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# ONLINE COPYRIGHT INFRINGEMENT IN THE EUROPEAN UNION

## MUSIC, FILMS AND TV (2017-2018), TRENDS AND DRIVERS


November 2019

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# CONTENTS

# ACRONYMS AND ABBREVIATIONS

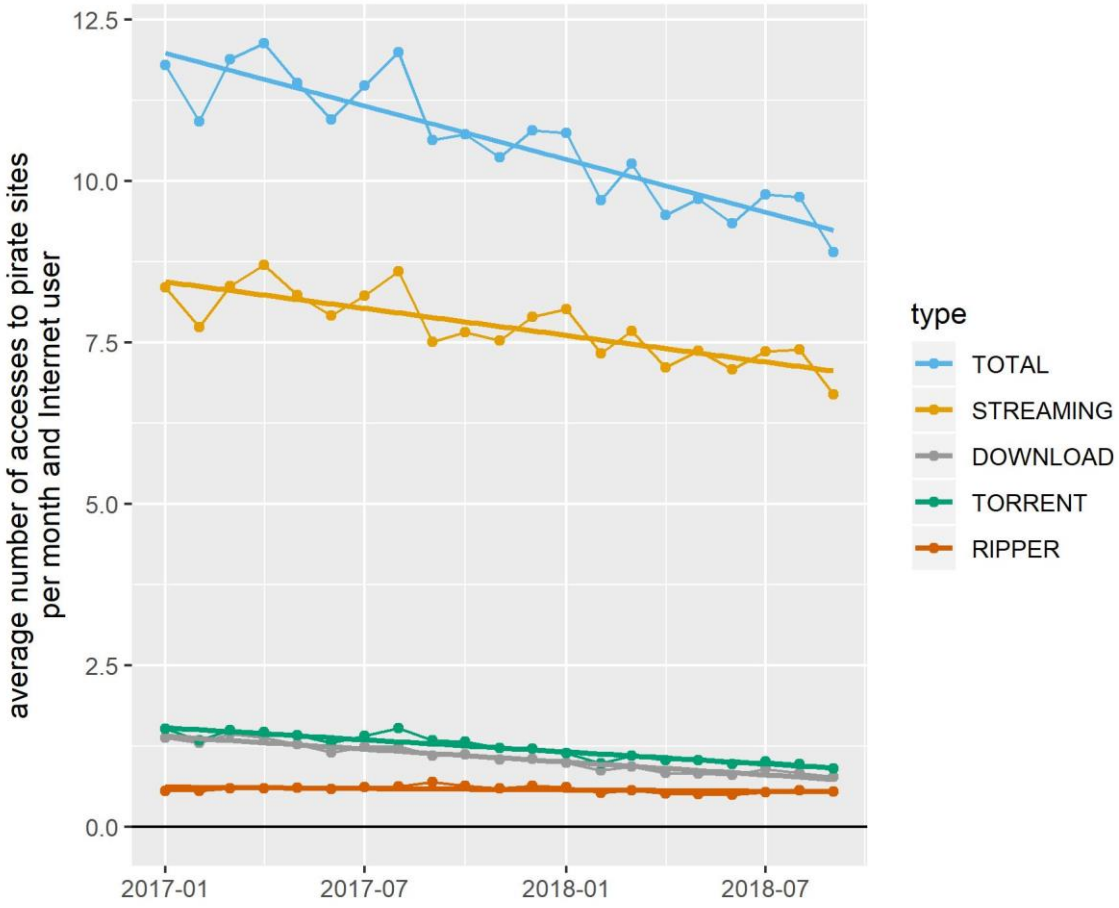
| | |
|---|---|
| AVOD | ad-based video-on-demand |
| CJEU | Court of Justice of the European Union |
| DVD | Digital Versatile Disc |
| FOD | free on-demand service |
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| HDI | Household Disposable Income |
| IFPI | International Federation of the Phonographic Industry |
| ITU | International Telecommunication Union |
| LD | laserdisc |
| pE | pan-European |
| PPS | purchasing power standard |
| SBMS | subscription-based music services |
| SVOD | subscription video-on-demand |
| TVOD | transactional video-on-demand |
| UGC | user-generated content |
| VCD | video compact disc |
| VOD | video-on-demand |
| VSP | video sharing platforms |

# 1. EXECUTIVE SUMMARY

This report examines consumption of copyright-infringing content in the 28 EU Member States, for TV programmes, music and film, using a variety of desktop and mobile access methods, including streaming, downloading, torrents and ripping software. The report consists of two parts, a descriptive analysis of the trends in consumption of infringing content, and an econometric analysis of the factors that influence differences in piracy rates among the EU Member States.

The analysis is based on a rich set of data on access to pirated music, film and TV programmes in all 28 Member States, for the period January 2017 to September 2018. The data covers both fixed and mobile devices, as well as the main access methods: streaming, downloads, torrents and stream ripping.

The good news in this report is that digital piracy is declining, as shown in the figure below. Between 2017 and 2018, overall access to pirated content declined by 15 %. The decline was most pronounced in music, at 32 %, followed by film (19 %) and TV (8 %).



However, piracy remains a significant problem, more so in some Member States than in others. The average internet user in the EU accessed pirated content 9.7 times per month in 2018, ranging from almost 26 times per month in Latvia and Lithuania to less than 4 times per month in Finland.

The econometric analysis in Section 5 seeks to explain those differences among the Member States. Based on a review of the existing literature and available data sources, a number of factors that could influence consumption of pirated content in a given country were examined. These factors included socio-economic variables (income levels, education, inequality, unemployment); demographic variables such as the proportion of young people in the population; variables related to the features of the relevant marketplace, including market size, the extent of the internet infrastructure and the number of legal offers available for the various types of content; and attitudes towards intellectual property infringement, as reported in the IP Perception study published by the EUIPO.

Among the socio-economic factors, the level of **income per capita** and the extent of **inequality** seem to have the greatest impact on consumption of pirated content: high per capita income and low degree of income inequality are associated with lower levels of illicit consumption. The overall **size of the market**, as measured by the number of internet users in a country, also matters: the average consumption of pirated content is lower, all other things being equal, in larger Member States. A higher **acceptance of digital piracy**, as evidenced in the IP Perception study, is also associated with a higher level of consumption of pirated content.

Some of the other variables examined also seemed to have an impact on consumption of pirated content, but this impact was not clear-cut. For example, **awareness of legal offers** (as reported in the IP Perception study) appears to reduce consumption of pirated film but increase consumption of pirated TV content, while there was no statistically significant impact on music consumption. It seems that the relationship between legal offers and piracy is a complex one and warrants further study.

A follow-up study, to be carried out in 2020, will examine the consumption of individual pirated film titles in all 28 Member States, possibly compared to legitimate consumption of the corresponding content (e.g. box office revenues).

# 2. INTRODUCTION

The purpose of this study is to quantify the extent of digital piracy ([1]) in the EU Member States and to carry out an econometric analysis of the factors that make consumers in some countries more likely to engage in this practice than in others.

Following this introductory section which proposes a definition of copyright infringement and briefly describes the various legal and illegal business models, Section 3 discusses the data used for the subsequent analysis. Section 4 presents various descriptive statistics and piracy trends, while Section 5 contains the econometric analysis. The final section sets out the conclusions and discusses possibilities for further research.

## 2.1 COPYRIGHT IN THE EU

Copyright law provides authors with exclusive rights which enable them to control the use of their works and to gain income from that use. Authors and/or right(s) holders may authorise or prohibit certain uses of their works, such as reproduction and distribution of copies of their works, as well communication and making the works available to the public ([2]).

In addition to author's rights, copyright law creates 'related' (or 'neighbouring') rights, which are designed to reward and/or incentivise creative endeavour and the investments of those who make creative works accessible to the public: music and audiovisual performers, record producers, radio and TV broadcasters, etc. In the EU, the producers of the first fixation of a film are also protected by related rights ([3]).

Independently of the economic rights, authors also have moral rights which, at the least, include the right of authorship and the right of integrity of the work. Other moral rights that national laws may provide for are the right of divulgation or the right of withdrawal. These rights can usually be asserted by the author even if the copyright has been transferred to a third party ([4]).

It is important to note that copyright protection is applicable only to the expression of ideas, not to the ideas themselves. Copyright registration (at both EU and national levels) is not required for copyright

([1]) Strictly speaking, 'piracy' refers to the act of making copyright-infringing content available to consumers. This study focuses on the consumption of this content by internet users in the EU. The correct term is therefore 'consumption of pirated content' or 'consumption of copyright-infringing digital content'. However, as a shorthand, 'piracy' is used interchangeably with these expressions.

([2]) At the EU level, the main 'economic rights' have been harmonised by the so-called Information Society Directive, D 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society, OJ L 167, 22/06/2001, pp. 10-19, Articles 2-4.

([3]) See Articles 2-3 Information Society Directive; see also the 'Rental Rights Directive', D 2006/115/EC of the European Parliament and of the Council of 12 December 2006 on rental right and lending right and on certain rights related to copyright in the field of intellectual property (codified version), OJ L 376, 27/12/2006, pp. 28-35, Article 7 et seq.

([4]) On national approaches to waivers of moral rights, see e.g. Consumers' Frequently Asked Questions (FAQs) on Copyright, Summary Report, A Project Commissioned by the European Union Intellectual Property Office, C.Geiger, F.Schönherr, January 2017p. 43 et seq.

protection ([5]). Protection arises automatically from the moment a work is created. In this respect, copyright differs significantly from other IP rights.

Copyright law is governed by the principle of territoriality, which means that each country has a separate system of rules, although international agreements from the end of the 19th century and the 1990s, and European legislation since the early 1990s have significantly harmonised these rules. Twelve directives have been adopted to harmonise important aspects of the copyright laws in the EU Member States. In addition, two regulations and provisions of several other legal instruments are relevant to the exercise and enforcement of copyright ([6]).

In the EU, the general rule is that the rights of authors are protected for their lifetime and 70 years after their death ([7]). The protection conferred by related rights lasts for 50 years after the performance, film or broadcast was published or communicated to the public, and 70 years for phonograms or performances fixed in phonograms ([8]).

The economic aspects of copyright are complex, reflecting trade-offs between the interests of creators, distributors, performers and consumers, and short-run versus long-run effects. The general objective of the system is to ensure adequate compensation for creators and other rights holders (so that a socially optimal level of creative activity takes place), while at the same time providing broad public access to the creative works and making it possible for other creators to build upon prior works ([9]).

## 2.2 EXPLOITING CREATIVE CONTENT ONLINE

The music, TV and film entertainment industry is undergoing rapid changes as the increase in internet-based streaming services is fundamentally changing the way creative content is produced, sold and distributed. Some of the new business models are described below.

Video-on-demand (VOD) is a form of video media distribution that allows users to consume TV and film content whenever they choose, instead of having to watch shows at a scheduled broadcast time. When discussing VOD models, music-only streaming is sometimes included ([10]); for the sake of simplicity and completeness, that is also the case in this report.

FOD, or free-on-demand, is a streaming service which is free for the user either because the provider is public (Arte Europe or the BBC iPlayer, for example), or because the user must also watch occasional advertisements (Popcornflix, VEVO, etc.), in which case it is called AVOD or ad-based VOD. This model is similar to the television model, but enhanced with demographic targeting and automated advertising.

The pay-on-demand markets comprise two main segments, transactional video-on-demand (TVOD) and subscription video-on-demand (SVOD).

([5]) Voluntary registration is, however, possible in many countries.
([6]) For an overview of EU legislation on copyright law, see the Commission's websites:
https://ec.europa.eu/digital-single-market/en/eu-copyright-legislation
https://ec.europa.eu/digital-single-market/en/copyright
([7]) On the term of protection in EU law, see also Derivative Use of Public Domain Content — Film Industry Focus, EUIPO, May 2017, p. 35 et seq.
([8]) See Directive 2011/77/EU of the European Parliament and of the Council of 27 September 2011 amending Directive 2006/116/EC on the term of protection of copyright and certain related rights, OJ L 265, 11/10/2011, pp. 1-5
([9]) From IPR-intensive industries and economic performance in the European Union Industry-Level Analysis Report, September 2019.
([10]) SBMS, subscription-based music services and Download Stores (see . https://pro-music.org/digital-music-services.php)

In SVOD a consumer agrees to a subscription service that provides access until cancelled by the consumer or the contract runs out. Netflix, HBO or Amazon Prime are examples of SVOD services; they also produce their own serial and film content. These SVOD services often provide high quality video over the internet without waiting or buffering issues. Typically, SVOD services run on monthly subscriptions with no limit on the amount of content consumed.

> *SVOD should probably be considered as a particular form of pay-television. Like a pay-TV channel, a SVOD service gives customers access to a vast array of more or less exclusive content. Of note is also the fact that pay-TV channels often propose catch-up services, i.e. a non-linear access to their catalogues ([11]).*

TVOD offers a free signup or free profile for the consumer and instead charges based on the volume of content or type of content consumed. This is the model for iTunes, Google Play or FilmDoo. Customers are charged on a pay-per-view basis while rights holders receive a commission on transactions. Most often, TVOD services focus on films and music, but this model has also been used for live events, including sports. Some TVOD services offer a pay-what-you-want model.

> *TVOD can be regarded, to an extent, as the dematerialisation of the DVD and Blu-ray retail and rental services, as both options provide the possibility to rent or purchase a single title (a film or an audiovisual work), whether in a physical or dematerialised format. TVOD usually works under a principle of revenue-sharing between the right[s] holder and the TVOD service ([12]).*

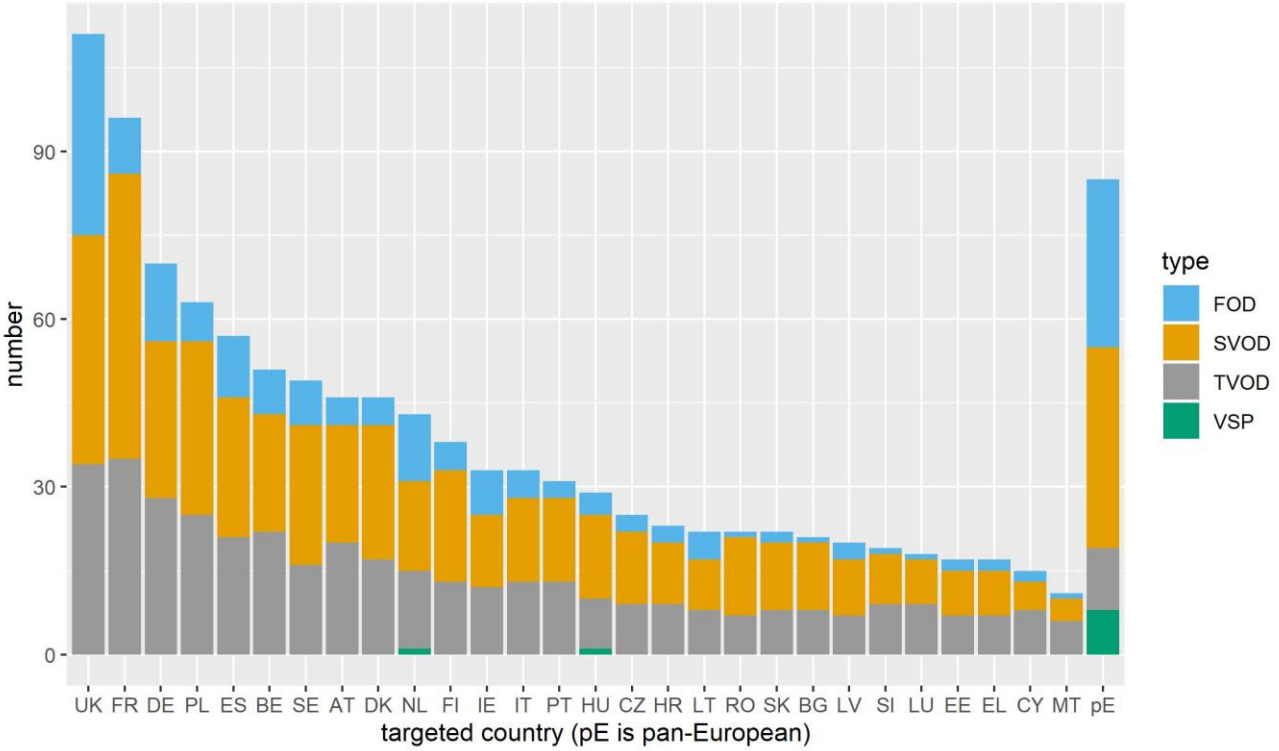
Some platforms have attempted to combine subscription-based and advertising-based content services. Typically, these hybrid models (for example, Spotify) take the form of increased payment for fewer adverts or use the 'freemium' model, where the basic model is free, but desirable upgrades such as an ad-free experience, access without an internet connection, or higher quality, require a subscription.

Video Sharing Platforms (VSP), like Dailymotion, Facebook, Instagram or YouTube ([13]), are platforms that distribute so-called user-generated content (UGC), that is, any form of content that has been posted by users on the online platforms. The VSP are attempting to develop new business models, including hybrid models ([14]).

The European Audiovisual Observatory maintains information on the different audiovisual services and licences in Europe in the MAVISE database ([15]). The following two figures show a summary (excluding traditional TV channels) of the availability of the various types of offers across the EU in September 2019.

([11]) VOD distribution and the role of aggregators, May 2017 European Audiovisual Observatory.
([12]) VOD distribution and the role of aggregators, May 2017 European Audiovisual Observatory.
([13]) These services are included in the MAVISE database (see below).
([14]) Certain online content-sharing service providers will be subject to a new liability regime introduced by the Copyright in the Digital Single Market Directive.
([15]) MAVISE is a free-access database on television channels and on-demand services and licences in 41 European countries and Morocco, providing information about audiovisual services available in Europe, including the licensing country and the owners and registries of licences issued by European audiovisual regulatory authorities. The MAVISE database, managed by the European Audiovisual Observatory, is supported by the CREATIVE EUROPE programme of the European Union. See http://mavise.obs.coe.int/

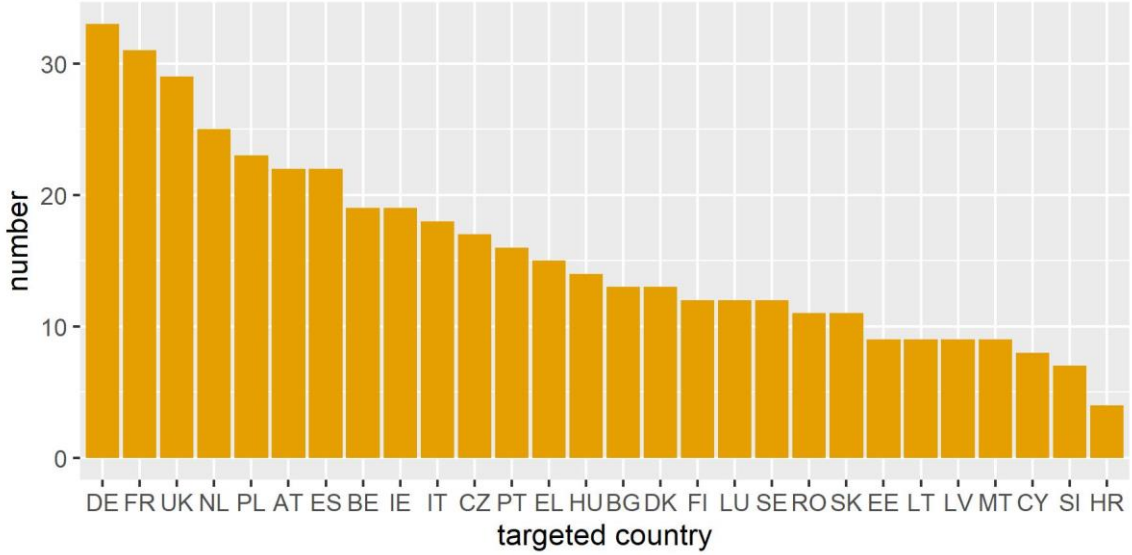
**Figure 1. Number of online video platforms in the EU in 2019**




Source: European Audiovisual Observatory/MAVISE

The pE category represents 85 platforms that are technically available in all European countries covered by MAVISE.

**Figure 2. Number of online music platforms in the EU in 2019**




Source: IFPI / Pro-Music https://pro-music.org/

Some prominent examples of the different types of platforms are shown below.

**Figure 3. Types of creative content internet platforms**

| Free (**FOD**) | | Paid | |
|---|---|---|---|
| Public | Ads | Subscription (**SVOD/SBMS**) | Per-view (**TVOD**) |
| Arte Europa<br>BBC iPlayer | Popcornflix<br>VEVO | Netflix<br>HBO | iTunes<br>Google Play |
| Hybrid (not in MAVISE)<br>Spotify (only audio)<br>Deezer (only audio) | | | |

| (**VSP**) of UGC (models in development) |
|---|
| Dailymotion<br>Facebook<br>Instagram<br>Youtube |

## 2.3 COPYRIGHT INFRINGEMENT ON THE INTERNET

Copyright infringement arises whenever a protected work is used without the authorisation of the copyright holder, and when this activity cannot be regarded as permitted use under one of the applicable exceptions or limitations to copyright.

