

# Policy Analysis

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## ***Policing Pirates in the Networked Age***

**by Stan Liebowitz**

### **Executive Summary**

New Internet-based technologies appear to threaten the ability of copyright owners to collect revenues for their intellectual creations, as epitomized by the recent public trials and tribulations experienced by Napster. That has resulted in new legislation against pirating and has given rise to new technologies to protect intellectual products. Both the new technologies and the counter-technologies that have followed them have attracted attention and analysis, sometimes bordering on the apocalyptic, from competing camps. The basic issue, whether technologies that enhance the ability to create unauthorized copying are destructive to the principles of copyright, is not a new one, however. Technologies that make it easier to pirate copyrighted materials have undergone economic examination for over two decades. Prior analysis, and prior experience, has indicated that the previous generations of copying technologies have not had dire consequences for copyright owners.

This paper examines whether new Internet copying technologies are likely to be different from prior technologies in their ability to destroy the value of intellectual property rights and concludes that they are. It then examines the evidence that has been put forward to support a claim that Napster had a negative impact on the

compact disk industry and concludes that the evidence does not support such a finding. I then explain why it is that the negative impacts of Napster were unlikely to have been felt at the time these examinations were undertaken.

Finally, the analysis examines the impact of a possible market-based solution to this potential problem, based on new anti-piracy technologies known as digital rights management. This technology not only promises to make copying harder, but also allows the copyright owner to charge tiny micropayments for various degrees of use of the product. This extra control by copyright owners over the use of the copyrighted material has set off a firestorm of controversy by individuals concerned that traditional "fair use" of a product will disappear and further claiming that digital rights management will lead to economic inefficiency. Fair use has historically allowed scholars and others to use small amounts of copyrighted materials for research or study without being obligated to make copyright payments. I show that digital rights management, contrary to these claims, does not eliminate fair use and is likely to enhance economic efficiency. Nevertheless, attempts by government to force the adoption of anti-copying technology appear misguided.

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## **Introduction**

As the storage and transmission of artistic creations become increasingly digital, the primary form of property right in such creations, that is, copyright, appears to face unprecedented enforcement challenges. The recent focus of attention has been on the digitization of audio, the circumvention of copyright in the trading of digital audio files, and particularly the Napster case. Yet the digitization of any artistic creation—whether audio, video, or the written word—threatens, or appears to threaten, current copyright regimes, as Napster successors such as Bearshare, Limewire, AudioGalaxy, and Morpheus make clear.

It is unclear whether copyright protection can continue to provide ample incentive for artistic creation. Will authors be able to appropriate more or less of their works' value than they have in the past? How does digital storage change the balance between authorized and unauthorized use? What pricing schemes are likely to arise? What legal rules strike the best balance between consumptive efficiency and productive efficiency? That is, how do we maximize use and creation at the same time?

For perspective, we should remember that copying technologies have been in existence for several generations. Doom-and-gloom scenarios have been raised before, and copyright owners have not often suffered great harm even when they were not given extra protection from copying technologies. Videocassette recorders (VCRs) are one example. Audiotaping is another.

This paper argues that the greatest threat to copyright owners has always come from organized, large-scale unauthorized copying. The digitizing of works and the ubiquity of the Internet have brought with them an increasing potential to organize what otherwise would be unorganized, making pirating cheaper, easier, and more widespread than ever before. This is what makes the current copying crisis more significant than the earlier "crises" involving videotaping and audiotaping and justifies a serious examination of the issues.

Current technologies for distributing pirated material appear capable of destroying the value of copyright, for reasons explained in detail below (although the recording industry failed to present evidence of such an impact in the Napster case). There are two slightly different technologies now in use to transfer files among users. Both systems essentially allow individuals to access and download music (usually in MP3 format) or other files from other users of the system. These are referred to as peer-to-peer systems since the files that are transferred are all stored on the users' PCs rather than commercial sites. One type of system, such as Napster, uses a central server to act as an intermediary in searches for particular songs or files. The other type, pioneered by Gnutella, forgoes the central server, allowing users to search for files (often audio, video, or software program files) on other computers and to download files at will. Although the latter seems like a pirate's dream, it is possible, in theory at least, for copyright owners to weather this new form of piracy in one of two ways.

