Paper for IMDS

Music Business Models and Piracy

Abstract

Purpose –An estimate of the scale of illegal file sharing activity across 10 countries is made and a correlation of this activity with country revenues. The work elucidates an under explored business model challenge which exists in parallel with a music piracy challenge.

Design/methodology/approach–The study data draws from a number of sources, including a data set of a survey of more than 44,000 consumers in ten different countries undertaken in 2010. Following analysis all findings are validated by a panel of industry experts.

Findings –Results show that non-legitimate file sharing activity is a heterogeneous issue across countries. The scale of activity varies from 14 per cent in Germany to 44 per cent in Spain, with an average of 28 per cent. File-sharing activity negatively correlates to music industry revenue per capita. This research finds many consumers are not engaging with online business models. Almost one fourth of the population claim that they do not consume digital music in either legal or illegal forms. This phenomenon is also negatively correlated with sales per capita.

Research limitations/implications –The comparative analysis in this work focuses upon business models which sell music as tracks or albums. Music streaming business models are excluded from this study which creates a limitation. Legal streaming accounts for ~1 per cent of revenue and is expected to grow significantly. A file sharer is taken to be an individual who illegally downloads music very often or often and a non-file sharer one who only does this occasionally, rarely or never. Technically, respondents may illegally stream music and state they do not illegally download. The exclusion of streaming coupled with the definition of file sharers mean figures presented are very conservative. The majority of the sample data, 60 per cent, is from European countries.

Practical implications –Results support the need for policy makers to introduce strong Intellectual Property Rights (IPR) regulation which reduces file-sharing activity. The work also identifies a large percentage of non-participants in the digital market who may be re-engaged with music through business model innovation.

Originality/value –This research presents a map of the current file sharing activity in 10 countries using a rich and unique dataset. The work identifies that a countries' legal origin correlates to data on file sharing activity, with countries from a German legal origin illegally file sharing least. Approximately half of the survey respondents chose not to answer the question related to file sharing activity. Different estimates of the true scale of file-sharing activity are given based upon three different assumptions of the file sharing activity of non-respondents to this question. The challenge of engaging consumers in the digital market through different business models is discussed in light of digital music's high velocity environment.

Keywords– Music Industry, File Sharing, Business Models, Cross-Country analysis.

1. Introduction

Revenues in the global music industry have been shrinking since the start of the twenty first century (Liebowitz and Watt, 2006; Liebowitz, 2006, 2008; Elberse, 2010; IFPI, 2011). Firms in this sector are moving from a focus on selling music as a physical product towards creating value from selling music in digital formats (Parry *et al.*, 2012) which gives rise to different business models (Balocco *et al.*, 2010). A clear correlation exists between digitalization (i.e. MP3 format, broadband availability, online file sharing) and revenue decline in the music industry, with the most common explanation for this decline being the role of illegal file sharing, often referred to as piracy (Liebowitz, 2008). The piracy phenomena may be a form of purchase substitution, where music consumers substitute illegal downloads for legal purchase (Liebowitz and Watt, 2006; Liebowitz, 2006). Widespread availability of broadband internet facilitates the growth of file sharing. As physical distance is largely irrelevant for internet based file sharing, individuals from across the world can participate (Siwek, 2007; RIAA, 2011). To counter act illegal file sharing some countries have introduced stronger legislation. Analysis shows a correlation between stronger legislation protecting Intellectual Property Rights (IPR) and increases in revenues (Bhattacharjee *et al.*, 2006; Adermon and Liang, 2010; IFPI, 2011; Danaher *et al.*, 2012).

Preventing piracy through legislation is not the sole response available to the music industry. The fall in revenue is partially attributed to a reduction in consumption as a result of the consumer's unfamiliarity with new digital sales formats, as time is needed to learn and adapt to new digital technologies (Parry *et al.*, 2012). In this new product-service system, in which market information is scarce, customers play a central role in creating value (Hilletofth, 2011) and to be successful firms need to adopt a customer-oriented perspective (Öztaysi *et al.*, 2011). Analyzing the digital music market, there are two groups of consumers identified that represent potential sources of new digital revenues that may be recovered: (1) those consumers currently engaged in illegal file sharing and (2) those consumers who have become disenfranchised with currently available digital business models.

This paper uses empirical analysis of a rich and unique dataset of more than 44,000 surveys conducted in 2010 in 10 different countries. The objective is twofold. First to direct the strategic approach of the music industry by estimating both the scale of illegal file sharing and the size of the market of those not engaging with digital business models for the 10 countries studied. Second, to understand how value is

created using correlation analysis at the country level between illegal file sharing and digital business models against total music revenues per capita. This paper calls for both improved regulation to limit piracy and the development of new business models.

The paper will continue with a literature review and construction of hypotheses. Following this is an explanation of the data used, empirical analysis undertaken and a presentation of the results. The work concludes with a discussion of the results and future research.

2. Digital business models and piracy

Revenues from the total music industry have decreased substantially since the beginning of the twenty-first century, Figure 1. The total sales from the 10 countries analyzed decreased from US$22bn (thousand million) in 2000 to US$13bn in 2010. From the literature two scenarios are identified which may be contributing towards the decrease in revenue: illegal file sharing of digital music and business models which are unfamiliar to the consumer. This paper attempts to quantify and disentangle the two scenarios and identify which may be the most significant in different contexts.

[Insert Figure 1]

2.1 The file sharing challenge

In economic terms file sharing reduces music sales when the market price of songs are higher than its consumer utility (Waldfogel, 2010). In this sense, piracy is a form of purchase substitution (Liebowitz and Watt, 2006; Liebowitz, 2006), where music consumers substitute illegal downloads for legal purchases. Empirical evidence supports the premise that illegal file sharing reduces music industry revenue, which supports calls for greater IPR protection (Hong, 2004; Rob and Waldfogel, 2004; Liebowitz, 2008; Michel, 2006; Zentner, 2006; IFPI, 2011). IPR protection takes two forms, either technological constraint on the user e.g. Digital Rights Management [DRM], or the introduction of legislative instruments.

Vernik *et al.* (2011) show that DRM is ineffective in preventing piracy as those who suffer most inconvenience from usage restrictions are legal purchasers. On the contrary, empirical studies of legislative reforms in different countries suggest that this is an effective approach (E.g. in the US Battacharjee *et al.*, 2006; in Sweden Adermon and Liang, 2010; and in France Danaher *et al.*, 2012). Special relevance should be given to the study of Danaher *et al.* (2012) who explored how the Hadopi (2009) legislation

affects digital music sales in the iTunes music store in France. They use a broad set of European countries as a control group. The results suggest that increased consumer awareness of the Hadopi law causes iTunes song and album sales to increase by 23 and 25 per cent respectively relative to changes in the control group.

