

# A Review of Economic Properties of Music Distribution

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## Abstract

Music industry is “facing the music” now. Big stakeholders try very hard to maintain their positions while other players see opportunities in the advent of peer-to-peer networks. Music, as a kind of representative information good, deserves its economic properties to be examined and made explicit. This paper reviews various aspects of the literature covering information goods, tries to extend the analysis to the distribution of music and points out possible venues to follow in order to look for a solution.

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## 1 Introduction

*"The rules for making a living making music have been remade over and over, from the first drum-beat. Until the 20th century, musicians in Western societies were generally held in contempt, their status approximating that of a vagabond. Even the most successful musicians were mistrusted." - New York Times (Mar. 16, 2002)*

This paper looks into the question of economics of music distribution. The issue is interesting because music as a kind of merchandise enjoys many unique properties, and these properties have not been thoroughly addressed by economic theory. The advent of the Internet further complicates the problem; music, originally a kind of very representative information good, has its economies unleashed by the Internet profoundly.

The traditional business model for distributing music is no longer the exclusive architecture bridging the creators, the sellers and the buyers<sup>1</sup>. The downturn of Napster,

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<sup>1</sup>A more precise segmentation would be: artists, labels/record companies, direct distribution companies, traditional retailers, online retailers, secondary market providers.

the emergence of services such as MusicNet, Pressplay or Rhapsody are all strategic considerations of major stakeholders. The previous Napster users are quickly becoming users of other P2P network softwares, which are sometimes referred to as Napster Clones. There are also individuals and organizations advocating free music<sup>2</sup> (Courtney 2000; DiCola 2001; Kelly 2002; MOLRA, bill number H.R. 5275<sup>3</sup>). The efforts freeing music and what the music industry portrays as a threat to copyright actually signify a change in the economics of music distribution. Careful economic analysis should be done before any claims to be accepted, and the result could provide a starting point for legal considerations.

This paper is organized as follows. Section 2 introduces the history of music publishing and copyright licensing, providing the background for a better understanding of the music industry. In section 3, I analyze the economic properties of music distribution, synthesize the existing literature, and discuss possible research questions. Section 4 reviews the literature in industrial economics related to legal use of copyrighted materials.

## 2 The history of music distribution

### 2.1 Music publishing

Ever since music could be recorded in manuscripts, the first important invention was music printing. Only after this invention, could composers, publishers, and the public refer to the titles (for example, *Primo libro di madrigali* or *Musica nova*), each of which referred to identical copies of works available. The development of music printing has changed immensely the access to musical repertoires and their availability. The major drawback of sheet music is that the buyers can not enjoy the music by listening to it.

After music printing, the biggest breakthrough in music publishing was the ability of recording and duplication. After records, people further invented tapes, tape cassettes, CDs, MDs as media for distributing music. Even before the so-called information revolution, music evolved into a very representative kind of information good. This market is characterized by mass-production, the ability to make copies ceaselessly and perfectly, which also characterizes the production of Ford Model T and Coca-Cola. Music works then are distributed on those media, and we have the traditional market with producers (composers, performers), publishers (the record labels), distributors and the public (music buyers and listeners).

Ever since the computers equipped with sound cards, people have more options in distributing music. Various formats<sup>4</sup> are supported by different applications, but before CD burners and MP3 became practical in computers, the computer does not pose an

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<sup>2</sup><http://www.ram.org/ramblings/philosophy/fmp/fma.html> contains a list of sites that supports freeing music.

<sup>3</sup>Music Owners' Listening Rights Act of 2000

<sup>4</sup>a partial list includes au, aif, midi, voc, rm, ra, wav, wma, mjf, as, rmi, hmp, hmi, xmi, mss, mus, cmf, gmd, mids, miz, hmz, mod, stm, s3m, it, xm, mtm, ult, cda, mp1, mp2, mp3, etc.

impact to the music industry. Music in format based on wave is too large for people to exchange, and music in midi format is not so rich and flexible. MP3 plus CD burners enabled computer users to duplicate music and enjoy almost loss-free appreciation of the original work. Together with the catalyst of broadband Internet connection and development of peer-to-peer (P2P) softwares, the cost of duplicating and distributing music has been reduced unprecedentedly.

