

Unchained Melody: A Price Discrimination-Based Policy Proposal for Addressing the MP3 Revolution

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Recent innovations allow Internet users to access and trade digital music files without paying those who have produced the music. MP3 and other data compression algorithms allow digital files to easily fit on hard drives or portable discs, and software such as Napster and Gnutella allow music fans to trade files on the Internet. These new technologies are turning recorded music into a public good, since no one can be prevented from enjoying an inexhaustible supply of digital copies.

We may expect private markets to provide less-than-optimal quantities of music as a public good. Indeed, foes of Napster claim that downloads are hurting sales of pre-recorded CDs (Stern 2000, A03). Others, such as Napster attorney David Boies, argue that Internet music trading does not hurt sales of prerecorded CDs and may actually enhance them by whetting consumers' appetites for new music (E03). Recent congressional inquiries and civil lawsuits have heightened interest in this question: What effect does Internet music trading have on sales of prerecorded CDs?

Controversy aside, Internet music trading demands study because it is a more efficient distribution system than the industry's traditional model.¹ With no costs of manufacturing, packaging, shipping, or retailing CDs, downloads can be offered at a marginal cost of virtually zero and can be enjoyed by music fans at the cost of just a few minutes of computer time. Internet music trading thus represents a tremendous

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potential efficiency gain in music distribution. To realize these gains, the recording industry must find a way to harness reasonable profits from the new technology.

We have surveyed almost a thousand college students to determine how the availability of digital music files has altered their music consumption habits, allowing us to estimate the effect of MP3s on their purchases of prerecorded CDs. The survey also allows us to evaluate the efficacy, for recording companies, of using intertemporal price discrimination to capture profits from Internet music downloads. Our goal is to find distribution and pricing schemes that allow recording companies to survive while taking advantage of new distribution technologies.

The Music Industry

It is important to distinguish between art and industry when examining music and searching for business models that will be responsive to new technologies. Ensuring a continued supply of music that reflects diverse consumer preferences is not identical to protecting those with interests vested in the status quo. In current rhetoric, there is a good deal of equivocation linking corporate and artistic vitality. The call to protect music by protecting a highly concentrated industry suggests ceremonial encapsulation, wherein "a new discovery in the arts or sciences will be incorporated . . . only to the extent that the community believes that the previously existing degree of ceremonial dominance can be maintained" (Bush 1987, 1093). Bush noted "ceremonial encapsulation, to the extent that it is successful, denies to the community those technological innovations that the existing knowledge fund is capable of generating, thereby depriving the community of higher levels of instrumental efficiency" (1093).

A brief overview of the music industry will identify areas where certain pecuniary and instrumental interests diverge. The music industry is highly concentrated—dominated by five media conglomerates.² Not surprisingly, market power has helped elevate prices. In fact, the recording industry recently settled with the Federal Trade Commission, and is currently being sued by thirty states, over price-fixing charges (Oestricher 2000). This market concentration belies the broad array of aesthetic and business sensibilities that mark music as a profession. For example, many artists, especially those whose work does not conform to the constructs of mass marketing, have welcomed the free exchange of MP3s. These artists value increasing their visibility and reaching a narrow but widely dispersed audience.

The industry's distribution model is also criticized as clumsy and outdated. The days when one could buy a "45"³ of the latest hit are gone. Instead, one typically must buy an entire CD. In the words of the artist once again known as Prince, "All it [the music industry] cares about is that kids on the Internet are downloading MP3s of the one hit song on the latest crappy release they put out . . . hoping to sell 2 million copies of the album when there is actually only one decent song on it" (Bauder 2000). The

exchange of MP3s of individual songs is more flexible and efficient. However, it threatens to reduce album sales.

A final characteristic of the industry worth mentioning is that the product cycle can be extremely short-lived. Pink Floyd's *The Dark Side of the Moon* notwithstanding, a typical album relies heavily on sales from the initial days and weeks of its release. Great music may be enduring, but the vicissitudes of fashion determine sales.

