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Internet File Sharing: The Evidence So Far and What It Means for the Future

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A heated public debate started when the original “file-sharing” service, Napster, went on-line in 1999. Napster was shut down in 2001, but the debate raged on as other file-sharing services—commonly referred to as peer-to-peer (P2P) networks—took its place. Advocates of file sharing argue passionately that the practice has not harmed album sales, and opponents argue with equal vehemence that it has.

Despite both sides’ positions, the research thus far does not show a clear effect on record sales from file sharing. Does this mean that P2P is harmless? Not necessarily. There are many reasons why P2P’s impact may not have appeared in empirical data, and there are valid reasons why P2P remains a threat to the music industry. This paper provides a brief discussion of these issues and explains why the music industry’s long-term viability is endangered by P2P file sharing.

What Is P2P File Sharing?

Peer-to-peer is now the common term used to describe Internet file-sharing services. The name derives from the underlying structure of the Internet, in which various computers store information and other computers retrieve it through interconnected networks. With P2P, all computers sharing information over the Internet are “peers” because they both store and retrieve information.

To use a P2P service, such as KaZaA, users download software that enables them to “join” a particular

Talking Points

- If current trends continue, most music consumers are likely to make their purchases on-line. Consequently, not only is the delivery of the product likely to change, but the product itself is likely to transform.
- Economic theory suggests that peer-to-peer (P2P) file sharing will decrease album sales, rather than increase as some have argued, and several new studies support this prediction.
- Internet file sharing threatens artists’ ability to sell their music through digital downloading because the digital files available from artists are virtually indistinguishable from those available on P2P services.
- Economists refer to these types of goods as perfect substitutes, reflecting the fact that one digital file is a nearly perfect replacement for the other.
- Because overly burdensome regulations hinder innovation and entrepreneurship, a market-based approach to dealing with the P2P problem is preferable.

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“club.” Joining allows each individual to search other members’ computers for specific files, such as a digital copy of the newest song by Galactic. Once the file is found, the member who initiated the search can download his or her own copy of the file directly from another member’s computer—at no cost. Typically, members of the group make their own digital files available for others to share, thus increasing the number of files that are available for everyone in the group. The overall size of the group, of course, is bounded only by the number of people connected to the Internet.

The majority of P2P services’ users trade digital copies of songs and, to a lesser extent, movies. Though there is nothing inherently illegal about the technology itself (it can be used to share any type of digital file, such as personal photos or text files), many of the files traded through P2P networks are copyrighted. It is the unauthorized “sharing” of these copyrighted materials that has stirred the P2P controversy.

Economic Theory on File Sharing

Most of the theoretical literature about copying intellectual property materials (such as music, books, and movies) was developed before the introduction of the Internet. Consequently, this area of economic theory cannot be used to defend P2P. For example, much of the existing literature bolsters the idea that small-scale sharing can make both consumers and producers better off.¹ Because producers know certain groups of consumers will buy rather than copy, those who will buy can be charged a higher price. In contrast, the large-scale nature of P2P copying and the downward pressure that P2P copying exerts on music prices invalidate this “beneficial for everyone” prediction.

Additionally, the economic theory often cited by P2P proponents has been misused to defend Inter-

net file sharing. P2P advocates argue (1) that file sharing increases album sales (known as the sampling effect) and (2) that individuals who use P2P to download music would not have purchased the music in the first place.

Stan J. Liebowitz provides an extensive analysis of why the first idea—the sampling effect—does not hold up to scrutiny.² The sampling story holds that consumers use P2P to “sample” songs from full-length albums. Because consumers could not sample prior to P2P, they were less likely to buy the full-length album. Therefore, the story goes, consumers who sample on P2P are now more likely to buy music.

The main problem with the sampling story is that consumers who sample may find that they dislike the music. These consumers will not purchase the album. For sampling to increase music sales unambiguously, individuals would have to sample the music, like the music, and then purchase the music they had already acquired free of charge (all with no downward pressure on music prices). Although this process may hold true for some music consumers, a complete market analysis suggests that the sampling effect will decrease overall music sales.

Similarly, P2P proponents’ second defense describes the behavior of only some music consumers. The author’s research points out that because P2P makes it easier to get a low-cost, high-quality copy, some individuals enter the market only to download free music.³ These consumers can be thought of as having a low preference for music, meaning that they probably do not buy significant amounts of music. This is a theoretical justification for the idea that some file sharers would not have bought music in the first place, but it says nothing about consumers with higher preferences for music.

