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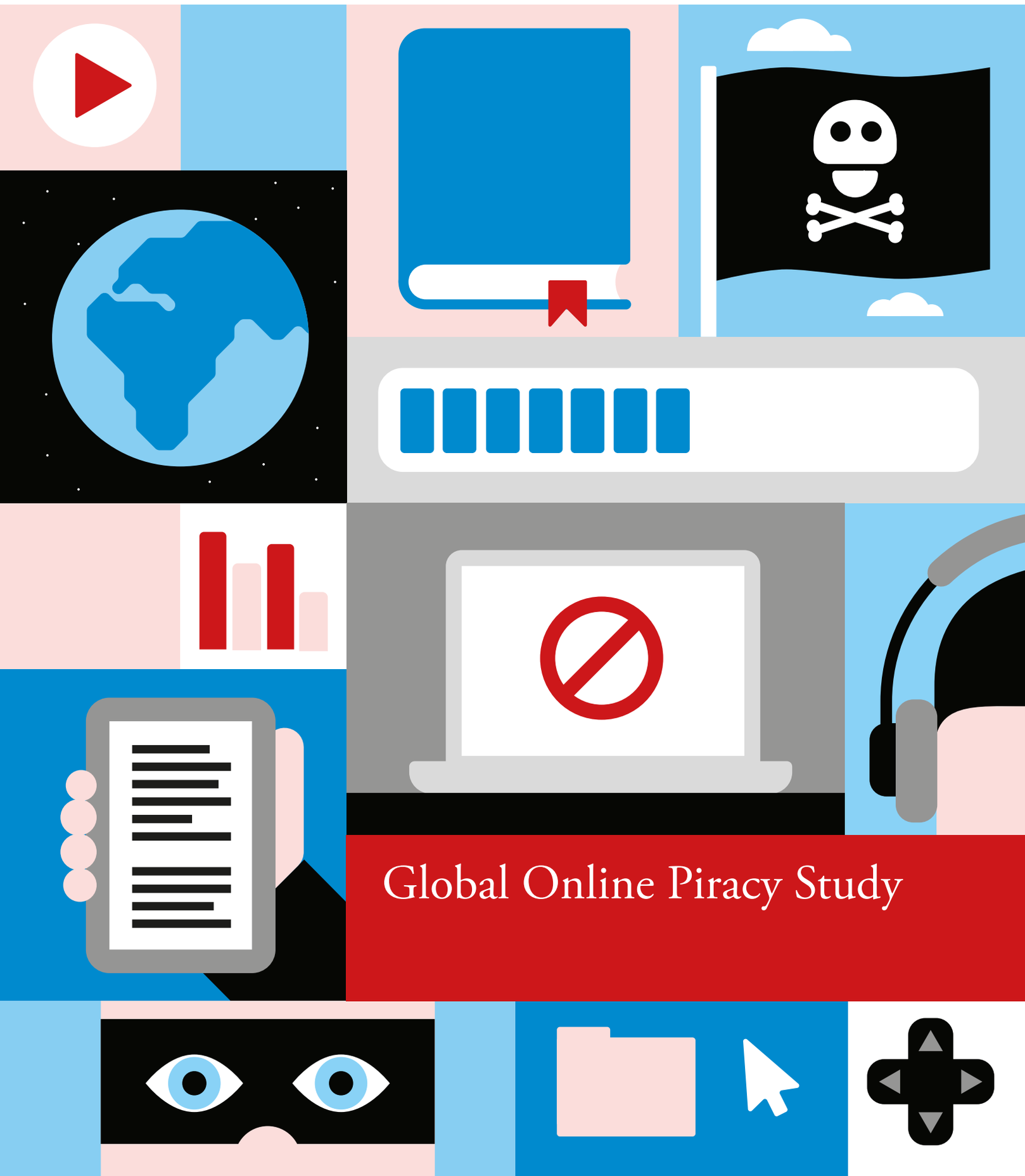

Global Online Piracy Study

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Global Online Piracy Study

Contents

Highlights

This report deals with the acquisition and consumption of ***music, films, series, books*** and ***games*** through the various ***legal*** and ***illegal channels*** that exist nowadays, in a set of ***13 countries*** in Europe (France, Germany, the Netherlands, Poland, Spain, Sweden), the Americas (Brazil, Canada) and Asia (Hong Kong, Indonesia, Japan, Thailand). The illegal channels studied are ***downloading*** and ***streaming*** from illegal sources (including via dedicated ***technical devices***), and ***streamripping***.

The purposes are (i) to provide factual information about the ***state of authorised and unauthorised acquisition and consumption of content***; (ii) to assess the ***underlying motives*** and mechanisms and the ***link with enforcement measures*** and legal supply; (iii) to assess the ***effect of online piracy on consumption from legal sources***. At the core of the study is a ***consumer survey*** among nearly ***35,000 respondents***, including over ***7,000 minors***, in 13 countries.

Legal analysis

Comparative legal research was performed on the basis of questionnaires on the legal status of online copyright infringement and enforcement, completed by legal experts in the 13 countries studied. It was found that, despite some legal uncertainty, the majority of acts studied are qualified as direct copyright infringement by users or give rise to liability for intermediaries. Moreover, ISPs are often subject to injunctions and duties of care even when they benefit from safe harbours. On the whole, copyright holders have a vast arsenal of legal enforcement measures to deploy against end users and ISPs. There is a trend in many countries toward copyright enforcement through civil or administrative measures aimed at blocking websites that provide access to infringing content. Notices to infringers and to platforms hosting or linking to infringing content with the aim of removing/blocking such content are likewise regularly used, the latter in the context of notice-and-takedown systems. Criminal measures are less popular.

Still, despite the abundance of enforcement measures, their perceived effectiveness is uncertain. Therefore, it is questionable whether the answer to successfully tackling online copyright infringement lies in additional rights or enforcement measures, especially if these will not lead to additional revenue for copyright holders and risk coming into conflict with fundamental rights of users and intermediaries. Instead, it might be sensible to search for the answer to piracy elsewhere – in the provision of affordable and convenient legal access to copyright-protected content.

Growing markets

Sales data for music, film and video, books and games reveal that across all content types and formats, per capita income appears to be an important driver of expenditures. However, above an annual income level of € 30,000 per capita, this relationship no longer seems to apply and national preferences dominate income effects. Zooming in, it is clear that physical sales are in continuous decline for almost every content type and in almost every country. Despite the decline in physical sales, the increase in digital sales led to ***net growth for total recorded music, audio-visual content, books and games*** between 2014 and 2017. Expenditures on live concerts and cinema visits are growing.

Survey outcomes

The percentage of the Internet population consuming content from ***legal*** sources varies between 61% in France and 93% in Indonesia. In most European countries, this percentage decreased somewhat between 2014 and 2017 – primarily due to a decrease for physical carriers – while total legal consumption volumes grew.

Consuming content from ***illegal sources*** – online piracy – is most prevalent in the Internet populations of Indonesia, Thailand and Brazil, followed by Spain and Poland. As a percentage of total population, Spain,

Canada and Hong Kong are the top three countries for piracy, while piracy is the least common in Germany, Japan and Indonesia, the last due to low Internet penetration. Between 2014 and 2017, the ***number of pirates decreased in all European countries except Germany***.

The per capita ***consumption volumes*** per legal and illegal content channel that follow from the survey do not always match these developments: for most countries and content types, an increase in the per capita volume of illegal content consumed is observed, despite a decreasing proportion of the population engaging in online piracy. This implies that the issue of piracy is gradually becoming confined to a smaller group: fewer people consume more on aggregate via illegal channels.

It might be tempting to argue that an increase in the use of certain enforcement measures against obviously illegal platforms has contributed to the decreasing number of pirates in Europe. However, a lack of evidence concerning the effectiveness of most enforcement measures and the strong link between piracy and the availability and affordability of content suggests otherwise: at a country level, ***online piracy correlates remarkably strongly with a lack of purchasing power***. Higher per capita income coincides with a lower number of pirates per legal users.

Moreover, pirates and legal users are largely the same people: demographically, pirates resemble legal users quite closely, although on average they tend to be somewhat younger and more often male. More importantly, for each content type and country, ***95% or more of pirates also consume content legally*** and their ***median legal consumption*** is typically ***twice*** that of ***non-pirating legal users***.

Displacement of legal sales

This study confirms earlier studies in finding statistical evidence that ***illegal consumption*** of music, books and games ***displaces legal consumption***. However, the displacement coefficients are surrounded with substantial ***uncertainty***. Separating these results between minors and adults suggests that displacement occurs for adults and not for minors.

The results for ***music*** indicate that illegal consumption primarily displaces legal downloads and physical carriers. The effect on streaming is not statistically significant. For live concerts and music festivals, a *positive* sampling effect is found. For ***audio-visual*** content, no such sampling seems to occur for the cinema, which suffers from statistically significant displacement, as do digital streams. No significant effects are found for physical purchases and digital downloads. For rentals, a marginally significant positive coefficient is found. For ***books***, the results are contrary to those for music and audio-visual in the sense that large and statistically significant displacement rates are found for books bought in print and borrowed from the library. These displacement rates may be overstated by people who have shifted from consuming print books to digital and others who have not. For ***games***, the effect found for free games is particularly high, but the coefficients found for the other channels are also statistically significant. Just like for books, the large coefficient for free games may be overstated.

Using time-structured data for ***blockbuster films***, an average displacement rate was found of ***–0.46*** of first legal views by first illegal views. This effect is smaller in Japan and the Netherlands and larger in Thailand and Brazil. The largest effect occurs on cinema visits. From these estimations, it is possible to calculate an upper bound for the relative ***sales loss*** of total film views per channel and per country. Overall, a maximum of about ***4.1%*** of all legal blockbuster views is displaced by illegal views.

An analysis of individual changes in consumption for respondents in six EU countries *between 2014 and 2017* reveals *significantly positive* correlations. Apparently, substitution effects – 'Shall I buy or shall I pirate?' – occur on the spot. Over a longer time span, improvements in the availability from legal channels are dominant and changes in personal preferences affect legal and illegal consumption alike.

Executive summary

A changing landscape for the acquisition and consumption of copyrighted content

The ways in which consumers acquire and experience music, films, series, books and games have changed radically over the last 20 years. Whereas such copyright-protected content was acquired primarily in the form of physical carriers such as cds, dvds and print books up to the turn of the century, nowadays an increasing amount of purely digital content is acquired and consumed via the Internet. And in recent years, it is possible to discern a second shift in consumption of content, from downloading from platforms such as iTunes, to streaming from Netflix, Spotify and the like: from ownership to access.

Along with, and sometimes even ahead of, the authorised distribution of content, unauthorised online content distribution – commonly referred to as 'online piracy' – has followed the same evolution: from physical carriers, such as counterfeit cds and dvds, via downloads from Napster and its successors such as The Pirate Bay and *cyberlockers* such as Megaupload, to streaming via platforms such as Popcorn Time. In some cases, *unauthorised streaming* is done through dedicated technical devices/set-top boxes with pre-installed links to unauthorised content platforms. A related use of copyright-protected material that is generally also viewed as unauthorised is *streamripping*, whereby software tools, browser plugins or special websites are used to store music or audio-visual content, such as YouTube videos, offline for later replay (in violation of YouTube's terms of service). These various channels coexist today and many consumers use a mix of them depending on the occasion.

Research questions and scope

This report deals with the acquisition and consumption of *music, films, series, books and games* through the various legal and illegal channels that exist nowadays, in a set of countries across the globe (see Table 1).

Table 1 Countries studied

Europe	France	FRA
	Germany	DEU
	The Netherlands	NLD
	Poland	POL
	Spain	ESP
	Sweden	SWE
	United Kingdom	GBR
Americas	Brazil	BRA
	Canada	CAN
Asia	Hong Kong	HKG
	Indonesia	IDN
	Japan	JPN
	Thailand	THA

The purpose of the study is threefold:

1. To provide factual information about the state of *authorised and unauthorised* acquisition and consumption of these content types.
2. To assess the underlying motives and mechanisms and the link with enforcement measures and legal supply.
3. To assess the effect of online piracy on consumption from legal sources.

To these ends, this study combines different sources and research methods. At the core of the study is a consumer survey among nearly 35,000 respondents, including over 7,000 minors (aged 14 to 17), in 13 countries. In addition, comparative legal research was performed on the basis of questionnaires on the legal status of online copyright infringement and enforcement, completed by legal experts in the 13 countries studied. A separate *Legal Background Report* contains this legal analysis and the full country reports that underlie it, but a brief overview is provided below and in the body of the main report.

Legal Background

Comparative legal research was performed on the basis of questionnaires on the legal status of online copyright infringement and enforcement, completed by legal experts in the 13 countries studied. It was found that, despite some legal uncertainty, the majority of acts studied are qualified as direct copyright infringement by users or give rise to liability for intermediaries. Moreover, ISPs are often subject to injunctions and duties of care even when they benefit from safe harbours. On the whole, copyright holders have a vast arsenal of legal enforcement measures to deploy against end users and ISPs. There is a trend in many countries toward copyright enforcement through civil or administrative measures aimed at blocking websites that provide access to infringing content. Notices to infringers and to platforms hosting or linking to infringing content with the aim of removing/blocking such content are likewise regularly used, the latter in the context of notice-and-takedown systems. Criminal measures are less popular.

Still, despite the abundance of enforcement measures, their perceived effectiveness is uncertain. Therefore, it is questionable whether the answer to successfully tackling online copyright infringement lies in additional rights or enforcement measures, especially if these will not lead to additional revenue for copyright holders and risk coming into conflict with fundamental rights of users and intermediaries. Instead, it might be sensible to search for the answer to piracy elsewhere – in the provision of affordable and convenient legal access to copyright-protected content.

The elusive effect of online piracy on sales

When online file sharing took off around the turn of the century, the recorded-music industry and, later, the film industry were quick to blame it for lost revenues. Indeed, it is largely undisputed that 1999 was a turning point for revenues from global recorded music sales and that real revenues from physical and digital recorded music sales declined for many years thereafter, only to start increasing again a few years ago. Likewise, global revenues from dvd sales and rentals have declined for many years since the turn of the century.

Nevertheless, answering the empirical question of the effect of unauthorised online content consumption on legal sales has proven to be cumbersome. A majority of the academic literature on the matter finds a negative net effect of illegal consumption on legal sales. However, there are relatively few studies on games and books, and a meta-analysis of the literature finds the evidence insufficient to conclude with certainty that piracy harms legal sales.

There are several reasons that there is no consensus on what may seem so obvious at first glance: the link between online piracy and legal sales. First, there are several opposing interactions between piracy and legal consumption, some of which have a negative impact on sales, some positive and some neutral. These various potential mechanisms are summarised in Table 2. The most prominent positive effect is known as the *sampling effect*: consumers are introduced to new music, actors and genres, and this creates new demand. Online piracy may also enhance the demand for *complementary products* such as live concerts and merchandise. On the downside, the most prominent effect is obviously *substitution*: a consumer refrains from buying specific content legally after having acquired or consumed it from an illegal source. Also, piracy may displace legal consumption via competition for people's time budget: one cannot watch one film from a legal source and one from an illegal source at the same time. Finally, neutral effects occur, for instance, when file sharing meets the demand of consumers with insufficient willingness to pay.

Table 2 Possible effects of online piracy on the purchase of legal content

Positive	+ It introduces consumers to music, films, books and games (and to artists, authors and genres), thus creating new demand. This is known as the sampling effect. + It allows consumers to pool their demand, resulting in increased demand. + It enhances willingness to pay and demand for concerts and related merchandise (complementary demand). + It enhances the popularity of products, boosting demand for legal supply (network effect).
Neutral	• It meets the demand of consumers who are not, or not sufficiently, willing to pay and subsequently are not served by legal supply. • It meets a demand for products that are not offered legally.
Negative	- It substitutes for the purchase of content or cinema visits (substitution effect). - It results in the deferred purchase of content at a lower price than the price at launch. - Sampling results in sales displacement as a result of fewer bad purchases. - It substitutes legal consumption via consumers' time budget.

The relative strength of these interactions is likely to differ between content types and channels. Even within content categories, differences can be expected between more recent and popular content, on the one hand, and older or niche content, on the other hand. Also, the average net effect may have changed over time, with the advance of fast broadband connections for consumers and the innovation by the content industries. Nowadays, a technological mismatch between supply and demand is a much less likely motivation for online piracy than it was a decade ago.

On top of these subtleties, estimating the effect of online piracy on sales faces methodological challenges that have to do with the fact that for many consumers, legal consumption and piracy go hand in hand. This is illustrated in this report by the demographic description of pirates and legal users, who are very much alike. Moreover, as a consequence of underlying individual preferences, pirates are much more likely to be legal users of each content type than are non-pirates, and the median legal consumption of pirates is typically twice that of non-pirates. As a consequence, a positive correlation between piracy and legal consumption can be expected which should not be hastily interpreted as a causal relationship.

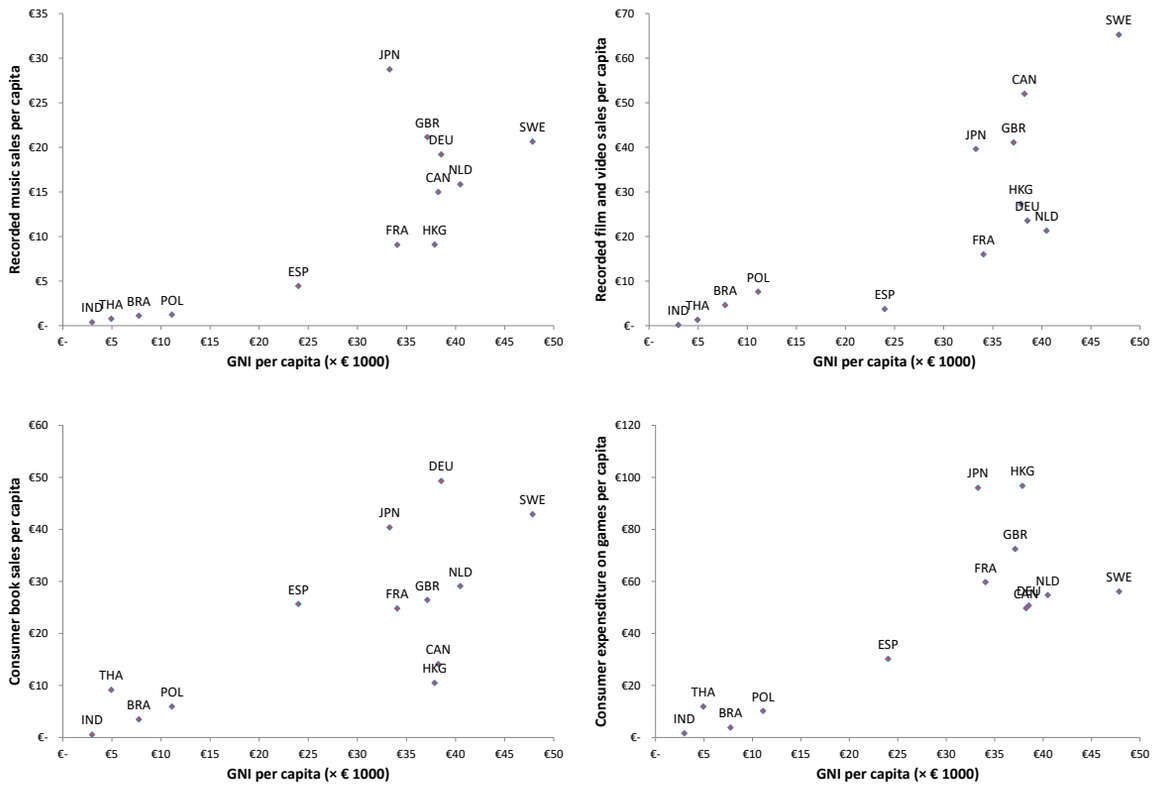
Development of legal sales

Analysis of sales data for music, film and video, books and games reveals that across all content types and formats, per capita income appears to be an important driver of per capita expenditure. However, above an annual income level of €30,000 per capita, this relationship no longer seems to apply and national preferences dominate income effects. This is illustrated in Figure 3.

Zooming into these sales per content type, it is clear that physical sales are in constant decline for almost every content type and in almost every country, most notably for audio-visual content. Books are relatively resilient to digitisation and print books still dominate in all countries. Digital sales have grown almost everywhere over the past three years. For music, digital streaming grew strongly at the expense of digital downloads. For audio-visual content, svod services such as Netflix are becoming the dominant model.

Despite the decline in physical sales, the increase in digital sales led to net growth for total recorded music, audio-visual content, books and games between 2014 and 2017. Expenditures on live concerts and cinema visits are growing almost everywhere. In the music category, live concerts generate revenues comparable to those for recorded music, except in Japan. In the audio-visual category, films generate not much less revenue than physical and digital recorded content combined.

Figure 3 Legal content sales and income per capita



Survey outcomes

The aim of the consumer survey was to provide information about the use of authorised and unauthorised channels for the acquisition and consumption of content, and to assess underlying motives and mechanisms and the effect of online piracy on consumption from legal channels.

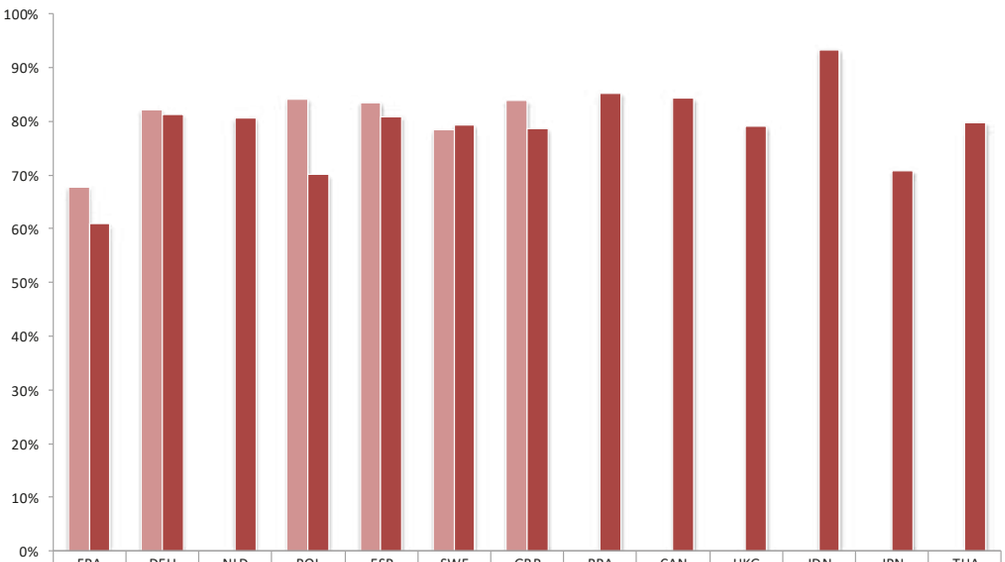
The survey reveals that ***music*** consumption and acquisition from ***illegal channels*** is most common in Spain, where 35% of the total population engaged in such activity in 2017, and least common in Japan, where 9% did so. Differences in the law do not seem to play a role here: downloading is illegal in both countries and both have enforcement measures available. Relative to the Internet population, music piracy is most common in Indonesia, Thailand and Brazil. Between 2014 and 2017, the number of music pirates decreased in each of the European countries for which two measurements are available. The percentage of the population pirating ***films and series*** also decreased in each of these countries. For the number of ***book*** pirates, the trend in all European countries is again downward, while for ***games*** the pattern is mixed.

The percentages of the population consuming any of these content types via any legal and illegal channel are summarised in Figures 4 and 5. Live concerts and merchandise are excluded from Figure 4, but offline legal consumption on physical carriers is included. Figure 4 shows that the percentage of ***legal*** content consumers in the Internet population per country varies between 61% (France) and 93% (Indonesia). Primarily due to a decrease for physical carriers, this percentage decreased somewhat between 2014 and 2017 in most European countries, whereas total sales volumes increased.

Figure 5, on the consumption and acquisition of content from ***illegal*** sources, shows that online piracy (excluding streamripping) is most prevalent in the *Internet populations* of Indonesia, Thailand and Brazil, followed by Spain and Poland. As a percentage of the *total population* (not depicted), Spain, Canada and Hong Kong are the top three countries for piracy, whereas online piracy is the least common in Germany, Japan and Indonesia. In line with the trends per content type outlined above, the percentage of pirates

decreased in all European countries except Germany. For the countries in this study outside Europe, this cannot be determined as no previous measurement using the same methodology is available.

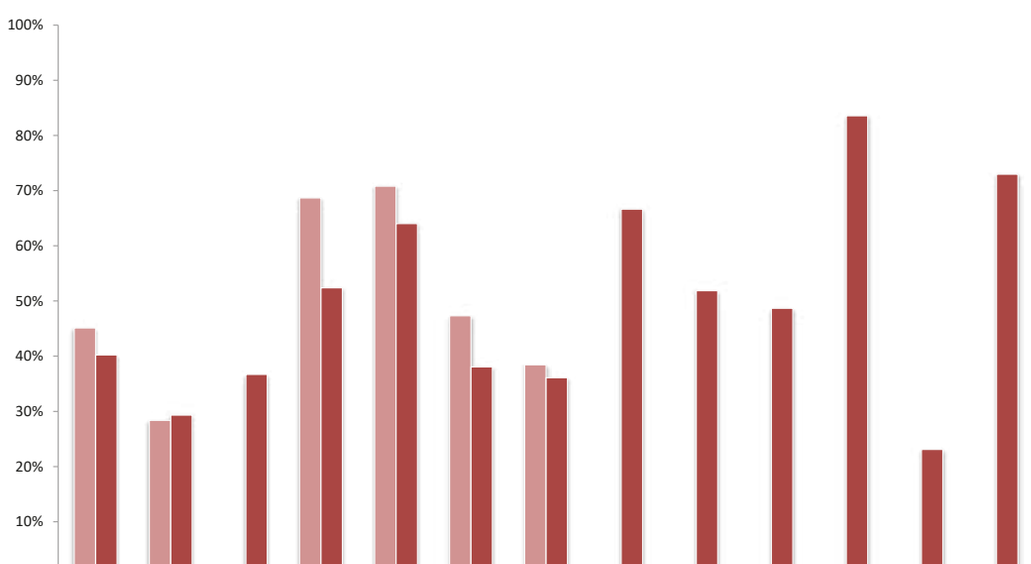
Figure 4 Acquired or accesses any content type legally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA
2014 (% of Int. pop.)	68%	82%		84%	84%	78%	84%						
2017 (% of Int. pop.)	61%	81%	81%	70%	81%	79%	79%	85%	84%	79%	93%	71%	80%

Note: exclusive of radio, linear television, live concerts and merchandise; inclusive of offline consumption from legal sources.

Figure 5 Acquired or accesses any content type illegally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA
2014 (% of Int. pop.)	45%	28%		69%	71%	47%	38%						
2017 (% of Int. pop.)	40%	29%	37%	52%	64%	38%	36%	67%	52%	49%	84%	23%	73%

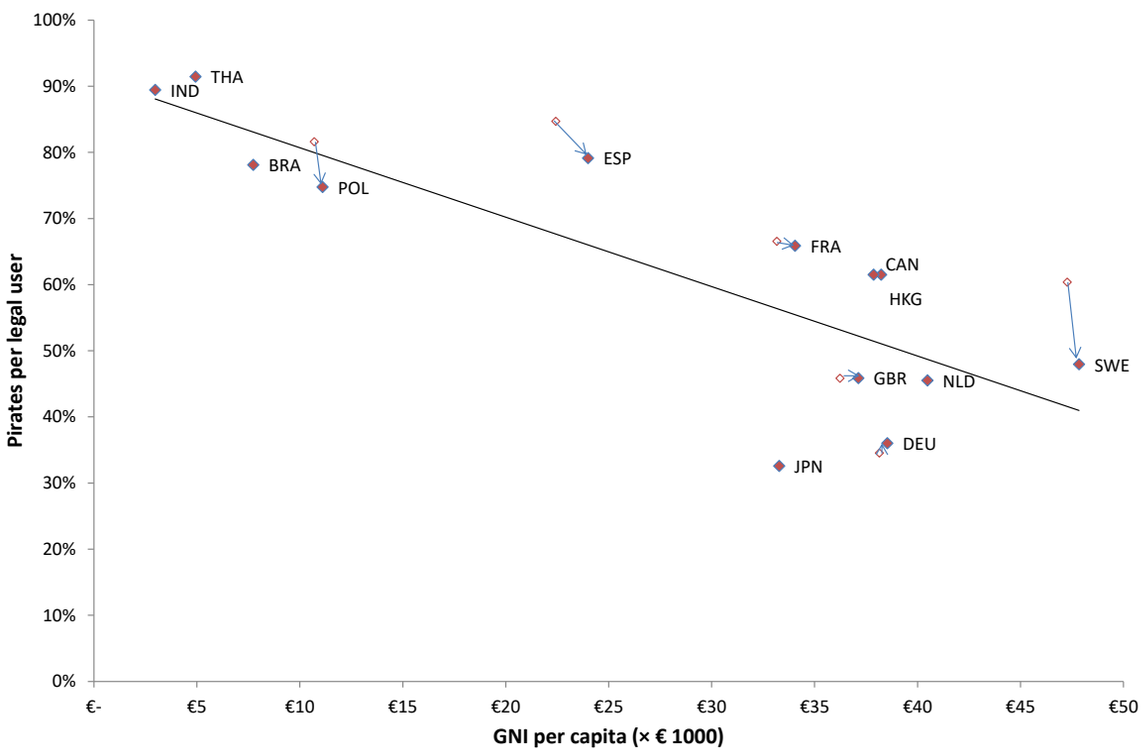
Note: exclusive of streamripping and pirated copies on physical carriers.

The per capita ***consumption volumes*** per legal and illegal content channel that follow from the survey do not always match these developments. Note that, to make these numbers less sensitive to outliers, seasonality and subtle differences between the 2014 (for European countries) and 2017 versions of the survey, these volumes are not calculated as means, but are approximated by the median consumption of the users over a channel, multiplied by the percentage using that channel. Decreasing volumes for physical

carriers are observed in most European countries, at least for music and audio-visual content, but not for games and books, despite a declining percentage of users of physical formats across the board. Similarly, for most European countries and for most content types, an increase in the per capita volume of illegal content consumed is observed, despite a decreasing percentage of the population engaging in online piracy. This implies that the issue of piracy is gradually becoming confined to a smaller group, although its total volume is not decreasing: fewer people consume more on aggregate via illegal channels.

It is, however, important to realise that the groups in Figure 4 and 5 overlap: in terms of demographics, pirates are very similar to legal users, although on average they tend to be somewhat younger and more often male. More importantly, for each content type and country, 95% or more of pirates also consume content legally and their median legal consumption is typically twice that of non-pirating legal users. Thus, the group of pirates in Figure 5 includes mostly people who also use legal channels, and the group of legal users in Figure 4 includes many people who also pirate content sometimes. Nevertheless, it is instructive to calculate the ratio between the percentages of people who have used illegal channels compared to people who have used legal channels at least once in 2017, and, if available, in 2014. This ratio turns out to be lowest in Japan and Germany, where there is about one user of illegal channels for any three users of legal channels. In Thailand and Indonesia, both groups are almost equally large.