The law creates exceptions and limitations in order to balance copyright protection with competing interests, such as freedom of expression and communication or privacy ([16]). One of the exceptions to copyright that the EU Member States may introduce into their national law is the so-called private copying exception ([17]), which refers to making copies of copyright protected works for strictly personal and non-commercial use. According to case-law from the Court of Justice of the EU (CJEU), the private copying exception is reserved for the user who has accessed or acquired a copy of the work in a legitimate manner (i.e. with the authorisation or licence of the copyright owners) ([18]).

In the internet era, copyright infringement has become easier, even when committed on a vast scale — one need only think of unauthorised large-scale file-sharing on peer-to-peer or torrent sites. The technology used to download copyright protected content is irrelevant, as is the fact of whether the work was downloaded in its entirety or in part.

Downloading a work from the internet constitutes an act of reproduction. During the process of streaming, no fixed copy or file is created on the end-user's computer. It appears that the question of whether the transient copy created in the course of streaming of an audiovisual work from an unlawful source may amount to copyright infringement has not yet been answered unanimously at the EU level.

([16]) Article 5 of the Information Society Directive provides for a long, exhaustive list of exceptions that Member States may implement. The recently adopted 'Copyright in the Digital Single Market Directive' provides for three additional mandatory exceptions. Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (Text with EEA relevance.), OJ L 130, 17/05/2019, pp. 92-125, Articles 3-5.
([17]) Article 5(2)(b) of the Information Society Directive
([18]) 10/04/2014, C-435/12, ACI Adam BV and Others v Stichting de Thuiskopie, Stichting Onderhandelingen Thuiskopie vergoeding, EU:C:2014:254.

In a case that concerned the sale of a multimedia player with pre-installed add-ons which helped users find infringing content online, the CJEU held that the acts of streaming by end-users of that kind of player are not covered by copyright exceptions ([19]).

Under EU law, rights holders may also apply for an injunction against an intermediary whose services are being used by a third party to infringe IPR, including copyright. The CJEU has given guidance on the criteria for liability in cases of alleged online infringements of copyright and related rights ([20]). It has also clarified, to a certain extent, if and under what circumstances different types of online platforms can be considered to have made a 'communication to the public' ([21]). According to the most recent Copyright in the Digital Single Market Directive, certain platforms can perform a communication to the public ([22]).

**Table 1. Types of copyright infringement ([23])**

| Type of infringement | Description |
|---|---|
| Physical infringement | Illegal copies of optical discs including Laserdiscs (LD), Video Compact Discs (VCD) and Digital Versatile Discs (DVD). Inexpensive to copy using optical media and decryption software. |
| Internet infringement | Illegal use on the internet. Piracy through the use of downloadable media formats to distribute films or music to other internet users. |
| Signal theft | Receiving cable TV or radio system or satellite signals without authorisation. Piracy through the supply to consumers of illegal cable decoders or satellite descramblers. |
| Broadcast piracy | On-air broadcasting of a programme, from a legitimate or pirate copy, without permission from the copyright holder, e.g. illegal internet protocol television (IPTV)([24]). |
| Unauthorised public performance | An institution or commercial entity showing a programme to its members or customers without permission from the copyright owner. |

This study will focus on internet infringement. Four methods of online copyright infringement can be described depending on the process used in the sites providing access to unauthorised content: streaming, downloading, stream ripping and torrent ([25]).

**Streaming**: this category includes any sites that primarily allow access to unauthorised content via online streaming directly from an end-user's web browser. Sites typically offer a wide range of content,

([19]) 26/04/2017, C-527/15 Stichting Brein v. Jack Frederik Wullems, EU:C:2017:300. Considering notably the way in which the features of the multimedia player are advertised, end-users would buy the player deliberately and in full knowledge that they would access a free and unauthorised offer of protected works. In addition, 'as a rule', the temporary acts of reproduction created in this situation by streaming would adversely affect the normal exploitation of the works and cause unreasonable prejudice to the legitimate interests of the rights holder; this practice 'would usually result in a diminution of lawful transactions relating to the protected works […]' (paras 69, 70).
([20]) It mainly clarified relevant provisions of the Information Society Directive, the e-commerce Directive (D 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market, OJ L 178, 17/07/2000, pp. 1-16, and the Enforcement Directive (D 2004/48/EC of the European Parliament and of the Council of 29 April 2004 on the enforcement of intellectual property rights (Text with EEA relevance), OJ L 157, 30/04/2004, pp. 45-86).
([21]) For an overview of recent case-law from the CJEU and national courts in 14 EU Member States on role of online intermediaries in the enforcement of IPR infringement, see the IPR Enforcement Case-law Collection: the Liability and Obligations of Intermediary Service Providers in the European Union, European Union Intellectual Property Office, 2019.
([22]) D 2019/790/EU of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (Text with EEA relevance.), OJ L 130, 17/05/2019, pp. 92-125, Article 17 et seq. which set out a specific liability regime for certain 'online content-sharing service providers'.
([23]) Based on (Walls, 2008), Introduction.
([24]) Notable variations of illegal IPTV business models are 'business to consumer subscription model', 'business to business model' and 'streaming portal model'. The three business models are extensively described in the EUIPO study 'Illegal IPTV in the European Union', November 2019.
([25]) Based on 'Muso Methodology 2017, Markets Insight Reports Market Analytics'

directly searchable from within the site. Some sites host infringing content themselves, but the majority provide links to external hosts.

**Download**: includes any sites that primarily allow use of unauthorised content via a direct download in the user's web browser. Sites in this category typically offer a wide range of content, directly searchable from within the site, and downloadable in their entirety. The sites rarely host the content themselves, and link to other sites which host the content.

**Stream ripping**: sites in this category allow the ripping ([26]), mainly of audio into downloadable MP3 files. This process takes place directly in a user's web browser. Typically, the user simply needs to enter a URL to instantly start the download of the MP3 file. Stream ripping is typically used to rip the audio from music videos, often from legitimate sources. Some sites offer allow users to rip video content and save it as a video file, but most sites in this category focus on ripping audio content only.

**Torrent**: a torrent ([27]) download portal allows a visitor to search for any content, and then download a small file that initiates the process of downloading the full product. Users of torrent sites must have a separate piece of software, called a torrent client, installed on their device. This is a peer-to-peer (P2P) download process, so the content is not received directly from the site, and instead comes from other torrent users who are sharing the same content. There is usually also an act of communication to the public involved of the copies that end-users make available for others to download. Torrenting can be public, where all torrent download portals are open for anyone to use, or private, where only members of the site can log in and access the site's content. Most private torrent sites operate an invite-only policy on membership.

([26]) Ripping is extracting all or parts of digital contents from a container. Originally it meant extracting WAV or MP3 format files from digital audio CDs, but can also be applied to extracting the contents of any media, most notably DVD and Blu-ray discs. Stream ripping refers to saving streamed content to files.
([27]) From BitTorrent, a communication protocol for file sharing.

# 3. DATA

The basic data for this study comes from tracking traffic to piracy websites, sourced from MUSO and further described in Section 3.1. Additional data was used to put the traffic in context, and to analyse it, such as:

- number of internet users in each country;
- economic variables such as per capita income;
- legal digital offer: internet and broadcast platforms;
- perception, awareness and behaviour in respect of piracy;
- costs of accessing the internet.

The data was sourced mainly from Eurostat, from the European Audiovisual Observatory and, for data on consumer perception and attitudes, from the EUIPO's IP Perception Study ([28]).

## 3.1 MUSO: TRACKING PIRACY

MUSO is a London-based company that provides statistics on piracy activity, by tracking online consumption of copyrighted content such as music, movies, television, publications or software. It also provides information about the audience of piracy websites ([29]) and their behaviour.

MUSO provided the EUIPO with data on the illegal consumption of digitally pirated films, TV shows and music gathered over a 21-month period, from January 2017 to September 2018 in all 28 EU Member States. The MUSO figures represent absolute 'activity' values; visits to piracy sites that represent individual accesses that could be associated with the consumption of a creative work.

This 'activity' is used as the basic data unit in this report. Specifically, the consumption of pirated digital content is defined as the average number of 'activities' per internet user per month in each country and period.

The MUSO information is detailed by geographical location, i.e. the country of residence of the consumer of copyright-infringing content, for the 28 Member States of the EU, by the method of access (streaming, torrent ([30]), download and stream ripping), and by the type of creative work (music, film or TV content) accessed. The data also shows whether access was requested from a computer or from a mobile client (browser, torrent client or other). Altogether, the total number of accesses (activities) reported by MUSO during the 21 months adds up to more than 70 billion connections.

([28]) EUIPO (2017): European citizens and Intellectual Property. Perception, awareness and behaviour.
([29]) MUSO has developed a database of more than 100 000 piracy sites that are actively monitored. Shutdowns, moves and domain changes are tracked, and the sites are classified by piracy category and the type of content on offer. A combination of automation, machine learning and human verification is used to identify new sites and to detect redirects, mirror sites and proxies.
([30]) MUSO distinguishes between public and private Torrent, however the data has been aggregated in this study since this division does not provide relevant information.

## 3.2 EUROSTAT: INTERNET USAGE, INCOME PER CAPITA

For normalisation, the number of 'regular internet users' as of January 2018, as reported by Eurostat, is used. There are 315 million internet users in the European Union (83 % of the population aged 16 to 74) ([31]). Table 2 shows the number of users in each Member State.

The internet can be accessed using mobile or fixed terminals. The data in Eurostat's table isoc_ci_dev_i ([32]) (03/07/2019) shows the number of internet users by access method (desktop versus mobile device).

([31]) Data is based on annual questionnaires on ICT (Information and Communication Technologies) of individuals aged 16 to 74. The size of the sample framework was calculated based on Eurostat table demo_pjan (Population on 1 January by age and sex), adding up population aged 16 to 74.

([32]) Individuals used the internet on a desktop computer or laptop or netbook or tablet (I_IUG_IPC).
Individuals used the internet on a mobile phone or smart phone (I_IUG_MP).
Individuals used the internet on a desktop computer or laptop or netbook and also a tablet computer or mobile phone or smart phone (I_IUG_IPCTMP).

**Table 2. Individuals regularly using ([33]) the internet in 2018 (thousands)**

| Country | Pop. 16-74 | % | Internet users |
|---|---|---|---|
| AT | 6 644 | 85 | 5 647 |
| BE | 8 334 | 87 | 7 250 |
| BG | 5 370 | 64 | 3 437 |
| CY | 658 | 84 | 552 |
| CZ | 8 059 | 84 | 6 770 |
| DE | 61 474 | 90 | 55 327 |
| DK | 4 286 | 95 | 4 071 |
| EE | 964 | 87 | 839 |
| EL | 7 895 | 70 | 5 526 |
| ES | 34 794 | 83 | 28 879 |
| FI | 4 063 | 93 | 3 779 |
| FR | 47 824 | 85 | 40 651 |
| HR | 3 087 | 73 | 2 253 |
| HU | 7 473 | 75 | 5 605 |
| IE | 3 481 | 80 | 2 785 |
| IT | 44 849 | 72 | 32 291 |
| LT | 2 085 | 78 | 1 626 |
| LU | 459 | 92 | 422 |
| LV | 1 419 | 81 | 1 149 |
| MT | 371 | 80 | 297 |
| NL | 12 846 | 94 | 12 075 |
| PL | 29 119 | 75 | 21 839 |
| PT | 7 688 | 71 | 5 458 |
| RO | 14 702 | 68 | 9 997 |
| SE | 7 326 | 91 | 6 666 |
| SI | 1 551 | 79 | 1 225 |
| SK | 4 215 | 78 | 3 288 |
| UK | 48 226 | 94 | 45 332 |
| **EU28** | **379 261** | **83** | **314 786** |

Source: Eurostat, tables pc_ind (3/7/2019) and demo_pjan (6/6/2019)

For the econometric analysis, gross national income was used, in particular Eurostat's table nama_10_pp (22/03/2019), **GNI (gross national income) per capita in PPS ([34]) in 2017**. While GNI is conceptually similar to GDP (Gross Domestic Product), it is a more direct measure of the income available to consumers ([35]) and thus thought to be a better predictor of their propensity to consume

([33]) Regular use: at least once a week on average within the last 3 months before the survey. Use includes all locations and methods of access and any purpose (private or work/business related). See ICT usage in households and by individuals (isoc_i)
([34]) The purchasing power standard, abbreviated as PPS, is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country.
([35]) GNI equals GDP plus factor incomes earned by foreign residents, minus income earned in the domestic economy by non-residents.

digital pirated content. Ideally, the average income of internet users would be used, but this data is not available. Therefore, the average income of the total population is used.

Arguably, a better income measure for analysing consumption (including consumption of pirated content) would be disposable income net of housing costs and similar fixed expenditures. Unfortunately, there are no comparable measures of this discretionary income for the 28 Member States.

## 3.3 European Audiovisual Observatory: online legal offer, TV offer

The European Audiovisual Observatory provides statistical and analytical information film, television, video/DVD, new audiovisual media services and public policy on film and television.

As mentioned in the introduction, the European Audiovisual Observatory, supported by the CREATIVE EUROPE programme of the European Union, has created the MAVISE database of TV and on-demand audiovisual services and companies across Europe. As of September 2019, MAVISE contained information on 11 122 TV Channels and 1 293 online services in 41 European countries and Morocco. The data by country is shown in Annex 1.

## 3.4 IP Perception study: legal offer awareness, receptivity to piracy, awareness of risk

Several variables from the IP Perception Study([36]) are used in the econometric analysis. These variables can be grouped into three groups:

**Table 3: IP perception questions**

IP Perception (%), attitudes to piracy

| question | label |
|---|---|
| **q3_5** | **It is acceptable to obtain content illegally from the internet when there is no immediately available legal alternative** |
| q3_6 | It is acceptable to obtain content illegally from the internet when it is for my personal use |
| q4b_1 | Accessed, downloaded or streamed illegal content intentionally (during the past 12 months) |

Source: IP Perception study

([36]) EUIPO (2017).

IP Perception (%), awareness of legal offer

| question | Label |
|---|---|
| **q4b_2** | **Paid to access, download or stream copyright protected content from a lawful source (during the past 12 months)** |
| **q6.1** | **Are you aware of lawful MUSIC services accessible to your country to access, download or stream?** |
| **q6.2** | **Are you aware of lawful FILM services accessible to your country to access, download or stream?** |
| **q6.3** | **Are you aware of lawful TV SERIES services accessible to your country to access, download or stream?** |
| q6.4 | Are you aware of lawful LIVE SPORTS EVENTS services accessible to your country to access, download or stream? |

Source: Observatory

IP Perception (%), 'piracy reducers'

| question | Label |
|---|---|
| q6.10 | Are you aware of any services accessible to your country to access, download or stream? |
| q9.1 | What reason would stop you from using illegal sources: Risk of punishment |
| **q9.2** | **What reason would stop you from using illegal sources: Personal bad experience with illegal sources** |
| q9.3 | What reason would stop you from using illegal sources: Bad experience of others with illegal sources |
| q9.4 | What reason would stop you from using illegal sources: Availability of affordable content from legal sources |

Source: EUIPO (2017)

Because these variables are correlated with each other, they cannot be used simultaneously in a regression analysis. Therefore, additional statistical analysis was carried out to determine which of the variables within each group had the greatest explanatory power. In the table above, the variables that were used in the regressions are shown in bold typeface.

## 3.5 International Telecommunication Union: internet and mobile costs

The International Telecommunication Union (ITU) is a specialised agency of the United Nations that is responsible for issues that concern information and communication technologies.

ITU collects prices on fixed-broadband and mobile broadband ([37]) in its member countries on an annual basis. The most recent data from 2017 are used in this study. The prices are collected from the operator with the largest market share, as measured by the number of subscriptions. Because a given monthly subscription price represents a different financial burden on the average household depending on its level of income, the prices have been expressed as a percentage of each country's monthly GNI per capita.

([37]) https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx
https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/pricemethodology.aspx

# 4. FINDINGS

This section presents descriptive statistics for consumption of pirated content during the period January 2017-September 2018. For total piracy and for the three content types separately (film, music, TV), the trend during the period is shown, as well as access method and consumption rates by country. The basic unit of analysis is the number of activities (accesses) per internet user per month.

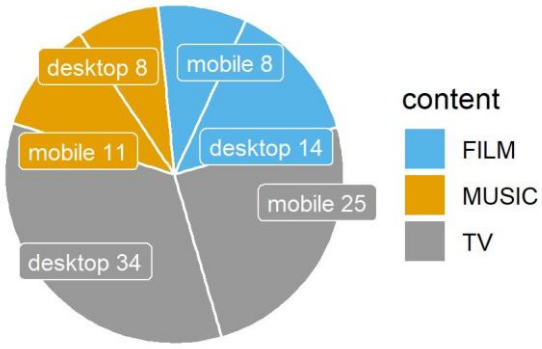
The data is presented graphically; however, complete data underlying all graphs in this section are shown in Annex 1.

## 4.1 TOTAL PIRACY

Figure 4 shows the distribution of online infringement in EU28 across the three content types and the desktop/mobile dimension for the nine months of 2018 covered by the data.

TV copyright infringement represented nearly 60 % of the total, followed by film and music piracy. The use of desktop devices to access TV content and films is greater than that of mobile devices, while access to music is greater from mobile devices.

**Figure 4. Access to pirated content in EU28 by content type and device, 2018**




Figures 5a and 5b show the trend in piracy during the 21 months from January 2017 to September 2018. Consumption of pirated content as a whole saw a notable decline during the period observed. This decline was general and sustained, in most countries, for most types of creative content and for most types of access. The main exception was the growth of TV piracy in Poland and several smaller countries.

Overall, across the EU, illicit consumption of the three content types, was 15.1 % lower during the first three quarters of 2018 compared with the same period in 2017.

The average internet user in the European Union accessed pirated content 9.7 times per month in the first nine months of 2018. Streaming was by far the most common access method, accounting for about 75 % of all access, followed by torrent, download and stream ripping. TV was the most frequently accessed type of pirated content, followed by film and music.

