developments suggest opposing trends for music and films or series: for music a shift is taking place in favor of legal sources, as music consumption from illegal sources is declining faster and legal consumption is increasing faster. On the other hand, the use of illegal sources to acquire films and series is increasing for a larger group than the use of legal sources.

Comparison between 2008 and 2012 measurements. A comparison of the findings of Survey 3 for 2012 with Survey 1 in 2008 confirms these opposing trends. Figure 3 shows that the overall percentage of file sharers declined sharply: from 38.3% of the population in 2008 to 27.2% in 2012 (Pearson $\chi^2 = 52.1$; $p = 0.000$; $df = 1$), even though the 2012 measurement included TV series and e-books, which the 2008 measurement did not. File sharing declined significantly for music, whereas it increased significantly for audiovisual material: from 34.8% to 21.7% (Pearson $\chi^2 = 79.3$; $p = 0.000$; $df = 1$) and from 11.2% to 18.3% respectively (Pearson $\chi^2 = 36.3$; $p = 0.000$; $df = 1$).⁹ There is also a slight but significant decrease for games: from 8.2% in 2008 to 6.0% in 2012 (Pearson $\chi^2 = 6.5$; $p = 0.011$; $df = 1$).¹⁰

Understanding the opposing trends for music and films/series. This article aims to explain these opposing developments for music and films/series. General copyright enforcement measures can be ruled out as an explanation, since these would affect the sharing of music and audiovisual content alike. Moreover, Poort et al. (2014) concluded that the most significant change in enforcement that took place in the Netherlands in this time span, court rulings which ordered Internet service providers to block access to The Pirate Bay, had no impact on the percentage of the population downloading from illegal sources.

⁹The difference cannot be explained by the fact that the 2012 measurement also includes downloading of TV series, as it is highly unlikely that almost 40% (7.1%/18.3%) of the people who downloaded audio-visual material from illegal sources in the past year downloaded only TV content. This is confirmed by a new survey in January 2014, which was focused exclusively on film and revealed a further increase of the percentage of file sharers to 21.5% of the Dutch population aged 16 years and older (Leenheer & Poort, 2014).

¹⁰Data for 2008 was representative for the Internet using population and has been extrapolated to the entire population by making use of the fact that people who do not use the Internet, do not download from illegal sources either. According to the International Telecommunication Union, 87.42% of the Dutch population aged 16–74 had used the Internet in the last 12 months in 2008 (<http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>).

Second, an increased uptake and speed of residential broadband connections could explain the observed increase in sharing film and series but would fail to explain the decrease in sharing music. Furthermore, the Dutch broadband market was already relatively mature in 2008: The number of fixed broadband subscriptions increased by a relatively small amount, from 35.1 per 100 inhabitants during the first survey to 39.4 during the third.¹¹ This small additional broadband uptake by relatively late adopters (or in Roger's 2010 terminology: "laggards") is an unlikely explanation for a substantial increase in file sharing for films and series.

Third, diverging price developments do not provide a satisfactory explanation. Between 2008 and 2012, the average price of a physical music album decreased by 4%, but the average price of a DVD also decreased by 2%. The average price paid for digital albums decreased, but that for digital singles increased. On the assumption that an average album has 10 tracks, the overall average price paid for a digital music track hardly changed (−1%).¹² Price developments for digital audiovisual services and music streaming are unknown, but most of the services that are available now did not exist in 2008.

This introduces the fourth candidate for explaining the opposing trends for music and audiovisual contents: the adequacy of legal online offers. Analysis of the consumption of music and audiovisual material from legal and illegal sources through the lens of the perceived adequacy of these channels, later in this article, provides strong support for this explanation.

Analysis

In the analysis of the consumption of music and audiovisual material, four acquisition channels are distinguished which may be substitutes or complements:

1. buying physical formats (CD, DVD, Blu-ray, etc.) in an offline or online store;
2. paid-for downloading or streaming from a legal source;
3. free downloading or streaming from a legal source; and
4. downloading or streaming from an illegal source.

