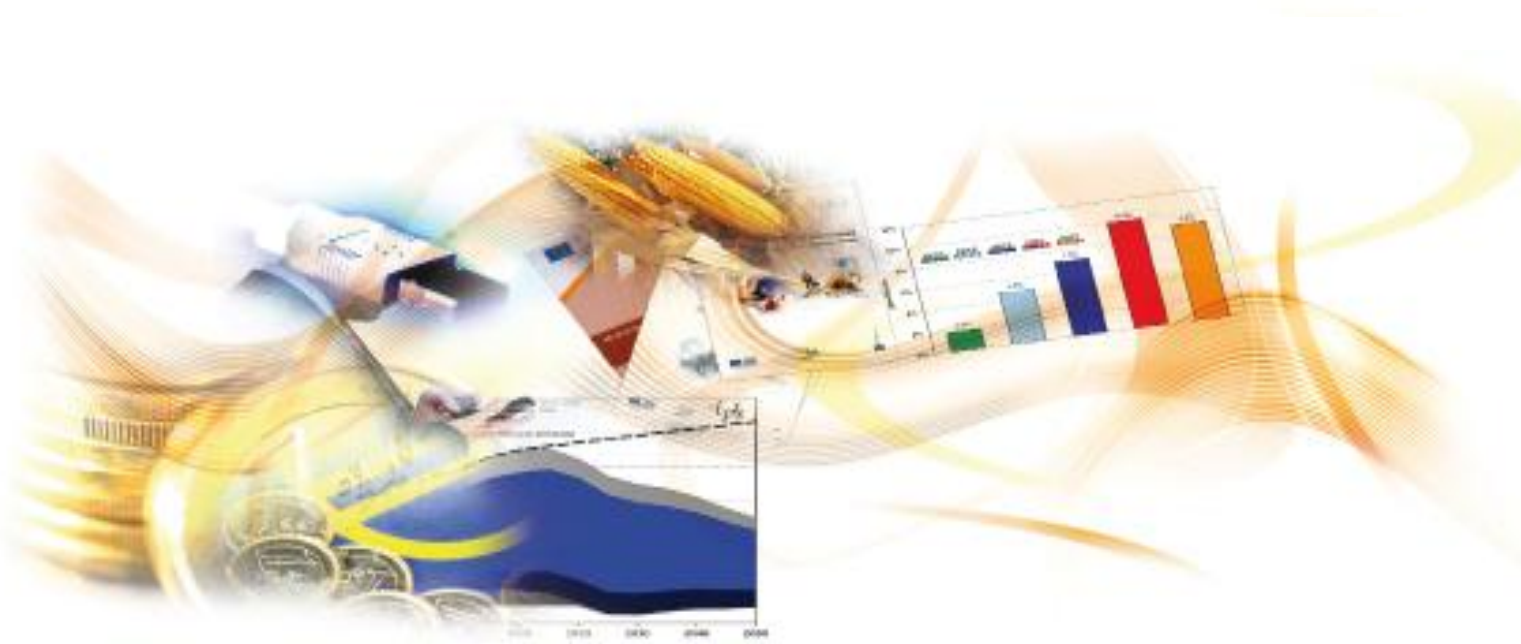# JRC TECHNICAL REPORTS

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Language, Copyright and Geographic Segmentation in the EU Digital Single Market for Music and Film

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Abstract

The EU seeks to create a seamless online Digital Single Market for media products such as digital music and film. The territoriality of the copyright regime is often perceived as an obstacle that induces geographical segmentation. This paper provides empirical evidence on the extent of market segmentation in the EU on the supply and demand side and measures the contribution of several drivers of this market segmentation. We use data from the Apple iTunes country stores in 27 EU Member States to measure geographical market segmentation in supply (availability), demand (sales) and prices across the EU for downloadable digital music and film. We find that availability of EU media products across country stores in the EU is hovering around 80% for music and 40% for films. Recent industry initiatives to reduce the transaction costs of making digital music available across borders have resulted in a reasonably wide availability though still short of the 100% mark. Consumer preference variables such as cultural proximity, a shared language or border and inherent preferences for home market products are the main drivers for the observed geographical market segmentation in demand patterns, both for music and film. Supply side factors including copyright-related trade costs probably still play a role in music though we can only infer this indirectly in the absence of data on copyright licensing arrangements at product level. Commercial strategies and territorial restrictions in distribution agreements reduce film availability, more so than copyright issues. We also find evidence of price differentiation across iTunes EU country stores.

Abstract

The EU seeks to create a seamless online Digital Single Market for media products such as digital music and film. The territoriality of the copyright regime is often perceived as an obstacle that induces geographical segmentation. This paper provides empirical evidence on the extent of market segmentation in the EU on the supply and demand side and measures the contribution of several drivers of this market segmentation. We use data from the Apple iTunes country stores in 27 EU Member States to measure geographical market segmentation in supply (availability), demand (sales) and prices across the EU for downloadable digital music and film. We find that availability of EU media products across country stores in the EU is hovering around 80% for music and 40% for films. Recent industry initiatives to reduce the transaction costs of making digital music available across borders have resulted in a reasonably wide availability though still short of the 100% mark. Consumer preference variables such as cultural proximity, a shared language or border and inherent preferences for home market products are the main drivers for the observed geographical market segmentation in demand patterns, both for music and film. Supply side factors including copyright-related trade costs probably still play a role in music though we can only infer this indirectly in the absence of data on copyright licensing arrangements at product level. Commercial strategies and territorial restrictions in distribution agreements reduce film availability, more so than copyright issues. We also find evidence of price differentiation across iTunes EU country stores

1.   Introduction

The EU Services Directive (2006)[1] seeks to make all services available in all EU Member States without geographical limitations, including online services such as digital media downloads on the internet. Article 20 of the Services Directive explicitly prohibits price differentiation and availability restrictions between Member States – unless there are objective reasons to do so. It is often claimed that the territoriality of copyright is an objective reason. The EU Copyright Directive (2001)[2] has to some extent harmonized copyright law between Member States but it remains essentially national law. In practice, every Member State has its own Copyright Management Societies (CMS). Contrary to sales of physical media products[3], music labels who want to sell an online digital version of a copyrighted media product in another Member State should clear copyright on this product with the copyright management authorities in that country. This creates a new source of trade costs for online digital media sales across borders, compared to selling physical media products across borders.

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[1]   See http://ec.europa.eu/internal_market/services/services-dir/proposal_en.htm
[2]   See http://en.wikipedia.org/wiki/Copyright_Directive
[3]   For physical media products, copyright is exhausted at the point of sale. This is not the case for digital media products where copyright continues to put restrictions on the use of the sold product. For instance, buyers are not allowed to sell it on a second-hand market.

Following a European Commission (2005) recommendation, the music industry has taken initiatives to try to overcome these trade costs[4]. Music labels and Copyright Management Societies (CMS) have bundled large volumes of repertoire together and make them available with pan-European or global copyright licenses that cover many European countries. Major labels have withdrawn copyright management from national CMS for Anglo-American and Latin repertoire and vested it in newly established organisations that perform this function. Smaller music labels have grouped together to clear their online copyrights through another organisation, Merlin. Still, many CMS are not members of these wider groupings and keep issuing national licenses (Dyson, 2013) and a significant part of the music repertoire available in EU Member States may still be subject to copyright-related cross-border transaction costs. Similar initiatives do not exist yet in digital film markets. The film sector relies predominantly on revenue from local distribution agreements through bricks & mortar cinemas and TV networks. Online distribution is not yet as common in film as in music. Film producers sell distribution rights to national distributors, with territorial restrictions build into the contract.

Trade costs linked to the de jure territoriality of the copyright regime are not the only potential driver of geographical fragmentation in online media markets. Other factors such as consumer preferences linked to language[5] and commercial strategies by rights holders will play a role too. Vertical arrangements between rights holders and online distributors may affect geographical availability (Langus et al., 2014). These questions are at the heart of the policy debate in the on-going review of the EU Copyright Directive[6].

The purpose of this study is twofold. First, it provides for the first time empirical evidence on the extent of market fragmentation for digital music and film in the EU on the supply (availability) and demand (sales) side. It shows that borders still constitute an obstacle to pan-European availability of digital music and film, despite recent private sector initiatives to overcome the territorial constraints induced by the copyright regime. Second, it investigates what role the copyright regime plays in this and to what extent other factors, such as differences in consumer preferences (language, culture) and supply side strategies, contribute to it. As such, this study fills a gap in the empirical evidence (Langus et al., 2014) on availability of copyrighted products across the EU Digital Single Market and the effectiveness of previous policy efforts to reduce transaction costs for cross-border copyright clearance. Earlier work on cross-border digital music trade in the EU (Gomez, Martens & Waldfogel, 2014) was based on detailed consumer demand (sales) data but did not include supply side availability. The present paper combines data on the supply and demand with prices. It does not address the potential welfare effects of

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[4] The recent EU Directive 2014/26 on collective management of copyright and multi-territorial licensing takes another step in this direction. It is of course too early to assess the impact of this new Directive.

[5] At the latest count, the EU28 has 24 official languages and at least twice that number of minority regional languages. See http://en.wikipedia.org/wiki/Languages_of_the_European_Union

[6] See http://ec.europa.eu/internal_market/copyright/copyright-infso/index_en.htm#consultation

remaining territorial constraints however. Another study in this working paper series looks into this matter (Aguiar & Waldfogel, 2014a).

Research on the importance of barriers to trade in cultural and media services on the internet goes back at least to Blum & Goldfarb (2006) who find that distance still matters on the internet, despite repeated claims about the death of distance (Cairncross, 2001). Geographical distance diminishes clickstream volumes. Gomez-Herrera et.al (2013) find that cross-border e-commerce in physical goods is significantly affected by language-related trade costs. They document the extent of cross-border trade in digital music and show how language plays an important role in explaining the observed trade patterns. Aguiar & Waldfogel (2014a) find that trade barriers in digital music do indeed have a negative effect both consumer and producer welfare. However, the relative importance of regulatory obstacles (copyright), language (consumer preferences) and commercial barriers (supply side constraints) remains to be disentangled. Consumer welfare is not only determined by the variety of goods available but also by prices[7]. The territoriality of copyright and the digital walls that this creates between country stores enables online retailers to practice price differentiation between consumers in different Member States.

There are many online music and film retailers in the EU, many of them with a national presence only. This research focuses on one of the major online media retailers, Apple iTunes with a digital presence in 27 out of 28 EU Member States. Though a lot of the music available in iTunes can be bought in each of these countries, iTunes maintains digital walls between its online stores in different Member States. A consumer in France cannot buy music from the iTunes store in Germany, for example. As such, the iTunes stores in the EU offer an ideal setting to measure cross-border availability. With a global market share of about 63 per cent[8] in 2013, iTunes is the largest provider of digital media downloads, far ahead of Amazon, the second largest provider with a market share of 22 per cent – though the iTunes market share in the EU may be somewhat lower. It should be representative of the current state of the EU Digital Single Market for media products. The iTunes stores do not contain information on the copyright arrangements that were used to distribute the media products. We can only try to infer indirectly from the observed availability patterns how a combination of copyright arrangements and commercial strategies affect availability.

Our findings revolve around three issues: cross-border availability, sales and pricing of digital music and films. We find that in August 2013 there was still substantial variation in availability in the iTunes

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[7]   See for instance Brynjolfsson, Hu and Smith (2003) "Consumer Surplus in the Digital Economy: Estimating the Value of increased Product Variety at Online Booksellers", Ellison and Ellison (2006) "Search, obfuscation and price elasticities on the internet", Mikians et.al. (2011) "Detecting search and price discrimination on the internet", Bounie, Eang, Sirbu and Waelbrouck (2011) "Online price dispersion an international comparison", Telecom Paris Tech.

[8]   See http://www.adweek.com/news/technology/itunes-losing-market-share-streaming-services-149017

country stores across the EU DSM. Less than half of all song tracks and music albums are available in all EU27 country stores. Overall, music availability in the EU DSM is somewhere between 73 and 82 per cent of what it could be in a fully open DSM where all song tracks and albums would be available in all EU27 countries. Recent initiatives to reduce copyright-related cross-border trade costs seem to be bearing fruit as much music is already available across all Member States[9]. Still, language and home market bias remain major drivers of availability. Considerable variation in availability at label, artist and product level suggests that commercial strategies keep affecting availability. Cross-border demand for digital music is clearly driven by language and, to a lesser extent, by cultural differences. Home bias or preference for local products remains strong. We also find that geographic market segmentation facilitates substantial price differentiation across iTunes country stores in the EU. About 45 per cent of song tracks and 70 per cent of albums are subject to price differentiation in at least one country store. Prices are affected by sales rank and differ by country.

The situation is worse for digital films where overall availability is estimated at 40 per cent. The film market is characterised by a more dominant supply from the US, compared to music, but similar patterns of supply and consumer demand, with strong market segmentation driven by consumer preferences for home products. Copyright licensing in film does not benefit from collective institutional clearing mechanisms. Furthermore, translation costs and promotion campaigns in the bricks & mortar cinema circuit may account for high fixed border costs and less widespread availability than in the case of music.

This paper is structured as follows. Section 2 discusses the data sources. Section 3 explains the methodology. Section 4 takes a supply side approach and explores to what extent labels make music available across iTunes country stores in the EU27. Section 5 takes a demand side perspective and differences in consumer preferences across countries and how this translates into (cross-border) music sales. Section 6 moves from the descriptive statistics to the analytical results, based on the gravity model. Section 7 looks for explanations for the observed pricing patterns in music. Section 8 repeats the supply and demand side analysis for films, including availability, sales and pricing. This turns out to be quite a different market. Section 9 presents some conclusions on the interaction between the territoriality of the copyright regime, consumer preferences and supply-side commercial strategies.

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[9] In October 2009, the participants in the Commission's Online Roundtable Conference released a joint statement in which they agreed to explore in the short term "the development of efficient licensing platforms" including multi-territorial licenses for online performing and mechanical rights and deliver pan-European/multi-repertoire licenses to commercial users.

2.   The music data

iTunes is the market leader in the EU for legal digital media downloads, especially for music. It has online country stores in 27 EU Member States, all separated by digital walls that prevent users located in one country from downloading a media product from another iTunes country store[10]. iTunes publishes a daily updated list of top-300 products for songs, albums[11] and films in every country store[12]. We combined the Top-300 lists for each of these three products on a given day in August 2013 in the 27 iTunes EU country stores into a long pan-EU list and checked prices and availability of this long list of products in each EU country store. A product is assumed to be available in a country store when a search query for it in that store, either by iTunes ID number or by title of the product, returns information on title, artist and price. Many songs and albums are sold in different versions. For instance, an album can come in a standard or in a deluxe version; songs can come in radio, "featuring", mix and extended play versions. We can treat these versions as different or as identical products. We compare the two definitions in Table 1A. When different versions are counted as different products, the number of songs in our sample reaches 5,993 and the number of albums 4,822. If different versions are treated as identical products then the numbers are reduced to 2,938 songs and 3,986 albums. The geographical availability distribution is somewhat flatter in the latter case.

We collected data on titles, artists, labels, ranking in the Top-300 and prices for each song track and music album. We added two meta-tags to the iTunes data. We identify all music artists by their country of origin and the language of their songs. Country of origin of the artist is defined as country of birth. Other possible criteria include the country of residence of the artist or his main market. As discussed in Gomez-Herrera et al. (2014) none of these three definitions is waterproof and are subject to potential biases. The country of birth criterion has been used in previous studies (Legrand, 2012). Artists can sing in more than one language. In that case we identify the language for each song or album. Data for these tags where obtained from various internet sources such as Wikipedia and artists' home pages.

Obviously, the combined top-300 list across 27 countries is just a very small sample of the total number of songs and albums in the iTunes stores. In September 2014, iTunes claimed to have over 43 million music tracks in its worldwide catalogue. Still, as a result of power laws in online distribution the top-300 should represent a large share of total sales. We do not have data on the share of the top-300 in iTunes sales. However, we have comparable data from Nielsen Music for a wider sample of

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[10] This policy changed in late 2014; iTunes now publishes only the Top-200.   iTunes does not provide streaming services for music and film. For film, we only cover 26 Member States, not Romania where very few films are available.

[11] The list of albums actually contained quite a few singles. We reclassified these as singles.

[12] Regarding the frequency of iTunes charts updates, see for instance
http://www.gareth53.co.uk/blog/2009/10/how-itunes-charts-work.html

digital music download websites, including iTunes (Gomez-Herrera et al., 2014). According to these data, the top-300 songs represented between 30 and 40 per cent of *annual* digital music sales in a sample of 14 European countries in 2011. Annual top-300 shares will be considerably smaller than daily or weekly shares, because of the high turnover in the charts during the year. We can therefore safely assume that daily top-300's represent substantially more than half of all sales.

Independently of the representativeness of the sample, this is clearly a biased sampling method that favours more popular music that appears in the Top-300 in at least one country store. The long tail of the sales distribution is under-represented in this sample. This might affect our findings. To verify possible bias in the sampling we calculate the correlation between chart ranking and availability. We find a positive but weak correlation for music (+0.03) and film (+0.07) and conclude that the impact of sample bias on availability is sufficiently weak for the purpose of this research. The sample may however not be representative for availability in the long tail. We are unable to verify this with this small sample.

The catalogue of available products varies across EU iTunes stores. The label decides in which countries his product is made available and iTunes' digital walls enforce this geographical segmentation. The default option in iTunes is worldwide availability. Small labels who "manually" introduce their products in iTunes – possibly via aggregators - have to explicitly change that option if they want to restrict geographical availability to specific countries according to the iTunes guide for music sellers[13]. Large labels have their own agreements with iTunes that automate the introduction of products in the catalogue. Transaction costs to upload music on the iTunes website are low, with fixed annual fees of US$ 10 for a song track and US$ 30 for an album[14], independently of the number of countries where it is made available. The marginal cost per country is zero. Consequently, internal iTunes costs will not affect geographic availability.