I define the traditional music distribution industry as composed of the record labels characterized by the "big five" which includes Warner Music (a division of United States-based AOL Time Warner), Universal Music Group (a division of the French media group, Vivendi Universal SA), EMI Recorded Music (a division of United Kingdom-based EMI Group), BMG Entertainment (a division of German media conglomerate, Bertelsmann AG), and Sony Music Entertainment (a division of Japanese giant, Sony). In this market, music works are packaged, marketed, distributed and retailed. The Internet has great impacts on distribution networks. The chief economist at Morgan Stanley Dean Witter, Stephen Roach, calculates that the E-commerce combination of business-to-business and business-to-consumer will reduce the labor force in the distribution sector of the economy by 35% over the next 5 years (Morgan Stanley, 2001).

Napster was founded in 1999, it uses a peer-to-peer architecture for members to exchange MP3 files freely without transaction cost other than the connection fee and the opportunity costs of members. In late 1999, the Recording Industry Association of America (RIAA) put the company to court for copyright infringements. After several hearings, on March 6th, 2001 the court's ruling confirmed the claims and ordered that Napster had to eliminate all copyrighted material from its server within 72 hours after notification by the right holders.

Although Napster lost in the court, the technology inspired many people to fundamentally change the current economics of music distribution. There have been many softwares emerged or prospered after the Napster ruling. Some artists have decided to quit from the major recording labels and establish direct connection with the music buyers through web music publishing. Major recording companies also started online services such as MusicNet, Pressplay or Rhapsody to fight back the digital invasion from smaller players. Some other innovative business models emerged; for example, MusicLink.com (formerly Fairtunes.com) allows music fans to pay the artists directly and voluntarily. Also, MP3.com allows people to preview songs and purchase them individually or direct fans to buy albums online.

## **2.2 Copyright licensing**

The Columbia Encyclopedia describes a copyright as being:

"A right granted by statute to the author or originator of certain literary, artistic, and musical productions whereby for a limited period of time he or she controls the use of the product. The work may be reproduced by the individual or by another licensed to do so by the individual. Royalties are paid on each performance of the work or each copy that is sold."

There are many items that fall under the category of copyrightable material, such as literary works, musical compositions, musical recordings, works of art, radio and TV programs. More recently, computer software and the semiconductor chip have been added to the list.

One may distinguish essentially three periods in the development of the protection of books and music: the régime of privileges, the period in which the laws on the copyright were elaborated, and the appearance of international laws on the copyright (Rasch 2001).

Legal concerns of music publications co-evolved with the laws that regulated publishing in general. Since music only constitutes a small fraction of the total publishing production, there is a considerable delay in legal concerns for music. The first attempts to regulate the trade against piracy came from the composers and publishers rather than from a legal or government agency<sup>5</sup>. The U.S. Congress first extended copyright to theater music in 1856 and to non-dramatic performances in 1897.

Performance Rights Organizations (PROs) provide a key administrative service for music users, who might otherwise need to deal directly with songwriters and composers to obtain the rights to perform copyrighted music. There are 3 major PROs representing artists in America: the American Society of Composers, Authors, and Publishers (ASCAP), Broadcast Music Inc. (BMI), and the Society of European Stage Authors and Composers (SESAC). Since ASCAP's inception in 1914, the PROs have made pooled performance rights for catalogued works available to music users mostly through blanket licenses. ASCAP and BMI license the rights to publicly performed musical compositions in non-dramatic settings in the United States. Licensees together now pay nearly one billion dollars to the two organizations for the right to use their catalogued material, which together include roughly 97 percent of all American compositions. Television and radio broadcasters respectively account for approximately 45 and 36 percent of total license revenues at ASCAP (ASCAP, 2002; BMI 2002). Some specific types of licensing are broadcast licensing<sup>6</sup>, general licensing<sup>7</sup>, Internet licensing, and music library.

The Antitrust Division of the Justice Department negotiated Consent Decrees regarding competitive practices with ASCAP in 1941 and 1951, and with BMI in 1941 and 1966. Per the terms of these Consent Decrees, ASCAP and BMI must offer to radio and television stations program licenses that make full catalog available on an individual program basis. On September 5, 2000, the Antitrust Division and ASCAP filed with the U.S. District Court of the Southern District of New York a Joint Motion to enter a newly negotiated Second Amended Final Judgment (AFJ2) that resolves many outstanding issues in performing rights. AFJ2 generally expands and clarifies ASCAP's

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<sup>5</sup>Some anti-piracy measures are: simultaneous publishing in different countries, and international commercial agreements.