A comparison of the use of these four channels in the past year and in the past week is provided in Table 1. In line with the time trends above, the relative position of paid-for downloading and streaming from legal sources is the least favorable for films and series. Measured over the past year, paid-for downloading and streaming is the least popular channel for both music and audiovisual material, but the gap between this channel and illegal sources is considerably wider for films and series, both in relative (percentage) and absolute (percentage points) terms. For games and books, illegal sources are the least popular channel.

The second half of Table 1 reveals information about the behaviour of the most fervent consumers by displaying content consumption in the last week. In this group, downloading and streaming music, films and series from illegal sources comes in second after free legal

¹¹ Penetrations 2008Q2 and 2012Q2 according to <http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm>. To compare, the Organisation for Economic Co-operation and Development average was 20.4 and 25.8, respectively, per 100 inhabitants. The percentage of the Dutch population with Internet access increased from 87% in 2008 to 93% in 2012.

¹² See the NVPI market information 2008–2012, <http://www.nvpi.nl/marktinformatie>

TABLE 1
 Downloading, Streaming, and Purchasing per Content Type ($N = 2,009$)

	<i>Purchased Offline and Online Store</i> (1)	<i>Downloading and Streaming From a Legal Source</i>		<i>Downloading and Streaming From an Illegal Source</i> (4)	<i>All Channels (1 to 4)</i>	<i>Total Legal (1 to 3)</i>
		<i>Paid-for</i> (2)	<i>Free</i> (3)			
Past year						
Music	40.0%	17.1%	36.5%	21.7%	63.0%	60.8%
Films and series	44.8%	11.8%	25.3%	18.3%	59.4%	57.2%
Games	19.7%	8.8%	14.6%	6.3%	28.7%	27.7%
Books	69.0%	7.8%	9.2%	6.3%	70.9%	70.5%
Past week						
Music	3.1%	3.7%	14.4%	6.3%	20.5%	18.4%
Films and series	3.8%	1.5%	8.7%	6.2%	16.1%	13.1%
Games	1.7%	1.3%	3.2%	1.0%	5.7%	5.2%
Books	9.8%	0.7%	0.9%	0.9%	11.2%	10.8%

sources. In this group, acquiring films and series from illegal sources is just as common as for music.

At an individual level, the frequency of use of all four channels is strongly correlated, both within and between content types. Nearly all correlation coefficients in Table 2 are positive and significant ($p < 0.01$), which indicates that aficionados of music make more frequent use of all four channels. The same goes for aficionados of films and series. Within a content type, correlation is particularly high between the use of free online services (3) and illegal sources (4), which suggests a segmentation between consumers with and consumers without willingness to pay. Correlation coefficients are lower between the purchase of physical formats and consumption from all three online sources.

Interest in music and interest in audiovisual material are positively correlated, and a preference for a specific consumption channel stands out: respondents who have bought a CD more recently, are much more likely to have bought a DVD or Blu-ray more recently, and the same holds for legal and illegal online acquisition.¹³ A similar pattern occurs when adding books and games, although between these and music or audiovisual fewer correlation coefficients are significant.

Ratings on factors which determine the choice of acquisition channel. In Survey 2 (January 2012), respondents were asked about the factors that influence their choice between acquisition channels. Title availability and price came up as the most decisive factors by far, followed by (technical) sound and/or video quality (Table 3).

Based on these outcomes, respondents were asked in Survey 3 to rate each acquisition channel for music and films/series on title availability, technical quality and price. In the first two rows of Table 4 the mean ratings for all respondents are presented. Significant differences

¹³Note that these correlations are partly explained by underlying sociodemographic variables, in particular age.