Apart from geographical availability, the pricing decision is, in principle, also taken by the label. According to the iTunes guide for music sellers, labels can freely choose where to make their music available as well as the price tier for that music, from the available price tiers pre-defined by iTunes. For song tracks, iTunes pre-defines three price tiers from which music sellers can choose (0.69, 0.99 and 1.29 €) with 1.29 € being the default and most frequently used price. Albums normally have a minimum price determined by the number of songs on the album. For music albums we have detected 108 price tiers in the data. However, TuneCore,[15] an iTunes aggregator that helps smaller labels to get their music on the iTunes website, points out that iTunes reserves the right to modify the pricing.

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[13] See https://itunesconnect.apple.com/docs/UsingiTunesProducerMusic.pdf pages 26 and 34.
[14] See http://www.tunecore.com/index/pricing
[15] See http://help.tunecore.com/app/answers/detail/a_id/37

Apple's 2009 stated intention to phase out price differentiation across EU country stores also suggests that it has leverage over pricing decisions. Large labels may have sufficient market power to negotiate prices with iTunes, especially for successful music. Labels sign a contract with iTunes that specifies the applicable pricing brackets and policies. Price differences across iTunes country stores may therefore be a combination of commercial choices both by the music seller and by Apple iTunes, enabled by the digital walls between iTunes country stores that prevent price arbitrage.

Only three EU iTunes country stores have price quotes in currencies other than the Euro: the UK (Pound sterling), Denmark (Danish kronor) and Sweden (Swedish kronor). Absolute prices will always differ at least a bit between Euro-denominated and other iTunes country stores because of exchange rates and rounding-off of price tiers to a convenient figure. For the purpose of price differentiation calculations we allow a margin of 10 per cent between prices in Euro and in other currencies (converted into Euro) before we classify a non-Euro price observation as different from a Euro price, to account for exchange rate fluctuations and differences due to rounding-off of prices.

3. A supply side perspective: Cross-border availability of digital music

It is useful to split total demand for media products in two components that may have different drivers: the number of products available / supplied across borders (the extensive margin of trade) and, conditional on availability, consumer demand for these products (the intensive margin of trade). The first represents the supply side: music labels decide whether or not to make their products available in a particular country. The second represents the demand side: consumers decide how much to buy of the available products. Of course, supply and demand cannot be neatly separated. They interact, for instance when suppliers launch promotion campaigns that affect demand. Similarly, the role played by copyright-related trade costs cannot be directly observed and separated in the absence of data on licensing arrangements at product level. We will examine some indirect evidence to assess the role of copyright in the observed trade patterns.

We construct supply (availability) and demand (consumer preferences and sales) matrices for albums and songs, by Country of Origin (CoO) of the artist (for music), and by Country of Destination (CoD) (See Tables 2, 3 and 4 in Annex). The diagonal cells in these matrices represent domestic availability and sales; off-diagonal cells represent cross-border availability and sales. Diagonal figures normally dominate but some off-diagonal figures are pretty high too, often for country pairs that share a language. Together, these descriptive statistics already offer interesting insights into geographical availability, consumer preferences and sales patterns for music in the EU27 iTunes country stores.

If the territorial fragmentation of the EU copyright regime is an obstacle to making music available then music produced in one country would tend to be less available in the iTunes stores in other countries. Alternatively, commercial strategies may affect availability. We define an availability indicator as the ratio of actual over potential availability of products from a country of origin (CoO) in a country of destination (CoD). If the EU Digital Single Market were a perfectly open market, all digital media products would be available in all 27 countries and the ratio would peak at 100 per cent.

Table 1 presents the cumulative distribution of available songs and albums in the EU27. The overall availability index is around 73 per cent for songs and 76 per cent for albums if we count only identical products as different products. The distribution becomes somewhat flatter if we count different versions of the same product as a single product and availability increases somewhat to 79 and 82 per cent respectively. The availability distribution for music is clearly U-shaped. About 43 per cent of all songs and 47 per cent of all albums are available in all EU27. From there onwards availability quickly drops. However, at the other end of the distribution there is an upsurge again, with about 13 per cent of all song tracks and 15 per cent of albums being available ≤ 3 countries. We find that availability is positively but weakly correlated with popularity (sales rank) in these countries, with a correlation coefficient of 0.03 for music. First, this very low correlation coefficient suggests that our biased sampling method (that restricts data collection to music in the Top-300) has little impact on the availability metrics. However, there are a number of caveats to be taken into account. We do not know if availability would be lower if the long tail in the iTunes sales distribution would be taken into account. The iTunes website provides no indications of sales rank beyond the Top-300. Moreover, the Top-300 may well over-represent the major music labels and under-represent indies. We have no means to check this.

If the marginal costs for making a copyrighted product available in additional countries would be positive, availability should be limited by the expected market size for a product. At some threshold level of marginal costs music labels would refrain from making their music available in infra-marginal countries[16]. However, the weak correlation between sales ranking and availability does not support this hypothesis. On the contrary, it lends support to the view that industry initiatives to develop a pan-territorial licensing system in the EU do indeed seem to reduce copyright-related cross-border transaction costs. Once a pan-territorial license is obtained, the marginal copyright cost of making music available in an additional country (covered by the license) is zero.

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[16] We have very little empirical evidence on the cost of clearing and making available of copyrighted material across countries and reaching agreements with copyright management societies. KEA (2012) estimates these costs at up to 280.000 € for a repertoire of a million songs.

On the other hand, availability remains below the 100 per cent mark for about half of all music products. Why would a label make its music available in, say, 20 countries but not in 27? One reason can be that these pan-territorial copyright arrangements do not necessarily cover all 27 Member States. See Dyson (2013) for a detailed overview of country coverage of various initiatives. Beyond these geographical limitations on pan-European licensing arrangements, commercial strategies by the labels may also play a role. One would assume that once a music label uses a particular licensing channel to manage its copyrights, or at least once an artist decides to go for one particular channel, it would be applied to all albums produced by that label or artist. We find however considerable variation in availability within labels and even for artists who have several albums with the same label. Artists who have two or more albums with the same label are, on average, available in 22.8 countries with a standard deviation of 3.3 countries. This standard deviation is an indication that commercial strategies drive variations in availability. Of course, all this constitutes only indirect indications of the (absence of) impact of copyright-related cross-border trade costs. We have no direct evidence, for which we would need information on the type of copyright license and licensing arrangements per song and album title. That information is not included in the iTunes data.

Tables 2.1 and 3.1 present the bilateral availability matrices with the number of music products by country of origin (CoO) and their availability in countries of destination (CoD). Reading the tables vertically, i.e. the number of products from a CoO available in the CoDs, we can deduct availability patterns across the EU. A few small MS with a relatively small number of songs and albums in iTunes have high availability ratios throughout the EU. German or French music is less widely spread than music from smaller MS while Finish, Hungarian and Greek music seems to be less available almost everywhere. One would expect the highest availability in the home country market. This is mostly but not always true. For example, there are 89 songs from Germany available in Germany, but 93 in Austria, a German language country. A distinction has to be made between the number of songs or albums available from a CoO in a CoD and the total number of distinct products available from a CoO. Different (versions of) songs and albums may be available in different markets. For example, there are 401 songs from the UK in our data sample but only 292 of these are actually available in the UK (See Table 2.1). The countries with the highest number of UK songs in the iTunes store are Slovenia and Hungary (340). Different versions of songs might explain part of the discrepancies between these figures.

Language may play a role in music availability. This is obvious for English language music from the UK and the US that is widely available. This would lead us to expect that English-language songs from other countries would also easily spread. However, there is no evidence for that. Correlation between the share of English-language music in total music supply from a country of origin and geographical availability of the country's music is actually negative (-0.36 for songs and -0.29 for albums). It looks

as if only English-language music from native language artists in the UK, the US and Ireland is widely available. This hypothesis was also confirmed by Gomez et.al (2014).

Reading the tables horizontally, i.e. where does the music available in a country come from, we find that the total number of songs and albums available is rather stable across countries – around 2300 songs and 3000 albums per country store. Songs of domestic origin represent only a very small share (1-4%) of the available supply of music, except in the UK where domestic songs account for 14% of the available supply. While the UK is a dominant supplier of music in the EU, it has relatively little (non-English) music from other EU CoO in its iTunes store. Close to 60% of that supply comes from other EU countries, of which about 40% non-English language supply. The dominant sources of song supply are the US with about 26%, followed by 12% from the UK. The remainder comes from the rest of the world, most of which will be English language music too. As a result, English language songs account for about two thirds of all music available. The situation is very similar for albums.

Germany, France and Sweden come in a second group with a 4-5% share of available music supply. About 67% of Swedish music is actually in English – closely followed by English-language songs from Denmark, France and Germany. Apart from the dominance and wider spread of English language music, there is no obvious pattern to be detected in availability. Relatively small countries with a small number of products in the iTunes store still manage to make it widely available across the EU while CoO with a larger supply do not score better. The largest supply is usually available in the home market but availability in other countries does not seem to follow obvious language, distance or market size related patterns. This is confirmed by the gravity analysis (See Section 6).

4.   A consumer side perspective: Cross-border sales of digital music

We now move from the supply side perspective (availability) to the consumer perspective: consumer preferences for music from particular origins and total demand or sales. Music can be widely available but does it also sell widely? We do not directly observe the volume of sales in iTunes stores. However, we have data on sales rank for music that makes it into the Top-300 in any of the countries covered. The inverse of sales rank (the 300th product in the ranking gets value 1; the top product value 300) is a good proxy for sales and we use the logarithm of this pseudo-sales estimate as an indicator of sales of a song from a CoO in a CoD. For example, to the top song in the Top-300 we attribute a pseudo-sales estimate of log(300) = 2.477; the bottom ranked song receives a value of log(1) = 0[17]. This is reflected in Tables 2.2 and 3.2 for songs and albums. The value in a cell in these tables is the <u>average</u> of the

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[17] Note that we have less than 7000 observations, out of a total of around 100.000 song and album level observations, with log of sales rank >0. Only products that make it into the top-300 have a sales ranks >0.

logarithmic pseudo-sales estimate for all songs from a CoO available in a CoD. This value is a logarithmic proxy indicator of consumer preference for songs from the CoO in the CoD. The cells in Tables 2.3 and 3.3 represent the sum of the log of sales ranks for all songs from a CoO available in a CoD. We consider this to be a good proxy indicator for total demand or sales.

Reading Tables 2.2 (songs) and 3.2 (albums) vertically, they show that the strongest consumer preferences for CoO music is clearly in the CoO itself. For all CoO except Cyprus, the diagonal cell values (where CoO=CoD) exceed those in any other CoD. Demand for music from Cyprus is stronger in Greece than in Cyprus. In some cases there are strong contenders for a second position. For example, German music is in strong demand in Austria and Luxemburg; however, that favour is not returned by Germany. Czech music enjoys strong demand in Slovakia, and vice versa. Obviously, these are cases of shared language between the CoO and the CoD. There is strong demand for UK music throughout the EU, almost as strong as in the UK itself. Some other countries also seem to enjoy a fairly well-spread demand for their music throughout the EU, although considerable less than at home: Germany, France, the Netherlands, Sweden and to a lesser extent Italy. Reading Tables 2.2 and 3.2 horizontally, they give an indication of consumer preferences for music from particular countries.   While availability of domestic music hovered around 1-4% of the total number of songs in a country store, consumer preferences for domestic music are strong and consumer demand for domestic music represents 17-18% of total demand.   This shows that, on average, domestic music ranks considerably higher on the iTunes music charts than foreign music. Conversely, foreign music ranks lower, on average, and this is reflected in the lower share of other EU music in total demand, compared to its share in availability. The US share in availability and demand is fairly constant.

A Table 2.4-3.4 we present the findings from Tables 2.2-2.3 and 3.2-3.2 in a different categorization across language zones.   We distinguish between domestic music, non-English EU music, English language music from the UK, Ireland and the US, and music from the rest of the world (RoW).   On average across all EU27 Member States, English language music dominates availability (47%), closely followed however but other non-English EU music (38%). Domestic music is only a small fraction of all available music (3%) except in the UK. However, EU consumers have an outspoken preference for domestic music (13.9) - compared to their average preference for EU music - followed at a distance by preference for English language music (2.4). Preferences for non-English EU music are considerably below average and even below preferences for music from the RoW. Consumer preferences make it very hard to export non-English EU music. They constitute a much stronger (non-regulatory) barrier than copyright. Strong preferences for domestic music boost sales more than proportional to availability and somewhat reduce sales of English language music compared to availability.   The same is true for albums.

5.   A more analytical methodology

We now move from the descriptive statistics in the previous two sections to a more analytical approach. We apply a standard gravity trade model to the supply (availability) and demand (sales) matrices to generate some more insights. This model has become a workhorse for empirical cross-border trade analysis, as Baldwin and Taglioni (2006) point out. It was first introduced by Tinbergen (1962) and it suggest that trade between two countries is proportional to their economic mass and inversely proportional to trade costs between them, usually proxied by physical distance. It could be argued that in digital online markets the role of distance is sharply diminished. Digital music is transported through the internet where transport costs are essentially zero. Bloom and Goldfarb (2006), Lendle et al. (2012) and Gomez-Herrera et al. (2013) show however that gravity holds in an online environment. In that case, distance can be interpreted as a measure of cultural difference between countries.

The classic explanatory variables in the gravity model include language preference, home bias as preference for home market products and physical distance as preference for cultural proximity. In all versions of the model we use country of origin and destination fixed effects. As such, the gravity model controls mostly for the role that consumer preferences play in availability and sales, leaving supply-side factors, including the cost of clearing copyright, as an unexplained residual. As will be shown below, that residual is relatively small.

First, we use gravity to examine differences in supply side availability of products across iTunes country stores in the EU. We use OLS for country level regressions and Probit at the product level. The country level gravity equation looks as follows:

$$lAvail_{ij} = \beta_0 + \beta_1 ldist_{ij} + \beta_2 comlang_{ij} + \beta_3 \hom e_{ij} + \beta_4 eng_{ij} + \eta_i + \eta_j + \varepsilon_{ij} \qquad (1)$$

where

$lAvail_{ij}$ = log of share of products from country i available in country j

$ldist_{ij}$ = log of the geographical distance between countries i and j

$Comlang_{ij}$ = dummy variable with value=1 if countries i and j share a common language

$Home_{ij}$ = dummy variable with value=1 if country and origin are the same

Eng_{ij} = dummy variable with value=1 if the language of the country of origin is English

η_i, η_j = country fixed effects dummies

The use of a Probit regression at product level has the advantage that we can add product level characteristics as explanatory variables, such as language at song level. For music, the language of origin is not necessarily identical to the official language of the country of origin. The artist may sing in

another language, for instance in English. In some versions of the regression we use an explicit dummy variable for songs in English and drop the language fixed effects. The Probit equation looks as follows:

$$y_{ij} = \beta_0 + \beta_1 ldist_{ij} + \beta_2 comlang_{ij} + \beta_3 \hom e_{ij} + \beta_4 eng_{ij} + \eta_i + \eta_j + \varepsilon_{ij} \qquad (2)$$

Where y_{ij} is a dummy variable that takes the value 1 when a media product from country i is available in country j

In a second approach we use consumer preferences for products from CoO i in CoD j as the dependent variable. Since our dataset does not contain the quantity of products sold, we have used the logarithm of the inverse of the rank of a song or album in the iTunes charts as a proxy for sales. Again, we estimate the equation at the country and product level, in both cases using OLS. The country level specification is as follows:

$$avg\_lrank_{ij} = \beta_0 + \beta_1 ldist_{ij} + \beta_2 comlang_{ij} + \beta_3 \hom e_{ij} + \beta_4 eng_{ij} + \eta_i + \eta_j + \varepsilon_{ij} \qquad (3)$$

where the dependent variable is the average logrank of products from country i sold in country j. At the product level, the specification is the same but we use the logarithm of the inverted sales rank for each song and album as the dependent variable.

Finally, our third focus is on prices. We analyse the impact that the popularity (sales rank) of a song or album has on its price using two different equations. The first is estimated using OLS:

$$lprice_{ij} = \beta_0 + \beta_1 ldist_{ij} + \beta_2 comlang_{ij} + \beta_3 \hom e_{ij} + \beta_4 lrank_{ij} + \eta_i + \eta_j + \varepsilon_{ij} \qquad (4)$$

Where $lprice_{ij}$ is the logarithm of the absolute price (converted into Euro where applicable) and $lrank_{ij}$ is the logarithm of the inverted rank for each product.

The second price equation is specified as a Probit where the dependent variable is a dummy that takes the value 1 if the observed price is different from the mode price (the most frequently cited price across EU27 iTunes stores). Since some countries use a different currency, we allow for a 10% margin before we consider a price as different from the mode price. The explanatory variables included are the same as in equation (4). We discuss the results of these three approaches in the following sections.

6. *Gravity model analysis of supply and demand*

We estimate the gravity model separately for songs and albums availability and consumer demand. We present estimations at country and at product level (See Tables 5.1 and 5.2). For availability at

country level, the dependent variable is defined as the logarithm of the share of products produced in country of origin i that are available in country of destination j. At product level, the dependent variable is a dummy that takes the value 1 if a product from i is available in j. For consumer demand at product level, the dependent variable is the logrank of a product from country i sold in country j (average of all logranks for country level regressions)[18]. We use two versions of the gravity model, with common language and with contiguity, for comparison purposes only. Table 5.3 puts the same country level results for availability and consumer demand side by side, to facilitate comparison.