**Figure 5a. Piracy trends by type of content, EU28, 2017-2018**
**Average accesses per internet user per month**

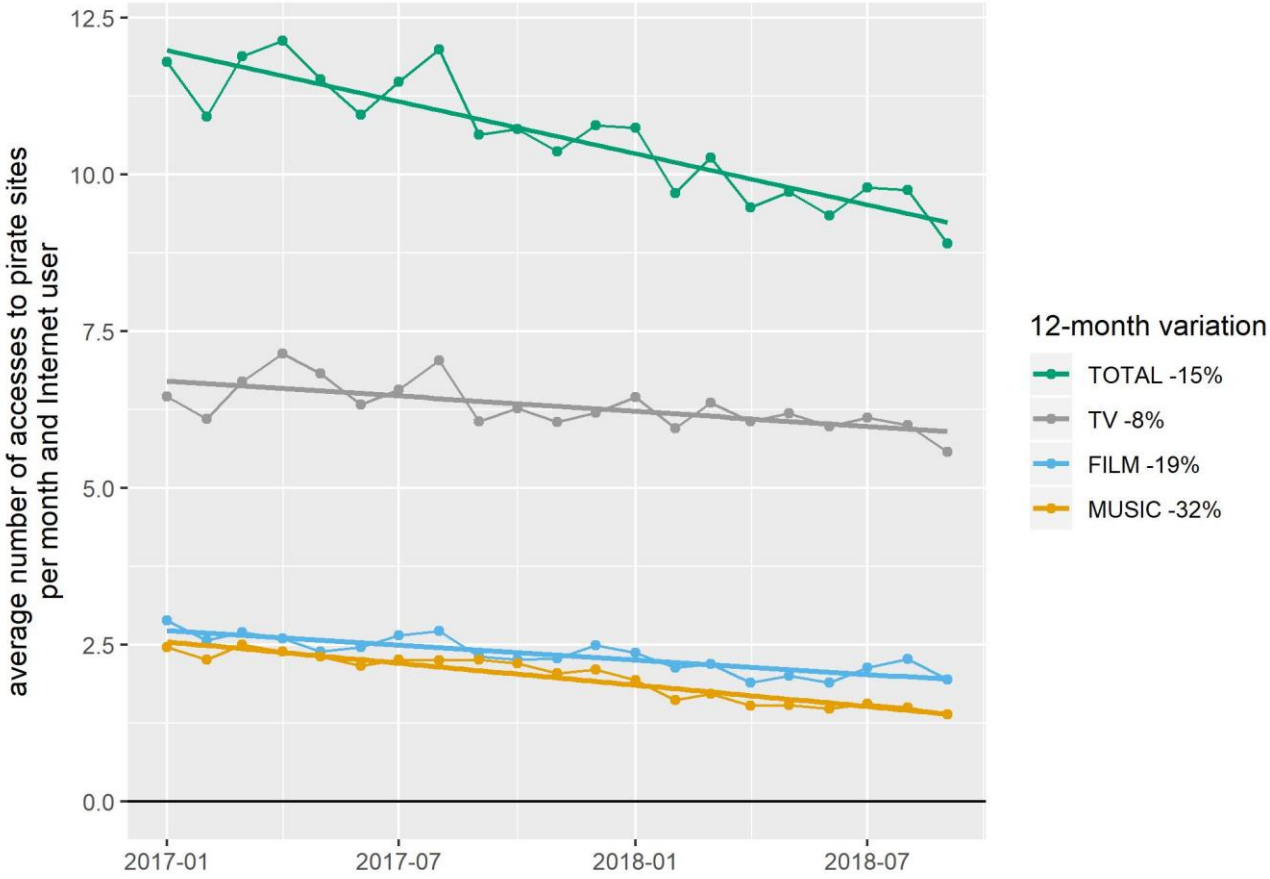


**Figure 5b. Piracy trends by access method, EU28, 2017-2018**
**Average accesses per internet user per month**

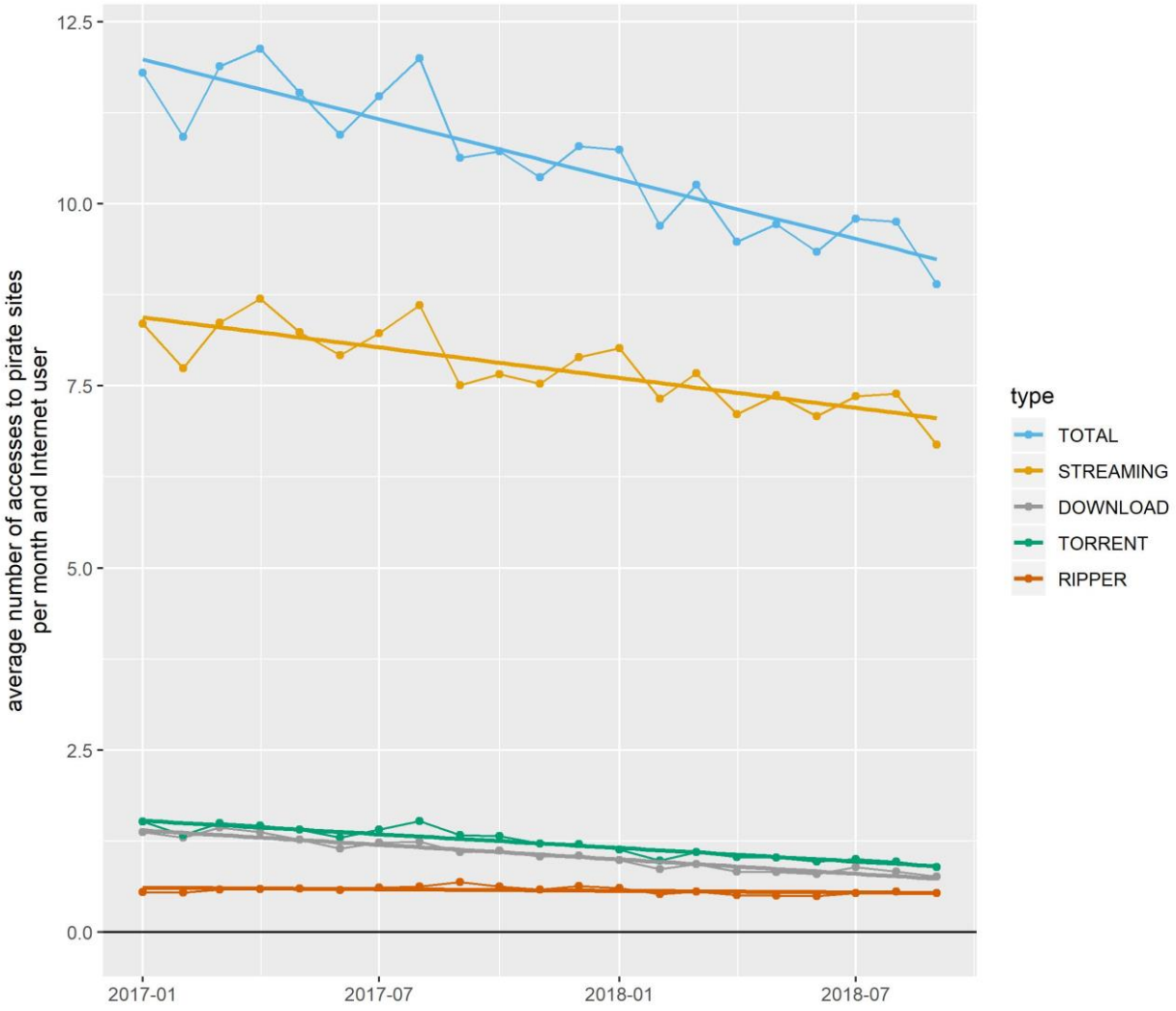
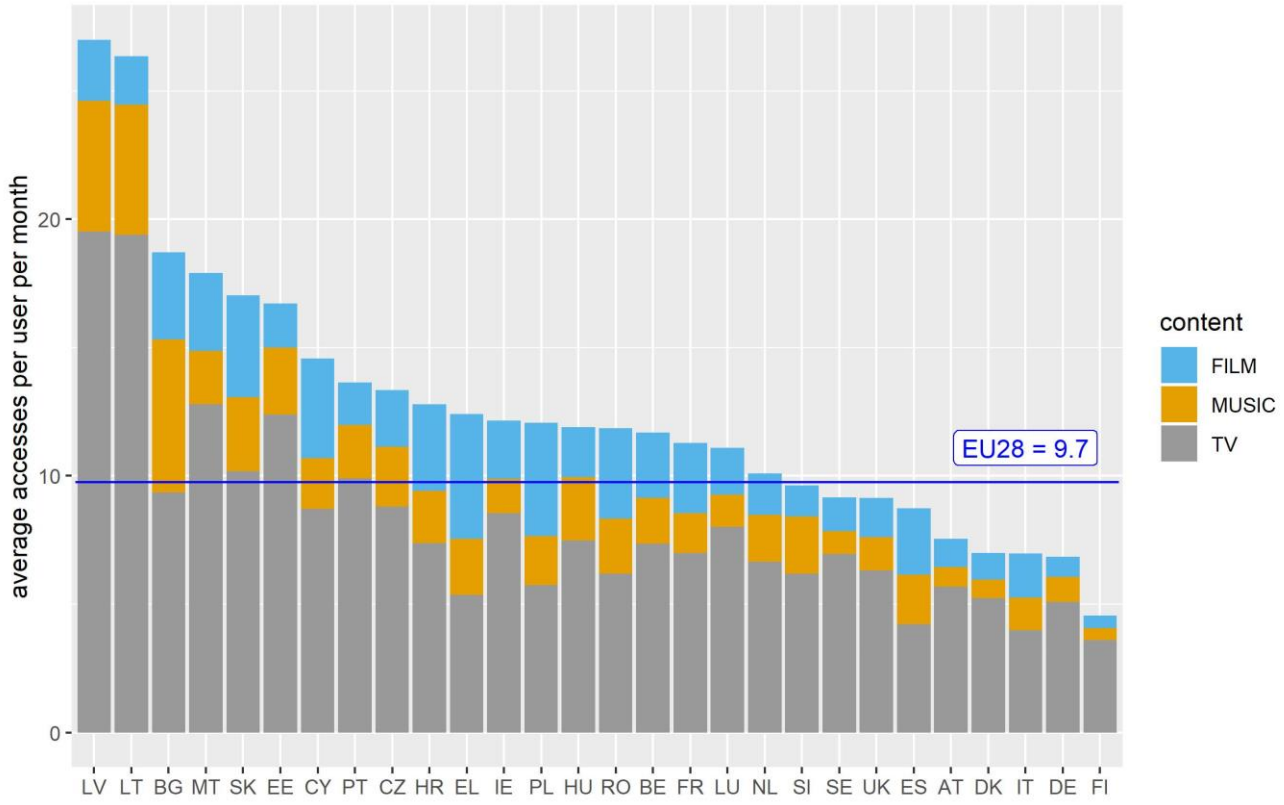



Figure 6 shows piracy by EU Member State. For each country, piracy is broken down by content type accessed.

**Figure 6. Total piracy by country and content type, 2018**




In two countries, Latvia and Lithuania, consumption of pirated content is clearly higher (more than 26 accesses per month) than in the rest of the EU. Finland has the lowest rate at 4.6 access per user per month. Germany, Italy, Denmark, Austria, Spain, Sweden, the UK and Slovenia are also below the EU average of 9.7.

Figure 7 shows the piracy trend by country. In the figure, the horizontal axis shows the piracy level during the first three quarters of 2017. The vertical axis shows the rate of growth or decline in piracy between this period and the corresponding period in 2018. The dotted vertical line represents the EU average piracy rate in 2017, approximately 11.5, while the dotted horizontal line represents the rate of decline from 2017 to 2018, approximately 15 %. The two dotted lines then divide the diagram into four quadrants with the following characteristics:

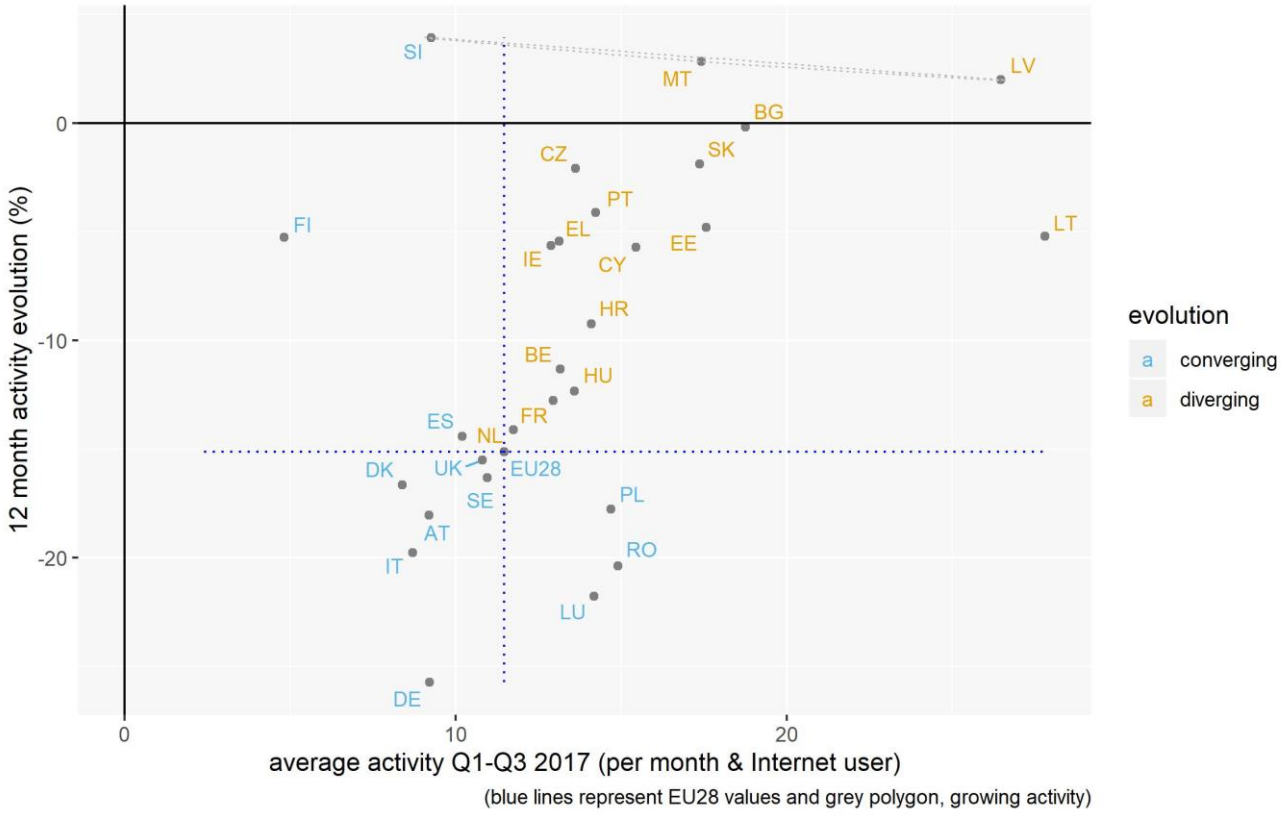
- In the SW quadrant are countries that were below the EU average in 2017 and that declined faster than the EU average during the subsequent 12 months. This group of countries includes Austria, Denmark, Germany, Italy, Sweden and the UK.

- In the SE quadrant are countries that were above the EU average in 2017 but declined faster than the EU overage during the subsequent 12 months. These countries include Luxembourg, Poland and Romania.

- In the NE quadrant are countries that were above the EU average in 2017 and declined slower than the EU average between 2017 and 2018; this group includes half of the Member States.
- In the NW quadrant are two countries, Finland and Spain, that were below the EU average in 2017 but declined slower than the EU average between 2017 and 2018.

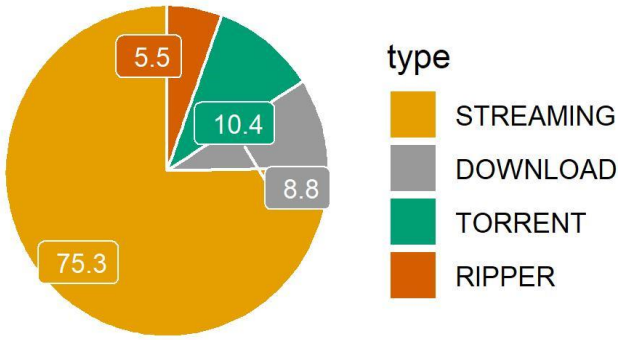
Consumption of pirated content fell in all countries except Slovenia, Malta and Latvia.

**Figure 7. Total piracy trends by country, 2017-2018**



Finally, Figure 8 shows the distribution of piracy in the EU by access method. As mentioned above, streaming is the preferred method with a 75 % share. The remaining 25 % is divided between download, torrent and ripper. Nearly 95 % of the streaming activity is concentrated in TV and film.

**Figure 8. Total piracy by access method, EU28, 2018**



## 4.2 FILM

Access to pirated films decreased at a rate of 19.2 % annually during the 2017-2018 period. The reduction occurred in all types of access. Streaming is the dominant access method to pirated film content, both from desktops and mobile devices.

**Figure 9. Film piracy trends, EU28, 2017-2018**
**Average accesses per internet user per month**

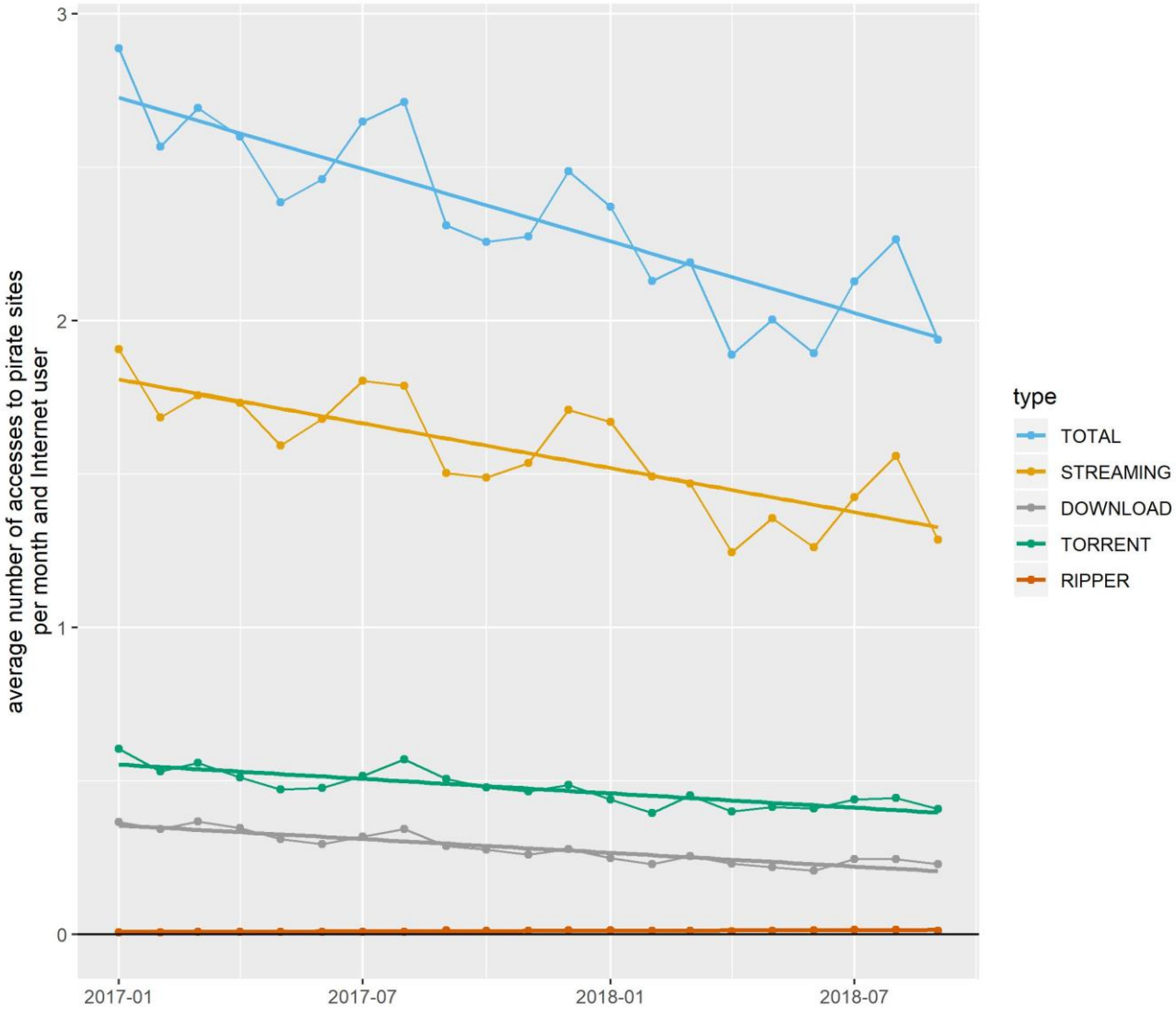
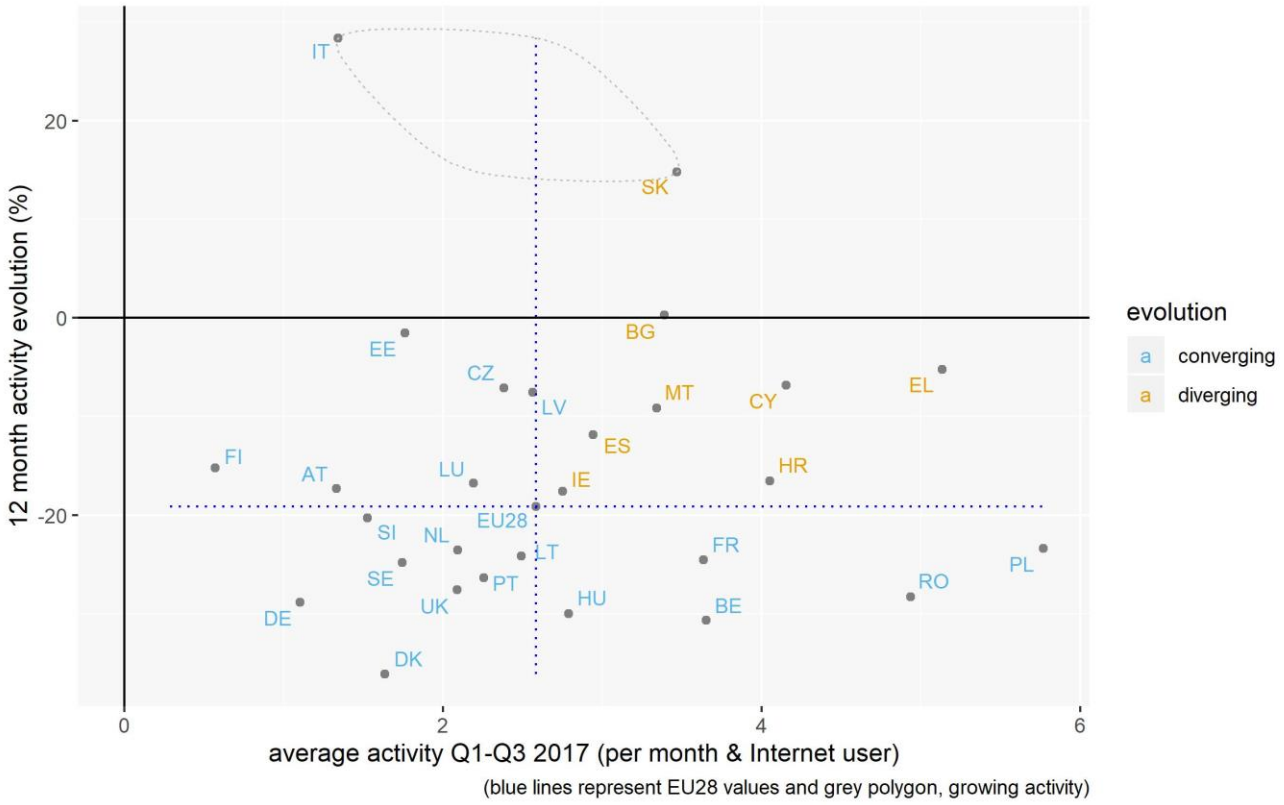



Figure 10 shows the film piracy trend by country. As in Figure 7 above, the horizontal axis shows the piracy level during the first three quarters of 2017. The vertical axis shows the growth in piracy from this period to the corresponding period in 2018. The dotted vertical line represents the EU average

piracy rate in 2017, approximately 2.6 accesses per internet user per month, while the dotted horizontal line represents the rate of decline from 2017 to 2018, approximately 19 %.