TABLE 2
Significant and Strong Correlation Between Frequency of Use of Distribution Channels (Spearman's Rho)

	<i>Music</i>				<i>Films and Series</i>		
	(1)	(2)	(3)	(4)	(1)	(2)	(3)
Music							
Paid-for d/s from legal source (2)	0.17 (0.00)						
Free d/s from legal source (3)	0.15 (0.00)	0.43 (0.00)					
d/s from illegal source (4)	<i>0.05</i> (0.01)	0.36 0.00	0.58 0.00				
Films and series							
Purchased offline and online store (1)	0.43 (0.00)	0.20 (0.00)	0.26 (0.00)	0.14 (0.00)			
Paid-for d/s from legal source (2)	0.06 (0.01)	0.33 (0.00)	0.25 (0.00)	0.22 (0.00)	0.17 (0.00)		
Free d/s from legal source (3)	0.08 (0.00)	0.27 (0.00)	0.52 (0.00)	0.40 (0.00)	0.21 (0.00)	0.35 (0.00)	
d/s from illegal source (4)	0.01 (0.54)	0.29 (0.00)	0.46 (0.00)	0.68 (0.00)	0.14 (0.00)	0.30 (0.00)	0.56 (0.00)

Note. d/s = Downloading/streaming.

Bold correlation coefficients, $p < 0.01$; correlation coefficients in italics, $p < 0.05$.

TABLE 3
Mean Scores and Rank (1–4) of Factor Importance (Scale from 0 to 100)

	<i>Music</i> (<i>n</i> = 748)	<i>A/V Content</i> (<i>n</i> = 667)	<i>Games</i> (<i>n</i> = 157)	<i>Books</i> (<i>n</i> = 972)
Title availability	16 (1)	19 (1)	18 (2)	28 (1)
Price	15 (2)	18 (2)	19 (1)	20 (2)
Technical quality	14 (3)	12 (3)	12 (3)	
Ease of obtainment	9	10 (4)	8	9 (3)
Free of viruses and malware	9 (4)	8	10 (4)	4
Safety of payments	7	7	6	9 (4)
Privacy and security	6	6	4	4
Payment options	4	3	4	5
Certainty of content legality	4	4	3	3
Interoperability	5	3	2	2
Future accessibility	3	3	3	2
Other	2	2	1	4

TABLE 4
Mean Scores of Channels for Acquiring Music and Films/Series, Respectively,
on Availability, Quality, and Price

	<i>Availability</i>				<i>Technical Quality</i>				<i>Price</i>	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)
All respondents										
Music	4.22**	3.97**	3.68**	3.77**	4.43	3.89	3.65**	3.50**	3.84	3.55*
Films/series	4.15**	3.81**	3.47**	3.69**	4.46	3.88	3.54**	3.40**	3.91	3.73*
Respondents who ever file shared . . .										
Music	4.11	3.96	3.68	3.95	4.45	3.98	3.80	3.69	4.07	3.73
Films/series	<i>4.09</i>	3.67	3.40	3.89	4.56	3.90	3.60	3.64	4.16	3.91

Note. Mean values excluding answer category “Don’t know.” Significant differences between music and films/series (paired samples *t* test) for the sample of all respondents are marked with **($p < 0.01$) or *($p < 0.05$). Significant differences with respect to the variable for the last music or films/series downloaded or streamed from an illegal source (*F* test) are marked in bold ($p < 0.01$) or italics ($p < 0.05$).

between music and films/series per channel (paired samples *t* test) are marked with **($p < 0.01$) or *($p < 0.05$). Several observations can be made.

Comparing between music and film/video:

- All consumption channels for music score significantly higher on availability than their counterparts for films/series.
- Online films and series (2) are considered more expensive than online music.
- The technical quality of free legal (3) and illegal online music (4) is rated significantly higher than their counterparts for films and series.

Comparing between legal and illegal channels:

- Physical formats (1) score significantly better on availability than illegal sources (4) for both music and films/series. Paid-for online music (2) also scores better than illegal sources on availability. For films/series this difference in the availability ratings is not significant (t 1.48; $p = 0.14$). Title availability of free legal sources for music and films/series (3) is considered worse than that of illegal sources (4).
- For both music and films/series, the technical quality of all legal channels is considered significantly better than that of illegal sources.