Figure 6 Pirates per legal content user vs. per capita income (in constant prices)



This metric, as well as the more detailed statistics per content type and per channel, reconfirms the earlier observation that the percentage of the population engaging in online piracy is decreasing in most of Europe. It might be tempting to argue that an increase in the use of certain enforcement measures against obviously illegal platforms (e.g. Pirate Bay) contributed to the decreasing number of pirates in Europe. However, a lack of evidence concerning the effectiveness of most enforcement measures and the strong link between piracy and the availability and affordability of content suggests otherwise: Figure 6 plots the number of pirates per legal user against per capita income. At a country level, online piracy correlates remarkably strongly with a lack of purchasing power. Higher per capita income coincides with a lower number of pirates per legal users. In countries above the line, there are more users of unlawful sources per legal user than can be expected from the average income level. Spain is notably above the line, despite the wide and increasing

array of enforcement measures available against infringing users and intermediaries in Spanish law. In countries below the line, in particular Japan and Germany, there are fewer pirates per legal user than would be predicted based on per capita income. Arrows show the development that countries have made between 2014 and 2017. In general, this development has been along or towards the trend line.

Displacement of legal sales

How does online piracy affect legal consumption? A simple correlation does not determine a causal relationship and a simple time series analysis does not distinguish between the effects of piracy and of changes in preferences or in legal supply. This study uses three routes to estimate this displacement effect. The first route uses the number of content units per consumption channel that are reported in the survey for a so-called *instrumental variable regression*. The second analyses the survey question in which respondents had to indicate for a list of blockbuster films for the years 2015 to 2017 which ones they had seen and how. The third combines the responses in the survey with those in a similar survey in 2014, to analyse individual changes in consumption for the respondents who participated in both: a *panel study.*

The results of the first route using *instrumental variable regression* are presented in Table 7. For music, live concerts are not included in these estimations. Table 7 provides statistical evidence that illegal consumption of music, books and games displaces legal consumption. Note, however, that the estimations are surrounded with substantial uncertainty: for music, the 95% confidence interval for the displacement ranges from –0.06 to –1.23. For books and games, in particular, this range is large, which may have to do with the fact that underlying these content types is a wider variety of actual works. One could imagine that people who download games from illegal channels have little interest in simpler free online games. Separating these results between minors and adults suggests that displacement occurs for adults and not so much for minors.

Table 7 IV estimation of displacement rates per content type

	Music	Audio-visual	Books	Games
Displacement rate	–0.65**	–0.136	–1.195**	–1.963*
Standard error	0.30	0.301	0.580	1.029
95% confidence interval	–1.23 ~ –0.06	–0.73 ~ 0.45	–2.33 ~ -0.06	–3.98 ~ 0.05
N	14,712	16,289	11,878	10,567

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Music excluding live concerts.

Breaking down the results from Table 7 into the various legal channels for acquiring or consuming content generally yields more significant results. The results for ***music*** suggest that illegal consumption primarily displaces legal downloads and physical carriers. The effect on streaming is not statistically significant. For live concerts and music festivals, a *positive* effect is found. This ties in with the intuition that digital recorded music is not a substitute for but a complement to live music and that this interaction benefits from the *sampling effect*.

For ***audio-visual*** content, no such sampling seems to occur for cinema visits, which suffer from statistically significant displacement, as do digital streams, whereas no significant effects are found for physical purchases and digital downloads. For rentals, a marginally significant positive coefficient is found, which would lead to the conclusion that illegal consumption of audio-visual content promotes (what is left of) physical rentals. Rentals (also from libraries) also concern older audio-visual content, which may benefit from a sampling effect.

For ***books*****,** the results are contrary to those for music and audio-visual in the sense that large and statistically significant displacement rates are found for books bought in print (or as audiobooks on a physical carrier) and borrowed from the library. Against the background of a much smaller and statistically insignificant

estimate for book downloads from legal sources – the most obvious substitute for illegal downloads – these displacement rates may be overstated by capturing the effect of some people who have shifted from consuming print books to digital and others who have not.

For ***games***, the displacement rate found for free games is particularly high, but the coefficients found for the other channels are also statistically significant. Just like for books, the large coefficient for free games may be overstated by a partial segmentation between consumers who primarily play free games, and game pirates who are more hardcore gamers, preferring console games.

Using time-structured data for ***blockbuster films***, an average displacement rate was found of ***–0.46*** of first legal views by first illegal views. This effect is smaller in Japan and the Netherlands and larger in Thailand and Brazil. In combination with a positive sampling effect on second legal views and taking various robustness checks into account, it is concluded that the aggregate displacement effect for blockbuster films lies ***between –0.20 and –0.45***. Given the fact that this relates to blockbusters, for which larger displacement can be expected than for niche content and older content, and that it is audio-visual content, which most people consume only once or twice, this bandwidth is also a plausible upper bound for overall displacement in the other content types. An analysis per channel reveals that most of the displacement occurs for cinema visits. Displacement rates for later windows are smaller.

From these estimations, it is possible to calculate an upper bound for the relative ***sales loss*** of total film views per channel and per country. Overall, a maximum of about ***4.1%*** of all legal blockbuster views is displaced by illegal views. For specific channels, this varies from 3.2% for tv to 4.5% for legal streams and downloads. Per country, it ranges from 0.3% in Japan to 10.3% in Thailand.

Combining the survey data with those of a similar survey in 2014, partially targeting the same respondents, allows for an analysis of ***individual changes*** in consumption in six EU countries over time. This reveals ***significantly positive*** correlations for each content type. Therefore, an increase in illegal consumption over time is found to correlate with an increase in legal consumption and vice versa. Apparently, substitution effects – 'Shall I buy or shall I pirate?' – occur on the spot. Over a longer time span, improvements in the availability from legal channels are dominant and changes in personal preferences affect legal and illegal consumption alike.

1. Introduction

The ways in which consumers acquire music, films, series, books and games have changed radically over the last 20 years. Whereas such copyright-protected content was bought primarily in the form of physical carriers such as cds, DVDs and printed books up to the turn of the century, nowadays an increasing amount of purely digital content is acquired and experienced via the Internet. And in recent years, it is possible to discern a second shift in consumption of content, from downloading from platforms such as iTunes to streaming from Netflix, Spotify and the like: from ownership to access.

In the music industry, for instance, digital sales – downloads plus subscription services – accounted for 54% of global revenues in 2017, whereas physical formats were down to a 30% share. In that year, streaming grew by 41% to account for 38% of total revenues, while revenues from downloads declined by 21% (IFPI, 2018: 11–13).[1] In 2016, total spending in Europe on buying and renting video was €9.7 billion (International Video Federation, 2017). Physical DVDs and Blu-ray discs accounted for €4.2 billion of that, down by 18%, while digital video and video on demand grew by 27% to €5.4 billion. The gaming industry has undergone a similar shift toward digital sales and subscriptions. Physical books have, so far, been more resilient to digitisation. E-book adoption is increasing, but the revenue share of e-books is no higher than 30% in any of the markets studied in this report (see Section 5.4).

Along with, and sometimes even ahead of, the authorised distribution of content, unauthorised online content distribution – commonly referred to as 'online piracy' – has followed the same evolution: from physical carriers, via downloads, to streaming. For both legal and illegal distribution and consumption of content, these various channels coexist today to serve the preferences of different consumers.

This report deals with the acquisition and consumption of *music, films, series, books and games*[2] through the various legal and illegal channels that exist nowadays, in a set of countries across the globe. The purpose is threefold:

1. To provide factual information about the state of *authorised and unauthorised* acquisition and consumption of these content types
2. To assess the underlying motives and mechanisms and the link with enforcement measures and legal supply
3. To assess the effect of online piracy on consumption from legal sources

To these ends, the study combines different sources and research methods. Consumer surveys have been conducted among nearly 35,000 respondents, including over 7,000 minors, in 13 countries.[3] The results of these surveys have been combined with the insights from a questionnaire concerning copyright legislation and enforcement, which was completed by legal experts in each of the countries. In addition, country data have been obtained from the World Bank, and the resulting data set has been analysed using state of the art econometric techniques.

1 Performance rights and synchronisation rights were responsible for the remaining 16%.
2 Software other than games, sports and porn fall outside the scope of this study.
3 Data collection for these surveys was conducted by SSI (all 13 countries) and CentERdata (the Netherlands).

Thirteen countries in Europe, the Americas and Asia are studied in this report, as described in Table 1.1. The table also gives the official three-letter country code used throughout this study to abbreviate country names in tables and figures.

Table 1.1 Countries studied

Europe	France	FRA
	Germany	DEU
	The Netherlands	NLD
	Poland	POL
	Spain	ESP
	Sweden	SWE
	United Kingdom	GBR
Americas	Brazil	BRA
	Canada	CAN
Asia	Hong Kong	HKG
	Indonesia	IDN
	Japan	JPN
	Thailand	THA

The choice of these countries was made for methodological reasons, as well as because of their representativeness and the research interests of Google. With regard to the former, a comparable consumer survey was conducted by the authors for the European countries in 2014 (Van der Ende, Poort et al., 2015) and for the Netherlands in 2012 (Poort and Leenheer, 2012). Revisiting the countries in that report allows for studying developments in content consumption for these countries over time. It also provides the unique opportunity to follow more than 4,000 respondents in seven countries over a longer time span.[4]

The structure of this report is as follows:

- ***Chapter 2*** gives a brief overview of the empirical literature on the effect of online piracy on legal content consumption and online copyright enforcement.
- ***Chapter 3*** gives basic statistics and sales data for the countries in this study.
- ***Chapter 4*** gives basic descriptives of the response to the consumer survey and provides considerations concerning representativeness and weighting.
- ***Chapter 5*** presents the results of the survey concerning the acquisition of music, films and series, books and games via the various legal and illegal channels.
- ***Chapter 6*** reports the results of the econometric analysis to estimate the rate at which illegal content consumption displaces legal consumption.
- ***Annex A*** presents background figures for Chapters 3 and 5.
- ***Annex B*** contains detailed information on the data sources and data used for weighting respondents and the resulting weight factors.
- ***Annex C*** contains the English-language version of the consumer survey conducted, as well as country-specific information on content channels and blockbuster films per country.

A separate *Legal Background Report* contains an analysis of copyright legislation and enforcement in the countries studied. It includes the results of the legal questionnaire that was developed for this purpose and the names of the legal experts who completed it.

4 Van der Ende, Poort et al. (2015) conducted surveys in France, Germany, Poland, Spain, Sweden and the United Kingdom, to which 3,366 responded again in 2017. In an earlier report, Poort and Leenheer (2012) studied the Netherlands, which is why a separate consumer survey was conducted by CenterData, to also allow for a longitudinal analysis for the Netherlands for 986 respondents. Thus, a total of 4,352 respondents were followed over time.

2. A brief history of online piracy research

The launch of Napster in 1999 is considered by many to be the start of large-scale unauthorised online file sharing. Napster – a legitimate for-pay music service since 2004 – began as the first globally used platform for exchanging music files without authorisation of copyright holders. This was two years before the launch in 2001 of iTunes, the first platform to sell music digitally and per track. After its shutdown in 2001, Napster was succeeded by many technically more refined platforms and sharing protocols such as Morpheus, Gnutella, LimeWire, eMule and BitTorrent. Such platforms and protocols generally do not store copyright-protected content on a central server but facilitate direct *peer-to-peer* ('p2p') exchanges among users (peers) to avoid liability and vulnerability. This exchange started off with music, but, as soon as growing Internet bandwidth allowed, films, series and games followed suit.

A different technology, known as *cyberlockers* – such as Megaupload (succeeded by Mega) and Rapidshare – makes use of cloud storage hosted at locations that aim to be out of reach of copyright enforcement. Just like authorised supply via platforms such as Spotify and Netflix, illegal supply expanded to streaming more recently, enabling users to enjoy music, films and series without permanently downloading them. Popcorn Time is a popular example of such a service for films and series. In some cases, *unauthorised streaming* is done via dedicated technical devices/set-top boxes with pre-installed links to unauthorised content platforms. A related use of copyright-protected material that generally is considered unauthorised is *streamripping*, whereby software tools, browser plugins or special websites are used to store music or audio-visual content, such as YouTube videos, offline for later replay (in violation of YouTube's terms of service).

This chapter provides a brief overview of our legal background analysis, as well as the quantitative, empirical research into the link between online piracy and legal sales and of the effect of various enforcement measures to combat online piracy.

2.1 Legal Background[5]

Copyright law is substantially harmonised by international treaties – the Berne Convention, the TRIPS Agreement, and the WIPO Internet Treaties (WCT and WPPT) – which set out basic rules and minimum standards regarding copyright law and enforcement. Most countries are signatories to all such treaties. The exceptions are Brazil and Thailand, which are not members of the WIPO Treaties. Apart from that, the harmonizing influence of international law is felt in the ways in which domestic laws tackle online copyright infringement.

In addition, EU law in this field is significantly harmonised through a series of directives, as interpreted by the Court of Justice of the European Union (CJEU): (i) the InfoSoc Directive, implementing the WCT/WPPT and containing the regulation of online exclusive rights and injunctions against Internet intermediaries; (ii) the Enforcement Directive, implementing certain TRIPS provisions on civil enforcement measures for all intellectual property rights, including injunctive relief and damages; and (iii) the E-Commerce Directive (ECD), setting forth liability exemptions or safe harbours for certain intermediaries, prohibiting the imposition of general monitoring obligations, but not harmonizing intermediary liability beyond that.

5 Comparative legal research was performed on the basis of questionnaires on the legal status of online copyright infringement and enforcement, completed by legal experts in the 13 countries studied. A separate *Legal Background Report* contains this legal analysis and the full country reports that underlie it.

Infringing acts by users

For each country, the legality of a number of online acts by users that refer to using copyright-protected content is examined. Two preliminary remarks should be made. First, there are no significant differences in legal treatment of the types of content studied. Second, there are no substantial differences between the treatment of adults and of minors for civil copyright infringement. Findings for each act can be summarised as follows:

(i) Downloading. As a rule, downloading from illegal/unauthorised sources is copyright infringement. This act is covered by the exclusive right of reproduction and not privileged by a private use/copying limitation. That being said, some uncertainty exists in Poland (divergent interpretations of CJEU judgements), Brazil (lack of case law and no criminalisation of the act), Hong Kong (possible fair dealing defence) and Indonesia (fair dealings clause). Moreover, the act is not infringing in Canada regarding recorded music (covered by the private copying exception) and Japan for content other than digital sound or video recordings.

(ii) Streaming (reception). After the CJEU decision in Filmspeler, most EU experts consider this to be copyright infringement, whether or not it is done using technical devices or Kodi boxes with pre-installed add-ons. The act is covered by the reproduction right and not privileged by the temporary and transient copying exception. Outside the EU, the status of the act is uncertain. In Brazil, Canada, Hong Kong and Japan, the reception of streams from unauthorised sources by users is probably outside the scope of copyright or covered by an exception for temporary/transient copying, and thus non-infringing. In Indonesia and Thailand, the act might be infringing, but the absence of case law places its legality in a grey area.

(iii) Streamripping. This act is treated identically to downloading and considered infringing in most countries, based on the fact that in both cases the user makes a permanent copy of the work. However, since streamripping is frequently done from legal/authorised platforms (e.g. YouTube, Netflix) and there is almost no specific case law on it, it is not possible to conclude that the act amounts to copyright infringement in those scenarios.

In addition to these acts by users, the legal questionnaire assessed the status of uploading (generally infringing), the sale of technical devices or Kodi boxes with pre-installed add-ons and hyperlinking (both acts subject to uncertainty and nuanced legal analysis).

Enforcement

The *Legal Background Report* also examines public and private enforcement measures, procedures, remedies and sanctions against online copyright infringement available in national laws, whether civil (e.g. injunctions), administrative (e.g. warnings) or criminal (e.g. prison sentences). Enforcement measures may be aimed at the direct infringer (the user of protected content) or at intermediaries (e.g. ISPs). Combining the arsenal of enforcement measures against users and intermediaries, it can be said that there is no shortage of civil, administrative and criminal measures to tackle online copyright infringement.

Enforcement against (end-)users

Civil enforcement measures range from different types of injunctions, such as blocking access and content removal, to damages. In our study, no national law allows punitive damages for copyright infringement, and only Canadian law provides for statutory damages (as an alternative to actual damages). Some countries' laws are worth highlighting. In Germany, the law requires sending cease-and-desist letters to infringers as a condition for initiating legal proceedings. Spanish law contains special measures for the suspension and blocking of Internet access, removal of illegal content and obtaining personal data. UK law has developed a 'search order' to allow preservation of evidence before trial, and injunctions for the disclosure of personal data (*Norwich Pharmacal* orders). The law in Hong Kong has strong parallels with that of the UK in this respect. Brazilian law is different in that its lack of adaptation to the digital age has meant the challenging need to apply existing enforcement measures by analogy to online infringement.

Only France, the UK, Indonesia and Thailand have ***administrative enforcement measures*** against users. French law contains the famous – and since 2013 severely mitigated – 'three strikes'-type graduated response system managed by the HADOPI, the main sanctions of which are fines. The UK has adopted the Voluntary Copyright Alert Programme (VCAP), involving email alerts sent by ISPs to broadband subscribers whose accounts are used to infringe copyright. The system, for which there is little publicly available information, is meant as a deterrent and does not include sanctions. In Indonesia, a Ministerial Joint Regulation and a Circular Letter set up separate reporting systems for infringing content that may lead to its blocking or removal. The law in Thailand includes an administrative enforcement measure for copyright infringement that constitutes a crime, which provides administrative officers broad powers to remove or block infringing content. Finally, Spanish law contains a procedure directed at ISPs that allows for measures such as the suspension of the infringer's Internet connection and blocking/removing of infringing content.

Criminal measures are not harmonised in Europe. Most EU countries criminalise intentional acts of direct copyright infringement and subject them to sanctions ranging from fines to prison terms, and include seizure of infringing material and publication of the sentence. Offences are usually aggravated if they occur on a commercial scale or with a for-profit aim. Criminal measures against users appear to play a more significant role in France and Spain. In France, for instance, offences using an online service may lead to suspension of Internet access for one year. In Spain, the scope of criminal copyright infringement was extended in 2015 to encompass users of P2P services. The legislative framework of the remaining countries is similar to that of the EU member states, with the notable difference of Brazilian law, which does not criminalise making single copies of works for private non-commercial aims (e.g. when downloading from unauthorised sources or streamripping).

Enforcement against intermediaries

The combination of rules affords copyright holders a broad range of enforcement measures not only against end users but also against ISPs, especially against platforms that knowingly host protected content for streaming or downloading by users or that knowingly provide links to unauthorised content. Depending on the facts of the case and the national law at issue, the platform itself may be qualified as a user – in which case it is subject to the enforcement measures discussed above – or as an intermediary. In the latter case, platforms may be subject to different rules, including potential exemptions or safe harbours, and separate enforcement measures.

In the EU, intermediaries that benefit from safe harbours stemming from the ECD (access, caching, hosting) are still subject to injunctions and duties of care. Most member states have implemented these provisions, despite some idiosyncrasies. Importantly, safe harbours do not establish liability of intermediaries, but merely certain exemptions from it. National laws determine this liability by applying tort law and doctrines of contributory infringement, sometimes specifically tailored for ISPs.

In Europe, there is serious debate on the hosting safe harbour and its application to user upload platforms such as YouTube and Daily Motion. To benefit from this safe harbour, the platform must not have knowledge or awareness of the illegal content that it hosts and, upon obtaining it, must remove or disable access to such content. The latter obligation enables the setting up of notice-and-takedown (NTD) systems. National laws deal differently with these knowledge standards and ensuing obligations. Outside the EU, the landscape is irregular. In general, the ability of ISPs and online platforms to rely on safe harbours is reduced or eliminated when they have control or knowledge/awareness of illegal content, or when they fail to act against such content upon obtaining such knowledge.

National laws include a vast array of enforcement measures against intermediaries aimed at ending or preventing infringement by users of their services, including: the suspension of the infringer's Internet access; measures to identify the infringer; the monitoring, filtering, blocking or removing of infringing content; warning systems; obligations imposed on ISPs to notify public authorities of alleged infringing activities; and graduated response systems.

Starting with ***civil measures***, most EU countries enable different injunctions against ISPs. Particularly common are injunctions for website blocking and removal of infringing content, especially in the UK and Spain. Other prominent examples are injunctions to impose specific filtering systems (France) and to remove infringing content and take reasonable measures to filter future comparable infringements (Germany), NTD procedures established through Codes of Conduct (Netherlands), to suspend the Internet service provided to the infringer (Spain), and orders for the disclosure of personal data of infringers (UK and Sweden). Outside the EU, the laws of Brazil, Indonesia, Japan and Thailand do generally not specify enforcement measures against ISPs but assess their liability on the basis of tort law and duties of care, subject to remedies like injunctions and damages. In Canada, a platform that 'enables' infringement through its services loses safe-harbour protection. Moreover, all countries apparently allow – through express legal provision, doctrine, or strategic litigation – injunctions against ISPs for the disclosure of personal data of users in relation to copyright infringement.

Most national laws do not contain ***administrative measures*** targeting ISPs. Exceptions are Spain, the UK, Indonesia and Thailand. Likewise, the majority of national laws do not contain ***criminal measures*** targeting ISPs. To the extent that intermediaries commit or are involved in any of the crimes of copyright infringement defined in national law, they are subject to the criminal measures described for users. Nevertheless, since 2015 Spanish law has included a crime for websites that regularly offer links to infringing content (e.g. on P2P and other platforms).

Effectiveness of enforcement

The abundance of available enforcement measures does not mean that they are actually used or effective. The *Legal Background Report* indicates that the use and perceived effectiveness of enforcement measures varies substantially across countries. Moreover, such effectiveness is, in general, questioned whereas economic research indicates that in general, the effect of actions against platforms that accommodate unauthorised file sharing is short-lived at best. Illegal supply and demand typically need up to half a year to meet again at a new platform after an important platform has been shut down or access to it has been blocked.

In Germany, the most widely used and effective measure is cease-and-desist letters. In France, the expert mentions the HADOPI-run graduated response system, although its effectiveness is at best debatable. In the Netherlands, both blocking orders and the voluntary NTD system used by ISPs are mentioned, but there are doubts as to their effectiveness. In Spain, there is ample reported use of the special administrative procedure against ISPs described above to tackle infringement by end users (by disconnecting their Internet service) and unauthorised websites (by blocking access to them). In addition, collective management organisations often notify ISPs and other websites about infringing content and request its blocking/removal. Again, the effectiveness of these measures is questioned. Nevertheless, the expert notes that at least blocking websites and notifications by collective management organisations appear to decrease access to infringing content. In Sweden, information injunctions followed by cease-and-desist letters are identified as the most efficient measures, whereas other injunctions against intermediaries are less common, perhaps as a result of higher legal requirements and a lack of specific rules on NTD. In the UK, blocking injunctions against unauthorised websites (e.g. live streaming of sports or providing access to films) are widely used, with several hundred having been granted. There is some empirical evidence that this had a statistically significant negative effect on total online piracy and a positive effect on the use of legal video streaming platforms. Criminal sanctions are generally not a popular means for tackling online copyright infringement in Europe, despite their

availability and occasional use (e.g. in Spain and Sweden).

Outside Europe, in Brazil, the most effective measures are sending out-of-court notifications and a judge-made NTD system. In Canada, the most common measure is infringement notices sent by copyright holders to users via ISPs (the so-called notice-and-notice system). Reportedly, millions of notices have been sent since the coming into force of the law in 2015. In addition, Canada is currently discussing a web-blocking mechanism to be managed by a third-party agency and enforced by the Canadian Radio-television and Telecommunications Commission. In Hong Kong, notices to infringers and takedown notices to intermediaries are the most common measures. Copyright holders also resort frequently to reporting infringements to the Customs and Excise Department, which monitors online forums to track users engaging in copyright infringement and have them arrested. In Indonesia, several measures are noted: filing criminal complaints against infringers; the administrative provisions that allow for closing infringing websites; and a program that lists the most popular piracy websites in the country and encourages advertisers to boycott them, which has reportedly led to the blocking of hundreds of infringing websites. In Japan, information injunctions are widely used, and there are recent developments toward implementing a future website-blocking system by ISPs. Finally, in Thailand, criminal enforcement by the police authorities is viewed as the most effective enforcement measure. This is typically preceded by direct notices from copyright holders to users for the removal of infringing content.

2.2 The effect of online piracy on sales

When online file sharing took off around the turn of the century, the recorded-music industry and, later, the film industry were quick to blame it for lost revenues. In 2000, for instance, the IFPI wrote, 'Online piracy poses exactly the same threat as its physical equivalent to the creativity of artists and the investment of record producers. Potentially its impact is far greater than physical piracy' (IFPI, 2000: 5). And in a 2005 study for the Motion Picture Association, LEK Consulting wrote, 'Piracy is the biggest threat to the U.S. motion picture industry' and claimed that in 2005 the major US studios lost $6.1 billion to piracy, 38% of which took place online (LEK, 2005). This alarmist tone echoes the music industry's earlier response to the boom of private copying in the 1980s – 'home taping is killing music' – (e.g. Bottomley, 2015), as well as the fear in the early 1950s that radio airplay would hurt record sales (Leblebici et al., 1991: 356).

As Internet connectivity and bandwidth grew, so did online piracy. But more recently, there is evidence that online piracy is declining, at least in some countries, since the advent of legal streaming services such as Spotify and Netflix (e.g. Poort and Weda, 2015; Telecompaper, 2018). On the other hand, a recent report by piracy-tracking company MOSU claims that global piracy is at an all-time high, after a 1.6% increase from 2016, due primarily to an increase in demand for tv content (+3.4%) and music (14.7%) and despite a decrease in demand for films (–2.3%).[6] In a similar vein, a study by PRS for Music and the UK Intellectual Property Office recently reported an increase in streamripping by 141% between January 2014 and September 2016, causing PRS for Music to call it the 'most aggressive form of music piracy'.[7]

Notwithstanding these statistics and the intricacies of establishing a causal link between online piracy and legal sales to be discussed below, it is largely undisputed that 1999 was a turning point for revenues from global recorded music sales. Between 1999 and 2014, global revenues from physical and digital recorded music sales declined by 42% in nominal terms, from $25.2 to $14.6 billion. Only since 2015 has the global

6 MOSU (2018), 2017 Annual Piracy Reports (information from MOSU press release March 21, 2018, retrieved from: https://www.muso.com/magazine/global-piracy-increases-throughout-2017-muso-reveals/. For a critical discussion of the MOSU report for Canada, see http://www.michaelgeist.ca/2018/02/case-bell-coalitions-website-blocking-plan-part-2-weak-evidence-state-canadian-piracy/. Geist concludes that MUSO systematically overestimates the number of and visits to pirate websites and that online piracy in Canada has in fact decreased.

7 As explained in the *Legal Background Report* to the present study, the legal status of streamripping is sometimes unclear (Section 3.2).

music market been growing again, to $17.3 billion in 2017 (IFPI, 2018: 11). North American real video revenues (exclusive of box office) continued to grow until 2004, then levelled off and declined between 2005 and 2010 (Liebowitz, 2013: 265).

Nevertheless, the empirical question of the effect of unauthorised online content consumption on legal sales has proven to be cumbersome. In past years, a substantial body of academic literature emerged on the effect of the unauthorised sharing of copyrighted works, but no general consensus was reached. Most of the earlier contributions focus on the music industry – e.g., 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 films – e.g., Bounie, Bourreau and Waelbroeck (2006), Hennig-Thurau, Henning and Sattler (2007) and Rob and Waldfogel (2007).

In literature reviews (e.g., Handke, 2012; Smith and Telang, 2012; Watson, Zizzo and Fleming, 2014), it is observed that there are very few studies concerning other markets, such as games, books and software. Smith and Telang (2012) conclude that 'the vast majority of the literature … finds evidence that piracy harms media sales'. However, most of this evidence suggests a much smaller effect than a one-to-one displacement of sales by illegal copies, and quantitative estimates vary substantially.

In a meta-analysis of the empirical literature up until 2013, Hardy, Krawczyk and Tyrowic (2015: 2) write, 'In total, for the final analysis we have identified as many as 40 studies (with more than 600 estimates) of which 4 argue in favor of a positive effect of 'piracy' on sales, 21 demonstrating the opposite, 6 finding no relationship whatsoever and 5 finding the direction of the link dependent on the type of content or analyzed sample. In addition, in most of the papers, at least some of the specifications were insignificant.' Thus, a democratic vote would yield a narrow majority for a negative effect, but in a more rigorous meta-analysis, Hardy et al. conclude that as a whole, the literature fails to reject the hypothesis of no effects on sales.

Different and opposing interactions between piracy and sales

How can it be that this relationship between unauthorised consumption of works and sales, which seems obvious at first glance, is so elusive and hard to establish in practice? A likely explanation is that closer scrutiny paints a more diverse picture. Unauthorised distribution and consumption of works can affect legal consumption in several different ways, some of which have a negative impact on sales, some positive and some neutral. These various potential mechanisms are summarised in Table 2.1.

The most prominent positive effect is known as the *sampling effect*: consumers are introduced to new music, actors and genres and this creates new demand. Online piracy may also enhance the demand for *complementary products* such as live concerts and merchandise (e.g., Dewenter, Haucap and Wenzel, 2012; Mortimer, Nosko and Sorensen, 2012) and increase the popularity of content; this is known as the *network effect*.

On the downside, the most prominent effect is obviously *substitution*: a consumer refrains from buying specific content legally after having acquired or consumed it from an illegal source. Other negative effects on sales occur when sampling leads to fewer bad buys or deferred purchases at lower prices. Lastly, piracy may displace legal consumption via competition for people's time budget: if one watches a film illegally, one cannot watch a film legally at the same time.

Neutral effects with respect to sales occur when file sharing meets the demand of consumers with insufficient willingness to pay, consumers who have demand for a work that is not on offer, or for a work in a specific technical quality or file type that is not legally available.

Table 2.1 Possible effects of online piracy on the purchase of legal content

Positive	+ It introduces consumers to music, films, books and games (and to artists, authors and genres), thus creating new demand. This is known as the sampling effect. + It allows consumers to pool their demand, resulting in increased demand.* + It enhances willingness to pay and demand for concerts and related merchandise (complementary demand). + It enhances the popularity of products, boosting demand for legal supply (network effect).**
Neutral	• It meets the demand of consumers who are not, or not sufficiently, willing to pay and subsequently are not served by legal supply. • It meets a demand for products that are not offered legally.
Negative	- It substitutes for the purchase of content or cinema visits (*substitution effect*). - It results in the deferred purchase of content at a lower price than the price at launch - Sampling results in sales displacement as a result of fewer bad purchases. - It substitutes for legal consumption via consumers' time budget.

Source: Based on Eijk, Poort and Rutten (2010). Time budget mechanism added. * This applies in particular to exchanges of media with friends rather than to anonymous exchanges through large P2P networks. ** This applies in particular to the use of software for which network effects are clear. A (modest) network effect may also be found for lifestyle products such as music, films and games.

Differences among and within content types and changes over time

Against the background of the ten different possible interactions in Table 2.1, it is less of a surprise that the findings of empirical studies on the relationships between online piracy and legal consumption of content vary widely, ranging from positive to neutral to negative. Moreover, the strength of the different interactions is likely to differ among and within content types, and between occasional pirates and heavy pirates. In top of that, it is likely to have changed over time.

One relevant difference *between* music and games, on the one hand, and films, series and books, on the other hand, is that most people enjoy the same music many times, whereas they watch a film or read a book only once or twice. This implies that sampling is likely to be more relevant for music – try before you buy – than for audio-visual content and books. Also, the positive effect of piracy on the demand for related products such as live concerts and merchandise may be more significant for music, whereas the time budget effect is less relevant as music is often enjoyed while doing other things at the same time. All this suggests that net sales displacement is like to be higher for films, series and books than for music. The position of games in this spectrum is not obvious: it is likely that a fully functional game from an illegal source displaces demand for a legal version, but the gaming industry has more technical possibilities to ensure that an illegal version is not a perfect substitute – for instance, because it does not allow for periodic updates.