Film piracy decreased in all Member States except Italy and Slovakia during the 2017-2018 period. Among the countries that had an above-average film piracy rate in 2017, Belgium, France, Hungary, Poland and Romania declined in 2018 at a faster rate than the overall EU average decline. Seven other countries with above-average rates in 2017 declined in 2018, albeit at a slower rate than EU overall.

**Figure 10. Film piracy trends by country, 2017-2018**




As shown in Figures 11 and 12, film piracy is concentrated in streaming (68 %), but there is also considerable activity in torrent (20 %) and download. Ripper activity for films is negligible.

There are however, differences by country. For example, torrent dominates in Croatia while download is more common in the Czech Republic and Portugal. In Poland, Romania and to a lesser extent Greece, streaming accounts for a higher proportion of film piracy than the EU average.

**Figure 11. Film piracy by access type, EU28, 2018**

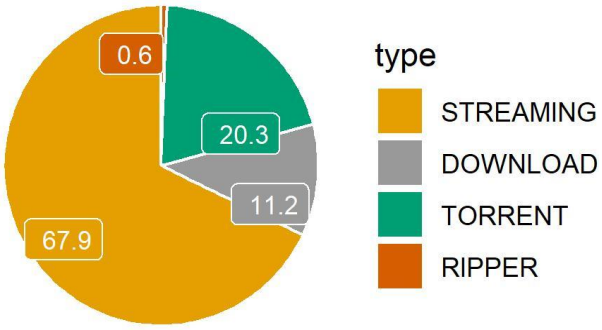
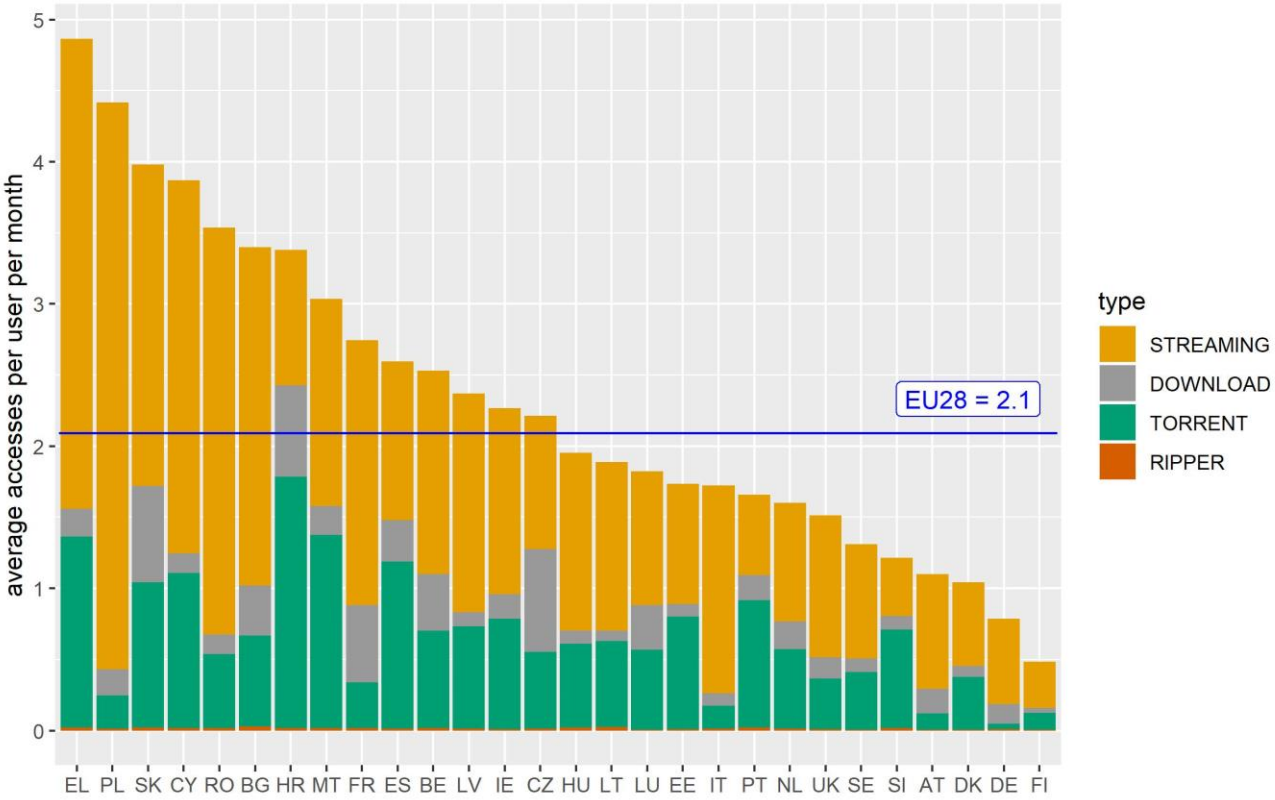


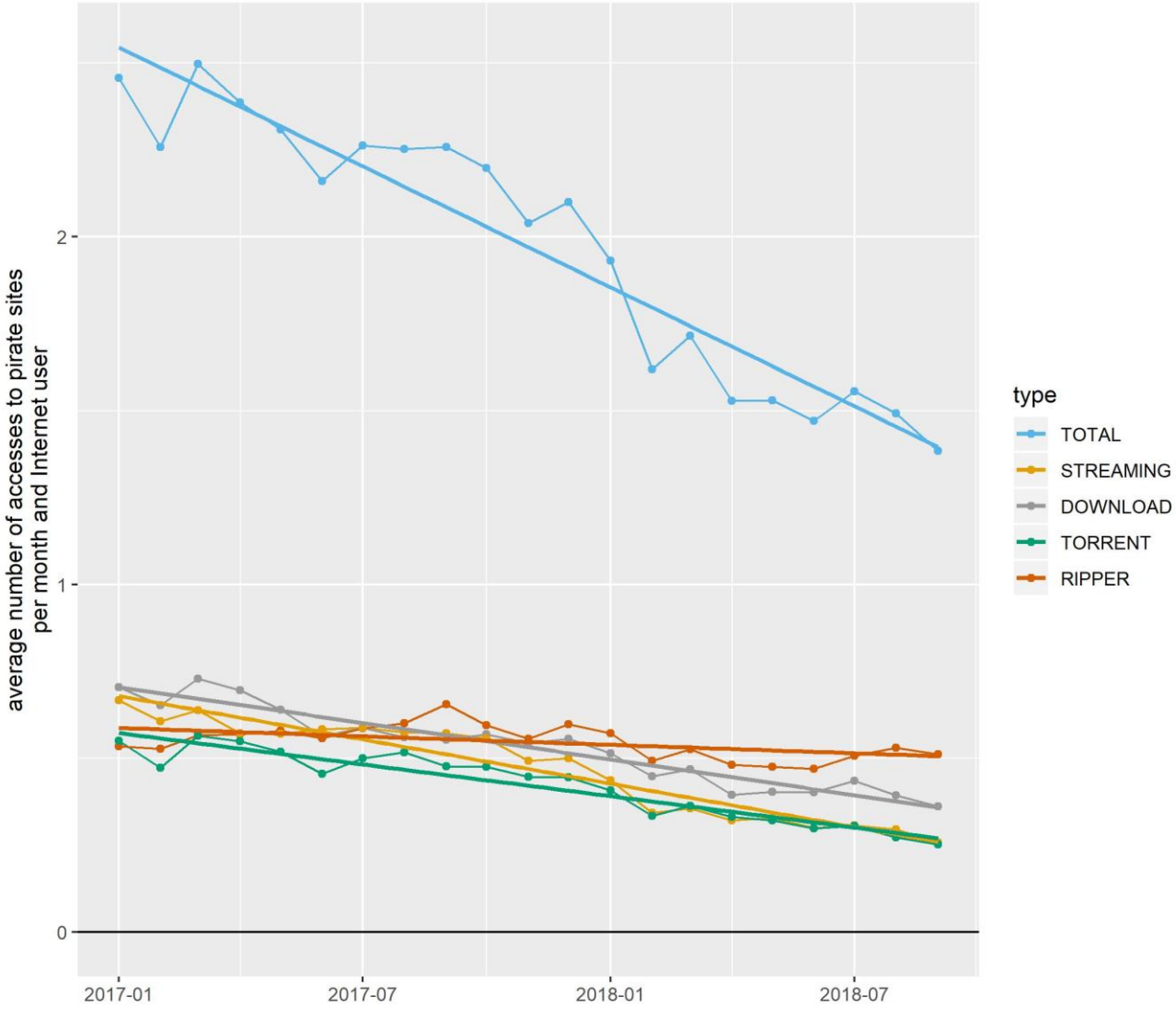

**Figure 12. Film Piracy by country and by access type, 2018**



## 4.3 Music

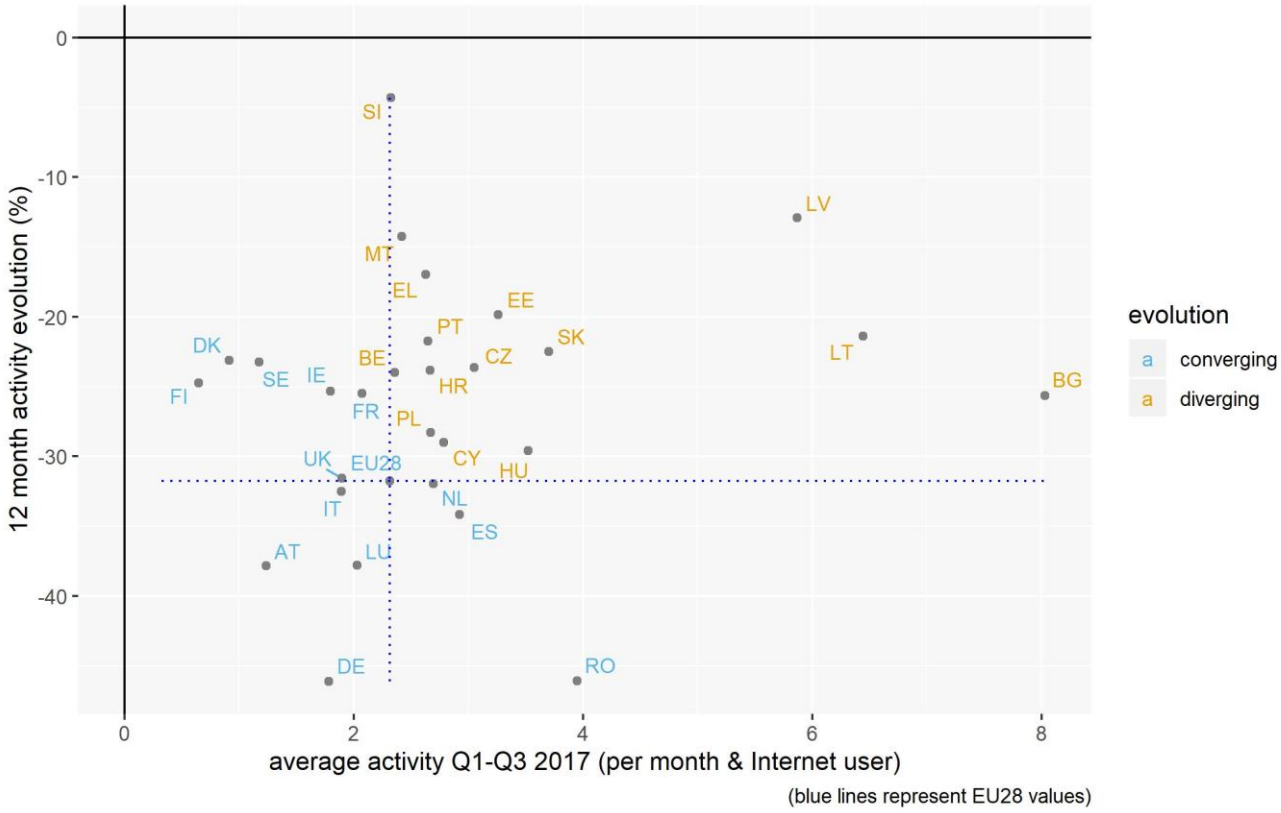
Consumption of pirated music decreased by 31.8 % between the first three quarters of 2017 and the same period in 2018. As shown in Figure 13, the reduction was in all types of access, although the fall in ripper activity was modest. In the first nine months of 2018, the average internet user in the EU accessed pirated music 1.6 times per month, compared to 2.3 in 2017.

**Figure 13. Music Piracy trends, EU28, 2017-2018**
**Average accesses per internet user per month**



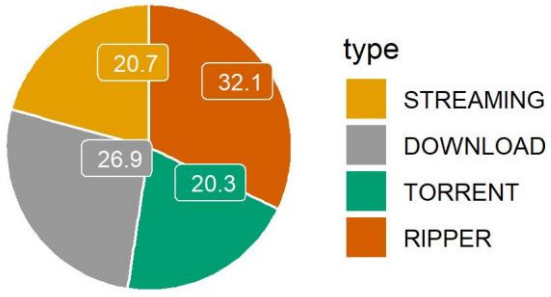

As shown in Figure 14, piracy activity in music has declined in all 28 EU Member States, although in 15 predominantly eastern and southern countries, which had an above-average level of music piracy in 2017, the decline is relatively lower than for the EU as a whole.

**Figure 14. Music Piracy trends by country, 2017-2018**



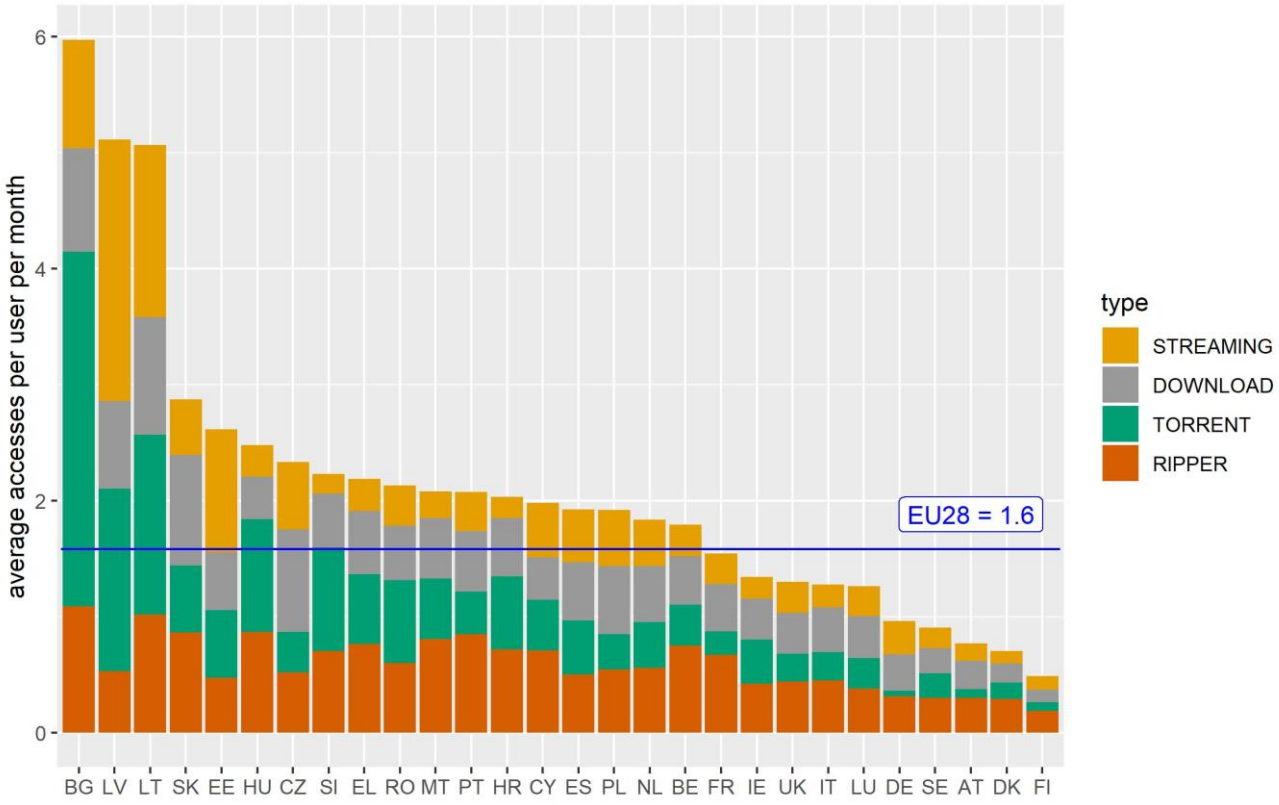

The distribution of activity by type is more varied for music than for the other content types, with the four main types — streaming, download, torrent and ripper — used in roughly equal shares, as shown in Figure 15.

**Figure 15. Music piracy by access type, EU28, 2018**



Activity in music piracy ranks from a high of 6.0 activities per user per month in Bulgaria to a low of 0.5 activities in Finland. The EU28 average was 1.6, with 10 Member States below that figure.

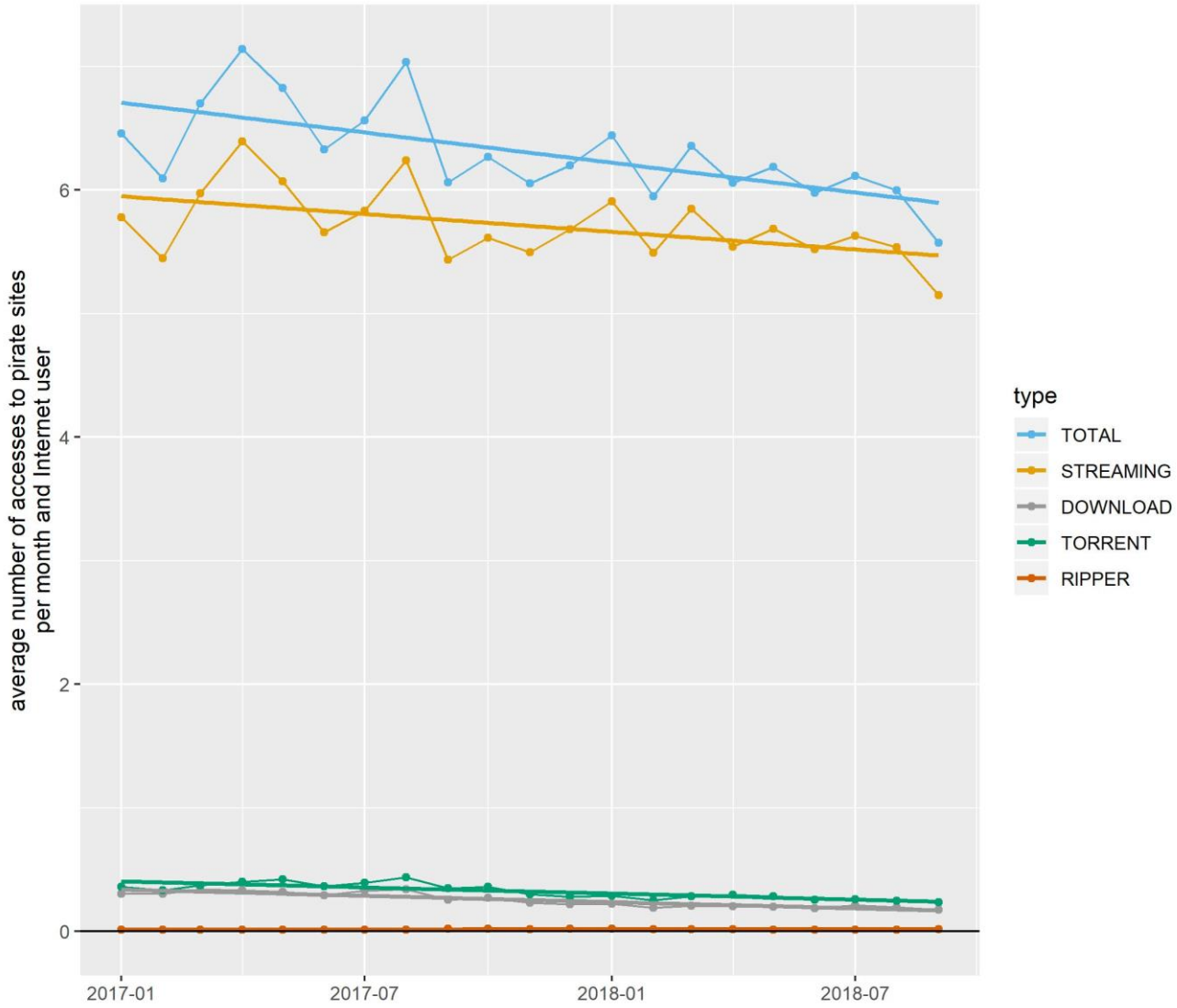
**Figure 16. Music piracy by country and by access type, 2018**



## 4.4 TV CONTENT

Of the three main content types studied in this report, TV has experienced the slowest decline in piracy, falling by 7.7 % from 2017 to 2018.