The first hypothesis is constructed to test the theory that piracy in music industry results in purchase substitution:

H1: There is an inverse relationship between file sharing activity and revenues in the music industry

2.2 Business model development

The term Business Model here refers to the design of the value creation, delivery and capture mechanisms employed by an enterprise to entice customers to pay for value, and convert those payments to profit (Teece, 2010). Differences between the business model and strategy lies within three areas (Chesbrough and Rosenbloom, 2002): business models start at value creation for the customer whereas strategy places more emphasis upon value capture and sustainability; financing may not be as prominent in business models as in strategy; the business model assumes knowledge is cognitively limited and biased by a firms previous success, whereas strategy assumes careful analytics based upon reliable and available information with little recognition of cognitive limitations.

Analysis of music business models (Molteni and Ordanini, 2003; Choi and Perez, 2007) shows that mp3 technology provided a turning point in the music market, as this file format facilitated the development of online offerings which increased the availability and choice for consumers (Graham *et al.*, 2004). Prior to this innovation a firm's competitive advantage was heavily dependent on high-street shops with limited stock space, competing on managerial capabilities in balancing stock and consumer demand. Digital music removed much of the supply side challenge, deliver operating efficiencies across the supply chain (Coltman *et al.*, 2001) and allowed the development of business models which integrate customer and supplier in a relationship (Sommer, 2003). This requires a re-evaluation of organizational strategies and learning capabilities of music vendors (Lin *et al.*, 2011). Music vendors need to differentiate their offerings to clearly demonstrate their value propositions to their customers (Burn and Ash, 2005). Digital music business models may encompass traditional physical unit sales, digital unit sales, streamed music, online radio and forums for consumer engagement and

comment on content (Bustinza *et al.*, 2012). These additions to the product offering are likened to the servitization process, where firms are increasingly seeking revenue from services associated with their product (Vandermerwe and Rada, 1988).

Industry revenue decline suggests that the 'recipe' for a successful music business model has yet to be achieved (Baden-Fuller and Morgan, 2010). 'Unbundling', a common facet of the digital music business model where each individual track from an album may be bought separately, produces a decrease in total industry revenue (Elberse, 2010). Danaher *et al.* (2010) show that file sharing of NBC content increased substantially when it was removed from iTunes in 2007. File sharing activity decreased and revenues were recovered once the content was restored to the iTunes catalogue in 2008. Therefore, digital stores such iTunes may provide revenue gains from those who may currently be non-buyers or illegally share files. Consequently customer demand may be stimulated through evolution and new business model development (Hilletofth, 2011; O'Cass and Ngo, 2011).

The online market is a high-velocity environment as demand, competition and technology are constantly changing (Wirtz *et al.*, 2007). Music distributors have begun to establish new business models where they are part of the value chain (i.e. cloud music services) being necessary for that a close analysis of customers behaviour. Business models are built around delivering customer value but knowledge of innovation management in the music industry may be limited, exemplified by the negative impact of mp3 technology on revenue. To better understand how business models create value for customers firms have begun to more closely customers' analyse behaviour (Parry *et al.*, 2012). Understanding and development of successful business models may be seen as part of a more complex strategy, which would include lobbying for IPR protection, to recover revenues. For all these reasons, a second hypothesis is created to test whether new business models can increase revenues:

H2: There is a positive relationship between new business models and recovering revenues in the music industry

3. Empirical analysis

3.1 Data

A unique cross section questionnaire with 44,206 valid observations from 10 countries is exploited. Four continents are represented with a recognised bias towards Europe as 6 European countries are represented, with 2 countries from North America and 1country each for Asia and Oceania. The questionnaire and responses formed part of a global survey conducted between September and December 2010 by one of the 'Big 3' global music companies with the objective of gaining insight into music consumer behaviour (Informa Telecoms & Media, 2010). A representative sample of the general population is given by random sampling. The survey extends to over 300 questions, using Likert scales, open and closed questions. Analysis takes into account a subset of responses relating to consumer purchasing behaviour. This sample has been proved to be valid in a recent study by Parry *et al.* (2012).

Available comparisons between digital file sharing activities and business models are shown in Table 1. Data from different sources attempts to quantify and measure file sharing activity. In the sample period IFPI (2011) data for illegal file sharing is available only for Spain, but is similar to the primary data used in this paper.

[Insert Table 1]

Waldfogel (2010) surveyed 500 US graduate students in 2010 and showed that of a sample of 50 popular songs students on average possess 7.63 legally purchased and 7.20 illegally downloaded songs, suggesting piracy in the US accounts for half of music consumption. Compared to other estimates of US piracy this figure is consistent with Peitz and Waelbroeck (2004) who estimate levels in 2001 at 40 per cent and is inconsistent with Liebowitz (2006) who estimate 13 per cent during 2005. The author's conservative estimation, 27 per cent, falls between previous studies.

In the primary data 53.5 per cent of the individuals responding to all the questions chose not to answer the question related to their music file sharing activity. This leaves a question: is the behaviour of the 46.5 per cent that chose to respond to this question representative of the whole population, or do they differ? If they differ the usual methodology employed for missing data, of taking into consideration only the respondents of each question, could create errors within the given estimate. Further analysis of the non-respondent group was undertaken to give different estimates of file sharing activity dependent on the assumptions made regarding the distribution and attitudes of this group.

3.2 Estimates of file sharing activity and the business models challenge

A dummy variable, named *File Sharers / Non File Sharers,* is generated by the ordinal response [1=Very often; 2=Often; 3=Occasionally; 4=Rarely; 5= Never] to the question: *"How frequently do you normally download music files without paying...?"*. Here a *File Sharer* is taken to be an individual who illegally downloads music very often or often and a *Non-File Sharer* one who does this occasionally, rarely or never. This provides a conservative estimate to construct the proxy for file sharers.

A proxy for defining a digital buyer is generated using the question: *"Does your music collection contain Digital downloads that you paid for?"* This is a dummy variable, named *Digital Buyers / Non Digital Buyers*.

The variable analysis and consumer categories follow the flow shown in figure 2. Initially a *File Sharer / Non-File Sharer* dyad of consumers is created. Analysis of these subgroups identifies if consumers buy digital music or not, creating the groups *Buyers Digital/ Non-Buyer Digital*. An estimate is then made of the total size by population of each sub-group: the group called *Legal Buyers* who legally purchase digital music; the group *Non-buyers* who buy no digital music; *Sharer & Buyer* who both buy digital music and illegally file share; and *Illegal File Sharers* who only have illegally shared digital music, with results shown in Table 2.