The strength of the different effects also varies *within* content types: the sampling effect is likely to be weaker for famous artists and blockbuster films from which consumers generally know what to expect. Moreover, popular and recent content is more likely to be on offer legally, whereas older and niche content may be unavailable or out of commerce. If so, consumption of such content from illegal sources cannot displace legal acquisition for that specific title. This effect is likely to be stronger in countries such as Thailand, Indonesia and Hong Kong, where not all major legal platforms are available.

Watson, Zizzo and Fleming (2015) mention the long-tail distribution of pirated content, and the net displacement effect may be different further down this tail than in the head of the distribution. Indeed, some studies find indications that more popular musicians and albums (Blackburn, 2004; Mortimer et al., 2012) and blockbuster films (Peukert, Claussen and Kretschmer, 2013) suffer more from the substitution effect, whereas less-well-known productions may even benefit as the opposing sampling effect prevails. However, other studies find an opposite effect (Bhattacharjee, Gopal, Lertwachara, Marsden and Telang, 2007; Hammond, 2013).

Lastly, the relevance of the interactions in Table 2.1 has changed over time. In the early days of illegal file sharing, music was available only on physical carriers, bundled in albums. Consumers who only wanted

a specific song were not served. Likewise, audio-visual content was tied to DVDs locked with technical protection measures. This situation has changed dramatically, and nowadays most popular content is available not only on physical carriers but also as digital downloads and via streaming services. In addition, film trailers and music videos are generally available for free via platforms such as YouTube. And Spotify, for instance, offers a free ad-sponsored music streaming service.

Such developments have reduced the incentive to turn to illegal sources for sampling or for specific technical formats that are not on offer via legal channels. It seems plausible that this has reduced piracy, and that is indeed what Poort and Weda (2015) concluded for the illegal consumption of music concurrent with the rise of legal music streaming. The authors also suggest that the net displacement rate of the remaining piracy may be higher as the positive sampling effect and the neutral effect of unmatched demand lose their relevance. Moreover, as many consumers lost interest in 'owning' content on cds and DVDs, they became less likely to buy a physical carrier after sampling a digital file. In the Netherlands, this proved to be fairly common in 2008, but much less so by 2012: in 2008, 63% of music pirates and 48% of film pirates did this at least once in the preceding year, whereas four years later these rates had dropped to 20% and 23%, respectively (Poort and Leenheer, 2012: 35). On the other hand, by now the remaining pirates may be the ones with the lowest purchasing power or willingness to pay.

Methodological challenges

A last, but no less important, explanation for the unequivocal outcomes of empirical studies are the methodological challenges involved. Put simply, one cannot just compare the legal and illegal music or film consumption of individuals and conclude that the observed correlation is causal. Several studies have shown that legal and illegal consumption go hand in hand and that on average, people who consume from illegal sources are the content industry's largest customers (e.g. Eijk, Poort and Rutten 2010). The underlying reason is that people who are more interested in music, films, series, books or games tend to consume more via any available channel, leading to a positive correlation between consumption from illegal and legal channels.

This means that empirical studies that observe individual consumption need to control for such individual differences as much as possible. The easiest way to do that in a survey is to ask individuals how much of a music, film, book or game aficionado they are. But even controlling for this, there are remaining unobserved individual characteristics that tend to induce a positive correlation. Several studies use a so-called instrumental variable (IV) approach to resolve this issue. The aim in this approach is to look for variables that correlate with consumption from illegal sources but that affect consumption from legal sources only through the former.

Earlier studies used instruments related to Internet availability and speed or individual Internet skills (e.g. Zentner, 2006; Oberholzer-Gee and Strumpf, 2007; Dang Nguyet et al., 2012). That may have been a valid approach when content consumption via the Internet was almost synonymous with consumption from illegal sources, but today that can no longer be maintained. Indeed, in the current survey it is observed that such variables tend to correlate strongly and positively with consumption from both legal and illegal channels as people need to have Internet access and Internet skills for both, making them unsuitable as instrumental variables. The current study uses a different instrument related not to Internet aptitude or availability but to moral attitudes toward activities such as jaywalking, taking a flash photo in a museum and travelling on public transit without a ticket (see Section 6.1). This approach was also used in Van der Ende, Poort et al. (2015). In addition, this study uses panel data analysis to control for unobserved individual characteristics (see Sections 6.2 and 6.3).

A related complexity is that both legal and illegal content supply have changed and diversified over time. To legally consume recorded music, for instance, one can buy a cd, rent it or borrow it from a library, purchase a digital file (e.g., on iTunes) or use a streaming service such as Spotify. There are also different channels for illegal consumption now. As mentioned in the introduction, the market as a whole has shifted from physical

carriers via downloads to streams. This implies that it is dangerous to interpret developments per channel in isolation: legal consumption via one channel cannibalises consumption via another. Put differently, a decrease in cd purchases may be due to legal downloads and streams as well as to online piracy. Ideally, one would estimate the effect of consumption via *all illegal channels* on *all legal channels*. This involves making assumptions about how to add streams, downloads and physical carriers (see Section 4.3).

2.3 The effect of enforcement on online piracy

Over the years, the entertainment industry has pursued a variety of strategies to combat unauthorised file sharing. Strategies that are currently followed in the countries studied in this report are described in detail in the *Legal Background Report*. Like the previous section, the discussion below focuses on *empirical* studies of the effect of such strategies.

Strategies involving legal supply

Some strategies against piracy concern the entertainment industry's own supply – for instance, the use of Digital Rights Management (drm) technology to prevent users from sharing legally acquired content. This strategy has been legally reinforced by the recognition of protection against circumvention of technological protection measures and rights management information in international law (in the WIPO Treaties) and to varying extents in the national laws of all countries in this study (See *Legal Background Report*, Sections 2–3 and Annex 2). For cds and digital music downloads, however, this strategy proved to be counterproductive and was mostly abandoned (Sinha, Machado and Sellman, 2010; Vernik, Purohit and Desai, 2011). For streaming services, audio-visual products, e-books and games, drm is still commonly used.

Another strategy is to offer legal digital alternatives. Danaher, Dhanasobhon, Smith and Telang (2010) study the effect of the removal of nbc content from the iTunes store in December 2007 and its restoration in September 2008 on BitTorrent piracy and DVD sales on Amazon. They associate the removal with an 11.4% increase in piracy of this content, twice the legal digital sales prior to removal. After the content was restored, no significant effects on DVD sales or on piracy levels were found. Similarly, Poort and Weda (2015) observe a decrease in online music piracy in the Netherlands between 2008 and 2012, while unauthorised consumption of films and tv content almost doubled. They link these opposite trends to the emergence of adequate legal services for downloading and streaming music (in particular Spotify) but the absence (at that time) of equally satisfactory services for audio-visual content.

A more controversial strategy involves the pollution or poisoning of illegal file sharing networks with useless decoys (Christin, Weigend and Chuang, 2005).

Legal action against individual file sharers

Legal action and enforcement against unauthorised sources can be distinguished in action against individual file sharers, the demand side of the illegal market, and action against the supply side, platforms that accommodate unauthorised file sharing.

In June 2003, the Recording Industry Association of America (RIAA) initiated a series of lawsuits against individual file sharers. Bhattacharjee, Gopal, Lertwachara and Marsden (2006) tracked the online file sharing behaviour of over 2,000 individuals. They found that in reaction to these lawsuits, the majority of substantial file sharers decreased the number of files shared typically by 90% and small-time file sharers typically by two-thirds. However, the individuals who continued unauthorised file sharing increased their activity again after a court ruling that made it harder for the RIAA to request the names of file sharers from ISPs. Furthermore, the authors note that individuals may have gone off the radar, using more covert file-sharing technologies.

Adermon and Liang (2011) studied the effects of implementation of the Intellectual Property Rights Enforcement Directive (IPRED) in Sweden on music and film sales. The authors found an 18% drop in

Internet traffic during the six months following implementation. Using difference-in-difference analysis with Finland and Norway as controls, they concluded that the implementation led to an increase in sales of physical music by 27% and digital music by 48%. No significant effects were found on cinema visits or DVD sales. On the other hand, it was also shown in the study that 'the reform effects more or less disappeared after six months except for digital music sales'. This suggests that it was primarily the publicity and awareness campaigns around the new legislation that had a temporary effect. Adermon and Liang (2011) also reported the outcome of two consumer surveys on file sharing. In 2009, 23% of the respondents stated that they had stopped using file-sharing sites as a result of the new legislation, and 37% used file-sharing sites less (N = 429). In 2010, 52% stated they used file-sharing sites less for downloading music than the year before (N = 1,060). In the group who reported downloading less than the year before, 56% mentioned Spotify and 25% 'better legal services' as the reason for this, and 34% mentioned the IPRED.

Danaher, Smith, Telang and Chen (2012) studied the effect of the French HADOPI legislation on digital sales in the iTunes store. Under this 'three strikes' legislation, implemented in October 2009, infringers first receive a warning. When caught again, they get a second warning; then, suspension of their Internet connection may be ordered. Using a difference-in-difference approach comparing French data with other countries, the authors found a positive effect on song and album sales at iTunes of 22.5% and 25%, respectively. However, it is impossible to disentangle the effects of the current legislation and the education campaigns accompanying the introduction of HADOPI. Most of the effect seems to have arisen before the (amended) legislation was finally accepted by the Constitutional Council and diminished since then. However, HADOPI is increasing the number of cases it brings to court and the three million e-mails and 330,000 notice letters that the committee sent between 2010 and 2014 appear to have caused a reduction in online copyright infringement (*Legal Background Report*, Section 4.1).

Legal action against platforms that accommodate file sharing

A different strategy is directed toward platforms that accommodate file sharing – the supply side of the illegal market. The most direct way to do this is to shut down platforms and websites that host or direct to illegal content. However, this may be problematic if the platform is outside the jurisdiction of enforcement. Also, a platform that is taken down may quickly re-emerge elsewhere or be succeeded. An early example of this was the shutdown of Napster in July 2001. As mentioned above, Napster was soon succeeded by alternative platforms such as KaZaA and BitTorrent clients that decentralise the file-sharing process. The bootstrapping of the process occurs at sites such as The Pirate Bay.

In January 2012, Megaupload, the most popular cyberlocker, was shut down. Danaher and Smith (2013) studied the effects of this on unauthorised file sharing and legal online film rentals and purchases. They analysed cross-country variation in the use of Megaupload before and the change in legal sales after the shutdown. No relationship was found between the penetration of Megaupload and digital sales prior to the shutdown. However, a significant positive relationship was found between this penetration and the change in legal sales after the shutdown. For each additional 1% of pre-shutdown penetration, post-shutdown sales increased by an extra 2.5–3.8%. The absence of a relationship between Megaupload penetration and digital sales prior to shutdown suggests that the effect of such a shutdown is temporary and lasts until consumers have found their way to alternative suppliers of illegal video content. Peukert, Claussen and Kretschmer (2013) also studied the effect of the Megaupload shutdown and found that the shutdown had a negative effect on box-office revenues for smaller and mid-range films. Only blockbusters benefited from the shutdown of Megaupload, whereas smaller films may have benefited more from file sharing through word-of-mouth in social networks. Overall, the effect that they found was not statistically significant.

Lauinger et al. (2013) also studied the effect of legal actions against cyberlockers, such as removing certain content. They found that such actions are a nuisance to cyberlocker users but that their effect on overall availability of content and on file-sharing activity is limited. They concluded that cyberlockers 'are probably most vulnerable to antipiracy measures targeted at removing external sources of revenue. Indexing sites may

be less affected, especially those that are less driven by (and reliant on) monetary gain' (Lauinger et al., 2013: 12).

Along the same lines, Aguiar, Claussen and Peukert (2018) studied the effect in Germany of the shutdown of an unauthorised video-streaming website (kino.to). They concluded, 'This intervention was not very effective in reducing unlicensed consumption or encouraging licensed consumption, mainly because users quickly switch to alternative unlicensed sites.' Moreover, they observed that after the shutdown, the unlicensed market became more fragmented, making it more resilient to subsequent interventions.

An alternative approach being applied in an increasing number of countries, particularly in Europe, is blocking access to infringing websites.[8] As noted in the *Legal Background Report* (Section 4), in most countries website blocking would require a court order or at least follow an administrative procedure, to avoid chilling effects and over-blocking of websites containing both infringing and non-infringing content or content the legality of which is debatable.[9] There are different technical means of blocking access (for a discussion, see Cory, 2016), but the key element is that blocking can be done nationally or at the level of an Internet provider, without taking down the platform that is offering or directing to unauthorised content. Thus, jurisdiction is less of an obstacle. Research shows that blocking access to individual websites has little or no effect on consumption from illegal channels, as people can easily circumvent the blocking injunction or move to alternative websites (Poort, Leenheer et al., 2014). On the other hand, there is evidence that simultaneously blocking a large number of websites in the UK had a statistically significant negative effect on total online piracy and a positive effect on the use of legal video streaming platforms (Danaher, Smith and Telang, 2016).

Other approaches to combating the supply of unauthorised content may involve cutting off revenue streams of infringing websites by persuading advertisers and credit card companies to boycott them, removing search results and removing infringing apps from app stores.

8 According to information from the Motion Picture Association Canada, at least 42 countries are currently blocking infringing websites, and in Europe alone, 1,800 websites and 5,300 domains have been blocked. See: https://torrentfreak.com/mpa-reveals-scale-of-worldwide-pirate-site-blocking-180410/.

9 See also Council of Europe (2015) and http://www.michaelgeist.ca/2018/02/case-bell-coalitions-website-blocking-plan-part-4-absence-court-orders-put-canada-odds-almost-everyone/.

3. Country statistics and sales developments

This chapter provides some basic statistics for the 13 countries in this study and gives an overview of sales levels for music, films and series, books and games per country. General country data (Section 3.1) have been retrieved from the World Bank. Data on sales volume per content type (Sections 3.2–3.5) have been retrieved from *PWC Global entertainment and media outlook 2018-2022*, which is based on a variety of sources. Sales revenues are presented in € per capita in each country. Corresponding graphs for the relative development between 2014 and 2017 are given in Annex A. Where possible and relevant, a distinction is made between physical formats, digital sales and live attendance (live concerts and cinema visits), in line with the distinctions in the consumer survey.

3.1 Country statistics

Table 3.1 presents basic country statistics for the 13 countries in this study. It shows that Indonesia and Brazil are by far the largest countries population-wise. Combined, the 13 countries have a population of more than one billion.

Table 3.1 Country statistics (2016)

	Population (million)	Aged 0–14	Aged 15–64	Aged 65 and older	Female	Income per capita (€1,000)
France	66.9	18.2%	62.5%	19.3%	50.8%	34.05
Germany	82.7	13.1%	65.6%	21.3%	50.8%	38.54
The Netherlands	17.0	16.6%	65.0%	18.4%	50.3%	40.48
Poland	37.9	14.8%	69.0%	16.2%	51.7%	11.11
Spain	46.4	14.8%	66.1%	19.2%	51.0%	24.00
Sweden	9.9	17.4%	62.8%	19.8%	50.0%	47.85
United Kingdom	65.6	17.6%	64.0%	18.4%	50.7%	37.13
Brazil	207.7	22.1%	69.6%	8.2%	50.8%	7.74
Canada	36.3	16.0%	67.5%	16.6%	50.4%	38.24
Hong Kong	7.3	11.2%	73.0%	15.8%	53.9%	37.87
Indonesia	261.1	27.7%	67.1%	5.2%	49.6%	2.98
Japan	127.0	12.9%	60.5%	26.6%	51.2%	33.28
Thailand	68.9	17.7%	71.4%	11.0%	51.2%	4.94
Total	**1034.8**	**16.9%**	**66.5%**	**16.6%**	**51.0%**	**27.55**

Source: World Bank (data.worldbank.org, retrieved 21 November 2017. No 2017 data available per 19 June 2018).

Differences in the age composition of the countries in the study are expected to affect the channels used for content acquisition: earlier studies (e.g. Poort and Leenheer, 2012; Van der Ende, Poort et al., 2015) have shown that digital content consumption, and in particular consumption from illegal sources, is much more common in younger age groups. In terms of age composition, the European countries and Canada are relatively comparable, with 13% to 18% of the population aged between 0 and 14; 62% to 69% aged between 15 and 64, and 17% to 21% aged 65 and older. Out of these eight countries, Germany has the oldest population.

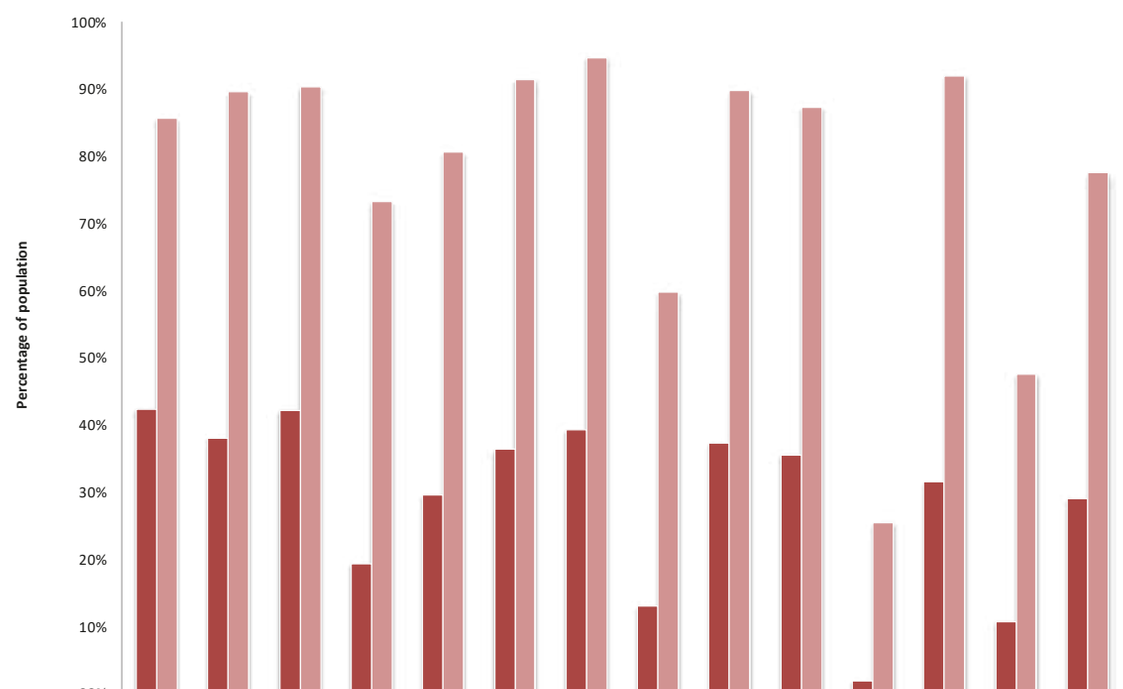
Indonesia and Brazil have a considerably younger population, with a large percentage of children aged 14 and below, and fewer seniors. The age composition in Japan is the mirror image of that, with over a quarter

of the population aged 65 and older. Thailand and Hong Kong have a relatively large population share between 15 and 64 years of age. By gender, a relatively high percentage of females in Hong Kong stands out.

The last column in Table 3.1 gives the gross national income per capita in each of the countries. Sweden is the richest country in the set with, an average per capita income of nearly €48,000. In Europe, per capita income is much lower in Spain and Poland, at €24,000 and €11,000, respectively. Per capita income is lowest in Indonesia, Thailand and Brazil, ranging from €3,000 to €8,000. The last row in Table 3.1 gives the total population and the population weighted average for the other indicators.

Internet access is obviously a necessary condition for online consumption of music, films, series, games and books from both legal and illegal sources. Therefore, Internet penetration figures per country are an essential factor in comparing and interpreting the outcomes of the survey. Figure 3.2 gives the number of fixed broadband lines as a percentage of the total population (left bar) and an indicator for the population share that has recently used the Internet (right bar). Internet use has roughly the same country pattern as per capita income. It is more than 80% in the wealthy countries, between 70% and 80% in Poland and Spain, and ranges from 25% to 60% in Indonesia, Thailand and Brazil.

Figure 3.2 Internet users and broadband lines



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Fixed broadband	42%	38%	42%	19%	29%	36%	39%	13%	37%	35%	02%	31%	11%	29%
Internet users	86%	90%	90%	73%	81%	92%	95%	60%	90%	87%	25%	92%	48%	78%

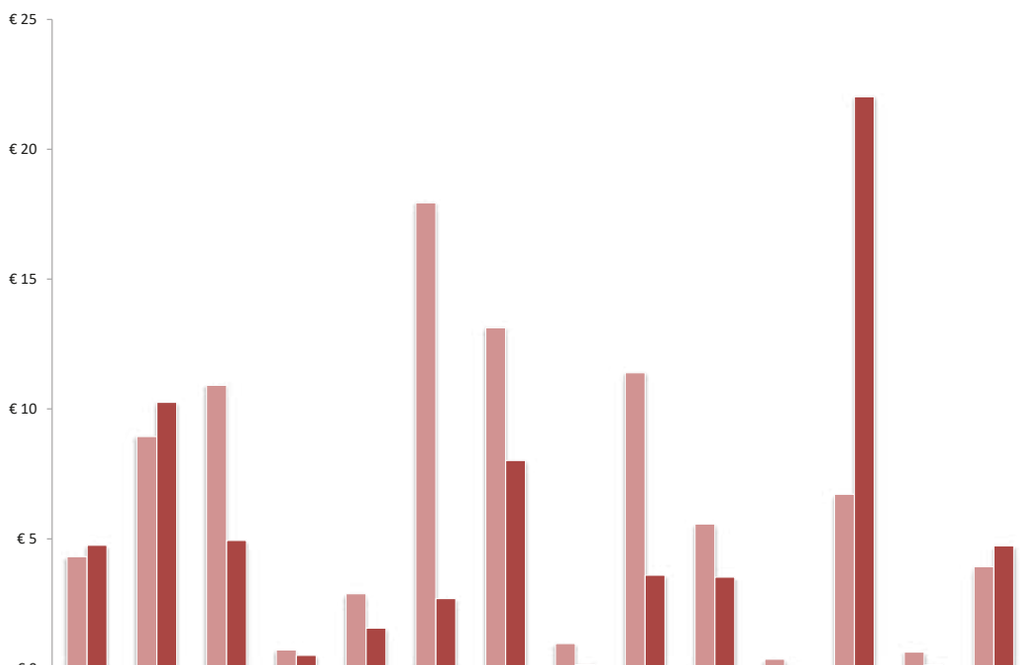
Source: World Bank (data.worldbank.org, retrieved 21 November 2017. No 2017 data available per 19 June 2018).Fixed broadband subscriptions per 100 people, Internet users defined as individuals who have used the Internet (from any location) in the last three months via a computer, mobile phone, personal digital assistant, games machine, digital tv or other means.

The number of fixed broadband lines per capita is no higher than 0.42 in any country, which can be explained by the fact that households generally share a fixed line. At an average household size of 2.5 persons, 0.40 lines per capita would amount to almost universal access. In line with Internet use between 80% and 90%, the number of fixed broadband lines per capita is between 0.3 and 0.4 in the wealthy countries. This number is much lower in Poland, Thailand, Brazil and most notably Indonesia, even compared to Internet use in those countries. This illustrates that these countries rely much more than the others on mobile Internet instead of fixed lines.

3.2 Music

Figure 3.3 presents the digital (left bars) and physical (right bars) recorded music sales per country in 2017. Data are revenues in € per capita. It shows that digital recorded music has outgrown physical carriers in most of the countries. The exceptions are France, Germany and Japan. Sweden has gone almost entirely digital, whereas Japan is holding on to physical carriers. Over the past three years, digital has increased substantially, while revenues from physical carriers have decreased across the board (Annex A, Figure A.1).

Figure 3.3 Digital and physical recorded music sales



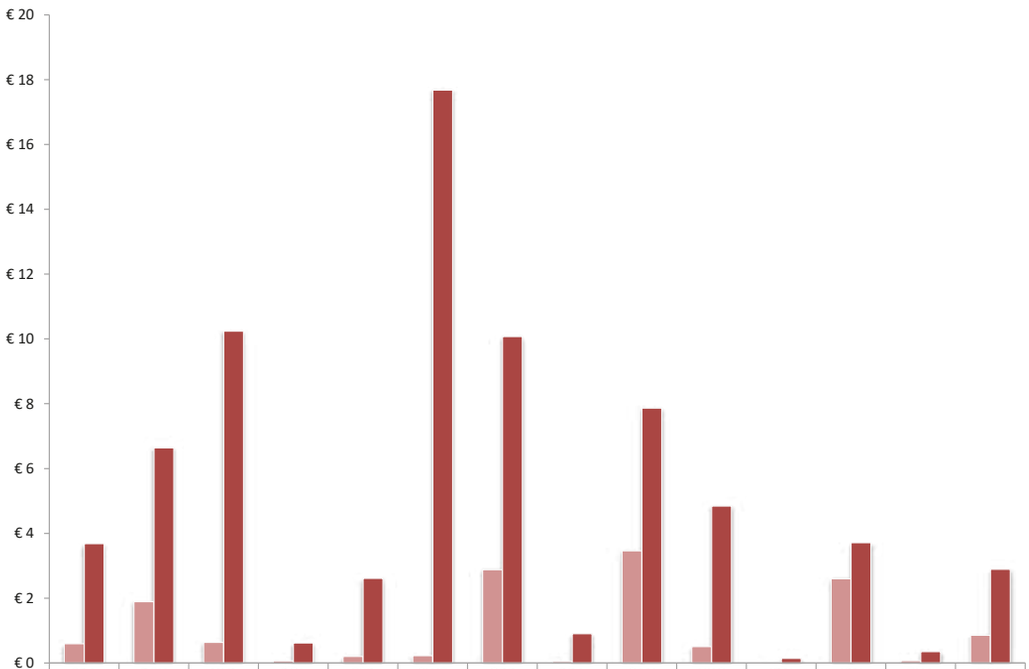
	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Digital	€ 4.31	€ 8.94	€ 10.91	€ 0.72	€ 2.89	€ 17.94	€ 13.13	€ 0.97	€ 11.39	€ 5.57	€ 0.36	€ 6.71	€ 0.63	€ 3.92
Physical	€ 4.75	€ 10.26	€ 4.93	€ 0.51	€ 1.55	€ 2.69	€ 8.02	€ 0.14	€ 3.59	€ 3.52	€ 0.02	€ 22.03	€ 0.13	€ 4.73

Source: *PWC Global entertainment and media outlook 2018-2022*. 2017 revenues from digital sales (left bars) and physical sales (right bars) in € per capita. Digital sales consist of downloading, streaming and mobile.

Figure 3.4 zooms in on the digital revenues from recorded music. It presents revenues per capita from downloading (left bars) and streaming services (right bars) in 2017. Streaming generates greater revenues than does downloading in each country. On average, revenues from streaming services are more than three times higher than those from downloads in these 13 countries. Streaming is most popular in Sweden, the home of Spotify, followed by the Netherlands and the United Kingdom. In Poland, Spain and outside Europe, revenues from streaming services are lower. In Canada and Japan, this seems related to the relative popularity of downloads;[10] in countries such as Poland, Brazil, Indonesia and Thailand, relatively low purchasing power is a likely explanation. Music streaming has increased steeply over the past three years in almost every country, while this market seems to have matured in Sweden. Music downloading has shrunk considerably in almost all countries (Annex A, Figure A.2).

10 Furthermore, mobile music revenues – not depicted – are also substantial in Japan.

Figure 3.4 Digital music downloading and streaming



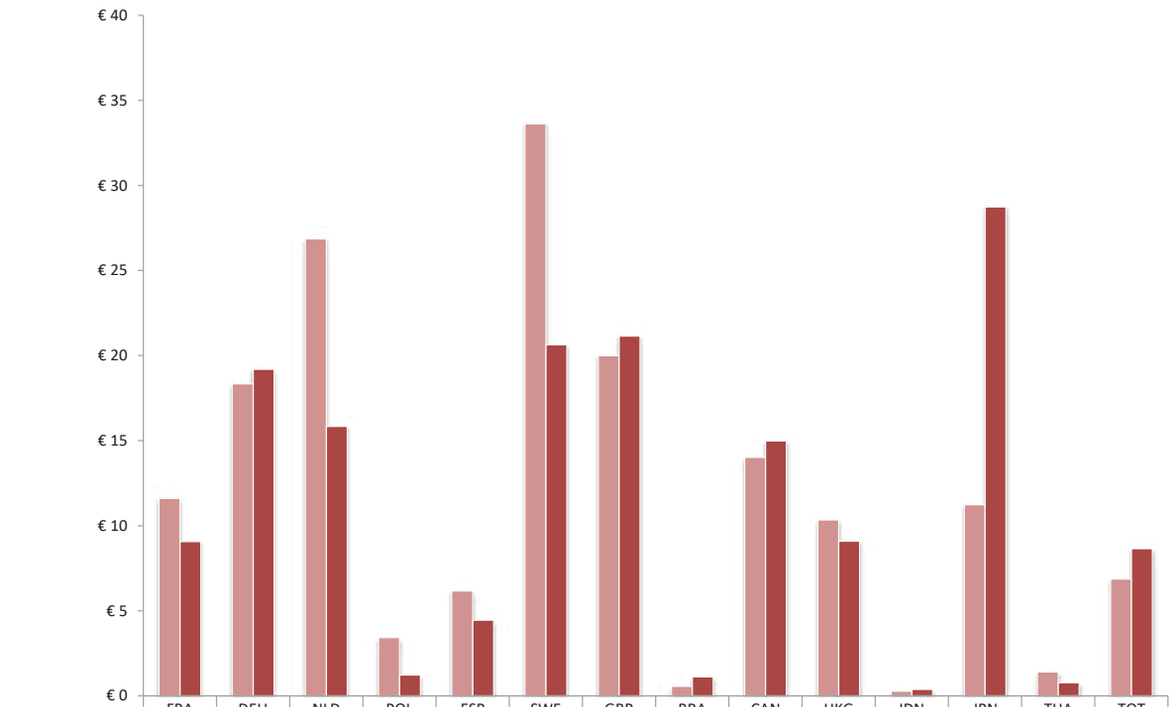
	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloading	€ 0.59	€ 1.89	€ 0.63	€ 0.06	€ 0.20	€ 0.22	€ 2.88	€ 0.04	€ 3.46	€ 0.50	€ 0.01	€ 2.60	€ 0.07	€ 0.86
Streaming	€ 3.68	€ 6.64	€ 10.24	€ 0.62	€ 2.61	€ 17.68	€ 10.07	€ 0.90	€ 7.87	€ 4.84	€ 0.14	€ 3.71	€ 0.35	€ 2.89

Source: *PWC Global entertainment and media outlook 2018-2022*. 2017 revenues from digital downloads (left) and streaming services (right) in € per capita.

Zooming out from the previous two graphs, Figure 3.5 shows that consumer expenditures on live music and recorded music (digital plus physical) are of similar magnitude in nine out of the 13 countries in this study. Exceptions are the Netherlands and Sweden, in which expenditures on live music are substantially higher, and Japan and Brazil, in which they are considerably lower. Consumer spending on both live music and recorded music has increased in almost each country over the past three years, with the exception of Poland (live) and France and Thailand (recorded) (Annex A, Figure A.3).

To conclude this section on music, Figure 3.6 plots consumer expenditures on recorded music against income (both per capita). A strong correlation between the two is clearly visible for lower-income countries, but the trend disappears above an income level of about €30,000 per capita. Put differently, expenditures in Japan, the UK, Germany, Sweden and the Netherlands are substantially higher than the trend for the other countries would suggest. One could assert that above this level, recorded music is sufficiently affordable and national preferences dominate income effects.