<sup>6</sup>Including Radio, Non- Commercial Radio, Television, and Cable.

<sup>7</sup>Including, Aircraft, Amusement Park, Arena, Auditorium, Bowling Center, Circus, College & University, Concert Promoter, Convention Center, Country Club, Cruise Ship, Dance Studio, Family Show, Festival, Health & Fitness Center, Hotel, Ice Rink, Movie Theatre, Museum, Music In Business, Nightclub, Planetarium, Professional Sports Team, Racetrack, Resort, Restaurant, Retail Store, Roller Skating Rink, Shopping Mall, Sports Bar, Stadium, Tavern, Theme Park, Water Park, Web Site, Zoo.

obligation to offer genuine license alternatives to more user groups, such as background music providers and Internet companies. It also streamlines administrative provisions for resolving rate disputes and modifies or eliminates restrictions that now govern ASCAP's relations with its members.

The new segment license proposed in AFJ2 could in effect enable stronger competition between ASCAP and BMI. Originally, the PROs each sell a blanket license and represent mutually exclusive groups of artists, so the users must purchase licenses from all of them. The segment license, however, enables the broadcast and webcast radio users to bundle songs more efficiently. In an ideal competitive market, segment license revenues depend on the number of segments sold, so the PROs would have incentives to lower the license fee and induce more consumption of segment licenses.

### **3 Economic properties of music**

Economists now use the concepts of choice, strategy, information, equilibrium, and so on to analyze economic phenomena, but a more ambitious (also more traditional) aim would be providing policy advice to improve economic efficiencies in reality.

This section will try to identify the most conspicuous economic properties of music in digital form. Relevant insights from the literature are drawn and reviewed for further exploration of this issue in different approaches. All these properties could affect the policy advice for regulation<sup>8</sup>.

#### **3.1 Transaction cost**

The transaction cost approach to the organization of firms has been among the most significant advances in industrial organization in the last 25 years. There is a vast amount of papers taking the Transaction Cost Economics (TCE) view of Williamson (1975, 1979, 1985) and Klein, Crawford, and Alchian (1978). This branch of literature pushed forward the "firm boundaries" approach laid out by Coase (1937). Rindfleisch and Heide (1997) provide a synthesis and integration of recent contributions to TCE by both marketers and scholars in related disciplines, an evaluation of recent critiques of TCE, and an agenda for further research on TCE.

The music industry is established on the premises of transaction cost economics. The cost for the musicians to distribute the music to as large an audience as possible would be forbidding without the music distributing market mechanism. As a kind of experience good, music needs to be experienced before anyone wants to purchase<sup>9</sup>. Huge amount of money is invested in marketing and promotion for particular musicians or albums, the royalty collection mechanism brought about by ASCAP, BMI and SESAC

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<sup>8</sup>"Regulation" here refers to a set of feasible policies that have potentials to achieve a more efficient market.

<sup>9</sup>Except perhaps for the reputation effect of famous musicians

helps the industry to lower the transaction cost in assuring to get the musicians compensated.

The earliest music market was taking the form of live performance, where music users can directly pay the music producers. As the number of the musicians is increasing, and people's preference is getting more diversified, the information cost increases. This requires economic agents to be specialized, and the separation between music production and consumption to be increased. Hence, transaction costs arise and the music industry evolves. The traditional music distribution might be an efficient way to address the problem of transaction cost, but it might no longer be so in the face of the Internet technology, which enabled very effective communication between the sellers and buyers. With the help of the Internet, on one hand, the music producers can directly publish the music and potentially increase the audience significantly; on the other hand, the music buyers can have a much larger pool of selection of music works. Relying on fast evolving search capabilities, ever increasing bandwidth, and growing online music discussion boards, the gap between music producers and buyers is getting closer and closer. The lowered transaction cost will have profound effects on the music distribution companies. Napster.com is the first threat, and there are other peer-to-peer softwares available that greatly undermine the existing market of music distribution.

Recent research works suggest a trend of "disintermediation" by using E-commerce to cut middlemen. Lucking-Reiley and Spulber (2001) shows support to the claim that efficiencies in B2B E-commerce are obtained by disintermediation. The advances in the information and communication industry enable virtual transactions to overcome the physical distance between people. These faster and more efficient ways of communication enabled economic agents in the global economy to interact directly.

