The Effects of Piracy on the Music Industry

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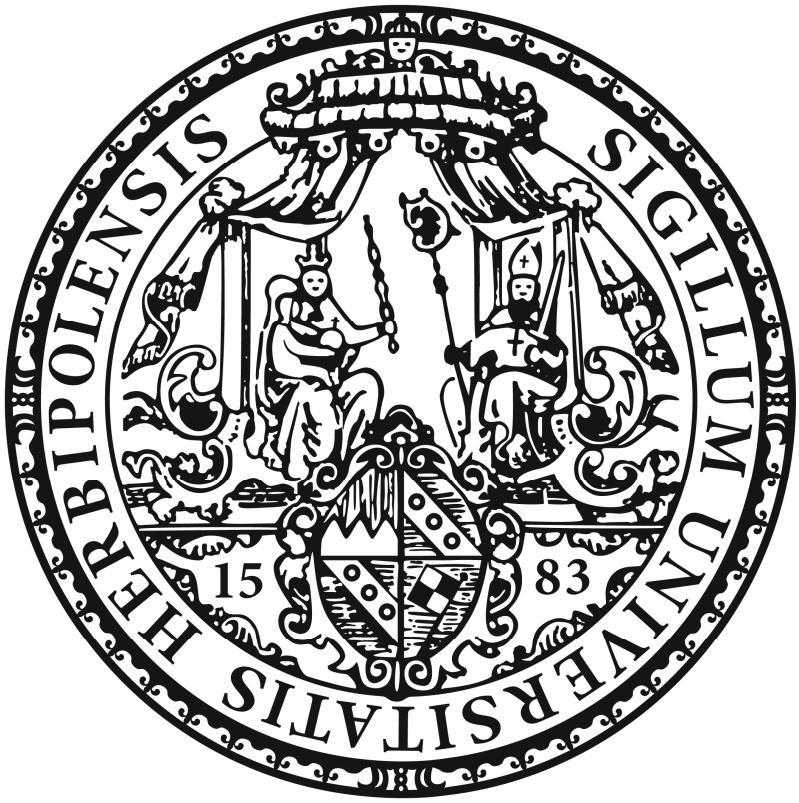

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Eingereicht bei:	Professor Toker Doganoglu, Ph.D. Lehrstuhl für VWL, insbesondere Industrieökonomik Julius-Maximilians-Universität Würzburg
Betreuer:	Professor Toker Doganoglu, Ph.D.
Abgabedatum:	10.01.2014

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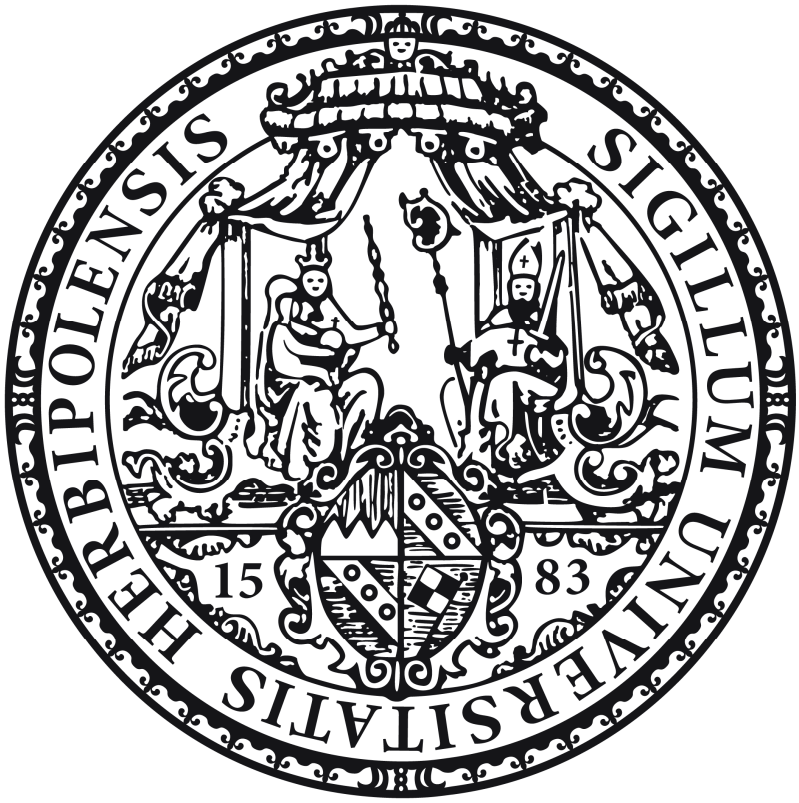

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Table of Contents

Zusammenfassung

Die vorgelegte Arbeit behandelt das Thema der Musikpiraterie und ihre Effekte auf die Musikindustrie.
Nach 10 Jahren mit steigenden Umsatzzahlen verzeichnete die weltweite Musikindustrie seit dem Jahr 1999 nur noch Verluste. Erst im Jahr 2012 hat sich dieser Trend gelegt und es wurde das erste mal nach 13 Jahren ein positiver Gewinn verzeichnet (zwar nicht in jedem Land, aber zumindest im weltweiten Durchschnitt).
Ziel dieser Arbeit ist es zu beurteilen, ob und wenn ja, in welchem Maße die Einführung von Software wie Napster oder KaZaA mit diesen Umsatzrückgängen zusammen hängt.
Im ersten Schritt ist es nötig, die technologischen Entwicklungen zu erläutern, welche dazu geführt haben, dass Internetpiraterie überhaupt möglich und „bequem“ durchzuführen wurde.
Desweiteren werden Effekte auf der Angebots- wie auch auf der Nachfrageseite diskutiert, um herauszufinden, welche Einflüsse file sharing auf der jeweiligen Seite hat bzw. hatte.
Abschließend wird versucht auf theoretische Weise Veränderungen in der Gesamtwohlfahrt zu zeigen.

List of Figures

List of Tables

List of Abbreviations

ADAT	Alesis Digital Audio Tape
AOL	America Online
BMG	Bertelsmann Music Group
BV Phono	Bundesverband der phonographischen Wirtschaft
BVMI	Bundesverband Musikindustrie
CD	Compact Disc
Corp.	Corporation
CS	Consumer Surplus
DAT	Digital Audio Tape
DWL	Deadweight loss
EMI	Electric and Musical Industries
EP	Extended Play
EU	European Union
GDP	Gross domestic product
IFPI	International Federation of the Phonographic Industry
Inc.	Incorporation
Kbps	Kilobytes per second
LP	Long Play
MB	Megabytes
Mbps	Megabytes per second
MP3	Motion Picture Experts Group Layer 3
N.D.	Northern District
NBA	National Basketball Association
OECD	Organisation for Economic Co-Operation and Development
P2P	Peer-to-peer
REV	Revenue
RIAA	Recording Industry Association of America
USD	US Dollar

1 Introduction

1.1 Problem Statement

Music plays an important role in many people's life, but not everybody is willing to pay for it. With the advent of file sharing in 1999 it became popular to pirate digital files instead of buying music on CD.

In the following years, the music industry has been experiencing losses in sales and therefore in revenues. The people in charge hold piracy responsible for these declines and started to sue operators and users of file sharing networks.

If the reason was that easy to find there would been no music produced anymore since users are able to find files on the Internet easily and free of charge, however, artists release new records daily and these are purchased by consumers.

One can conclude that piracy could not be the only reason for the decline in revenues. Economists have been trying to estimate in which degree piracy is a reason and which other factors affect music sales.

1.2 Setup and Ambition

This working paper exhibits the effects of piracy on the music industry in the period since 1999. It discusses effects on sales, consumer behavior and incentives of artists to produce new music.

The first section identifies technological developments of music production and distribution. It describes the evolution of recording techniques from first wax cylinders to digital music files.

In the following section copyright issues and the functionality of file sharing networks like Napster are presented.

The main chapter of this essay examines the set of problems from different points of view:

At first, effects on the supply side are discussed. When sales decline, incentives to produce new music should also decline. This chapter explains in which degree this applies to music and its producers, the artists. Other important aspects to look at to evaluate the supply side effects are complementary sources of income.