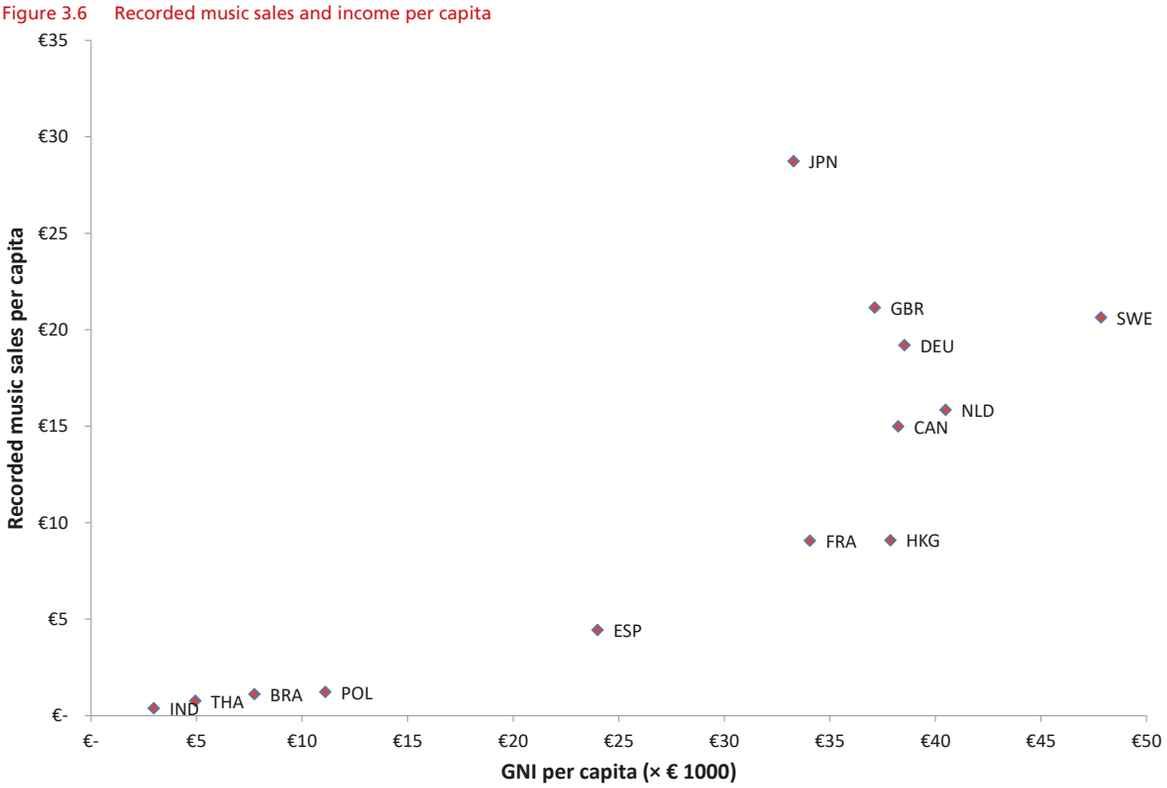
Figure 3.5 Live music ticket sales and recorded music sales



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Live	€ 11.60	€ 18.34	€ 26.85	€ 3.42	€ 6.16	€ 33.62	€ 19.99	€ 0.55	€ 14.01	€ 10.33	€ 0.27	€ 11.23	€ 1.40	€ 6.86
Physical + Digital	€ 9.06	€ 19.20	€ 15.84	€ 1.22	€ 4.44	€ 20.63	€ 21.14	€ 1.11	€ 14.98	€ 9.08	€ 0.37	€ 28.74	€ 0.76	€ 8.65

Source: *PWC Global entertainment and media outlook 2018-2022*. 2017 revenues from recorded music (left bars) and live music ticket sales (right bars) in € per capita. Recorded music revenues exclusive of performance and synchronisation rights.

Figure 3.6 Recorded music sales and income per capita

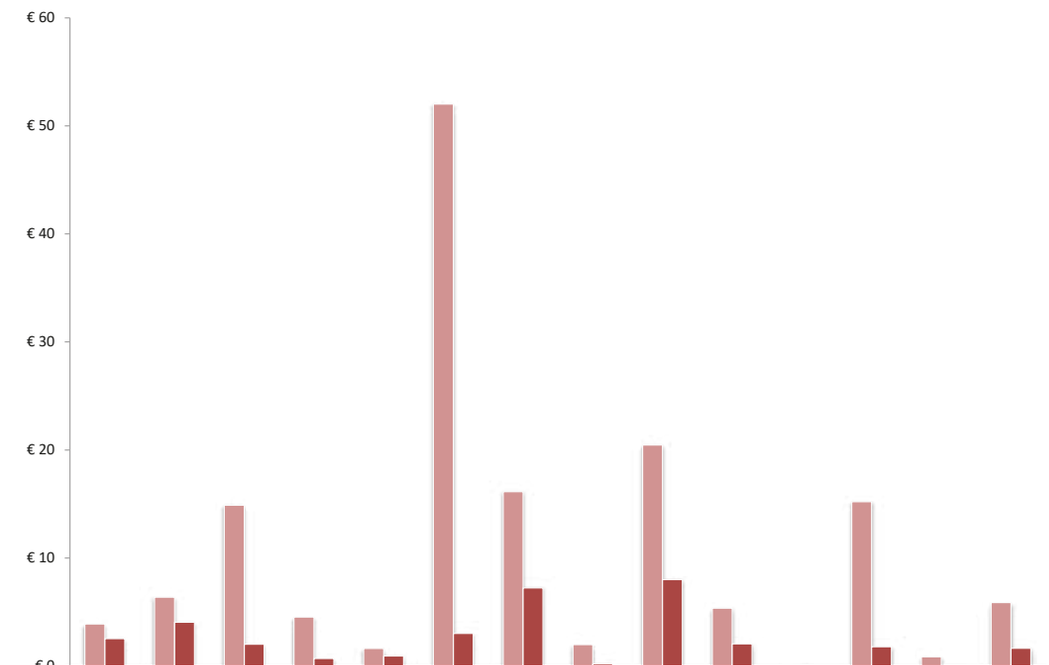


Source: PWC/World Bank. 2017 revenues from recorded music exclusive of performance and synchronisation rights.

3.3 Film and video

Figure 3.7 depicts per capita expenditure on video-on-demand subscriptions such as Netflix (svod), and transactional video on demand, digital rental or downloads, such as Apple tv (tvod). Revenues from svod are particularly high in Sweden, Canada, the Netherlands, the United Kingdom and Japan. tvod is most popular in Canada and the UK. In each of the countries studied in this report, tvod and, to a lesser extent, svod have grown rapidly over the past three years (Annex A, Figure A.4).

Figure 3.7 Subscription and transactional video on demand (svod and tvod)



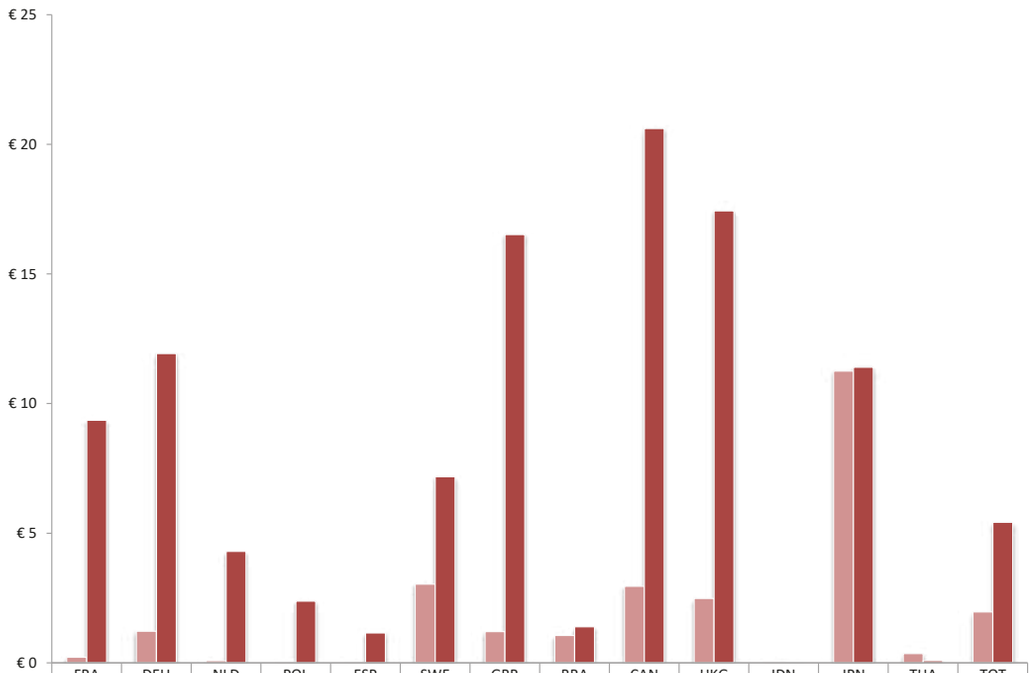
	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
SVOD	€ 3.89	€ 6.36	€ 14.89	€ 4.52	€ 1.62	€ 52.03	€ 16.13	€ 1.96	€ 20.45	€ 5.35	€ 0.08	€ 15.21	€ 0.84	€ 5.86
TVOD	€ 2.53	€ 4.04	€ 2.01	€ 0.68	€ 0.91	€ 3.00	€ 7.22	€ 0.19	€ 7.98	€ 2.04	€ 0.02	€ 1.77	€ 0.03	€ 1.63

Source: *PWC Global entertainment and media outlook 2018-2022*. Figures generally do not include VOD subscriptions bundled with tv packages.

Figure 3.8 shows that, despite years of decline in almost every country (Annex A, Figure A.5), sell-though and rental of physical carriers for film and video remain a substantial source of revenue, particularly in Canada, Hong Kong and the UK. A comparison of this figure with the preceding one reveals the extent to which countries have 'gone digital' for audio-visual content. In this respect, Sweden and the Netherlands are the frontrunners.

Figure 3.9 zooms out to the total market for recorded film and video (vod plus physical carriers) and compares it with cinema box-office revenues. Box-office revenues are higher in France, Spain, Hong Kong, Indonesia and Thailand and lower in the other countries. Between 2014 and 2017, revenues from vod plus physical carriers increased in most countries in this study, but not in France, the United Kingdom and Hong Kong. Countries such as the Netherlands, Poland, Spain, Thailand and particularly Indonesia experienced turbulent growth (Annex A, Figure A.6). Cinema box-office revenue has increased in each of the countries.

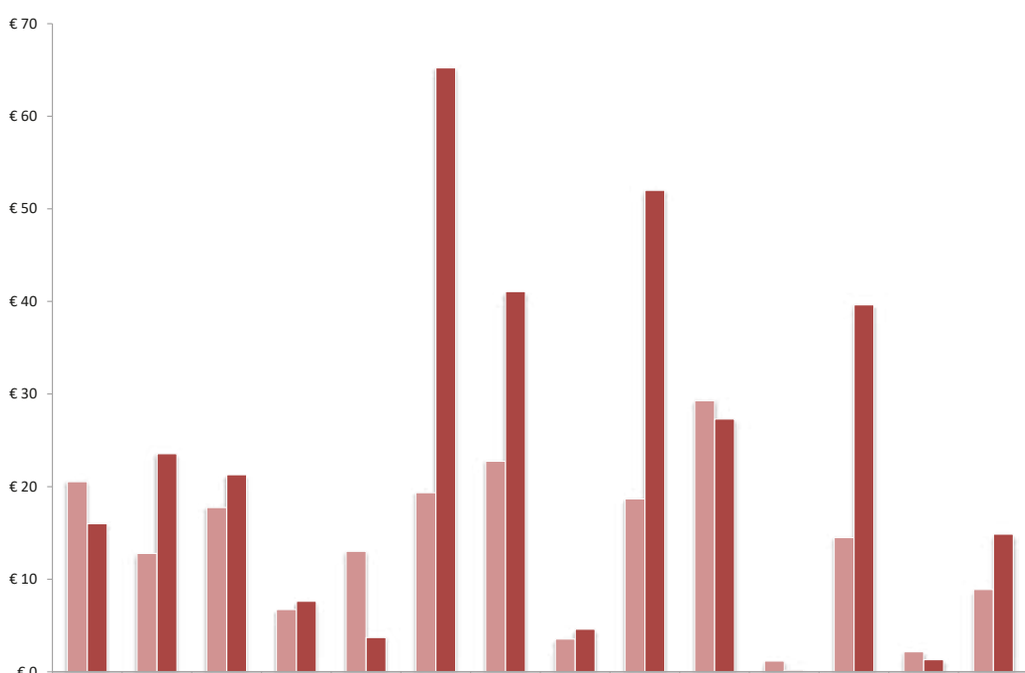
Figure 3.8 Blu-ray and DVD rentals and sell-through



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Rentals	€ 0.21	€ 1.21	€ 0.08	€ 0.02	€ 0.02	€ 3.03	€ 1.20	€ 1.05	€ 2.95	€ 2.48	€ 0.03	€ 11.25	€ 0.35	€ 1.96
Sell-through	€ 9.36	€ 11.93	€ 4.29	€ 2.38	€ 1.15	€ 7.18	€ 16.52	€ 1.39	€ 20.61	€ 17.43	€ 0.01	€ 11.40	€ 0.08	€ 5.42

Source: *PWC Global entertainment and media outlook 2018-2022*. Physical home video rentals/sell-through.

Figure 3.9 Box office in cinemas and digital plus physical video revenues

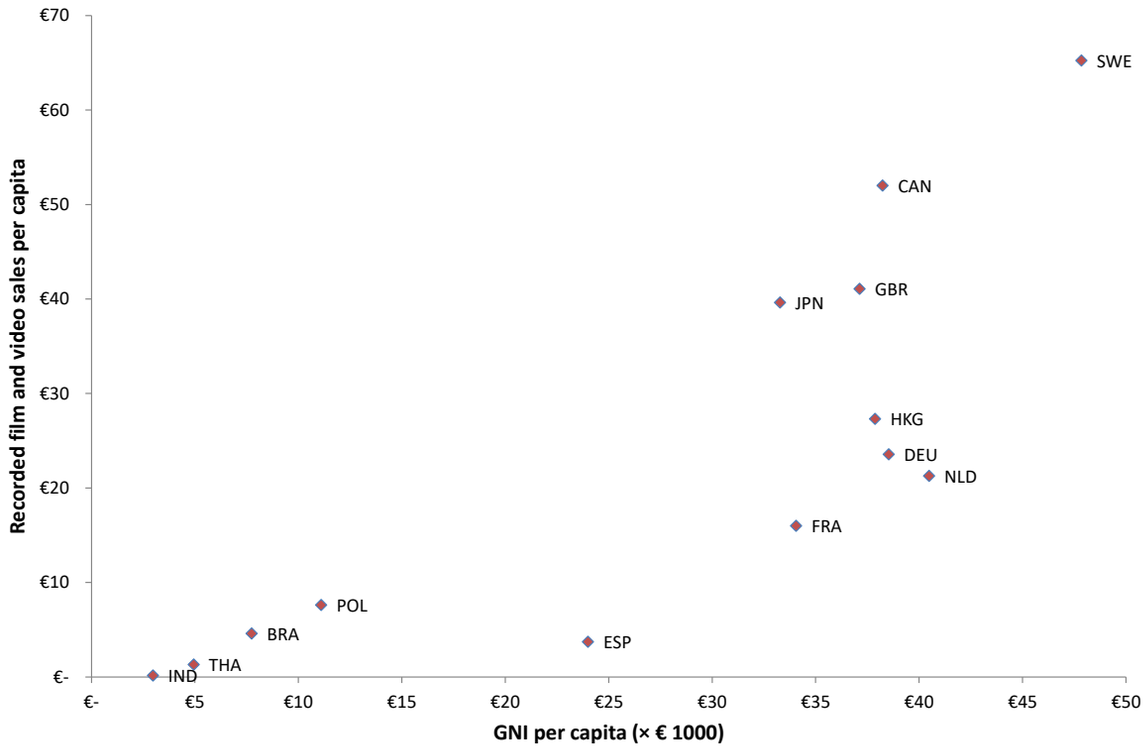


	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Cinema	€ 20.52	€ 12.77	€ 17.73	€ 6.71	€ 13.01	€ 19.33	€ 22.74	€ 3.53	€ 18.67	€ 29.28	€ 1.14	€ 14.49	€ 2.16	€ 8.88
VOD + Physical	€ 15.98	€ 23.55	€ 21.27	€ 7.60	€ 3.70	€ 65.24	€ 41.07	€ 4.59	€ 51.99	€ 27.30	€ 0.15	€ 39.63	€ 1.30	€ 14.86

Source: PWC Global entertainment and media outlook 2018-2022. Digital plus physical video revenues consist of tvod, sdov, physical home video sell-through and physical home video rentals. Generally do not include VOD subscriptions bundled with tv packages.

Finally, Figure 3.10 plots consumer expenditures on recorded films and videos against income (both per capita). Like for music, a strong correlation between the two exists for lower-income countries – although Spain breaks this trend by showing low per capita expenditures – whereas above an income level of about €30,000 per capita, there is no longer a clear pattern.

Figure 3.10 Recorded film and video sales and income per capita

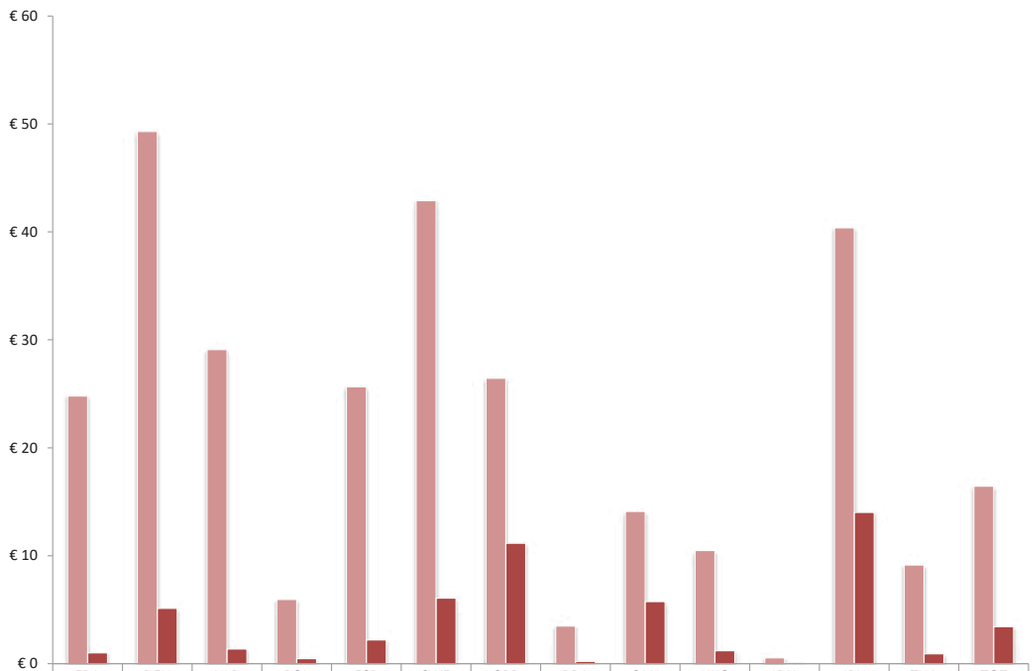


Sources: *PWC Global entertainment and media outlook 2018-2022*/World Bank.

3.4 Books

Figure 3.11 provides per capita sales revenues for printed books and audiobooks (left bars), and e-books (right bars). Educational and professional publications have been excluded. Expenditures on printed books turn out to be highest in Germany, Sweden and Japan. The other European countries, except for Poland, follow *ex aequo*. E-books are the most popular in the United Kingdom and Japan. The e-book market is growing in each of the countries (Annex A, Figure A.7). Over the 13 countries combined, the e-book market has grown by 46% in the last three years. The growth of e-books is particularly strong in Asian countries. Printed books and audiobooks combined have shown a slight decrease in most countries, exceptions being the Netherlands, Sweden, UK and Canada. Comparing the two bars per country in Figure 3.11, one can see that the UK, Canada and Japan have the most mature e-book markets. The French book market is the least digitised of all.

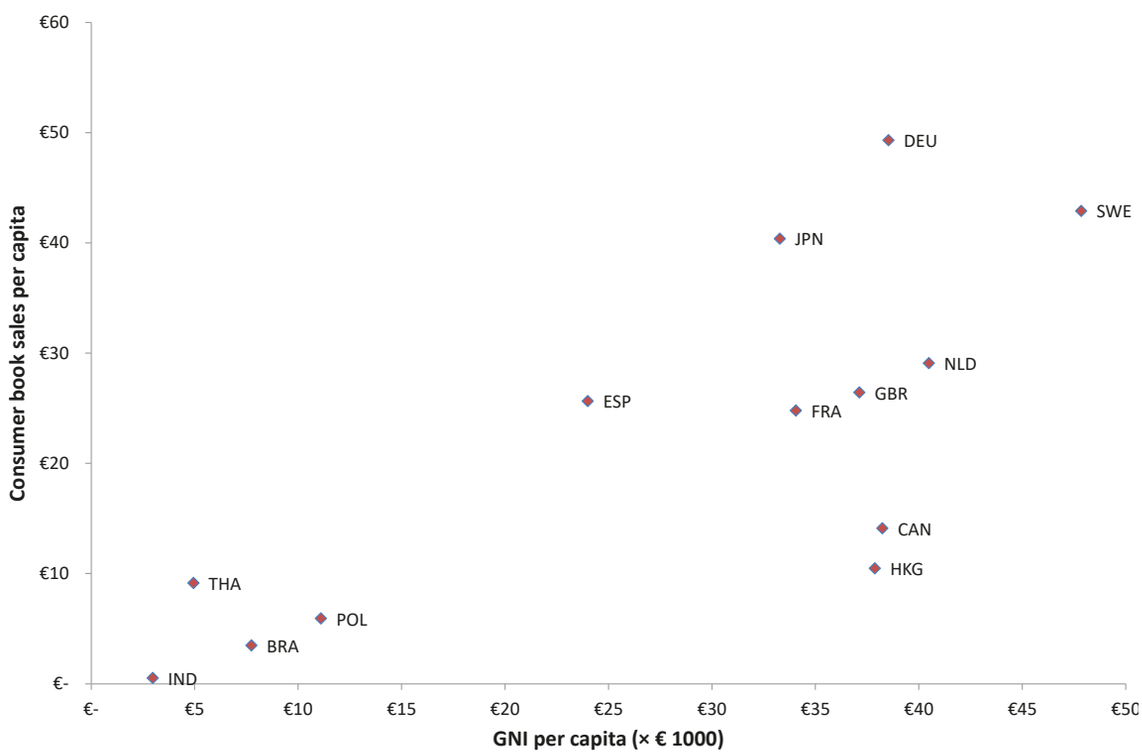
Figure 3.11 Print/audiobook and e-book sales revenues (consumer books)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Print+Audiobooks	€ 24.79	€ 49.31	€ 29.09	€ 5.93	€ 25.65	€ 42.90	€ 26.43	€ 3.47	€ 14.10	€ 10.47	€ 0.53	€ 40.38	€ 9.14	€ 16.44
Ebooks	€ 0.99	€ 5.11	€ 1.35	€ 0.45	€ 2.19	€ 6.06	€ 11.15	€ 0.20	€ 5.74	€ 1.19	€ 0.07	€ 14.00	€ 0.89	€ 3.42

Source: *PWC Global entertainment and media outlook 2018-2022*.

Figure 3.12 Consumer book sales and income per capita



Source: *PWC Global entertainment and media outlook 2018-2022*/World Bank.

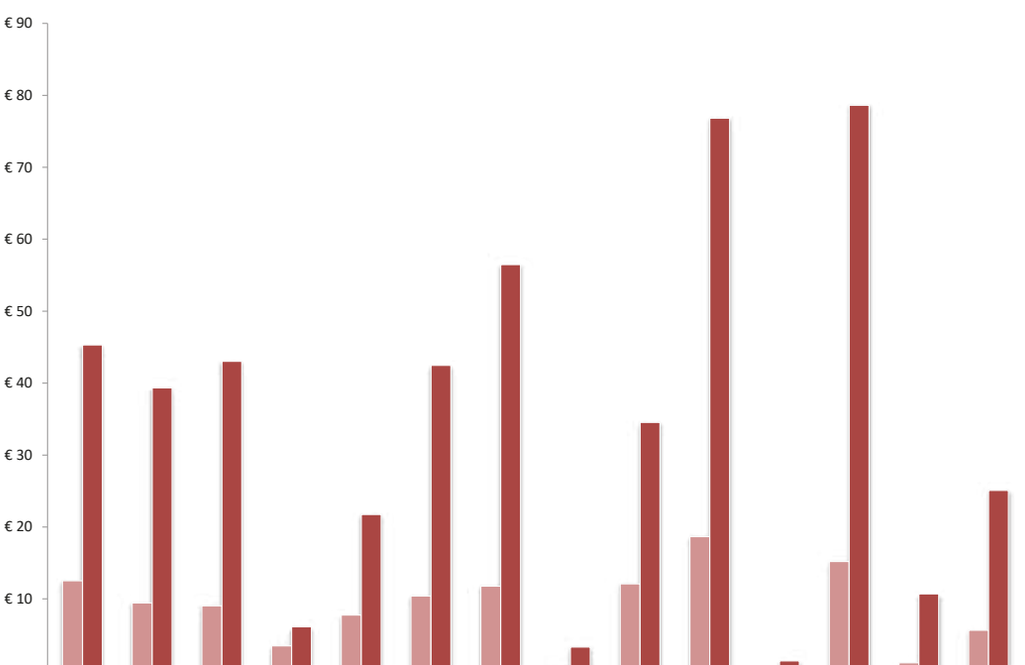
Figure 3.12 plots consumer expenditures per capita on books against per capita income. This graph differs somewhat from that for music and film/video expenditures in the sense that per capita expenditures are more varied in lower-income countries. Thailand and Spain have relatively higher sales levels than would be expected based on per capita income. This may be explained by the fact that book markets are comparatively more national and less global. As a consequence, pricing will follow local income levels more naturally. Canada and Hong Kong report relatively low per capita expenditures on books and, like for music and film/video, there is no discernible relationship between per capita income and expenditures within the group of higher-income countries.

3.5 Games

The market for video games consists of many different business models and revenue streams. Figure 3.13 simplifies this by focusing on revenues from physical carriers on the one hand (left bars), and all digital revenues from consumers on the other hand (right bars). Expenditures on hardware and advertising revenues are excluded (advertising revenues are between 1% and 6% of total revenues from digital and physical sales), but expenditures on social games/casual games, subscriptions, digital downloads and in game purchases are included. Digital revenues are much higher than revenues from physical carriers in every country. On average they are almost five times as high. These digital revenues have grown between about 50% and 100% over the past three years in each country (Annex A, Figure A.8). Revenues from physical carriers have decreased in each country.

Per capita expenditures on games are particularly high in Hong Kong and Japan. This is also reflected when plotting these expenditures against per capita income (Figure 3.14): even against the background of relatively high per capita income in these countries, per capita expenditures on games stand out. Expenditures in Thailand are also relatively high in light of income levels. Overall, the pattern in Figure 3.14 is much like that for the other content types.

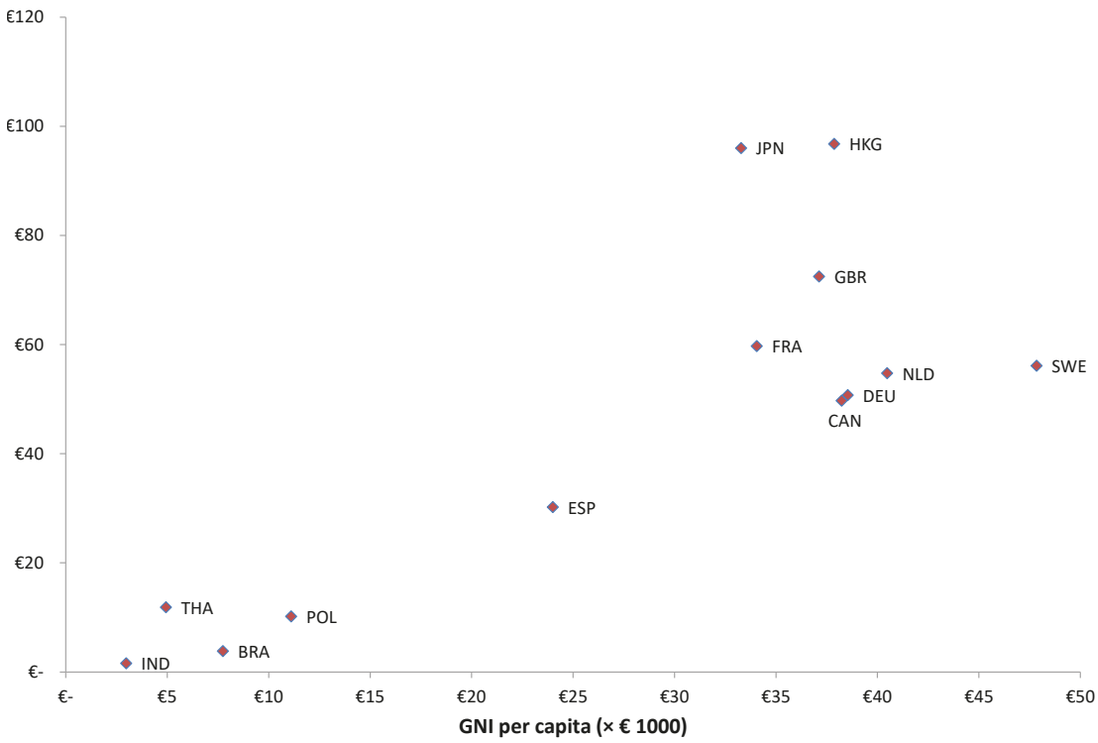
Figure 3.13 Revenues from physical and digital games



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical	€ 12.52	€ 9.42	€ 9.04	€ 3.45	€ 7.74	€ 10.39	€ 11.77	€ 0.36	€ 12.08	€ 18.64	€ 0.11	€ 15.20	€ 1.11	€ 5.63
Digital	€ 45.29	€ 39.32	€ 43.02	€ 6.10	€ 21.72	€ 42.46	€ 56.46	€ 3.31	€ 34.54	€ 76.82	€ 1.38	€ 78.62	€ 10.69	€ 25.09

Source: *PWC Global entertainment and media outlook 2018-2022*. Physical revenues from console games and PC games. Digital revenues as total revenues from consumers minus physical revenues and include expenditures on social games/casual games, digital downloads, subscriptions, in game purchases, etc.

Figure 3.14 Consumer expenditures on games per capita



Source: *PWC Global entertainment and media outlook 2018-2022*/World Bank.

3.6 Conclusions

From the graphs and discussion in this chapter, some overarching observations emerge:

- Across all content types and formats, per capita income appears to be an important driver of per capita expenditure, but above an annual income level of €30,000 per capita, this relationship no longer seems to apply and national preferences dominate income effects.
- Physical sales are in decline for almost all content types and in almost every country, most notably for audio-visual content.
- Books are relatively resilient to digitisation, and print books are still dominant in each country.
- Digital sales have grown almost everywhere over the past three years. For music, digital streaming grew strongly at the expense of digital downloads. For audio-visual content, video on demand on both a subscription and transaction basis – svod and tvod – grew, but svod, such as Netflix, is becoming the dominant model.
- Despite the decline of physical sales, the increase in digital sales led to a net growth for total recorded music, audio-visual content, games and books between 2014 and 2017.
- Expenditures on live concerts and films are growing almost everywhere. For music, live concerts generate revenue comparable to that for recorded music in most countries.