[Insert Figure 2 & Table 2]

Aggregating all countries together shows that 28 per cent of the population illegally file share. Approximately half of those who file share also pay for digital music, though the other half do not pay for any of the digital music they consume. From the 73.2 per cent of the population who respect intellectual property rights 68.6 per cent are *Buyers of Digital* music and 31.4 per cent are *Non-Buyers of Digital* music.

Legal Buyers make up half of the full population (49.2 per cent) and further action is not required with regards this group in the analysis. 22.5 per cent of the population are currently disengaged with the digital market. This group of population may be converted to digital purchase through new business models or marketing campaigns. As they do not file share legislation is unlikely to impact upon their behaviour. Sharer & Buyers make up 13.1 per cent and Illegal File Sharers represent 15.1 per cent of the full population. Their attitudes may be influenced by both legislative action and new business model development.

In order to analyze for homogeneity analysis is replicated at the country level. Findings are not homogeneous across countries. Two countries, Spain and Netherlands, have few legitimate buyers as a proportion of total population (<30 per cent). Findings

show that Italy, Spain and the Netherlands have relatively high piracy rates. The population who only engage in illegal file sharing in Spain is 31.4 per cent, Netherlands 27.6 per cent and Italy 21.2 per cent. In recognition of this issue Spain has introduced The Law on the Sustainable Economy, also known as the Sinde-Wert Act, to protect intellectual property rights (Batuecas-Caletrio and Aparicio-Vaquero, 2012; Spain IIPA, 2012). Italy's Regulatory Communication Authority (AGCOM) was formed in December 2010 and is developing legal reforms to protect IPR (Italy IIPA, 2012). Netherlands have not announced any intent to legislate.

Germany is the country with the lowest relative piracy, 14.1 per cent, lower than France where piracy is at 22.7 per cent, despite France having introduced the Hadopi (2010) law to tackle illegal file sharing one year before the survey was undertaken. Germany may be used as a target benchmark for an achievable rate of illegal file sharing under current market conditions. Japan has the second lowest file sharing activity and in exploring links it was found that Japan and Germany share legal origin, (Djankov *et al.* 2002). They are the only 2 countries with German legal origin included in the analysis. The other countries have either French Legal Origin (France, Spain, Netherlands and Italy) or English Legal Origin (UK, US, Australia and Canada) which cluster into distinct groups when percentage file sharing is plotted against revenue (see figure 3.1.2). Further analysis is required to test how meaningful this correlation is.

The UK is the country with the most successful revenue and business model mix, with 69 per cent legal buyers and 20.5 per cent level of piracy. Only 10.4 per cent of the population have left the music market. Whilst the US, Canada and Australia share similarities in terms of language, economic development, legal origin and culture as a group they differ from the UK. Piracy is 25-30 per cent in the population, 50-60 per cent are legitimate buyers, leaving 15-20 per cent as a potential business model challenge.

3.3 Digital market outsiders

The group of non file sharers and non digital buyers are currently described as excluded from the digital market but not necessarily as a consequence of a business model challenge. Table 3 provides analysis of this group which make up 22.5 per cent of the sample. The smallest sub-group, 1.2 per cent, are identified as financially constrained, disclosing that they are unemployed, and so have no disposable income to spend on music. A second group are those who claim to have no interest in music, making up 5.6

per cent of the sample. 4.2 per cent of the aggregate sample buy music, but only in physical format, reflecting the low revenues generated by physical sales. The remaining 11.4 per cent are those with a latent passion for music but who are currently not engaged, representing a challenge for those developing business models.

[Insert Table 3]

An issue within this analysis is that the question disclosing File sharing is answered only by 20,550 consumers, while digital buying is answered by 44,206. The difference is large and whilst we do not have evidence as to their motivation, it is likely a result of respondents resisting self-incrimination though answering this question (Mercado-Kierkegaard, 2005). This privilege is recognised by the European Court of Human Rights (Funke v. France 1993; Ernest Saunders v. United Kingdom 1997). An analysis of them introduces a new group (*Don't Respond*) detailed in data section.

'What happens with the group of population that doesn't want to disclose their piracy behaviour?' In Table 4 the sample is split into consumers that claim to be file sharers, consumers that claim to be non-file sharers and consumers that avoid answering this question. 53.5 per cent of the population avoids answering this question, with homogeneity across countries ranging from 44.2 per cent in Spain to 59 per cent in Japan. Three options are considered here as to why people avoided answering this question: First, they do not want to self-incriminate as they are file sharers. In this scenario total file sharing activity will equal the sum of the non-respondents and explicitly recognized file sharers. Homogeneity would exist across countries and file sharing activity would be between ~63 per cent (Australia, UK and Germany) and ~72 per cent (Netherlands and Italy); second, non-respondents follow a similar distribution to the rest of the sample. If this is the case the results remain the same as offered in Table 2; finally, they are not familiar with digital products and services and are Non-File Sharers. The Business Model challenge thus rises on average to ~65 per cent of population and piracy is a smaller issue, with a Spain the maximum of 24.6 per cent and Germany the minimum with 6 per cent of the population.

[Insert Table 4]

With the objective of clarifying the general reason for not responding to the question on file sharing behaviour Table 5 analyzes the characteristics of File Sharers, Non-File Sharers and Don't Respond groups, reporting mean values and standard deviation for the following set of variables:

- Dummy Variables: Digital and Physical buying behaviour.

- Counting variables: Hours listen voluntarily per week and age.
- Likert Scale Variables: Consumers were asked about for their passion for music, their willingness for buying music legitimately, and their willingness to acquire music without paying.

[Insert Table 5]

The percentage of buying physical is 30.1 per cent and digital at 31.2 per cent in the total sample. However, the distribution is quite different. As shown in Table 5, only 3 per cent of the group that don't respond to the file sharing question buy digital music, but 30.1 per cent buy music in physical format. This percentage is close to that for Non-File Sharers, 33.3 per cent and larger than the File Sharers, 25.1 per cent. Therefore it cannot be concluded that the Don't Respond group are non buyers, they simply have different preferences when buying and they listen to fewer hours of music per week; 2.5 hrs in comparison with 2.9 hrs of Non-File Sharers and 3.8 hrs for File Sharers. The Don't Respond group is less passionate about music than the other groups, which correlates with their average age ~45 years; older than File Sharers at 31.1 and Non-File Sharers at 38.5 years old. To explore the view that the Don't Respond group may be not be illegal file sharers two control variables were included; their willingness to buy music legitimately and download music without paying. On average the group place greatest value on buy music legitimately, a value of 3.8 compared to 2.6 for File Sharers. The group also has the lowest value for acquiring music without paying: 2.2 compared to 3.7 for File Sharers.