There are several sources of transaction cost in the traditional literature. Williamson's analysis focuses on two aspects: specialized asset and measurement costs. Milgrom and Roberts (1992) seeks to extend this approach by suggesting the concept of bargaining costs. They suggest 3 classes of bargaining costs: (1)coordination failures - markets fail to select an equilibrium, (2)measurement costs - the cost of determining the value of a good, and (3)private information about preferences - impossibility to learn the true valuation of agents. In Shi and Mathysen (2002), seven sources of transaction cost are identified, and the effects of E-commerce are analyzed: Search cost (pre-purchase information cost), Accuracy of pre-purchase information, Uncertainty on quality of goods and services, Asset specificity and opportunistic behavior, Negotiation cost. It is obvious that all the suggested sources of transaction cost are also changing rapidly in the music distribution market.

Casson and Wadeson (1998) models the communication between upstream firms and downstream firms as a rational response to communication costs. The model is used to analyze the impact of IT on the conduct of subcontracting. This model can be extended to address the disintermediation issues in music industry. Leffler and Rucker (1991) adopt the transaction cost framework to explain the choice between lump-sum and per unit payment provisions in private timber-harvesting contracts. They posit that contracting parties will choose the organizational and contractual forms which minimize the costs of transacting, and that transaction cost explanations provide a better

explanation than risk-based arguments. In the case of music market, the distribution industry actually selected to continue the traditional way of distributing music, and fought against online distribution in the beginning and established its own online distribution schemes; it is interesting to find out if such a choice reflects the minimization of the transaction costs.

There are more and more economic activities mediated by computers, sophisticated monitoring of transactions will be easier and easier; this allows more efficient contractual arrangements in the transactions, so a reduction in transaction costs can be expected in this context.

### 3.2 Property rights

The pattern of property rights over assets is important in determining incentives (Moore, 1992). Some musicians are suggesting that currently the music distribution industry is the "residual claimant" of the music production<sup>10</sup>. In Hart and Moore (1990), a framework is proposed to identify a firm with the assets that its owners control. The framework is used to study how changes in ownership affect the incentives of employees as well as those of owner-managers. Residual rights to control encompass not only the rights to use assets, but also to "decide when or even whether to sell the asset" (Hart, 1995). In addition to the issues traditionally considered in the theory of the firm, the approach of property rights has been applied to corporate finance (Hart, 1995), corporate governance, the organization of production in public versus private firms, and the boundaries of knowledge-intensive firms (Brynjolfsson, 1994). Fama (1980) explains how the separation of ownership from control can be an efficient form of organization relative to organizations in which the risk-bearing and decision-making functions are combined. In his particular setting, the agency problem is mitigated by the managerial labor market.

In the context of music distribution, the ownership of intellectual property rights also poses similar issues for analysis. The US constitution explicitly grants Congress the duty "to promote the progress of science and useful arts, by securing, for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries." This kind of protection is a double-edged sword. If the protection period is too short, there won't be enough incentive rewards for creative works; but if the protection period is too long, the standard deadweight losses of monopoly will arise. There has been a lot of economic analysis of intellectual property protection; a recent survey is Besen and Raskind (1991). One insight we could draw from economics literature is that monopoly may not necessarily bring about inefficiency, when a monopolist can price discriminate, the deadweight loss problem can be much less severe. When a monopolist commits first degree price discrimination, the supply can increase to competitive level, thus eliminating the deadweight loss (Varian, 1992). Armstrong and Vickers (2001) show that when consumers have the essentially the same tastes, and when there is a fixed cost of servicing each consumer, then third degree price discrimination will

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<sup>10</sup>The cost to produce a CD *en masse* is about \$0.50. The average price per CD: \$17.99. The average amount that an artists receives: \$0.12" (Wittur, 2001)

generally make consumers better off. This potential research direction will be further explored in the next section about bundling.

Music is owned by the artists, but in control of the sellers. There are traditional agency problems in this context. Those who have control of the music distribution have incentives to sell the music that can bring them most revenues, and distort the market by extensive and disproportional promotions in favor of a small number of works. Music listeners may not value the music produced by big labels as much if they have a chance to know about smaller labels and new musicians, this is a severe distortion and source of social inefficiency. The overwhelming advertising campaign may further skew the consumers' preference and lead to distorted demand (Zhang, 2002).