4. Survey sample descriptives, weighting and data cleaning

4.1 Sample composition and recruitment

As can be seen from Table 4.1, the survey was completed by a total of 34,673 respondents, between 2,640 and 2,750 per country. In total, the response contains over 7,000 minors between 14 and 17 years of age, between 500 and 604 per country. A total of 4,352 respondents from seven European countries were approached with similar surveys in 2012 (the Netherlands) and the other six countries (2014), which implies that they can be followed over time.

Table 4.1 Sample composition by country, age and gender

		Total	Minors	Adults	Female	Male	Longitudinal
Europe	FRA	2,640	529	2,111	1,343	1,297	849
	DEU	2,659	554	2,105	1,344	1,315	661
	NLD	2,654	540	2,114	1,325	1,329	986*
	POL	2,648	537	2,111	1,364	1,284	344
	ESP	2,662	538	2,124	1,342	1,320	539
	SWE	2,662	560	2,102	1,330	1,332	442
	GBR	2,653	525	2,128	1,349	1,304	531
Americas	BRA	2,664	528	2,136	1,382	1,282	
	CAN	2,684	564	2,120	1,349	1,335	
Asia	HKG	2,644	500	2,144	1,442	1,202	
	IDN	2,649	535	2,114	1,306	1,343	
	JPN	2,704	558	2,146	1,362	1,342	
	THA	2,750	604	2,146	1,395	1,355	
Total		**34,673**	**7,072**	**27,601**	**17,633**	**17,040**	**4,352**

*In a separate survey conducted by CentERdata.

The respondents were reached through Survey Sampling International (ssi). In building proprietary panels, ssi employs a broad, multi-sourced online approach. ssi offers a national representative online panel for each country. National panel sizes of ssi are necessarily far larger than the number of respondents (less than 3,000 per country), because not all panellists can be reached at the same time and panellists are not allocated to a survey if a sufficient number of respondents in the same category (gender and age) have already answered the survey.

Although ssi reaches out to offer panel membership as broadly as possible, and anyone can apply to join, ssi does not accept all applications. A 'moat' is built around the panel to ensure that any panel member whose application to join is accepted is likely to answer surveys carefully and truthfully. Respondents are not paid to join a panel, and ssi employs various quality checks in an effort to identify potential poor-quality respondents and prevent them from joining or remaining on ssi panels. These include identity checks and pattern recognition across surveys to detect fraudulence, and checks on inattention such as speeding (answering questions in a very short time), straight-lining (checking the same option for all answers), unthoughtful answers to open questions and quickly clicking away introductory texts). By default, ssi panellists are blacklisted and never invited again after three inattentive surveys, or at once depending on the gravity of the problem. In general, 2–3% of the shortest interviews are removed from the sample, and 7% are removed due to indications of inattentive answers. Since respondents can pause while filling in the questionnaire, the longest interviews are not removed unless they fail the other quality checks. Furthermore, ssi extends its

reach to include those who would never join a panel through ssi Dynamix™ – a dynamic sampling platform that links to the panels of ssi, as well as to social media, online communities, affiliate partners and more.

4.2 Representativeness and weighting

Respondents were admitted to the survey used for this report until quotas by gender and age were filled. The quotas were set to ensure a sample that reflects the Internet-using population. By design, minors (aged 14–17 years old, in particular aged 16–17 due to difficulties with recruiting minors aged 14–15 in a short time) have been oversampled because this is a small age group of specific interest. People above age 50 are underrepresented in the panels of some countries and are hence undersampled. To correct for this, respondents are given weights by gender and age, such that respondents in oversampled categories are given smaller-than-unit weights and respondents in undersampled categories are given larger-than-unit weights.

In addition, a correction is made to make the sample representative for the *Internet population* of each country. This means that respondents in overrepresented categories are given smaller-than-unit weights and respondents in underrepresented categories are given larger-than-unit weights. More details about the calculation of weights, the data sources and data used and the resulting weighting factors are provided in Annex B. Representativeness for the total population in each country is discussed in Chapter 5.

4.3 Data cleaning

Consumption per type of content was calculated by combining the consumption from different reference periods (transactions in the past one, three or twelve months) and different measurement units (tracks versus albums versus hours of streaming, episodes versus seasons). This implies that assumptions had to be made to add these content-acquisition channels and to convert consumption of the past one, three and twelve months to annual totals.

Different measurement units were combined in the following way:

- For music, 1 album is assumed to contain 10 tracks on average.
- For music, 1 hour of streaming is treated as equivalent to 0.1 albums or 1 track.[11]
- For tv series, 1 season is assumed to consist of 10 episodes on average.

This means that, for example, 90 albums consumed in the last three months would be transformed into 3,600 music tracks per year: 10 tracks per album, times four seasons, times the reported number of 90.

Additionally, because extremely high numbers in individual reference periods and measurement units can distort any estimate based on annualised numbers, a preliminary cleaning was done by setting numbers exceeding the value that is dependent on the content type and a reference period or measurement unit (ranging between 50 and 300) to missing. This preliminary cleaning affects only a few dozen responses for any type of transaction. Without this preliminary cleaning, the standard deviation would be so high that almost no reported numbers would be above three times the standard deviation even if they are obvious outliers.

11 Album sales and downloads refer to *acquisition* of music, while streaming relates to *consumption*. If one assumes that one hour of streaming contains 15 tracks of four minutes, then 100 hours of streaming = 1,500 streams. According to the 'album-equivalent unit' as currently used by the music industry (e.g. in charts) 1,500 streams is the equivalent of 1 album, implying that one hour of streaming should be given a weight of 0.01 for lifetime consumption, say ten years. See https://en.wikipedia.org/wiki/Album-equivalent_unit. Because the survey covers only consumption over one year, a weight of 0.1 was applied to one hour of streaming.

Consumption in the past one, three and twelve months was combined to calculate annual figures. Since the survey was held in August and September, this raises the question of how representative consumption in the summer is for the rest of the year. In general, consumption during the summer months constitutes on average a quarter of annual consumption, suggesting no seasonality. Hence, figures for the last 1 and 3 months are multiplied by 12 and 4, respectively, to arrive at annual figures. A few deviating assumptions about seasonal consumption patterns are outlined below per type of content. For consumption via illegal channels, Google trends statistics on the search words were assessed. This suggested no seasonality for the reported volumes.

After consumption was converted into annual figures taking account of seasonality, consumption that exceeds three times the standard deviation above the average was removed from the sample for the analysis presented in Chapter 6. To compare figures for 2017 and 2014 data, the seasonality assumptions were applied that are specific for each year[12] and consumption that exceeded two times the standard deviation above the average was removed.

Music

According to USA data, total physical and online sales of music in Q3 constitute 25% of yearly sales.[13] BuzzAngle Music Reports for Canada and USA suggest that on-demand audio and video streams in Q3 are also on average 25% of annual sales.[14] The situation is different for live concerts, for which 40% of annual sales are in the summer months.[15] Therefore, for live concerts, the numbers of the last 1 and 3 months are multiplied by 7.5 and 2.5, respectively.

Audio-visual

Based on figures of the Digital Entertainment Group (USA, 2016, 2017), it is apparent that physical retail sales (sell-through [including EST] and brick-and-mortar rental)[16] in Q3 are 22% of annual sales. Therefore, the figures for physical sales and rentals of the last 1 and 3 months are multiplied by 13.89 and 4.63, respectively. No seasonality in sales figures is evident for video on demand and streaming (VOD + subscription streaming).

According to Mojo Box Office figures, box office peaks in Q4 and hits the bottom Q1, but is around average in Q2 and Q3. Table 4.2 presents an overview of the share of the third-quarter box office gross results per country and subsequent multiplication factors for the yearly consumption volume.

12 See Ende, Poort et al. (2015) for details on the applied seasonality assumptions for the 2014 survey.
13 Warner Music Group quarterly sales for the years 2014, 2015, 2016 and 2017 (https://csimarket.com/stocks/single_growth_rates.php?code=WMG&rev).
14 BuzzAngle Music Report for Canada and the USA for 2017 (http://www.buzzanglemusic.com/buzzanglemusic-2017-reports/).
15 www.prnewswire.com/news-releases/live-nation-entertainment-reports-thirdquarter-2013-financial-results-230707351.html.
16 http://www.degonline.org/portfolio_page/deg-year-end-2017-home-entertainment-report/.

Table 4.2 Yearly gross box office per country and subsequent multiplication factors

Country	Share of yearly box office in third quarter 2017	Multiplication factor for one-month figures	Multiplication factor for three-month figures
France**	25.0%	12.00	4.00
Germany	25.4%	11.80	3.93
Netherlands	23.2%	12.93	4.31
Poland	22.8%	13.14	4.38
Spain	23.0%	13.07	4.36
Sweden*	23.3%	12.90	4.30
UK	22.3%	13.45	4.48
Brazil	20.4%	14.71	4.90
Canada	20.2%	14.83	4.94
Hong Kong**	21.7%	13.82	4.61
Indonesia***	20.6%	14.56	4.85
Japan**	37.3%	8.05	2.68
Thailand	22.4%	13.38	4.46

Source: Yearly Gross Box Office from Mojo Box Office, film consumption in Sweden.* For Sweden, figures are based on cinema visits for 2016 (http://www.filminstitutet.se/en/learn-more-about-film/statistics/film-statistics/).** For Hong Kong and Japan, high volatility is observed in sales figures; therefore, an average for 2014, 2015 and 2016 is used as a proxy of the share of box office. *** No figures are available for Indonesia; therefore Malaysia is used as a proxy.**** These figures are calculated based on the yearly gross box office of France and Algeria, Monaco, Morocco and Tunisia.

Books

Available quarterly statistics on book sales suggest no seasonality, as the sales for all channels of book consumption for the third quarter constitute 25%.[17] Therefore, all reported volumes of book consumption for the last 1 and 3 months are multiplied by 12 and 4, respectively.

Games

According to quarterly sales figures of Activision and Sony, physical sales in the third quarter of 2017 are 14% of the annual sales.[18] Therefore, all reported volumes of physical games for the last 1 and 3 months are multiplied by 20.7 and 6.9, respectively. Available statistics for other channels of games consumption show no seasonality.[19]

17 Book sales for the USA: http://newsroom.publishers.org/book-publishers-begin-2017-with-49-revenue-growth/; book sales for the Netherlands are based on figures from KVB-SMB/GfK; book sales for Brazil: http://www.snel.org.br/levantamento-mensal/, Canada book sales: https://www.booknetcanada.ca/blog/2017/8/1/mid-year-state-of-the-nation-canadian-book-publishing.

18 The figure is calculated as a mean of the figures of Sony Group and Activision, available here: http://investor.activision.com/results.cfm and https://www.sony.net/SonyInfo/IR/library/er.html.

19 This is based on the Net Revenues for digital online channels figures of Activision and Games Network sales of Sony group.

5. Use of legal and illegal content acquisition channels

This chapter presents the most important descriptive outcomes of the consumer survey.[20] For music, films and series, books and games, it reports the ***percentage of the Internet population using*** various types of acquisition channels. Also, it gives the estimated ***consumption volume per capita*** per channel and country and compares these between those who occasionally use illegal channels and those who do not. Finally, it describes the main ***socio-economic characteristics*** of users of legal and illegal channels per country and provide insights into ***motivations for using illegal channels***.[21]

In general, results have been weighted to be representative of the *Internet population* in each country.[22] As Figure 3.2 shows, however, the Internet population as a percentage of the total population differs substantially among the countries in this study: from 95%, in the UK, to 25%, in Indonesia. Lower Internet penetration levels reduce the representativeness of the results for the total population, since consumption patterns may differ between people with and without Internet access: the latter group cannot order content on webshops but might visit physical stores more frequently, with an uncertain net effect. For *online* channels, however, one can safely say that acquisition and consumption are zero by default outside the Internet-using population. Therefore, in graphs for online channels, figures were added for the total population by multiplying the figures for Internet users by the Internet penetration level. For offline channels and for combinations of online and offline channels, this was not possible.

As stated in the introduction to this report, a partially comparable consumer survey was conducted by the authors in France, Germany, Poland, Spain, Sweden and the United Kingdom in 2014 (Van der Ende, Poort et al., 2015). This makes a comparison with 2014 numbers possible in these countries, with the exception of newly emerging online channels. A partially comparable survey was also conducted for the Netherlands two years earlier (Poort and Leenheer, 2012). There are two main differences between that study and the current one. First, the 2012 study is representative of the total population instead of the Internet population and was conducted within a different panel, by CentERdata. Second, there are some differences in the categorisation of acquisition channels and some channels did not exist or were not addressed in 2012. For these reasons, a comparison over time for the Netherlands is made only between the two surveys in the CentERdata panel in 2012 and 2017, and only for physical carriers and all illegal channels combined.

5.1 Music

Legal sources and related products

Figure 5.1 presents the proportion of Internet users consuming recorded music via any of the legal channels distinguished in the consumer survey in the year preceding the survey (henceforth loosely referred to as ‘in 2017’ or ‘in the past year’): physical formats, digital downloads and digital streams. The percentages for these underlying channels are given in Table 5.2.[23]

20 Annex C contains the English-language version of the consumer survey, as well as the country-specific information in the survey.
21 The figures and trends in this chapter do not necessarily correspond to the sales figures in Chapter 3, for example because legal channels include free content, which is not covered by sales figures.
22 Note that respondents were weighted per country but not across countries. Therefore, in the totals in this chapter and in the econometric analysis in the next chapter, Japan, for example, with a large population, was not given more weight than Sweden, for example, with a relatively small population.
23 The corresponding graphs can be found in Annex A.

Figure 5.1 shows that the proportion consuming recorded music in any of those formats varied between 40% and 80% per country. Between 2014 and 2017, it remained fairly stable in most European countries, with the exception of Poland, where it dropped substantially.

Figure 5.1 Consumed recorded music from any legal channel (last year)

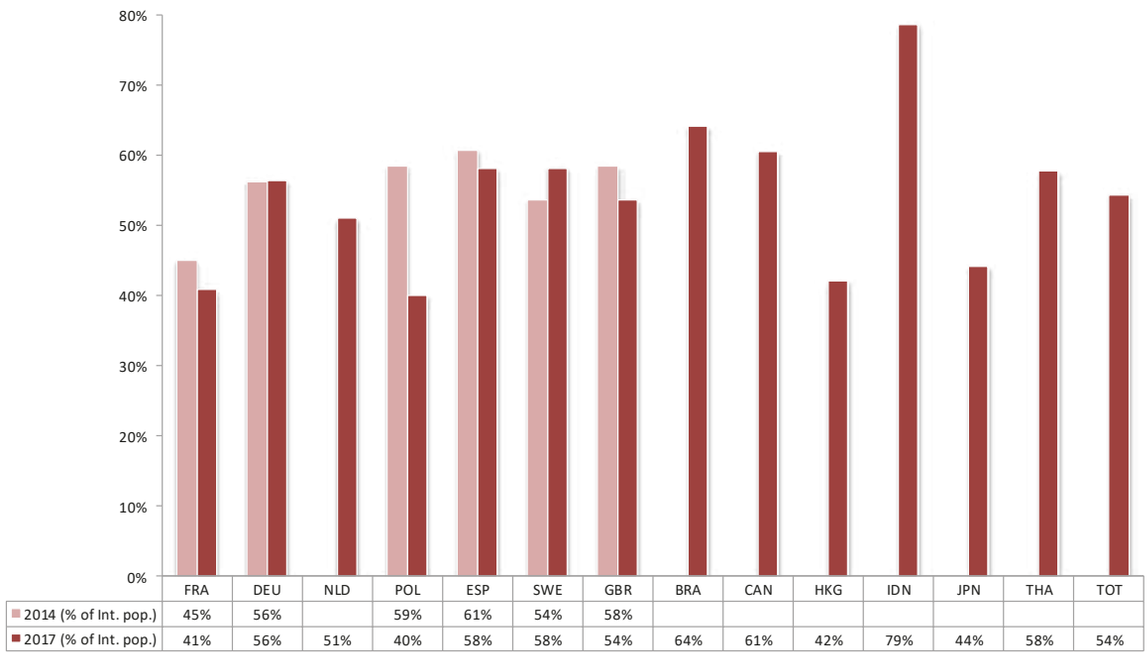


Table 5.2 Percentage of the Internet population using legal channels to consume music

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical carriers	27%	40%	30%	30%	35%	23%	35%	32%	34%	27%	47%	37%	42%	34%
Downloads, legal sources	27%	39%	34%	30%	47%	29%	42%	57%	48%	35%	75%	29%	54%	42%
Streaming, legal sources	37%	37%	40%	30%	54%	53%	44%	54%	51%	37%	72%	20%	52%	45%
Live concerts and festivals	29%	39%	37%	36%	48%	38%	35%	45%	42%	31%	48%	27%	41%	38%
Music-related merchandise	22%	21%	19%	32%	32%	33%	28%	31%	33%	32%	44%	30%	47%	31%
2014														
Physical carriers	30%	44%		42%	42%	25%	43%							
Downloads, legal sources	29%	36%		40%	45%	27%	47%							
Streaming, legal sources	41%	28%		50%	55%	49%	43%							
Live concerts and festivals	30%	40%		46%	51%	34%	42%							

Table 5.2 shows that over all 13 countries in this study, streaming is the legal channel most commonly used to acquire recorded music, followed by digital downloads and physical carriers. The last category excludes second-hand purchases and street vendors. In all six European countries in the 2014 study, a smaller proportion of Internet users bought music on *physical carriers* in 2017 than in 2014. The same result is found for the Netherlands in the CentERpanel, in which the proportion dropped from 40% to 21% of the total population between 2012 and 2017. For *music downloads* from legal sources, there has been a small increase

in Germany, Sweden and Spain, and a small decrease in France, Poland and the UK.[24]

Table 5.2 (third line) confirms the overall popularity of legal streaming. In Germany, Sweden and the UK, it became more popular as a percentage of the Internet population between 2014 and 2017, whereas in France, Spain and, particularly, Poland, the numbers suggest that its popularity has decreased. This can be attributed, in part, to an increase in the number of Internet users since 2014, particularly in Poland. The fourth line in Table 5.2 shows that between 27% (Japan) and 48% (Spain and Indonesia) of Internet users attended a live concert in 2017. Compared to 2014, the percentage is (slightly) down in all European countries except for Sweden.

Table 5.3 Per capita consumption of music per type of legal channel (Internet population)

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical carriers (albums)	2.0	3.0	1.4	1.4	1.3	0.8	1.7	2.0	1.9	2.0	5.0	4.1	3.1	1.5
Downloads, legal sources (albums)	3.1	4.3	1.9	2.9	5.3	1.1	4.0	7.6	3.7	3.7	12.8	2.5	7.3	3.3
Streaming, legal sources (hours)	11.9	11.5	13.0	6.5	23.0	28.2	19.7	12.5	16.9	8.4	17.0	3.8	12.2	15.2
Live concert / music festival	0.7	0.9	0.9	1.7	2.3	0.9	0.9	2.2	1.2	0.8	2.3	0.7	1.9	1.1
Digital legal (albums)	4.3	5.5	3.2	3.5	7.6	3.9	6.0	8.9	5.4	4.6	14.5	2.8	8.6	4.8
Nominal growth between 2014 and 2017														**EU6**
Physical carriers (albums)	0.6	-0.4		-1.6	-2.0	-0.1	-1.7							-1.4
Live concert / music festival	0.0	0.0		-0.3	0.1	0.1	-0.2							0.1
Digital legal (albums)	2.4	3.4		1.0	4.0	1.9	2.5							2.2

Table 5.3 presents the average *volume of acquisition or consumption* per respondent for each type of channel. This is calculated as the median value of non-zero numbers multiplied by the fraction of non-zero numbers.[25] Thus, the first row in Table 5.3 gives the per capita consumption of physical music carriers, whereas in the bottom part of the table, it is observed that this number has decreased for each country covered by the 2014 survey except for France. For the six countries combined, the average consumption decreased from 2.9 to 1.5. In general, this is consistent with the decreasing sales revenues from recorded music on physical carriers reported in Chapter 3.

Table 5.3 also shows that the per capita number of live concerts or music festivals visited remained fairly stable. Per capita consumption from legal digital sources increased in all six countries and, with the exception of Poland, this increase was larger than the decrease for physical carriers. This is consistent with the observation in Chapter 3 that revenues from recorded music increased almost in every country in this study.

24 This pattern differs somewhat from the trend in sales revenues as reported in Annex A, Figure A.2, which was downward for all European countries. A possible explanation is that legal channels include free content, such as short samples or theme songs of films, series or games. Another possibility is that some consumers reported temporary downloads from streaming services such as Spotify in this category.

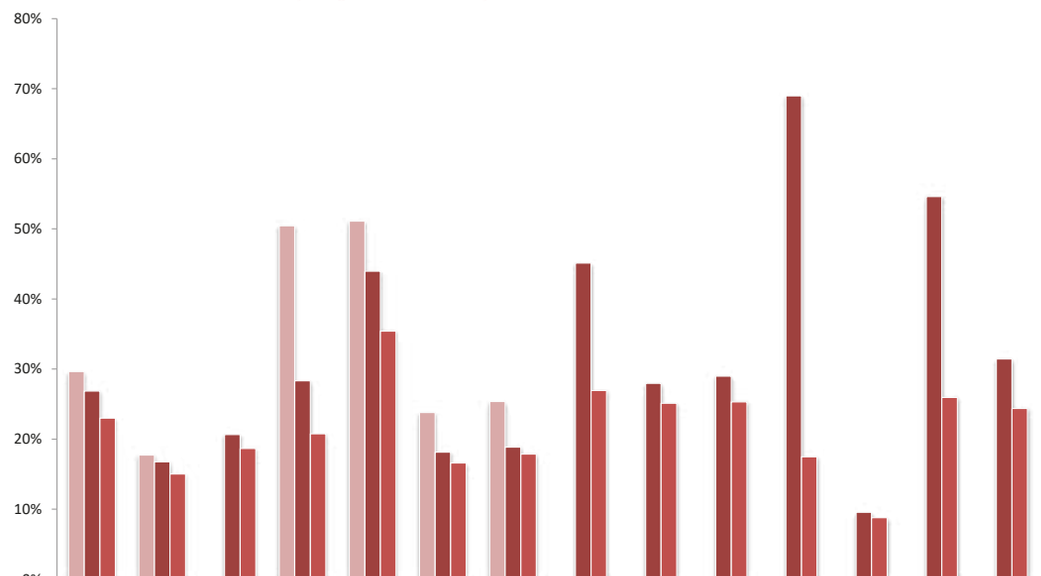
25 Using simple *means* here would be unreliable, as means are very sensitive to a small number of respondents that mention very large numbers. This issue is aggravated by the fact that in the 2017 survey, the most frequent users were asked about their consumption in the last month, whereas in the 2014 survey, such users were asked about their consumption in the last *three* months. This approach for 2017 improves accuracy as it reduces recollection errors, but it also reduces the comparability of means calculated from the data. Using the median as an alternative to the mean leads to less sensitivity to outliers, but typically more than half of the respondents report not to have used a specific type of channel, implying a mean value of 0. From this, it follows that a robust estimate of per capita numbers of transactions is the median value of positive numbers multiplied by the fraction of positive numbers.

Illegal sources

Like Figure 5.1 does for legal channels, Figure 5.4 combines consumption of recorded music from *illegal sources* over the past year. In this graph, downloading and streaming from illegal sources are combined, as is the use of dedicated devices with pre-installed links to stream music from illegal sources. The percentages for these underlying channels are given in Table 5.5.[26] Streamripping is not included in the percentages in Figure 5.4 but is presented separately in Table 5.5, because to the extent that such streamripping occurs from authorised content on platforms such as YouTube, Soundcloud or Netflix, the source itself is not illegal, even if the ripping may be a violation of the service provider's terms of service. The legal uncertainty surrounding this issue is discussed in the *Legal Background Report*, which also notes the general absence of doctrinal analysis and case law in this respect. Thus, in such scenarios and in the absence of clear guidance from statute or case law, the legal status of this activity remains uncertain.

Figure 5.4 reveals that music consumption from illegal channels is most popular in Spain, where 35% of the total population engaged in such activity in 2017, and least popular in Japan, where 9% did so. Relative to the Internet population, it is most common in Indonesia, Thailand and Brazil. Figure 5.4 also shows that between 2014 and 2017, music consumption from illegal channels became less popular in each of the countries for which two measurements are available. The same holds true for the Netherlands, where in the CentERpanel it dropped from 22% of the population in 2012 to 10% in 2017.

Figure 5.4 Consumed recorded music from any illegal channel (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
2014 (% of Int. pop.)	30%	18%		50%	51%	24%	25%							
2017 (% of Int. pop.)	27%	17%	21%	28%	44%	18%	19%	45%	28%	29%	69%	10%	55%	31%
2017 (% of total pop.)	23%	15%	19%	21%	35%	17%	18%	27%	25%	25%	17%	9%	26%	24%

26 The corresponding graphs can be found in Annex A.

Table 5.5 Percentage of the Internet population using illegal channels to consume music

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads, illegal sources	22%	14%	18%	26%	39%	17%	15%	42%	22%	23%	66%	8%	53%	28%
Streaming, illegal sources	21%	12%	11%	17%	35%	9%	12%	29%	19%	23%	54%	7%	45%	23%
Streaming, dedicated devices	10%	12%	11%	13%	22%	7%	13%	23%	16%	18%	35%	8%	34%	17%
Streamripping	30%	23%	23%	26%	40%	20%	19%	45%	31%	27%	68%	13%	49%	32%
2014														
Downloads, illegal sources	28%	16%		47%	49%	23%	23%							
Streaming, illegal sources	21%	14%		34%	35%	11%	19%							

Table 5.5 presents percentages for the underlying channels of Figure 5.4, as well as for streamripping. It reveals that *downloading* music from illegal sources is particularly popular in the Internet populations of Indonesia and Thailand[27]). Japan stands out by having the lowest percentage that downloaded music from illegal sources (8%). All European countries for which a 2014 measurement is available show a decrease. A similar pattern is found for music *streaming* from illegal sources, with, in general, slightly lower numbers. The use of dedicated devices with pre-installed links to stream music from illegal sources (Table 5.5, line 3) is less common than are downloading and streaming without such devices.[28] Streamripping (Table 5.5, line 4) turns out to be more common than any of the illegal channels within the Internet population of each country.

Table 5.6 Per capita consumption of music per type of illegal channel (Internet population)

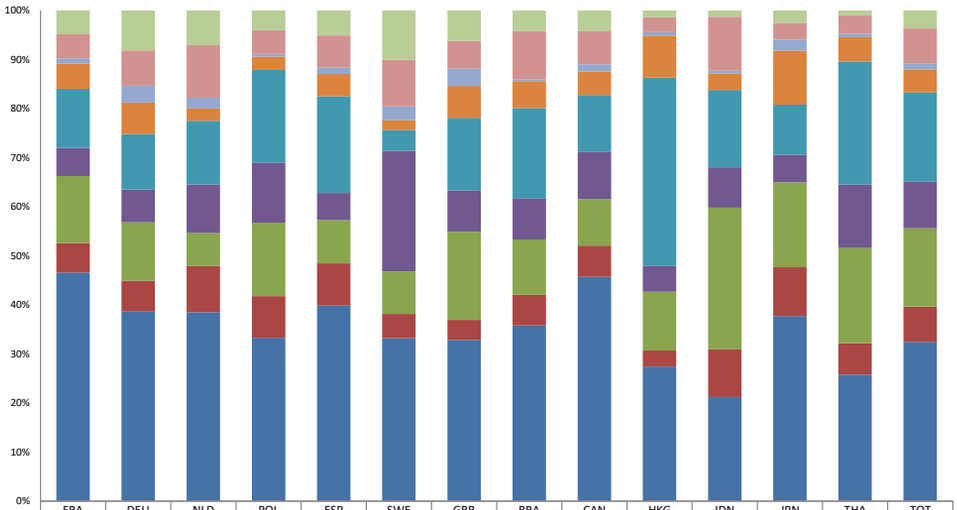
2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads, illegal sources (albums)	2.4	1.4	1.4	2.2	4.8	0.7	0.9	5.0	2.5	1.1	8.9	0.9	6.5	2.1
Streaming, illegal sources (hours)	2.4	1.3	1.3	1.9	5.0	1.0	1.4	4.3	2.2	2.5	6.2	0.7	5.0	1.9
Streaming, techn. devices (h)	1.1	1.2	1.2	1.6	2.3	0.6	1.4	4.2	1.7	2.0	4.0	0.8	3.8	1.4
Listen streamripped music (h)	3.4	2.2	1.6	2.4	4.1	1.9	1.9	5.3	2.6	1.3	10.3	1.2	6.0	2.6
Digital illegal (albums)	2.7	1.7	1.7	2.5	5.5	0.8	1.2	5.9	2.9	1.6	9.9	1.1	7.4	2.5
Nominal growth between 2014 and 2017														EU6
Digital illegal (albums)	1.2	0.7		-0.5	1.4	-0.2	-0.4							0.5

Table 5.6 presents the per capita *volume of acquisition or consumption* for each type of illegal channel and streamripping. These figures are mostly in line with the percentages of users of illegal channels, with the highest numbers for Indonesia (9.9), Brazil (5.9) and Thailand (7.4) and low numbers for countries such as Japan, Sweden and the UK. The last row in Table 5.6 indicates that the per capita combined number of illegal downloads and streams has increased in France, Germany and Spain. For Poland, Sweden and the UK a decrease is observed. Combined with the finding above that the percentage of users of such illegal channels is decreasing in each country, this leads to the observation that a shrinking group in Germany, France and Spain is pirating more music.

27 For Indonesia, this could be explained partly by the general exception or "fair dealings" clause to the reproduction right (see *Legal Background Report*, Section 3.1). For both countries, low Internet penetration is also an important factor. Within the total population, these numbers are much in line with the other countries.

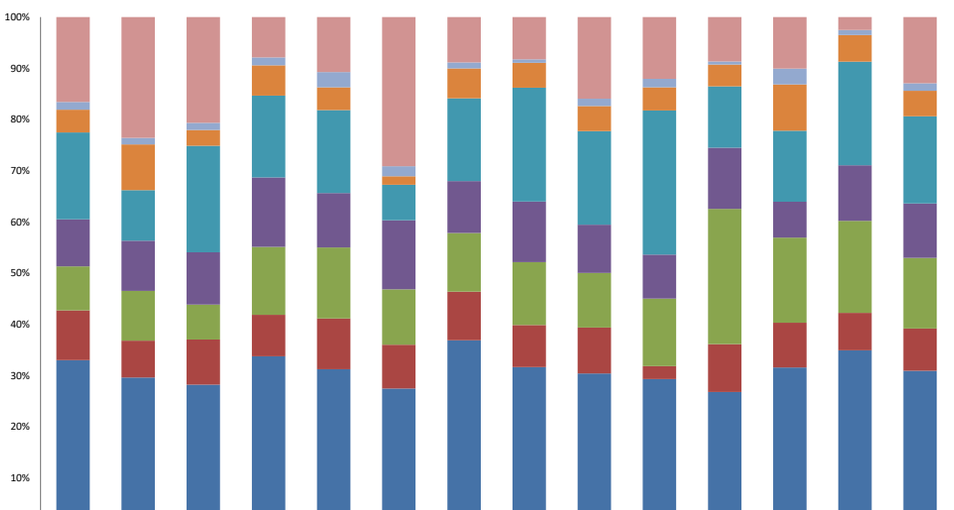
28 Still, these numbers are higher than one might have expected and may suffer from some overreporting (e.g. from respondents using apps to stream from illegal sources). This is supported by the observation that only about 45% of the reported users of such devices confirm in Question 4 of the survey that they know what Kodi or Kodi boxes are. Given the overlap among illegal channels, such possible reporting errors do not affect any of the overall conclusions of this study.