First, copyright harms could be ameliorated through the mechanism of "indirect appropriability" if copyright holders were to set up their file-trading systems accordingly.<sup>1</sup> (Indirect appropriability is when copyright owners collect for unauthorized copying by charging higher prices for originals.) Unfortunately for copyright holders, it would have been easier to convert a centrally organized system such as Napster into a more copyright friendly system than it will be for the peer-to-peer systems that appear to be replacing Napster. Thus, the recent attempts by the record industry to shut Napster down may backfire by moving users to the harder-to-control peer-to-peer systems, thereby harming the chance for appropriation of value by copyright holders.

Second, copy protection schemes known as digital rights management (DRM) or automated rights management (ARM), can ameliorate copyright harms by making it much more difficult to make unauthorized copies in the first place. DRM often works by inserting

code in the digitized product (e-book, song, movie, or software) that prevents copying some or all of the work without acquiring the rights through legitimate means. One option (feared by opponents of DRM technologies) is to have pay-as-you go pricing built into the product. These payments, sometimes known as micropayments, can, in principle, allocate much more limited rights of access than the all-or-nothing purchases that are typical of most physical manifestations of intellectual properties, such as compact disks (CDs) and books. The specter of such self-enforcing copyright has caused alarm among groups of scholars and users who argue that it would give too much power to copyright owners and damage the current balance between producers and users. However, as will be demonstrated below, there is little economic support for this concern. A review of the basic economics involved is worthwhile.

## The Winners and Losers of Copying

The issue at the heart of copyright, indeed of all intellectual property law, is the degree to which copyright owners can appropriate the value produced by the consumption, or appreciation, of their works by others.<sup>2</sup>

At the center of many disputes, both current and historical, is the question, How much appropriation is the right amount?<sup>3</sup> Is it possible to have too much appropriation? What impact do technologies have on appropriation?

Economists have tended to focus on the tradeoff between consumption efficiency (maximizing the amount consumers get of any intellectual product) and production efficiency (preserving incentives to create these products). On the one hand, if the copyright holder could not appropriate any revenues, the creators of intellectual properties would probably produce far fewer intellectual products than would be optimal.<sup>4</sup> On the other hand, restricting others' ability to make copies would put consumption of these products at a less than "ideal" level.

This restriction in use is sometimes carelessly referred to as a loss due to the "monopoly" of the copyright owner. As University of Virginia law professor Edmund Kitch correctly points out, providing property rights does not confer economic monopoly—which would imply that consumers have only a small number of alternative products that are not very good substitutes.<sup>5</sup> In reality, the "monopoly" conferred by copyright is no greater than the monopoly that each worker has on his or her efforts, or that each firm has on products bearing its name. Still, monopoly power or not, the ideal number of reproductions of a public good—a public good being defined as a good that does not get used up when consumed—would require making a quantity of reproductions above the level that copyright owners would find in their best interest to produce.<sup>6</sup>

Even if a technology were to increase the revenues of copyright owners, say by increasing the pool of users, the relative level of appropriability might still be diminished. To make a simple analogy, if we increase the size of a pie, even a smaller share of that pie might result in a larger piece. In such a case, the copyright owner would be worse off than he would be if appropriability were to be constant (unless it were impossible to increase the size of the pie without also decreasing the share going to the copyright holder).<sup>7</sup> This distinction is relevant to the impact of technologies on the financial remuneration achieved by copyright holders.

### Surviving Piracy: Exposure and Network Effects

The pirating of copyrighted materials is normally thought to be harmful to the interests of copyright owners.<sup>8</sup> This is because piracy is often expected to prevent the copyright owner from appropriating any of the value created by his work. The mechanism by which unauthorized copying may harm the owners of intellectual products is straightforward enough that no detailed explanation seems necessary. Potential consumers are no longer compelled to purchase the product

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from the copyright owner when the option of using unauthorized copies is available to them. Defections from the legitimate market are normally expected to reduce the revenues that can be earned in the market.

In some instances, however, the piracy impacts on the copyright holder’s ability to appropriate will be negligible. One obvious instance is the case where an individual engaged in pirating would not have purchased an original even if pirating were not an option.<sup>9</sup> In this case, the prevention of piracy would provide no pecuniary reward for the copyright owner and would only diminish the gratification of the individual engaged in piracy.

Another phenomenon that may make copying helpful, or at least not harmful, to copyright owners is the “exposure effect”—a form of advertising or sampling that could ultimately lead to larger sales of legitimate versions.<sup>10</sup> Users of pirated software, for example, might find themselves wanting the manuals and technical support that would be available only to authorized users. Or, as claimed in the Napster defense, Napster users may just sample songs to get a better idea of which CDs to buy.