To the music industry as a whole, the traditional music copyright mechanism has never been challenged so brutally. According to the Recording Industry Association of America (RIAA)'s 2001 year-end report ([riaa.org](http://riaa.org)), the number of units shipped domestically from record companies to retail outlets and special markets (music clubs and mail order) fell 10.3% in 2001. Specifically, total U.S. shipments dropped from 1.08 billion units shipped in 2000 to 968.58 million in 2001 - a 10.3% decrease. The dollar value of all music product shipments decreased from \$14.3 billion in 2000 to \$13.7 billion in 2001 - a 4.1% decrease, this is following a 1.8% decrease from 1999 to 2000. According to recent surveys commissioned by the RIAA and conducted by Peter Hart Research Associates among a total of 2,225 music consumers between the ages of 12 and 54, 23% of those music consumers surveyed said that they did not buy more music in 2001, because they downloaded or copied most of their music for free. Over 50 percent of those music fans that have downloaded music for free have made copies of it. Just two years ago, only 13% copied it onto a portable device or a CD. According to the London-based International Federation of the Phonographic Industry (IFPI, <http://www.ifpi.org>), global piracy on the physical side costs the recording industry over \$4 billion a year. All these evidences cry for a rethinking of copyright laws to address the emergent issues.

### **3.3 Bundling**

Bundling refers to a marketing method in which firms offer for sale packages containing more than one unit of the product (Adams and Yellen, 1976). In traditional music distribution market, music works are sold mostly bundled together: a tape or a CD has several songs from either the same or different artists. The most obvious reason is that this saves costs of production and distribution. Two other well-studied reasons are: 1) reduction of dispersion of willingness to pay (Bakos and Brynjolfsson, 1999, 2000, 2001); and 2) increased barriers to entry (Whinston, 1990; Nalebuff, 1999, 2000; Bakos and Brynjolfsson, 2000). When a music piece is digitalized, the reason of reduced costs of production and distribution no longer holds. The Internet technology enables a song to be downloaded individually and charged individually, given the overhead in distributing the physical media, there might be efficiency gains by selling individual songs, also, a pay-per-use scheme could be useful in extracting buyer's

willingness-to-pay, and thus be the bases of price discrimination (Bakos and Brynjolfsson 2001). The Internet also has the potential to introduce brand new ways of bundling, such as the subscription business model. The possibilities could be: 1) bundling the works from a certain artist; 2) bundling works from same genre; 3) unlimited access to a certain pool of music works; 4) temporal bundling of music works, etc.

Bakos and Brynjolfsson (1999) found that bundling very large numbers of unrelated information goods could be surprisingly profitable<sup>11</sup>, and it is possible to achieve greater sales, greater economic efficiency and greater profits per good from a bundle than can be achieved by selling the goods separately.

Nalebuff (1999, 2000) show that a firm that sells a bundle of complementary products will have a substantial advantage over rivals who sell the component products individually, and the advantage increases with the size of the bundle. Comparing with the gains from price discrimination, Nalebuff shows that the gains from entry-deterrent effect are larger.

Before 1998, videotapes are sold at about \$65 a copy to the stores. Ever since 1998, the video rental industry formed an alliance with the movie studios. Each movie would be charged 0-\$8 apiece, and the revenue from renting will be shared by the movie producer and the store. Blockbuster has increased its inventory 7 fold. Dana and Spier (2000) show that revenue sharing is a valuable instrument in vertically separated industries when there is intra-brand competition among the downstream firms, demand is stochastic or variable, and downstream inventory is chosen before demand is realized; they show revenue sharing, combined with a low input price, aligns the incentives in the vertical chain. In an empirical study, Mortimer (2002) finds that total upstream and downstream profits increase by 4-5%, and consumers benefit substantially when revenue-sharing contracts are adopted. The video renting industry suggests a potential solution to the dilemma of the music industry. Varian (2000) studied the implications of buying, sharing and renting information goods, and he found that in three circumstances the profits increase when the goods are shared: 1) when the transactions cost of sharing is less than the marginal cost of production (seems evident for the music distribution industry<sup>12</sup>); 2) when content is viewed only a few times and transaction costs of sharing are low; and 3) when a sharing market provides a way to segment high-value and low value users. Bakos, Brynjolfsson, and Lichtman (1999) show that even when the transaction cost of sharing is greater than the marginal cost of production, sharing can markedly increase profit in some circumstances.