3.4 File sharing activity, business model issues and sales per capita

In this analysis, illegal file sharing has been related to an individual's attitude towards buying music, but does not include average spending. IFPI data presents national average expenditure per capita for the year 2010. Figures range from US$4 in Italy to US$31 in Japan. In Figures 3.1 to 3.6 the different measures of file sharing activity and business model issues are related to the true value of sales per capita. As with Table 2, figures 3.1.1, 3.1.2 and 3.2 assume that the Don't Respond group follow the same distribution of those who answered the question. Figures 3.3 and 3.4 assume non-respondents are File Sharers and Figures 3.5 and 3.6 assume they are Non-File Sharers.

[Insert Figures 3.1 to 3.6]

In Figure 3.1 a negative relationship is seen between file sharing activity and sales per capita ($R^2 > 0.5$) supporting the literature (Hong, 2004; Rob and Waldfogel, 2004;

Bhattacharjee *et al.*, 2006; Michel, 2006; Zentner, 2006; Liebowitz, 2008). The line of best-fit has a highly negative slope, -60, such that a reduction of 1 per cent in file sharing gives a rise of US$0.6 in expenditure per capita. Therefore, Hypothesis 1 is accepted. In Figure 3.2, a negative relationship exists between business model issues and sales per capita ($0.1 > R^2 > 0.2$), supporting the literature (Burn and Ash, 2005; O'Cass and Ngo, 2011; Parry *et al.*, 2012). Therefore, Hypothesis 2 is accepted.

When it is assumed that non- respondents to the file sharing question are Non-File Sharers (Figure 3.6) a quadratic relationship is observed, casting doubt upon the validity of the assumption. It seems illogical to suggest that the country with highest sales per capita (i.e. Japan) is faced with a significant business model challenge. However, this is a high velocity environment and may indicate future challenges for this market. Future work including data on streamed services, both illegal and legal, may better inform this argument.

4. Discussion

The empirical literature analyzing the music industry during the last decade has emphasized the role of piracy in the decrease of music industry revenues. Drawing upon a sample of more than 44,000 surveys from 10 countries this work supports the previous findings and suggests that illegal file sharing decreases sales per capita and is a common problem around the world. Based upon conservative assumptions an estimated 28.2 per cent of the population participates in illegal file sharing.

However, the work challenges the assumption that piracy is solely responsible for the revenue decline in the music industry. With the digitalization of music the dynamics of the music market have dramatically changed. Many new music business models reflect a theoretical shift in understanding what music retail is, presenting music to consumers not as a product but as a service (Parry *et al.*, 2012). Examples include pay as you go business models exemplified by Apples *iTunes* and pay monthly models exemplified by *Spotify* (Osterwalder and Pigneur, 2010). The transformation may have excluded some consumers from the market, described in this paper as a Business Model Challenge. According to the analysis presented this challenge accounts for ~22.5 per cent of the population, only six percentage points below the level of file sharing at ~28.2 per cent. Of the 50.7 per cent of the consumers who find themselves outside the legal market, only 28.2 per cent of them may be recovered through legislation aimed at reducing piracy; supporting H1 and calling for a stronger IPR regulation. The remainder

of the sample must be recovered through business model innovation, providing access to music in a way that better suits this groups requirements; supporting H2.

A correlation was observed between piracy level and the legal origins of the country (Djankov *et al.*, 2002). Countries with German legal origin seem less inclined to illegally file share than other countries. However, in discussions with industry experts they recognised that in Germany there have been numerous lawsuits against file-sharers over many years whilst in Japan piracy is seen as a growing issue with regards streaming over smart phones. Future research will explore this correlation and related issues.

This paper also makes a methodological contribution. Only 46.5 per cent of the survey respondents are willing to answer the question regarding their file sharing activities. This opens a debate: do the non-respondents follow a similar distribution to the respondents with regards their attitude to file sharing? Three scenarios are used to enable the redistribution of respondents. First, as with previous research (Peitz and Waelbroeck, 2004; IFPI, 2011) it is assumed that non-respondents follow a similar distribution to respondents. Second, it is assumed that non-respondents are File Sharers. Third, non-respondents are assumed to be Non-File Sharers. The evidence would suggest that non-respondents tend to be closer to non-file sharing groups, the third assumption, as they are older and would appear to favour physical music purchases. However, accepting this assumption raises a paradox (see Figure 3.6): why would Japan, the country with the highest sales per capita, have the greatest business model challenge? This requires future research, as Japan may have a particular issue with piracy and streaming over mobile networks.

A limitation of this study is the analysis of business models as applied to music services as the analysis of the digital market is undertaken without data on the usage of streaming services. Streaming accounts for ~1 per cent of revenue, but this is set to grow. Future research will correct for this gap.

Finally, this paper has also managerial and policy implications. The results suggest the exploitation of business models, rather than traditional business strategy, to manage music industry uncertainty. In this sense, customers play a central role, and managers in the music industry may be aware that there is a proportion of the population that could be recovered using new business models. Music distributors have begun to understand customers' behaviour which will increase their targeting of value propositions, clarifying market segments and better describing the position of the firm

within the value network. These business models are the key of future and successful business strategies. Finally, the work provides policy makers with estimates of piracy rates which can be used to benchmark individual countries.

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Figure 1. Evolution of music sales per country
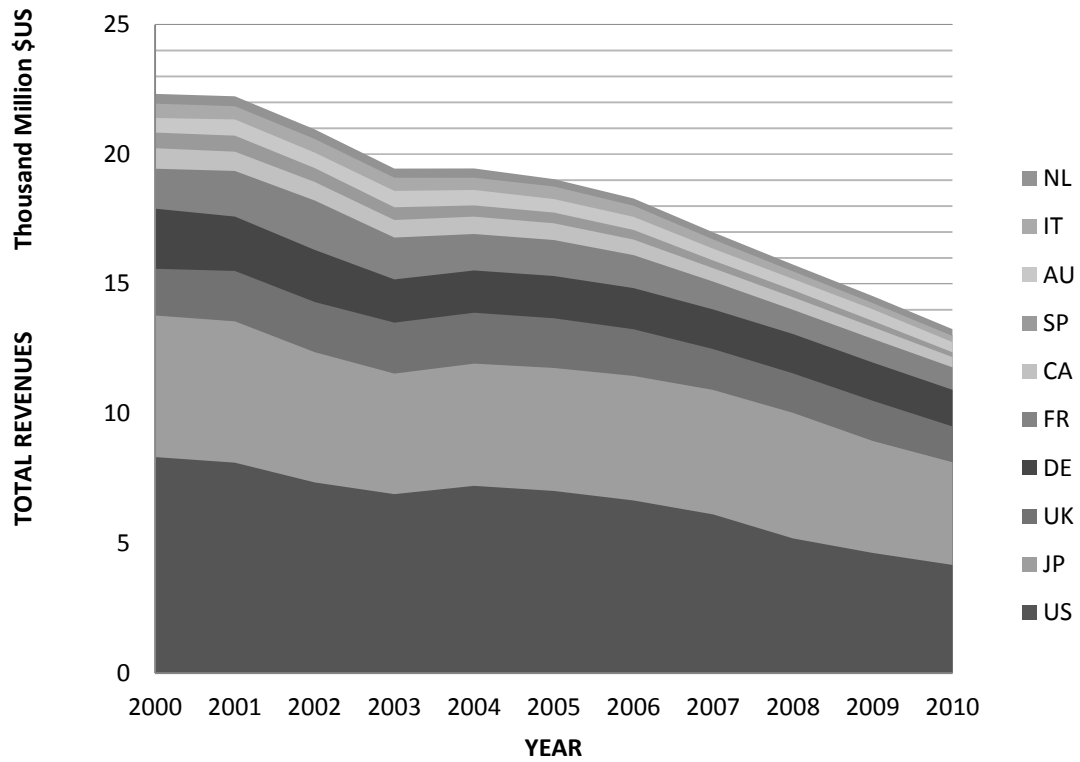
Source: Total revenue information per country from 2000 to 2010 provided by IFPI.