The last two rows in Table 4 give the mean ratings for respondents who ever file-shared music and films/series, respectively. In case file sharing behavior significantly correlates with respondents’ ratings, means have been marked in bold ($p < 0.01$) or italics ($p < 0.05$). These rows reveal that people who ever downloaded or streamed from illegal sources consider the price of physical formats (1) and paid-for online services (2) significantly higher. As can be expected, they also give significantly higher marks to the availability and technical quality of

TABLE 5
Mean Scores for Users of Channels on Availability, Quality, and Price

	<i>Availability</i>				<i>Technical Quality</i>				<i>Price</i>	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)
All respondents										
Music	4.23**	4.10**	3.74**	3.95*	4.43	4.03	3.73**	3.69*	3.84	3.52
Films/series	4.15**	3.82**	3.48**	3.89*	4.46	3.95	3.55**	3.64*	3.90	3.68
Respondents who ever file shared . . .										
Music	4.11	4.02	3.69	3.95	4.46	4.03	3.80	3.69	4.06	3.63
Films/series	<i>4.10</i>	3.71	3.42	3.89	4.57	3.92	3.59	3.64	4.15	3.76

Note. Mean values excluding answer category “Don’t know.” Significant differences between music and films/series (paired samples *t* test) for the sample of all respondents are marked with **($p < 0.01$) or *($p < 0.05$). Significant differences with respect to the variable for the last music or films/series downloaded or streamed from an illegal source (*F* test) are marked in bold ($p < 0.01$) or italics ($p < 0.05$).

the illegal supply. Interestingly, more frequent file sharers appreciate the technical quality of legal online music (2 and 3) and of DVDs/Blu-rays (1) more, which could indicate the presence of the previously mentioned music and films/series aficionados in this group.

What is both striking and alarming, is that respondents who ever downloaded films or series from illegal sources, rate the availability of paid-for legal online channels for such content significantly lower than the average respondent. In fact, they rate it lower than the availability from illegal sources ($t = -2.35$; $p = 0.02$). In other words: those who ever downloaded films or series think that the availability from illegal sources is better than from legal digital sources. For music, these channels have equivalent scores in terms of availability.

Note that causality could run both ways here: People who appreciate a channel more, may use it more frequently and use other channels less. Alternatively, appreciation could be the *result* of using a channel (an “acquired taste”). The latter can be tested by restricting the sample to respondents who ever used each specific channel. Thus, all respondents had the chance to acquire a taste for the channel they rate. Table 5 gives the results, following the same structure as Table 4. In general, the quality and availability ratings for online legal music services are somewhat higher within the group that ever experienced it. Most differences between Table 4 and Table 5 are small, however, and most significance levels are unaffected. This indicates that these ratings are predominantly exogenous, that is, ratings primarily influence frequency of use rather than the other way around.

Figure 4 zooms in on paid-for and free legal online services, again with a distinction between respondents who ever used the respective service and those who did not.¹⁴ Two lessons can be drawn from this:

- Paid-for online services receive higher scores for title availability and technical quality than free legal services ($p < 0.05$ in all cases). This holds for both music and films/series.

¹⁴Note that defining users as people who have consumed the service in the previous year gives a virtually identical picture.