In an N-good bundling model with multi-dimensional consumer preferences, Chuang and Sirbu (1998) find that both mixed bundling and pure unbundling dominates pure bundling. The implication to the music industry is that if consumers positively value only a subset of the bundle components, mixed bundling (i.e. offer both individual components and bundled package) is the profit maximizing strategy.

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<sup>11</sup>This could be a justification to bundle music works belonging to different genres and styles.

<sup>12</sup>In Johnson (1985)'s paper, he suggests that the originals' distribution cost will always be less than the copying cost, because the producer can change to any lower-cost scheme by adopting the technology with lower cost. This is not true for the music industry: P2P softwares, the copying technology people use, can not be easily adopted by recording labels.

Applying artificial intelligence knowledge, Brooks and Durfee (2000) propose a mechanism to automatically calculate optimal pricing and bundling strategies. A bundling business model has the best potential of solving the music industry's problem of declining revenue from traditional media (CD, Cassette, LP/EP, DVD, etc.). The remedy should be accompanied by legal, technological, business process advances I discuss in other sections.

### 3.4 Public Good

Goods that are not excludable and are nonrival are called public goods (Varian 1992). Music, when downloaded on the harddisks, is neither excludable nor rival. Music is bond to be nonrival, because whenever a music work is produced, the listening of the music will not reduce the provision of it to others. Traditional way of distributing music does not incur a public good problem because music is attached to a physical media that is excludable (When I am listening to this CD or tape, no one else can listen to it at the same time). The Internet enables the music to be enjoyed by many people at the same time by distributing copies easily. Free riders (or pirates) then enjoy a rent that potentially hurt the producers' profit and incentive to make music.

Technologically, some new inventions attempted to address this problem by recombining music with its medium. Macrovision's SAFEAUDIO is a software-based audio copy protection solution for music CDs designed to prevent unauthorized copying of music CDs or ripping of songs. SAFEAUDIO provides high compatibility with legacy players, including PC's and provides an "authentication" option for PC and Internet applications. The copy protection prevents the audio data from being copied onto a PC as WAV files. Cactus Data Shield (CDS) was developed by Midbar Tech and uses a different technique that makes the audio 'invisible' to a PC. Sunncomm's MediaCloQ Digital Content Cloaking Technology (DC2) prevents CDs from been played on PCs unless they include a data session with MP3 (or similar) files. These technologies are created to strengthen the traditional music distribution scheme, when more and more music works are published in MP3 format<sup>13</sup>, the free rider issue inherent in public goods problems will eventually rise.

### 3.5 Regulation

The existing copyright collective organizations, which are called PROs (Performance Rights Organizations), such as ASCAP, BMI and SESAC have developed intricate licensing and distribution mechanisms to represent the public performance copyright interests on behalf of music copyright holders. This seemingly oligopolistic structure actually poses a (naturally) monopolistic issue because each of them represents different artists and there seems to be no direct competition among them. Economics

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<sup>13</sup>Theoretically, it is impossible to protect a CD as long as it can be played some way. With Analog-Digital and Digital-Analog techniques, there are many ways to record a music and distribute it in digital form.

literature on antitrust can shed much light on this issue. For example, applying the research framework of Salop and Craig-Romaine (1999).

Furthermore, the research on the political economy of regulation (Stigler, 1971; Kroszner and Strahan, 1999), efficient regulation of monopolies (Laffont and Tirole 1993), the effects of economic regulation and deregulation (Joskow and Rose, 1989; Newbery, 1998) can be drawn on by analysis of regulation in the music industry.

Perhaps the most widely accepted view of regulation originated from Stigler's (1971) private interest theory. Stigler suggests that different interest groups use regulations to protect their special interests, and the politicians supply regulations in exchange for votes. Following this tradition, economists have modeled the state as a tax and transfer mechanism that shifts rents from one interest group to another, usually at the cost of economic efficiency. The debate between regulation and deregulation prevails many industries in the history. The regulation advocates believe that the government (or the so called social planner) has an advantage in providing the transaction cost reducing service, because it is independent of the interests it regulates. Thus, a government may be more efficient in ensuring a most efficient outcome. The deregulation advocates suggest that government may not have enough information in the specific industries, and its regulatory efforts may actually distort the market relationships.