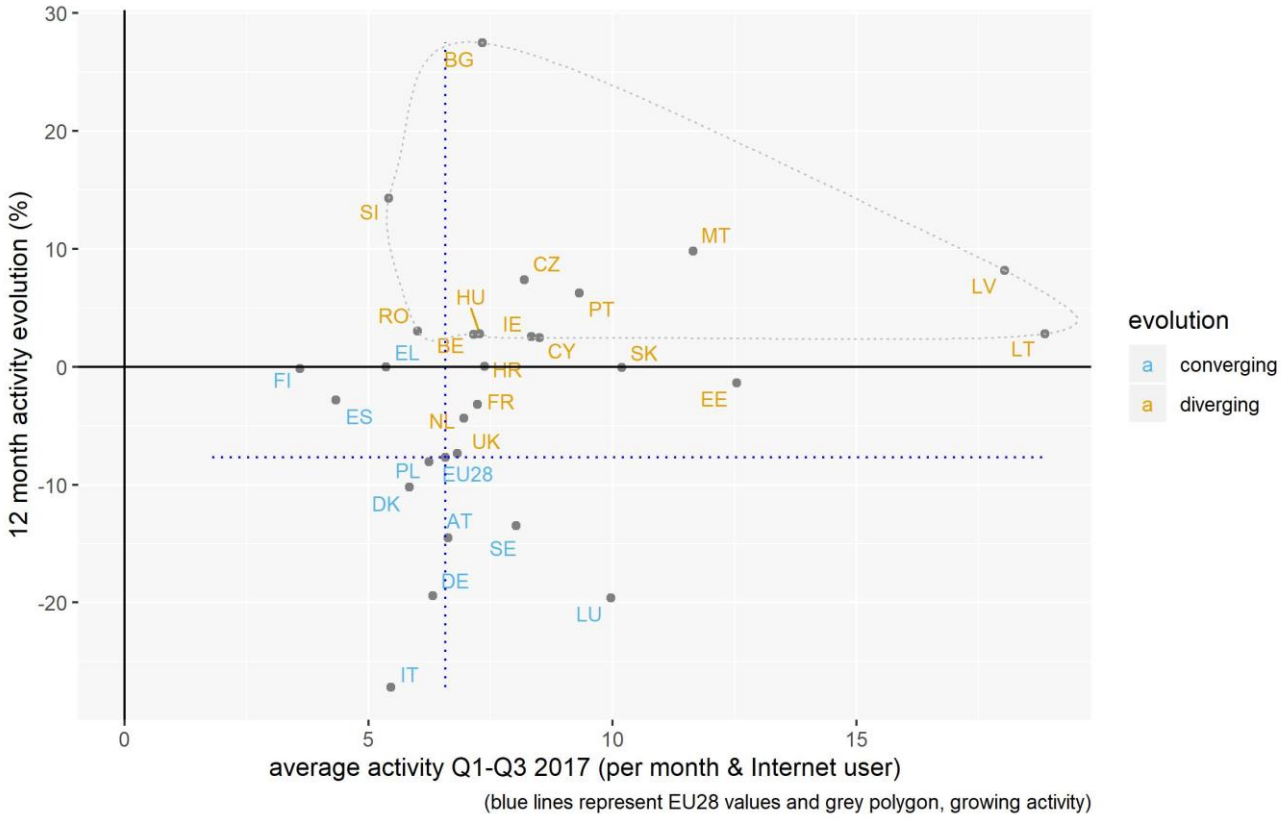
**Figure 17. TV Piracy trends, 2017-2018**
**Average accesses per internet user per month**




As shown in Figure 18, the reduction occurred in about half of the EU Member States, while in the rest of the EU illegal access to TV content continues to grow.

The growth in TV piracy was most notable in Bulgaria, with a 2017 rate close to the EU28 average, rising above the average in 2018. Conversely, there were significant declines in Italy, Germany and Austria as well as in the Scandinavian countries.

**Figure 18. TV piracy trends by country, 2017-2018**




As shown in Figures 19 and 20, streaming is by far the preferred method for accessing pirated TV content in all countries, whether using a mobile or desktop device. Streaming accounts for 92 % of illicit TV consumption.

**Figure 19. TV piracy by access type, EU28, 2018**

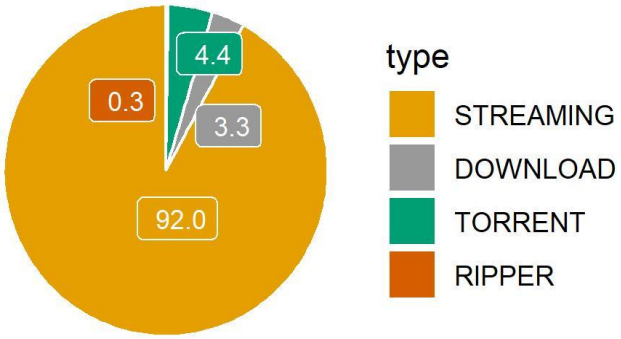
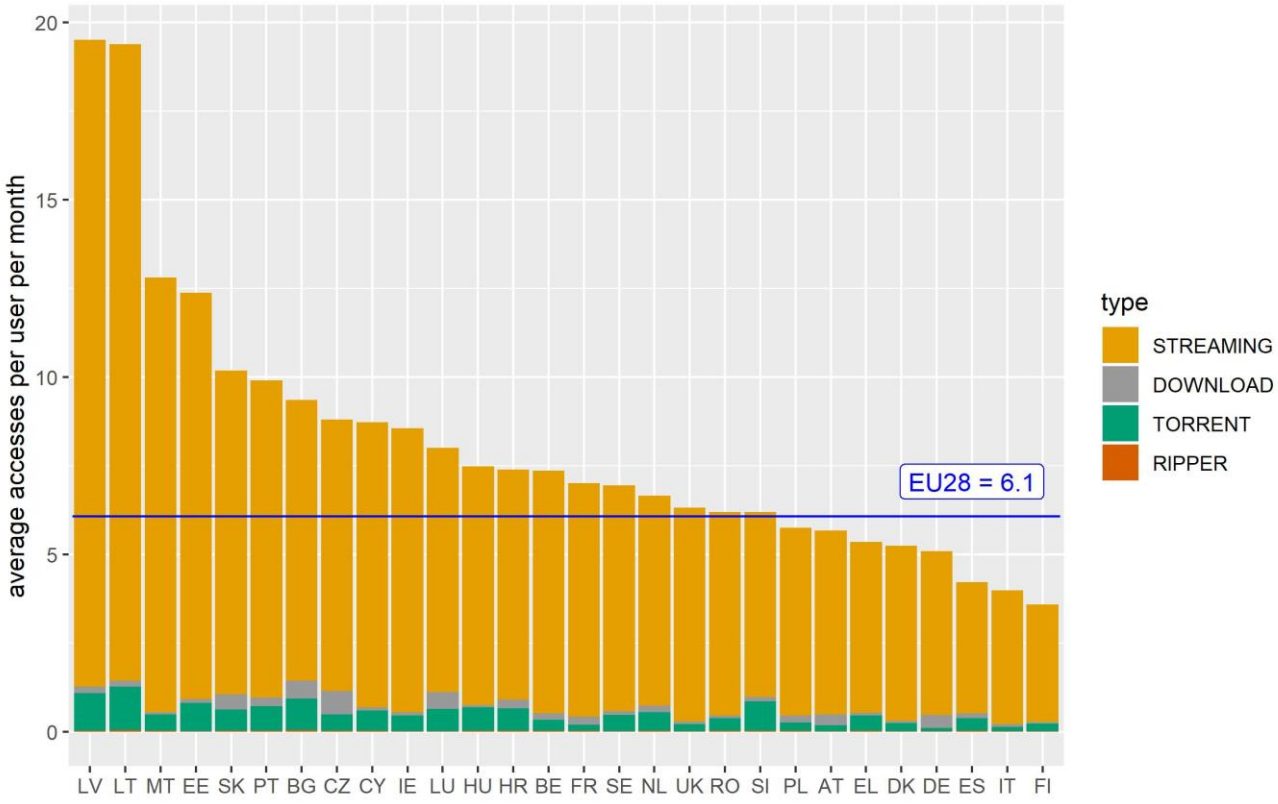



**Figure 20. TV piracy by country and by access type, 2018**




Piracy was highest in Lithuania and Latvia at more than 19 activities per user per month, and lowest in Finland, at approximately 3.6 monthly activities per user.

# 5. Econometric Analysis

The previous section showed that while piracy of all three types of content has declined from 2017 to 2018 in most Member States, it remains significant. In addition, there are large differences from one Member State to another. In this section, those differences are analysed statistically, with the objective of uncovering the socio-economic, market and other factors affecting piracy levels in a country.

Most of the previous studies on copyright infringements focused on software and music piracy and used the individual as a unit of analysis. To some extent, the conclusions of these studies (especially those on music) can also be extrapolated to films and TV([38]). Software and creative works share some characteristics in terms of information assets and public goods. All are information assets with high initial production costs and almost zero or insignificant reproduction costs (Shapiro et al., 1999). Similar to software, creative works are vulnerable to illegal copying, given the ease with which copies can be made at an insignificant cost. They also have similar characteristics to public goods, since consumption by one individual does not reduce availability to other consumers of the product (Samuelson and Nordhaus, 1995).

It is the objective of this study to analyse the country-level data on online piracy of creative works from the 28 EU countries to reveal the factors that drive the differences at the country level, shown in the preceding section. This approach was first proposed for physical music piracy in 58 countries in (Ki et al., 2006) and later by (Walls, 2008) for all kind of piracy in films in 26 countries. However, unlike Ki who based his study on 'local surveys, individual research, and seizure statistics by affiliate national groups' ([39]) or Walls who used IIPA estimates ([40]), the current study is based on more than 70 billion individual observations of access to illegal sites over a 21-month period, aggregated to country level.

In this section, the average activities (monthly accesses to illicit content per internet user) per country are regressed on a series of variables that, according to the literature, could have an influence on the level of consumption of pirated content in a given country. These variables are discussed in the next subsection, while the results of the econometric analysis are presented in Subsection 5.2.

([38]) See, for example: (Banerjee et al. ,2005), (Cesareo & Pastore, 2014) or (Ki et al., 2006).
([39]) See (Ki et al., 2006) Methodology.
([40]) 'Exactly how these estimates are calculated is somewhat of a mystery' (Walls, 2008), Introduction.
See also INTERNATIONAL INTELLECTUAL PROPERTY ALLIANCE 2004 SPECIAL 301 REPORT, Appendix B: Methodology.

## 5.1 DRIVERS OF CONSUMPTION OF PIRATED CONTENT

This subsection sets out the factors that are thought to influence consumers' propensity to access pirated content. These factors can be grouped into socio-economic, demographic, market characteristics and attitude variables. Not all the variables listed here were used in the final regression analyses, in some cases due to data shortcomings, and in other cases because they were tried and found not to be statistically significant.

### *5.1.1 Income*

At the individual level, consumption of pirated content is often thought to be related to household income, since the wealthier households can better afford to pay for the legitimate content (Husted, 2000); (Rapp and Rozek,1990). (Ki et al., 2006) argue that a country's income influences piracy in two ways: (1) richer countries tend to have stronger intellectual property protection systems and (2) consumers in those countries have more available income for consumption of all goods, including legitimate digital content. Therefore, the first hypothesis is:

*H1: The higher per capita income, the lower the consumption of pirated content per capita.*

The variable used was **GNI per capita**. This variable, along with GDP per capita, is the variable most often used in previous studies on piracy. GNI is the total domestic and foreign output accruing to residents of a country, consisting of GDP, plus factor incomes earned by residents in other countries, minus income earned in the domestic economy by non-residents.

Other income measures could have been used. For example, Household Disposable Income (HDI) measures the income of households (wages and salaries, self-employment income, social benefits, etc.), after taking into account net interest and dividends received and the payment of taxes and social contributions. An even better measure would be House Discretionary Income ([41]). However, no authoritative sources for these income concepts were available for all 28 Member States.

### *5.1.2 Social inequality*

Income inequality can affect consumption of pirated content because music, film and television programmes which are consumed by higher-income individuals in a given country are also of interest to lower-income individuals, since knowledge of this content is a factor in social interaction ([42]). At the same time, low-income individuals, having a reduced ability to pay for legitimate content, may be more likely to use illicit content instead. (Ki et al., 2006) examined the impact of income inequality on music piracy rates at the country level and discovered that piracy was significantly related to income inequality. Therefore, the second hypothesis was formulated as follows:

*H2: The higher the income inequality, the higher the consumption of pirated content per capita.*

Three variables are often used to reflect social inequality: the Gini coefficient, the at-risk-of-poverty rate and the youth unemployment rate.

([41]) Discretionary income is disposable income, minus all payments necessary to meet current bills. It is total personal income after subtracting taxes and basic expenses (such as food, medicine, rent or mortgage, utilities, insurance, transportation, property maintenance, child support, etc.) required to maintain a certain standard of living.

([42]) Consumers downloading music illegally are motivated by three basic utilities: economic (saving money), collection (musical enjoyment) and social (increasing interaction and connectivity with others) (Sheehan et al., 2012).

The **Gini coefficient** measures the extent to which the distribution of income within a country deviates from a perfectly equal distribution. A Gini coefficient of 0 would mean perfect equality with everyone having the same income, while a coefficient of 1 corresponds to complete inequality, with all income accruing to only one individual. The values of the Gini coefficient were obtained from the indicator 'ilc_di12' in Eurostat for the year 2017. The average value of the coefficient for the 28 EU Member States was 0.31, ranging from 0.23 in Slovakia to 0.40 in Bulgaria.

The **at-risk-of-poverty rate** is the share of people with a disposable income (after social transfers) below the at-risk-of-poverty threshold, which is set at 60 % of the national median disposable income after social transfers. The data was obtained from indicator 'ilc_di12c' in Eurostat for the year 2018.

**Youth unemployment rate** is the percentage of unemployed individuals in the 15-24 years age group compared to the total labour force in that age group (excluding those in education). The values were obtained from the indicator 'une_rt_a' in Eurostat for the year 2018.

### *5.1.3 Population structure*

The EUIPO IP Perception study (2017) found that while younger consumers are more likely to have paid to access content, they are also more likely to have intentionally accessed content using illegal sources. Hence, the third hypothesis is:

*H3: The higher the proportion of young people in a country, the higher the consumption of pirated content per capita.*

The variable used was **Proportion of population aged 15-24** published by Eurostat.

### *5.1.4 Attitude and behaviour*

(Cesareo & Pastore, 2014) found that the 'moral intensity' of the individual negatively influences their intention to participate in digital piracy. In other words, independently of the level of income or other socio-economic variables, in some countries consumers have a more permissive attitude towards IPR infringement than in others. This is also one of the findings in the IP Perception study (EUIPO, 2017).

Therefore, the fourth hypothesis was:

*H4: The more permissive the attitude towards piracy in a country, the higher the consumption of pirated content per capita.*

Two questions in the IP Perception study, q3.5 and q9.2, were considered as measures of attitude.

**Q3.5** was: 'It is acceptable to obtain content illegally from the internet when there is no immediately available legal alternative'.

The second question, **q9.2** was: 'What reason would stop you from using illegal sources: Personal bad experience with illegal sources.' Wolfe and Marcum (2008) found that fear of computer viruses affects respondents' intentions to engage in digital piracy. The IP Perception study also indicated that this could be a deterrent to accessing sites providing pirated content.

For each of these two questions, the variable used in the regression was the proportion of respondents who answered either 'Totally agree' or 'Tend to agree'.

### *5.1.5 Digital development*

(Walls, 2008) argues that countries with higher levels of IT infrastructure have lower levels of movie piracy. His study found that piracy decreased with the level of overall internet use.

Therefore, the fifth hypothesis was:

*H5: The higher the level of digital development, the lower the consumption of pirated content per capita.*

Arguably, the quality of the internet infrastructure could also *increase* the consumption of pirated content. After all, the same bandwidth that is used to stream a film from a legal source can also be used to stream content from an illicit source. Therefore, a priori this hypothesis was not considered particularly strong.

Six variables were considered as proxies for the degree of digital development:

1. **revenue per capita from digital music**, obtained from IFPI;
2. question **q4b.2** in the IP Perception study: 'Paid to access, download or stream copyright protected content from a lawful source' (proportion of respondents answering affirmatively);
3. question **q6.1-4** in the IP Perception study, indicating awareness of legal offers for the various types of content;
4. **% of internet users in the country**, published by Eurostat;
5. **% of mobile users in the country**, published by Eurostat;
6. **mobile broadband cost relative to GNI**, published by ITU — this variable indicates how accessible broadband is to the average consumer in a country.

### *5.1.6 Market size*

Studies of software piracy (Gopal & Sanders, 1998) and music (Ki et al., 2006) have found a negative relationship between the size of a market and the level of piracy, regardless of income levels of the country. The exact nature of the mechanism at work is not clear. In (Ki et al., 2006), the authors stated that in countries with a large music market, people tended to recognise music as a social value, leading to greater respect for copyright to protect against music piracy. The study found that the size of the music market was significantly and negatively associated with music piracy rates, taking other factors into account. Therefore, the sixth hypothesis in the present study is:

*H6: The bigger the market, the lower the consumption of pirated content per capita.*

The **number of internet users**, published by Eurostat, was used as a measure of the relevant market size.

### *5.1.7 Legal offer*

It has been widely argued that the availability of legal offers has the effect of reducing piracy, and as seen in the responses to the IP Perception study, in 2017, 31 % of respondents across the EU declared it acceptable to obtain online content illegally when there is no immediately available legal alternative.

Therefore, the seventh hypothesis was:

*H7: The more extensive the legal offer, the lower the consumption of pirated content per capita.*

Three variables were used as proxies for legal offer availability: the **number of online video platforms**, the **number of TV channels**, and the **number of music platforms** available in each Member State.

The first two variables were obtained from the MAVISE database of the European Audiovisual Observatory, counting the platforms or channels targeting the market of each country, regardless of the origin of the platform or channel.

The data on the number of music platforms was sourced via IFPI from the website https://www.pro-music.org/

### *5.1.8 Education*

Level of education has been considered by some as a predictor of piracy. It was considered in (Ki, 2006), and even though a direct impact on piracy was not found, an indirect impact was found through the associated improvement of intellectual property protection. However, in the IP Perception study (EUIPO, 2017), the opposite effect was found: respondents with higher educational attainment were more likely to access illicit content. For this reason, no clear hypothesis could be formulated and this variable was not used in the econometric analysis.

## 5.2 REGRESSION MODELS

The table below summarises the hypotheses and the associated variables. Since the number of variables is high, especially in relation to the number of observations, several methods of variable selection were used ([43]), with the aim of obtaining a single variable per hypothesis.

([43]) Including factor analysis (a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables) and stepwise regression.