Table 5.3 reveals a relative stable pattern for songs and albums. All coefficients have the expected sign and they are all significant, except for distance in availability of songs. Geographical distance comes with a negative coefficient; common language and home bias have positive coefficients. The very small but negative distance coefficient implies that album availability declines a bit with increasing distance between countries. This is a standard finding in traditional trade models where goods have to be physically transported and transport costs increase with distance. This may be somewhat surprising in online music where availability is not associated with physical transport. Labels can make music available in other countries at essentially zero transport costs; it is just a click on the iTunes website. Blum & Goldfarb (2006) interpret geographical distance as a proxy for cultural difference. This could be applicable here as well: labels seem to be willing to make more effort to make their products available in culturally "nearby" countries.

More importantly, the distance, language and home bias effects are an order of magnitude stronger in consumer demand than in supply side availability. Concretely, this means that foreign songs and albums are only 15 per cent less likely to be available in a country than home produced music. However, consumers are 24 times (exp 3.19) more likely to buy home-made songs and 8 times (exp 2.13) more likely to buy home-made albums than imported music. This indicates that differences in consumer preferences across the EU are the main driver of market segmentation. Music labels may increase their efforts to make music more widely available but it is not going to have a major impact on sales since consumers have a clear preference for domestic music. The OLS version of the gravity model at country level explains more than 80 per cent (the R-squared) of the observed variation in availability and consumer demand. That leaves relatively little margin for other explanatory variables – should we have any – to improve the fit to the data. In other words, the three consumer-demand related variables already explain the bulk of the observed variation in the data.

The explanatory power of the model declines when we move to the product level regressions in Tables 5.1 and 5.2. The R-squared drops to around 40 per cent. This is normal in dataset with a large number

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[18] This is equal to the cell totals in Tables 2.2 and 3.2 divided by the number of products, or the cell totals in Tables 2.1 and 3.1.

of observations at product level. Individual product characteristics will become a more important driver. Home bias coefficients at product level are not directly comparable for availability and consumer demand because the first is estimated with a Probit and the second with OLS though it remains positive and significant in both. Common language becomes insignificant in the product level availability regressions but regains its prominence and statistical significance in the demand regressions. We add the dummy "English language" in the product level regressions. The sign of the coefficient is ambiguous: singing in the English language slightly diminishes availability for songs but increases it for albums. It is stable and positive for consumer demand however. The sudden switch in sign for songs may be related to the fact that availability of English language music (from US and UK mainly) is indeed very variable. For example, the availability of 622 distinct UK-origin songs in the sample is only 82 per cent. Belgium has more UK songs than the UK.

7. *Price differentiation in digital music*

Price differentiation in the Apple iTunes store has been investigated before. In April 2007, following a complaint by UK consumer organisation Which? that iTunes products were more expensive in the UK that in other EU iTunes stores, the European Commission sent a Statement of Objections to major record companies and Apple iTunes. The statement referred to alleged agreements between them that might violate the EU Treaty's rules prohibiting restrictive business practices (Article 81) and restrict consumer choice to buying music from the iTunes store in their country of residence. In January 2008, the Commission welcomed Apple's stated intentions to equalize prices between the UK and the rest of the European market over a period of six months. The Commission also acknowledged that it found no evidence that agreements between Apple and major record companies led to geographic fragmentation in availability among iTunes stores in the EU. Rather, the fragmentation of the copyright management regime in the EU was responsible for this. As a result, the case was dropped.

In this section we explore the extent of price differentiation for identical products across the iTunes country stores. Price differentiation is made possible by the strict digital separation between national stores. Consumers from country A cannot download media products from the iTunes store in country B. Geographical price differences are the result of commercial strategies by the labels and/or Apple iTunes. The question is: what drives these strategies? We first examine some descriptive statistics on the extent of price differentiation. Then we test two explanatory models: the cultural distance model used in the previous sections and country specific factors.

Table 7.a presents an overview of price differentiation in the iTunes country stores. It shows the number of products (tracks, albums and films) available and the number of stores where the price diverges from the most frequently quoted price (the mode price). For example, 1547 song tracks or 53 per cent of the

total number of songs in our data sample are not subject to any price differentiation: they have equal prices across all 27 country stores. Similarly, there are 192 tracks for which the price diverges in only 1 country from the most frequently quoted price, 120 tracks for which it diverges in 2 countries, etc. The situation is worse for albums where only 19 per cent is available without price differentiation across country stores. This deviation can be positive or negative. Table 7.b reveals the structure of pricing patterns across the EU27 for songs and albums. For example in Austria 26.57% of all songs have a higher price than the mode price and 2.16% have a lower price[19]. Countries with higher prices on average for songs are Finland, Ireland and Germany, followed by Austria, France and Belgium. Negative variation is more frequent in Eastern European countries. For albums country patterns for positive variations are similar; negative variations are generally lower. Again, more recent EU Member States tend to have lower prices than the rest. Figures 8a and 8b present the same data for songs and albums in a more intuitive graphic format. They show that price dispersion exists but remains relatively subdued.

We first test a comprehensive price regression at the product level that includes the cultural distance variables that we used in the previous sections, including language, geographical distance, home market effects and sales rank. The latter could be considered a proxy for price elasticity. We also add country fixed effects to the equation. Table 5.4 shows the results for the OLS and Probit versions of the price regressions. In the first case, the dependent variable is the logarithm of the absolute price level (converted into Euro); in the second case it is the probability that the price in a country store diverges from the mode price. The results have the expected signs and are statistically significant in most cases. More importantly, the coefficients are very low. In fact, a number of coefficients are zero (statistically insignificant). The positive rank coefficient in OLS suggests that prices go up with popularity, an indication of profit maximizing pricing behaviour by the labels. The fairly high positive coefficients on common language in the Probit equation suggest that there is considerable price differentiation between (neighbouring) countries that share a language and are thus more likely to trade music with each other. Beyond these few observations, the low value of the coefficients shows that the explanatory variables in this model do not really give us a lot of insight in the observed pricing patterns.

Finally, we turn to country patterns in pricing. We take the coefficients from the destination country fixed effects in the OLS price level regression and plug them as a dependent variable in a regression with national price levels and GDP per capita as explanatory variables. Germany, the largest EU market, is taken as the reference country Table 6 shows that the coefficient for the log of price level is positive and significant; GDP per capita is not significant. In other words, the overall price level in the country of

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[19] For the three countries with currencies different from the Euro (Denmark, United Kingdom and Sweden) we allow for a 10% exchange rate instability margin after conversion into Euro before we classify a price as different from the mode price.

destination seems to be an important driver of the price of digital music in an iTunes country story. In a digital online service where marginal delivery costs to any destination are essentially close to zero, this type of pricing strategy points again – as expected - towards profit-maximizing behaviour by the labels, piggy-backing on the digital walls induced by the copyright management system. We conclude from this that country level prices play a more important role in price setting than cultural distance variables. This might be a welfare-enhancing pricing strategy. However, further research would be required to validate this.

8. *Film*

In this section we repeat the analysis for the digital film data. In a first round (August 2013), film data were collected in the same way as music data, by scanning the Top-300 of films in every EU iTunes store and combining this into a long list of 1,986 films. We added the country of production and considered different language versions of the same film as the same product, using the IMDB film database. 419 out of 1,986 films where co-produced by two or more countries; 745 were EU (co-) produced films. However, contrary to music, films can come in different language versions in different iTunes stores. It is often not easy to find a language version of a film in iTunes, especially when the translated title bears no resemblance to the original and because of differences in spelling of translations between iTunes and IMDB. However, a limited test sample suggested that, despite our best efforts, we missed out on many language versions available in country stores. We tried a new approach in a second data collection round in February 2015: we collected all films (in all languages) produced by all the directors in the original August 2013 sample of 1,986 films. We searched for availability of all titles associated with these directors in the iTunes EU country stores, irrespective of whether they appear in the top charts or not. This generated a sample of 6,548 original films. On average, they were available in 1.1 language versions per country store – in other words most films are available in only one language in each store.

Overall film availability in the EU iTunes stores is very similar in both samples: 41.5% in the first sample of 1,986 films and 39.8% in the second sample of 6,548 films (see Table 1A)[20] - but substantially lower than for music. Availability of EU-produced films is ever lower at 28.2%. About 30% of all films are available in 1 or 2 countries only; at the other end of the geographical distribution, around 10% of all films are available in almost all countries. Figure 4 shows that the U-shaped geographical distribution curve is somewhat smoother for the second sample than for the first.

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[20] One the one hand, more exhaustive counting of language versions should increase the availability index. On the other hand, the second sample goes deeper into the long tail where availability may be lower than in the top charts. The net effect of these two opposing forces may explain why the second larger sample has a slightly lower availability rate, despite an increase in the language versions count.

We observe that 89% of all films are available in one language only, in most cases either in English or in the official language of the country. Only 11% is made available in at least 2 and up to 4 language versions in a given country (see Figure 2). Belgium and Luxemburg score best on language variety and are the only countries where at least some films are available in 4 languages. Austria, Germany and France also have a relatively high number of films available in at least 2 languages.

The digital film availability score from these iTunes samples are considerable higher than availability in the only other study on this subject that we know of, carried out by the European Audio-Visual Observatory (2014, pp 208-225). That study covers a sample of only 50 films in 7 EU Member States and examines their availability across 6 online providers in each Member State. Average availability in that study reaches 19%. However, availability of the 50 films in the iTunes stores in these 7 countries reaches 38% on average, better than almost all national providers and very similar to our estimates.

We checked if "windowing" of film releases affects availability. Availability of the first sample of films collected in August 2013 was verified again in October 2014, 14 months later. Overall availability increased by about 1%. This shows that the windowing effect exists online but remains very weak.

Lower availability of films compared to music points to higher cross-border trade costs for films. This can be due to several factors. First, contrary to music, making films available across language borders requires translation. Translation costs are fixed costs that can vary between as little as a 1000 € for subtitling a short feature film to hundreds of thousands of Euro for dubbed films with professional actors. Second, vertical agreements between film producers and local distributors may contain a variety of clauses that restrict domestic digital availability, let alone cross-border availability. Film release requires investments in promotion campaigns by the local distributor. The distributor will only make this investment if he has a reasonable expectation of making a profit. He will not want competing distribution channels (DVD, online) to benefit from the spill-over effects of his costly cinema promotion campaign, unless he has a stake in these channels as well. He may also want to avoid spill-overs outside his domestic market, including through online channels. Third, copyright clearance costs may play a role. Copyright clearance for film is more complex than for music because there are more domains involved in the clearance process: source material and screenplay, music, images and sound recording, set design, the film itself, broadcast, distribution and cable use rights. Unlike in the music industry, there are as yet no international institutional arrangements between film producers and distributors that facilitate copyright clearance at the pan-European level. On the other hand, in most EU countries there is a presumption of transfer of rights to the producer.

Though both the first and second film sample have very similar distribution characteristics, we use the data from the first sample for the remainder of the analysis. The second sample includes very few films with a rank in the iTunes sales charts. That deprives us of a proxy measure for sales volume and

consumer preferences and prevents us from carrying out the gravity analysis. As with music, we checked for possible bias in our first sample that was obtained from the top charts. Correlation between ranking in the Top-300 and geographical availability is only +0.07. This supports the view that our findings regarding the geographical spread of films are only weakly affected by sampling bias but it offers no guarantee that availability deeper into the long tail would not be affected by sampling bias. Cross-border availability figures in this data sample could be considered as an upper bound on availability. Figures may decline if we would dig deeper in the long tail.

Table 4.1 presents availability by country of origin of the film and country of destination[21] in the EU26[22]. The majority of films are produced (or co-produced) by the US (66%), a much higher proportion than for music (25% US music albums). At the same time, availability of US films (49%) is higher than the average. US film producers seem to have an easier time to overcome cross-border trade cost. Since both US and EU FILMs face the same copyright regime in the EU market, the difference in availability must be due to market factors.

The UK and France are the two largest EU producers with 7-8% of the available film supply. France is an exceptional market with by far the lowest penetration rate of US and English language films in general (63%) and a very high percentage of domestic film production (18%). There are no national quotas on digital film distribution in France but spill-over effects from cinema and TV distribution (where quotas exist) may explain this exceptional situation[23]. Germany, Italy, Denmark, Sweden and the Netherlands follow at a distance. The diagonal line in Table 4.1 shows that films are mostly available in their country of production. We find that co-produced films are not available in 51% of the co-producing countries[24]. Table 4.2 presents consumer preferences for films from each country of origin (CoO) in each country of destination (CoD). Cells in this table are calculated as the average of the log of sales rank of all films from a CoO available in a CoD. Diagonal values represent preferences for domestic films; off-diagonal elements are preferences for imported films[25]. As with music, we consider this to be a good proxy variable for consumer preferences. Table 4.3 shows a proxy variable for total

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[21] We could have used the second sample for the country of origin and destination analysis but prefer not to do so since we cannot use second sample data for the subsequent gravity analysis on country of origin & destination data.

[22] We leave out the iTunes Romania country store because there were only 3 films available at the time of data collection. Our sampling method could find films from only 18 EU countries in the 26 iTunes stores; there are no films produced in the remaining 9 EU countries in our sample.

[23] As foreseen in the EU Broadcasting and "TV without Frontiers" Directives. France has a quota of 40% for domestic films on TV, the highest of all EU Member States.

[24] Out of 415 co-produced films in our first sample, 327 have at least one co-producing partner in the EU, resulting in a total of 499 EU co-producing partners for co-produced films. However, these films are available in only 256 co-producing country stores. That implies an availability score of 51% for co-produced films in the iTunes country stores in the co-producing partner countries. There are 644 observations (films x countries) of co-produced films that are not available in the iTunes country stores in all the co-producing countries.

[25] Note that Tables 4.1, 4.2 and 4.3 are not square, so that the diagonal line is sometimes interrupted. This is due to the fact that in our limited sample not all EU26 are producers of films.

film sales, based on the sum of the log ranks of all available films. Table 1B combines availability, consumer preferences and sales estimates in a single table, classified by language group (domestic, English and non-English, RoW). The same observations as we made for music apply to film, though the effect is amplified. Domestic films represent a very small percentage of the total supply. English-language film supply is very dominant at over 80%. Consumers prefer domestic over English language films but the difference is not as strong as for music. Clearly, the quality appreciation of domestic films is relatively low compared to domestic music.

The consumer preference estimates in Table 4.2 are used as the dependent variable in the gravity equations in Tables 5.1 (availability), 5.2 (consumer demand) and 5.3 (supply and demand combined). For the film gravity model we cannot use common language as an explanatory variable. Films are translated (dubbed or subtitled) and made available in the language of the CoD. This eliminates common language as a meaningful explanatory for availability. We replace this variable with Contiguity (shared borders), as a proxy for cultural similarities between the country of origin and destination[26]. As such, it captures part of the distance effect. For co-produced films we take the main producer country as listed in the IMDB film database as the country of origin. In most cases this boils down to the US. Both the OLS and Probit regressions show similar significance and signs of the coefficients though the coefficients are larger in the case of films of a single country of origin. As the availability regression in column 5 in Table 5.1 shows, the coefficient is strongly positive and significant. Neighbouring countries are 50 per cent more likely to trade films then other country pairs. For music, that likelihood is only around 5 per cent[27]. With the introduction of contiguity, distance becomes statistically insignificant in the OLS country level gravity equation. It retains some degree of significance in the Probit product level regressions. This essentially reduces the gravity model to contiguity and home bias as the two key variables. Together, they explain more than 80 per cent of the observed variation in cross-border availability (Table 5.1). However, they explain less than 60 per cent of the observed variation in consumer preferences (Table 5.2), a considerably lower figure than for music. The digital film consumer demand regressions in Tables 5.2 and 5.3 confirm and amplify the strong culturally inward-looking trend in film markets, driven by consumer preferences. As already noted in the case of music, the coefficients for home bias in the consumer demand regression is higher than in the availability regression. However, the increase is far less dramatic for films. Moreover, the coefficient for contiguity in consumer demand is essentially zero, a steep drop from its value in the availability equation – though it regains prominence in the product level regression.

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[26] In any case, shared language and shared borders are highly correlated (+0.49). EU country pairs that (partially) share a language include: UK-IE, FR-BE, NL-BE, BE-LU, FR-LU, LU-DE, DE-AU, CZ-SK, IT-AU, IT-DE, GR-CY, SE-FI, UK-MT, AU-LU, BE-DE. Only the last three pairs are not contiguous.

[27] For the sake of comparison, and as a robustness check, we also ran the music regressions with the contiguity variable as a replacement for common language.

For films, absolute prices range from 2 to 22€, with 47 different price levels in between. Figure 3 shows relative price dispersion across different versions of the same film. Dispersion is measured as the difference in the price of one version of the film with respect to the mode price in that group of films, in absolute terms. Price differences between films available in 2 languages range from 0 to 10€. Table 7c shows the incidence of price dispersion among available films: 365 films out of 1,271 available in 2 languages have price differences across countries. The price regression shows that home markets and contiguous markets are priced lower and that climbing the sales charts drives up prices as well.

9.   *Summary and conclusions*

The aim of this study is to fill a gap in the empirical evidence on market fragmentation in digital music and film in the EU and measure the current degree of market segmentation in the wake of these initiatives and find some explanations for the observed patterns. Using data from the Apple iTunes country stores, the dominant provider of digital media downloads in the EU, we find that availability is in the 73-82 per cent range for music and around 40 per cent for film. There is still some way to go to achieve 100 per cent mark that would be expected in a truly open Digital Single Market, especially in digital film. We continue to work on improving sampling of translated films and items in the long tail far below the Top-300 charts.