Figure 5.7 Primary reason for downloading music from illegal sources



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Other	5%	8%	7%	4%	5%	10%	6%	4%	4%	1%	1%	3%	1%	4%
The ease to add music to my collection	5%	7%	11%	5%	7%	9%	6%	10%	7%	3%	11%	3%	4%	7%
It is unlikely to get caught	1%	3%	2%	1%	1%	3%	4%	0%	1%	1%	1%	2%	1%	1%
The speed or reliability	5%	6%	3%	3%	5%	2%	6%	6%	5%	9%	3%	11%	5%	5%
The ease of use	12%	11%	13%	19%	20%	4%	15%	18%	12%	38%	16%	10%	25%	18%
Non-availability through legal channels	6%	7%	10%	12%	6%	25%	8%	8%	10%	5%	8%	6%	13%	10%
The quality of sound (bitrate)	14%	12%	7%	15%	9%	9%	18%	11%	9%	12%	29%	17%	19%	16%
It was the first site I found	6%	6%	9%	8%	9%	5%	4%	6%	6%	3%	10%	10%	6%	7%
The price	47%	39%	38%	33%	40%	33%	33%	36%	46%	27%	21%	38%	26%	32%

Figure 5.8 Primary reason for streaming music from illegal sources



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Other	17%	24%	21%	8%	11%	29%	9%	8%	16%	12%	9%	10%	3%	13%
It is unlikely to get caught	2%	1%	1%	2%	3%	2%	1%	1%	1%	2%	1%	3%	1%	1%
The speed or reliability	4%	9%	3%	6%	4%	2%	6%	5%	5%	4%	4%	9%	5%	5%
The ease of use	17%	10%	21%	16%	16%	7%	16%	22%	18%	28%	12%	14%	20%	17%
Non-availability through legal channels	9%	10%	10%	14%	11%	13%	10%	12%	9%	9%	12%	7%	11%	11%
The quality of sound (bitrate)	9%	10%	7%	13%	14%	11%	11%	12%	11%	13%	26%	17%	18%	14%
It was the first site I found	10%	7%	9%	8%	10%	9%	10%	8%	9%	3%	9%	9%	7%	8%
The price	33%	30%	28%	34%	31%	27%	37%	32%	30%	29%	27%	32%	35%	31%

Motivations and profiles

Figure 5.7 and 5.8 give respondents' primary motivation for downloading and streaming from illegal sources. Since these reasons were asked with a closed question, respondents' motivations may interrelate. Across the board, price is the most common reason, followed by the perceived ease of use and sound quality. Note that price as a reason does not equate to sales displacement: these respondents may have a low willingness to pay.

The demographic composition of users of legal and illegal channels to access recorded music is very similar. In general, pirates do not have telling characteristics that distinguish them from users of legal sources (see Annex A, Tables A.18 and A.19). Among music consumers, gender distribution is fairly balanced whereas age distribution varies substantially from country to country, in great part reflecting the distribution of the Internet population. That being said, music pirates are slightly more often male and more often under 35 years of age. There is little difference between pirates and legal users in terms of level of education or employment status.[29]

A telling difference does exist, however, in *legal music consumption* by people who do or do not make use of illegal channels. This is shown in Table 5.9. The first half gives the percentage of the Internet population that used any of the legal channels for music in the past year, as in Figure 5.1, but now split between those who *also* used illegal channels for music last year ('pirates') and those who did not use such channels for music last year ('non-pirates'). It shows that almost every pirate also consumed music from legal sources, while only 31% of non-pirating Internet users did so in all 13 countries combined. In France and Poland, it is as low as 18% and 16%, respectively.

The second half of Table 5.9 gives the median consumption of recorded music, from any legal channel, by pirates and by non-pirating legal consumers. In each country, this median legal consumption is considerably higher for pirates. On average for the 13 countries, it is almost twice as high.

Table 5.9 Consumption of recorded music from any legal channel: pirates vs. non-pirates

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Consumed recorded music from any legal channel last year														
Pirates	96%	97%	94%	94%	95%	95%	98%	98%	95%	89%	98%	96%	97%	96%
Non-pirates	18%	43%	36%	16%	23%	43%	39%	32%	42%	19%	31%	36%	9%	31%
Median consumption of recorded music from any legal channel last year														
Pirates	18.0	24.2	18.0	17.2	19.0	16.0	21.6	25.2	19.2	18.6	27.6	26.4	26.4	22.0
Non-pirating legal users	10.8	12.0	10.0	8.6	12.0	9.6	16.0	14.4	12.0	14.8	13.6	12.0	15.0	12.0

To conclude this section on music, Table 5.10 compares the *changes* in consumption of recorded music from legal and illegal channels over time. This is done for all 533 respondents in France, Germany, Poland, Spain, Sweden and the UK who participated in both the 2014 and the 2017 survey and reported non-zero consumption from both legal and illegal sources in both years. Thus, it follows the behaviour of 'pirating legal users' in Europe over time.

29 Note that 'unemployed' here refers not only to respondents who are seeking a job, but also to respondents who are students, retired or have a partner who earns the household income. Therefore, 'unemployed' should not be read as 'lower purchasing power'.

The row totals in the column show that from this group, 30% decreased their consumption from illegal channels, while 17% increased it. For 53%, consumption from illegal channels remained the same. The column totals in the last row show the mirror image of this: 53% increased their legal consumption while 42% decreased it. Combined, this reveals that these respondents who can be followed over time have made a shift toward legal consumption. Most concerning for the music industry will be the 26% in the first column who decreased their legal consumption while their illegal consumption remained the same or increased.

Table 5.10 Changes 2014 to 2017 in consumption of music from legal and illegal channels (N=533)

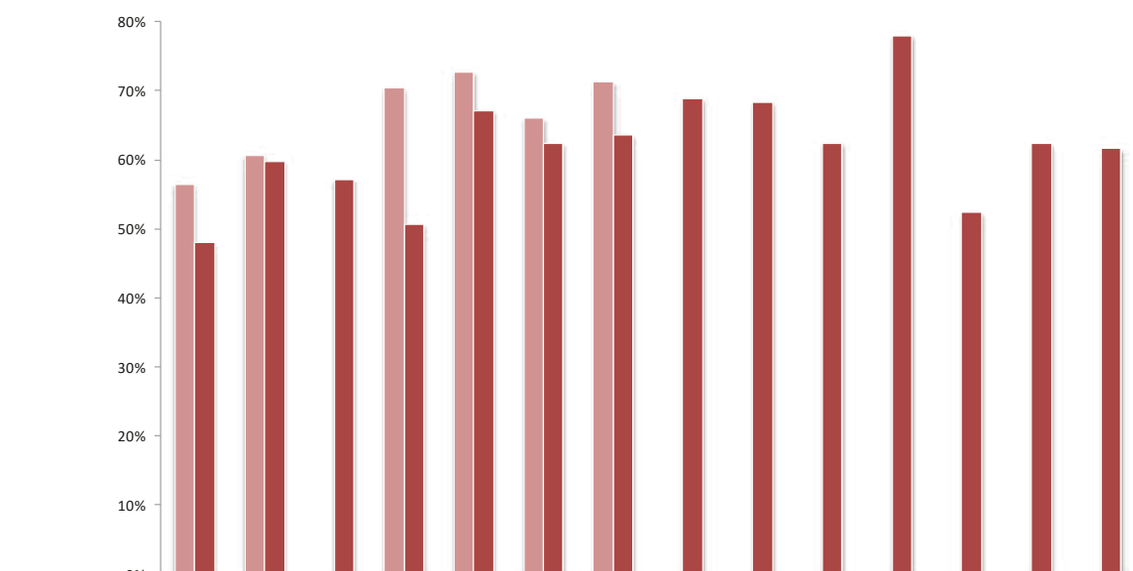
		Consumption from legal channels			
		Decrease	**Equal**	**Increase**	**Total**
Illegal channels	**Decrease**	15%	1%	14%	30%
	Equal	20%	3%	29%	53%
	Increase	6%	1%	10%	17%
	Total	42%	5%	53%	100%

5.2 Film and video

Legal sources and related products

Figure 5.11 presents the proportion of Internet users consuming films and TV series in the past year via any of the *legal* channels distinguished in the consumer survey: sales and rental of DVDs or Blu-ray disks, digital downloads and streams and cinema visits. The percentages for these underlying channels are given in Table 5.12.[30] Note that watching linear television is not included in the survey. Such consumption of films and series from legal sources varied between 48% and 78% of the Internet population per country. It decreased slightly in each of the six European countries that were surveyed in 2014 as well.

Figure 5.11 Consumed a film or TV-series from any legal channel (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	57%	61%		71%	73%	66%	71%							
2017 (% of Int. pop.)	48%	60%	57%	51%	67%	62%	64%	69%	68%	62%	78%	52%	62%	62%

30 The corresponding graphs are in Annex A, Figures A.20–A.24.

Table 5.12 Percentage of the Internet population using legal channels to consume films and video

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
DVD and Blu-ray	27%	40%	27%	26%	36%	29%	44%	37%	38%	37%	50%	23%	44%	35%
Rentals	17%	23%	14%	19%	32%	18%	20%	27%	29%	19%	39%	24%	35%	24%
Downloads, legal sources	22%	29%	24%	22%	42%	24%	36%	47%	35%	37%	64%	19%	51%	35%
Streaming, legal sources	34%	42%	50%	39%	57%	54%	56%	61%	64%	47%	73%	24%	56%	50%
Cinema	45%	52%	51%	48%	64%	54%	55%	63%	61%	60%	70%	45%	56%	56%
Film/series merchandise	20%	18%	14%	24%	33%	22%	26%	36%	28%	36%	41%	18%	46%	28%
2014														
DVD and Blu-ray	32%	44%		34%	39%	34%	54%							
Rentals	16%	27%		31%	36%	25%	27%							
Downloads, legal sources	32%	19%		34%	39%	15%	32%							
Streaming, legal sources	40%	26%		61%	47%	50%	57%							
Cinema	51%	53%		61%	68%	54%	63%							

Table 5.12 shows the percentages of the Internet population that used the underlying channels for acquiring and consuming films and tv series in the past year. From the channels that were surveyed, cinema visits are the most widely used throughout the entire country set, followed by streaming.

Comparing the first two lines for 2017 and for 2014 in Table 5.12, one can observe that in all six European countries fewer people bought, rented or borrowed DVDs and Blu-ray disks in that year than in 2014 (with the exception of rentals in France).[31] Downloading and streaming from legal sources have become more common in Germany, Spain and Sweden and less so in France and Poland. In the UK, the percentage downloading films and series from legal sources increased somewhat, whereas streaming remained at about the same level. The penetration of cinema visits as a percentage of the Internet population decreased in most European countries. Japanese respondents report comparably low consumption rates for all channels except rentals.

Table 5.13 Per capita consumption of films & series per legal channel (Internet population)

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical carriers, sales	2.3	3.4	1.6	2.2	3.1	1.4	3.1	3.5	3.3	3.3	6.6	2.2	5.8	3.1
Physical carriers, rentals	1.1	1.9	1.1	1.0	2.5	0.8	1.0	2.5	2.4	0.9	4.4	3.1	3.9	2.1
Cinema	5.3	4.0	4.3	6.2	8.1	2.3	7.4	9.0	8.9	5.9	13.0	2.4	7.2	6.5
Downloads, legal sources	2.3	3.2	1.8	1.6	4.9	2.6	4.1	5.5	2.9	4.1	10.0	2.2	6.6	3.7
Streaming, legal sources	4.9	8.9	15.8	7.1	13.7	19.8	15.6	19.4	20.9	4.0	18.0	2.9	10.8	11.6
Digital, legal	7.2	12.1	17.7	8.8	18.6	22.4	19.7	25.0	23.8	8.0	27.9	5.1	17.4	15.3
Nominal growth between 2014 and 2017														**EU6**
Physical carriers, sales + rental	0.8	-0.4		-1.7	-0.3	-1.4	-2.5							-1.2
Cinema	1.4	-0.1		1.7	0.2	0.2	2.5							1.7
Digital, legal	2.2	8.8		-0.5	11.0	16.2	11.4							8.0

Note: for all channels, numbers are given in films or seasons; ten episodes are deemed equal to one season.

31 The same trend is seen in the CentERpanel for the Netherlands, where purchasing DVDs and Blu-ray disks (without rental) decreased from 45% to 19% of the total population between 2012 and 2017.

The per capita acquisition and consumption of films and series in Table 5.13 points in the same direction as Figure 5.11: in each of the countries that allow for a comparison between 2014 and 2017 except France, the per capita number of physical carriers bought or rented decreased. This is largely in line with the development of sales revenues described in Chapter 3. The per capita number of cinema visits has increased in all six European countries except Germany, despite the decrease between 2014 and 2017 in the percentage of the Internet population visiting the cinema in the preceding year. The per capita consumption from legal digital channels increased substantially in all EU countries, with the exception of Poland.

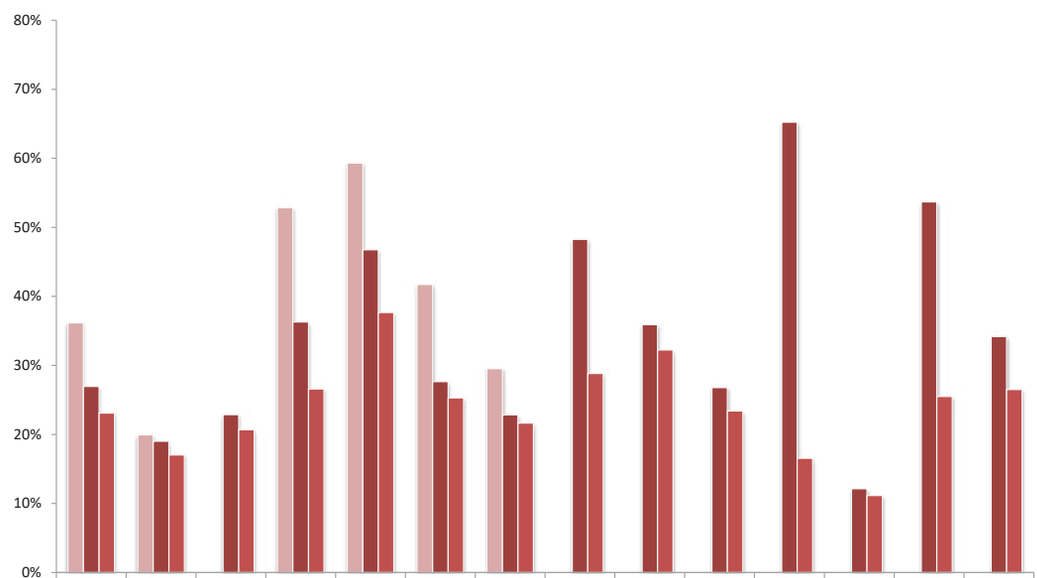
Illegal sources

Downloading and streaming audio-visual content from illegal sources (Figure 5.14) is most common in Spain, followed by Canada, when measured as a percentage of the total population.[32] Within the Internet population, Indonesia stands out, followed by Thailand and Brazil. This is confirmed by the per capita numbers in Table 5.16.

In almost all European countries in the set, the percentage of the Internet population downloading and streaming audio-visual content from any illegal source decreased between 2014 and 2017. This downward trend is also found in the CentERpanel for the Netherlands, where it dropped from 18% to 13% of the total population between 2012 and 2017. Only in Germany did it remain stable, despite a slight decline in 'ordinary' downloading and streaming (see Table 5.15).

Table 5.15 shows that in general, the percentage of the Internet population per country using the specific channels to access illegal sources for audio-visual content follows the pattern in Figure 5.14, with the higher percentages for Indonesia and the lowest for Japan. The corresponding graphs are included in Annex A, Figures A.26–29. Like for music, streamripping films or tv series is more common than is downloading or streaming from illegal sources in almost every country in this study.

Figure 5.14 Consumed a film or TV-series from any illegal channel (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	36%	20%		53%	59%	42%	30%							
2017 (% of Int. pop.)	27%	19%	23%	36%	47%	28%	23%	48%	36%	27%	65%	12%	54%	34%
2017 (% of total pop.)	23%	17%	21%	27%	38%	25%	22%	29%	32%	23%	17%	11%	25%	26%

32 For reasons explained in Section 5.1, streamripping is not included here.

Table 5.15 Percentage of the Internet population using illegal channels to consume films & series

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads, illegal sources	21%	13%	17%	25%	41%	17%	15%	39%	24%	20%	58%	6%	48%	27%
Streaming, illegal sources	20%	15%	16%	31%	37%	22%	17%	38%	24%	19%	60%	11%	46%	27%
Streaming, dedicated devices	13%	12%	12%	15%	24%	8%	17%	27%	23%	19%	41%	6%	41%	20%
Streamripping	25%	18%	18%	24%	39%	15%	18%	45%	25%	35%	66%	12%	49%	30%
2014														
Downloads, illegal sources	27%	14%		43%	48%	27%	24%							
Streaming, illegal sources	31%	18%		44%	54%	34%	25%							

Table 5.16 presents the per capita *volume of acquisition or consumption* of films and series for each type of illegal channel and for streamripping. Like for music, the highest numbers are encountered in Indonesia, Thailand and Brazil. The lowest numbers are found in Japan and the Netherlands. Despite the *decrease* in the percentage of the Internet population downloading and streaming from illegal sources that was observed for the EU countries in Figure 5.14, an *increase* in the per capita consumption from illegal sources is found. This implies that fewer people consumed more on aggregate via illegal channels.

Table 5.16 Per capita consumption of films & series per illegal channel (Internet population)

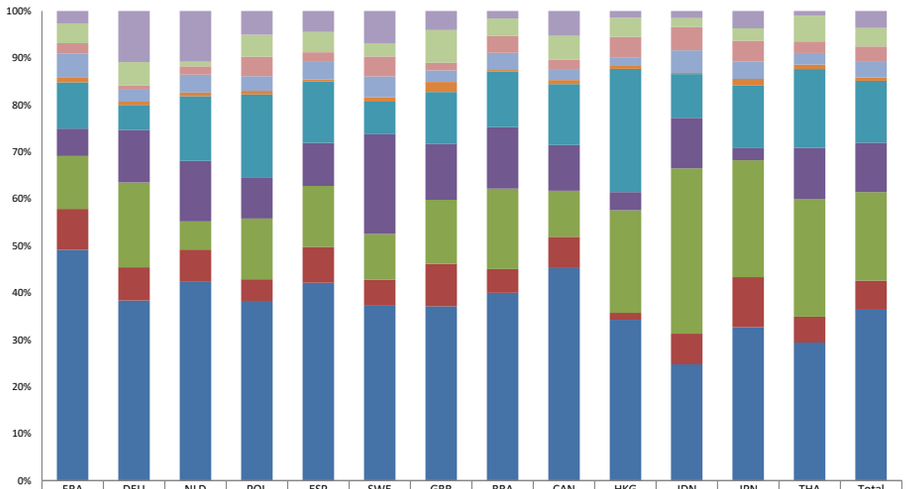
2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads, illegal sources	2.3	3.2	1.8	1.6	4.9	2.6	4.1	5.5	2.9	4.1	10.0	2.2	6.6	3.7
Streaming, illegal sources	2.2	1.6	1.7	3.6	4.4	2.4	1.8	4.4	2.8	1.9	10.2	1.3	5.4	3.0
Streaming, techn. Devices	1.3	1.3	0.9	1.2	2.5	0.9	1.7	2.9	2.5	1.4	4.9	0.5	4.8	2.2
Watch streamripped content	1.1	0.9	0.9	1.2	2.3	0.7	0.9	4.8	1.1	1.4	9.0	0.5	5.3	1.9
Digital, illegal	5.8	6.1	4.4	6.4	11.8	5.9	7.6	12.8	8.2	7.4	25.0	4.1	16.8	9.0
Nominal growth between 2014 and 2017														**EU6**
Digital, illegal	2.0	4.2		0.1	2.2	2.0	4.4							2.8

Note: for all channels, numbers are given in films or seasons; ten episodes are deemed equal to one season

Motivations and profiles

Figures 5.17 and 5.18 give respondents' primary motivation for downloading and streaming films and series from illegal sources. As it is for music, price is the dominant reason. One notable exception is Hong Kong, where ease of use is the primary reason for 52% of those who streamed from illegal sources.

Figure 5.17 Primary reason for downloading film and video from illegal sources



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
Other	3%	11%	11%	5%	4%	7%	4%	2%	5%	1%	2%	4%	1%	4%
Ease of adding films or TV-series to my collection	4%	5%	1%	5%	4%	3%	7%	4%	5%	4%	2%	3%	6%	4%
It is unlikely to get caught	2%	1%	2%	4%	2%	4%	2%	4%	2%	4%	5%	4%	2%	3%
Speed or reliability	5%	3%	4%	3%	4%	4%	2%	4%	2%	2%	5%	4%	2%	3%
Availability or ease of subtitling	1%	1%	1%	1%	0%	1%	2%	0%	1%	1%	0%	1%	1%	1%
Ease of use	10%	5%	14%	18%	13%	7%	11%	12%	13%	26%	9%	13%	17%	13%
Non-availability through legal channels	6%	11%	13%	9%	9%	21%	12%	13%	10%	4%	11%	3%	11%	11%
The quality of sound and vision	11%	18%	6%	13%	13%	10%	14%	17%	10%	22%	35%	25%	25%	19%
It was the first site I found	9%	7%	7%	5%	8%	6%	9%	5%	7%	1%	7%	11%	5%	6%
The price	49%	38%	42%	38%	42%	37%	37%	40%	45%	34%	25%	33%	29%	36%

Figure 5.18 Primary reason for streaming film and video from illegal sources

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
Other	10%	19%	21%	6%	11%	11%	11%	8%	11%	3%	4%	7%	2%	9%
It is unlikely to get caught	2%	1%	1%	1%	2%	2%	1%	1%	1%	2%	1%	2%	0%	1%
Speed or reliability	2%	5%	4%	4%	3%	2%	5%	3%	3%	3%	3%	6%	6%	4%
Availability or ease of subtitling	4%	1%	3%	6%	1%	3%	1%	4%	2%	5%	6%	1%	3%	3%
Ease of use	15%	7%	10%	17%	14%	8%	15%	18%	17%	52%	13%	20%	15%	18%
Non-availability through legal channels	9%	11%	15%	15%	10%	31%	13%	15%	14%	6%	10%	3%	13%	13%
The quality of sound and vision	10%	14%	8%	13%	15%	8%	13%	15%	10%	9%	32%	18%	25%	16%
It was the first site I found	9%	7%	5%	9%	7%	7%	7%	7%	8%	1%	6%	8%	7%	7%
The price	37%	34%	32%	28%	36%	30%	35%	29%	34%	18%	23%	35%	28%	30%

Like for music, users of legal and illegal channels to access films and series are very similar in their demographic composition (see Annex A, Tables A.30-A.31). Differences are fairly small in general, but the higher representation of males and people under 35 years of age is more prominent than for music. Again, there is little difference between pirates and legal users in level of education or employment status.

Just like for music, the large difference lies in media consumption by pirates versus non-pirates. The first half of Table 5.19 shows that almost every person who used illegal sources in the past year to access films or series also used legal channels in that period. The percentages are even closer to 100% for this category than

for music. For consumers who did not use illegal channels, the proportion lies between 23% (Poland) and 54% (Sweden). The second half of Table 5.19 shows that over all 13 countries in this study, the median legal consumption of pirates is twice that of non-pirating legal users.

Table 5.19 Consumption of films and series from any legal channel: pirates vs. non-pirates

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Consumed films and series from any legal channel last year														
Pirates	98%	96%	96%	99%	100%	97%	99%	99%	99%	98%	99%	99%	100%	99%
Non-pirates	29%	51%	46%	23%	38%	54%	52%	39%	51%	48%	38%	44%	21%	42%
Median consumption of films and series from any legal channel last year														
Pirates	44.0	65.5	66.1	44.9	65.4	61.0	60.0	84.1	67.2	54.0	76.8	50.4	69.3	63.9
Non-pirating legal users	25.0	25.9	35.0	22.0	40.8	35.3	45.0	48.2	52.8	31.3	39.6	15.3	26.8	31.3

Finally, Table 5.20 compares the *changes* in the consumption of films and series from legal and illegal channels over time for 697 'pirating legal users' in Europe who participated in both the 2014 and the 2017 survey. The pattern is similar to that for music in Table 5.10: in this group, 25% decreased their consumption from illegal channels, while 17% increased it. For 58%, consumption from illegal channels remained the same. The column totals in the last row show that 52% increased their legal consumption while 46% decreased it. Overall, these respondents who can be followed over time also made a shift toward legal consumption for audio-visual material. Nevertheless, 31% (24% plus 7%) decreased their legal consumption while their illegal consumption remained the same or even increased.

Table 5.20 Changes 2014-2017 in consumption of films and series from legal and illegal channels (N=697)

		Consumption from legal channels			
		Decrease	Equal	Increase	Total
Illegal channels	Decrease	14%	0%	10%	25%
	Equal	24%	2%	32%	58%
	Increase	7%	0%	9%	17%
	Total	46%	3%	52%	100%

5.3 Books

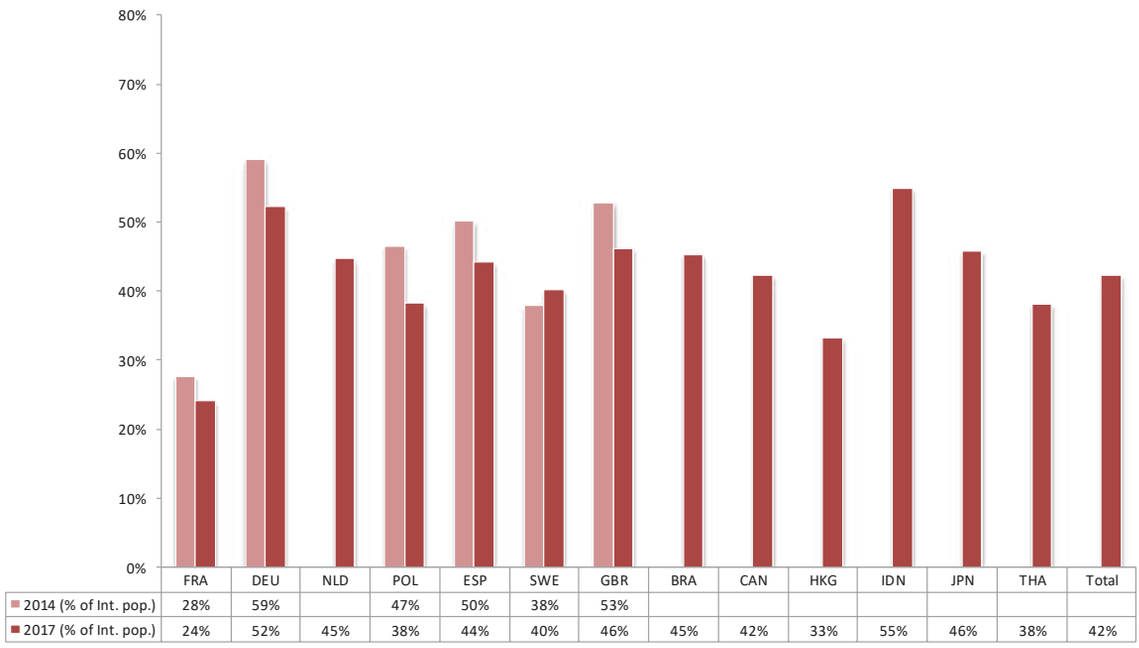
Legal sources

Figure 5.21 presents the proportion of Internet users consuming books in the past year via any of the *legal* channels distinguished in the survey: sales of print books or of audiobooks on physical carriers, borrowing print books or audiobooks from a public library, and downloading or streaming books in digital form. Table 5.22 gives the percentages for these underlying channels.[33] This percentage varies between 24% of the Internet population in France and 55% in Indonesia. Everywhere in Europe except for Sweden, the proportion of Internet users acquiring or reading books decreased between 2014 and 2017.

The first lines in Table 5.22 reveal that fewer Internet users buy or borrow print books or audiobooks on physical carriers across Europe in 2017 than in 2014. The same development is seen in the CentERpanel for the Netherlands, where the percentage of the total population that bought a book in the preceding year decreased from 69% to 61% between 2012 and 2017. In France, only 22% of the Internet population bought a book in 2017, against 47% in Germany. E-books are equally unpopular in France in comparison with the other countries in this study. This figure also suggests that the group of e-book buyers has shrunk in European countries since 2014. The proportion of people buying e-books or reading books/listening to audiobooks online is highest in the UK and Spain, and lowest in France.

33 The corresponding graphs are in Annex A, Figure A.32-A.35.

Figure 5.21 Acquired a book, e-book or audiobook via any legal channel (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	28%	59%		47%	50%	38%	53%							
2017 (% of Int. pop.)	24%	52%	45%	38%	44%	40%	46%	45%	42%	33%	55%	46%	38%	42%

Table 5.22 Percentage of the Internet population using legal channels to consume books

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Bought print book or audiobook on physical carrier	22%	47%	39%	34%	39%	32%	41%	38%	35%	28%	49%	40%	35%	37%
Borrowed print or audio-book	15%	19%	22%	27%	31%	24%	24%	27%	27%	26%	39%	24%	29%	26%
Downloads	13%	25%	19%	21%	32%	17%	31%	33%	27%	19%	46%	18%	34%	26%
Streams	10%	18%	12%	19%	25%	21%	22%	30%	23%	17%	46%	14%	29%	22%
2014														
Bought print book or audio-book on physical carrier	26%	56%		42%	44%	32%	48%							
Borrowed print or audio-book	18%	23%		38%	36%	27%	30%							
Downloads	15%	26%		27%	33%	16%	36%							
Streams	11%	12%		24%	23%	11%	17%							

The per capita number of books acquired (Table 5.23) suggests a more optimistic picture for the legal book market, with some growth in most countries for print and audiobooks and more growth for e-books and streaming services. In combination with the decreasing number of print and e-book buyers observed in Table 5.22, this suggests that fewer people are buying more books in Europe.