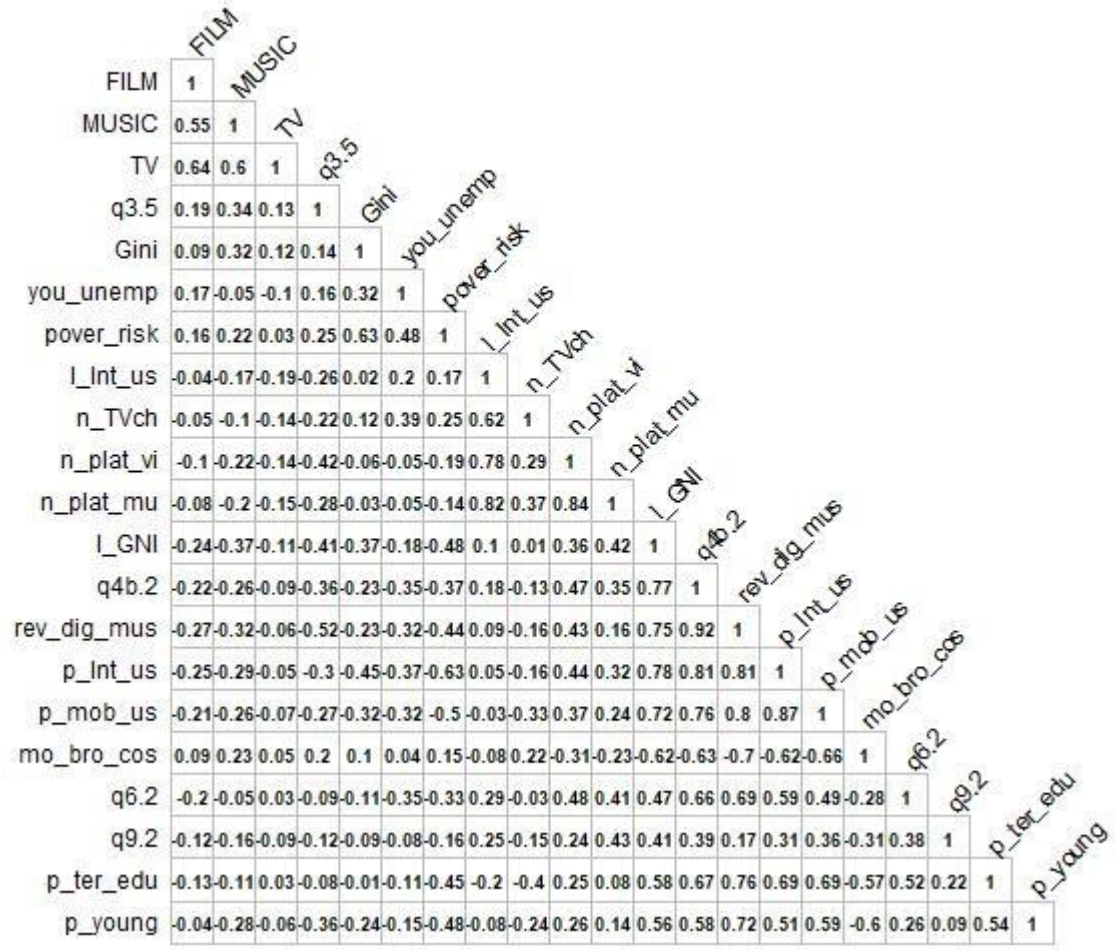
**Table 4: Summary of hypotheses and variables**

| | Group | Variable | Description | Literature |
|---|---|---|---|---|
| **H1** | Income | GNI | Gross national income per capita | (Yang et al., 2009) |
| **H2** | Social inequality | Gini | Gini coefficient, income inequality | (Banerjee et al., 2005)<br>(Ki et al., 2006) |
| | | pover_risk | Poverty risk | (Gunter et al., 2010) |
| | | you_unemp | Youth unemployment | (Gomes et al., 2018) |
| **H3** | Population structure | p_young | Proportion of population aged 15-24 | |
| **H4** | Attitude and behaviour | q3.5 | It is acceptable to obtain content illegally from the internet when there is no immediately available legal alternative | (Cesareo & Pastore, 2014) |
| | | q9.2 | What reason would stop you from using illegal sources: Personal bad experience with illegal sources | (Thongmak, 2017) |
| **H5** | Digital development | rev_dig_mu | Revenue per capita from digital music | (Banerjee et al., 2005) |
| | | q4b.2 | Paid to access, download or stream copyright protected content from a lawful source | |
| | | q6* | User awareness of legal offer (four different variables) | |
| | | p_Int_us | Percentage of internet users in population | (Walls, 2008) |
| | | p_mob_us | Percentage of mobile users in population | |
| | | mo_bro_cos | Mobile broadband cost, relative to GNI | |
| **H6** | Market size | log_Int_us | Log10 of the number of total internet users | (Ki et al., 2006)<br>(Gopal et al., 1998) |
| **H7** | Legal offer | n_TVch | Number of TV channels | |
| | | n_plat_vi | Number of online platforms for video and TV | (Briggs, 2013) |
| | | n_plat_mu | Number of online platforms for music | |

In all regressions, the dependent variable is the number of accesses per internet user per month to each of the three types of pirated content.

The correlations among the variables are shown in Figure 21.

**Figure 21. Correlation matrix**



| | FILM | MUSIC | TV | q3.5 | Gini | you_unemp | pover_risk | l_Int_us | n_TVch | n_plat_vi | n_plat_mu | l_GNI | q4b.2 | rev_dig_mus | p_Int_us | p_mob_us | mo_bro_cos | q6.2 | q9.2 | p_ter_edu | p_young |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FILM | 1 | | | | | | | | | | | | | | | | | | | | |
| MUSIC | 0.55 | 1 | | | | | | | | | | | | | | | | | | | |
| TV | 0.64 | 0.6 | 1 | | | | | | | | | | | | | | | | | | |
| q3.5 | 0.19 | 0.34 | 0.13 | 1 | | | | | | | | | | | | | | | | | |
| Gini | 0.09 | 0.32 | 0.12 | 0.14 | 1 | | | | | | | | | | | | | | | | |
| you_unemp | 0.17 | -0.05 | -0.1 | 0.16 | 0.32 | 1 | | | | | | | | | | | | | | | |
| pover_risk | 0.16 | 0.22 | 0.03 | 0.25 | 0.63 | 0.48 | 1 | | | | | | | | | | | | | | |
| l_Int_us | -0.04 | -0.17 | -0.19 | -0.26 | 0.02 | 0.2 | 0.17 | 1 | | | | | | | | | | | | | |
| n_TVch | -0.05 | -0.1 | -0.14 | -0.22 | 0.12 | 0.39 | 0.25 | 0.62 | 1 | | | | | | | | | | | | |
| n_plat_vi | -0.1 | -0.22 | -0.14 | -0.42 | -0.06 | -0.05 | -0.19 | 0.78 | 0.29 | 1 | | | | | | | | | | | |
| n_plat_mu | -0.08 | -0.2 | -0.15 | -0.28 | -0.03 | -0.05 | -0.14 | 0.82 | 0.37 | 0.84 | 1 | | | | | | | | | | |
| l_GNI | -0.24 | -0.37 | -0.11 | -0.41 | -0.37 | -0.18 | -0.48 | 0.1 | 0.01 | 0.36 | 0.42 | 1 | | | | | | | | | |
| q4b.2 | -0.22 | -0.26 | -0.09 | -0.36 | -0.23 | -0.35 | -0.37 | 0.18 | -0.13 | 0.47 | 0.35 | 0.77 | 1 | | | | | | | | |
| rev_dig_mus | -0.27 | -0.32 | -0.06 | -0.52 | -0.23 | -0.32 | -0.44 | 0.09 | -0.16 | 0.43 | 0.16 | 0.75 | 0.92 | 1 | | | | | | | |
| p_Int_us | -0.25 | -0.29 | -0.05 | -0.3 | -0.45 | -0.37 | -0.63 | 0.05 | -0.16 | 0.44 | 0.32 | 0.78 | 0.81 | 0.81 | 1 | | | | | | |
| p_mob_us | -0.21 | -0.26 | -0.07 | -0.27 | -0.32 | -0.32 | -0.5 | -0.03 | -0.33 | 0.37 | 0.24 | 0.72 | 0.76 | 0.8 | 0.87 | 1 | | | | | |
| mo_bro_cos | 0.09 | 0.23 | 0.05 | 0.2 | 0.1 | 0.04 | 0.15 | -0.08 | 0.22 | -0.31 | -0.23 | -0.62 | -0.63 | -0.7 | -0.62 | -0.66 | 1 | | | | |
| q6.2 | -0.2 | -0.05 | 0.03 | -0.09 | -0.11 | -0.35 | -0.33 | 0.29 | -0.03 | 0.48 | 0.41 | 0.47 | 0.66 | 0.69 | 0.59 | 0.49 | -0.28 | 1 | | | |
| q9.2 | -0.12 | -0.16 | -0.09 | -0.12 | -0.09 | -0.08 | -0.16 | 0.25 | -0.15 | 0.24 | 0.43 | 0.41 | 0.39 | 0.17 | 0.31 | 0.36 | -0.31 | 0.38 | 1 | | |
| p_ter_edu | -0.13 | -0.11 | 0.03 | -0.08 | -0.01 | -0.11 | -0.45 | -0.2 | -0.4 | 0.25 | 0.08 | 0.58 | 0.67 | 0.76 | 0.69 | 0.69 | -0.57 | 0.52 | 0.22 | 1 | |
| p_young | -0.04 | -0.28 | -0.06 | -0.36 | -0.24 | -0.15 | -0.48 | -0.08 | -0.24 | 0.26 | 0.14 | 0.56 | 0.58 | 0.72 | 0.51 | 0.59 | -0.6 | 0.26 | 0.09 | 0.54 | 1 |

In the correlation matrix, correlated groups of variables can be observed. For example, two of the variables representing inequality, the Gini coefficient and the proportion of the population at risk of poverty, have a correlation of 0.63.

Another group of correlated variables represent the size of the market and the legal offer: number of TV channels, total number of internet users and number of legal platforms for online video and music. For example, number of internet users and number of music platforms have a correlation coefficient of 0.82.

Finally, a larger group of variables that represent digital development also exhibit significant correlation with each other. For example, there is a strong correlation between q4b.2 (declaration of use of legal platforms) and rev_dig_mus (average digital music revenue per user), with a correlation coefficient of 0.92.

Such correlations among the explanatory variables are problematic because they can lead to a phenomenon known as multicollinearity. A consequence of this is that it becomes very difficult to

precisely identify the separate effects of each variable. For this reason, where a group of variables exhibit high mutual correlation, one of these variables must be selected for regression. For the variables from the IP perception study, factor analysis techniques were used to achieve data reduction by identifying variables representative of a much larger group of variables. From a group of fourteen variables, four were chosen in this manner.

The main criterion for model selection was the Variance Inflation Factor (VIF) which measures how much the variance of the regression coefficient is inflated due to multicollinearity in the model. Only models with VIF less than 5 were considered. The Bayesian Information Criterion (BIC) was also used to avoid overfitting. The BIC is discussed in more detail in Annex 2.

For these regressions, dependent and independent variables have been standardised. A variable is standardised in the sample by subtracting its mean and dividing by its standard deviation. This will not affect statistical significance of the estimated coefficients nor the overall goodness of fit of the regressions, but it does improve the interpretation of the estimated coefficients ([44]). In particular, it allows for a comparison of the size of the coefficients, both within a particular model and between models.

Table 5 shows the results of the three best models for consumption of pirated music, film and TV, respectively. The following two pages show the detailed results of each of the three models, including significance levels of the estimated coefficients and the goodness of fit statistics. A number of additional models were evaluated in the course of the study. The results of those models are broadly consistent with those shown below, but the selected models were judged to be the best based on statistical criteria. The additional models are shown in Annex 2.

Overall, the selected models exhibit high goodness of fit measures, and the estimated coefficients are generally significant and have the expected signs for the hypotheses being tested. Further discussion of the results can be found in Subsection 5.3 below.

([44]) When standardising an independent variable, the new coefficient will be the old one multiplied by the standard deviation of the variable. By standardising the dependent variable, all new coefficients will be the old ones divided by the standard deviation of the dependent variable. In standardised models the intercept is zero.

**Table 5: Summary of main regression results**

| | | Dependent variable: | | |
|---|---|---|---|---|
| | | Total Activity | | |
| | | Music | Film | TV |
| H1 | Income | -0.453*** | -0.499** | |
| | l_GNI | (0.150) | (0.193) | |
| H2 | Income inequality | 0.373*** | 0.041 | 0.421*** |
| | Gini | (0.111) | (0.144) | (0.126) |
| | Youth unemployment | | | -0.352** |
| | you_unemp | | | (0.144) |
| H3 | Proportion of youth | | 0.404** | |
| | p_young | | (0.164) | |
| H4 | Inclination to piracy | 0.349*** | 0.441** | 0.152 |
| | q3.5 | (0.116) | (0.162) | (0.132) |
| H5 | Paid to legal services | | | -0.478*** |
| | q4b.2 | | | (0.187) |
| | Awareness of legal offer | | | |
| | Film | | -0.407** | |
| | q6.2 | | (0.170) | |
| | TV | | | 0.433** |
| | q6.3 | | | (0.189) |
| H6 | Total internet users | -0.370* | | -0.461*** |
| | l_Int_us | (0.207) | | (0.133) |
| H7 | Number of Legal platforms | | | |
| | Video | | 0.206 | |
| | n_plat_vi | | (0.168) | |
| | Music | 0.232 | | |
| | n_plat_m | (0.223) | | |
| | Observations | 28 | 28 | 28 |
| | R2 | 0.764 | 0.611 | 0.696 |
| | Variance Inf. Fact. | 4.230 | 2.572 | 3.290 |
| | Note: | *p<0.1; **p<0.05; ***p<0.01 | | |

[1] Activity TOTAL MUSIC

```
lm(formula =
     Music_activity ~ 0 + l_GNI + Gini + q3.5 + l_Int_us + n_plat_mu,
        data = a)

     Min       1Q     Median     3Q      Max
 -0.98329  -0.31669 -0.05479   0.33863  1.02424

Coefficients:
          Estimate Std. Error t value Pr(>|t|)
l_GNI      -0.4531     0.1496  -3.028  0.00599 ***
Gini        0.3729     0.1112   3.353  0.00275 ***
q3.5        0.3488     0.1163   2.998  0.00642 ***
l_Int_us   -0.3704     0.2067  -1.792  0.08631 *
n_plat_mu   0.2321     0.2232   1.040  0.30919
---
Signif. codes:  *p<0.1; **p<0.05; ***p<0.01

Residual standard error: 0.5268 on 23 degrees of freedom
Multiple R-squared:  0.7636,   Adjusted R-squared:  0.7122
F-statistic: 14.86 on 5 and 23 DF,  p-value: 1.485e-06
Variance Inf. Fact.   4.230
```

[2] Activity TOTAL FILM

```
lm(formula =
     Film_activity ~ 0 + l_GNI + Gini + p_young + q3.5 + q6.2 + n_plat_vi,
        data = a)

Residuals:
    Min      1Q     Median     3Q     Max
 -1.0755  -0.4386 -0.1080    0.3913  1.3654

Coefficients:
          Estimate Std. Error t value Pr(>|t|)
l_GNI     -0.49878    0.19328  -2.581   0.0171 **
Gini       0.04099    0.14407   0.285   0.7787
p_young    0.40390    0.16354   2.470   0.0218 **
q3.5       0.44080    0.16183   2.724   0.0124 **
q6.2      -0.40711    0.16957  -2.401   0.0253 **
n_plat_vi  0.20588    0.16774   1.227   0.2327
---
Signif. codes:  *p<0.1; **p<0.05; ***p<0.01

Residual standard error: 0.6908 on 22 degrees of freedom
Multiple R-squared:  0.6112,   Adjusted R-squared:  0.5051
F-statistic: 5.764 on 6 and 22 DF,  p-value: 0.0009941
Variance Inf. Fact.   2.572
```

```
      [3] Activity TOTAL TV

lm(formula =
     TV_activity ~ 0 + Gini + you_unemp + q3.5 + q4b.2 + q6.3 + l_Int_us,
       data = a)

Residuals:
     Min       1Q      Median    3Q      Max
 -1.09153  -0.26841  -0.08154  0.11614  1.32967

Coefficients:
           Estimate Std. Error t value Pr(>|t|)
Gini         0.4207     0.1257   3.348  0.00291 ***
you_unemp   -0.3516     0.1438  -2.445  0.02294 **
q3.5         0.1518     0.1321   1.150  0.26259
q4b.2       -0.4776     0.1868  -2.556  0.01800 **
q6.3         0.4325     0.1886   2.293  0.03176 **
l_Int_us    -0.4607     0.1327  -3.472  0.00216 ***
---
Signif. codes:  *p<0.1; **p<0.05; ***p<0.01

Residual standard error: 0.6108 on 22 degrees of freedom
Multiple R-squared:  0.696,    Adjusted R-squared:  0.6131
F-statistic: 8.396 on 6 and 22 DF,  p-value: 8.315e-05
Variance Inf. Fact.   3.103
```

## 5.3 ECONOMETRIC ANALYSIS — MAIN FINDINGS

Of the hypotheses described above and tested through the regressions described in the preceding subsection, H1 (income), H2 (inequality) and H4 (attitude) are most clearly supported by the results.

As expected, **higher per capita income, as measured by GNI, is associated with lower levels of consumption of pirated music and film** (although no such effect was found for TV content). The effect on both types of content is similar in magnitude and statistically significant.

As regards H2, **high income inequality is associated with higher levels of access to pirated content, especially for music and TV** where the impact is highly statistically significant. For film, the coefficient for this variable also has the expected sign but is not statistically significant.

Hypothesis H4 is confirmed by all three regressions. All things being equal, **countries in which consumers show a high degree of acceptance of piracy have higher levels of consumption of pirated content**. This effect is especially pronounced for music and film.

The **size of the market** has the expected negative effect on piracy rates, at least for music and TV. However, no effect could be detected for film.

The evidence on the **impact of legal offer** is mixed. The number of legal platforms for music and film has the 'wrong' sign (in other words, countries with more legal offers have higher levels of piracy, contrary to expectations), but the coefficients are not statistically significant. Awareness of legal offers does appear to reduce film piracy, though, and the effect is significant. However, somewhat counter-

intuitively, higher awareness of legal TV offers is associated with higher consumption of pirated TV content. It appears that the relationship between legal offer and piracy is a complex one and merits further investigation.

# 6. Conclusions

## 6.1 Main conclusions

This report examines consumption of copyright-infringing content in the 28 EU Member States, for TV programmes, music and film, using a variety of desktop and mobile access methods, including streaming, downloads, torrents and stream ripping.

The good news in this report is that digital piracy is declining. Between 2017 and 2018, overall accesses to pirated content declined by 15 %. The decline was most pronounced in music, at 32 %, followed by film (19 %) and TV (8 %).

However, piracy remains a significant problem, more so in some Member States than in others. The average internet user in the EU accessed pirated content 9.7 times per month in 2018, ranging from almost 26 times per month in Latvia and Lithuania to less than 4 times per month in Finland.

The econometric analysis in Section 5 seeks to explain those differences between the Member States. Based on a review of the existing literature and the available data sources, a number of factors that could influence consumption of pirated content in a given country were examined. These factors included socio-economic variables (income levels, education, inequality, unemployment); demographic variables such as the proportion of young people in the population; variables related to the features of the relevant marketplace, including market size, the extent of the internet infrastructure and the number of legal offers for the various types of content; and attitudes towards intellectual property infringement, as reported in the IP Perception study published by the EUIPO.

Among the socio-economic factors, the level of **income per capita** and the extent of **inequality** seem to have the greatest impact on consumption of pirated content: high per capita income and a low degree of income inequality are associated with lower levels of illicit consumption. The overall **size of the market**, as measured by the number of internet users in a country, also matters: the average consumption of pirated content is lower, all other things being equal, in larger Member States. A higher **acceptance of digital piracy**, as evidenced in the IP Perception study, is also associated with a higher level of consumption of pirated content.

Some of the other variables examined also seemed to have an impact on consumption of pirated content, but this impact was not clear-cut. For example, **awareness of legal offers** (as reported in the IP Perception study) appears to reduce consumption of pirated film but increase consumption of pirated TV content, while there was no statistically significant impact on music consumption. It seems that the relationship between legal offers and piracy is a complex one and warrants further study.

## 6.2 Limitations and directions for further research

The econometric analysis in the present study was constrained by the fact that while the data on access to sources of pirated content was quite granular (monthly data by country by content type and

access method), the data on the explanatory variables (such as the answers to IP Perception study questions by country) was only available as one data point per Member State, thus necessitating an aggregation of the country data and conducting the analyses with 28 observations([45]). Despite this limitation, the results of the analysis are useful in terms of pointing to further research and providing direction for awareness-raising efforts.

In general, various studies point to socio-economic variables, consumer awareness and attitudes, and **strength of enforcement** as relevant factors for consumption of pirated content (and indeed other types of IPR infringement). Therefore, another factor which merits further examination is an index of the strength of copyright enforcement in the different Member States. Such an index was not available for the present study, but in future studies efforts should be made to construct such a measure based on objective data from reputable sources so that all relevant factors can be taken into account in the analysis.

This study focuses on the aggregate levels of piracy in the three main content categories: music, film and TV. As such, it has provided insight into the phenomenon. However, the analysis will be enriched in a follow-up study of title-level data, provided by MUSO and planned for 2020. This study will examine the consumption of individual pirated film titles, possibly compared to legitimate consumption of the corresponding content (e.g. box office revenues). Similarly, if granular data on consumption of specific types of TV content (such as live sports) were available, an analysis of the impact of this type of piracy on the rights owners could be carried out.

Furthermore, while the availability of legal offers is intuitively important, their prices relative to income (indicating affordability to the average consumer) are also relevant. Unfortunately, no data was available for this study, but this data will hopefully be made available for future studies. Combining data on availability of legal offers, awareness of those offers and their relative cost could help explain in more detail the impact on consumption of pirated content.

Finally, as shown in Section 4, there has been a significant reduction in the consumption of pirated content in the EU between 2017 and 2018. A future study, using a longer time series, could attempt to identify the dynamic factors behind this trend.

([45]) Small samples tend to increase the probability of “type II errors” that can be thought of as “false negatives”. In other words, an explanatory variable that in reality does influence the dependent variable appears not to be statistically significant in the regression.

# 7. Annex 1: data

The table below shows the number of TV channels and online video and music platforms available in each EU Member State as of October 2019.