We explore to what extent the copyright regime, commercial strategies and consumer preferences may play a role in explaining the observed cross-border availability and sales patterns. Since we have no detailed copyright licensing data for each product it is not possible to fully separate the contribution of copyright. We can only rely on indirect evidence generated by the data. We use a gravity model that controls for various sources of consumer preferences, such as language, (cultural) distance and preference for home market products. We find that consumer preferences explain the bulk of the observed variations in music sales but less so variations in availability. We find no indications that fixed cross-border copyright clearance costs play a role in music availability patterns. The asymmetries in geographical coverage of existing cross-border copyright management institutions for music may explain part of the observed limitations in availability, together with the fact that national licensing still occurs for a significant part of the music market. We find evidence that there is considerable variation in music availability at label and even at artist level which may also be an indication that commercial strategies have a significant impact on availability.

The market for digital films is different. The US is a more dominant supplier in the film market compared to the music market. Higher availability of US than EU-produced films indicates that market factors may be more important than copyright in explained the observed availability patterns. Consumer preference for domestic films is stronger than for English-language and US films but the relative

strength of domestic preference is not as strong as for music. They may also contribute to explaining the limited market size for EU films. Moreover, territorial restrictions in distribution agreements between film producers and national cinema operators – still the prime source of film revenue – may contribute to lower film availability - compared to music – and slow growth of digital sales. At the same time, low digital sales make it uninteresting for film producers to by-pass these cinema distribution agreements. It is unclear how these agreements affect the welfare of European consumers and producers in a digital age. In the US, the film distribution model is gradually shifting to online distribution as the digital market is growing and becoming large enough to generate its own momentum. Geographical restrictions and the resulting fragmentation in the EU market may slow down the shift to a digital distribution model.

We find evidence of price differentiation between iTunes country stores. Price differentiation is piggy-backing on territorial fragmentation in the copyright regime. Price variation seems to be driven mainly by differences in overall price levels per country.

Future research could gain significant mileage from collecting data deeper into the long tail of the sales distribution and on the type of copyright licensing arrangement used for the distribution of digital music in the EU. Another important step would be to estimate the potential consumer and producer welfare effects from full availability, especially in digital film where availability remains relatively low. This requires a more complete modelling of consumer behaviour and supply with cross border production cost effects, for instance as in Aguilar & Waldfogel (2014a, 2014b).

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Table 1A: Availability distribution for songs, albums and films

#countries available	SONGS Versions = different Freq.	%	Versions = same Freq.	%	ALBUMS Versions = different Freq.	%	Versions = same Freq.	%	FILMS First sample Freq.	%	Second sample Freq.	%	EU films only Freq.	%
1	489	8.2%	192	6.5%	374	7.8%	302	7.6%	302	15.2%	780	11.9%	199	26.6%
2	359	6.0%	121	4.1%	329	6.8%	174	4.4%	282	14.2%	1,196	18.3%	163	21.8%
3	233	3.9%	83	2.8%	141	2.9%	95	2.4%	164	8.3%	504	7.7%	81	10.8%
4	43	0.7%	13	0.4%	27	0.6%	17	0.4%	63	3.2%	352	5.4%	23	3.1%
5	26	0.4%	10	0.3%	28	0.6%	16	0.4%	45	2.3%	277	4.2%	18	2.4%
6	60	1.0%	21	0.7%	36	0.7%	26	0.7%	54	2.7%	213	3.3%	19	2.5%
7	37	0.6%	10	0.3%	20	0.4%	24	0.6%	42	2.1%	193	2.9%	9	1.2%
8	36	0.6%	12	0.4%	26	0.5%	36	0.9%	27	1.4%	169	2.6%	6	0.8%
9	48	0.8%	14	0.5%	20	0.4%	32	0.8%	33	1.7%	157	2.4%	11	1.5%
10	48	0.8%	17	0.6%	31	0.6%	30	0.8%	31	1.6%	119	1.8%	8	1.1%
11	39	0.7%	17	0.6%	33	0.7%	49	1.2%	32	1.6%	124	1.9%	6	0.8%
12	79	1.3%	24	0.8%	30	0.6%	45	1.1%	42	2.1%	157	2.4%	6	0.8%
13	64	1.1%	23	0.8%	37	0.8%	48	1.2%	35	1.8%	144	2.2%	9	1.2%
14	56	0.9%	23	0.8%	42	0.9%	49	1.2%	38	1.9%	101	1.5%	8	1.1%
15	84	1.4%	28	1.0%	51	1.1%	67	1.7%	47	2.4%	92	1.4%	16	2.1%
16	45	0.8%	15	0.5%	29	0.6%	45	1.1%	38	1.9%	78	1.2%	8	1.1%
17	43	0.7%	29	1.0%	31	0.6%	58	1.5%	74	3.7%	56	0.9%	8	1.1%
18	64	1.1%	20	0.7%	31	0.6%	29	0.7%	52	2.6%	98	1.5%	7	0.9%
19	43	0.7%	27	0.9%	30	0.6%	43	1.1%	69	3.5%	95	1.5%	19	2.5%
20	55	0.9%	23	0.8%	33	0.7%	38	1.0%	69	3.5%	75	1.1%	14	1.9%
21	84	1.4%	46	1.6%	68	1.4%	42	1.1%	167	8.4%	96	1.5%	34	4.6%
22	87	1.5%	47	1.6%	67	1.4%	43	1.1%	79	4.0%	130	2.0%	10	1.3%
23	198	3.3%	96	3.3%	111	2.3%	54	1.4%	72	3.6%	139	2.1%	23	3.1%
24	242	4.0%	160	5.4%	182	3.8%	117	2.9%	42	2.1%	225	3.4%	14	1.9%
25	398	6.6%	221	7.5%	258	5.4%	190	4.8%	51	2.6%	332	5.1%	11	1.5%
26	325	5.4%	365	12.4%	253	5.2%	438	11.0%	34	1.7%	646	9.9%	15	2.0%
27	2708	45.2%	1,281	43.6%	2504	51.9%	1,879	47.1%						
Total	5993	100.0%	2938	100.0%	4822	100.0%	3986	100.0%	1984	100.0%	6548	100.0%	745	100.0%
Availability		73.1%		78.92%		75.7%		82.47%		41.5%		39.8%		28.2%

Source: Apple iTunes and authors calculations

Table 1B: Synthesis table of availability, consumer preferences and sales of music and films

	Songs									Albums									Films								
	Availability			Consumer pref			Total sales			Availability			Consumer pref			Total sales			Availability			Consumer pref			Total sales		
Country	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN	Dom	NEN	EN
AT	0%	42%	43%	10.4	0.9	1.4	3%	27%	56%	1%	42%	37%	14.8	0.9	1.8	9%	25%	47%	1%	22%	73%	2.7	1.0	1.86	1%	15%	79%
BE	2%	40%	45%	13.2	0.9	0.9	22%	22%	46%	2%	41%	37%	18.0	0.9	1.6	18%	12%	44%	1%	20%	74%	3.7	1.1	0.88	4%	21%	73%
BG	1%	38%	47%	15.5	0.9	1.2	13%	12%	62%	0%	41%	39%	14.4	0.9	1.3	3%	20%	52%	0%	10%	85%	0.0	0.8	1.70	0%	2%	94%
CY	0%	40%	46%	-	0.9	1.6	3%	21%	63%	0%	41%	38%	-	0.9	2.2	1%	19%	47%	0%	11%	85%	0.0	0.8	1.65	0%	2%	96%
CZ	1%	40%	46%	13.9	0.9	1.2	18%	15%	54%	2%	40%	38%	16.4	0.9	0.8	34%	13%	39%	1%	11%	84%	5.5	1.0	1.46	3%	3%	91%
DE	4%	39%	43%	12.3	0.9	1.4	26%	12%	49%	5%	38%	37%	13.7	0.9	1.5	34%	10%	35%	6%	16%	74%	2.7	1.0	2.05	7%	10%	79%
DK	4%	39%	45%	18.8	0.9	1.3	35%	9%	42%	3%	39%	37%	21.8	0.9	2.1	36%	2%	43%	3%	12%	81%	4.7	1.1	1.10	10%	9%	79%
EE	1%	39%	46%	14.6	0.9	1.2	13%	12%	60%	1%	42%	38%	16.3	0.9	1.6	8%	19%	53%	0%	11%	85%	0.0	0.9	1.39	0%	3%	95%
ES	2%	38%	45%	20.8	0.9	1.1	32%	7%	40%	4%	39%	37%	22.2	0.9	1.5	43%	3%	36%	3%	13%	80%	4.4	0.9	1.72	6%	7%	84%
FI	5%	38%	45%	16.5	0.9	1.1	41%	13%	35%	4%	39%	37%	20.5	0.9	1.3	50%	8%	33%	2%	12%	82%	5.1	1.1	1.25	7%	11%	81%
FR	3%	38%	46%	14.0	1.0	0.9	31%	16%	42%	4%	38%	38%	17.9	0.9	1.5	35%	6%	40%	18%	13%	63%	3.4	0.9	2.30	21%	7%	66%
GB	14%	29%	44%	9.9	0.5	6.6	34%	-31%	88%	14%	28%	38%	11.7	0.3	8.2	37%	-32%	68%	9%	5%	82%	1.8	1.0	1.49	12%	7%	79%
GR	2%	38%	47%	12.9	0.9	0.8	26%	22%	39%	2%	39%	39%	10.4	0.9	1.0	26%	12%	37%	0%	11%	85%	0.0	0.8	1.64	0%	2%	95%
HU	2%	40%	46%	17.7	0.9	1.3	23%	13%	52%	1%	41%	38%	15.8	0.9	1.3	15%	13%	51%	0%	11%	85%	5.2	1.0	1.75	0%	4%	94%
IE	2%	40%	45%	15.1	0.3	7.3	14%	-10%	89%	1%	40%	38%	18.5	0.1	9.1	10%	-5%	77%	0%	13%	82%	3.9	0.9	1.27	1%	7%	90%
IT	4%	38%	46%	13.3	1.0	0.6	37%	16%	34%	4%	39%	38%	18.1	0.8	2.0	36%	4%	40%	9%	15%	71%	3.8	1.1	1.79	14%	7%	75%
LT	0%	40%	45%	14.6	0.9	1.4	2%	16%	56%	0%	42%	38%	16.3	0.9	1.1	4%	16%	52%	0%	11%	85%	0.0	0.9	1.70	0%	3%	92%
LU	0%	41%	45%	16.3	0.9	1.0	1%	25%	56%	0%	42%	38%	15.3	0.9	1.5	1%	23%	55%	0%	16%	79%	4.6	1.1	0.99	0%	19%	79%
LV	1%	39%	45%	10.1	0.9	1.6	9%	14%	58%	0%	42%	38%	18.4	0.9	1.3	7%	13%	49%	0%	11%	84%	0.0	0.7	1.45	0%	1%	96%
MT	1%	39%	45%	15.9	0.9	1.9	7%	13%	69%	0%	41%	39%	17.3	0.9	1.8	6%	14%	55%	0%	11%	84%	0.0	0.8	1.54	0%	2%	96%
NL	3%	39%	46%	16.8	0.9	1.6	31%	10%	49%	3%	40%	37%	17.0	0.8	2.5	25%	6%	44%	4%	15%	77%	4.1	1.1	0.99	13%	10%	75%
PL	1%	38%	47%	14.5	0.9	1.2	18%	15%	55%	2%	40%	38%	18.2	0.9	1.6	20%	10%	53%	0%	11%	84%	0.0	0.9	1.49	0%	3%	95%
PT	1%	41%	45%	18.7	0.9	1.5	9%	10%	57%	1%	41%	38%	20.1	0.8	2.3	14%	5%	57%	0%	11%	85%	0.0	1.0	1.73	0%	3%	94%
RO	3%	37%	46%	17.5	1.0	1.0	34%	9%	41%	1%	41%	38%	16.7	0.9	1.9	13%	13%	52%									
SE	4%	39%	44%	20.3	0.9	1.5	39%	6%	46%	4%	39%	37%	21.7	0.9	1.6	41%	5%	40%	3%	12%	81%	4.9	1.1	1.15	13%	9%	77%
SI	1%	41%	45%	16.1	0.9	1.5	4%	13%	56%	0%	42%	38%	19.3	0.9	1.4	7%	12%	44%	0%	11%	85%	0.0	0.7	1.55	0%	3%	93%
SK	1%	40%	46%	14.4	0.9	1.2	11%	15%	57%	1%	41%	38%	14.9	0.9	1.2	12%	20%	48%	0%	11%	84%	5.7	1.0	1.35	0%	3%	93%
EU avg	2%	39%	45%	14.6	0.9	1.7	20%	12%	54%	2%	40%	38%	16.50	0.84	2.10	20%	10%	48%	2%	13%	81%	2.54	0.95	1.51	4%	7%	86%

Note: NEN = non-English EU music, EN = English language music from US, UK and IRL. Dom = domestic, RoW = rest of the world. Consumer preferences are relative preferences compared to the average for EU music.

Source: Apple iTunes data and authors' own calculations.

Table 2.1: Supply of songs (number of songs from CoO available in CoD)

CoO >	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW	TOTAL	EU only
CoD																															
AT	10	44	26	7	32	93	39	27	49	88	55	297	50	42	43	81	5	2	22	14	59	31	12	60	57	8	18	652	370	2293	1271
BE	7	52	26	7	32	92	48	26	50	89	82	334	49	42	48	72	5	2	21	14	74	32	11	63	61	8	18	730	354	2449	1365
BG	6	33	26	7	20	89	37	25	46	78	47	333	53	41	44	61	5	2	22	14	60	31	7	67	47	7	15	688	361	2272	1223
CY	6	32	25	7	32	78	45	26	49	89	51	325	55	42	46	66	5	2	22	14	61	32	11	64	56	8	18	693	356	2316	1267
CZ	6	44	26	7	35	90	45	26	47	92	50	333	49	43	45	64	5	2	22	14	65	31	11	63	58	8	25	710	350	2366	1306
DE	8	41	26	7	33	89	39	27	47	92	54	277	49	43	43	80	5	2	22	14	59	31	12	59	57	8	22	633	358	2237	1246
DK	5	42	26	7	32	83	86	26	48	97	65	323	49	41	47	63	5	2	22	14	55	31	11	64	75	8	18	715	351	2411	1345
EE	6	33	26	7	33	90	45	26	48	94	48	333	50	41	46	71	5	2	22	13	63	32	11	61	61	8	19	713	389	2396	1294
ES	6	44	26	7	32	89	48	26	60	88	64	332	47	41	48	65	4	2	22	14	59	29	12	64	57	8	18	712	394	2418	1312
FI	7	44	26	7	33	85	52	26	47	109	65	326	50	41	47	72	5	2	22	14	56	31	11	64	78	8	19	719	353	2419	1347
FR	5	41	26	7	23	87	43	23	45	80	76	305	49	40	46	72	5	2	22	13	53	32	12	63	53	7	22	700	350	2302	1252
GB	6	38	26	7	33	81	34	25	43	77	53	292	52	43	47	66	5	2	22	13	47	30	11	64	50	7	21	588	320	2103	1195
GR	7	35	26	5	32	82	47	26	50	90	50	338	58	41	45	67	5	2	22	14	61	32	11	65	57	8	18	721	352	2367	1294
HU	7	44	26	7	33	89	47	26	51	91	60	340	48	46	48	77	5	2	21	14	67	32	11	63	61	8	21	715	352	2413	1346
IE	6	41	26	7	33	85	44	26	46	89	54	307	47	42	39	65	5	2	22	14	52	31	11	64	52	8	22	641	331	2212	1240
IT	6	42	26	7	31	86	44	26	49	88	61	328	46	42	45	82	5	2	22	14	56	30	11	58	60	8	17	700	346	2338	1292
LT	6	33	26	7	33	90	47	26	47	94	48	336	50	42	45	71	5	2	22	14	64	31	11	61	64	8	19	705	384	2391	1302
LU	6	52	26	7	32	85	48	26	49	89	83	340	49	41	46	69	5	2	22	14	72	32	9	62	60	8	18	723	364	2439	1352
LV	7	33	26	7	33	89	46	26	47	93	48	332	50	42	46	71	5	2	21	14	62	30	11	61	65	8	19	705	387	2386	1294
MT	6	31	26	7	23	76	39	25	48	81	53	310	48	42	42	65	5	2	22	14	60	30	11	62	56	7	15	670	373	2249	1206
NL	7	48	26	7	33	92	46	26	50	89	62	331	48	42	47	80	5	2	22	14	79	33	12	62	63	8	21	720	337	2412	1355
PL	6	32	26	7	31	86	46	28	48	90	46	331	47	41	43	63	5	2	22	14	57	34	7	59	55	8	17	712	365	2328	1251
PT	8	45	26	6	34	86	50	26	53	90	64	338	48	44	48	78	4	2	22	14	66	33	19	66	63	8	22	722	370	2455	1363
RO	6	34	26	7	31	85	48	26	46	88	46	326	45	41	45	64	5	2	22	14	63	31	11	74	59	8	17	704	370	2344	1270
SE	6	41	26	7	32	85	52	26	46	99	63	301	49	40	41	61	5	2	22	14	55	31	11	64	85	8	21	681	326	2300	1293
SI	7	45	26	7	32	87	46	26	49	88	52	328	50	44	46	77	5	2	22	14	67	31	12	66	57	8	18	699	364	2375	1312
SK	6	43	26	7	35	91	47	26	47	90	50	330	49	43	46	64	5	2	22	14	63	31	11	64	58	8	25	711	351	2365	1303
Max #	10	52	26	7	35	93	86	28	60	109	83	340	58	46	48	82	5	2	22	14	79	34	19	74	85	8	25	730	394	2654	1530
Distinct #	12	62	25	7	35	132	94	29	65	109	98	401	58	47	50	90	5	2	22	14	99	35	20	90	106	8	25	832	686	3258	1740
Share	0%	2%	1%	0%	1%	4%	3%	1%	2%	3%	3%	12%	2%	1%	2%	3%	0%	0%	1%	0%	3%	1%	1%	3%	3%	0%	1%	26%	21%		
Availabilit	54%	65%	104%	98%	90%	66%	50%	89%	74%	82%	59%	81%	85%	89%	91%	78%	99%	100%	99%	99%	62%	89%	56%	70%	57%	98%	77%	84%	52%		
#English	4	23	1	1	3	56	43	6	9	14	39	377	15	13	49	8	0	0	1	10	57	5	4	30	71	1	4	783	217		
%English	33%	37%	4%	14%	9%	42%	46%	21%	14%	13%	40%	94%	26%	28%	98%	9%	0%	0%	5%	71%	58%	14%	20%	33%	67%	13%	16%	94%	32%		