Each year, more than 30,000 new music titles are released. There is a marked scarcity in the number of channels and a high entry cost of the distribution networks necessary to reach the consumer. High entry costs are associated with the regional and national market presence necessary to build a critical mass of consumers to justify the initial sunk cost in artist development, production and marketing. This is a typical situation for the existence of "natural monopolists" (Tirole, 1988). As can be found in the industrial organization literature (Schmalensee, 1979; Sharkey, 1982; Noll, 1989; Gasmı, Laffont and Sharkey 1999; just name a few), the regulation problem has multifarious conclusions from different approaches. Traditionally, several industries are discussed extensively, including Electricity, Telecommunications, Cable TV, Banking, and Transportation.

Whether and how music industry should be regulated is a problem ignored by economists for long. The *laissez-faire* tradition now faces the challenges from new technologies and new business models. The trend of digitalization of information goods necessitates a closer look into the economics of regulation in music distribution.

## **4 Literature Review on Copying and Pirating**

One of the earliest attempts to look at the issue of economics of copyright is Hurt and Schuchman (1966). Frase (1966) notes that Hurt and Schuchman's suggestions of tax relief and direct payment may not be appropriate. Breyer (1970), in a framework similar to Hurt and Schuchman, improves the arguments by focusing on author's right to benefit from the work and suggests using some sort of social welfare model in this context. Pethig (1988) examines the historical changes in the information goods market.

He shows in a Cournot-Nash game where pirates<sup>14</sup> can copy information goods, the result is reduced profits for the copyright owner, profit-sharing contracts with authors, and less production of information goods. A recent work by Yoon (2001) specifies the optimal level of copyright protection for an individual producer and the society as a whole. He shows that an increase in copyright protection may increase or decrease the social welfare loss due to underutilization, but it will always decrease the social welfare loss due to underproduction. Watt (2000) is a nice recent survey on the economics of copyright.

Each time when there was an advance in copying technology, there would be lobbying, proposals, oppositions from content providers, and almost always, the content producers suffered losses. This is true in the case of introduction of Xerox copier in 1959, in the case of Sony Beta VCR in 1974, and the digital audio tape (DAT) in the 1980s. There are several seminal papers starting to talk about the effects of copying and pirating (Novos and Waldman, 1984; Liebowitz, 1985; Johnson, 1985; and Besen and Kirby, 1989). When software piracy becomes prevalent, there are also many papers addressing this issue.

Novos and Waldman (1984) show that when consumers have different copying costs, there is no social welfare loss due to underutilization, and only tenuous social welfare loss due to underproduction. Liebowitz (1985) concerns exclusively on photocopying of journals. He shows that under indirect appropriability, the purchaser of the original good takes the value of copies into account when determining their willingness to pay for the original, hence, the producer of the original good can capture some of the copying profit by charging a higher price for the good than they could in the absence of copying. He concludes that under some conditions<sup>15</sup>, producer returns can increase with piracy. Liebowitz's model is not suitable for software or music market because he assumes that pirate copies can only be made from originals. Johnson (1985) uses a spatial production differentiation model to analyze two models of copying differing in characteristics related to marginal cost and fixed cost, he concludes that an increase in copying has uncertain effects on the price the monopolist charges for his creative work, but the revenue would decrease; in the long run, social welfare will depend on the numbers of people switching from buying to copying and the elasticity of supply. The author suggests that whether someone is buying or copying is determined by his valuation, his unit wage rate as well as cost of copying. In the market, people are separated into 3 segments: those don't care (very low valuation), those pirate (higher valuation but lower copying cost), and those buy (highest valuation but higher copying cost). This segmentation brings elegant math results, but it can not be generalized to the current situation for analyzing music distribution, because in the real world people with low wage rate can not even afford a computer, they have no way to use CD burners to pirate music, and very rich people may as well enjoy a high cognitive surplus by pirating mu-

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<sup>14</sup>These pirates are different from later pirates people are talking about. These are pirating companies, they pirate the goods without paying to the producers, which is a typical case of pirating of books. Later papers are more and more focusing on individual pirates, especially when legal frameworks can deter pirating sellers, and the Internet infrastructure enable individuals pirating of softwares and music easily.

<sup>15</sup>The most important condition is that the producer can price discriminate between consumers who copy and not.

sic online (to show “I can”). At least in the context of music distribution, the distinction line between buyers and pirates should not be one monetary but cognitive. Besen and Kirby (1989) analyze 3 models where copies and originals are imperfect substitutes and marginal cost of copying is constant but greater than the marginal cost of producing originals, where copies and originals are perfect substitutes, but the marginal cost of copying is increasing, and where copyright royalties are considered. They show that long run welfare would depend on how copying affects the number of works produced, so copying should be restricted in the case where consumer gains are not much larger than producer losses. This result is very interesting if applied to the music distribution industry, a welfare analysis of consumer gains in a world of free music will shed light on strategy and policy.