A more recent claim is that copying may benefit copyright holders when network effects are strong.<sup>11</sup> Network effects exist when the value consumers place on a good is a function of the number of individuals who use the good, with the archetypal case being the fax machine.<sup>12</sup> An example of network effects for products prone to piracy might be word processing software that becomes more valuable the more individuals are using the same software. In such an instance, it is conceivable that the extra value that paying customers receive from the larger user base might outweigh any revenues lost by the copyright holder from being unable to prevent piracy. The prevention of unauthorized copying might actually prove financially harmful to the interests of the copyright owner if it resulted in former pirates not using the product. Of course, if all or enough of the pirates were to become purchasers of authorized versions, the prevention of piracy

would be remunerative for the copyright owner, even in the presence of network effects.

Even though, in a world characterized by exposure effects or network effects, piracy might work to actually enhance the revenues of the copyright owner, appropriability would not necessarily be enhanced. Both network and exposure effects increase the amount of the value received by consumers, allowing the copyright owner to generate more revenues with constant or even somewhat reduced levels of appropriability. In our pie analogy, the size of the piece might be increasing even if the piece’s share of the whole were decreasing, as long as the pie itself were growing rapidly enough. So even if pirating were beneficial to copyright owners, meaning that the copyright owner received larger revenues (a larger absolute size piece of the pie) that doesn’t mean that appropriability was increasing (the copyright owner’s *share* of the now larger value generated by the intellectual product might be smaller).

Of course, these are the exceptions to the more general rule, which holds that allowing potential consumers to pirate copies of a work is likely to reduce the revenues available to the copyright owner.

### **Surviving Piracy: Indirect Appropriation**

As noted earlier, copyright owners are sometimes able to collect revenue from unauthorized copiers by charging higher prices for the originals from which the unauthorized copies are made. The mechanism is simple: If the copyright owner knows which originals will be used to make copies, a higher price can be charged for them, allowing the copyright holder to capture part, all, or more of the revenue than might have been appropriated through ordinary sales if unauthorized copying could be prevented.

Assume that every purchaser of a compact disc makes a single audiocassette copy to play in his automobile. No one makes copies from borrowed CDs. Assume further that this copying, although illegal, is unstoppable. What would be the impact on the copyright holders who, in addition to selling compact discs, had also planned to sell prerecorded tapes?

Since each original CD will have a copy made from it, and since it is reasonable to infer that the consumers of originals place some value on the ability to make a copy, each consumer's willingness to pay for the original CD is higher than it would otherwise be. The copyright owner can capture some of this additional value by charging a higher price for the CD.<sup>13</sup> This is the basic idea behind indirect appropriability. The logic here is the same as would be true for any durable good that can be resold into another market. If automobiles could not be resold, for example, the price that consumers would be willing to pay for new autos would undoubtedly fall.

Whether the copyright owner is better off or worse off in a regime of unfettered copying depends on the particular circumstances. Assume, for example, that all consumers would be willing to pay \$9 for a particular CD and would also be willing to pay \$4 for a cassette tape of the same music that they could play in their automobile cassette players (assume they do not have CD players in their cars). If home taping were allowed and consumers made cassettes, the sellers of CDs would discover that they could raise the price of CDs to \$13 without any loss of sales (assuming no cost to the consumer for the cassette and the time to make the tape). If home taping were disallowed, under the same assumed circumstances, the seller of prerecorded tapes could charge a price of \$4 and capture this group's value. Either way, the seller would be unharmed by the copying and thus presumably indifferent to whether copying was allowed or not.

If there are costs involved in making copies, whether profits would be enhanced or hindered would depend on the cost of individuals making and delivering copies relative to the cost of firms doing so. If it turns out to be much less expensive to make prerecorded cassettes commercially than to have them made at home, one at a time, it would be inefficient to have personal copying replace commercial production. The copyright owner will not be able to net as much from the home-taping consumer (who deducts

the cost of the blank cassette and time from his willingness to pay) as he would from the sale of cassettes. Note, however, that commercial costs include shipping, inventorying, and delivery to the consumer, not just manufacturing, which makes the cost advantages of prerecorded tapes at least questionable.

Another complication will arise if there is a subgroup of music listeners who purchase prerecorded tapes for the home instead of purchasing CDs. If the price established for this group is also \$9, say, then the seller of prerecorded tapes is in something of a bind in terms of capturing revenues from both groups of cassette listeners. If the price of prerecorded cassettes were lowered to \$4 to capture the value from the automobile cassette users, the seller would lose \$5 from those individuals who would be willing to pay \$9 to purchase prerecorded tapes for home listening. If the seller keeps the price at \$9, sales to those wishing to listen to cassettes in automobiles will be greatly diminished.