Music as a Public Good

New technologies are moving *recorded* music into the realm of public goods.⁴ For example, streaming audio and Internet radio are blurring the distinction between broadcasts and recorded content by allowing individuals to listen to CD-quality reproductions on demand. MP3s are the most controversial of these technologies, since they allow users to inexpensively create and trade digital copies of recordings. Free software, an Internet connection, and a few minutes of computer time are the only requirements to obtain compact, high-fidelity recordings. The supply of such music is exceptionally varied: several artists have recently decried the availability, on the Internet, of music *before* it was officially released, and of music that was never intended for release (Cohen 2000, 41; Huffstutter 2000, A1).

These trends have elicited dire predictions from some artists and recording companies. They fear that they are being robbed of revenues, and ultimately of the incentive to produce new music and are often angry at the "theft" of their intellectual property (Boriand 2000). It seems that the technologies are producing a collision of ethics and efficiency: some music consumers are pursuing an efficient new distribution technology which conflicts with the values of music producers—and perhaps with copyright law.

The Purpose of Copyright Law and Monopoly Rents

Current law grants copyright owners the right to reproduce copies of works and to sell, lease, or lend the works to the public. In music, works created after January 1, 1999, are copyrighted for 70 years after the author's death in most cases, with works made for hire having even longer copyrights; upon expiration of copyright, works enter the public domain (Stefik 1999, 86).

The *optimal patent* creates an efficient tradeoff between monopoly power's distorting effects on prices and its positive impacts on incentives to innovation (Johnson 1985, 159). By the same token, copyright law must, to some degree, provide economic rents to producers of intellectual and artistic works as a means of encouraging their creation.

While copyright law provides protection for copyright holders, copyright infringement still occurs. Theorists have developed models to predict effects on con-

sumer and producer surplus. William Johnson (1985) built two models relying on different assumptions; the model most relevant to the case of MP3s assumes zero marginal cost of copying once a fixed cost (e.g., hardware and Internet connection) is incurred. Johnson concluded that it is possible that “unlimited copying reduces social welfare and that restrictions on copying may enhance social surplus” (172). The actual outcome, however, depends on the effect of copying on the demand for originals versus its effects on total consumption, the elasticity of supply of new works, and utility derived from product variety. As Johnson noted, “The ambiguity about welfare effects is clear in the long run, where the greater consumption of works through copying is balanced by the reduced incentive to produce new works” (161).

Stanley Besen and Nataraj Kirby (1989) developed a general model which analyzes the economic effects of copying under indirect appropriability and direct appropriability⁵ (1989, 257). The latter assumption is most relevant to MP3s. Under the assumption of direct appropriability and a constant marginal cost of copying, Besen and Kirby concluded that “producer profits must decline. . . . because the producer must lower the price of originals to compete successfully with copies” (270). These theoretical predictions seem to validate the recording industry’s fears and warn that reduced profits may reduce incentive to produce new music. The first question, then, is whether MP3s reduce the demand for prerecorded music.

Potential Policy Responses

Engineering and policy are two approaches for ensuring continued provision of music by protecting legal suppliers’ compensation. The engineering approach seeks configurations of hardware and software that ensure illegitimate files are unplayable. The prospects for such an approach are somewhat dubious because each new technology becomes a target for those wishing to demonstrate their technological prowess. Additionally, these measures tend to be a nuisance for legitimate consumers. The Secure Digital Music Initiative (SDMI), a cooperative effort of roughly 200 music, telecommunications, and electronics companies, illustrates the problems with the engineering approach. One technology favored by SDMI is digital watermarking. Copyrighted files would have a digital watermark that would be non-duplicable but necessary for the file to be played. Recently, four SDMI watermarking technologies were subjected to public testing, and all failed (Gentile 2000). They are just recent examples in a long trend of failed technologies meant to protect music, games, and other software (Kan 2000).

The engineering approach has a fundamental flaw. Whether watermarks, encryption, or some other technology protects files, at some point these files must be converted from ostensibly secure electronic bits into music. Testifying before Congress, Gnutella developer Gene Kan made exactly this point. “Since humans don’t have decryption systems built into their anatomy, information must be deciphered before

we experience it. . . . The only way to make music that cannot be copied is to make music that cannot be heard” (Kan 2000).