Source: Apple iTunes and authors' own calculations

Table 2.2: Consumer preferences for songs (average logrank of songs from CoO in CoD)

Cod \ CoO>	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW
AT	2.31	0.47	0.00	0.00	0.00	1.19	0.23	0.00	0.00	0.00	0.38	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.54	0.00	0.00	0.53	0.32
BE	0.77	3.31	0.00	0.00	0.00	0.00	0.13	0.00	0.11	0.06	0.67	0.35	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	1.04	0.00	0.00	0.00	0.23	0.00	0.00	0.33	0.21
BG	0.00	0.31	4.81	0.00	0.00	0.04	0.19	0.00	0.11	0.00	0.52	0.58	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.14	0.00	0.24	0.35	0.70	0.00	0.57	0.36
CY	0.00	0.31	0.00	2.83	0.00	0.03	0.00	0.00	0.00	0.00	0.36	0.42	1.56	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.53	0.00	0.00	0.44	0.27
CZ	0.60	0.20	0.00	0.00	4.15	0.10	0.12	0.00	0.00	0.00	0.58	0.34	0.00	0.00	0.27	0.09	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.40	0.00	1.05	0.44	0.31
DE	0.67	0.44	0.00	0.00	0.00	2.42	0.23	0.18	0.00	0.11	0.23	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.35	0.00	0.00	0.52	0.31
DK	0.00	0.00	0.00	0.00	0.00	0.07	3.29	0.00	0.11	0.00	0.25	0.23	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.59	0.00	0.00	0.37	0.30
EE	0.85	0.00	0.00	0.00	0.00	0.06	0.00	3.83	0.00	0.00	0.63	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.49	0.00	0.64	0.00	0.00	0.41	0.29
ES	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.18	0.00	0.25	0.21	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.17	0.40	0.00	0.00	0.34	0.43
FI	0.00	0.10	0.00	0.00	0.00	0.19	0.21	0.00	0.08	3.62	0.25	0.22	0.30	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.08	0.48	0.00	0.00	0.36	0.29
FR	0.00	1.73	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	3.16	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.16	0.15	0.00	0.00	0.34	0.25
GB	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.88	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.67	0.21
GR	0.00	0.16	0.00	0.75	0.00	0.38	0.00	0.00	0.15	0.12	0.44	0.29	3.42	0.00	0.07	0.51	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.42	0.33	0.00	0.00	0.27	0.28
HU	0.00	0.21	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.34	0.38	0.00	4.05	0.11	0.07	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.07	0.67	0.00	0.00	0.41	0.29
IE	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.63	0.00	0.00	2.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.49	0.15
IT	0.72	0.09	0.00	0.00	0.00	0.17	0.09	0.00	0.00	0.00	0.45	0.17	0.00	0.00	0.00	3.68	0.00	0.00	0.00	1.01	0.18	0.10	0.00	0.25	0.52	0.00	0.00	0.32	0.31
LT	0.00	0.16	0.00	0.00	0.00	0.52	0.11	0.00	0.00	0.00	0.67	0.51	0.11	0.00	0.19	0.00	4.43	0.00	0.15	0.00	0.39	0.00	0.48	0.00	0.49	0.00	0.00	0.53	0.68
LU	0.00	0.52	0.00	0.00	0.00	1.17	0.31	0.00	0.04	0.00	0.35	0.35	0.00	0.00	0.15	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.03	0.34	0.00	0.00	0.43	0.39
LV	1.61	0.31	0.00	0.00	0.00	0.07	0.11	0.00	0.05	0.03	0.61	0.51	0.11	0.00	0.86	0.13	1.08	0.00	3.70	0.00	0.04	0.24	0.00	0.00	0.40	0.00	0.00	0.42	0.45
MT	0.00	0.00	0.00	0.00	0.00	0.08	0.10	0.00	0.11	0.00	0.58	0.56	0.00	0.00	0.24	0.29	0.00	0.00	0.00	4.02	0.13	0.00	0.00	0.00	0.74	0.00	0.00	0.61	0.26
NL	0.00	0.53	0.00	0.00	0.00	0.10	0.08	0.00	0.00	0.00	0.25	0.31	0.00	0.00	0.21	0.06	0.00	0.00	0.00	0.00	2.99	0.00	0.00	0.00	0.28	0.00	0.00	0.36	0.23
PL	0.00	0.62	0.00	0.00	0.00	0.10	0.12	0.29	0.00	0.05	0.59	0.41	0.00	0.09	0.19	0.07	0.00	0.00	0.00	0.00	0.16	4.24	0.49	0.00	0.51	0.00	0.00	0.43	0.27
PT	0.00	0.00	0.00	0.00	0.00	0.21	0.14	0.00	0.00	0.00	0.40	0.29	0.00	0.00	0.10	0.06	0.00	0.00	0.00	0.00	0.00	0.00	3.28	0.08	0.18	0.00	0.00	0.42	0.46
RO	0.00	0.76	0.00	0.00	0.00	0.05	0.10	0.21	0.05	0.00	0.42	0.21	0.11	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.27	0.36	0.00	0.00	0.45	0.40
SE	0.00	0.00	0.00	0.00	0.00	0.05	0.18	0.00	0.00	0.00	0.26	0.21	0.00	0.00	0.13	0.08	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	2.95	0.00	0.00	0.33	0.19
SI	0.00	0.31	0.00	0.00	0.00	0.10	0.00	0.00	0.09	0.00	0.59	0.41	0.00	0.10	0.23	0.07	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.54	4.19	0.26	0.50	0.68
SK	0.00	0.10	0.00	0.00	1.36	0.00	0.15	0.13	0.00	0.00	0.31	0.36	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.15	0.53	3.71	0.48	0.38
Tot D	9.4	10.6	4.8	3.6	5.5	7.4	5.9	4.6	5.1	4.0	14.0	10.3	5.6	4.5	6.2	5.2	5.5	5.0	3.9	5.0	7.6	4.7	4.7	6.0	13.7	4.9	5.0		
Ext D	7.1	7.3	0.0	0.8	1.4	5.0	2.6	0.8	0.9	0.4	10.9	9.4	2.2	4.5	3.8	1.5	1.1	0.0	0.2	1.0	4.6	0.5	1.5	1.7	10.8	0.7	1.3		
%Ext	75%	69%	0%	21%	25%	68%	44%	17%	18%	9%	77%	91%	39%	100%	60%	29%	20%	0%	4%	20%	60%	10%	31%	28%	78%	14%	26%		

Source: Apple iTunes and authors' own calculations

Table 2.3: Consumer demand (sum of logrank of songs from CoO in CoD)																														
CoO>	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW	TOTAL
Cod																														
AT	23.15	20.85	0.00	0.00	0.00	110.62	8.92	0.00	0.00	0.00	20.88	112.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.22	0.00	0.00	0.00	30.99	0.00	0.00	347.63	118.71	826
BE	5.39	172.29	0.00	0.00	0.00	0.00	6.17	0.00	5.65	5.51	54.65	118.45	0.00	0.00	0.00	5.41	0.00	0.00	0.00	0.00	76.84	0.00	0.00	0.00	14.23	0.00	0.00	244.16	75.48	784
BG	0.00	10.39	124.95	0.00	0.00	3.91	7.19	0.00	4.85	0.00	24.37	192.01	0.00	10.91	0.00	0.00	0.00	0.00	0.00	0.00	6.84	4.28	0.00	15.81	16.58	4.91	0.00	392.86	130.43	950
CY	0.00	9.81	0.00	19.79	0.00	2.30	0.00	0.00	0.00	0.00	18.57	136.51	85.70	0.00	11.06	0.00	0.00	0.00	0.00	0.00	4.55	0.00	0.00	0.00	29.85	0.00	0.00	305.70	96.92	721
CZ	3.61	8.73	0.00	0.00	145.37	9.06	5.55	0.00	0.00	0.00	29.00	114.11	0.00	0.00	12.31	5.58	0.00	0.00	0.00	0.00	9.72	0.00	0.00	0.00	22.97	0.00	26.27	311.30	107.94	812
DE	5.39	17.94	0.00	0.00	0.00	215.09	9.08	4.99	0.00	9.71	12.33	83.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.38	0.00	0.00	0.00	20.08	0.00	0.00	326.18	110.89	836
DK	0.00	0.00	0.00	0.00	0.00	5.42	283.34	0.00	5.20	0.00	16.38	72.98	0.00	0.00	5.03	0.00	0.00	0.00	0.00	0.00	5.07	0.00	0.00	0.00	44.23	0.00	0.00	263.98	105.89	808
EE	5.12	0.00	0.00	0.00	0.00	5.48	0.00	99.46	0.00	0.00	30.20	168.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.22	0.00	5.36	0.00	39.17	0.00	0.00	293.12	114.05	764
ES	0.00	0.69	0.00	0.00	0.00	0.00	0.00	0.00	250.57	0.00	16.28	69.50	0.00	0.00	5.25	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	10.79	23.00	0.00	0.00	243.44	168.13	793
FI	0.00	4.32	0.00	0.00	0.00	15.74	11.14	0.00	3.81	394.30	16.19	70.80	15.24	0.00	5.59	0.00	0.00	0.00	0.00	0.00	15.48	0.00	0.00	4.82	37.49	0.00	0.00	261.44	104.05	960
FR	0.00	70.95	0.00	0.00	0.00	10.03	0.00	0.00	0.00	0.00	240.50	82.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.44	0.00	0.00	10.11	7.72	0.00	0.00	241.40	86.58	776
GB	5.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.92	256.75	0.00	0.00	10.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.42	0.00	0.00	394.48	65.75	751
GR	0.00	5.47	0.00	3.76	0.00	31.03	0.00	0.00	7.70	10.78	21.97	97.52	198.07	0.00	3.33	33.93	0.00	0.00	0.00	0.00	5.46	0.00	0.00	27.54	18.85	0.00	0.00	196.64	98.79	761
HU	0.00	9.31	0.00	0.00	0.00	20.80	0.00	0.00	0.00	0.00	20.14	129.88	0.00	186.36	5.50	5.09	0.00	0.00	0.00	0.00	3.00	0.00	0.00	4.60	40.77	0.00	0.00	293.99	102.40	822
IE	5.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.65	192.00	0.00	0.00	96.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	5.45	0.00	0.00	313.97	48.79	679
IT	4.33	3.81	0.00	0.00	0.00	14.97	4.16	0.00	0.00	0.00	27.42	56.50	0.00	0.00	0.00	301.60	0.00	0.00	14.14	9.93	3.00	0.00	0.00	14.78	31.36	0.00	0.00	223.37	108.50	818
LT	0.00	5.19	0.00	0.00	0.00	46.55	5.14	0.00	0.00	0.00	32.40	172.95	5.30	0.00	8.56	0.00	22.17	0.00	3.37	0.00	25.02	0.00	5.25	0.00	31.22	0.00	0.00	372.56	262.00	998
LU	0.00	26.83	0.00	0.00	0.00	99.70	14.82	0.00	2.20	0.00	29.09	117.63	0.00	0.00	6.94	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	1.79	20.30	0.00	0.00	309.23	142.95	781
LV	11.27	10.12	0.00	0.00	0.00	6.05	5.28	0.00	2.20	2.48	29.34	170.49	5.35	0.00	39.67	8.92	5.39	0.00	77.74	0.00	2.40	7.27	0.00	0.00	25.92	0.00	0.00	298.24	175.17	883
MT	0.00	0.00	0.00	0.00	0.00	6.14	3.83	0.00	5.15	0.00	30.61	173.73	0.00	0.00	10.10	19.17	0.00	0.00	0.00	56.32	7.86	0.00	0.00	0.00	41.34	0.00	0.00	409.51	97.22	861
NL	0.00	25.55	0.00	0.00	0.00	9.60	3.56	0.00	0.00	0.00	15.46	101.25	0.00	0.00	9.81	4.48	0.00	0.00	0.00	0.00	236.04	0.00	0.00	0.00	17.46	0.00	0.00	261.60	76.38	761
PL	0.00	19.81	0.00	0.00	0.00	8.25	5.50	7.99	0.00	4.48	27.13	135.24	0.00	3.83	8.26	4.11	0.00	0.00	0.00	0.00	9.09	144.11	3.40	0.00	27.80	0.00	0.00	305.69	98.44	813
PT	0.00	0.00	0.00	0.00	0.00	0.00	7.02	0.00	0.00	0.00	25.85	99.53	0.00	0.00	4.84	4.67	0.00	0.00	0.00	0.00	0.00	0.00	62.23	5.02	11.13	0.00	0.00	300.33	169.47	708
RO	0.00	25.71	0.00	0.00	0.00	3.97	4.62	5.34	2.20	0.00	19.43	67.02	4.96	0.00	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	315.90	21.23	0.00	0.00	318.81	148.15	941
SE	0.00	0.00	0.00	0.00	0.00	4.44	9.53	0.00	0.00	0.00	16.20	63.27	0.00	0.00	5.34	4.76	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	251.17	0.00	0.00	225.73	61.39	645
SI	0.00	13.99	0.00	0.00	0.00	8.86	0.00	0.00	4.50	0.00	30.72	132.87	0.00	4.42	10.60	5.48	0.00	0.00	0.00	0.00	8.44	0.00	0.00	0.00	30.72	33.49	4.66	347.77	248.33	885
SK	0.00	4.30	0.00	0.00	47.48	0.00	7.04	3.40	0.00	0.00	15.28	118.76	0.00	0.00	5.21	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	9.44	30.81	0.00	92.86	338.69	135.05	813
Tot D	69.5	466.1	124.9	23.6	192.8	656.3	401.9	121.2	294.0	427.3	847.0	3306.4	314.6	205.5	267.9	403.2	27.6	10.0	81.1	70.5	521.0	158.7	76.2	423.9	897.2	38.4	123.8	8141.8	3257.8	
Ext D	46.3	293.8	0.0	3.8	47.5	441.2	118.5	21.7	43.4	33.0	606.5	3049.7	116.6	19.2	171.3	101.6	5.4	0.0	3.4	14.1	285.0	14.5	14.0	108.0	646.1	4.9	30.9			
%Ext	67%	63%	0%	16%	25%	67%	29%	18%	15%	8%	72%	92%	37%	9%	64%	25%	20%	0%	4%	20%	55%	9%	18%	25%	72%	13%	25%			

Source: Apple iTunes and authors' own calculations

Table 3.1: Supply of albums (number of albums from CoO available in CoD)