In the second part of this chapter impacts of piracy on the demand are analyzed. Due to the availability of free downloads the demand for paid music may decrease if piracy substitutes the sales. In contrast to that theory other studies see the possibility of increasing demand on account of piracy, which implies lower sampling costs.

In the end of the chapter a theoretical approach of welfare analysis is given.

The last chapter concludes, considering the argumentations of the main chapter, if and to what extent piracy can be seen responsible for the losses made in the music industry since 1999. It also gives an outlook on the future of piracy.

2 Recent Developments in Technology and its Impact on the Music Industry

2.1 Music Distribution

2.1.1 Music Sales over Time

After suffering an almost constant decline from $14.6 billion in 1999[1] to $7.8 billion in 2009 (46.6 percent) (See figure 1), US music industry revenues stabilized in the last two years.

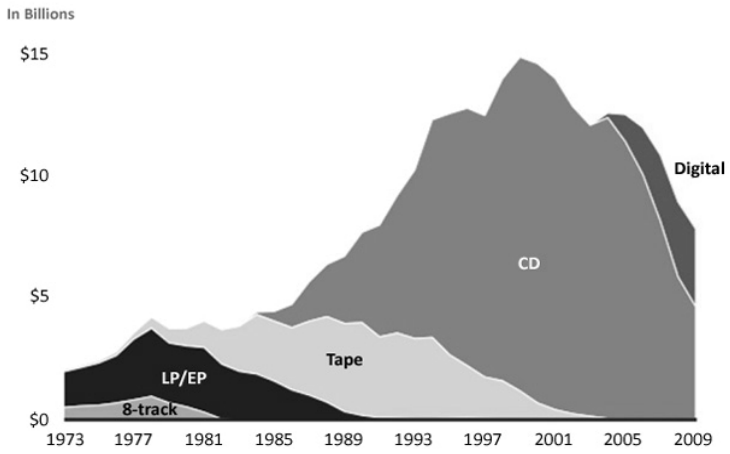

Figure 1: US Recorded Music Industry Turnover 1973-2009
(Source: Bain & Company (2011), p. 2; RIAA year-end shipment statistics; Bain analysis (2011))

Although US overall recorded music sales revenues decreased by 0.9 percent to $7.1 billion in 2012 after a small rise from 2010 to 2011 (See figure 2), a trend is noticeable.[2]

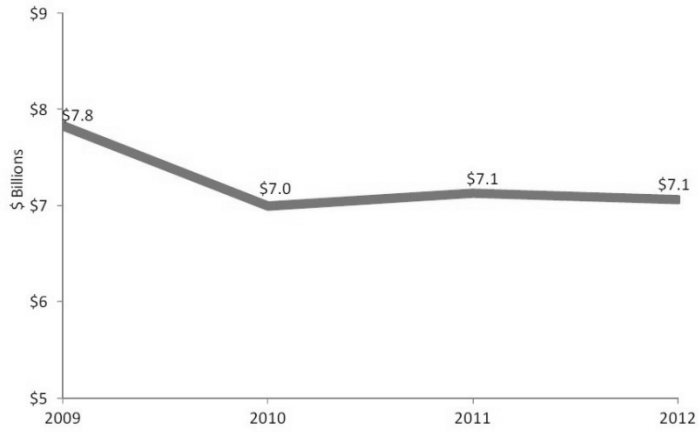

Figure 2: Total US Music Industry Revenues 2009-2012
(Source: Friedlander (2013), p. 1)

[1] Cf. RIAA (n.y.)
[2] Cf. Friedlander (2013), p.1.

IFPI's annual "Recording Industry in Numbers – The recorded music market in 2013" states that this trend also can be seen in global music turnovers:

After global music revenues rose between 1990 and 1999 by 63 percent from $24.1 billion to $39.4 billion,[3] "2012 was the first year of industry growth since 1999."[4] However, total music sales only made revenues of $16.5 billion, which still is less than half of 1999's level.

Japan, the second biggest music market in the world, is the only one of the top four which experienced a growth in 2012 (4 percent).

Due to a decline by 4.6 percent (from $1.36 billion to $1.29 billion) Germany was overtaken by the United Kingdom in this ranking, even though its music sales suffered an even steeper fall by 6.1 percent (from $1.41 billion in 2011 to $1.33 billion in 2012).

Two countries in the top twenty markets are outstanding: Sweden and India.

India's music market grew by 22.1 percent in 2012 up to $146 million, which describes an all-time record in music sales in India and the highest growing-rate in revenues in this ranking.

Also Sweden's growing-rate was very high compared to the other countries mentioned in the top twenty (18.7 percent).[5]

2.1.2 New Distribution Channels

Before the decline of music sales started in 1999, there had been no alternatives to purchasing music physically, e.g. on CD, vinyl or tape. With the upcoming of Napster in June 1999,[6] consumers had the possibility to download MP3-files free of charge.

Not only downloading the songs was much cheaper than buying a CD, users were able to choose only the songs they liked instead of buying a 12-song album, with only a few songs they wanted to listen to.[7]

Paid Music Downloads

Four years later, on April 28, 2003[8], Apple launched the iTunes Music Store - a legal alternative for à-la-carte downloads.[9]

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[3] Cf. Zentner (2006), p. 63.
[4] Smirke (2013).
[5] Cf. Ibid.
[6] Cf. Madden (2009), p. 6.
[7] Cf. Waldfogel (2010), p.1
[8] Cf. Apple Inc. (2003).
[9] Cf. Waldfogel (2010), p. 1.

At its launch the iTunes Music Store featured over 200,000 songs from the 5 major labels BMG, EMI, Sony Music Entertainment, Universal and Warner.[10] In 2013 there are more than 37 million songs to find in the online store,[11] which generated a total turnover of $4.3 billion in 2012.[12] Due to that, Apple's iTunes Music Store is market leader with a market share of over 75 percent (total global digital revenues: $5.6 billion).

Apple's innovation led to a new drift of purchasing digital music. In the last years digital sales developed to play an ever bigger role in music business. In 2012, 34 percent of global revenues were made by digital distribution.

Subscription Services

Other channels of digital music distribution are subscription services like Spotify, Deezer or Rhapsody. The idea of subscription services differs a lot from paid music download shops like iTunes, Amazon MP3 etc.:

Consumers of paid subscription services may listen to as many songs as they want to for a fixed fee, but they do not own the song files.

This services' popularity have been growing nearly everywhere in the world. In fact, the number of paying subscribers increased by 44 percent in 2012 and revenues grew by 59 percent in the first half of 2012. That could be a hint why the overall turnover in global music industry could see a growth.

The country with the biggest percentage of consumers using subscription services is Sweden; 48 percent of music consumption is made by these services; compared with only 11 percent who use paid downloads. A counterexample is the United Kingdom where only 19 percent use subscription services, facing 39 percent paying for downloads.

Among more than 30 different subscription services in the world tracked by IFPI, a leading brand in this division of digital distribution is Spotify with more than five million paying subscribers (as at 2012), up from three million in 2011. In Europe, it is the second largest source of digital music revenue, except Finland, Norway and Sweden, where it is the largest.

Although Spotify offers a free-to-hear business model, more than 20 percent of the users upgrade their account to a paid premium service.[13]

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[10] Cf. Apple Inc. (2003).
[11] Cf. Apple Inc. (2013).
[12] Cf. Dediu (2013) .
[13] Cf. IFPI (2013), pp. 6-15.

2.2 Digitalization and New Technologies

2.2.1 Lower Recording Costs

At inception of music recording (1890-1900) it was costly and complex to record music to phonograms. To make a given number of copies, the artist had to play his or her song either once for every copy or multiple recorders had to be running simultaneously or, alternatively, a combination of both.

Additionally, first tinfoil-wrapped phonographic cylinders, invented by Thomas Edison in 1877, later wax cylinders, improved by Alexander Graham Bell,[14] had to be replaced whenever the performer made a mistake.