1. See, for example, Stan J. Liebowitz, “Copying and Indirect Appropriability: Photocopying of Journals,” *Journal of Political Economy*, Vol. 93 (1985), pp. 945–957, and Y. Bakos, E. Brynjolfsson, and D. Lichtman, “Shared Information Goods,” *Journal of Law and Economics*, Vol. XLII (1999), pp. 117–155.
2. Stan J. Liebowitz, “Pitfalls in Measuring the Impact of File Sharing,” University of Texas at Dallas, School of Management, Working Paper, July 2004.
3. Norbert J. Michel, “A Theoretical and Empirical Analysis of the Impact of the Digital Age on the Music Industry,” Ph.D. dissertation, University of New Orleans, 2003, at www.uno.edu/theses/available/etd-11212003-100808/ (August 3, 2004).

For instance, there surely are consumers with higher preferences for music who copy some music and buy other music. For these consumers, the introduction of P2P services increases the likelihood that they will choose to copy rather than buy. The low-preference consumers do not significantly affect music sales; therefore, the introduction of P2P leads us to predict fewer music sales. The size of this decrease, however, depends on other factors such as Internet and high-speed Internet use. The current evidence about P2P's impact on music sales is not perfect (as with all empirical work), but most recent studies do support the theoretical prediction that P2P will decrease album sales.

The Evidence on File Sharing

Because of econometric and data issues, studies thus far have produced disparate estimates of file sharing's impact on album sales. For example, it was widely reported that a Harvard professor's research found that file sharing had virtually no impact on overall album sales and seemed to increase sales of some albums.⁴ However, Liebowitz both details several econometric problems with that paper and estimates that file sharing reduced album sales between 2000 and 2003 by as much as 30 percent.⁵

Another study found that cross-country aggregate data support a 20 percent reduction in compact disc sales from file sharing,⁶ but that researcher's individual-level (or micro-level) data tests support a much smaller negative impact (8 percent) on sales. Using a different econometric approach, this same research estimates that file sharing reduces the likelihood of buying music by 30 percent. The author's research also uses micro-level data and finds that file sharing decreased CD sales in the U.S. by approximately 4 percent between 1999 and 2001.⁷

Why the Evidence May Not Matter

Each of the above-mentioned studies has its own strengths and weaknesses. None of the results, however, supports the contention that P2P does not threaten the *long-term* viability of the music industry. The reasons that the current evidence is only a small piece of the puzzle can be summarized as follows:

- **Relatively Few Studies.** The Internet and P2P downloading are both relatively new phenomena, and collecting sufficient data for empirical studies is difficult. This task is made cumbersome because data that identify P2P users, their downloads, music purchases, and demographics are not readily available. The number of studies that investigate file sharing is growing, but the overall number of studies is still small.
- **Shortcomings of Aggregate Data.** Using aggregate-level data, such as total industry sales, to study the impact of file sharing restricts the number of observations and "control" variables for regression analysis. As a result, it is difficult to generalize aggregate-level test results to the behavior of individual consumers.
- **Shortcomings of Micro Data.** Using micro-level data, such as individuals' downloads and music purchases, makes it difficult to generalize test results to the entire music industry. In other words, even if it can be shown that a given set of albums was not adversely affected by P2P downloading, it may be too much of a leap to suggest that the entire music industry will not be affected by P2P.
- **Technical Problem for Regressions.** Another individual-level data problem is that people who download music on P2P systems may be more likely than other individuals to buy music. This

4. Richard Morin, "License to Steal," *The Washington Post*, June 27, 2004, p. B5, at www.washingtonpost.com/wp-dyn/articles/A7319-2004Jun26.html. This article refers to Felix Oberholzer and Koleman Strumpf, "The Effect of File Sharing on Record Sales: An Empirical Analysis," Working Paper, March 2004.

5. Liebowitz, "Pitfalls," pp. 15–25.

6. Alejandro Zentner, "Measuring the Effect of Online Music Piracy on Music Sales," University of Chicago, Department of Economics, Working Paper, June 2003.