CoO>	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW		TOTAL	EU only
CoD																																
AT	28	33	8	8	57	158	77	18	106	117	110	421	72	42	40	113	9	3	14	14	65	51	27	27	81	16	23	678	667		3083	1738
BE	21	49	8	8	61	137	76	19	100	122	118	424	69	41	41	110	9	4	14	14	84	51	31	26	83	16	25	705	681		3147	1761
BG	23	31	8	8	55	133	66	18	101	110	106	417	70	39	40	97	7	3	13	14	62	49	25	31	70	15	23	678	634		2946	1634
CY	19	29	8	8	61	116	69	20	99	116	102	431	70	40	37	102	9	3	14	14	68	50	29	28	80	15	28	671	625		2961	1665
CZ	20	35	8	8	67	139	72	19	95	119	104	432	68	38	40	95	8	2	14	14	67	50	31	30	82	14	30	682	647		3030	1701
DE	24	33	8	7	64	156	78	19	100	121	110	414	69	43	43	107	8	4	13	14	66	51	28	27	83	16	27	680	672		3085	1733
DK	22	35	8	7	61	129	103	17	101	123	119	431	70	34	40	99	8	3	14	14	66	48	30	26	102	15	23	686	656		3090	1748
EE	21	36	8	7	60	136	73	19	104	128	112	430	69	42	40	103	9	3	14	14	66	49	33	29	82	14	24	692	642		3059	1725
ES	22	37	8	7	61	136	71	18	113	120	120	429	70	40	40	109	10	4	14	14	70	51	30	26	87	15	25	690	669		3106	1747
FI	21	35	8	8	61	136	81	20	105	134	122	428	71	42	45	107	8	3	14	14	66	50	31	29	103	15	23	691	659		3130	1780
FR	22	41	8	8	48	131	72	20	101	117	123	416	70	36	40	106	8	3	14	14	63	50	27	24	84	16	26	701	648		3037	1688
GB	19	33	8	8	65	128	66	18	98	110	111	416	71	40	43	99	8	4	13	14	60	47	28	28	74	16	27	667	661		2980	1652
GR	19	34	8	7	57	128	74	20	97	115	109	424	73	36	39	105	8	3	14	14	63	47	32	29	85	15	24	691	624		2994	1679
HU	22	34	8	8	66	136	70	18	99	117	111	434	67	39	42	106	9	4	14	14	67	52	32	27	81	16	25	678	632		3028	1718
IE	18	31	8	7	59	131	71	17	103	115	113	425	69	38	39	103	10	4	15	14	64	48	27	29	85	15	26	683	677		3044	1684
IT	17	36	8	7	59	135	71	20	102	118	114	431	67	40	43	116	10	3	14	14	65	48	31	30	83	15	23	677	637		3034	1720
LT	23	37	8	7	59	137	74	19	103	124	112	430	66	42	43	107	9	4	14	14	65	49	29	28	83	15	25	685	637		3048	1726
LU	19	47	8	8	60	129	74	18	94	119	125	434	67	40	38	109	9	3	14	14	82	52	29	24	85	16	25	697	671		3110	1742
LV	23	36	8	7	63	132	72	19	101	124	112	430	69	41	42	107	9	4	14	14	66	48	29	30	80	15	25	684	633		3037	1720
MT	19	29	8	8	57	118	65	19	96	112	102	423	70	37	36	94	8	3	12	14	62	49	28	28	74	15	25	664	622		2897	1611
NL	23	47	8	8	63	137	74	19	102	119	122	423	68	36	39	106	8	4	15	14	85	53	31	26	90	16	24	704	675		3139	1760
PL	22	38	8	8	60	134	74	18	102	113	110	421	67	41	41	102	8	3	13	14	61	53	28	27	85	15	22	693	633		3014	1688
PT	22	37	8	8	64	130	73	20	102	120	114	426	67	41	42	108	8	3	15	14	68	52	37	27	86	16	27	705	655		3095	1735
RO	20	33	8	8	60	137	69	19	99	113	104	422	68	37	39	98	8	3	13	14	68	50	32	31	82	16	23	677	627		2978	1674
SE	20	33	8	7	60	127	82	18	104	123	123	423	68	38	40	101	9	3	14	14	67	51	29	27	108	16	26	691	652		3082	1739
SI	21	33	8	8	62	130	70	19	104	119	103	429	72	45	41	109	9	3	15	13	67	49	29	29	80	15	22	682	637		3023	1704
SK	22	33	8	8	66	138	70	19	98	120	106	426	69	43	42	96	9	3	14	14	66	49	32	32	84	16	29	700	642		3054	1712
Max #	28	49	8	8	67	158	103	20	113	134	125	434	73	45	45	116	10	4	15	14	85	53	37	32	108	16	30	705	681			
Distinct #	30	56	8	8	72	193	111	20	126	143	148	508	76	48	50	134	10	4	15	14	99	57	41	37	118	16	34	805	1006		3987	2176
Share	1%	1%	0%	0%	2%	5%	3%	1%	3%	4%	4%	13%	2%	1%	1%	3%	0%	0%	0%	0%	2%	1%	1%	1%	3%	0%	1%	20%	25%		100%	55%
Availability	71%	64%	100%	95%	84%	69%	66%	94%	80%	83%	76%	84%	91%	83%	81%	78%	86%	82%	93%	100%	68%	88%	73%	76%	72%	96%	74%	85%	64%			
#English	8	38	0	0	3	53	48	5	5	32	48	491	10	9	50	11	3	1	0	10	66	6	5	8	65	2	1	780	213			
%English	27%	68%	0%	0%	4%	27%	43%	25%	4%	22%	32%	97%	13%	19%	100%	8%	30%	25%	0%	71%	67%	11%	12%	22%	55%	13%	3%	97%	21%			

Source: Apple iTunes and authors' own calculations

Table 3.2: Consumer preferences for albums (average logrank of albums from CoO in CoD)

CoD \ CoO>	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW
AT	2.71	0.00	0.00	0.00	0.00	0.97	0.07	0.00	0.00	0.05	0.16	0.38	0.00	0.00	0.26	0.04	0.00	0.00	0.00	0.00	0.08	0.10	0.00	0.00	0.11	0.00	0.00	0.33	0.24
BE	0.00	3.32	0.00	0.00	0.00	0.04	0.13	0.00	0.00	0.00	0.57	0.48	0.00	0.00	0.11	0.05	0.00	0.00	0.00	0.00	0.07	0.10	0.00	0.00	0.13	0.00	0.00	0.27	0.34
BG	0.23	0.12	3.11	0.00	0.00	0.18	0.00	0.00	0.34	0.24	0.18	0.38	0.05	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.29	0.13	0.00	0.00	0.45	0.37
CY	0.00	0.00	0.00	0.55	0.00	0.12	0.03	0.00	0.22	0.00	0.18	0.42	0.75	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.19	0.10	0.00	0.00	0.33	0.47
CZ	0.28	0.22	0.00	0.00	4.26	0.03	0.00	0.00	0.05	0.00	0.15	0.45	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.16	0.06	0.00	0.00	0.20	0.00	1.12	0.20	0.20
DE	0.49	0.17	0.00	0.00	0.00	1.82	0.13	0.00	0.05	0.04	0.19	0.22	0.00	0.00	0.08	0.04	0.00	0.00	0.00	0.00	0.16	0.11	0.00	0.00	0.06	0.00	0.00	0.30	0.25
DK	0.00	0.00	0.00	0.00	0.00	0.00	3.17	0.00	0.05	0.00	0.05	0.29	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.37	0.27
EE	0.00	0.00	0.00	0.00	0.00	0.38	0.04	3.67	0.14	0.12	0.19	0.54	0.00	0.00	0.25	0.17	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.49	0.00	0.00	0.31	0.27
ES	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	3.14	0.00	0.26	0.26	0.00	0.00	0.12	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.22
FI	0.00	0.00	0.00	0.00	0.00	0.07	0.23	0.00	0.00	3.89	0.05	0.29	0.00	0.00	0.12	0.03	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.39	0.00	0.00	0.31	0.14
FR	0.24	0.51	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	2.61	0.32	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.33	0.27
GB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.75	0.00	0.00	0.47	0.04	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.12	0.00	0.00	0.36	0.34
GR	0.59	0.13	0.00	3.02	0.00	0.00	0.00	0.00	0.15	0.00	0.22	0.37	3.24	0.00	0.27	0.23	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.12	0.00	0.00	0.25	0.37
HU	0.86	0.00	0.00	0.00	0.00	0.15	0.06	0.00	0.09	0.04	0.10	0.51	0.00	3.32	0.00	0.13	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.06	0.00	0.00	0.33	0.30
IE	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.19	0.64	0.00	0.00	2.22	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.42	0.23
IT	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.03	0.00	0.05	0.34	0.00	0.00	0.23	2.50	0.00	0.00	0.00	0.38	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.24	0.24
LT	0.14	0.12	0.00	0.00	0.00	0.10	0.07	0.00	0.12	0.00	0.39	0.52	0.00	0.00	0.00	0.10	4.34	0.00	0.72	0.00	0.00	0.00	0.00	0.20	0.40	0.00	0.00	0.35	0.38
LU	0.00	0.50	0.00	0.00	0.00	0.73	0.06	0.00	0.00	0.00	0.47	0.55	0.00	0.00	0.14	0.08	0.00	3.71	0.00	0.00	0.09	0.00	0.00	0.00	0.21	0.00	0.00	0.38	0.28
LV	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.24	0.12	0.04	0.18	0.54	0.00	0.00	0.13	0.12	0.00	0.00	4.53	0.00	0.23	0.00	0.00	0.00	0.25	0.00	0.00	0.29	0.43
MT	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.08	0.00	0.19	0.48	0.00	0.00	0.40	0.54	0.00	0.00	0.00	4.20	0.25	0.00	0.00	0.00	0.26	0.00	0.00	0.42	0.36
NL	0.00	0.30	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.11	0.39	0.00	0.00	0.47	0.10	0.00	0.00	0.00	0.00	2.60	0.00	0.00	0.00	0.06	0.00	0.00	0.30	0.34
PL	0.00	0.14	0.00	0.00	0.08	0.17	0.00	0.00	0.04	0.00	0.29	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	3.61	0.00	0.00	0.18	0.00	0.00	0.36	0.24
PT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14	0.56	0.00	0.00	0.23	0.04	0.00	0.00	0.00	0.00	0.00	0.00	3.54	0.00	0.10	0.00	0.00	0.41	0.34
RO	0.20	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.16	0.05	0.23	0.47	0.00	0.00	0.42	0.25	0.00	0.00	0.00	0.00	0.18	0.00	0.00	3.72	0.25	0.00	0.00	0.33	0.29
SE	0.00	0.00	0.00	0.00	0.00	0.06	0.12	0.00	0.00	0.08	0.12	0.27	0.00	0.00	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	0.00	0.00	0.34	0.19
SI	0.00	0.00	0.00	0.00	0.08	0.22	0.00	0.00	0.08	0.00	0.34	0.35	0.00	0.00	0.26	0.03	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.07	4.04	0.00	0.29	0.48
SK	0.00	0.00	0.00	0.00	1.37	0.15	0.06	0.00	0.10	0.04	0.08	0.50	0.00	0.00	0.05	0.15	0.00	0.00	0.00	0.00	0.20	0.10	0.00	0.15	0.13	0.00	3.78	0.33	0.29
Total	5.7	5.7	3.1	3.6	5.8	5.9	4.3	3.9	5.1	4.6	7.7	11.9	4.0	3.3	6.6	5.2	4.3	3.7	5.2	4.6	6.0	4.2	3.5	4.5	7.5	4.0	4.9		
External	3.0	2.4	0.0	3.0	1.5	4.1	1.1	0.2	2.0	0.7	5.1	11.1	0.8	0.0	4.4	2.7	0.0	0.0	0.7	0.4	3.4	0.6	0.0	0.8	4.1	0.0	1.1		
%External	53%	41%	0%	85%	26%	69%	26%	6%	38%	15%	66%	94%	20%	0%	66%	52%	0%	0%	14%	8%	57%	14%	0%	18%	54%	0%	23%		

Source: Apple iTunes and authors' own calculations

Table 3.3: Consumer demand for albums (sum of logrank of albums from CoO in CoD)

CoO>	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	US	ROW	TOTAL
CoD																														
AT	75.76	0.00	0.00	0.00	0.00	153.18	5.44	0.00	0.00	5.62	18.15	161.91	0.00	0.00	10.42	4.87	0.00	0.00	0.00	0.00	5.38	5.31	0.00	0.00	9.08	0.00	0.00	224.02	158.75	837.89
BE	0.00	162.48	0.00	0.00	0.00	5.06	9.93	0.00	0.00	0.00	67.41	203.34	0.00	0.00	4.54	5.24	0.00	0.00	0.00	0.00	5.50	4.96	0.00	0.00	10.85	0.00	0.00	190.95	233.03	903.28
BG	5.39	3.71	24.90	0.00	0.00	24.43	0.00	0.00	34.56	26.45	19.59	157.41	3.83	0.00	0.00	17.62	0.00	0.00	0.00	0.00	24.67	0.00	0.00	9.13	8.89	0.00	0.00	307.96	235.06	903.61
CY	0.00	0.00	0.00	4.42	0.00	13.96	2.20	0.00	21.39	0.00	18.86	179.83	52.54	0.00	0.00	7.43	0.00	0.00	0.00	0.00	30.00	0.00	0.00	5.25	7.97	0.00	0.00	224.13	291.40	859.37
CZ	5.64	7.53	0.00	0.00	285.72	4.64	0.00	0.00	4.37	0.00	15.70	194.05	0.00	0.00	0.00	4.91	0.00	0.00	0.00	0.00	10.42	3.22	0.00	0.00	16.48	0.00	33.69	135.85	129.10	851.32
DE	11.83	5.64	0.00	0.00	0.00	283.83	10.43	0.00	4.98	5.43	21.24	90.84	0.00	0.00	3.61	4.44	0.00	0.00	0.00	0.00	10.47	5.65	0.00	0.00	4.76	0.00	0.00	201.73	170.59	835.48
DK	0.00	0.00	0.00	0.00	0.00	0.00	326.69	0.00	5.31	0.00	5.65	127.14	0.00	0.00	10.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.54	0.00	0.00	255.58	175.42	917.5
EE	0.00	0.00	0.00	0.00	0.00	52.29	3.22	69.77	14.24	15.47	21.71	231.43	0.00	0.00	9.85	17.66	0.00	0.00	0.00	0.00	4.75	0.00	0.00	0.00	39.97	0.00	0.00	217.22	174.52	872.1
ES	0.00	5.08	0.00	0.00	0.00	0.00	0.00	0.00	355.14	0.00	8.78	111.01	0.00	0.00	4.61	10.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	174.99	146.99	817.39
FI	0.00	0.00	0.00	0.00	0.00	9.28	18.26	0.00	0.00	520.61	5.67	123.02	0.00	0.00	5.50	3.00	0.00	0.00	0.00	0.00	4.86	0.00	0.00	0.00	39.94	0.00	0.00	215.24	94.94	1040.3
FR	5.23	20.82	0.00	0.00	0.00	20.49	0.00	0.00	0.00	0.00	321.59	133.42	0.00	0.00	0.00	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.11	0.00	0.00	228.18	173.13	912.37
GB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.26	313.47	0.00	0.00	20.22	4.37	0.00	0.00	0.00	0.00	10.20	0.00	0.00	0.00	9.03	0.00	0.00	240.24	227.90	845.68
GR	11.12	4.58	0.00	21.14	0.00	0.00	0.00	0.00	14.87	0.00	24.09	155.72	236.61	0.00	10.49	24.39	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0.00	10.09	0.00	0.00	174.43	230.38	921.5
HU	18.90	0.00	0.00	0.00	0.00	19.82	4.17	0.00	9.38	4.19	11.17	222.37	0.00	129.45	0.00	13.95	0.00	0.00	0.00	0.00	24.09	0.00	0.00	0.00	5.04	0.00	0.00	226.00	191.80	880.34
IE	0.00	0.00	0.00	0.00	0.00	5.17	0.00	0.00	0.00	0.00	21.88	272.96	0.00	0.00	86.75	9.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.63	0.00	0.00	286.01	153.30	840.65
IT	0.00	0.00	0.00	0.00	0.00	12.68	0.00	0.00	3.14	0.00	5.67	146.70	0.00	0.00	9.89	289.51	0.00	0.00	0.00	5.33	0.00	4.97	0.00	0.00	0.00	0.00	0.00	164.86	155.43	798.18
LT	3.22	4.30	0.00	0.00	0.00	13.83	5.21	0.00	11.87	0.00	44.20	223.10	0.00	0.00	0.00	10.44	39.07	0.00	10.02	0.00	0.00	0.00	0.00	5.48	32.88	0.00	0.00	238.89	244.97	887.48
LU	0.00	23.53	0.00	0.00	0.00	94.81	4.38	0.00	0.00	0.00	59.23	239.80	0.00	0.00	5.48	8.49	0.00	11.12	0.00	0.00	7.41	0.00	0.00	0.00	18.17	0.00	0.00	266.61	185.14	924.18
LV	0.00	0.00	0.00	0.00	0.00	18.87	9.51	4.65	12.05	4.39	19.79	231.99	0.00	0.00	5.45	13.32	0.00	0.00	63.38	0.00	15.22	0.00	0.00	0.00	20.02	0.00	0.00	195.30	269.98	883.93
MT	0.00	0.00	0.00	0.00	0.00	15.20	0.00	0.00	7.90	0.00	19.84	202.99	0.00	0.00	14.45	51.13	0.00	0.00	0.00	58.76	15.53	0.00	0.00	0.00	18.88	0.00	0.00	278.96	221.75	905.37
NL	0.00	14.33	0.00	0.00	0.00	10.97	0.00	0.00	0.00	0.00	13.66	165.79	0.00	0.00	18.32	10.73	0.00	0.00	0.00	0.00	220.69	0.00	0.00	0.00	5.27	0.00	0.00	212.33	227.04	899.12
PL	0.00	5.50	0.00	0.00	4.89	22.46	0.00	0.00	4.42	0.00	31.94	252.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.99	191.52	0.00	0.00	15.46	0.00	248.82	150.57	941.94
PT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.59	0.00	16.31	237.72	0.00	0.00	9.48	4.64	0.00	0.00	0.00	0.00	0.00	0.00	131.08	0.00	8.87	0.00	0.00	289.07	222.64	934.42
RO	3.93	0.00	0.00	0.00	0.00	8.86	0.00	0.00	15.86	5.44	23.94	199.97	0.00	0.00	16.53	24.43	0.00	0.00	0.00	0.00	12.39	0.00	0.00	115.21	20.15	0.00	0.00	226.25	183.12	856.09
SE	0.00	0.00	0.00	0.00	0.00	7.39	9.88	0.00	0.00	9.65	14.35	115.17	0.00	0.00	5.41	4.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	367.98	0.00	0.00	233.68	125.84	893.97
SI	0.00	0.00	0.00	0.00	5.08	28.70	0.00	0.00	8.23	0.00	34.51	148.87	0.00	0.00	10.74	3.53	0.00	0.00	0.00	0.00	12.77	0.00	0.00	0.00	5.20	60.61	0.00	200.19	303.07	821.5
SK	0.00	0.00	0.00	0.00	90.57	20.13	3.91	0.00	10.03	5.20	8.99	211.66	0.00	0.00	2.30	14.34	0.00	0.00	0.00	0.00	13.40	5.11	0.00	4.67	10.81	0.00	109.66	233.92	187.70	932.42
Total	141.0	257.5	24.9	25.6	386.3	846.1	413.2	74.4	552.3	602.5	894.2	5054.0	293.0	129.5	264.2	566.2	39.1	11.1	73.4	64.1	445.3	220.7	131.1	139.7	709.1	60.6	143.3			
External	65.3	95.0	0.0	21.1	100.5	562.2	86.6	4.7	197.2	81.8	572.6	4740.6	56.4	0.0	177.5	276.7	0.0	0.0	10.0	5.3	224.6	29.2	0.0	24.5	341.1	0.0	33.7			
%External	46%	37%	0%	83%	26%	66%	21%	6%	36%	14%	64%	94%	19%	0%	67%	49%	0%	0%	14%	8%	50%	13%	0%	18%	48%	0%	24%			