By 1901 a first cost reducing method emerged: It was possible to make 25 copies by using a single master recording. This improvement implied a 2,500 percent increase over the previous method.

The even more important improvement was the invention of the reverse metal master stamper. Using this technique, multiple thousand copies could be produced before the stamper had to be replaced. The development of mass-production also affected other recording related costs like renting a studio because less time was needed to record.[15]

Around 1914, the medium which would last roughly 70 years had replaced the wax cylinder. These flat discs were less costly to produce.

The first "revolution" recording industry could see was the introduction of magnetic tape in the 1950s: Magnetic tape was the first medium that was able to edit after recording. Also, multiple copies could be produced from one master without abrasion of the tape.

However, the predominant medium of music listening still has been the analogue gramophone record until it was dominated by the digital CD in the early 1990s. According to this, the technology invented and improved on and on by Thomas Edison, Alexander Graham Bell etc. was the most important medium for approximately 100 years.

By 2002 independent artists could build up their own home recording studio for just $5,000.[16] A reason for this cost reduction was the advent of Alesis Digital Audio Tape (ADAT) in 1991. According to Alesis, investments musicians had to pour into a studio, decreased from $50,000 to $4,000 by using the new ADAT.[17] The only gadgets the artists needed for their

[14] Cf. Vogel (2004), pp. 192 et seqq.
[15] Cf. Alexander (1994), pp. 115-117.
[16] Cf. Kalmar (2002), p. 73.
[17] Cf. Alesis (2013).

recording studio were "an ADAT eight-track recorder, a mixing board, monitors, microphones and a DAT mix-down deck."[18]

Compared to old recording techniques, digital recording is less cost-intensive and time-consuming.

Vogel explains that independents were not the only ones benefiting from the digitization of music. By 2004 major labels needed a budget of $200,000 - $350,000 to produce a popular album, depending on the time spent in a studio. This budget includes cost for studio, backup singers and musicians, post-production etc. Additionally, every record needs promotion including costs for advertising with local retailers, merchandise, "promo" press kits as well as radio and TV commercials. Depending on the popularity of the artist those costs can add up to $100,000 for moderately common releases and up to $500,000 for major artists.

On the other hand, the manufacturing costs for a CD are quite low; less than $1,00 per unit are spent for pressing CDs, which results of decreasing prices for raw materials.[19]

These numbers could be confirmed by IFPI in 2004 (see table 1). [20]

Table 1: Average cost of a CD in Euro area (in USD)
Source: Based on: Peitz/Waelbroeck (2004), p. 2; quoting IFPI

Recording	~1.81
Production	~0.20 to ~4.03
Marketing	~0.20 to ~4.03
CD press	~0.80
Margin of retailers	~1.61 to ~2.01
Margin of record companies	~2.01 to ~3.22
Copyright payment to artist	~1.01
Taxes	~2.82
Sum	~10.48 to ~19.74

While the average price of a CD in that time was around 17 Euro (~ $13.70) it is obvious that not every recording is profitable at all. In fact, according to RIAA only "1 out of 10 acts ever turns a profit." [21]

[18] Kalmar (2002), p. 73.
[19] Cf. Vogel (2004), pp. 207 et seq.
[20] All numbers were scaled to USD with mean exchange rate of 2004 (USD/EUR = 0,8059)
Cf. OANDA Corp. (2004).
[21] Peitz/Waelbroeck (2004), p. 3; quoting Philips (2001)

> "Typically, less than 15% of all sound recordings released by major record companies will even make back their costs. Far fewer return profit. (...) There were 38,857 albums released last year; 7,000 from the majors and 31,857 from independents. Out of the total releases, only 233 sold over 250,000 units. Only 437 sold over 100,000 units. That's 1% of the time for the total recording industry that an album even returns any significant sales, much less profit. Fortunately, when it hits, it can hit big. That's what goes to fund the next round of investments to develop and nurture new artists."[22]

These data imply that the few successful releases compensate all losses made by unprofitable releases; otherwise no record company could stay in the market.

One reason for that phenomenon could be the cost structure of recording industry. While the marginal costs are quite low, but not zero, the fixed costs are rather large.

As one can see the music recording business is a very risky one according to make profits, however, it is possible for major record companies to release thousands of flops, as long as there are enough profit making releases.[23]

2.2.2 MP3 – Almost same Quality at better Compression

Prior invention of the new file compression format "Motion Picture Experts Group Layer 3" (MP3), created by the German Fraunhofer-Gesellschaft in the 1990s,[24] a song of 3 minutes needed approximately 50 MB of storage[25].

This new format has several advantages over to the former one:

The most obvious advantage is the size of the MP3-files. By "discrete sampling of continuous sound waves and passing the resulting samples through high and low band filters"[26] the reduced file size requires only 1/10 to 1/20 of space of the original file. Each minute on CD requires about 10 MB of hard disk space but compressed to MP3 the required space falls to one megabyte without much loss in quality, because only 10 percent of the sounds on a CD are hearable for humans.[27]

The new compression technique made it more convenient to listen to music that's technical quality is close enough to the original. More music could be stored on a single CD or put on a MP3-Player which came to market in spring 1998.[28]

By this time, the recording industry did not see a market for digital music, so none of the

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[22] Peitz/Waelbroeck (2004), p. 4; quoting a Press release by Hilary Rosen (2000), president and CEO of RIAA 1998 - 2003

[23] Cf. Ibid., pp. 2-4.

[24] Cf. Sandulli (2007), p. 326.

[25] Cf. Ibid., p. 325.

[26] Alexander (2002), p. 153.

[27] Cf. Zentner (2006), p. 70.

[28] Cf. Oberholzer-Gee/Strumpf (2010), p. 24.

major companies started selling music in a digital way.[29]

2.2.3 Broadband Penetration

The third aspect of technological development is the spread of high-speed Internet connections. Broadband connections[30] are necessary for both legal and illegal music downloads. With the increase of fast Internet connections in the late 1990s it was possible to share illegal copies of recordings on the Internet conveniently.

Users downloading with a dial-up Internet connection (56 Kbps modem) needed about 12 minutes for a 5 MB file. With the advent of fast broadband connections, the same file could be downloaded in a time between 20 and 80 seconds (depending on connection).[31]

Broadband subscriptions grew by 138 million (from 83 million to 221 million) or 165 percent from 2003 to 2007 in OECD area (see Figure 1).[32]

By 2009 less than 10 percent of wired Internet subscriptions used dial-up connections, decreasing further the share in 2011 was only about 3.3 percent.[33]

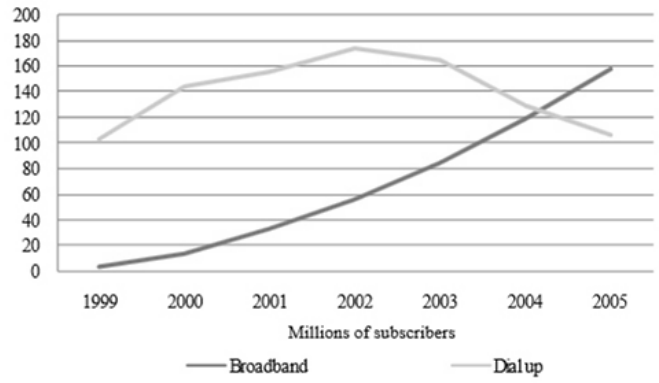

Figure 3: Growth of dial-up and broadband Internet access in the OECD area, 1999-2005
(Source: OECD (2008), p. 23)

But the improvement of Internet speed per se is not the only important aspect which opens opportunities for digital distribution on the one hand and piracy on the other hand.

Broadband access got cheaper with widespread adoption and the resulting increasing

[29] Cf. Sandulli (2007), p. 326.
[30] The OECD Guide to Measuring the Information Society 2011 defines broadband as an Internet access service (…) with an advertised download speed greater than or equal to 256 kbps.
OECD (2011), p. 130.
[31] Cf. Zentner (2006), p. 70.
[32] Cf. OECD (2008), p. 23.
[33] Cf. OECD (2013), p. 99.

competition between Internet providers. The OECD analyzed the development in prices from September 2005 to October 2006 and exposed a decline of 16-19 percent (depending on technology).[34]

To compare data for different countries and times it is necessary to normalize prices. A suitable way to do so is using prices per megabit per second.