Table 5.23 Per capita consumption of books per type of channel (Internet population)

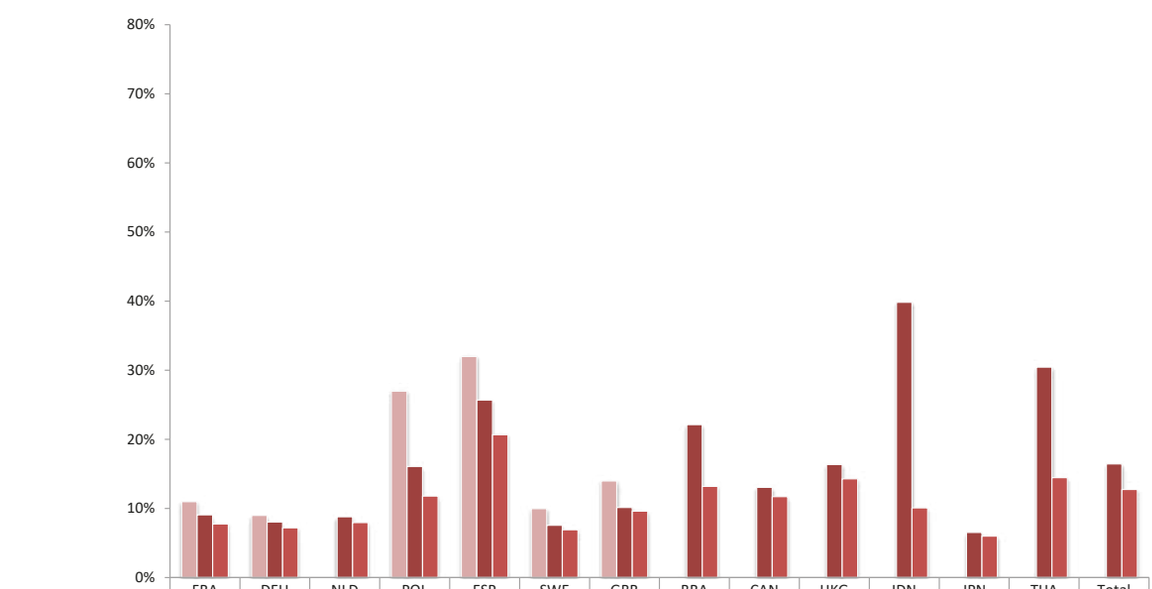
2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Print/phys. audiobook sales	2.5	5.4	4.6	3.8	4.6	3.7	4.8	4.3	4.1	2.1	5.3	4.6	3.7	4.2
Print/phys. audiob. borrow	1.7	2.0	2.3	2.9	3.6	2.6	2.6	3.0	2.9	2.8	4.1	3.8	3.0	2.8
Downloads, legal sources	1.4	2.9	2.2	1.6	3.7	1.3	3.5	3.6	3.1	1.4	4.9	1.9	3.6	2.9
Streaming ,legal sources	1.1	1.9	1.3	1.8	2.9	2.3	2.5	3.2	2.6	1.2	4.8	1.4	3.0	2.4
Digital, legal	2.5	4.8	3.5	3.4	6.6	3.6	6.0	6.8	5.8	2.6	9.7	3.4	6.6	5.3
Nominal growth between 2014 and 2017														**EU6**
Print/audiobooks (total)	0.9	0.9		-2.4	2.6	1.8	1.4							1.0
Digital, legal	1.4	2.6		0.7	3.1	2.5	2.6							2.4

Illegal sources

For downloading books from illegal sources (Figure 5.24), Spain comes in first once again.

Just like for music and audio-visual material, a downward trend can be observed in European countries for books. In the CentERpanel for Netherlands, this percentage remained stable: 6.3% in 2012 against 6.7% in 2017. In terms of the per capita number of downloads from illegal sources, the pattern is mixed: a small decline is observed in Poland, Spain and the UK, whereas equally small growth levels are seen in the other three European countries.

Figure 5.24 Downloaded an e-book or audio book from file sharing site or cyberlocker such as The Pirate Bay, bookzz, bookfi, etc., or from Usenet providers such as Giganews (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	11%	9%		27%	32%	10%	14%							
2017 (% of Int. pop.)	9%	8%	9%	16%	26%	8%	10%	22%	13%	16%	40%	7%	30%	16%
2017 (% of total pop.)	8%	7%	8%	12%	21%	7%	10%	13%	12%	14%	10%	6%	14%	13%

Table 5.25 Per capita consumption of books per type of channel (Internet population)

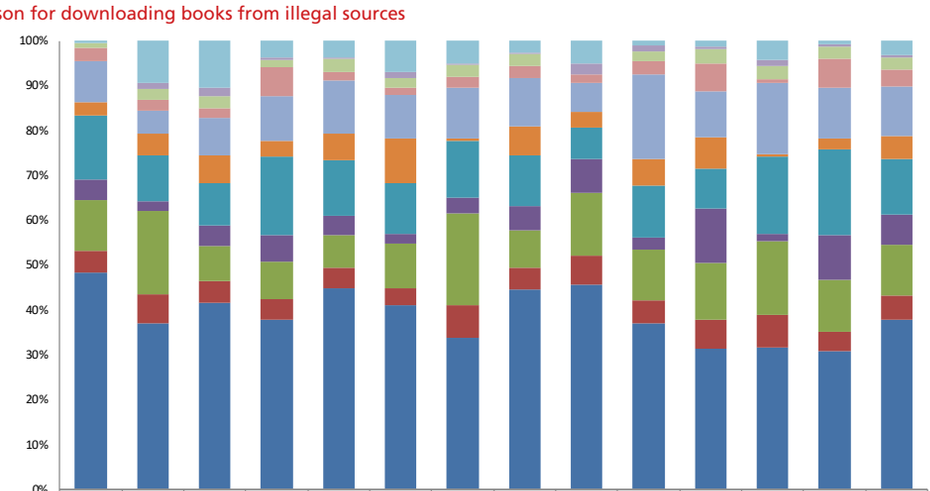
2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads, illegal sources	0.7	0.6	0.6	1.4	1.9	0.5	0.7	1.6	1.0	1.1	6.2	0.5	2.9	1.2
Nominal growth between 2014 and 2017														**EU6**
Downloads, illegal sources	0.3	0.1		-0.3	-0.1	0.1	-0.1							0.0

Motivations and profiles

Figure 5.26 gives respondents' primary motivation for downloading books from illegal sources. Again, price stands out at the dominant reason.

The differences in demographic composition of users of legal and illegal channels to acquire or access books are greater than for music and audio-visual material (Annex A, Tables A36 and A.37). The *legal* book consumer is predominantly female in Europe and Canada, whereas the gender balance is fairly equal in Asian countries and Brazil. However, the majority of book *pirates* are male in each country. Particularly in Sweden, this difference is strikingly large: 43% males among legal book buyers, versus 68% among book pirates. The age distribution also differs more than for music and films/series. Piracy is substantially more prevalent in the 18–34-year age group. Also, it is more prevalent among employed consumers in most countries.

Figure 5.26 Primary reason for downloading books from illegal sources



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
Other	0%	10%	10%	4%	4%	7%	5%	3%	5%	1%	1%	4%	1%	3%
It is unlikely to get caught	0%	1%	2%	1%	0%	1%	0%	0%	2%	1%	1%	1%	0%	1%
Speed or reliability	1%	2%	3%	2%	3%	2%	3%	3%	0%	2%	3%	3%	3%	2%
Availability of books in my own language	3%	2%	2%	6%	2%	2%	2%	3%	2%	3%	6%	1%	7%	4%
Ease of use	9%	5%	8%	10%	12%	10%	11%	11%	7%	19%	10%	16%	11%	11%
The availability of non-mainstream books	3%	5%	6%	3%	6%	10%	0%	6%	4%	6%	7%	1%	2%	5%
The number of available books	14%	10%	9%	17%	12%	11%	13%	11%	7%	12%	9%	17%	19%	13%
The file format / compability with my hardware	4%	2%	5%	6%	4%	2%	4%	5%	7%	3%	12%	1%	10%	7%
The layout quality	11%	18%	8%	8%	7%	10%	20%	8%	14%	11%	13%	17%	12%	11%
It was the first site I found	5%	7%	5%	5%	5%	4%	7%	5%	7%	5%	6%	7%	4%	5%
The price	48%	37%	42%	38%	45%	41%	34%	45%	46%	37%	31%	32%	31%	38%

Just like for music and audio-visual material, there is a large difference in the book consumption of pirates versus non-pirates. The first half of Table 5.27 shows that almost every person who downloaded books from illegal sources in the past year also used legal channels in that period. For consumers who did not use illegal channels, the proportion ranged between 15% (France) and 45% (Germany). The second half of Table 5.27 shows that over all 13 countries in this study, median legal consumption by pirates is almost twice as high at that by non-pirating book buyers.

Table 5.27 Consumption of books from any legal channel: pirates vs. non-pirates

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Consumed books from any legal channel last year														
Pirates	98%	97%	96%	98%	98%	98%	100%	98%	97%	99%	100%	97%	100%	99%
Non-pirates	15%	45%	37%	24%	26%	33%	37%	30%	31%	19%	25%	37%	13%	29%
Median consumption of books from any legal channel last year														
Pirates	43	42	48	48	40	32	40	48	47	32	56	48	50	45
Non-pirating legal users	30	19	20	27	20	24	26	20	25	24	21	24	20	24

Table 5.28 compares the *changes* in book consumption through legal and illegal channels over time for 513 pirating legal book consumers in Europe who participated in both the 2014 and the 2017 survey. The pattern is very similar to that for music or films and series: 15% decreased their consumption from illegal channels, while 11% increased it. For 75%, consumption from illegal channels remained the same. The column totals in the last row show that 52% increased their legal consumption, whereas 42% decreased it. Again, these respondents who can be followed over time made a gradual shift toward legal consumption of books. That being said, a third (32% plus 3%) decreased their legal consumption while their illegal consumption remained the same or even increased.

Table 5.28 Changes from 2014 to 2017 in consumption of books from legal and illegal channels (N=513)

		Consumption from legal channels			
		Decrease	**Equal**	**Increase**	**Total**
Illegal channels	**Decrease**	7%	1%	7%	15%
	Equal	32%	6%	37%	75%
	Increase	3%	0%	8%	11%
	Total	42%	7%	52%	100%

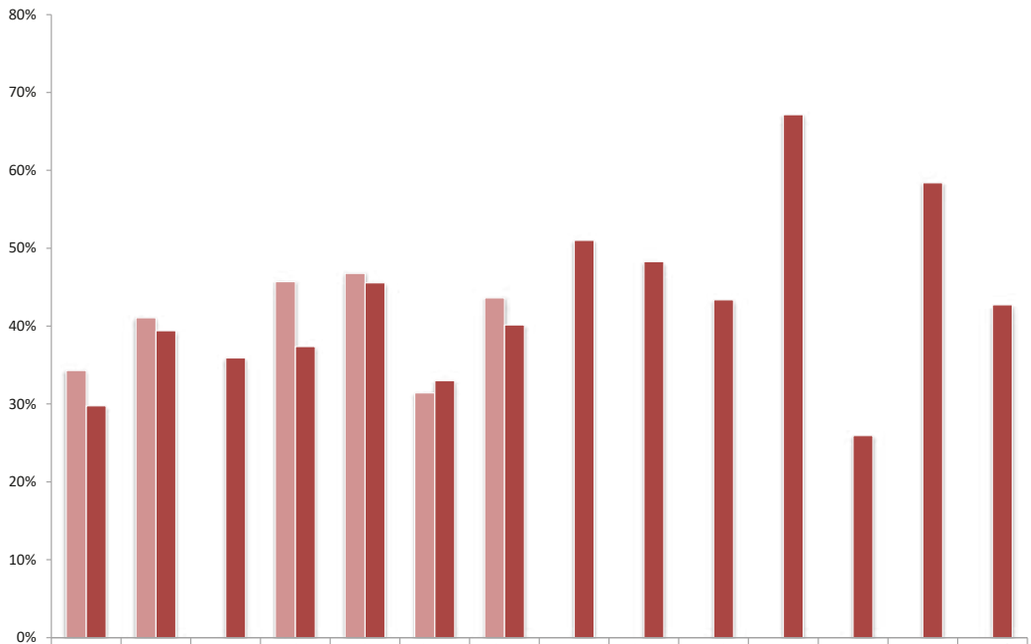
5.4 Games

Legal sources and merchandise

Figure 5.29 presents the proportion of Internet users who accessed a new game in the past year via any of the *legal* channels distinguished in the survey: on a physical carrier, as a digital download, paid-for online or free online. The percentages for these underlying channels are given in Table 5.30.[34] Such consumption of games from legal sources varied between 26% of the Internet population in Japan (the country with the oldest population) and 67% of the Internet population in Indonesia. It decreased slightly in 2017 in all of the European countries that were surveyed in 2014 except Sweden.

34 The corresponding graphs are in Annex A, Figure A.38-A.42.

Figure 5.29 Acquired or accesses a new game legally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	34%	41%		46%	47%	31%	44%							
2017 (% of Int. pop.)	30%	39%	36%	37%	46%	33%	40%	51%	48%	43%	67%	26%	58%	43%

Table 5.30 Percentage of the Internet population using legal channels to consume games

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical carrier	21%	28%	22%	25%	32%	18%	30%	32%	30%	26%	44%	19%	40%	28%
Downloads, legal sources	19%	24%	21%	22%	33%	21%	29%	36%	31%	31%	52%	14%	50%	29%
Paid-for online	15%	22%	18%	20%	31%	21%	23%	42%	27%	27%	54%	13%	44%	27%
Free online	23%	27%	26%	31%	38%	22%	26%	41%	37%	33%	60%	13%	54%	33%
Games merchandise	14%	12%	12%	19%	23%	15%	18%	24%	22%	27%	36%	13%	40%	21%
2014														
Physical carrier	23%	31%		31%	36%	21%	35%							
Downloads, legal sources	15%	18%		24%	27%	13%	26%							
Paid-for online	23%	21%		33%	36%	20%	27%							
Free online	26%	27%		39%	38%	18%	29%							

Table 5.30 shows the percentages of the Internet population using underlying channels to access new games legally in the past year. Overall, free online games are the most widely played, followed closely by legal downloads and physical carriers. Once again, Table 5.30 indicates a decline in the use of physical carriers for all European countries in the set.[35] Downloading games from legal sources, on the other hand, has attracted more users in each European country between 2014 and 2017. Paid-for and free online gaming has remained fairly stable in Europe, showing an increase in some countries and a decrease in others. Table 5.31, on the other hand, suggests that the per capita number of transactions in the Internet population has increased in Europe for both physical and digital legal channels, Poland being the exception here.

35 For the Netherlands, a decline for the consumption of physical carriers from 20% to 10% between 2012 and 2017 was found in the CentERdata panel.

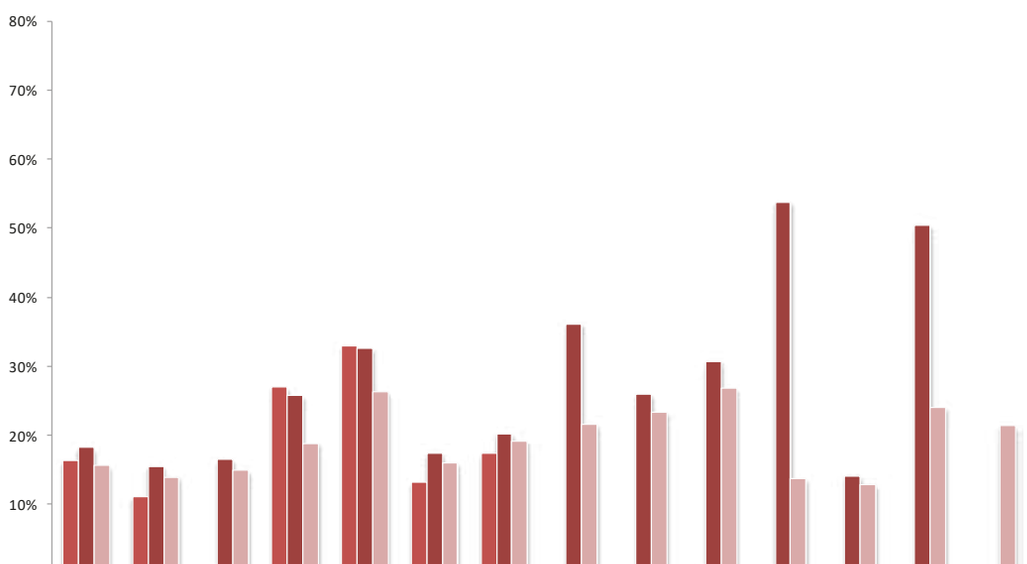
Table 5.31 Per capita consumption of games per type of (Internet population)

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Physical carriers	1.4	3.6	2.9	3.3	4.3	1.2	4.1	6.2	4.0	3.3	8.3	3.5	7.7	3.6
Digital legal	8.2	8.0	7.4	8.2	11.5	7.3	9.0	16.2	10.9	8.6	25.2	4.3	20.3	10.0
Nominal growth between 2014 and 2017														**EU6**
Physical carriers	0.4	1.5		0.7	1.1	0.3	0.9							0.9
Digital legal	3.2	2.5		-1.2	1.5	3.2	2.0							2.1

Illegal sources

Within the entire set of countries, the percentage of the Internet population that accessed games illegally (downloading from illegal sources or playing for free on a chipped, modded or flashed console) is highest in Hong Kong (27% of the total population). Among Internet users, accessing games illegally is more common in Indonesia[36] and Thailand.

Figure 5.32 Acquired or accesses a new game illegally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	16%	11%		27%	33%	13%	17%							
2017 (% of Int. pop.)	18%	15%	16%	26%	33%	17%	20%	36%	26%	31%	54%	14%	50%	
2017 (% of total pop.)	16%	14%	15%	19%	26%	16%	19%	22%	23%	27%	14%	13%	24%	21%

Across Europe, there was a slight increase in this percentage between 2014 and 2017, except for Poland and Spain, where it remained stable (Figure 5.32). Between 2012 and 2017, a decrease in accessing games illegally was observed in the Netherlands. Table 5.33 gives the percentages for the underlying channels.[37] This pattern is largely reflected in the per capita number of illegally acquired games (Table 5.34), although the latter suggests that the volume of game piracy is also in decline in the United Kingdom.

36 In Indonesia, non-commercial downloading is probably covered by an exception, which may explain the popularity of the practice (see *Legal Background Report*, Section 3.1).

37 Corresponding graphs can be found in Annex A, Figure A.43 and A.44.

Table 5.33 Percentage of the Internet population using legal channels to consume games

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Downloads illegal sources	12%	10%	10%	18%	23%	8%	11%	26%	13%	19%	46%	6%	44%	19%
Playing chipped/ modded console	10%	10%	10%	13%	24%	7%	10%	25%	12%	18%	43%	6%	38%	17%
2014														
Downloads illegal sources	14%	10%		24%	29%	11%	15%							
Playing chipped console	13%	9%		18%	25%	10%	15%							

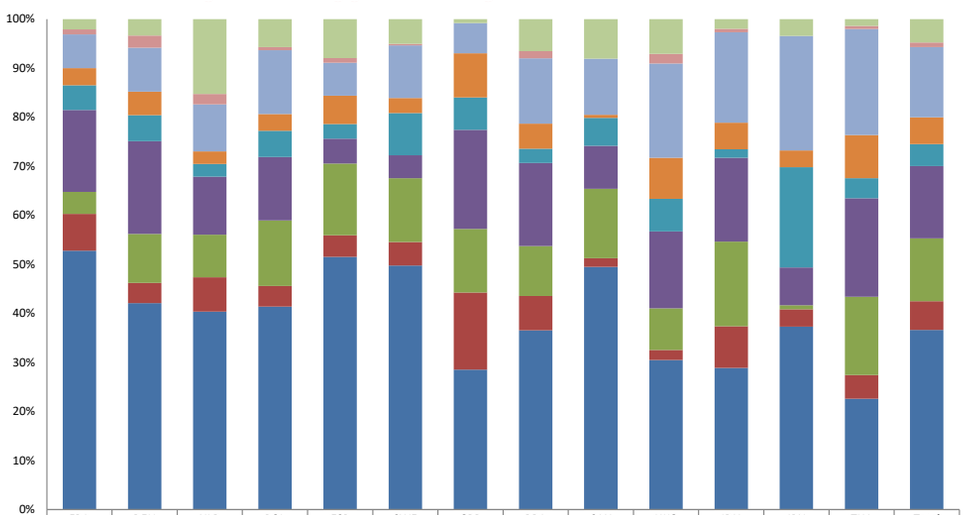
Table 5.34 Per capita consumption of games per type of (Internet population)

2017	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Digital illegal	2.5	1.8	1.8	2.5	4.4	1.1	1.4	5.2	2.4	2.9	9.6	1.1	8.8	3.9
Nominal growth between 2014 and 2017														**EU6**
Digital illegal	1.2	0.6		-0.8	-0.2	0.1	-1.0							-0.3

Motivations and profiles

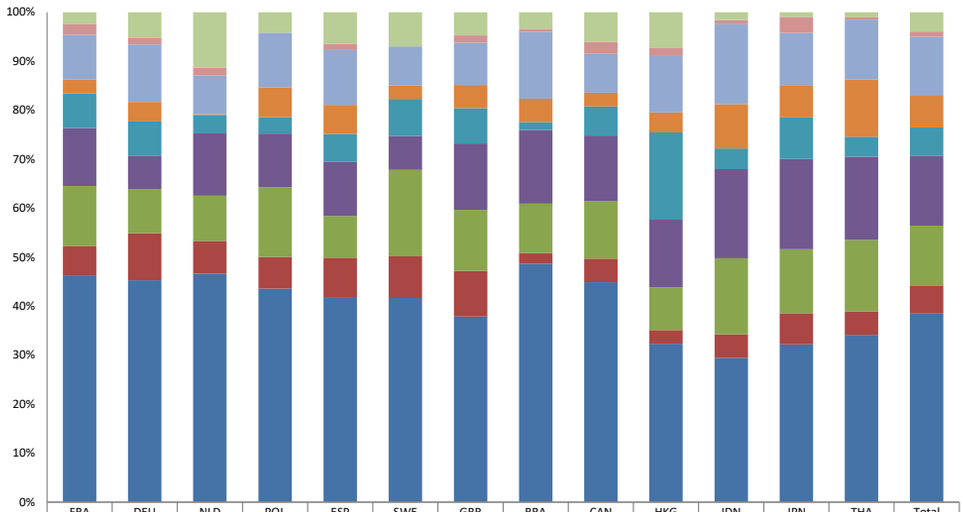
Figure 5.35 and 5.36 gives respondents' primary motivation for downloading games from illegal sources and for playing on modded consoles. Once again, price stands out as the dominant reason. Looking at the demographic composition of users of legal and illegal channels to acquire or access games (see Annex A, Tables A.46 and A.47), one can observe that game consumers, and in particular game pirates, are on average younger and more often male than are consumers of the other content types.

Figure 5.35 Primary reason for downloading and streaming games from illegal sources



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
Other	2%	3%	15%	6%	8%	5%	1%	6%	8%	7%	2%	3%	1%	5%
It is unlikely to get caught	1%	2%	2%	1%	1%	0%	0%	1%	0%	2%	1%	0%	1%	1%
Ease of access	7%	9%	10%	13%	7%	11%	6%	13%	11%	19%	18%	23%	22%	14%
Speed or reliability	3%	5%	3%	3%	6%	3%	9%	5%	1%	8%	5%	3%	9%	5%
Possibility of in-game cheats	5%	5%	3%	5%	3%	9%	7%	3%	6%	7%	2%	20%	4%	4%
Ease of use	17%	19%	12%	13%	5%	5%	20%	17%	9%	16%	17%	8%	20%	15%
Non-availability through legal channels	4%	10%	9%	13%	15%	13%	13%	10%	14%	8%	17%	1%	16%	13%
It was the first site I found	8%	4%	7%	4%	4%	5%	16%	7%	2%	2%	9%	4%	5%	6%
The price	53%	42%	40%	41%	52%	50%	29%	37%	49%	31%	29%	37%	23%	37%

Figure 5.36 Primary reason for playing games om modded console etc.



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
Other	2%	5%	11%	4%	6%	7%	5%	3%	6%	7%	2%	1%	1%	4%
It is unlikely to get caught	2%	1%	2%	0%	1%	0%	2%	1%	2%	2%	1%	3%	1%	1%
Ease of access	9%	12%	8%	11%	11%	8%	9%	14%	8%	12%	16%	11%	12%	12%
Speed or reliability	3%	4%	0%	6%	6%	3%	5%	5%	3%	4%	9%	6%	12%	6%
Possibility of in-game cheats	7%	7%	4%	3%	6%	8%	7%	2%	6%	18%	4%	8%	4%	6%
Ease of use	12%	7%	13%	11%	11%	7%	14%	15%	13%	14%	18%	18%	17%	14%
Non-availability through legal channels	12%	9%	9%	14%	9%	18%	12%	10%	12%	9%	16%	13%	15%	12%
It was the first site I found	6%	10%	7%	6%	8%	8%	9%	2%	5%	3%	5%	6%	5%	6%
The price	46%	45%	47%	44%	42%	42%	38%	49%	45%	32%	29%	32%	34%	39%

Again, however, the most striking difference between game pirates and non-pirating legal gamers lies in their consumption from legal sources. This is shown in Table 5.37. The first half of this table shows once more that almost every person who used illegal sources in the past year to access games also used legal channels during that period, whereas this percentage is lower by almost a factor of four for non-pirates. The second half of Table 5.37 shows that over all 13 countries in this study, the median legal consumption of pirates is 50% higher than that of non-pirating legal users. Only in Canada are these numbers equal.

Table 5.37 Consumption of films and series from any legal channel: pirates vs. non-pirates

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
Consumed games from any legal channel last year														
Pirates	95%	98%	96%	98%	96%	94%	97%	95%	95%	94%	97%	97%	96%	96%
Non-pirates	18%	29%	25%	19%	23%	25%	30%	26%	37%	27%	32%	20%	21%	26%
Median consumption of films and series from any legal channel last year														
Pirates	32.9	27.7	31.0	36.7	31.0	30.0	30.8	40.0	25.0	35.7	44.7	20.7	41.0	36.0
Non-pirating legal users	25.0	24.0	24.0	24.0	26.9	24.0	25.0	25.0	25.0	20.7	25.0	14.0	36.0	24.0

To conclude this section on games, Table 5.38 compares the *changes* in the consumption of games from legal and illegal channels over time for 261 'pirating legal game users' in Europe who participated in both the 2014 and the 2017 survey.

The pattern differs from that for the other content types: 22% decreased their consumption from illegal channels, while 20% increased it. For 58%, consumption from illegal channels remained the same. The column totals in the last row show that 47% increased their legal consumption while 49% decreased it. Overall, this suggests a slight shift *away* from legal consumption for games, where a shift toward legal consumption was observed for the other content types.

Table 5.38 Changes 2014-2017 in consumption of films and series from legal and illegal channels (N=697)

		Consumption from legal channels			
		Decrease	**Equal**	**Increase**	**Total**
Illegal channels	**Decrease**	13%	0%	8%	22%
	Equal	28%	2%	28%	58%
	Increase	8%	1%	11%	20%
	Total	49%	4%	47%	100%

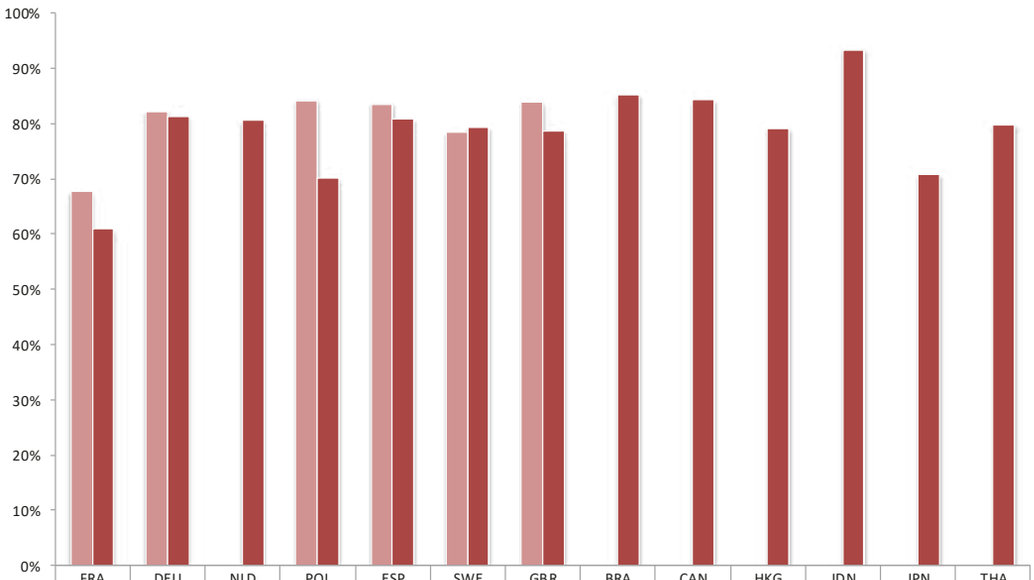
5.5 Conclusions

Figures 5.39 and 5.40 condense the key information in this chapter further by presenting the percentage of the Internet population consuming any content type via any legal or illegal channel. Again, live concerts, merchandise and streamripping are excluded here. Figure 5.39 shows that the percentage of legal content consumers in the Internet population per country varies between 61% (France) and 93% (Indonesia). In the European countries, this percentage decreased somewhat between 2014 and 2017, Sweden being the exception with a slight increase.

Figure 5.40 presents the percentage of the Internet population and the total population that accessed content from *illegal* sources. This confirms the earlier observations that online piracy is most prevalent in the Internet populations in Indonesia, Thailand and Brazil, followed those in Spain and Poland. As a percentage of the total population, Spain, Canada and Hong Kong are the top three countries for online piracy, whereas it is least common in Germany, Japan and Indonesia (the last due to low Internet penetration). The percentage of pirates decreased in all European countries except Germany.

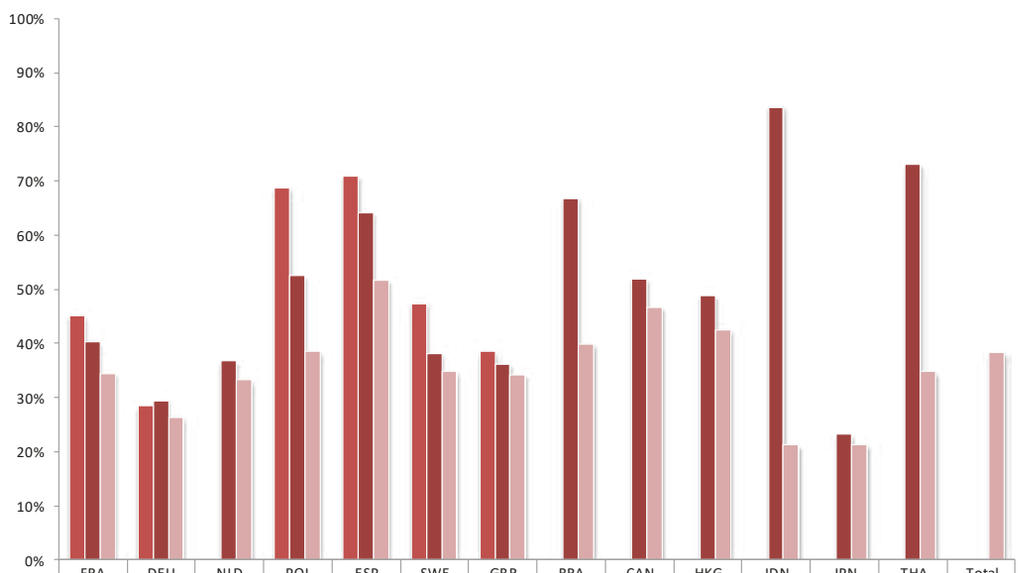
An important observation that follows from this chapter is that the groups in Figures 5.39 and 5.40 overlap to a large extent: in term of demographics, pirates are not very different from legal users, although on average they tend to be somewhat younger and more often male. More importantly, for each content type and country, 95% or more of pirates also consume content legally, and their median legal consumption is typically twice that of non-pirating legal users. Thus, the group of pirates in Figure 5.40 includes mostly people who also use legal channels, and the group of legal users in Figure 5.39 includes many people who also pirate content sometimes. Over time, it is observed in this chapter that the average pirate tends to increase legal consumption and decrease illegal consumption gradually. This pattern was found for music, films and series and books, but not for games.