Source: Apple iTunes and authors' own calculations

Table 4.1: Supply of films (number of films from CoO available in CoD)

CoO >	AT	BE	CZ	DE	DK	ES	FI	FR	GB	HU	IE	IT	LU	MT	NL	PL	SE	SK	US	ROW		TOTAL	EU only
CoD																							
AT	4	2	1	35	2	7	0	19	57	1	0	3	2	1	3	1	3	1	434	30		606	576
BE	1	11		20	2	6	0	60	73	1	1	2	1	1	39	0	4	1	742	43		1008	965
BG	0	0	0	7	4	0	0	8	60	1	1	1	0	0	0	0	0	1	664	35		782	747
CY	0	1		6	3	0	0	9	58	1	1	1	0	0	0	0	0	1	617	33		731	698
CZ	0	0	6	7	4	0	0	10	75	1	1	2	0	0	0	0	0	1	787	41		935	894
DE	3	1	1	36	2	7	0	20	57	1	0	3	2	1	3	1	3	1	447	27		616	589
DK	0	2		7	28	3	2	20	66	1	0	1	1	0	0	0	13	0	744	37		925	888
EE	0	0	0	6	4	0	0	11	72	1	1	1	0	0	0	0	0	1	768	41		906	865
ES	0	1	1	6	4	15	0	13	52	1	1	1	0	0	0	0	2	1	403	23		524	501
FI	0	2		7	4	3	17	21	66	1	1	1	1	0	0	0	13	1	783	38		959	921
FR	0	3	1	10	1	4	0	81	41	0	2	2	1	0	0	0	1	0	279	23		449	426
GB	0	3	3	10	6	4	0	22	95	1	3	2	1	0	1	0	3	1	895	46		1096	1050
GR	0	0	0	7	1	0	0	10	66	1	1	1	0	0	0	0	0	1	665	32		785	753
HU	0	0	0	7	4	0	0	11	71	1	1	1	0	0	0	0	1	1	756	39		893	854
IE	0	2	3	10	6	4	0	20	94	1	4	2	1		1	0	3	1	883	46		1081	1035
IT	0	1	0	6	1	4	0	10	51	1	0	44	0	0	0	0	0	1	326	22		467	445
LT	0	0	0	6	4	0	1	11	70	1	1	1	0	0	0	0	0	1	763	41		900	859
LU	1	6	0	13	3	4	0	47	70	1	1	2	1	1	6	0	4	1	757	41		959	918
LV	0	0	0	6	4	0	0	11	70	1	1	0	0	0	0	0	0	1	717	40		851	811
MT	0	1	0	6	4	0	0	12	67	1	1	1	0	0	0	0	0	1	688	35		817	782
NL	1	6	0	15	3	4	0	27	79	1	1	1	1	0	39	0	4	1	712	37		932	895
PL	0	0	1	6	4	0	0	12	72	1	1	1	0	0	0	0	1	1	745	38		883	845
PT	0	0	1	6	1	0	1	9	55	1	1	1	0	0	0	0	1	1	611	27		716	689
SE	0	1	0	7	10	3	4	20	68	1	1	1	1	0	0	0	33	1	783	40		974	934
SI	0	0	0	6	4	0	1	10	60	1	1	1	0	0	0	0	0	1	651	35		771	736
SK	0	0	5	7	4	0	0	10	73	1	1	2	0	0	0	0	0	1	765	42		911	869
Max #	4	11	6	36	28	15	17	81	95	1	4	44	2	1	39	1	33	1	895	46		1360	419
Distinct #	5	14	6	55	34	25	18	131	162	1	7	49	2	1	42	1	39	1	1314	97		2004	593
Share	0%	1%	0%	3%	2%	1%	1%	7%	8%	0%	0%	2%	0%	0%	2%	0%	2%	0%	66%	5%			
Avail %	7%	11%	14%	18%	13%	10%	5%	15%	40%	93%	15%	6%	24%	15%	8%	7%	8%	89%	49%	36%		0%	0%

Source: Apple iTunes and authors' own calculations. Note: first sample data only.

Table 4.2: Consumer preferences for films (average logrank of films from CoO in CoD)

CoO>	AT	BE	CZ	DE	DK	ES	FI	FR	GB	HU	IE	IT	LU	MT	NL	PL	SE	SK	US	ROW
Cod																				
AT	**2.7**	2.7	0.0	2.1	0.0	2.5		3.1	1.7	0.0		3.7	2.4	0.0	3.6	0.0	3.5	0.0	2.0	2.1
BE	0.0	**3.7**		1.1	2.3	3.4		2.5	0.7	0.0	0.0	1.8	0.0	0.0	0.6		3.8	0.0	1.1	0.8
BG				2.1	0.0			2.2	1.6	0.0	0.0	0.0						0.0	1.8	1.5
CY		0.0		1.9	0.0			2.1	1.3	0.0	0.0	0.0						0.0	2.1	0.6
CZ			**5.5**	0.8	0.8			1.7	1.6	0.0	0.0	2.5						4.8	1.3	1.1
DE	1.1	3.7	0.0	**2.7**	0.0	3.0		2.7	2.1	0.0		3.2	2.6	5.0	5.3	0.0	3.1	0.0	2.0	1.6
DK		2.8		2.6	**4.7**	5.3	2.8	2.0	0.9	0.0		5.7	0.0				1.8		1.3	0.8
EE				1.8	2.5			1.4	1.1	0.0	0.0	0.0						0.0	1.6	0.8
ES		5.5	0.0	1.9	1.2	**4.4**		3.5	1.1	0.0	5.4	5.0					5.1	0.0	2.3	1.6
FI		2.1		2.3	0.8	5.4	**5.1**	2.7	1.3	0.0	0.0	3.6	0.0				3.8	0.0	1.2	0.4
FR		4.8	0.0	3.6	4.8	4.3		**3.4**	1.9		5.3	4.3	0.0				5.4		2.7	3.3
GB		2.7	0.0	1.6	0.9	2.7		1.8	**1.8**	0.0	0.0	0.0	0.0		5.7		1.8	0.0	1.2	0.7
GR				1.6	0.0			2.0	1.5	0.0	0.0	0.0						0.0	1.8	1.0
HU				2.9	2.5			1.6	2.0	**5.2**	0.0	0.0					4.9	0.0	1.5	0.7
IE		0.0	0.0	1.4	1.7	5.0		1.7	1.3	0.0	**3.9**	0.0	0.0		5.4		3.4	0.0	1.3	0.4
IT		5.5		2.8	0.0	5.6		3.6	1.1	0.0		**3.8**						0.0	2.5	1.8
LT				1.7	2.4		3.9	1.8	1.9	0.0	0.0	0.0						0.0	1.5	1.6
LU	2.9	2.8		1.8	0.0	5.2		3.2	0.8	0.0	0.0	0.0	**4.6**	0.0	0.0		0.7	0.0	1.2	0.5
LV				0.9	0.0			1.3	1.2	0.0	0.0							0.0	1.7	1.0
MT		0.0		0.8	0.0			2.0	1.3	0.0	0.0	0.0						0.0	1.8	0.8
NL	0.0	1.4		1.8	0.0	2.6		1.8	0.8	0.0	0.0	3.9	0.0		4.1		4.8	0.0	1.2	0.9
PL			0.0	1.8	0.0			1.4	1.5	0.0	0.0	0.0					4.8	0.0	1.5	0.8
PT			0.0	1.8	0.0		5.0	2.0	1.5	0.0	0.0	3.9					4.7	0.0	2.0	1.4
SE		0.0		2.1	2.7	4.8	2.7	1.9	1.1	0.0	0.0	5.7	0.0				**4.9**	0.0	1.2	0.6
SI				0.8	1.4		5.3	2.7	1.2	0.0	4.9	0.0						0.0	1.9	1.4
SK			5.3	0.8	0.7			0.4	1.2	0.0	0.0	0.0						**5.7**	1.5	1.3
Tot D	6.7	37.8	10.8	47.3	29.5	54.0	24.8	56.6	35.3	5.2	19.5	47.0	9.6	5.0	24.6		56.7	10.5		
Ext D	4.0	34.1	5.3	44.7	24.8	49.7	19.7	53.2	33.5	0.0	15.6	43.2	5.0	5.0	20.6		51.7	4.8		
%Ext	59%	90%	49%	94%	84%	92%	79%	94%	95%	0%	80%	92%	52%	100%	84%		91%	46%		

Source: Apple iTunes and authors' own calculations. Note: first sample data only.

Table 4.3: Consumer demand for films (sum of logranks of films from CoO in CoD)

CoO>	AT	BE	CZ	DE	DK	ES	FI	FR	GB	HU	IE	IT	LU	MT	NL	PL	SE	SK	US	ROW	TOTAL
Cod																					
AT	**10.9**	5.5	0.0	72.0	0.0	17.7		58.9	97.3	0.0		11.0	4.8	0.0	10.8	0.0	10.5	0.0	876.8	61.7	1237.8
BE	0.0	**40.4**		21.6	4.6	20.4		148.8	50.8	0.0	0.0	3.6	0.0	0.0	22.5		15.1	0.0	790.6	33.2	1151.6
BG				15.0	0.0			17.3	95.0	0.0	0.0	0.0						0.0	1204.4	52.0	1383.7
CY		0.0		11.2	0.0			19.2	72.6	0.0	0.0	0.0						0.0	1268.0	20.0	1391.0
CZ			**33.0**	5.3	3.3			17.3	119.3	0.0	0.0	5.0						4.8	1053.8	46.0	1287.9
DE	3.3	3.7	0.0	**95.5**	0.0	20.8		53.5	119.5	0.0		9.5	5.2	5.0	15.9	0.0	9.3	0.0	894.1	42.8	1278.0
DK		5.6		18.2	**133.0**	15.8	5.6	40.4	59.3	0.0		5.7	0.0				24.0		966.6	28.9	1303.0
EE				10.9	10.1			15.6	82.6	0.0	0.0	0.0						0.0	1252.7	31.9	1403.8
ES		5.5	0.0	11.2	4.8	**65.6**		45.9	59.0	0.0	5.4	5.0					10.2	0.0	931.2	36.9	1180.7
FI		4.2		16.1	3.3	16.2	**87.4**	56.8	83.5	0.0	0.0	3.6	0.0				50.0	0.0	974.2	16.0	1311.3
FR		14.5	0.0	36.0	4.8	17.0		**273.0**	78.4		10.5	8.7	0.0				5.4		750.4	75.3	1274.1
GB		8.2	0.0	16.0	5.6	10.9		39.9	**167.8**	0.0	0.0	0.0	0.0		5.7		5.4	0.0	1081.8	34.2	1375.7
GR				10.9	0.0			20.4	96.7	0.0	0.0	0.0						0.0	1202.1	31.4	1361.5
HU				20.0	10.1			17.9	141.8	**5.2**	0.0	0.0					4.9	0.0	1131.7	27.5	1359.3
IE		0.0	0.0	14.4	10.0	19.9		33.5	117.7	0.0	**15.6**	0.0	0.0		5.4		10.3	0.0	1130.9	17.2	1375.0
IT		5.5		16.6	0.0	22.3		36.1	55.3	0.0		**165.4**						0.0	814.1	40.5	1155.7
LT				10.1	9.6		3.9	20.0	131.6	0.0	0.0	0.0						0.0	1156.3	66.6	1398.0
LU	2.9	16.6		23.9	0.0	20.7		151.9	58.4	0.0	0.0	0.0	**4.6**	0.0	0.0		2.8	0.0	872.2	18.9	1172.9
LV				5.6	0.0			13.8	81.1	0.0	0.0							0.0	1251.8	38.9	1391.1
MT		0.0		5.0	0.0			23.4	84.1	0.0	0.0	0.0						0.0	1258.8	29.6	1400.9
NL	0.0	8.5		26.9	0.0	10.6		48.2	59.8	0.0	0.0	3.9	0.0		**158.3**		19.2	0.0	867.0	32.5	1234.9
PL			0.0	10.7	0.0			17.2	109.0	0.0	0.0	0.0					4.8	0.0	1097.9	29.8	1269.3
PT			0.0	10.9	0.0		5.0	18.1	81.8	0.0	0.0	3.9					4.7	0.0	1209.8	36.8	1371.0
SE		0.0		14.8	26.9	14.3	10.7	38.2	77.0	0.0	0.0	5.7	0.0				**162.8**	0.0	906.5	22.3	1279.1
SI				4.8	5.5		5.3	27.2	73.2	0.0	4.9	0.0						0.0	1220.2	50.0	1391.1
SK			26.7	5.6	2.9			3.9	88.2	0.0	0.0	0.0						**5.7**	1133.2	52.5	1318.8
Tot D	17.0	118.3	59.7	509.1	234.5	272.2	117.9	1256.4	2340.6	5.2	36.4	230.9	14.6	5.0	218.6		339.5	10.5			
Ext D	6.1	77.9	26.7	413.6	101.5	206.6	30.5	983.4	2172.7	0.0	20.8	65.5	10.0	5.0	60.3		176.6	4.8			1,310
%Ext	36%	66%	45%	81%	43%	76%	26%	78%	93%	0%	57%	28%	69%	100%	28%		52%	46%			

Source: Apple iTunes and authors' own calculations. Note: first sample data only.

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Table 5.1: Supply side availability regressions

VARIABLES	OLS at country level			Probit at product level		
	Songs	Albums	Films	Songs	Albums	Films
ldistance	-0.0089	-0.0167***	-0.0600	0.0749***	-0.1183***	-0.0545**
	(0.006)	(0.005)	(0.089)	(0.012)	(0.011)	(0.026)
comlang	0.0514***	0.0459***		0.0330	0.0205	
	(0.016)	(0.013)		(0.027)	(0.023)	
home	0.1221***	0.0670***	1.3902***	0.5553***	0.1294***	1.7906***
	(0.020)	(0.017)	(0.213)	(0.046)	(0.043)	(0.071)
Contig			0.4170***	0.1851***	0.0180	0.6084***
			(0.117)	(0.027)	(0.024)	(0.045)
English				-0.2523***	0.3327***	0.3694***
				(0.014)	(0.013)	(0.027)
Constant	-0.4522***	-0.0044	-1.1553*	0.4896***	1.7850***	-0.2130
	(0.045)	(0.050)	(0.664)	(0.111)	(0.104)	(0.235)
Observations	756	756	316	78,543	107,271	53,591
R-squared	0.882	0.811	0.861			

Standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1
All regressions with CoO and CoD fixed effects. Product level regressions include product fixed effects as well

Table 5.2: Consumer demand regressions (OLS, dependant variable = average of the log ranks)

| VARIABLES | -------------- country level ------------------ | | | ----------- product level, product fe -------- | | |
	Songs	Albums	Films	Songs	Albums	Films
ldistance	-0.0471**	-0.0555***	-0.1835	-0.0235*	-0.0707***	-0.1219
	(0.020)	(0.019)	(0.231)	(0.013)	(0.012)	(0.085)
home	3.3246***	2.9891***	1.8621***	2.7504***	2.3560***	0.9751***
	(0.065)	(0.065)	(0.555)	(0.069)	(0.061)	(0.201)
comlang	0.3616***	0.3110***		0.4180***	0.2686***	
	(0.050)	(0.050)		(0.029)	(0.024)	
Contiguity			0.0868			0.2484*
			(0.305)			(0.137)
LoO= English				2.7234***	-0.0018	-1.1350
				(0.072)	(0.169)	(0.840)
Constant	0.4549***	0.3961***	2.3480	-4.5382***	0.6987***	2.0176**
	(0.146)	(0.145)	(1.728)	(0.472)	(0.179)	(0.980)
Observations	756	756	316	53,625	64,716	20,546
R-squared	0.884	0.863	0.563	0.409	0.382	0.488

Standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1

All regressions with CoO and CoD fixed effects. Product level regressions include product fixed effects as well

Table 5.3: Supply (availability) and consumer demand for media products (country level OLS)

VARIABLES	Songs		Albums		Films	
	Availability	Cons dem	Availability	Cons dem	Availability	Cons dem
ldistance	-0.0089	-0.0471**	-0.0167***	-0.0555***	-0.0600	-0.1835
	(0.006)	(0.020)	(0.005)	(0.019)	(0.089)	(0.231)
comlang	0.0514***	3.3246***	0.0459***	0.3110***		
	(0.016)	(0.065)	(0.013)	(0.050)		
home	0.1221***	0.3616***	0.0670***	2.9891***	1.3902***	1.8621***
	(0.020)	(0.050)	(0.017)	(0.065)	(0.213)	(0.555)
Contig					0.4170***	0.0868
					(0.117)	(0.305)
Constant	-0.4522***	0.4549***	-0.0044	0.3961***	-1.1553*	2.3480
	(0.045)	(0.146)	(0.050)	(0.145)	(0.664)	(1.728)
Observations	756	756	756	756	316	316
R-squared	0.882	0.884	0.811	0.863	0.861	0.563

Source: authors' calculations

Notes:

*** p<0.01, ** p<0.05, *
- Standard errors in brackets: p<0.1
- All regressions with CoO and CoD fixed effects
- Films: origin is considered to be the first country of origin