Alternatively, an emphasis on policy could be used. Both the engineering and policy approaches are contrivances that create scarcity or otherwise allow business to glean profit from the provision of a virtually public good. Different schemes may be more favorable than others based on criteria such as efficiency, equity, and non-invidiousness. A popular policy proposal is to fund the “free” consumption of music, and other information, through the sale of advertising. This *fallacy of advertising*, a subset of the fallacy of composition, is a ubiquitous plague on our society. For individuals, advertising can make specific goods more affordable, but for all the goods enjoyed by all of society, advertising must add to costs.

Our proposed business model is to use intertemporal price discrimination. Piracy would be discouraged by providing, for older music, an inexpensive and legal alternative. Higher prices would be charged for newer music when demand is more inelastic and copyright protection may be more strictly enforced.

Price discrimination requires the ability to separate consumers into groups with different elasticities of demand, and to charge different prices while preventing re-selling between groups. The efficacy of intertemporal price discrimination rests on an empirical question—the willingness of consumers with higher elasticities to wait for less expensive, but legal, options to become available. Some consumers may wait because they want to avoid illegal activity, the transaction costs of “free” MP3s (caused by, for example, poor recordings, file mislabeling, and poor Internet connections of non-commercial sources), and because they want their favorite artists to earn some revenues.

Along with the relatively lower prices charged for older music to consumers with more elastic demand, this plan would require, for the sake of firms’ profits, higher prices for newer music. Presumably, some consumers with inelastic demand would be willing to pay premiums for newer music. Zero-price resale (copying) would be discouraged through more enthusiastic enforcement of copyright law on newer output using stiffer penalties, closer tracking of downloads, and other means. An intertemporal price discrimination model would provide business and law enforcement with priorities to direct their efforts and signal would-be pirates that newer files are aggressively protected. Metallica dramatically demonstrated that piracy is not anonymous by naming about 300,000 individuals who had exchanged their recordings using Napster.

Survey and Empirical Findings

To determine whether MP3s have impacted sales of prerecorded music and whether this new distribution mechanism may allow reasonable industry profits, we surveyed 996 of our students.⁶ These students were in introductory classes and thus

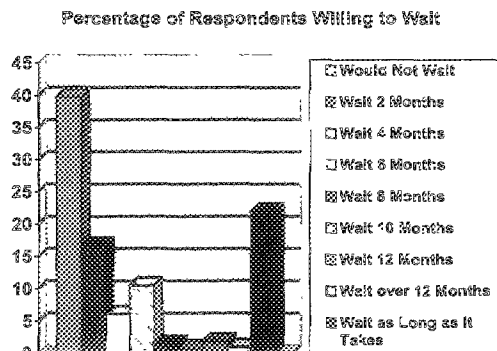
came from a broad variety of majors; as college students, they were in a demographic group strongly identified with music sales, Internet access, and Internet music downloads.

The survey asked a variety of questions to determine each respondent's access to computers and the Internet, purchases of prerecorded CDs and use of Internet music downloads, the effects of the latter on the former, and the willingness to pay for downloads according to the length of time for which the music has been available in prerecorded form.

Our data indicated the following:

1. Almost two-thirds (65 percent) of the respondents owned MP3 files at the time of the survey.
2. 47 percent of the respondents owned more than fifty MP3s, and almost 7 percent own more than a thousand MP3s.
3. On average, those respondents with MP3s have bought 2.4 fewer prerecorded CDs in the past year than they believe they would have in the absence of MP3 availability. However, most of the respondents (57.2 percent) report no impact on their purchases, and about 7 percent report buying more CDs as a result of the availability of MP3s.
4. Over 40 percent of MP3s owned by respondents were by artists whose music they would not ordinarily purchase.
5. Over 60 percent of respondents with MP3 holdings showed a willingness to wait to acquire downloads in order to avoid breaking the law. More than half of those would wait less than six months while about 37 percent of these waiters claim they would wait as long as required to avoid breaking the law (see figure 1).