**TV, video and music legal offer**

Channels and online platforms

| Targeted Country | Number of TV channels (1) | Number of video platforms (1) | Number of music platforms (2) |
|---|---|---|---|
| EU28 | 7 865 | 1 059 | 111 |
| **Pan-European** | **1 123** | **85** | **(*)** |
| AT | 165 | 46 | 22 |
| BE | 176 | 51 | 19 |
| BG | 188 | 21 | 13 |
| CY | 49 | 15 | 8 |
| CZ | 187 | 25 | 17 |
| DE | 462 | 70 | 31 |
| DK | 136 | 46 | 13 |
| EE | 89 | 17 | 9 |
| EL | 166 | 17 | 15 |
| ES | 637 | 57 | 22 |
| FI | 123 | 38 | 12 |
| FR | 387 | 96 | 31 |
| HR | 177 | 23 | 4 |
| HU | 513 | 29 | 14 |
| IE | 72 | 33 | 19 |
| IT | 1 578 | 33 | 18 |
| LT | 94 | 22 | 9 |
| LU | 35 | 18 | 12 |
| LV | 93 | 20 | 9 |
| MT | 27 | 11 | 9 |
| NL | 357 | 43 | 24 |
| PL | 208 | 63 | 23 |
| PT | 83 | 31 | 16 |
| RO | 372 | 22 | 10 |
| SE | 146 | 49 | 12 |
| SI | 171 | 19 | 7 |
| SK | 219 | 22 | 11 |
| UK | 496 | 111 | 29 |

*Source:(1) MAVISE (Oct. 2019); (2) Pro_Music (Nov. 2019),*
*(*) Only 2 (counted in the totals of each country), 4 present in 27 countries, 1 in 26 countries*

MAVISE is a database on audiovisual services and licenses in Europe, managed by the European Audiovisual Observatory in collaboration with the European Platform of Regulatory Authorities (EPRA) and its network of European audiovisual regulatory authorities and supplemented with additional sources of information. The database covers the 41 member countries of the Observatory and includes all the main providers in each market, as well as the pan-European providers, which refers to services that are not meant to serve a particular market but are technically available all over Europe. Some TV channels or platforms are present in more than one country, but are not pan-European. As a consequence, the total for EU28 does not match the sum of the corresponding columns.

Pro-Music is a web service maintained by IFPI. The list contains legal online music services that offer music as a download, stream or ringtone. The list is compiled by IFPI based on information supplied by local industry groups.

The following tables show the data on consumption of pirated content that are used for the graphs in the report.

### EU28 TOTAL piracy

per internet user per month

| Date | Total activity | Streaming | Download | Torrent | Ripper |
|---|---|---|---|---|---|
| 2017-Jan | 11.8004 | 8.3561 | 1.3744 | 1.5161 | 0.5538 |
| 2017-Feb | 10.9209 | 7.7389 | 1.2989 | 1.3358 | 0.5473 |
| 2017-Mar | 11.8901 | 8.3678 | 1.4362 | 1.4991 | 0.5870 |
| 2017-Apr | 12.1289 | 8.6985 | 1.3759 | 1.4632 | 0.5914 |
| 2017-May | 11.5219 | 8.2356 | 1.2725 | 1.4121 | 0.6017 |
| 2017-Jun | 10.9484 | 7.9203 | 1.1490 | 1.2992 | 0.5799 |
| 2017-Jul | 11.4759 | 8.2237 | 1.2335 | 1.4091 | 0.6096 |
| 2017-Aug | 11.9990 | 8.6045 | 1.2459 | 1.5242 | 0.6244 |
| 2017-Sep | 10.6304 | 7.5121 | 1.0973 | 1.3319 | 0.6891 |
| 2017-Oct | 10.7203 | 7.6590 | 1.1176 | 1.3170 | 0.6267 |
| 2017-Nov | 10.3662 | 7.5275 | 1.0372 | 1.2146 | 0.5869 |
| 2017-Dec | 10.7877 | 7.8922 | 1.0528 | 1.2113 | 0.6313 |
| 2018-Jan | 10.7440 | 8.0164 | 0.9877 | 1.1332 | 0.6067 |
| 2018-Feb | 9.6989 | 7.3263 | 0.8694 | 0.9812 | 0.5220 |
| 2018-Mar | 10.2628 | 7.6724 | 0.9335 | 1.0995 | 0.5573 |
| 2018-Apr | 9.4779 | 7.1096 | 0.8312 | 1.0282 | 0.5089 |
| 2018-May | 9.7217 | 7.3727 | 0.8225 | 1.0236 | 0.5029 |
| 2018-Jun | 9.3425 | 7.0811 | 0.7980 | 0.9677 | 0.4957 |
| 2018-Jul | 9.7960 | 7.3605 | 0.8940 | 1.0071 | 0.5343 |
| 2018-Aug | 9.7526 | 7.3919 | 0.8344 | 0.9668 | 0.5595 |
| 2018-Sep | 8.8969 | 6.6957 | 0.7660 | 0.8969 | 0.5384 |

*Source: Own calculations based on MUSO data*

The methodology used by MUSO is briefly described below.

Activity and geographical location

The core unit of measurement is a “visit”. The definition of a site visit is a web user entering a website and viewing one or more pages, with no more than 30 minutes of inactivity. If there is over 30 minutes of inactivity and the same user then views another page from the same website, then it counts as an additional visit. MUSO maintains a set of 35,000 of the highest traffic piracy websites, with the underlying individual website traffic and geographic location data provided by SimilarWeb.

Type of content attribution

Some piracy sites are dedicated to serving content for only one content type, e.g. only film or only music, while other sites offer multiple types of content. MUSO’s algorithm calculates a country-specific ratio to apply to the total visits to such multi-content piracy sites which estimates the subtotal of visits to the site seeking each type of content. This calculated sub-total for a particular content type is then added to the visits to content-specific sites.

## TOTAL piracy by content type by country

per internet user per month

| Country | Film | Music | TV | Total activity |
|---|---|---|---|---|
| AT | 1.10 | 0.77 | 5.67 | 7.54 |
| BE | 2.53 | 1.79 | 7.35 | 11.67 |
| BG | 3.40 | 5.97 | 9.35 | 18.72 |
| CY | 3.87 | 1.98 | 8.72 | 14.56 |
| CZ | 2.21 | 2.33 | 8.80 | 13.34 |
| DE | 0.79 | 0.96 | 5.09 | 6.84 |
| DK | 1.04 | 0.70 | 5.24 | 6.99 |
| EE | 1.73 | 2.61 | 12.37 | 16.72 |
| EL | 4.86 | 2.18 | 5.35 | 12.40 |
| ES | 2.59 | 1.92 | 4.21 | 8.73 |
| FI | 0.48 | 0.49 | 3.59 | 4.56 |
| FR | 2.74 | 1.54 | 7.00 | 11.29 |
| HR | 3.38 | 2.03 | 7.38 | 12.79 |
| HU | 1.95 | 2.48 | 7.48 | 11.91 |
| IE | 2.27 | 1.34 | 8.55 | 12.15 |
| IT | 1.72 | 1.28 | 3.98 | 6.98 |
| LT | 1.89 | 5.06 | 19.39 | 26.34 |
| LU | 1.82 | 1.26 | 8.01 | 11.09 |
| LV | 2.37 | 5.11 | 19.51 | 26.99 |
| MT | 3.03 | 2.08 | 12.80 | 17.91 |
| NL | 1.60 | 1.83 | 6.65 | 10.09 |
| PL | 4.42 | 1.92 | 5.74 | 12.07 |
| PT | 1.66 | 2.07 | 9.90 | 13.63 |
| RO | 3.54 | 2.13 | 6.19 | 11.86 |
| SE | 1.31 | 0.90 | 6.95 | 9.16 |
| SI | 1.22 | 2.23 | 6.19 | 9.63 |
| SK | 3.98 | 2.87 | 10.19 | 17.04 |
| UK | 1.51 | 1.30 | 6.32 | 9.13 |

*Source: Own calculations based on MUSO data*

## TOTAL piracy trends by country

activity v trend

| Country | First 9 months 2017 | First 9 months 2018 | 12 month trend (%) |
|---|---|---|---|
| AT | 9.2 | 7.5 | -18.0 |
| BE | 13.2 | 11.7 | -11.3 |
| BG | 18.8 | 18.7 | -0.2 |
| CY | 15.4 | 14.6 | -5.7 |
| CZ | 13.6 | 13.3 | -2.1 |
| DE | 9.2 | 6.8 | -25.7 |
| DK | 8.4 | 7.0 | -16.7 |
| EE | 17.6 | 16.7 | -4.8 |
| EL | 13.1 | 12.4 | -5.4 |
| ES | 10.2 | 8.7 | -14.4 |
| FI | 4.8 | 4.6 | -5.2 |
| FR | 12.9 | 11.3 | -12.8 |
| HR | 14.1 | 12.8 | -9.2 |
| HU | 13.6 | 11.9 | -12.3 |
| IE | 12.9 | 12.2 | -5.6 |
| IT | 8.7 | 7.0 | -19.8 |
| LT | 27.8 | 26.3 | -5.2 |
| LU | 14.2 | 11.1 | -21.8 |
| LV | 26.5 | 27.0 | 2.0 |
| MT | 17.4 | 17.9 | 2.8 |
| NL | 11.7 | 10.1 | -14.1 |
| PL | 14.7 | 12.1 | -17.8 |
| PT | 14.2 | 13.6 | -4.1 |
| RO | 14.9 | 11.9 | -20.4 |
| SE | 11.0 | 9.2 | -16.3 |
| SI | 9.3 | 9.6 | 3.9 |
| SK | 17.4 | 17.0 | -1.9 |
| UK | 10.8 | 9.1 | -15.5 |
| **EU28** | **11.5** | **9.7** | **-15.1** |

*Source: Own calculations based on MUSO data*

## EU28 FILM piracy

per internet user per month

| Date | Total activity | Streaming | Download | Torrent | Ripper |
|---|---|---|---|---|---|
| 2017-Jan | 2.8875 | 1.9076 | 0.3672 | 0.6050 | 0.0077 |
| 2017-Feb | 2.5662 | 1.6842 | 0.3432 | 0.5309 | 0.0078 |
| 2017-Mar | 2.6927 | 1.7565 | 0.3684 | 0.5595 | 0.0083 |
| 2017-Apr | 2.5995 | 1.7316 | 0.3472 | 0.5121 | 0.0086 |
| 2017-May | 2.3853 | 1.5925 | 0.3113 | 0.4726 | 0.0088 |
| 2017-Jun | 2.4607 | 1.6797 | 0.2945 | 0.4780 | 0.0085 |
| 2017-Jul | 2.6484 | 1.8044 | 0.3184 | 0.5165 | 0.0091 |
| 2017-Aug | 2.7117 | 1.7877 | 0.3433 | 0.5711 | 0.0095 |
| 2017-Sep | 2.3111 | 1.5029 | 0.2879 | 0.5071 | 0.0132 |
| 2017-Oct | 2.2559 | 1.4884 | 0.2760 | 0.4789 | 0.0127 |
| 2017-Nov | 2.2743 | 1.5359 | 0.2604 | 0.4659 | 0.0121 |
| 2017-Dec | 2.4874 | 1.7096 | 0.2775 | 0.4874 | 0.0129 |
| 2018-Jan | 2.3715 | 1.6701 | 0.2481 | 0.4394 | 0.0138 |
| 2018-Feb | 2.1292 | 1.4916 | 0.2299 | 0.3961 | 0.0115 |
| 2018-Mar | 2.1901 | 1.4687 | 0.2560 | 0.4530 | 0.0124 |
| 2018-Apr | 1.8894 | 1.2459 | 0.2315 | 0.4013 | 0.0108 |
| 2018-May | 2.0038 | 1.3569 | 0.2189 | 0.4155 | 0.0125 |
| 2018-Jun | 1.8933 | 1.2609 | 0.2080 | 0.4109 | 0.0135 |
| 2018-Jul | 2.1267 | 1.4244 | 0.2463 | 0.4402 | 0.0158 |
| 2018-Aug | 2.2645 | 1.5584 | 0.2462 | 0.4449 | 0.0150 |
| 2018-Sep | 1.9375 | 1.2868 | 0.2299 | 0.4092 | 0.0115 |

*Source: Own calculations based on MUSO data*

## FILM piracy by country

per internet user per month

| Country | Streaming | Download | Torrent | Ripper | Total activity |
|---|---|---|---|---|---|
| AT | 0.8089 | 0.1696 | 0.1145 | 0.0075 | 1.1005 |
| BE | 1.4309 | 0.3969 | 0.6840 | 0.0188 | 2.5305 |
| BG | 2.3766 | 0.3554 | 0.6377 | 0.0281 | 3.3979 |
| CY | 2.6228 | 0.1365 | 1.0924 | 0.0168 | 3.8686 |
| CZ | 0.9349 | 0.7229 | 0.5406 | 0.0136 | 2.2119 |
| DE | 0.5987 | 0.1404 | 0.0384 | 0.0079 | 0.7855 |
| DK | 0.5907 | 0.0775 | 0.3681 | 0.0073 | 1.0436 |
| EE | 0.8435 | 0.0886 | 0.7906 | 0.0108 | 1.7335 |
| EL | 3.3058 | 0.1941 | 1.3448 | 0.0200 | 4.8647 |
| ES | 1.1148 | 0.2899 | 1.1763 | 0.0133 | 2.5942 |
| FI | 0.3265 | 0.0357 | 0.1181 | 0.0046 | 0.4848 |
| FR | 1.8636 | 0.5423 | 0.3221 | 0.0158 | 2.7439 |
| HR | 0.9521 | 0.6434 | 1.7675 | 0.0184 | 3.3815 |
| HU | 1.2496 | 0.0924 | 0.5870 | 0.0227 | 1.9517 |
| IE | 1.3059 | 0.1745 | 0.7749 | 0.0105 | 2.2659 |
| IT | 1.4603 | 0.0897 | 0.1622 | 0.0119 | 1.7241 |
| LT | 1.1845 | 0.0749 | 0.6029 | 0.0259 | 1.8882 |
| LU | 0.9404 | 0.3166 | 0.5593 | 0.0075 | 1.8238 |
| LV | 1.5375 | 0.0977 | 0.7205 | 0.0127 | 2.3684 |
| MT | 1.4568 | 0.2028 | 1.3567 | 0.0184 | 3.0346 |
| NL | 0.8312 | 0.1961 | 0.5581 | 0.0146 | 1.6000 |
| PL | 3.9875 | 0.1816 | 0.2331 | 0.0143 | 4.4166 |
| PT | 0.5677 | 0.1759 | 0.8937 | 0.0223 | 1.6596 |
| RO | 2.8612 | 0.1374 | 0.5240 | 0.0155 | 3.5381 |
| SE | 0.8040 | 0.0968 | 0.4036 | 0.0076 | 1.3119 |
| SI | 0.4108 | 0.0939 | 0.6940 | 0.0171 | 1.2159 |
| SK | 2.2619 | 0.6764 | 1.0210 | 0.0223 | 3.9816 |
| UK | 0.9984 | 0.1484 | 0.3536 | 0.0116 | 1.5120 |

*Source: Own calculations based on MUSO data*

## FILM piracy trends by country

activity v trend

| Country | First 9 months 2017 | First 9 months 2018 | 12 month trend (%) |
|---|---|---|---|
| AT | 1.3 | 1.1 | -17.3 |
| BE | 3.7 | 2.5 | -30.7 |
| BG | 3.4 | 3.4 | 0.3 |
| CY | 4.2 | 3.9 | -6.8 |
| CZ | 2.4 | 2.2 | -7.1 |
| DE | 1.1 | 0.8 | -28.9 |
| DK | 1.6 | 1.0 | -36.2 |
| EE | 1.8 | 1.7 | -1.5 |
| EL | 5.1 | 4.9 | -5.2 |
| ES | 2.9 | 2.6 | -11.8 |
| FI | 0.6 | 0.5 | -15.2 |
| FR | 3.6 | 2.7 | -24.5 |
| HR | 4.1 | 3.4 | -16.5 |
| HU | 2.8 | 2.0 | -30.0 |
| IE | 2.8 | 2.3 | -17.6 |
| IT | 1.3 | 1.7 | 28.4 |
| LT | 2.5 | 1.9 | -24.2 |
| LU | 2.2 | 1.8 | -16.8 |
| LV | 2.6 | 2.4 | -7.6 |
| MT | 3.3 | 3.0 | -9.2 |
| NL | 2.1 | 1.6 | -23.6 |
| PL | 5.8 | 4.4 | -23.4 |
| PT | 2.3 | 1.7 | -26.4 |
| RO | 4.9 | 3.5 | -28.3 |
| SE | 1.7 | 1.3 | -24.8 |
| SI | 1.5 | 1.2 | -20.3 |
| SK | 3.5 | 4.0 | 14.8 |
| UK | 2.1 | 1.5 | -27.6 |
| **EU28** | **2.6** | **2.1** | **-19.2** |

*Source: Own calculations based on MUSO data*

## EU28 MUSIC piracy

per internet user per month

| Date | Total activity | Streaming | Download | Torrent | Ripper |
|---|---|---|---|---|---|
| 2017-Jan | 2.4563 | 0.6678 | 0.7041 | 0.5501 | 0.5343 |
| 2017-Feb | 2.2588 | 0.6064 | 0.6527 | 0.4723 | 0.5274 |
| 2017-Mar | 2.4979 | 0.6385 | 0.7285 | 0.5651 | 0.5657 |
| 2017-Apr | 2.3869 | 0.5724 | 0.6957 | 0.5494 | 0.5695 |
| 2017-May | 2.3088 | 0.5706 | 0.6397 | 0.5194 | 0.5792 |
| 2017-Jun | 2.1605 | 0.5836 | 0.5637 | 0.4550 | 0.5583 |
| 2017-Jul | 2.2623 | 0.5876 | 0.5885 | 0.4997 | 0.5865 |
| 2017-Aug | 2.2521 | 0.5749 | 0.5602 | 0.5167 | 0.6002 |
| 2017-Sep | 2.2578 | 0.5721 | 0.5532 | 0.4771 | 0.6554 |
| 2017-Oct | 2.1977 | 0.5574 | 0.5697 | 0.4762 | 0.5945 |
| 2017-Nov | 2.0394 | 0.4934 | 0.5435 | 0.4464 | 0.5562 |
| 2017-Dec | 2.1002 | 0.5007 | 0.5564 | 0.4447 | 0.5984 |
| 2018-Jan | 1.9308 | 0.4361 | 0.5152 | 0.4075 | 0.5720 |
| 2018-Feb | 1.6185 | 0.3437 | 0.4478 | 0.3343 | 0.4927 |
| 2018-Mar | 1.7149 | 0.3563 | 0.4689 | 0.3639 | 0.5258 |
| 2018-Apr | 1.5283 | 0.3221 | 0.3943 | 0.3310 | 0.4809 |
| 2018-May | 1.5293 | 0.3285 | 0.4037 | 0.3222 | 0.4750 |
| 2018-Jun | 1.4705 | 0.3003 | 0.4020 | 0.2991 | 0.4693 |
| 2018-Jul | 1.5549 | 0.3076 | 0.4355 | 0.3052 | 0.5068 |
| 2018-Aug | 1.4920 | 0.2951 | 0.3935 | 0.2733 | 0.5301 |
| 2018-Sep | 1.3847 | 0.2580 | 0.3624 | 0.2531 | 0.5112 |

*Source: Own calculations based on MUSO data*

## MUSIC piracy by country

per internet user per month

| Country | Streaming | Download | Torrent | Ripper | Total activity |
|---|---|---|---|---|---|
| AT | 0.1494 | 0.2443 | 0.0779 | 0.2960 | 0.7677 |
| BE | 0.2728 | 0.4171 | 0.3555 | 0.7478 | 1.7931 |
| BG | 0.9340 | 0.8948 | 3.0546 | 1.0870 | 5.9704 |
| CY | 0.4696 | 0.3657 | 0.4360 | 0.7081 | 1.9794 |
| CZ | 0.5818 | 0.8834 | 0.3458 | 0.5196 | 2.3306 |
| DE | 0.2859 | 0.3163 | 0.0477 | 0.3103 | 0.9602 |
| DK | 0.1082 | 0.1614 | 0.1429 | 0.2891 | 0.7015 |
| EE | 1.0632 | 0.4969 | 0.5810 | 0.4719 | 2.6130 |
| EL | 0.2752 | 0.5463 | 0.5984 | 0.7638 | 2.1836 |
| ES | 0.4575 | 0.5011 | 0.4643 | 0.5010 | 1.9239 |
| FI | 0.1197 | 0.1071 | 0.0740 | 0.1859 | 0.4867 |
| FR | 0.2660 | 0.4097 | 0.1986 | 0.6704 | 1.5447 |
| HR | 0.1860 | 0.5028 | 0.6273 | 0.7162 | 2.0323 |
| HU | 0.2733 | 0.3656 | 0.9742 | 0.8657 | 2.4788 |
| IE | 0.1869 | 0.3537 | 0.3810 | 0.4197 | 1.3413 |
| IT | 0.1963 | 0.3880 | 0.2430 | 0.4488 | 1.2761 |
| LT | 1.4830 | 1.0163 | 1.5460 | 1.0181 | 5.0634 |
| LU | 0.2622 | 0.3579 | 0.2644 | 0.3786 | 1.2630 |
| LV | 2.2521 | 0.7593 | 1.5692 | 0.5306 | 5.1112 |
| MT | 0.2283 | 0.5190 | 0.5221 | 0.8067 | 2.0761 |
| NL | 0.4009 | 0.4822 | 0.3945 | 0.5569 | 1.8345 |
| PL | 0.4841 | 0.5851 | 0.3052 | 0.5421 | 1.9165 |
| PT | 0.3345 | 0.5209 | 0.3673 | 0.8483 | 2.0709 |
| RO | 0.3504 | 0.4668 | 0.7127 | 0.6008 | 2.1306 |
| SE | 0.1775 | 0.2149 | 0.2138 | 0.2970 | 0.9033 |
| SI | 0.1651 | 0.4656 | 0.8931 | 0.7021 | 2.2260 |
| SK | 0.4751 | 0.9558 | 0.5790 | 0.8599 | 2.8698 |
| UK | 0.2657 | 0.3564 | 0.2391 | 0.4376 | 1.2988 |