The average price[35] a user had to pay in OECD area for the "cheapest" Mbps was about $3.77 in 2007. In 2012 prices started at $0.04 per Mbps.

[34] Cf. OECD (2008), p. 40.
[35] All prices in USD PPP

3 Intellectual Property Protection and Piracy

3.1 Introduction to Copyright

With the first printing establishment in England, founded by William Caxton in 1467 the beginning of copyright could be found in the common law.

This law was initiated by the British Crown to bring the new invention under its control. The motives were political and economic as well; first to put down the spread of differing views through cheap and easy copies, second, the Crown expected profits from a growing printing market and due to the Statute of Anne, the first copyright act in the world, it could benefit from book sells.[36]

"[This] act for the Encouragement of Learning, by vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned", introduced in 1710,[37] underlined the interests of author over stationers. The copyright was valid 14 years from publication, but, if the author was still alive, it was extended for another 14 years.

Primarily only books were protected by the copyright act. Later other kinds of works were added to this act, so were musical works in 1842. With the Imperial Copyright Act of 1911 the right of reproduction in sound recordings got protected.

The first copyright act in the United States was modeled after the structure of the Statute of Anne and installed in 1790. Likely to the British version protection was valid for 14 years and could be renewed once.[38]

The main aspect of copyright is also defined by The Universal Declaration of Human Rights:

"Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author."[39]

Since the beginning of copyrights – the Statute of Anne – two major systems of protection of intellectual property got predominant: On the one hand the Anglo-Saxon or –American "copyright systems" based on the Statute of Anne which is common in former British colonies like the USA, New Zealand and India, on the other hand Continental European "author's rights" or "droit d'auteur" which spread from Continental Europe to Latin America, former French colonies and some Asian countries.

These two systems basically differ in focus of what is protected. While the copyright system

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[36] Cf. Goldstein/Hugenholtz (2010), pp. 15 et seq.

[37] An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned

[38] Cf. Goldstein/Hugenholtz (2010), p.17.

[39] Cf. United Nations (1948), Article 27(2).

focuses on the copy, which is a means for distribution, the author's right protects the creator of the work. "Works of the mind whatever may be the kind, form of expression, merit, or destination"[40] are described as protected works. This is stated in the first paragraphs of the respective laws.

The British Copyright, Designs and Patents Act defines *"copyright [as] a property right which subsists [...] in original work of authorship [...]"*[41] while its French equivalent explains that *"The author of a work of the mind enjoys an exclusive right [...] of intangible property in this work on the basis of the mere facts of its creation."*[42]

Even though the systems contradict in some points, there are approximations due to different treaties (e.g. Berne Convention in 1989) developed recently.

The two concepts of protection also distinguish in other aspects.

The first aspect is the need of formalities. Since the Berne Convention in 1989 both systems usually no longer require formalities to achieve protection. Originally, copyright needed a registration.

A consequence of the need of formalities is the demand of fixation. The Author's rights system does not require of fixation, so even improvisation of music is protected from the moment it is expressed. Contrarily, in copyright system countries fixation is needed.

Due to relevant international law there is no difference in duration – works are protected for 50 years post mortem auctoris.

Unlike to the requirements of fixation or formalities, author's right system is stricter with exceptions and limitations than the copyright system, so the question whether a right is infringed is answered differently. While author's rights system dominated treaties focus on rights granted to an author (e.g. reproduction right, distribution right etc.), copyright precisely defines the infringement:[43]

"Copyright in a work is infringed by a person who, without the license of the copyright owner, does, or authorizes another to do, any of the acts restricted by copyright."[44]

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[40] Lewinski (2008), p. 45; quoting German Copyright Act, Art 2(2)/French Intellectual Property Code, Art L112-1(1).
[41] Lewinski (2008), p. 40; quoting Copyright, Designs and Patents Act, S1.
[42] Lewinski (2008), p.43; quoting French Intellectual Property Code, Art L111-1(1).
[43] Lewinski (2008), pp. 33-63.
[44] Stokes (2009)

3.2 File Sharing / Peer-to-Peer

With the widespread of CD burners, recordings could be copied and shared among friends with little cost. But, because of its bigger impact to music sales, this paper focuses on Internet file sharing.

How does P2P work?

The digitalization of music, as presented in chapter 2.2, made online piracy attractive to the rank and file.

In June 1999 Shawn Fanning, an 18-year-old freshman at Boston's Northeastern University,[45] developed the software for the first P2P (peer-to-peer) file sharing network Napster. The software was planned as a tool to trade music files with his dorm mate but indeed he launched a network with 30 million users in the first year.

Napster made it possible for its users to find files easier on the Internet than previous techniques.

Before Napster it was possible to find downloadable music, but harder and significantly harder and not up to date. With Napster, file lists were updated every time a user logged in or out. Also they could be found easily with only one software application and downloaded quite fast.

Prior Napster users worked with a client-server model: Search engines and music websites were used to find and download audio files. These files were located on servers somewhere in the world.

This technique entailed several issues: First, users had to line up at the gates of the servers in order to get the desired file. The second problem was that websites were not updated regularly and therefore links were often broken.

Napster, the first generation of peer-to-peer networks, was built on "hybrid" decentralized architecture. Servers still were needed but not anymore to store files. Central servers only were used as intermediaries that could give information where requested files were located.

Every computer in this network became a client as well as a server. Files stored on the hard drive could be downloaded by other clients and vice versa.

[45] Cf. Oberholzer-Gee/Strumpf (2010), p. 24.

Due to legal difficulties Napster's successors improved the architecture, so no more servers were needed and "real" peer-to-peer networks without servers were created. (See Figure 4 to differ between the different forms of networks)

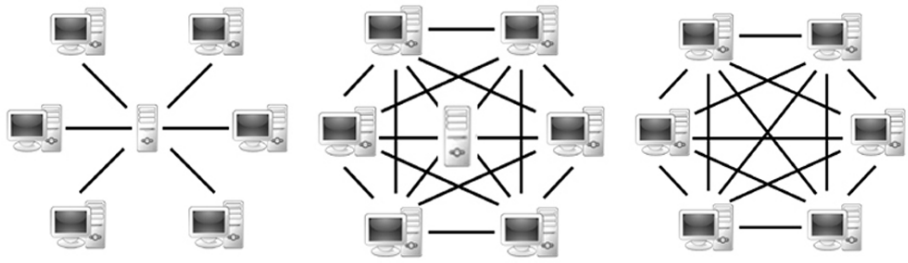

Figure 4: Comparison of network architectures: Client-server; "hybrid" P2P; "real" P2P (from left to right)
(Source: Based on Gigatribe (n.y.))

Legal difficulties

In December 1999, only six months after its release, the RIAA (representing A&M Records and seventeen other record companies)[46] sued Napster for "contributory and vicarious copyright infringement."[47]

Both, the District Court, N.D. California in 2000 and the Ninth Court in 2001, agreed that Napster's users were liable for the direct infringement.[48] Additionally the court considered "that Napster officials had knowledge of and control over copyrighted works – on account of their awareness of files on the central index"[49] and could not rely on "fair use",[50] so Napster was "held vicariously liable."[51]

As a result of these rulings Napster went bankrupt and shut down in 2001,[52] but file sharing via P2P was not. Other P2P networks like KaZaA, Grokster, etc. emerged and piracy proceeded.

To get successful software systems mentioned above needed to change the architecture (See paragraph above). To decrease the "likelihood of liability" those subsequent systems lacked central servers and created more decentralized networks.

This development made it more difficult for labels to make money from the services.