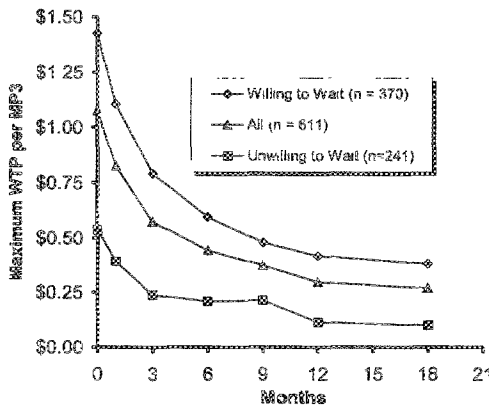
Figure 1. Respondents Willing to Wait Before Exchanging MP3s to Avoid Breaking Copyright Law



6. Even with limited incomes and easy access to free MP3s, respondents still expressed a strong willingness to pay for legal downloads from commercial sites. On average, the maximum willingness to pay among all respondents ranged from \$1.07 apiece for new songs to \$0.27 apiece for songs that are eighteen months old. For those expressing a willingness to wait to acquire MP3s in order to comply with the law, the range is \$1.42 to \$0.38 (see figure 2).

Points 3 and 4 suggest many downloaders use MP3s to sample songs by artists whose CDs they would not normally purchase, which may explain why MP3s have a smaller impact on CD purchases than some have supposed. The fact that 7 percent of downloaders have been induced to purchase additional prerecorded CDs suggests that recording companies may profitably exploit marketing strategies to appeal to this tendency and to this segment of the market. Points 5 and 6 suggest that recording companies could profitably use intertemporal price discrimination to exploit the efficiencies of Internet music downloads. Most respondents were willing to pay a price for MP3s well above their marginal cost. For new music, this willingness to pay averaged an amount comparable to the per-song price of a new CD. Considering both the reduction in production and distribution costs offered by Internet transactions and the willingness of consumers to pay for legal MP3s, there is good reason to believe that new technologies are compatible with an instrumental level of profit. What is more, by using marginal-cost pricing for older music, the industry can, at the same time, improve allocative efficiency. By then charging successively lower amounts as songs “age,”

Figure 2. Maximum Willingness to Pay per MP3, of Different Ages, by Those Willing and Unwilling to Wait in Order to Comply with Law



firms could continue earning profits while improving efficiency and encouraging consumers to engage in ethical behavior.

Conclusion

This paper has established that Internet music trading is simultaneously transforming music into a public good and creating enormous potential efficiency gains in music distribution. Our goal is to find a new distribution and pricing mechanism that will exploit these potential efficiency gains while still allowing recording companies to earn profit levels sufficient to keep producing new music. Based on survey results, we have found both a strong willingness to wait short periods, to avoid breaking the law, before exchanging MP3s and a substantial willingness to pay for legal MP3s. This suggests new technologies are not only good for consumers but also compatible with profits. By recognizing the varying elasticities of demand for music of various ages, an intertemporal price discrimination model may secure requisite profits, promote efficiency, and encourage consumers to engage in ethical behavior. This business model would allow firms to profit and an instrumental technology to flourish.

Notes

1. This is also an important issue because the public good characteristics of MP3s are similar to other types of information defining the information economy.
2. Sony, Time Warner, Bertelsmann AG, EMI, and Seagram.
3. Primitive analog recordings on vinyl discs designed to be played by a phonograph spinning at 45 rotations per minute.
4. Music was not always a commodity, and it already exists in various forms as a public good—radio and outdoor concerts, for example. To a certain extent, however, these media are used to enhance the exposure and sales of new music, and are not currently suspected of reducing sales.
5. With indirect appropriability, demand for originals reflects the willingness to pay of both purchasers and copiers. With direct appropriability, demand reflects only the value attached to the good by direct purchasers.
6. Copies of the survey may be obtained from the authors.

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