Takeyama (1994) points out that all these previous models fail to consider the possibility that consumption of illegal copies can generate surplus for consumers of originals. Building on the works by Katz and Shapiro (1985, 1986) and Farrell and Saloner (1985, 1986), She shows that demand network externalities can induce greater firm profits relative to the case where there is no copying, it can also lead to a Pareto improvement in social welfare. Her paper hints that illegal copying can function as a form of price discrimination among different classes of consumers. Conner and Rumelt (1991) and Shy and Thisse (1999) follows the same reasoning and conclude that piracy may potentially raise the producer’s profits.

Takeyama (1997) extends her work to show piracy may raise the legal demand by enabling the producer to credibly commit to not reduce its price in the future. Similar to Takeyama’s work, Duchêne and Waelbroeck (2001) conducts a welfare analysis, they show when network externalities satisfy some conditions, the losses generated by illegal copies can be compensated by the introduction of new products. Alexander (2002) is a recent review of the relationship between digital distribution and market structure in the music recording industry. He first gives a very brief history of the music recording industry, then introduces relevant digital technologies and recent law suites. He concludes that it is progressively more costly for the firms in the industry to counteract file sharing through legal mechanisms, and the major firms in the industry is likely to face significant difficulties in controlling the reproduction and distribution of their products. Belleflamme (2002) extends a model proposed by Mussa and Rosen (1978), he shows that when the copying technology involves a marginal cost and no fixed cost, producers act independently, when the copying technology involves a fixed cost and no marginal cost, pricing decisions are interdependent. Gayer and Shy (2002a, 2002b) show that it is not always a good strategy to impose a hardware tax to compensate software producers when the software must be used together with the hardware, and it is possible for producers of digital information goods to utilize the Internet, such as P2P systems, to enhance sales of their goods sold in store. Although the authors want to model the broad case of both software and music pirating, the assumptions are not satisfied in the real world. It is very hard to find a software piracy case where a hardware is necessary for the software to run. (One exception could be the 3-D game softwares, where a high-performance graphics card is needed, but this case does not fit into their other assumptions.) Due to the same reason, the result can not be easily extended to the market of music distribution.

Chen and Png (2002) summarized the previous research on piracy and copyright enforcement into three themes: the impact of piracy on the legitimate producer's sales and profit; the impact of piracy on social welfare and the optimal government policy; and how the legitimate producer should respond to piracy both through conventional business strategy, specifically pricing, and instruments particularly directed at piracy. In their model the government must consider how the publisher adjusts price and detection to changes in fine, tax, and subsidy, the key result is that increases in detection affect welfare more negatively than price cuts, also, tax is welfare superior to a fine, and subsidy is optimal. Zhang (2002) builds a spatial model of product differentiation, he shows that big recording labels' advertising will distort buyers' demand, and may even drive new entrants or small labels out of business. A P2P network enhanced by copyright management technology and legal frameworks will have positive effects on improving consumer welfare (by providing a better variety of music works), helping new entrants establishing niche market and competing with incumbents, and supporting the big labels to leverage their resources to improve profitability through price discrimination and other innovative pricing schemes.

There are few empirical attempts in the literature on this topic. Although facing strong critiques regarding the methods, Holm (2001) applies a contingent valuation approach to study willingness-to-pay for originals when illegal copies are available. He shows that piracy is insensitive to price cuts, and majority of the subjects wanted to pay a non-negligible amount for the original. The results can be used in the calculation of damages of piracy. Using international panel data for music CDs and cassettes, Hui, Png and Cui (2001) provide empirical evidence that the demand for both goods decreased with piracy.

## **5 Conclusion**

In order to know more about the economics of music distribution, I have studied the history of music distribution and copyright licensing. Drawing from existing literature, I find many similarities and differences between music and other kinds of information goods. Several potential venues in studying music distribution are suggested. The resolution of the music distribution problem requires efforts from economists, legal system researchers and industrial practitioners, this paper calls for attention from academia to develop models and methods that are suitable to, at least partially, address the issues.

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