Figure 2. Structure of analysis
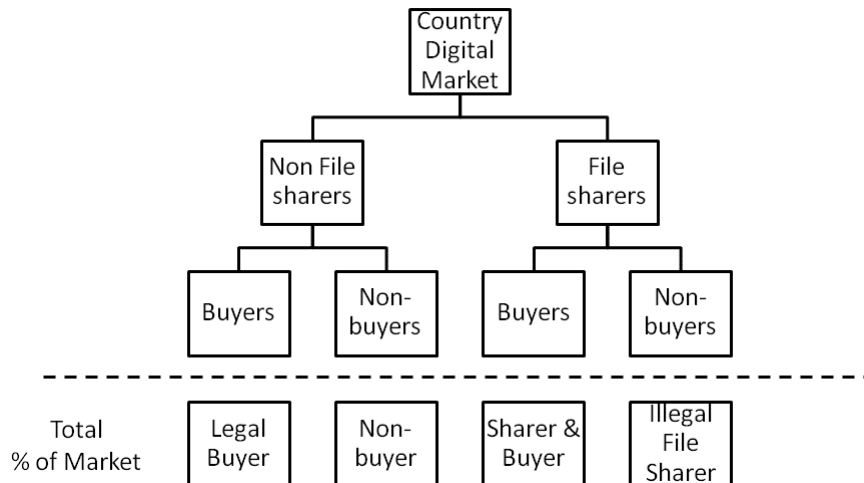
Figure 3.1.1. File sharing challenge (Subsample)
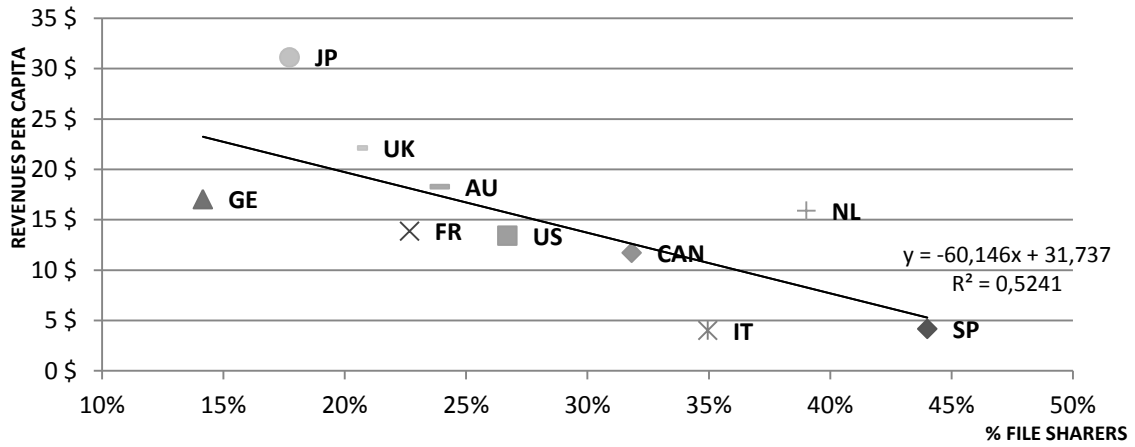
Figure 3.1.2. File sharing challenge (Subsample) with legal origins
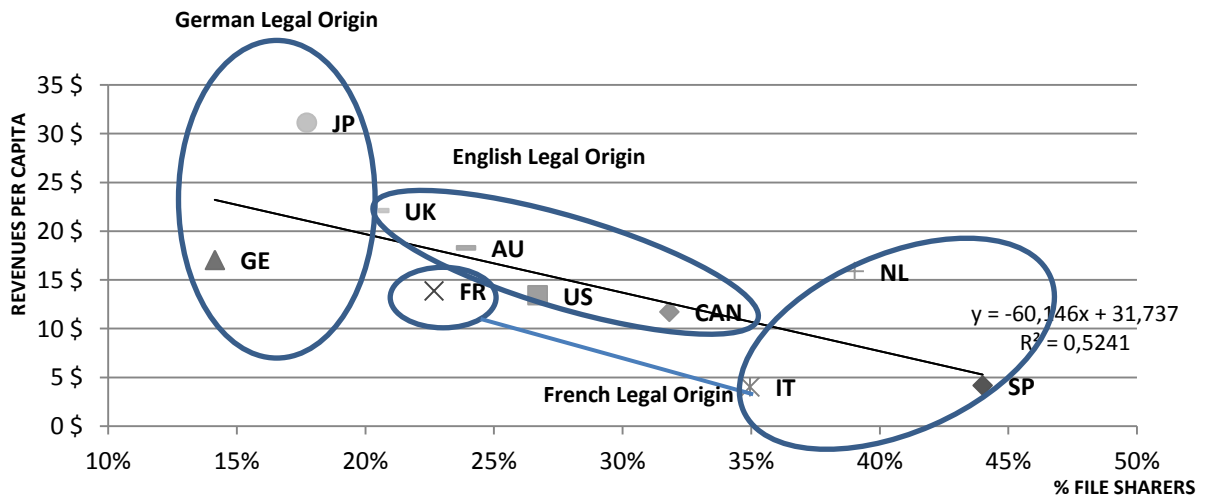
Figure 3.2. Business model challenge (Subsample)