7. Michel, "A Theoretical Analysis," Chapter 6.

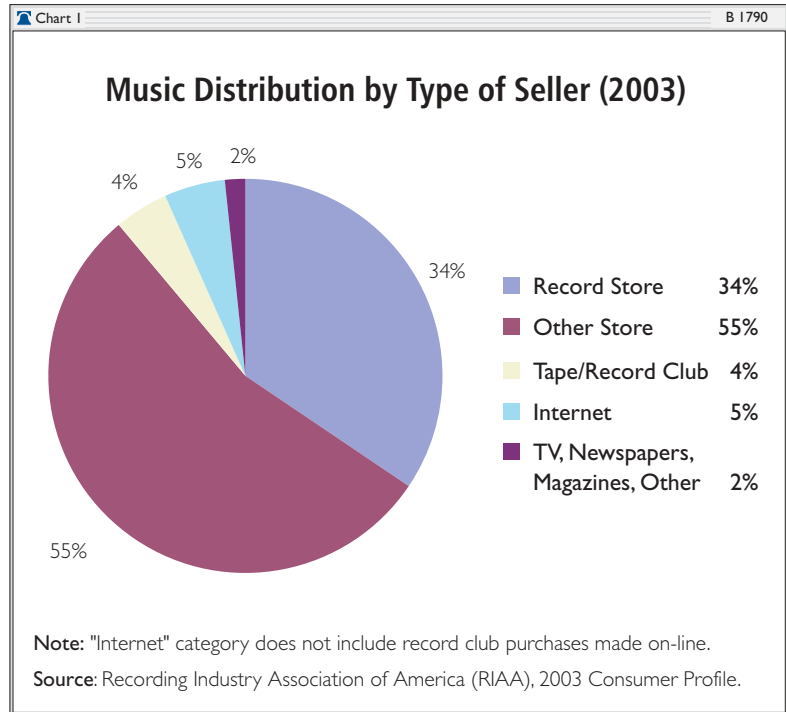
issue presents a problem for regression analysis because it can artificially skew test results. Thus, regressions could “falsely” indicate that the impact on music purchases is higher or lower than it really is.

- **Prior-Year Sales vs. Future Sales.** Studies that estimate the impact of P2P on album sales use data that reflect current market conditions. These studies do not have clear implications for the future of the music industry because the future market is likely to be vastly different from today’s market. In today’s market, most music consumers do not make their purchases on-line—a fact that is likely to change over time.

The Future Market for Music

The last bullet point—that the future market for music is likely to be quite different from today’s market—is vital to understanding the P2P debate. In 2003, the U.S. music industry reported annual sales of almost \$12 billion. Nearly all of those sales (about 90 percent) occurred in stores. Sales through mail order record clubs currently represent only about 4 percent of annual sales. Internet sales, though growing, still account for only 5 percent of the total. (See Chart 1.) Music sales over the Internet are likely to be more plentiful in the coming years, but Internet commerce for all types of goods is still in its early stages.

The U.S. Department of Commerce reports that, at the start of 2002, approximately 143 million people (54 percent of the U.S. population) were Internet users.⁸ Commerce also reports that most individuals (80 percent) still use the slower “dial-up” connections rather than the faster “broadband” connections—a finding that is particularly relevant in explaining the pervasiveness of music and movie downloads. Among all Internet users, 45 percent report that their main on-line activity is e-mailing and/or instant messaging, and 21 percent report



making on-line purchases. This report also shows that Internet use is higher among younger people and that younger individuals who use the Internet are likely to continue to do so as they age.

If current trends continue, most music consumers (in, say, 2020) are likely to make their purchases on-line. Consequently, not only is the delivery of the product likely to change, but the product itself is likely to transform. The full-length CD format has been the overwhelming favorite of music consumers for many years, rising from 58 percent of total music sales in 1994 to almost 90 percent by 2003. (See Table 1.) To sell these CDs, physical copies are made, packaged, and shipped to stores.

On the other hand, to sell a digital file over the Internet, one original has to be placed on a hard drive. There is no additional copying, packaging, or shipping because the original serves as the “master” copy for all customers. Consumers can simply access the Internet and download their own copies of the song to their hard drives—without leaving the comfort of their favorite computer chairs.

8. U.S. Department of Commerce, “A Nation Online: How Americans Are Expanding Their Use of the Internet,” February 2002, at www.ntia.doc.gov/ntiahome/dn/html/anationonline2.htm (August 3, 2004).

Still, until most consumers use the Internet to make purchases, it is unlikely that the digital format will overtake the full-length CD format. Instead, in the environment that is likely to exist for several more years, most music consumers will choose between buying a full-length CD or downloading individual songs. This choice is very different from the one that future consumers will have to make, and this difference is central to why Internet file sharing poses a serious threat to the music industry's future.