Figure 5.39 Acquired or accesses any content type legally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA
2014 (% of Int. pop.)	68%	82%		84%	84%	78%	84%						
2017 (% of Int. pop.)	61%	81%	81%	70%	81%	79%	79%	85%	84%	79%	93%	71%	80%

Figure 5.40 Acquired or accesses any content type illegally (last year)



	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	Total
2014 (% of Int. pop.)	45%	28%		69%	71%	47%	38%							
2017 (% of Int. pop.)	40%	29%	37%	52%	64%	38%	36%	67%	52%	49%	84%	23%	73%	
2017 (% of total pop.)	34%	26%	33%	38%	52%	35%	34%	40%	47%	42%	21%	21%	35%	38%

Table 5.41 Pirates per legal content user (last year, all content type and channels)

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA	TOT
2017	66%	36%	46%	75%	79%	48%	46%	78%	61%	61%	89%	33%	91%	63%
2014	67%	35%		82%	85%	60%	46%							

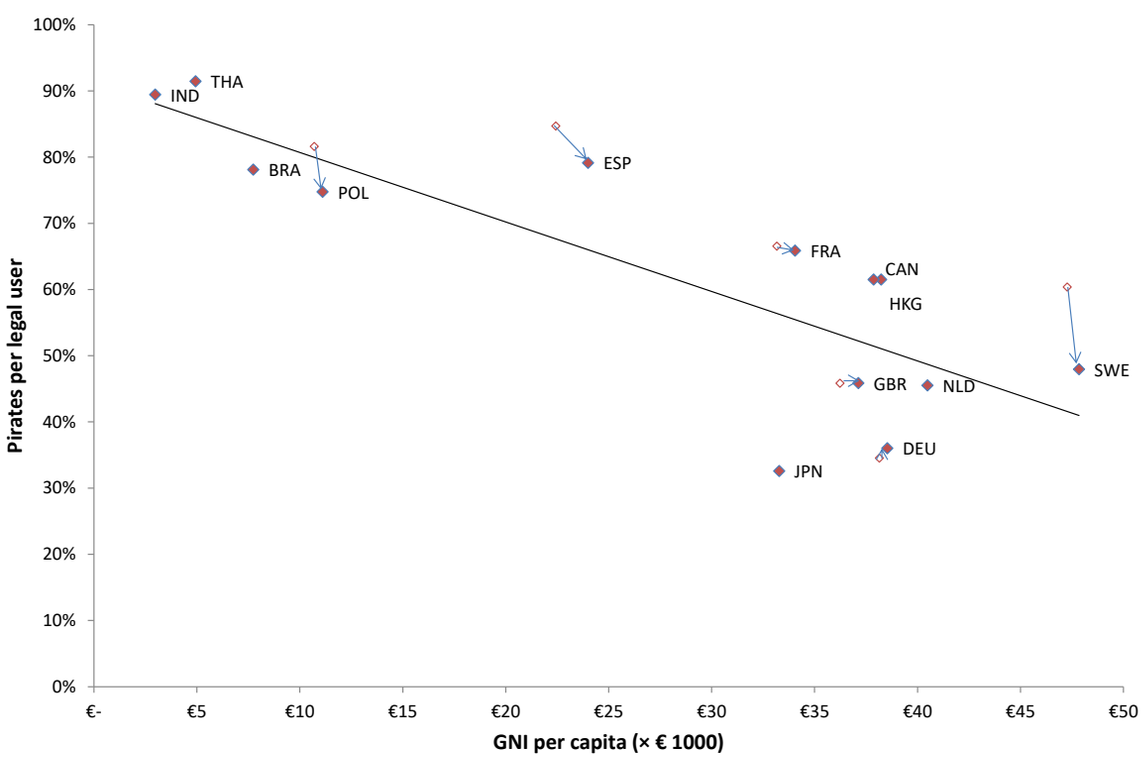
Table 5.41 shows the ratio between the percentages of people who have used illegal channels and people who have used legal channels at least once in 2017 and, if available, in 2014. This ratio turns out to be lowest in Japan and Germany, where there is about one user of illegal channels for every three users of legal channels. In Thailand and Indonesia, the groups are almost the same size. The second row in Table 5.41 shows that this ratio has decreased in Poland, Spain and Sweden, whereas it remained (nearly) constant in France, Germany and the United Kingdom.

This metric, as well as the more detailed statistics per content type and per channel, leads to the overarching conclusion that the percentage of the population engaging in online piracy is decreasing in most of Europe. Within Europe, the decreasing popularity of physical carriers – cds, DVDs, printed books and game disks – is also observed, while legal digital channels, in particular streaming, have rapidly gained popularity. This indicates that the decline of sales on physical carriers coincides more strongly with an increasing use of legal online channels than with online piracy.

The per capita *consumption volumes* per legal and illegal content channel presented in this chapter do not always match these developments. Decreasing volumes for physical carriers are observed in most countries, at least for music and audio-visual content, but not for games and books, despite a declining percentage of users of physical formats across the board. Similarly, for most countries and content types, an increase in the per capita volume of illegal content consumed is observed, despite a decreasing percentage of the population engaging in online piracy. This suggests that the issue of piracy is gradually becoming confined to a smaller group, although its total volume is not decreasing.

That being said, Figure 5.42 plots the number of pirates per legal user against per capita income and shows that at a country level, online piracy correlates strongly with a lack of purchasing power. Higher per capita income coincides with a lower number of pirates per legal users. In countries above the line, most notably Spain, there are more users of unlawful sources per legal user than would be expected from the average income level. This is despite the wide and increasing array of enforcement measures available against infringing users and intermediaries in Spanish law (see *Legal Background Report*, Section 4 and Annex 2 – Questionnaire Spain). In countries below the line, in particular Japan and Germany, there are fewer pirates per legal user than would be predicted based on per capita income. Arrows show country changes between 2014 and 2017.[38] In general, these changes have been along or toward the trend line.

Figure 5.42 Pirates per legal content user vs. per capita income (in constant prices)



38 On the horizontal axis, GNI per capita in 2014 and 2016 is used, expressing 2014 values in constant 2016 prices using the GDP deflator.

6. The effect of online piracy on legal consumption

Now that the usage of various legal and illegal content acquisition channels per country has been discussed in the previous chapters and trends have been established, it is time to return to the question how content consumption from illegal sources affects consumption from legal channels. Chapter 2 mentioned that a majority of the academic literature on the matter finds a negative net effect of illegal consumption on legal sales. However, there are relatively few studies on games and books, and a meta-analysis of the literature fails to reject the hypothesis of no effect on sales.

Section 2.1 explained that estimating such displacement rates is an intricate matter. First of all, there are several opposing interactions between piracy and legal consumption (Table 2.1), and the relative strength of these interactions is likely to differ depending on content type and channel. Even within content categories, differences can be expected between more recent and popular content, on the one hand, and older or niche content, on the other hand. In addition, the average net displacement effect may have changed over time, with the advance of fast broadband connections for consumers and innovations by the content industries. Nowadays, content is delivered in a variety of ways – not only on physical carriers but also as downloads or streams and in both transactional and subscription-based models – which implies that a technological mismatch between supply and demand is a much less likely motivation for online piracy today than a decade ago.

On top of these subtleties, estimating displacement rates involves methodological challenges that have to do with the fact that for many consumers, legal consumption and piracy go hand in hand. This was illustrated by the demographic description of pirates and legal users presented in the previous chapter and Annex A, which are very much alike. Chapter 5 also showed that – as a consequence of underlying individual preferences – pirates are much more likely to be legal users of each content type than non-pirates and that the median legal consumption of pirates is typically twice that of non-pirates. As a consequence of this, a *positive* correlation between piracy and legal consumption can be expected, which should be interpreted not immediately as a causal relation, but as a symptom of these underlying preferences.

In the current study, three methods are used to estimating displacement effects. These methods and their outcomes are discussed in this chapter. The first uses the number of content units per consumption channel reported in the 2017 survey for a so-called *instrumental variable regression* (Section 6.1). The second analyses the survey question in which respondents had to indicate for a list of recent blockbuster films which ones they had seen and how in a *quasi-panel study* (Section 6.2).[39] The third combines the responses in the 2017 survey with those in the 2014 survey for the respondents that participated in both, to perform a *panel study* (Section 6.3).

6.1 Instrumental variable regression

The methodological issue sketched out above – that underlying individual preferences drive a positive relation between illegal and legal content consumption – can be illustrated by regressing total consumption

39 A more rigorous methodological discussion of these two routes can be found in Van der Ende, Poort at al. (2015), Chapter 7 and 8.

from legal channels per content type on total consumption from illegal channels. The results of such a simple *ordinary least squares* (OLS) regression are summarised in Table 6.1.[40]

In this regression and all the other tables in this section, the variable of interest is the *total volume of consumption from **illegal** sources* for a specific content type. Different sources have been added in the way described in Section 4.3, and streamripping is excluded from this variable, for reasons discussed in Section 5.1. Unless indicated otherwise, the dependent variable in each regression is the *total volume of consumption from **legal** sources* for a specific content type, excluding merchandise and, for music, excluding live concerts and festivals.

The following control variables have been used:

- Demographic: age, gender, education level, employment status, minor (yes/no)
- Country dummies
- Time spent on the internet (question 1 in survey)
- Interest in music, films/series, books or games (question 3 in survey)
- Ownership of media devices (question 5 in survey).

Despite this extensive set of control variables that proved to be statistically very significant, OLS regressions yield *positive* correlations, as can be seen in Table 6.1. All of these correlations are even significant at a 99% confidence level (indicated by ***). Similarly, positive correlations can be found for many specific acquisition channels.

Table 6.1 OLS estimation of displacement rates per content type

	Music	Audio-visual	Books	Games
Displacement rate	0.42***	0.52***	0.97***	0.57***
Standard error	0.01	0.01	0.02	0.03
N	14,712	16,289	11,878	10,567

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Music excluding live concerts.

However, these positive coefficients should not be taken at face value, since they are likely caused by individual characteristics that drive both legal and illegal consumption and are not 'captured' by the control variables that are used, not even by the variable for a respondent's interest in a specific content type (question 3 in the survey). As was pointed out in Chapter 2, one way to deal with this is to use so-called *instrumental variables*. For this, one needs a variable that affects illegal consumption (positively or negatively) but does *not* directly affect legal consumption. It may affect legal consumption only through illegal consumption. Instrumental variables associated with Internet aptitude and access were argued in Chapter 2 to be no longer usable, since legal consumption also depends largely on Internet aptitude and access.[41]

Alternatively, and in line with Van der Ende, Poort at al. (2015), a number of questions was asked concerning the acceptance of activities like jaywalking, taking a flash photo in a museum and in travelling on public transit without a ticket (survey question 33). Such acts may not be allowed or may be considered morally disputable by people, but on the other hand they may be argued not to inflict any direct or marginal

40 In every analysis in this section, respondents who report no legal *and* no illegal consumption for a specific content type/channel are set to missing. This explains differences between estimations in the number of observations (N). For legibility, this chapter only presents the relevant displacement rate, standard error and N per estimation.

41 Candidate variables, relating to knowledge of piracy-related Internet terms (survey question 4) and the use of the Internet for news or homework (survey question 32) proved to be inadequate as instruments and were used as additional control variables instead.

damage to anyone. Thus, the hypothesis was that a respondent's attitude toward such actions would correlate with content consumption from illegal sources but be highly unlikely to have a *direct* effect on consumption from legal sources other than via piracy. Factor analysis was performed on the responses to the questions asked both to minors and to adults to reduce the number of variables. The conclusion of this was that there is one dominant factor giving roughly equal weight to all questions in Q33. This factor was used as an instrumental variable (IV), which proved to be strongly correlated with content consumption from illegal channels. Moreover, statistical tests show that, indeed, the use of an instrumental variable is required for econometric reasons and that the instrument concerning moral attitudes can be accepted as a strong and sufficient instrument.

The result of this instrumental variable estimation is presented in Table 6.2: the positive and significant coefficients from the OLS estimation in Table 6.1 have now been turned into negative coefficients, which are significantly below zero at a 90% confidence level for games and 95% for music and books.

This provides statistical evidence that illegal consumption of music, books and games displaces legal consumption. Note, however, that the coefficients themselves are surrounded with substantial uncertainty: for music, for instance, the 95% confidence interval for the displacement (approximated by the point estimate plus or minus 1.96 times the standard error) ranges from –0.06 to –1.23 (see Table 6.2). For books and games, in particular, this range is wide: for books, basically between 0 and –2 and for games between 0 and –4. This may have to do with the fact that underlying these content types is a wider variety of actual works. Thus, one could imagine that people who download games from illegal channels or play on modded devices have little interest in simpler free online games or that one chess game displaces more than one puzzle game. Likewise, one novel downloaded from illegal sources may occasionally displace more than one comic book.

Table 6.2 IV estimation of displacement rates per content type

	Music	Audio-visual	Books	Games
Displacement rate	–0.65**	–0.136	–1.195**	–1.963*
Standard error	0.30	0.301	0.580	1.029
95% confidence interval	–1.23 ~ –0.06	–0.73 ~ 0.45	–2.33 ~ -0.06	–3.98 ~ 0.05
N	14,712	16,289	11,878	10,567

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Music excluding live concerts.

Table 6.3 contains the same estimations as Table 6.2, but this time a split is made between minors and adults. The estimations suggest that displacement occurs for adults and not so much for minors: for adults, there is evidence of a substantial displacement for each content type, whereas for minors, the only significant effect – for audio-visual – is in fact positive at a 95% confidence level. This gives a strong indication that for minors, sampling dominates substitution for audio-visual content.

Table 6.3 IV estimation of displacement rates per content type

	Minors				Adults			
	Music	Audio-visual	Books	Games	Music	Audio-visual	Books	Games
Displacement rate	0.53	0.95**	–0.19	0.62	–1.10***	–0.89*	–1.82**	–2.49**
Standard error	0.52	0.38	0.69	2.59	0.40	0.53	0.87	1.16
N	3,413	3,569	2,458	2,839	11,299	12,720	9,420	7,728

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Music excluding live concerts.

Table 6.4 breaks the results from Table 6.2 down into the various legal channels for acquiring or consuming content. For several channels, displacement rates now become statistically more significant. Note that, since interactions between legal channels can be expected to occur, the per-channel coefficients should not be added to find an aggregate effect.

Table 6.4 IV estimation of displacement rates per content type

	Music			
	Physical	Downloads	Streams	Live
Displacement rate	–0.41**	–0.84***	–0.02	0.32***
Standard error	0.19	0.31	0.01	0.12
N	11,499	12,017	12,368	11,288

	Audio-visual				
	Physical buy	Rental	Downloads	Streams	Cinema
Displacement rate	–0.11	0.21*	–0.10	–0.65***	–0.40***
Standard error	0.12	0.12	0.12	0.25	0.13
N	11,256	9,387	10,115	12,778	14,938

	Books				
	Print buy	Print borrow	Downloads	Streams	
Displacement rate	–1.09***	–0.96**	–0.41	–0.50*	
Standard error	0.31	0.38	0.25	0.29	
N	10,543	7,654	7,141	6,212	

	Games				
	Physical		Downloads	Streams	Free
Displacement rate	–1.30**		–0.73*	–0.81*	–1.73***
Standard error	0.60		0.43	0.49	0.66
N	7,162		6,534	7,138	7,859

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively.

The results for ***music*** suggest that illegal consumption displaces legal downloads with an estimated displacement rate of –0.84, meaning that every 100 units of consumption from illegal sources (say, illegal downloads) displace about 84 legal downloads. The displacement for streaming is not statistically significant, whereas an estimated displacement rate of –0.41 is found for physical.

For live concerts and music festivals, a *positive* rate of +0.32 is found. This positive coefficient ties in with the intuition that digital recorded music is no substitute for live music but is a complement and that this interaction benefits from the *sampling effect*. Thus, every ten albums pirated would lead to three more concert visits. Note that live concerts are not included in the overall displacement rate for music, because it makes little sense to add up numbers of live concerts and downloads.

For ***audio-visual*** content, no such sampling seems to occur for films: the coefficient of –0.40 suggests that every ten units of illegal consumption lead to four fewer films seen in the cinema. A particularly large and significant displacement effect is found for digital streams (–0.65), whereas no significant effects are found for physical purchases and digital downloads. For rental, a marginally significant positive coefficient of +0.21 is found, which would lead to the conclusion that illegal consumption of audio-visual content promotes (what is left of) physical rental. A likely explanation for this is that rental (and borrowing from libraries) also concerns older audio-visual content, which may benefit from a sampling effect.

For ***books***, the results are contrary to those for music and audio-visual in the sense that large and statistically

significant displacement rates are found for books bought in print (or as audiobooks on a physical carrier) and borrowed from the library. Against the background of a much smaller and statistically insignificant estimate for book downloads from legal sources – the most obvious substitute for illegal downloads – these displacement rates may be overstated by capturing the effect of some people who have shifted from consuming print books to digital ones and others who have not.

In line with the hypothesis for understanding the high overall estimate for games in Table 6.2, the displacement rate found for free games in Table 6.4 is particularly high, but the coefficients found for the other channels are also statistically significant at a 90% or higher confidence level. Like books, the large coefficient for free games may be overstated by a partial segmentation between consumers who primarily play free games and game pirates who are more hardcore gamers and prefer console games.

6.2 Quasi-panel blockbuster films

From a methodological perspective, panel data – data containing consecutive measurements for the same respondents over time – are preferable to cross-sectional data as they make it possible to control for unobserved individual characteristics that are not captured by control variables or even instrumental variables.

Such a panel dataset was simulated by asking respondents in question 33 of the survey to indicate for items on a list of popular films from the years 2015, 2016 and 2017 which ones they had seen once or twice and if so, how. For each view of each film that they saw, they could indicate if they saw it in the cinema, on DVD or Blu-ray, as a download or stream from legal services, on tv or via various illegal channels.

This approach was first used by Rob and Waldfogel (2007) and Bai and Waldfogel (2009). The underlying assumption is that the vintages of the films correlate with the moment respondents saw them, thus adding time structure to the data. In a student sample in the US, Rob and Waldfogel (2007) found substantial displacement for blockbuster films close to –1. In a student sample in China, Bai and Waldfogel (2009) found much smaller displacement between –0.14 and –0.20. In a more representative online panel in China, these authors found even smaller and mostly insignificant effects. Van der Ende, Poort et al. (2015) found a displacement rate on the order of –0.4 in six European countries.

Table 6.5 presents the outcomes of the basic model along the same lines, for the 13 countries in this study combined. In line with the previous literature, it is acknowledged that if a film is seen a *first time* via an illegal source, this may directly *substitute* for a legal first view of that same film. Also, it could displace a first view of a different film due to competition for people's *time budget*: one can only see one film at a time. Or it could promote viewing a different film for the first time via the *sampling effect*, for instance because one likes the actor or genre or wants to see a sequel (these effects were described in Chapter 2 and summarised in Table 2.1). Combined, these effects lead to the net effect of illegal first views on legal first views. In the model in Table 6.5, this combined effect is estimated at –0.46, implying that for every 10 illegal first views, 4 to 5 legal first views are displaced. As can be seen from the ***, this estimate, as well as the others in Table 6.5, is statistically highly significant.[42]

A similar argument can be made for the effect of an illegal first view on legal second views. It could displace a legal second view of the same film, for instance because a person has downloaded it from an illegal source and does not buy the DVD. Or it could encourage a person to go and see the film legally, for instance in the cinema, if she really likes it. Also, it could have a positive (sampling) or negative (time budget) effect on second views of different films. Table 6.5 shows that the net effect of these possible interactions is small but positive: +0.04.

42 The *** indicates a 99% certainty the coefficient is below or above zero, as indicated by the sign of the coefficient. This section presents only so-called fixed effects models, as Hausman tests indicate fixed effects are preferable over random effects.

An illegal second view may also impact legal views. It may directly *substitute* for a legal second view of that same film. Via *time budget* competition, it may also negatively impact legal second views of different film or promote such views through the *sampling effe*ct. The net effect found in Table 6.5 is –0.30.

Of course, an illegal second view cannot impact the first view of that same film, which is why previous literature does not estimate an effect of illegal second views on legal first views. However, such an effect can occur on *other* films via the sampling effect. For instance, one can imagine someone watching a film a second time on an illegal channel and becoming enthusiastic to see the sequel in the cinema. To estimate an upper bound for this sampling effect, a regression was run including an effect of illegal second views on legal first views. It is an upper bound because the coefficient also captures the (expected positive) effect of legal first views on illegal second views. The grey numbers in Table 6.5 give the estimates if such an effect of illegal second views on legal first views is allowed. This changes the coefficient of illegal first views slightly (from –0.46 to –0.48) and yields a fairly large positive coefficient for illegal second views on legal first views (+0.37).

The point about a possible upward bias could also be argued for the effect of *all* illegal views on *all* legal views, as it may capture a reverse effect of legal views on illegal views as well. This net effect is estimated at –0.22. On the other hand, ignoring a possibly positive effect of illegal second views on legal first views of different films could bias the net displacement downward.

Table 6.5 Quasi-panel estimations for blockbuster films: base model

	1st legal	1st legal	2nd legal	Total legal
1st illegal	–0.46***	–0.48***	0.04***	
2nd illegal		0.37***	–0.30***	
Total illegal				–0.22***
N	95,034			

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Model based on annual data.

As a robustness check, Table 6.6 presents the estimations if film views are attributed to the specific *quarter* of the year during which films were released. This has the advantage of giving more time structure to the data, thereby enhancing the number of observations. However, the link between the release date of a film and the timing of views – in particular second views and views via legal channels other than cinema visits – may be too irregular to add extra information. Moreover, when quarterly data are used, there are many 'all zero observations' – i.e., combinations of respondents and quarters for which there are no views at all. Several such quarters in a row lead to a bias of the estimates toward zero. Indeed, the estimate of illegal first views on legal first views in this quarterly model is smaller, at –0.27. The estimate for all illegal views on all legal views is even slightly positive (+0.04) but as mentioned, this estimate could be argued to be biased upward. The second half of Table 6.6 confirms this: removing combinations of respondents and quarters for which there are no views at all yields displacement rates between those of Table 6.5 and the first half of Table 6.6. The estimate for the effect of all illegal views on all legal views is now negative but small at –0.06.

Table 6.6 Quasi-panel estimations for blockbuster films: robustness checks with quarterly data

	Quarterly data				Quarterly data: 'all zero observations removed'		
	1st legal	2nd legal	2nd legal	Total legal	1st legal	2nd legal	Total legal
1st illegal	–0.27***	0.11***	–0.32***		–0.35***	0.09***	
2nd illegal		–0.19***	0.534***			–0.24***	
Total illegal				0.04***			–0.06***
N	285,102				191,558		

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively.

Table 6.7 specifies the estimates in the base model of Table 6.5 (using annual data), now per legal channel. This table and the next one present only the estimates used in the previous literature and not the estimate of total illegal on total legal views and of illegal second views on legal first views, which may be biased upward. This table shows, for each channel, the same pattern as for all legal channels combined. It also reveals that most of the displacement occurs for cinema visits. Displacement rates for later windows are rather small

Table 6.7 Quasi-panel estimations for blockbuster films: split per legal channel

	All legal channels (base model)	Cinema	DVD / Blu-ray	Legal stream / download	TV
1st illegal on 1st legal	–0.46***	–0.24***	–0.07***	–0.06***	–0.09***
1st illegal on 2nd legal	0.04***	0.01***	-0.01	0.01**	0.02***
2nd illegal on 2nd legal	–0.30***	–0.03***	–0.07***	–0.10***	–0.10***
N	95,034				

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively. Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively.

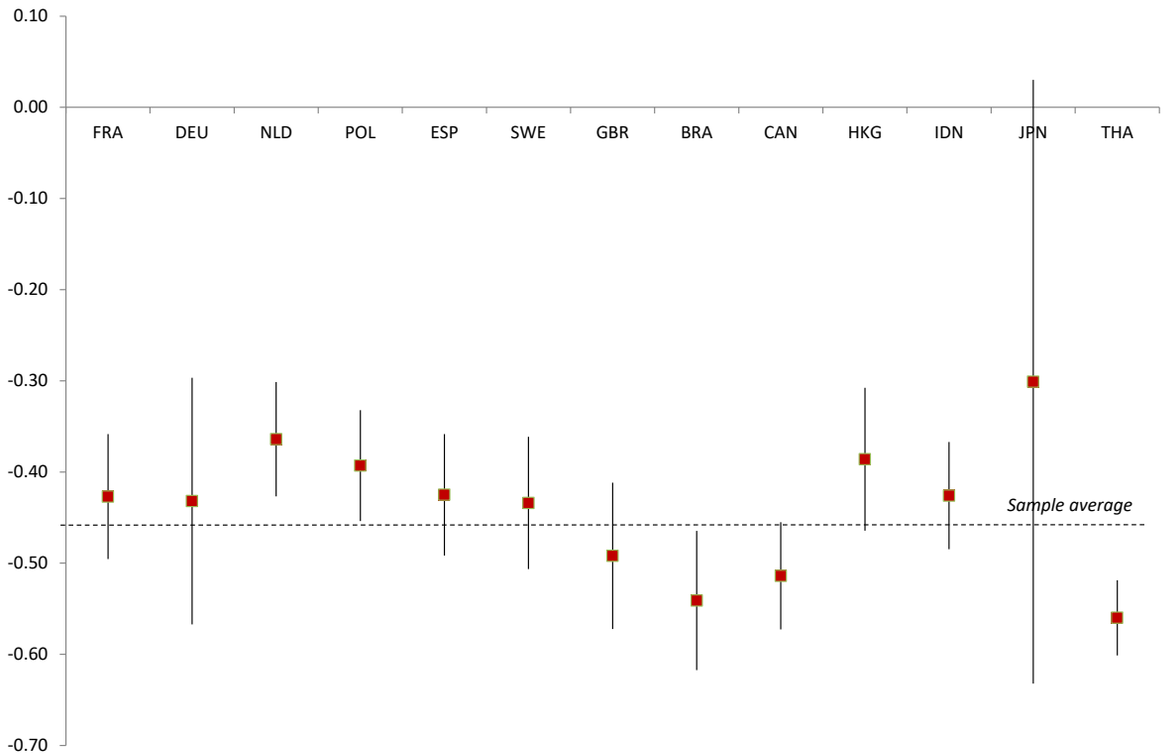
Table 6.8 gives the estimates per country. The first row of coefficients, for the displacement of legal first views by illegal first views is also given in Figure 6.9, in which the lines per country indicate the 95% confidence interval (again approximated by the point estimate plus or minus 1.96 times the standard error). It shows that for all countries except Japan, the 95% confidence intervals are well below 0. Most of them are not significantly different from the sample average of –0.46, with a few exceptions, most notably the Netherlands (lower displacement rate) and Thailand and Brazil (higher displacement rate).

Table 6.8 Quasi-panel estimations for blockbuster films: split per country

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA
1st illegal on 1st legal	–0.43 ***	–0.43 ***	–0.36 ***	–0.39 ***	–0.43 ***	–0.43 ***	–0.49 ***	–0.54 ***	–0.51 ***	–0.39 ***	–0.43 ***	–0.30 *	–0.56 ***
1st illegal on 2nd legal	–0.00	–0.16 ***	0.06 ***	–0.02	0.02	–0.03	–0.01	0.06	–0.01	0.03	0.15 ***	0.48 ***	0.04 **
2nd illegal on 2nd legal	–0.16 ***	0.05	–0.23 ***	–0.28 ***	–0.30 ***	–0.18 ***	–0.18 ***	–0.41 ***	–0.23 ***	–0.19 ***	–0.32 ***	–0.52 ***	–0.36 ***
N	7,116	6,930	6,633	7,518	7,647	7,287	7,290	7,758	7,422	7,473	7,719	6,273	7,968

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively.

Figure 6.9 Estimated displacement of first legal views by first illegal views per country



Combining the displacement rates found in Tables 6.7 and 6.8 with the average number of first and second views that respondents reported per channel, it is possible to estimate the relative sales loss of total film views per channel and per country:

- Over the entire sample, respondents report an average of 15.1 first and 5.9 second legal views, 21.0 altogether.Via illegal channels, the averages are 1.4 for first views and 1.0 for second views.
- Combining this information with the coefficients in the first column of Table 6.7 gives a net displacement of 0.9 legal views on average.
- In the counterfactual without displacement, there would have been 21.9 legal views, implying a relative sales loss of 0.9/21.9 = 4.1%.

Tables 6.10 and 6.11 present the relative net sales loss per channel and per country that follow from this calculation. For channels, these vary from 3.2% for tv to 4.5% for legal streams and downloads. Per country, they range from 0.3% in Japan to 10.3% in Thailand. Note that this calculation is likely to give an upper bound, as it does not take the possible effect of illegal second views on legal first views into account. Moreover, it uses the higher displacement rates found in the annual model and not the lower displacement in the quarterly models in Table 6.6.

Table 6.10 Relative net sales loss: split per legal channel

	All legal channels (base model)	Cinema	DVD / Blu-ray	Legal stream / download	TV
Relative net sales loss	4.1%	4.3%	4.4%	4.5%	3.2%

Table 6.11 Relative net sales loss: split per country

	FRA	DEU	NLD	POL	ESP	SWE	GBR	BRA	CAN	HKG	IDN	JPN	THA
Relative net sales loss	3.6%	0.9%	3.6%	5.0%	4.0%	3.3%	2.4%	3.1%	5.3%	3.0%	4.4%	0.3%	10.3%

6.3 Real panel

In principle, a real panel dataset is preferable to a quasi-panel such as described in Section 6.2, since it does not require assumptions about when consumption from legal or illegal sources took place. Such a panel is available in this study, by combining the 2014 data with the 2017 measurement. Having two measurements, three years apart, for the same set of respondents in six EU countries provides a unique opportunity to study displacement effects in a real panel. Conceptually, the question is how on average a change in the volume of illegal consumption between 2014 and 2017 relates to a change in legal consumption for that same person. Thus, underlying unobserved individual characteristics can be controlled for as long as they do not change over time.

Table 6.12 presents the results of three different versions of such a model, which may be counterintuitive at first sight: all coefficients are positive, substantial and significant at a 99% confidence level. Therefore, an increase in illegal consumption over time is found to correlate with an increase in legal consumption and vice versa. This result appears to be at odds with the negative displacement effects found in the preceding two sections. On an intuitive level it can be understood, however, by acknowledging that substitution effects – 'shall I buy or shall I pirate?' – occur on the spot, whereas changes in legal supply and in behavioural patterns are dominant over a longer time span. From the observation in the preceding chapter that consumption from legal and illegal sources go hand in hand for an overwhelming majority (>95%) of pirates, it follows that changes in personal preferences over time affect legal and illegal consumption alike.

This point is also reflected by the changes in consumption over time presented in Chapter 5. Table 5.10, for instance, shows that 15% of all longitudinal music consumers decreased their consumption from both illegal and legal channels, while 10% increased both legal and illegal consumption. This 25% induces a positive correlation. On the other hand, 14% increased their legal consumption while decreasing their illegal consumption and 6% did the opposite. This group, which induces a negative correlation, is smaller than the group leading to a positive correlation. In other words, the fact that consumption from legal and illegal sources are two sides of the same coin dominates the gradual shift that people make over time toward using legal channels.

Table 6.12 Panel estimation of displacement rates per content type

Base model: Fixed effects, observation with zero consumption per channel in 2014 or 2017 set to missing				
	Music	**Audio-visual**	**Books**	**Games**
Displacement rate	**0.48*** **	**0.34*** **	**0.83*** **	**0.69*** **
Standard error	0.08	0.07	0.16	0.10
N	2,093	2,628	1,995	1,235
Robustness check: Fixed effects, observation with zero consumption per channel in 2014 or 2017 not set to missing				
Displacement rate	**0.67*** **	**0.57*** **	**1.36*** **	**1.09*** **
Standard error	0.05	0.05	0.13	0.06
N	3,319	3,774	3,014	2,217
Robustness check: OLS of change in illegal consumption on change in legal consumption (with controls)				
Displacement rate	**0.49*** **	**0.36*** **	**0.91*** **	**0.74*** **
Standard error	0.08	0.07	0.16	0.10
N	532	695	513	261

Note: symbols *, **, *** stand for statistical significance at a 90%, 95%, 99% confidence level, respectively.

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