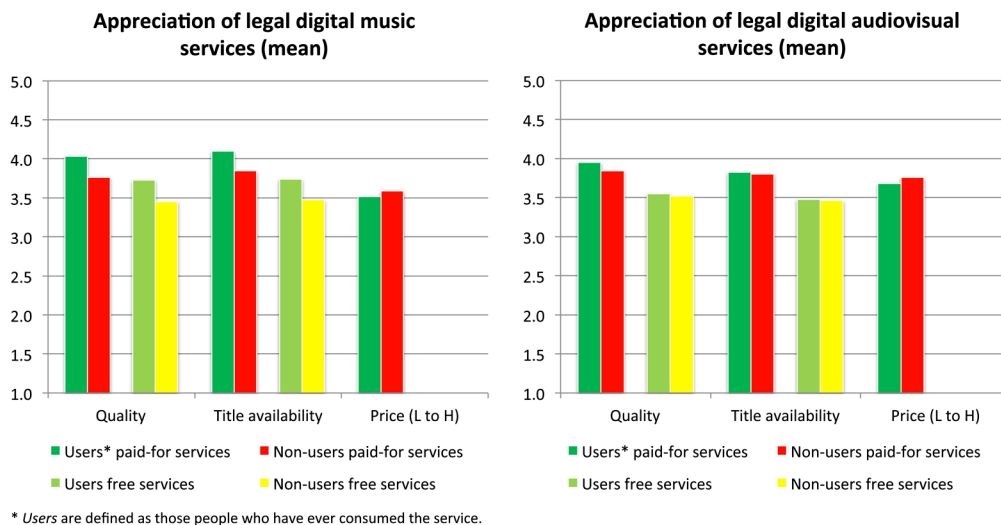


FIGURE 4 Users of legal digital services like them better.

- Users of legal online music services give them higher scores than nonusers, while there is no such difference for online audiovisual services. Users are defined as those people who have ever consumed the service.

Modeling. To gain a more comprehensive understanding of the use of the four channels for acquiring music and audiovisual content in relation to the rating of these channels—on title availability, technical quality, and price—models have been estimated for the last use of each channel. Because this last use is an ordinal variable, ranging from never (lowest) to less than a week ago (highest), ordered logit models have been used. Explanatory variables in each model are

- age cohort;
- gender (1 = male; 2 = female);
- urbanization ranging from 1 (*not urbanized*) to 5 (*very highly urbanized*);
- net monthly household income bracket;
- educational attainment;
- the rating of price, availability, and quality of each channel for the content type in the dependent variable.

Based on the insights from the correlation matrix in Table 2, a second model was estimated for each channel, including the last use of the same channel for alternative content types. For instance, the second model for downloading music from illegal sources also includes the last video and e-book download from illegal sources. These variables all have highly significant positive coefficients and serve as a proxy for channel preference, regardless of content type.

To prevent a substantial loss in the number of observations, which would also imply a biased restriction of the data set on heavy content users, the option “I do not know” for ratings on price, title availability, and technical quality has been recoded to “neither good nor bad.” Note that these variables are assumed to be exogenous in these models, in line with the observations from Table 4 and Table 5 (i.e., ratings influence frequency of use and not vice versa).

Music

The results for the last music acquisition per channel are presented in Table 6. The coefficients for the demographic variables are mostly straightforward and are not discussed here in detail. One effect is noteworthy, however: Urbanization has a positive coefficient in the first model for purchasing CDs, which may stem from the fact that CD stores are located in more urbanized areas. The fact that this coefficient drops and becomes insignificant in the second model, suggests that the absence of media stores in rural regions affects DVD or book acquisition similarly.

The first model for CD acquisition indicates that people who value the sound quality of CDs more highly are more frequent CD buyers, whereas the more satisfied people are with the quality of illegal supply, the less often they buy CDs. Both coefficients are no longer significant when correcting for channel preference, which indicates that these effects are not specific for music and are similar for other content types. Correlations with title availability of CDs and through illegal sources are more specific and robust: people who think more highly of CD availability buy CDs more frequently, and the higher people mark the availability through illegal sources, the less often they buy CDs. This all indicates that CD purchase and downloads or streams from illegal sources are to some extent substitutes (in line with the majority of the literature on the effects of file sharing on physical sales), whereas no indication is found for (strong) substitution effects between physical formats and legal online channels (in line with Nguyen et al., 2013). Price ratings have no significant effect either.

This substitution effect between CDs and downloads from illegal sources is mirrored in the rightmost models. Dissatisfaction with the technical quality of legal supply appears to be no driver for the use of illegal sources, but the insufficient availability of CDs is. A positive and significant coefficient for the perceived price of legal digital supply also indicates substitution from this channel to illegal channels. Note that this model has the highest explanatory power (pseudo $R^2 = 0.21 \sim 0.28$).

In the models for paid-for downloading and streaming, the rating of CD quality has a robustly negative coefficient. Because there are no significant price coefficients, this indicates a segmentation in the market—between those who are satisfied with the quality of downloads and streams and those who prefer CD quality—rather than substitution.