File sharing went underground and grew tremendously:

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[46] Cf. Carrier (2012), p. 903; Oberholzer-Gee/Strumpf (2010), p. 25.
[47] *A&M Records, Inc. v. Napster, Inc.,* 114 F. Supp. 2d 896 (N.D. Cal. 2000)
[48] Cf. Carrier (2012), p. 903; *A&M Records, Inc. v. Napster, Inc.,* 239 F.3d 1004 (9th Cir. 2001)
[49] Carrier (2012), p. 912.
[50] Cf. Ibid., p. 903.
[51] Ibid., p. 903.
[52] Cf. Ibid., p. 905.

In 2006 more than 60 percent of all Internet traffic was used by P2P networks.[53] In spring 2003 KaZaA/FastTrack peaked at about 4 million simultaneous users. In that time the RIAA started to sue file-sharing users due to direct infringement. By the end of 2008 about 35,000 lawsuits have been filed.[54] With these lawsuits the number of users downloading via P2P dropped by 10 to 30 percent.[55]

Lawsuits against users and operators of P2P networks aimed for containment of online piracy but users searched for newer and better ways.

The two most popular ways are BitTorrents and Digital Storage Locker.

Piracy cannot be erased completely. People will find ways to circumvent protections and use illegal ways to get the music.

But, as seen in Chapter 2.1, music sales are growing which could be an indicator that people are getting more likely to pay for music and pirate less.

[53] Cf. Oberholzer-Gee/Strumpf (2010), p.29; quoted according to Ferguson (2006)
[54] Cf. Oberholzer-Gee/Strumpf (2010), p. 24.
[55] Cf. Peitz/Waelbroeck (2004), p. 32.

4 Economic Effects of Piracy

4.1 Effects on Supply

4.1.1 Potential Decline of Music Supply

As seen in chapter 2.1 music sales declined in the past years.

A possible conclusion could be that artists "produce" less because of lower expected revenues.

One obvious way to measure the supply of music according to digital piracy could be to compare the number of new releases available. Studies show that there is no evidence that the availability of free music on the Internet decreased the incentives for artists to produce new music. Contrariwise, the annual number of new albums released has more than doubled.[56]

To get a better measure of supply it is necessary not only to compare quantity, but also quality. This argument becomes clear with a view to album sales in 2009: According to SoundScan only 12 of the 97,751 released albums in 2009 sold more than one million units.[57]

In his paper, Waldfogel presents two different methods of measuring supply:

The first approach is to measure the number of albums achieve some importance threshold. The number of sales again could be an indication of importance but it is rather misleading because it involves two issues: First, sales are falling over time and second, it is difficult to set a certain threshold.

The method Waldfogel chooses is, to consider both, professional and non-professional, "critics' retrospective rankings of songs and albums from multiple years."[58]

There are three data sets used. The first are 88 different professional rankings and ratings, 64 covering albums and 22 covering songs. Examples are Rolling Stone's 2004 list of the 500 best albums or Pitchfork Media's list of best 200 albums of the 2000s.

The second data is taken from metacritic.com, a website which "translates reviews from multiple sources to a unified 100-point scale."[59]

The third data are non-professional critics' (wiki ratings) like Zagat's list (which is based on a survey of over 10,000 respondents) and sites like BestEver.com or RateYourMusic.com where users can upload their rankings or enter ratings of songs, respectively.

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[56] Cf. Waldfogel (2011), p. 8; Oberholzer-Gee/Strumpf (2010), p. 20.
[57] Cf. Peoples (2010)
[58] Waldfogel (2011), p. 9.
[59] Ibid., p. 11.

The paper finally concludes that there is no empirical evidence that Napster declined music supply.[60]

Another method of analyzing supply is stated out by Christian Handke. In his paper he uses a basic version of an intervention analysis. The main idea in this approach is to detect whether a certain event (i.e. the advent of unauthorized copying of digital music) had an effect on following periods.

In contrast to Waldfogel, Handke focuses on supply in Germany in the period from 1984 to 2006. Unlike other institutions which see Napster's emerge in 1999 as the start of piracy,[61] the year 1998 is defined as the intervening year because of upcoming use of CD-burners for unauthorized copying. It also was the first year with declining turnover after a long period of rapid growth.

The outcome of this intervention are two periods; first, the "boom period" from 1984-1998, and second, the "recession period" from 1999-2006.

The hypothesis of this research is understandable: With the presence of piracy, the quantity of intellectual property grows less fast respectively even declines.

The latter can be eliminated easily with a look on absolute terms. The number of new titles in 2006 is 54.7 percent greater than in 1998 (See figure 6).

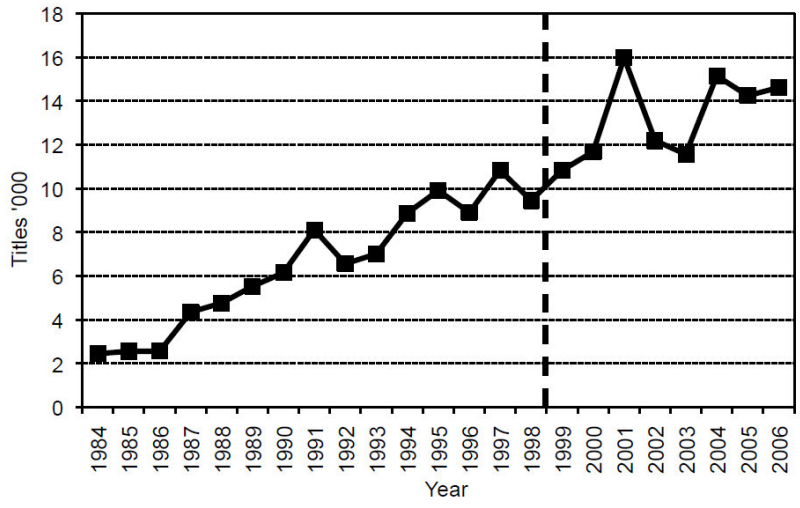

Figure 5: Time-plot of the number of "new titles" released annually
(Source: Handke (2012), p. 21; BV Phono, various issues)

[60] Cf. Ibid., pp. 3-22.
[61] Cf. RIAA (n.y.)

The last and most important question is whether there is a decline in the speed of growth.
To figure out the correlation between piracy and supply (if there is any) the study shows several regressions.
It concludes that there is no significant evidence for less growth in the number of new titles published during the recession period to the preceding boom period.

4.1.2 Artistic Motivations: Non-Monetary Incentives versus lower Revenues

The question still not answered in chapter 4.1.1 is why there is neither decline in absolute terms nor a slow-down in growth of supply.
Possible reasons can be that either artists do not suffer from the downturn in music sales or that there are more important non-monetary incentives from making music.
The first question can be answered with the concept of royalties. Generally, artists' income consists of a certain share in music sales.[62] Therefore artists suffer from lower sales.
The second alternative is not simple to quantify. Artistic motivation is not able to be defined with objective numbers.
The only way is to focus on artists' subjective opinions on motivation and why they keep producing music in the presence of piracy and possible lower revenues. An article from 2010 described that "the remuneration of artistic talent differs from other types of labor in at least two important aspects. Artists often enjoy what they do, suggesting that they might continue being creative even when the monetary incentives to do so become weaker. In addition, artists receive a significant portion of their remuneration not in monetary form – many of them enjoy fame, admiration, social status, and free beers in bars – suggesting that a reduction in monetary incentives might possibly have a reduced impact on the quantity and quality of artistic production. "[63]
A (non-representative) survey conducted for Pew Internet Report 2004 interviewed 2755 musicians about their opinions on file-sharing affirmed these findings (see table 2).

[62] Cf. Towse (1999), p. 372 et seq.; Mortimer/Nosko/Sorensen (2010), pp. 5 et seqq.
[63] Oberholzer-Gee/Strumpf (2010), p. 23.

Table 2: What are the musicians saying about free downloads? (1/2, US)
Source: Peitz/Waelbroeck (2004), p. 34; quoting Pew Internet report, June 2004.

Has free downloading on the Internet increased, decreased or not really affected					
	Increased	Decreased	No effect	This item does not apply to me	Don't know refused
Sales of your CDs or other merchandize	21	5	34	25	14
Radio play of your music	19	1	39	28	13
Attendance at your own concerts or live performances	30	0	29	27	13

Another survey in this report showed similar results: Only five percent of the respondents answered that free downloads had hurt their career. In contrast to this, 35 percent said that free downloads were helpful (see table 3).