*Source: Own calculations based on MUSO data*

## MUSIC piracy trend by country

activity v trend

| Country | First 9 months 2017 | First 9 months 2018 | 12 month trend (%) |
|---|---|---|---|
| AT | 1.2 | 0.8 | -37.8 |
| BE | 2.4 | 1.8 | -24.0 |
| BG | 8.0 | 6.0 | -25.7 |
| CY | 2.8 | 2.0 | -29.0 |
| CZ | 3.1 | 2.3 | -23.7 |
| DE | 1.8 | 1.0 | -46.1 |
| DK | 0.9 | 0.7 | -23.1 |
| EE | 3.3 | 2.6 | -19.8 |
| EL | 2.6 | 2.2 | -17.0 |
| ES | 2.9 | 1.9 | -34.2 |
| FI | 0.6 | 0.5 | -24.7 |
| FR | 2.1 | 1.5 | -25.5 |
| HR | 2.7 | 2.0 | -23.8 |
| HU | 3.5 | 2.5 | -29.6 |
| IE | 1.8 | 1.3 | -25.3 |
| IT | 1.9 | 1.3 | -32.5 |
| LT | 6.4 | 5.1 | -21.4 |
| LU | 2.0 | 1.3 | -37.8 |
| LV | 5.9 | 5.1 | -12.9 |
| MT | 2.4 | 2.1 | -14.3 |
| NL | 2.7 | 1.8 | -31.9 |
| PL | 2.7 | 1.9 | -28.3 |
| PT | 2.6 | 2.1 | -21.7 |
| RO | 4.0 | 2.1 | -46.1 |
| SE | 1.2 | 0.9 | -23.2 |
| SI | 2.3 | 2.2 | -4.3 |
| SK | 3.7 | 2.9 | -22.5 |
| UK | 1.9 | 1.3 | -31.6 |
| **EU28** | **2.3** | **1.6** | **-31.8** |

*Source: Own calculations based on MUSO data*

## EU28 TV piracy

per internet user per month

| Date | Total activity | Streaming | Download | Torrent | Ripper |
|---|---|---|---|---|---|
| 2017-Jan | 6.4566 | 5.7806 | 0.3031 | 0.3610 | 0.0119 |
| 2017-Feb | 6.0960 | 5.4483 | 0.3030 | 0.3326 | 0.0121 |
| 2017-Mar | 6.6996 | 5.9728 | 0.3393 | 0.3745 | 0.0129 |
| 2017-Apr | 7.1425 | 6.3945 | 0.3329 | 0.4017 | 0.0133 |
| 2017-May | 6.8277 | 6.0724 | 0.3215 | 0.4201 | 0.0137 |
| 2017-Jun | 6.3272 | 5.6570 | 0.2908 | 0.3662 | 0.0131 |
| 2017-Jul | 6.5652 | 5.8317 | 0.3266 | 0.3929 | 0.0140 |
| 2017-Aug | 7.0352 | 6.2419 | 0.3423 | 0.4363 | 0.0147 |
| 2017-Sep | 6.0615 | 5.4371 | 0.2562 | 0.3477 | 0.0205 |
| 2017-Oct | 6.2666 | 5.6132 | 0.2719 | 0.3619 | 0.0196 |
| 2017-Nov | 6.0525 | 5.4982 | 0.2334 | 0.3023 | 0.0187 |
| 2017-Dec | 6.2001 | 5.6820 | 0.2189 | 0.2793 | 0.0200 |
| 2018-Jan | 6.4418 | 5.9103 | 0.2244 | 0.2863 | 0.0209 |
| 2018-Feb | 5.9512 | 5.4910 | 0.1917 | 0.2508 | 0.0178 |
| 2018-Mar | 6.3578 | 5.8474 | 0.2087 | 0.2826 | 0.0192 |
| 2018-Apr | 6.0602 | 5.5416 | 0.2054 | 0.2960 | 0.0171 |
| 2018-May | 6.1885 | 5.6873 | 0.2000 | 0.2859 | 0.0154 |
| 2018-Jun | 5.9787 | 5.5199 | 0.1880 | 0.2577 | 0.0130 |
| 2018-Jul | 6.1144 | 5.6285 | 0.2123 | 0.2618 | 0.0117 |
| 2018-Aug | 5.9961 | 5.5384 | 0.1948 | 0.2487 | 0.0143 |
| 2018-Sep | 5.5747 | 5.1508 | 0.1737 | 0.2345 | 0.0157 |

*Source: Own calculations based on MUSO data*

## TV piracy by country

per internet user per month

| Country | Streaming | Download | Torrent | Ripper | Total activity |
|---|---|---|---|---|---|
| AT | 5.1895 | 0.3041 | 0.1679 | 0.0095 | 5.6710 |
| BE | 6.8403 | 0.1835 | 0.3028 | 0.0235 | 7.3500 |
| BG | 7.9168 | 0.4950 | 0.9010 | 0.0352 | 9.3479 |
| CY | 8.0367 | 0.0828 | 0.5752 | 0.0213 | 8.7160 |
| CZ | 7.6451 | 0.6714 | 0.4620 | 0.0169 | 8.7953 |
| DE | 4.6258 | 0.3687 | 0.0866 | 0.0098 | 5.0910 |
| DK | 4.9457 | 0.0546 | 0.2330 | 0.0091 | 5.2423 |
| EE | 11.4537 | 0.1183 | 0.7891 | 0.0137 | 12.3747 |
| EL | 4.8186 | 0.0788 | 0.4303 | 0.0249 | 5.3526 |
| ES | 3.6935 | 0.1345 | 0.3674 | 0.0164 | 4.2118 |
| FI | 3.3246 | 0.0437 | 0.2144 | 0.0057 | 3.5884 |
| FR | 6.5776 | 0.2401 | 0.1649 | 0.0198 | 7.0024 |
| HR | 6.4812 | 0.2497 | 0.6259 | 0.0233 | 7.3801 |
| HU | 6.7315 | 0.0654 | 0.6502 | 0.0283 | 7.4754 |
| IE | 7.9959 | 0.0992 | 0.4386 | 0.0132 | 8.5469 |
| IT | 3.7751 | 0.0636 | 0.1231 | 0.0146 | 3.9764 |
| LT | 17.9535 | 0.1615 | 1.2404 | 0.0326 | 19.3880 |
| LU | 6.8995 | 0.4725 | 0.6251 | 0.0098 | 8.0068 |
| LV | 18.2393 | 0.1852 | 1.0680 | 0.0160 | 19.5085 |
| MT | 12.2459 | 0.0660 | 0.4616 | 0.0232 | 12.7967 |
| NL | 5.9226 | 0.1848 | 0.5279 | 0.0180 | 6.6533 |
| PL | 5.2896 | 0.1903 | 0.2433 | 0.0177 | 5.7409 |
| PT | 8.9481 | 0.2451 | 0.6792 | 0.0278 | 9.9002 |
| RO | 5.7314 | 0.0894 | 0.3507 | 0.0193 | 6.1909 |
| SE | 6.3735 | 0.0988 | 0.4667 | 0.0095 | 6.9484 |
| SI | 5.2175 | 0.1150 | 0.8339 | 0.0213 | 6.1878 |
| SK | 9.1352 | 0.4294 | 0.5945 | 0.0276 | 10.1867 |
| UK | 6.0291 | 0.0844 | 0.1901 | 0.0142 | 6.3178 |

*Source: Own calculations based on MUSO data*

## TV piracy trend by country

activity v trend

| Country | First 9 months 2017 | First 9 months 2018 | 12 month trend (%) |
|---|---|---|---|
| AT | 6.6 | 5.7 | -14.5 |
| BE | 7.2 | 7.4 | 2.8 |
| BG | 7.3 | 9.3 | 27.5 |
| CY | 8.5 | 8.7 | 2.5 |
| CZ | 8.2 | 8.8 | 7.4 |
| DE | 6.3 | 5.1 | -19.4 |
| DK | 5.8 | 5.2 | -10.2 |
| EE | 12.5 | 12.4 | -1.3 |
| EL | 5.4 | 5.4 | 0.0 |
| ES | 4.3 | 4.2 | -2.8 |
| FI | 3.6 | 3.6 | -0.2 |
| FR | 7.2 | 7.0 | -3.2 |
| HR | 7.4 | 7.4 | 0.0 |
| HU | 7.3 | 7.5 | 2.8 |
| IE | 8.3 | 8.5 | 2.6 |
| IT | 5.5 | 4.0 | -27.2 |
| LT | 18.9 | 19.4 | 2.8 |
| LU | 10.0 | 8.0 | -19.6 |
| LV | 18.0 | 19.5 | 8.2 |
| MT | 11.7 | 12.8 | 9.8 |
| NL | 7.0 | 6.7 | -4.3 |
| PL | 6.2 | 5.7 | -8.0 |
| PT | 9.3 | 9.9 | 6.3 |
| RO | 6.0 | 6.2 | 3.0 |
| SE | 8.0 | 6.9 | -13.5 |
| SI | 5.4 | 6.2 | 14.3 |
| SK | 10.2 | 10.2 | -0.1 |
| UK | 6.8 | 6.3 | -7.4 |
| **EU28** | **6.6** | **6.1** | **-7.7** |

*Source: Own calculations based on MUSO data*

**IP Perception study (March 2017)**

% of respondents answering “totally agree” / “tend to agree”

| Country | Q3.5 | Q4b.2 | Q6.1 | Q6.2 | Q6.3 | Q6.4 | Q9.2 |
|---|---|---|---|---|---|---|---|
| AT | 27 | 31 | 58 | 50 | 48 | 34 | 59 |
| BE | 40 | 25 | 69 | 66 | 62 | 54 | 40 |
| BG | 46 | 18 | 43 | 44 | 37 | 42 | 32 |
| CY | 38 | 20 | 36 | 36 | 36 | 37 | 25 |
| CZ | 40 | 22 | 65 | 59 | 59 | 52 | 62 |
| DE | 22 | 29 | 57 | 51 | 57 | 50 | 34 |
| DK | 25 | 47 | 73 | 67 | 68 | 58 | 42 |
| EE | 37 | 20 | 50 | 46 | 47 | 42 | 26 |
| EL | 42 | 12 | 43 | 38 | 34 | 28 | 40 |
| ES | 39 | 24 | 66 | 64 | 59 | 57 | 48 |
| FI | 28 | 38 | 71 | 64 | 71 | 65 | 43 |
| FR | 34 | 26 | 67 | 62 | 52 | 41 | 32 |
| HR | 39 | 14 | 40 | 36 | 28 | 30 | 14 |
| HU | 25 | 17 | 58 | 55 | 52 | 51 | 39 |
| IE | 27 | 34 | 70 | 66 | 68 | 57 | 53 |
| IT | 29 | 16 | 49 | 45 | 34 | 33 | 17 |
| LT | 39 | 25 | 67 | 68 | 62 | 61 | 16 |
| LU | 34 | 44 | 59 | 49 | 50 | 40 | 44 |
| LV | 45 | 19 | 70 | 67 | 63 | 64 | 37 |
| MT | 29 | 13 | 48 | 49 | 45 | 43 | 15 |
| NL | 49 | 44 | 85 | 79 | 79 | 69 | 42 |
| PL | 34 | 28 | 63 | 59 | 54 | 57 | 29 |
| PT | 35 | 14 | 56 | 47 | 46 | 39 | 50 |
| RO | 30 | 17 | 46 | 43 | 33 | 37 | 31 |
| SE | 25 | 44 | 69 | 65 | 67 | 50 | 33 |
| SI | 40 | 18 | 54 | 50 | 47 | 50 | 17 |
| SK | 43 | 20 | 43 | 41 | 31 | 31 | 20 |
| UK | 22 | 42 | 73 | 67 | 69 | 53 | 41 |

Source: EUIPO (2017)

Q3.5 Illegal sources are acceptable if there is no legal alternative
Q4B.2 Paid for legal content during the past 12 months
Q6.x Aware of legal services (x=1 Music, x=2 Film, x=3 TV series, x=4 Live Sports Events)
Q9.2 Bad experience from illegal sources would stop me from accessing them

# 8. ANNEX 2: ECONOMETRICS

This annex shows a number of other models that were evaluated for each of the three content types, with the model chosen in the main body of the report shown first in each table.

In addition, the table below shows the descriptive statistics for all the variables used in the models.

### Descriptive Statistics

| Variable | N | Mean | St. Dev. | Min | Pctl(25) | Pctl(75) | Max |
|---|---|---|---|---|---|---|---|
| FILM | 28 | 2.3 | 1.1 | 0.5 | 1.6 | 3.1 | 4.9 |
| MUSIC | 28 | 2.1 | 1.3 | 0.5 | 1.3 | 2.3 | 6.0 |
| TV | 28 | 8.1 | 3.9 | 3.6 | 5.7 | 8.9 | 19.5 |
| q3.5 | 28 | 34.4 | 7.6 | 22.0 | 27.7 | 40.2 | 48.9 |
| Gini | 28 | 30.1 | 4.0 | 23.2 | 27.8 | 33.1 | 40.2 |
| you_unemp | 28 | 15.6 | 8.3 | 6.2 | 10.0 | 17.8 | 39.9 |
| pover_risk | 28 | 22.5 | 5.5 | 13.7 | 17.8 | 26.2 | 34.5 |
| n_TVch | 28 | 1,387.5 | 303.1 | 1,150.0 | 1,216.8 | 1,483.8 | 2,701.0 |
| l_Int_us | 28 | 6.7 | 0.6 | 5.5 | 6.3 | 7.0 | 7.7 |
| n_plat_vi | 28 | 37.4 | 24.3 | 11.0 | 20.8 | 46.8 | 111.0 |
| n_plat_mu | 28 | 15.8 | 7.5 | 4.0 | 10.5 | 19.8 | 33.0 |
| l_GNI | 28 | 4.4 | 0.1 | 4.2 | 4.3 | 4.6 | 4.7 |
| q4b.2 | 28 | 25.7 | 10.8 | 11.9 | 17.4 | 31.6 | 47.2 |
| p_Int_us | 28 | 81.7 | 8.6 | 64.0 | 75.0 | 87.8 | 95.0 |
| p_mob_us | 28 | 69.3 | 12.1 | 40.0 | 61.5 | 78.5 | 88.0 |
| mo_bro_cos | 28 | 1.3 | 0.4 | 0.8 | 0.9 | 1.6 | 2.0 |
| q6.1 | 28 | 58.9 | 12.2 | 36.0 | 48.8 | 68.9 | 85.0 |
| q6.2 | 28 | 54.7 | 11.6 | 35.6 | 45.7 | 65.5 | 79.0 |
| q6.3 | 28 | 52.0 | 13.8 | 27.8 | 42.8 | 62.0 | 78.6 |
| q6.4 | 28 | 47.3 | 11.4 | 28.2 | 38.8 | 56.6 | 68.8 |
| q9.2 | 28 | 35.1 | 13.1 | 14.4 | 26.0 | 42.4 | 61.5 |
| p_ter_edu | 28 | 33.9 | 8.4 | 17.8 | 26.5 | 41.3 | 46.9 |
| p_young | 28 | 10.9 | 1.1 | 9.1 | 10.0 | 11.6 | 13.2 |

## Other models

| | Dependent variable: | | | | | |
|---|---|---|---|---|---|---|
| | Total Music Activity | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| l_GNI | -0.453*** | -0.358*** | -0.360*** | -0.313** | -0.463*** | -0.371*** |
| | (0.150) | (0.119) | (0.124) | (0.133) | (0.145) | (0.089) |
| Gini | 0.373*** | 0.394*** | 0.383*** | 0.398*** | 0.377*** | 0.503*** |
| | (0.111) | (0.110) | (0.114) | (0.115) | (0.112) | (0.085) |
| you_unemp | | | | | | -0.402*** |
| | | | | | | (0.081) |
| q3.5 | 0.349*** | 0.368*** | 0.418*** | 0.403*** | 0.400*** | 0.463*** |
| | (0.116) | (0.115) | (0.116) | (0.117) | (0.115) | (0.083) |
| l_Int_us | -0.370* | -0.185* | | | | |
| | (0.207) | (0.105) | | | | |
| n_plat_mu | 0.232 | | | -0.112 | | |
| | (0.223) | | | (0.119) | | |
| q6.1 | | | | | 0.166 | |
| | | | | | (0.127) | |
| Observations | 28 | 28 | 28 | 28 | 28 | 28 |
| R2 | 0.764 | 0.752 | 0.721 | 0.731 | 0.739 | 0.863 |
| Bayesian Inf. Crit. | 58.054 | 56.008 | 56.070 | 58.381 | 57.478 | 39.454 |
| Variance Inf. Fact. | 4.23 | 4.04 | 3.579 | 3.712 | 3.833 | 7.297 |
| Note: | | | | *p<0.1; **p<0.05; ***p<0.01 | | |

The Bayesian information criterion (BIC) is a criterion for model selection; other things being equal, the model with the lowest BIC is preferred. BIC is based, in part, on the likelihood function and is closely related to the Akaike information criterion (AIC). When fitting models, it is possible to increase the likelihood by adding parameters, but doing so may result in overfitting. BIC attempts to resolve this problem by introducing a penalty term for the number of parameters in the model.

| | Dependent variable: | | | | | |
|---|---|---|---|---|---|---|
| | Total Film Activity | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| l_GNI | -0.499** | -0.515*** | -0.519*** | -0.294 | -0.427* | -0.450* |
| | (0.193) | (0.181) | (0.183) | (0.186) | (0.218) | (0.221) |
| Gini | 0.041 | | | | | |
| | (0.144) | | | | | |
| p_young | 0.404** | 0.401** | 0.407** | | 0.442** | 0.439** |
| | (0.164) | (0.160) | (0.162) | | (0.171) | (0.174) |
| q3.5 | 0.441** | 0.440** | 0.362** | 0.336* | 0.433** | 0.352** |
| | (0.162) | (0.159) | (0.148) | (0.170) | (0.160) | (0.151) |
| q4b.2 | | | | | -0.196 | -0.155 |
| | | | | | (0.264) | (0.266) |
| q6.2 | -0.407** | -0.405** | -0.312** | -0.349* | -0.335* | -0.251 |
| | (0.170) | (0.166) | (0.151) | (0.177) | (0.192) | (0.185) |
| n_plat_vi | 0.206 | 0.209 | | | 0.223 | |
| | (0.168) | (0.164) | | | (0.167) | |
| l_Int_us | | | | 0.114 | | |
| | | | | (0.161) | | |
| Observations | 28 | 28 | 28 | 28 | 28 | 28 |
| R2 | 0.611 | 0.610 | 0.582 | 0.484 | 0.619 | 0.588 |
| Bayesian Inf. Crit. | 75.318 | 72.088 | 70.661 | 76.598 | 74.724 | 73.585 |
| Variance Inf. Fact. | 2.572 | 2.562 | 2.394 | 1.937 | 2.627 | 2.429 |
| Note: | | | | *p<0.1; **p<0.05; ***p<0.01 | | |

| | Dependent variable: | | | | | |
|---|---|---|---|---|---|---|
| | Total TV Activity | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Gini | 0.421*** | 0.426*** | 0.419*** | 0.426*** | 0.357** | 0.346** |
| | (0.126) | (0.126) | (0.124) | (0.136) | (0.154) | (0.128) |
| you_unemp | -0.352** | -0.327** | -0.305** | -0.297* | | |
| | (0.144) | (0.143) | (0.141) | (0.160) | | |
| q3.5 | 0.152 | | | | | |
| | (0.132) | | | | | |
| q4b.2 | -0.478** | -0.544*** | -0.530*** | -0.555*** | -0.099 | -0.510** |
| | (0.187) | (0.179) | (0.175) | (0.193) | (0.169) | (0.188) |
| q9.2 | | | -0.195 | -0.333** | -0.154 | -0.227 |
| | | | (0.135) | (0.150) | (0.176) | (0.145) |
| q6.3 | 0.433** | 0.471** | 0.558*** | 0.491** | | 0.691*** |
| | (0.189) | (0.187) | (0.192) | (0.210) | | (0.196) |
| l_Int_us | -0.461*** | -0.502*** | -0.479*** | | -0.330 | -0.562*** |
| | (0.133) | (0.128) | (0.127) | | (0.217) | (0.130) |
| n_TVch | | | | -0.395** | -0.279 | |
| | | | | (0.141) | (0.213) | |
| Observations | 28 | 28 | 28 | 28 | 28 | 28 |
| R2 | 0.696 | 0.678 | 0.706 | 0.643 | 0.489 | 0.643 |
| Bayesian Inf. Crit. | 68.424 | 66.725 | 67.538 | 72.950 | 79.652 | 69.614 |
| Variance Inf. Fact. | 3.29 | 3.103 | 3.396 | 2.799 | 1.956 | 2.799 |
| Note: | | | | *p<0.1; | **p<0.05; | ***p<0.01 |

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# 10. List of Tables and Figures