The frequency of free downloading and streaming from legal sources correlates positively with the quality rating for CDs and paid-for online sources, suggesting free legal sources are used for sampling and are complements to paid for sources rather than substitutes. On the other hand, a negative sign for CD availability as well as a positive correlation with a higher perceived CD price in the first model and with paid-for online channel in both models suggest substitution. Negative coefficients for the quality of illegal supply indicate substitution as well.

TABLE 6
Models for the Last Music Acquisition

	<i>Purchased Offline and Online Store</i>		<i>Paid-for d/s From Legal Source</i>		<i>Free d/s From Legal Source</i>		<i>d/s From Illegal Source</i>					
	<i>Coef.</i>	<i>S.E.</i>	<i>Coef.</i>	<i>S.E.</i>	<i>Coef.</i>	<i>S.E.</i>	<i>Coef.</i>	<i>S.E.</i>				
Age	-0.13	0.03	-0.04	0.04	-0.27	0.04	-0.48	0.04	-0.45	0.04	-0.36	0.04
Gender	-0.13	0.10	-0.28	0.10	-0.61	0.12	-0.95	0.11	-0.90	0.12	-0.71	0.13
Urbanization	0.08	0.04	0.04	0.04	0.05	0.04	0.09	0.04	0.05	0.04	0.01	0.04
Income	0.09	0.05	0.04	0.05	0.07	0.06	-0.07	0.05	-0.15	0.06	-0.15	0.06
Education	0.10	0.03	0.03	0.03	-0.05	0.04	0.01	0.03	-0.06	0.04	-0.07	0.04
Quality (1)	0.19	0.08	0.06	0.08	-0.28	0.10	0.19	0.08	-0.05	0.10	0.00	0.10
Quality (2)	-0.01	0.10	-0.09	0.11	0.97	0.12	0.24	0.10	0.18	0.10	0.07	0.12
Quality (3)	-0.08	0.11	-0.05	0.11	-0.23	0.13	0.49	0.11	0.42	0.11	0.30	0.13
Quality (4)	-0.30	0.11	-0.18	0.11	-0.19	0.12	-0.26	0.11	-0.30	0.11	0.68	0.12
Availability (1)	0.33	0.07	0.31	0.07	0.00	0.08	-0.30	0.07	-0.20	0.07	-0.34	0.08
Availability (2)	0.17	0.10	0.12	0.10	0.66	0.10	0.19	0.10	0.14	0.10	0.18	0.11
Availability (3)	-0.12	0.10	-0.11	0.10	-0.10	0.10	0.32	0.10	0.32	0.10	-0.25	0.10
Availability (4)	-0.27	0.10	-0.23	0.10	-0.09	0.11	0.16	0.10	0.06	0.10	0.86	0.11
Price (1)	-0.08	0.07	-0.10	0.07	0.16	0.09	0.17	0.07	0.08	0.08	0.16	0.09
Price (2)	0.11	0.09	0.02	0.09	0.03	0.10	0.33	0.09	0.26	0.09	0.58	0.10
Films/series (1)			0.40	0.03			0.32	0.03				
Films/series (2)							0.28	0.04				
Films/series (3)									0.32	0.03		
Films/series (4)									0.17	0.04		
Books (1)			0.23	0.03					0.17	0.04		
Books (2)									0.17	0.04		
Books (3)									0.17	0.04		
Books (4)									0.17	0.04		
<i>N</i>	1,849		1,849		1,849		1,849		1,849		1,849	
Pseudo <i>R</i> ²	0.028		0.086		0.108		0.131		0.166		0.211	

Note. *d/s* = Downloading/streaming. Ordered logit estimation (Quadratic hill climbing). Bold coefficients $p < 0.01$; coefficients in italics $p < 0.05$.

Films and Series

Table 7 presents the results for the last acquisition of films or series. The first two models for purchasing DVDs and Blu-ray disks only give robustly positive coefficients for the quality and availability of this same channel. The other coefficients are not significant.

The models for paid-for downloading and streaming give a rather similar pattern. In addition, this channel is used more often by people who think less highly of the technical quality of DVD/Blu-ray or who rate the price of DVDs/Blu-rays higher. This indicates substitution from physical formats to paid-for downloads and streams.