Table 5.4: Price regressions

| | --------------------- OLS --------------- | | | -------------------- Probit -------------------------- | | |
VARIABLES	**Songs** lprice	**Albums** lprice	**Films** lprice	**Songs** price≠modepr	**Albums** price≠modepr	**Films** price≠modepr
ldistance	-0.0116***	0.0071**	-0.0229***	0.0055	-0.0828***	0.0622
	(0.002)	(0.003)	(0.005)	(0.022)	(0.015)	(0.073)
lrank	0.0032***	0.0051***	0.0226***	0.0050	0.0392***	-0.0162***
	(0.001)	(0.001)	(0.001)	(0.005)	(0.004)	(0.005)
home	-0.0190***	-0.0565***	-0.0586***	0.2496***	-0.0195	-0.4960***
	(0.005)	(0.010)	(0.016)	(0.059)	(0.045)	(0.149)
comlang	0.0007	-0.0182***		0.1604***	0.0806***	
	(0.003)	(0.005)		(0.031)	(0.025)	
contig			-0.1057***			-0.2683**
			(0.037)			(0.108)
Constant	0.1404***	1.6182***	2.5829***	-0.9427***	-1.4319***	-2.4774***
	(0.018)	(0.079)	(0.099)	(0.338)	(0.277)	(0.704)
Observations	81,276	98,393	21,480	78,162	98,366	21,434
R-squared	0.0995	0.0904	0.141			

Standard errors in parentheses

All regressions with CoO and CoD fixed effects

Table 6. Country level music price differences explained

VARIABLES	(1) fe
lprice_level	0.1781
	(0.113)
lgdp_pc	-0.0269
	(0.090)
Constant	-0.6508**
	(0.256)
Observations	27
R-squared	0.226

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7a. Number of products with country prices different from the mode price

Countries	SONGS Freq.	%	ALBUMS Freq.	%	FILMS (1st search) Freq.	%	FILMS (2nd search) Freq.	%
0	1,547	52.65%	739	18.54%	715	36.00%	2,069	31.48%
1	192	6.54%	1,168	29.30%	206	10.37%	1,031	15.69%
2	120	4.08%	337	8.45%	268	13.49%	657	10.00%
3	143	4.87%	197	4.94%	212	10.67%	530	8.06%
4	91	3.10%	114	2.86%	127	6.39%	476	7.24%
5	60	2.04%	101	2.53%	122	6.14%	407	6.19%
6	56	1.91%	98	2.46%	84	4.23%	287	4.37%
7	76	2.59%	94	2.36%	60	3.02%	215	3.27%
8	70	2.38%	83	2.08%	65	3.27%	160	2.43%
9	91	3.10%	86	2.16%	38	1.91%	132	2.01%
10	90	3.06%	110	2.76%	41	2.06%	112	1.70%
11	125	4.25%	150	3.76%	25	1.26%	108	1.64%
12	65	2.21%	132	3.31%	12	0.60%	88	1.34%
13	52	1.77%	154	3.86%	5	0.25%	112	1.70%
14	48	1.63%	170	4.26%	3	0.15%	79	1.20%
15	44	1.50%	96	2.41%	2	0.10%	41	0.62%
16	46	1.57%	59	1.48%	1	0.05%	36	0.55%
17	20	0.68%	50	1.25%	0	0.00%	24	0.37%
18	2	0.07%	43	1.08%	0	0.00%	6	0.09%
19	0	0.00%	4	0.10%	0	0.00%	2	0.03%
20	0	0.00%	1	0.03%	0	0.00%	0	0.00%
21	0	0.00%	0	0.00%	0	0.00%	0	0.00%
22	0	0.00%	0	0.00%	0	0.00%	0	0.00%
23	0	0.00%	0	0.00%	0	0.00%	0	0.00%
24	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	2,938	100.00%	3,986	100.00%	1,986	100.00%	6,572	100.00%

Source: Apple iTunes data and authors' own calculations.

Table 7b: Percentage of products with deviations from the mode price by country

COUNTRY	SONGS		ALBUMS		FILMS (1st search)		FILMS (2nd search)	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
AT	26.57%	2.16%	16.83%	8.73%	7.76%	11.55%	6.68%	27.13%
BE	21.23%	1.53%	19.70%	4.29%	9.13%	15.25%	10.17%	12.89%
BG	2.94%	8.96%	2.51%	13.20%	4.60%	2.30%	6.31%	2.65%
CY	3.89%	7.56%	7.97%	10.50%	6.71%	2.74%	11.95%	2.60%
CZ	3.76%	2.48%	3.89%	13.14%	4.61%	1.50%	7.46%	1.78%
DE	27.61%	1.99%	16.66%	10.24%	7.47%	11.69%	5.99%	29.10%
DK	97.31%	1.01%	89.03%	9.39%	89.30%	8.32%	70.54%	26.36%
EE	3.71%	8.23%	2.48%	11.15%	0.77%	4.30%	7.65%	1.13%
ES	10.29%	5.86%	19.80%	7.15%	11.64%	31.11%	8.16%	49.27%
FI	35.26%	1.42%	25.24%	4.82%	13.66%	13.24%	17.97%	30.11%
FR	25.24%	0.84%	20.91%	6.39%	8.24%	15.59%	19.94%	14.92%
GB	29.45%	69.16%	55.81%	43.32%	32.66%	61.59%	44.85%	40.88%
GR	6.80%	1.33%	7.78%	17.74%	10.26%	2.56%	11.02%	4.46%
HU	3.48%	3.44%	3.01%	17.04%	3.48%	1.24%	6.29%	3.19%
IE	29.81%	2.61%	20.70%	9.43%	25.16%	22.85%	32.46%	15.12%
IT	19.52%	1.99%	20.11%	4.85%	9.21%	25.70%	5.53%	40.62%
LT	3.34%	8.00%	4.89%	10.89%	0.78%	4.56%	7.22%	1.33%
LU	20.53%	1.33%	20.45%	3.70%	10.01%	17.18%	10.79%	13.49%
LV	3.48%	8.31%	2.93%	11.13%	0.94%	4.95%	7.34%	0.79%
MT	4.37%	7.83%	3.56%	7.46%	4.53%	3.43%	11.87%	5.01%
NL	8.81%	4.32%	20.13%	4.81%	10.42%	18.69%	8.93%	16.22%
PL	4.78%	2.74%	4.31%	16.42%	7.82%	2.83%	5.76%	10.64%
PT	19.08%	0.49%	17.96%	6.27%	9.83%	4.21%	8.36%	11.26%
RO	3.20%	8.42%	3.66%	13.50%				
SE	96.35%	2.82%	94.81%	4.67%	78.44%	17.25%	67.01%	29.57%
SI	2.68%	9.50%	3.97%	9.73%	4.03%	2.47%	5.50%	2.67%
SK	2.44%	9.20%	3.80%	7.07%	3.18%	1.32%	6.93%	2.44%

Source: Apple iTunes data and authors' own calculations.

Table 7c. Number of translated films that show price dispersion

# versions	# films showing price dispersion	Total number of films
2	365	1,271
3	89	196
4	10	16

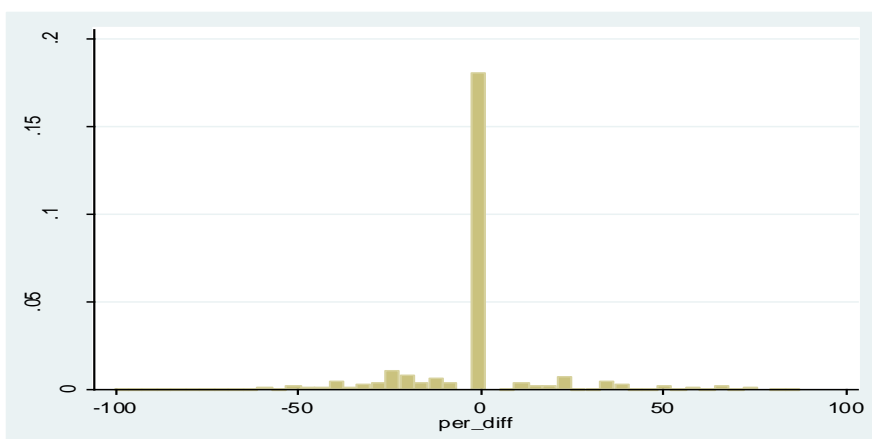Source: Apple iTunes data and authors' own calculations.

Figure 1a: Histogram of price dispersion for songs in the EU iTunes stores
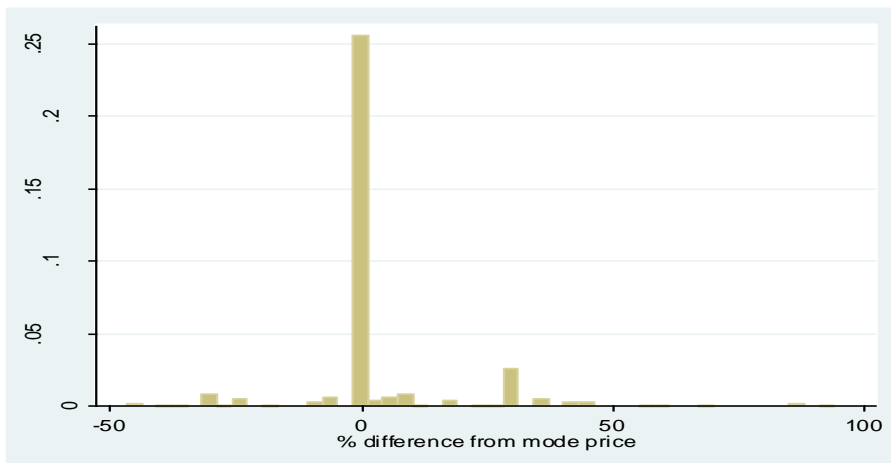
**Figure 1b: Histogram of price dispersion for albums in the EU iTunes stores**
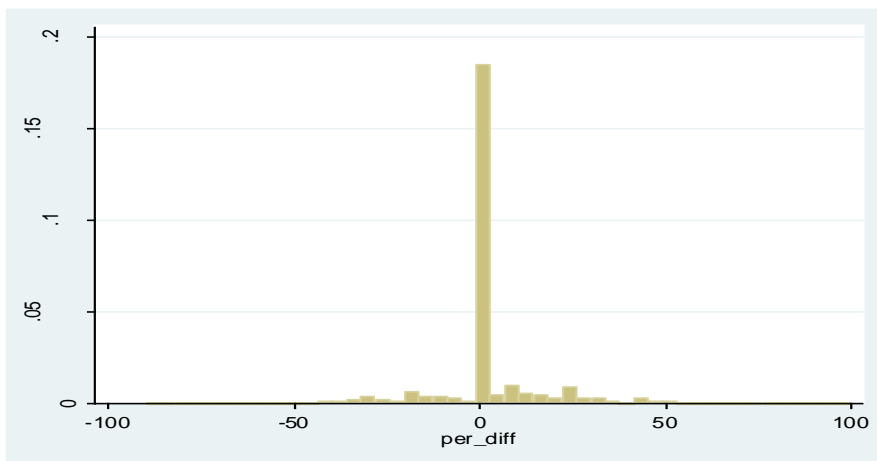
Figure 1c: Histogram of price dispersion for films in the EU iTunes stores
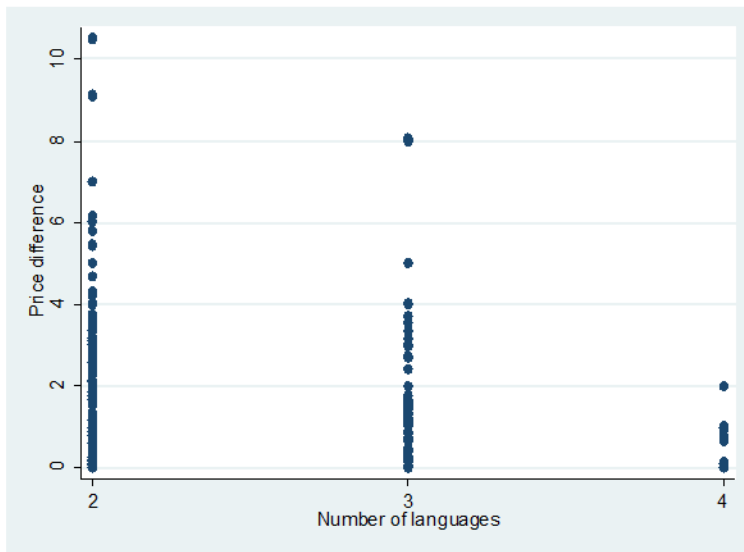

Source: Apple iTunes data and authors calculations. Note: Mode prices normalised to zero. Percentage difference from normalised mode price. Observations per song/album and across countries.
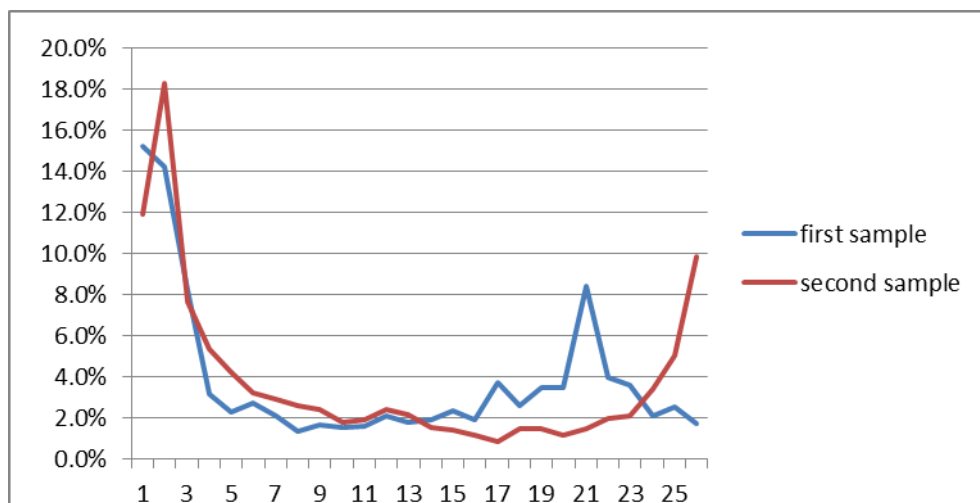
Figure 2. Number of films available per country in different languages
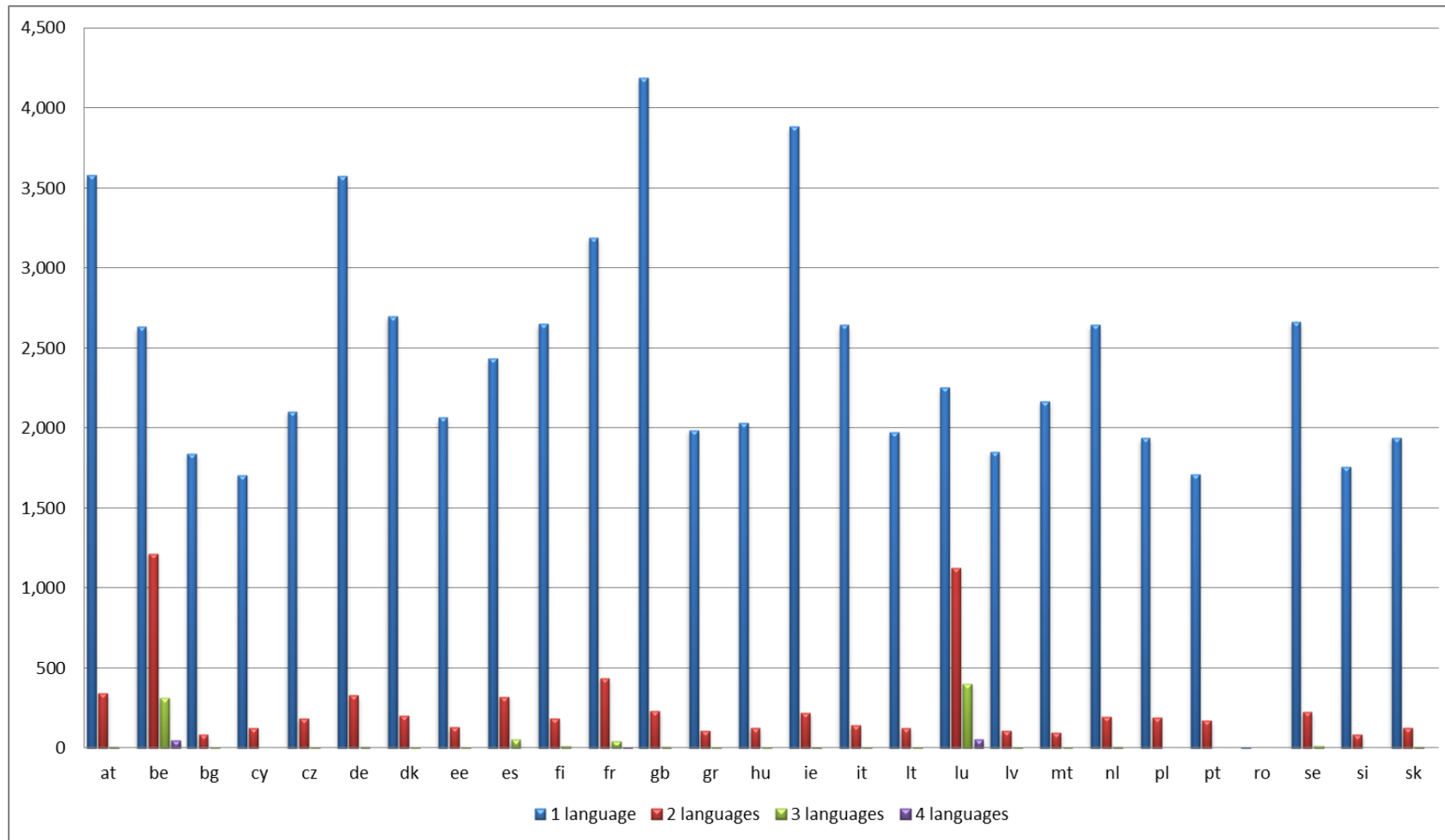
Source: Apple iTunes data and authors' calculations

Figure 3: Film price dispersion across different languages

Source: Apple iTunes data and authors' calculations

Figure 4: Geographical distribution of film availability (first and second samples)

Source: Apple iTunes data and authors' calculations

JRC Mission

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners.

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Stimulating innovation
Supporting legislation