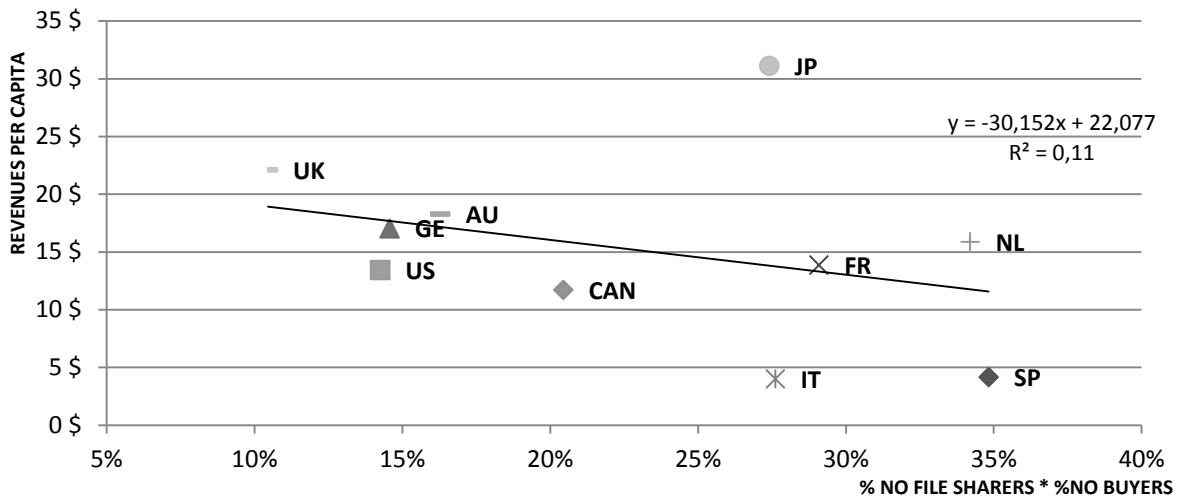
Figure 3.3. File sharing challenge (Full sample)
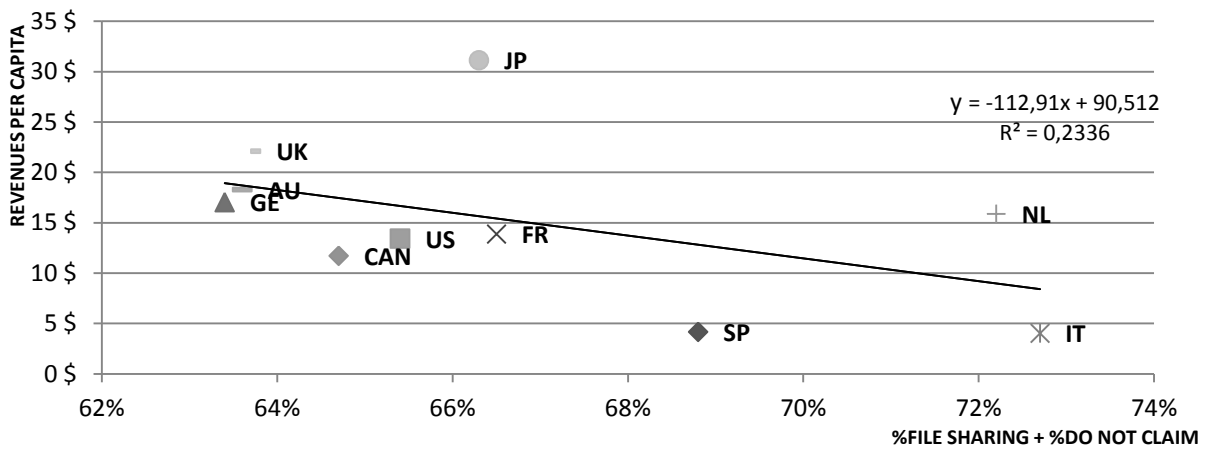
Figure 3.4. Business model challenge (Full sample)
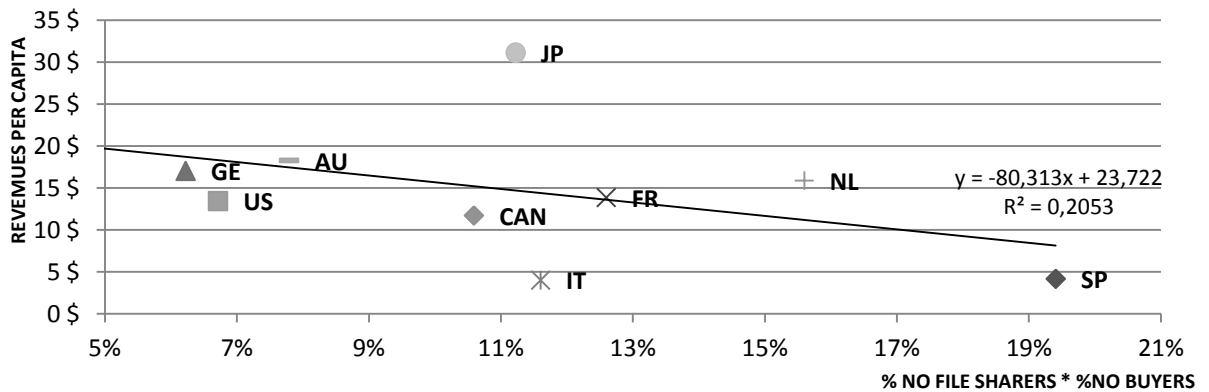
Figure 3.5. File sharing challenge (Full sample)