Substitute Goods

P2P threatens artists' ability to sell their music through digital downloading because the digital files available from sellers are virtually indistinguishable from those available on the file-sharing services. Economists refer to these types of goods as perfect substitutes, reflecting the fact that one digital file (the copy made available by the seller on the Internet) is a nearly perfect replacement for the other (the copy made available by the file sharer). It is a basic tenet of economic theory that, when choosing between two such goods, consumers will choose the one that costs less.

In the future, if most music consumers choose between for-sale downloads and those available through file-sharing services, it is difficult to argue that many will choose to pay for their digital copy. Surprisingly, file-sharing proponents often claim that the music industry has to "change its business model" to adapt to the new P2P environment. When the new environment forces a business to compete with perfect-substitute goods that are being given away, the best way to adapt is probably to exit the industry.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Full-length CD	58.4	65.0	68.4	70.2	74.8	83.2	89.3	89.2	90.5	87.8
Full-length Cassettes	32.1	25.1	19.3	18.2	14.8	8.0	4.9	3.4	2.4	2.2
Singles (all types)	7.4	7.5	9.3	9.3	6.8	5.4	2.5	2.4	1.9	2.4
Digital Download	na	na	na	na	na	na	na	0.2	0.5	1.3

Source: Recording Industry Association of America (RIAA), 2003 Consumer Profile.

Currently, the long-term profit of a downloading Web site depends on the ability to outsell competitors that do not charge for their product.⁹ The case can easily be made that digital downloading will never become the preferred method of selling music if file sharing is allowed to continue unabated.

What, if anything, should be done about Internet file sharing? Can a compromise be reached that maintains the important balance between artists' incentive to create and the public's access to these goods?

What Should Be Done?

Copyright owners should be able to protect their intellectual property against digital theft. There have already been a number of lawsuits against heavy users of P2P systems. These lawsuits can and should be pursued vigorously. Existing laws also provide remedies for those who contribute to infringement, such as P2P operators—although there is considerable litigation about how and when such contributory liability can be triggered.¹⁰

Policymakers can help to clarify rights by amending the law so that making copyrighted work available to the general public on the Internet is clearly an infringement and by allowing the Department of Justice to bring civil suits. Any changes in the law

9. Even Apple's iTunes, one of the biggest downloading Web site success stories, depends on sales of other types of goods (mainly iPod players) for most of its profit. Apple CEO Steve Jobs acknowledges that iTunes "competes with piracy." See Walter S. Mossberg, "The Music Man," *The Wall Street Journal*, June 14, 2004, p. B1.

10. See William F. Adkinson, Jr., "Liability of P2P File-Sharing Systems for Copyright Infringement by Their Users," Progress and Freedom Foundation, March 2004, at www.pff.org/publications/ip/ (July 24, 2004).

should be narrowly targeted, however, and should focus only on those who actually misappropriate protected works. Some current proposals, while perhaps well-intended, appear to swing too broadly.

One bill—S. 2560, introduced by Senator Orrin Hatch (R-UT)—would make liable anyone who “intentionally aids, abets, or procures” a copyright violation. This language could cover a huge range of legitimate activities. Intel pioneer Les Vadasz argues that these prohibited “activities” could even cover the production of microprocessors used to power PCs.¹¹

Similarly, regulation of devices and software should also be rejected. While technology mandates could reduce unauthorized copying, such rules would also stifle innovation. Whatever happens in Washington, the ultimate solution may be a private one, with copyright owners using new technologies to make unauthorized copying of works more difficult.

Conclusion

Economic theory suggests that P2P file sharing will decrease album sales, and several new studies show various levels of support for this prediction.

Isolating the impact of P2P on previous album sales, however, says very little about the music industry’s long-term viability if Internet file sharing continues unabated. Internet file sharing threatens artists’ ability to sell their music through digital downloading because the digital files available from artists are virtually indistinguishable from those available on P2P services.

This substitutable nature of the two products is decidedly more important for the future of the industry, when most consumers are likely to make their purchases on-line. Consequently, the case can easily be made that digital downloading will never become the preferred method of selling music if file sharing is allowed to flourish.

Making copyrighted material instantly available to the world without the owner’s permission is stealing. The challenge for policymakers is to curtail this theft of intellectual property without limiting legitimate activity or chilling technological innovation through regulation.

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11. Les Vadasz, “A Bill That Chills,” *The Wall Street Journal*, July 21, 2004, p. A10.