Table 3: What are the musicians saying about free downloads? (2/2, US)
Source: Peitz/Waelbroeck (2004), p. 35; quoting Pew Internet report, June 2004.

In general, would you say that free downloading on the Internet has (%)	
Helped my career	35
Hurt my career	5
Not really made any difference in my career	37
Has both helped and hurt my career	8
Don't know	15

The issue is also discussed controversial between musicians. While some bands do not worry at all about a possible decline in CD sells, others get really angry about illegal file sharing.
Die Ärzte, a German punk rock band, in a way even appreciates the fact that consumers buy less music. In their biography, drummer and singer Bela B. Felsenheimer complains about the music industry:

"Those car salesmen, who worked in the wrong branch, were speaking of stealing their art. On account of artificial increases in price they deserved nothing but a kick in the butt."[64]

This statement also implies that not the artists suffer from the presence of file sharing but other parts of the music industry.

In a song from 2007, he also criticizes the music industry for treating downloaders like dangerous criminals in a sarcastic way.[65]

Contrary to this point of view, Metallica sued Napster by its upcoming and later also its users due to copyright infringement.

In an interview Metallica's drummer Lars Ulrich agreed with his "colleague" Bela B. that it did not hurt the band (yet to that time) but owners of small independent record stores for example. He also states out that they do not make music to make their fans happy but they do it for themselves.[66]

In Ulrich's case, neither money nor fame is the most important incentive for him to make music. It is making music per se. For him it is a matter of principle, he does not want other people to steal his music.

4.1.3 Complementary Sources of Revenues

The last reason not every artist is suffering from piracy is that, especially for major acts, CD sales are not the only sources of revenues:

The total revenue consists of income from recordings, merchandise, concerts etc. Comparing ratios of artist incomes, big differences are noticeable. There are artists who make most of their income by giving concerts like Paul McCartney or Elton John (about 90 percent) and other artists who make up the biggest portion of their income by selling records like Jay-Z or Linkin Park (3 and about 13 percent, respectively, are made by giving concerts) (see table 4). Since concerts and recordings are complementary goods it is obvious that an increase in music consumption, which is expectable due to the possibility of free downloads, should increase the demand for live performances.[67] Considering these facts, it is possible that increasing revenues by live concerts are able to compensate losses in income by decreases in

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[64] Original quote: "Plötzlich sprachen diese Autoverkäufer, die bloß in der falschen Branche arbeiteten, vom Diebstahl ihrer Kunst. Die haben mit ihren künstlichen Preiserhöhungen doch gar nichts anderes verdient, als dass der Käufer ihnen mal in den Arsch tritt"
Die Ärzte/Karg (2001), p. 365.

[65] Cf. Felsenheimer (2007)

[66] Cf. Ulrich (2000)

[67] Cf. Mortimer/Nosko/Sorensen (2010), pp. 10 et seq.

record sales.[68]

Table 4: Artist Incomes (US$millions)
Source: Based on: Oberholzer-Gee/Strumpf (2010), p. 44; quoting Connolly and Krueger (2006)
Note: Figures are estimates of pretax gross income in 2002.

Rank	Artist	Concerts	Recordings	Publishing	Total
1	Paul McCartney	64.9	2.2	2.2	72.1
2	The Rolling Stones	39.6	0.9	2.2	44.0
3	Dave Matthews Band	27.9	0.0	2.5	31.3
4	Celine Dion	22.4	3.1	0.9	31.1
5	Eminem	5.5	10.4	3.8	28.9
8	Jay-Z	0.7	12.7	0.7	22.7
10	Elton John	20.2	0.9	1.3	22.4
13	Billy Joel	16.0	0.0	1.0	17.0
14	Neil Diamond	16.5	0.0	0.3	16.8
19	Linkin Park	1.7	4.7	6.3	13.1
	Average	12.7	1.7	1.3	17.4

A trend emphasizing this assumption is seen in concert prices. A study from 2005 investigating concert prices from 1981-2003 shows that these prices rose more quickly than the consumer price index (see figure 7).[69] With a view to this graph it is possible that artists adjust their ticket prices to decreasing income in record sales.

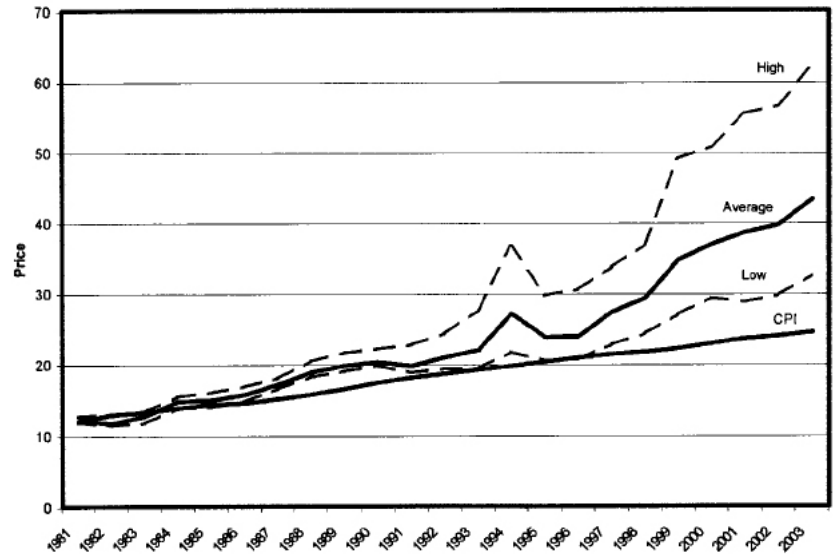

Figure 6: Average price per concert ticket, high-and low-price tickets, and overall inflation rate, 1981-2003
(Source: Krueger (2005), p.7)

[68] Cf. Oberholzer-Gee/Strumpf (2010), pp. 44 et seqq.
[69] Cf. Krueger (2005), p. 7.

4.2 Effects on Demand

4.2.1 Illegal Copies as Substitute to paid Music

The question whether illegal copies are the only reason or if other parameters are explaining the decline is investigated in several studies.

Most studies show displacement in sales due to file sharing. The estimated displacement rates range up to 30 percent in some studies, but an average number of these estimated rates can be set to 20 percent.[70]

A survey published in 2006 showed that downloading reduces the probability of buying records by 30 percent.

The study from October 2001 based on a cross-sectional analysis of 15,000 observations using instrumental variable techniques. The employment of access to broadband connection and Internet sophistication shows that illegal downloads reduce the probability of buying music by 30 percent.[71]

A reason for the displacement rate can be explained by the level of valuation of music. Downloaders tend to download songs that are valued lower, so these particular songs would not have been consumed without the possibility of downloading. Economists observed that the displacement rate correlates with the valuation of music.[72]

However, if music is valued lower it is not purchased and incentives to pirate are higher.[73]

Contrarily some studies show no displacement at all.[74]

A study from 2007 monitored transfers of music files and concluded that "even [the] most negative point estimate […] implies that an one-standard-deviation increase in file sharing reduces an album's weekly sales by a mere 368 copies, an effect that is too small to be statistically distinguishable from zero."[75]

There is even a study that shows some kind of combination of the first two findings.[76]

A survey from 2003/2004[77] shows that there is no significant effect on hit albums. With a look on smaller releases the displacement rate is about 20 percent.[78]

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[70] Cf. Oberholzer-Gee/Strumpf (2010), pp. 35-40.
[71] Cf. Zentner (2006), p. 66; Oberholzer-Gee/Strumpf (2010), p. 37.
[72] Cf. Rob/Waldfogel (2006), p. 30.
[73] Cf. Bhattacharjee/Gopal/Sanders (2006), p.1530.
[74] Cf. Oberholzer-Gee/Strumpf (2010), pp. 35-40.
[75] Oberholzer-Gee/Strumpf (2007), p. 38.
[76] Cf. Oberholzer-Gee/Strumpf (2010), p. 37.
[77] The sample was non-representative and should not be generalized.
[78] Cf. Oberholzer-Gee/Strumpf (2010), p. 35/ Rob/Waldfogel (2006), pp. 60 et seq.