Scatter plot with REVENUES PER CAPITA (y-axis, 0 $ to 35 $) versus %FILE SHARING (x-axis, 5% to 25%). Data points: JP, UK, AU, GE, FR, US, NL, CAN, IT, SP.

$$y = 266.56x^2 - 181.35x + 33.516$$
$$R^2 = 0.5112$$
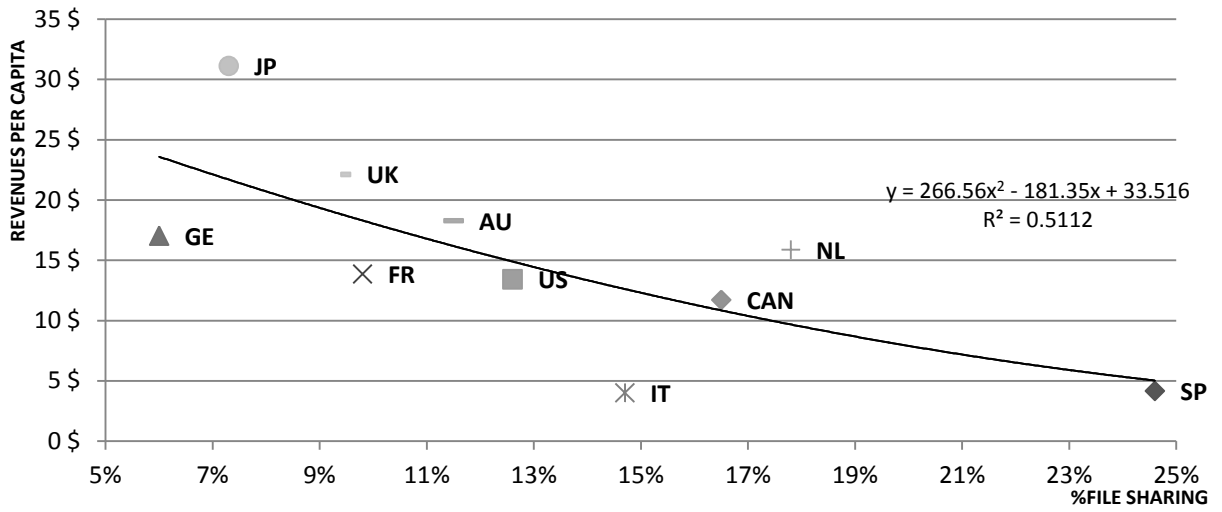
Figure 3.6. Business model challenge (Full sample)

Scatter plot with REVEMUES PER CAPITA (y-axis, 0 $ to 35 $) versus % NO FILE SHARERS * %NO BUYERS + %DO NOT CLAIM*%NO BUYERS (x-axis, 56% to 70%). Data points: JP, UK, AU, GE, US, CAN, NL, FR, SP, IT.

$$y = 2753,5x^2 - 3470,6x + 1101,7$$
$$R^2 = 0,2178$$
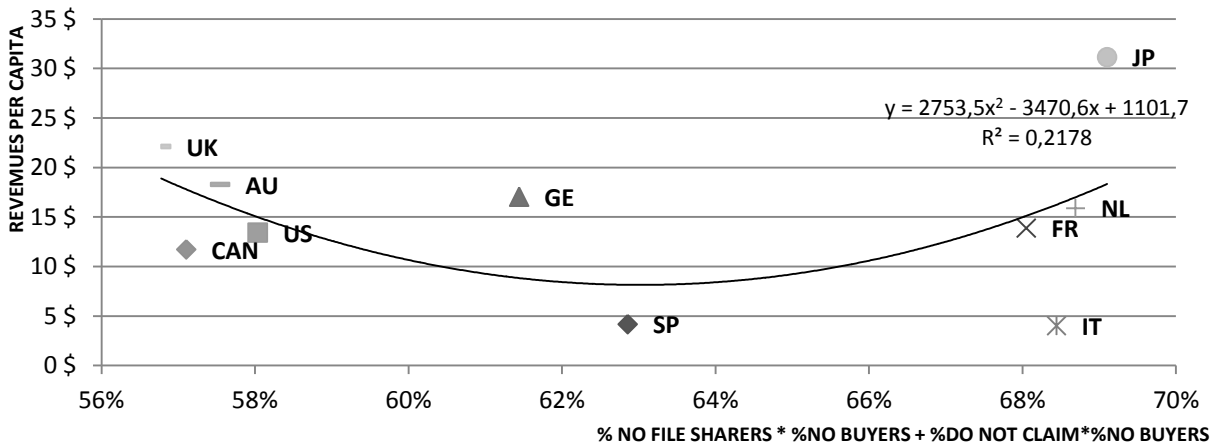
Table 1. Estimations of the scale of music piracy

	DIGITAL PIRACY				
	Peitz&Waelbroeck (2004) Period: 2001-2002*	Liebowitz (2006) Period: 2005**	Waldfogel (2010) Period: 2010***	IFPI Period: 2011	Industry Data Period: 2010
Spain	39%	--	--	45%	44%
Netherlands	40%	--	--	--	39%
Italy	46%	--	--	--	34.9%
Canada	44%	--	--	--	31.8%
US	40%	13%	48.6%	--	26.7%
Australia	37%	--	--	--	23.9%
France	34%	--	--	--	22.7%
UK	28%	--	--	--	20.5%
Japan	20%	--	--	--	17.7%
Germany	34%	--	--	--	14.1%
Total	38%	--	--	--	28.2%

Martin Peitz & Patrick Waelbroeck 2004, Review of Economic Research on Copyright Issues, 2004, vol. 1(2), pp. 71-79, Source: ifpi 2001-2002

**Liebowitz 2006, Source: Pew Internet Project, Source Usage over Time*

***Waldfogel 2010, Source: Original survey of 517 students asked for the number of songs legally purchased or illegally download out of 50 ex-ante selected popular songs. Of an average 14.83 songs owned 7.2 were illegally downloaded*

Table 2. Digital sales; Business models vs. Piracy (Only respondents all survey)

	Non-File Sharers		File Sharers	
AGGREGATE Observations: 20,550	71.8%		28.2%	
	Buyers Digital 68.6%	Non-Buyers Digital 31.4%	Buyers Digital 46.5%	Non-Buyers Digital 53.5%
Market total	Legal Buyers 49.3%	Non-buyers 22.5%	Sharer & Buyer 13.1%	Illegal File Sharer 15.1%
	Non-File Sharers		File Sharers	
SPAIN Observations: 2,514	56%		44%	
	Buyers Digital 37.8%	Non-Buyers Digital 62.2%	Buyers Digital 28.6%	Non-Buyers Digital 71.4%
Market total	Legal Buyers 21.2%	Non-buyers 34.8%	Sharer & Buyer 12.6%	Illegal File Sharer 31.4%
	Non-File Sharers		File Sharers	
NETHERLANDS Observations: 1,388	61%		39%	
	Buyers Digital 43.9%	Non-Buyers Digital 56.1%	Buyers Digital 29.2%	Non-Buyers Digital 70.8%
Market total	Legal Buyers 26.8%	Non-buyers 34.2%	Sharer & Buyer 11.4%	Illegal File Sharer 27.6%
	Non-File Sharers		File Sharers	
ITALY Observations 2,119	65.1%		34.9%	
	Buyers Digital 57.6%	Non-Buyers Digital 42.4%	Buyers Digital 39.4%	Non-Buyers Digital 60.6%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer

	37.4%	27.6%	13.8%	21.2%

	Non-File Sharers		File Sharers	
CANADA	68.2%		31.8%	
Observations: 2,638	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	70%	30%	54.9%	45.1%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	47.7%	20.4%	17.5%	14.4%

	Non-File Sharers		File Sharers	
US	73.3%		26.7%	
Observations: 2,364	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	80.6%	19.4%	61.1%	38.9%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	59.1%	14.2%	16.3%	10.4%