The third set of models shows that people who give higher rates to the technical quality of free legal sources for films and series use them more often. A negative sign for the availability of DVDs/Blu-rays in one of the models, as well as a robustly positive sign of the price rating for paid-for downloads and streams, suggests substitution from these channels. The positive coefficient for the availability of illegal sources suggests that for films and series, free legal and illegal sources are complements rather than substitutes.

Just as for music, the models for the last acquisition from illegal sources have the highest explanatory power (pseudo $R^2 = 0.22\sim 0.33$). Quality ratings for the three legal channels have no effect, indicating that dissatisfaction with the quality of legal supply is no issue. However, people who rate the availability of DVDs/Blu-rays lower and people who consider the price of legal downloads and streams to be higher, download significantly more often from illegal sources.

CONCLUSIONS AND DISCUSSION

Based on three representative surveys among the Dutch population aged 15 years and up, this article has shown that in the Netherlands downloading and streaming from illegal sources has declined between 2008 and 2012. The music industry can pride itself on this decline: file sharing music declined from 35% of the population to 22%. For films and series, it increased from 11% to 18% over this time span. This cross-sectional trend corroborates with individual, self-reported downloading behavior over time. The latter also reveals that a gradual shift is taking place for music in favor of legal digital sources. The opposite is the case for films and series, which leads to the observation that Elvis is returning to the building, while Bond is still on the way out.

General copyright enforcement measures and an increased uptake and speed of residential broadband connections can be ruled out as satisfactory explanations for these opposing trends. They would not explain diverging trends for music and video and are unlikely to have had much effect on file sharing at all. Neither can price developments for physical formats or music downloads explain these developments.

From the evidence presented in this article, it is concluded that the opposing trends for file sharing music and audiovisual content can be explained by differences in the adequacy of legal online offers. To this end an assessment was made of respondents' satisfaction with four channels by which they can acquire content—physical formats, paid-for downloading/streaming from legal sources, free downloading/streaming from legal sources and downloading/streaming from illegal sources—in terms of title availability, price, and technical quality. Legal online music services are considered more adequate than legal online audiovisual services: They

score better on title availability and price, which are the two most crucial drivers for the choice between acquisition channels. This implies a better perceived price/quality ratio for legal music offers. Free online music services are also considered to have a better technical quality than free online video, while theoretical papers have already shown that free online services can be effective against file sharing.

The good news for the content industries is that physical formats and paid-for online channels are on average considered to have better availability and technical quality than illegal sources. However, those who ever downloaded films or series from illegal sources think that the availability from these sources is in fact better than from legal digital sources. For music, these channels have equivalent scores in terms of availability. Alternatively, users of legal digital music services rate these higher on quality and title availability than nonusers do, whereas for film and video this difference is negligible.

Ordered logit models to explain the last time respondents used each specific channel also underline the general importance of technical quality, title availability, and price. People who rate a specific channel better generally use this channel more often. These models also give evidence for substitution as well as complementarity between the three legal channels. Downloading content from illegal sources turns out to be significantly driven by a lower satisfaction with the availability of physical formats and by a higher price perception of paid-for downloads and streams. Dissatisfaction with the technical quality of legal supply seems to be no bottleneck.

What implications can be drawn from this for media managers and policymakers? Legal online offers that are superior to illegal sources can regain consumers for legal consumption and even make them turn their back to illegal sources. In particular, the recent development and fast uptake of streaming music services seems most relevant for a decline in file sharing. Now, the audiovisual industries should make haste to provide legal online services that meet the standard set by music services in terms of repertoire, price, and technical quality: Illegal sources such as *PopcornTime* should not be able to provide a better user experience than legal digital services.

To reduce file sharing, the pricing of legal online services turns out to be a crucial instrument: The price perception of legal online services has a robust effect on file sharing for both music and audiovisual content. Also, the availability and technical quality of content from illegal sources directly relates to file sharing, but for the industry these turn out to be hard to influence.

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