In contrast to the majority, few studies found that file sharing has a positive effect on music sales.[79]

Additionally, some authors state that several factors affect music sales; piracy is only one among them.

Other factors, which could be responsible for the decline in music sales, are CD prices, the economic environment, demographics and substitution with other media and devices.

Because the demand for a good depends on its price, an increase in prices would explain the decline in music sales. Observing changes in real prices from 1999-2003 in the top five music market countries (USA, France, Germany, UK and Japan) shows no significant trend.

One of the main reasons for decreasing CD sales from 2000-2001 was a decrease in GDP growth in the countries mentioned above. Furthermore the bust of the internet bubble in 2000-2001 could have had an impact on consumers.

From a demographical point of view there are two contrary effects seen. While the younger population buys fewer recordings, older people replace their LP collection in CD format. Depending on which effect dominates, CD sales should de- or increase. If both effects compensate each other, there is obviously no effect at all.

Other forms of substitution by music on DVD, portable devices like MP3-players and computer games is are also observed in the same period, CD sales started to decline.[80]

Considering all these facts analyzed by several economists with different methods, it is quite obvious that it is impossible to give an ultimate conclusion in which degree piracy reduces music sales. Even though most studies show a negative effect of piracy, there are papers which disagree. Moreover, the effect of piracy cannot be isolated from the other factors.

4.2.2 Sampling as an Instrument to raise Demand

It is the nature of music to be an experience good; it has to be "tasted" before consumers can value it. Surveys show that radio is the most common type of media to influencing possible consumers (75 percent) but file sharing also seems to be a good method (19 percent).[81]

Although radio is the most influencing type of media, it offers only a limited supply of music. Generally only hits or new major releases are featured. Compared to this, the Internet (not

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[79] Cf. Oberholzer-Gee/Strumpf (2010), pp. 35-40.

Note: The mechanism of sampling is discussed in section 4.2.2 and therefore only mentioned marginally

[80] Cf. Peitz/Waelbroeck (2004), pp. 18-30.

[81] Cf. Ibid., p. 2 et seq.

only file sharing networks, but also websites like youtube etc.) offers better possibilities to get to know new music.[82]

Economists show – for certain conditions – that "consumers can make more informed purchasing decisions because of sampling and are willing to spend for the original although they could consume the download for free."[83] This observation is also confirmed in other studies. It is seen that the possibility to download music "free of charge" does not necessarily hurt the music industry. If consumers use these download to sample or to get to know new artists or songs in order to buy the records it can actually raise the demand of CDs.[84]

A reason for this behavior can be explained by the personal valuation of music:

Surveys show that user tend to value downloaded music less than purchased music. The numbers of difference range from one third to one half.[85]

4.2.3 Free Downloads to gain Consumers

Knowing the potential effect of sampling, some artists release free tracks on the internet to gain consumers for later, commercial releases.

A famous example (at least in Germany) was the release of his debut album by the rapper Cro. In December 2011 he released a free-to-download EP on his homepage. With help of social media he and his EP got quite popular.[86]

When he released his debut album a few months later in July 2012 he made it into the charts with 31 titles (7 tracks were listed in the download charts, 8 in the single charts and 16 in the streaming charts). According to media control, nobody made so many songs into the charts before at the same time.[87]

Moreover, only 8 artists sold more copies of their albums than Cro in 2012.[88]

Another, international known example was the release of "Magna Carta Holy Grail" by Jay-Z. After announcing the new record at the NBA Finals, one million copies were given away for users of selected smartphones.

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[82] Cf. Waldfogel (2012), pp. 340 et seq.
[83] Peitz/Waelbroeck (2006), p. 912.
[84] Cf. Bhattacharjee/Gopal/Sanders (2006), p. 1529.
[85] Cf. Rob/Waldfogel (2006), p.30.
[86] Cf. JD's Rap Blog (2011)
[87] Cf. Media Control (2012)
[88] Cf. BVMI (2013), p. 48.

From July 4, 2013 owners of these certain phones could download the album without charge.[89]

After its "regular" publication a few days later, the album was purchased more than one million times, so Jay-Z received a Multi-Platinum award in September 2013.[90]

The album is also listed in Billboard's 2013 Year-End Charts on position 12.[91]

These two artists are only named exemplarily. There were more releases which worked similarly, but these were quite popular in the last two years.

On the basis of these two examples it can hypothesized that free downloads can raise demand in order to buy new recordings of this artist. That emphasizes the assumption from chapter 4.2.2 that "cheap" samples can lead to an increase in CD sales.

4.3 Viable Business Models

Due to technological developments in the period around the year 2000 not only online piracy got more attractive to users but also did new business models to purchase or listen to music online (see figure 7).

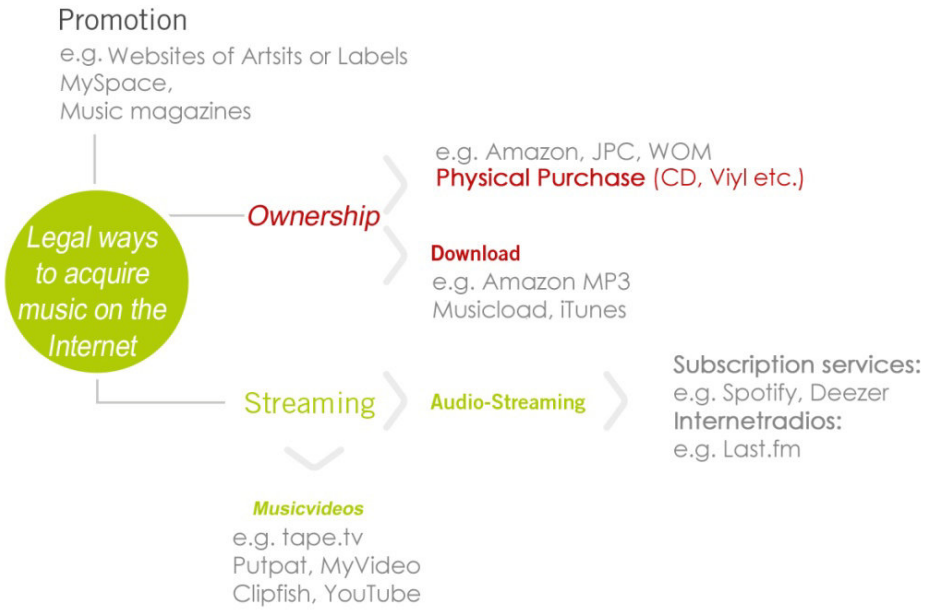

Figure 7: Legal ways to acquire music on the Internet
(Source: Based on BVMI (2012))

[89] Samsung paid $5.00 each for one million copies, so in fact, it was sold, but free of charge for the users. Cf. Ramirez (2013)
[90] Cf. RIAA (2013); The album hit Platinum instantly, because one million copies were given away.
[91] Cf. Billboard (2013)

The development of these services took a certain time. A survey from 2002 showed that the majority of the respondents were not eager to pay for subscription services or downloads while using a cost-free alternative like KaZaA.[92]

This observation was seen in 2001 when the major labels tried to establish two business models to offer digital music for a fixed fee:

MusicNet, supported by AOL Time Warner, Bertelsmann, and EMI, offered rather a renting- than a buying service.

Pressplay, launched by Sony and Vivendi Universal, also offered only limited content.

Both MusicNet and Pressplay turned out as flops and never reached the popularity of a convenient download service like iTunes.[93]

Download services like iTunes or Amazon MP3 offer a similar convenient way like P2P-software to download songs a-la-carte with a fairly low price (usually 99 cents each)[94] and without restrictions in use.

Other services like Spotify are departing from the initial concept of "owning" music. Users can listen to their favorite tracks and also personalized playlists without paying (ad sponsored) or at little cost.