	Non-File Sharers		File Sharers	
AUSTRALIA	76.1%		23.9%	
Observations:2,422	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	78.6%	21.4%	59.1%	40.9%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	59.8%	16.3%	14.1%	9.8%

	Non-File Sharers		File Sharers	
FRANCE	77.3%		22.7%	
Observations: 1,774	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	62.4%	37.6%	38.8%	61.2%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	48.2%	29.1%	8.8%	13.9%

	Non-File Sharers		File Sharers	
UK	79.5%		20.5%	
Observations: 2,021	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	86.9%	13.1%	68%	32%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	69%	10.4%	14%	6.6%

	Non-File Sharers		File Sharers	
JAPAN	82.3%		17.7%	
Observations: 1,682	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	66.7%	33.3%	56.7%	43.3%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	54.9%	27.4%	10%	7.7%

	Non-File Sharers		File Sharers	
GERMANY	85.8%		14.2%	
Observations: 1,628	Buyers Digital	Non-Buyers Digital	Buyers Digital	Non-Buyers Digital
	83%	17%	54.6%	45.4%
Market total	Legal Buyers	Non-buyers	Sharer & Buyer	Illegal File Sharer
	71.3%	14.6%	7.7%	6.4%

Table 3. Disentangling Non File Sharers - Non Digital Buyers

Country	Non File Sharers - Non Digital Buyers	Financially Constrained	Not Interested	Buy Physical	Pure Business Model Challenge
Spain	34.8%	2.9%	5.4%	5.6%	20.9%
Netherlands	34.2%	1.4%	11.2%	3.6%	18%
Italy	27.6%	1.6%	7.1%	5%	13.9%
Canada	20.4%	1.4%	5.6%	4.1%	9.3%
US	14.2%	0.5%	3.1%	2.9%	7.7%
Australia	16.3%	0.0%	4.1%	3.8%	8.4%
France	29.1%	2%	7.6%	6.6%	13%
UK	10.5%	0.4%	3.2%	2.6%	4.4%
Japan	27.4%	1.2%	10.1%	3.7%	12.4%
Germany	14.6%	0.6%	2.1%	4.2%	7.7%
Aggregate	22.5%	1.2%	5.7%	4.2%	11.4%

Table 4. Business models vs. Piracy (All respondents)

	Non-File Sharers		Don´t Respond		File Sharers	
	33.4%		53.5%		13.1%	
AGGREGATE	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 44,206	68.6%	31.4%	2.9%	97.1%	46.5%	53.5%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	No-Buyers Digital	Buyers & Sharers	Illegal File-Sharer
	22.9%	10.5%	1.5%	52%	6,1%	7%
	Non-File Sharers		Don´t Respond		File Sharers	
	31.2%		44.2%		24.6%	
SPAIN	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 4,509	37.8%	62.2%	1.7%	98.3%	28.5%	71.5%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	11.8%	19.4%	0.7%	43.5%	7%	17.6%
	Non-File Sharers		Don´t Respond		File Sharers	
	27.8%		54.4%		17.8%	
NETHERLANDS	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 3,045	43.9%	56.1%	2.4%	97.6%	29.2%	70.8%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	12.2%	15.6%	1.3%	53.1%	5.2%	12.6%
	Non-File Sharers		Don´t Respond		File Sharers	
	27.3%		58%		14.7%	
ITALY	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations 5,045	57.5%	42.5%	2%	98%	39.4%	60.6%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	15.7%	11.6%	1.2%	56.8%	5.8%	8.9%
	Non-File Sharers		Don´t Respond		File Sharers	
	35.3%		48.2%		16.5%	
CANADA	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 5,097	70%	30%	3.5%	96.5%	54.9%	45.1%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	24.7%	10.6%	1.7%	46.5%	9.1%	7.4%
	Non-File Sharers		Don´t Respond		File Sharers	
	34.6%		52.8%		12.6%	
US	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 5,008	80.6%	19.4%	2.8%	97.2%	61.1%	38.9%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	27.9%	6.7%	1.5%	51.3%	7.7%	4.9%
	Non-File Sharers		Don´t Respond		File Sharers	
	36.4%		52.1%		11.5%	
AUSTRALIA	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations:5,065	78.6%	21.4%	4.5%	95.5%	59.1%	40.9%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	28.6%	7.8%	2.3%	49.8%	6.8%	4.7%
	Non-File Sharers		Don´t Respond		File Sharers	
	33.5%		56.7%		9.8%	
FRANCE	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 4,090	62.4%	37.6%	2.2%	97.8%	38.8%	61.2%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	20.9%	12.6%	1.3%	55.4%	3.8%	6%
	Non-File Sharers		Don´t Respond		File Sharers	
	36.3%		54.3%		9.4%	
UK	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 4,420	86.9%	13.1%	4.2%	95.8%	68%	32%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	31.5%	4.8%	2.3%	52%	6.4%	3%
	Non-File Sharers		Don´t Respond		File Sharers	
	33.7%		59%		7.3%	
JAPAN	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 4,106	66.7%	33.3%	1.9%	98.1%	56.7%	43.3%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	22.5%	11.2%	1.1%	57.9%	4.1%	3.2%
	Non-File Sharers		Don´t Respond		File Sharers	
	36.6%		57.4%		6%	
GERMANY	Buyers Digital	Non-BuyerDigital	Buyers Digital	Non-Buyer Digital	Buyers Digital	Non-Buyer Digital
Observations: 3,821	83%	17%	3.8%	96.2%	54.5%	45.5%
Market total	Legal Buyers	Non-Buyers	Buyers Digital	Non-Buyers	Buyers & Sharers	Illegal File-Sharer
	30.4%	6.2%	2.2%	55.2%	3.3%	2.7%

Table 5. Characteristics of Non-File Sharers, File Sharers and Don't Respond

	Non-File Sharers		Don't Respond		File Sharers		Total Sample	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Digital Buyer	69.1%	0.5	3%	0.2	46.1%	0.5	31.1%	0.5
Physical Buyer	33.3%	0.5	30.4%	0.5	25.1%	0.4	30.1%	0.5
Hours per week	3	3.2	2.5	3.1	4	3.8	2.9	3.3
Age	38.5	15.2	44.8	16.6	31.1	14	40.9	16.5
"I have Passion for Music"	4.1	0.8	3.9	0.9	4.4	0.7	4	0.9
"I don't want to risk downloading"	3.7	1.4	3.8	1.4	2.6	1.4	3.6	2.5
"I prefer to acquire music without paying"	2.5	1.4	2.2	1.4	3.7	1.3	1.4	1.5