Current business models offer legal alternatives to prevent consumers from pirating which are, according to industry revenues, viable.

4.4 Welfare

To evaluate the effect of piracy on a whole economy it is necessary to analyze social welfare. Because a realistic welfare analysis is too complex to quantify, this section gives only a theoretical background on welfare.

It is important to distinguish between a welfare analysis in a world where file sharing exists and a world where it does not.

The first case represents the baseline for the comparison with the welfare in a world with downloading.

Assuming a demand function D(p) for music albums. Expecting that each consumer purchases at least one album, the demand function "reflects the distribution of consumers'

[92] Cf. Peitz/Waelbroeck (2004), p. 55.
[93] Cf. Waldfogel (2010), pp. 5 et seq.
[94] Cf. Ibid., p. 7.

willingness to pay for this album."[95] Since the producer is seen as a single-price monopolist, it causes "monopoly pricing, restriction of output, and deadweight loss:"[96] At a given price p, only consumers with valuations[97] above p will buy, consumers with a lower valuation than p will not, which yields a deadweight loss.

Figure 8 represents the demand curve with resulting areas of consumer surplus, revenues, and deadweight loss.

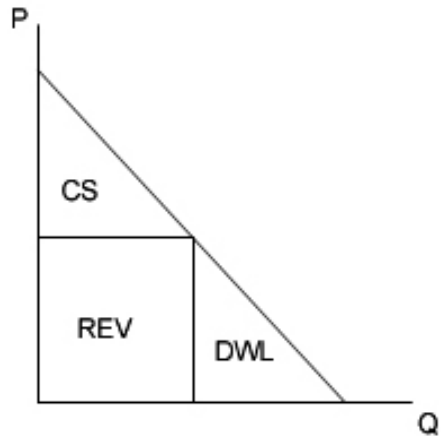

Figure 8: Single-price monopoly: The market before downloading.
CS = Consumer surplus; DWL = Deadweight loss; REV = Revenue.
(Source: Based on Rob/Waldfogel (2006), p. 36)

In case downloading is possible, it is necessary to divide the overall demand D(p) into subdemands: Downloaders' demand $D_D(p)$ and buyers' demand $D_B(p)$.

In a first case consumers with a low valuation of music (smaller than p) will download, while consumers with high valuation (above p) will purchase. This case is the "ideal" case. Welfare increases without losing revenues from downloads. The reason is obvious: low-valuation users would not purchase anyway, but, with the possibility of downloads, consumer surplus is generated. Figure 9 illustrates that the area of deadweight loss from figure 8 is transformed to consumer surplus.

[95] Rob/Waldfogel (2006), p. 36.
[96] Ibid.
[97] Valuation of music is introduced in chapter 4.2.2.

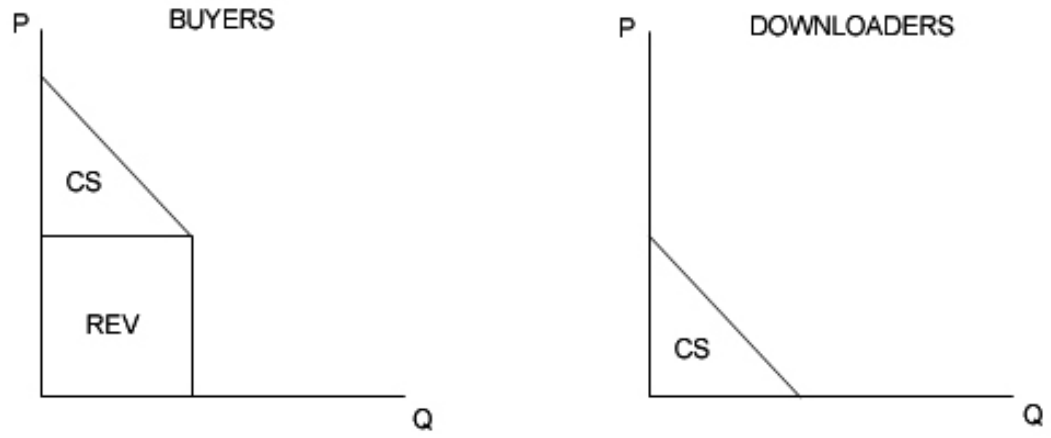

Figure 9: Downloaders are low-valuation demanders.
CS = Consumer surplus; REV = Revenues.
(Source: Based on Rob/Waldfogel (2006), p. 38)

In a second case consumers with high valuation are downloaders and consumers with low valuation are buyers. Assuming that high-valuation consumers do not purchase anymore, the monopoly price has to be reduced to increase demand.

The result of this price change is shown in figure 10: The area of consumer surplus and revenue prior in a world without downloading (See figure 8) now becomes consumer surplus and the area of deadweight loss now contains revenue (smaller due to decreased price), consumer surplus, and deadweight loss.[98]

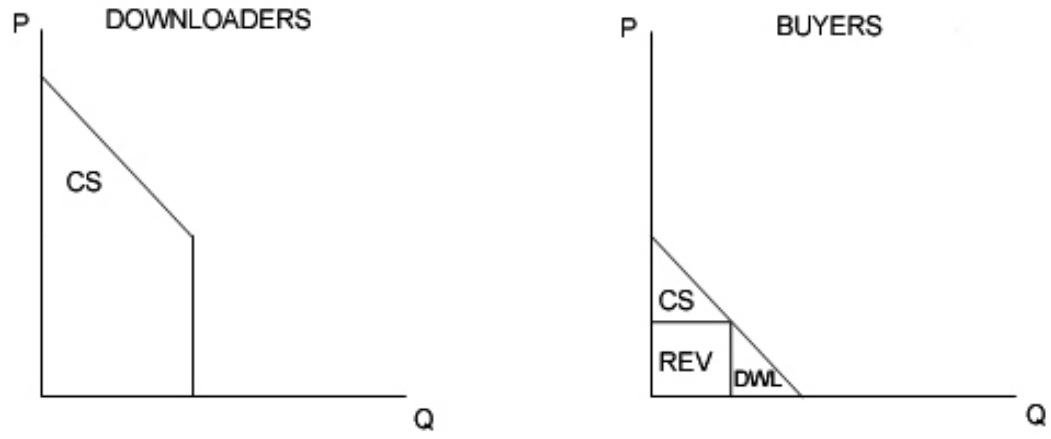

Figure 10: Downloaders are high-valuation demanders.
CS = Consumer surplus; DWL = Deadweight loss; REV = Revenue.
(Source: Based on Rob/Waldfogel (2006), p. 39)

[98] Cf. Rob/Waldfogel (2006), pp. 36-39.

This analysis leads to the conclusion that file sharing does not decrease welfare if the music is valued under its price and would not have been purchased anyway. So, in this particular case, downloading can increase welfare without hurting the music industry.[99]

[99] Cf. Peitz/Waelbroeck (2006), p. 912.

5 Conclusion

5.1 Results

Considering the studies discussed in this paper, it is not possible to conclude that piracy is the only reason music revenues declined.
Even though the majority of economists see sales displacements caused by piracy some see positive effects.
The main issue of investigating the reasons for declining revenues is that single effects cannot be isolated. Piracy is a worldwide phenomenon and is not only observed in single countries, so it is not possible to compare a country with piracy and a country without. Also technologies are developing very fast; to compare the 1990s with the 2000s would not yield to good results.
Closing one can say that piracy is a threat to artistic industries (e.g. music, movie or software industry) but not the only one.

5.2 Outlook

In the past years, several both national and international treaties and sanctions have been trying to fight piracy.
Mostly operators of websites making it possible to transfer pirated files (e.g. Napster, KaZaA, and Megaupload) were made responsible by record companies but also users supplying these files were sued due to copyright infringements.
To control Internet traffic legislative authorities are designing laws for telecommunications data retention. Since 2006, Internet providers in the EU have to store records of telephony and internet traffic. Some countries like Germany have not implemented this law yet because of intrusion into privacy. The German parliament wants to wait for decision by the European Court of Justice.[100]

[100] Cf. Tagesschau (2014)

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Erklärung

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