In this case allowing copying would benefit the copyright owner. Indirect appropriability would allow the seller to capture the \$4 from CD purchasers by raising the price of CDs to \$13, and the seller could still collect the full \$9 from those who buy prerecorded tapes for the home (the assumption that no copies are made from borrowed CDs is still in place). In this instance, it would be more profitable for the seller of tapes and CDs to allow copying. It is *possible* that allowing unfettered copying would improve the revenue position of the copyright owner.

Note that indirect appropriability implies that the purchasers of CDs in the example above actually pay copyright owners, albeit indirectly. Fair use, a defense to copyright infringement that allows copying in certain cases (discussed in more detail below), might protect the copiers from legal liability, but it does not prevent the "fair users" from indirectly paying the copyright owners.

Of course, just because indirect appropriability *might* help create profits doesn't mean that it will succeed in any particular case. An important influence on the likelihood that indirect appropriability will work is the vari-

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ability in the number of copies made of each original. In the automobile cassette example discussed earlier, each CD was used to make one tape. But if some CDs were used to make no copies and others were used to make 1,000 copies, indirect appropriability would become difficult or impossible.

In an atmosphere of rampant copying and variability in the number of copies made from each original, the seller will generally find it impossible to identify which originals should have the higher price. That is why instances of illicit organized copying, where a single original might be used by a copier to make thousands of copies, are so much more dangerous to copyright holders than unorganized copying where individuals make one or two copies for themselves.

Note also that there is less variation in the number of copies made from originals when *copying is ubiquitous and similar*. Thus, if some copying is difficult to stop, it might be profitable for copyright owners to encourage everyone to engage in the same degree of copying because that can afford the copyright holder some degree of appropriability. This has interesting implications for Napster and other digital distribution techniques, as discussed below.

There is one other form of indirect appropriation worth noting. In some instances, legislation may allow copyright owners to collect revenue in a manner other than charging for use. For example, a tax could be imposed on blank audiotapes or recorders.<sup>14</sup> This would not directly charge users for the right to copy, since audiotapes can be used to tape works for which copyright clearance was given or for taping uncopyrighted works. For example, people buying digital audiotapes pay an additional amount that goes to the copyright owners, but is only indirectly related to copying. We can refer to this as *explicit* indirect appropriability as opposed to the *implicit* indirect appropriability described earlier. On the other hand, organizations such as the Copyright Clearance Center try to *directly* appropriate revenues for the copyright owners. The CCC gathers rights from

publishers and licenses libraries to make copies upon payment to CCC—with the payment being a function of how much and what is copied based on CCC surveys of copying in the libraries.

## **The Impacts of New Technologies on Copyright Owners**

Each new copying technology may appear to require fresh analysis as each generation argues that the new technologies created during its watch require total upheavals of the status quo. This has been the case with the advent of sound recordings, television, photocopiers, or, most recently, the Internet. But history tells us that when it comes to copyright, the more things change, the more they remain the same. Copyright law seems generally to have been successful in balancing the costs and benefits to both users and producers as technologies have changed. The trick, of course, is in striking that balance. Some of the major technological challenges are listed below.

### **Photocopying**

The ability to photocopy all books and magazines with ease might have been thought to jeopardize the livelihood of authors and publishers. After all, anyone could take a copyrighted work and make copies without compensating the copyright owner. Yet the photocopier proved a boon to those whose works were most frequently copied.<sup>15</sup>

This occurred for two reasons. First, publishers were able to appropriate a portion of this additional value by raising their prices. Second, the convenience of being able to make copies was so great that the nature of scholarship changed within academic communities, and the market for journals grew relative to the market for books.

The mechanism underlying this growth in journals was indirect appropriability.<sup>16</sup> Publishers were able to identify those locations where photocopying copyrighted materials most frequently occurred—libraries and other

similar institutions—and which materials were most frequently photocopied—academic journals. Publishers then began charging a much higher price for library subscriptions than for personal subscriptions—often two, three, or four times as much. The price differentials that are practically ubiquitous now among publishers of academic journals did not exist before the photocopier arrived on the scene.

Moreover, before the advent of the photocopier, researchers needed either to have a personal subscription to a journal or to take notes in a library. Books tended to be on single topics, unlike journals, which contained articles on a variety of topic that would appeal to different scholars. The inconvenience and cost of photocopying entire books made the practice prohibitive. Articles in journals, on the other hand, were well suited to the photocopier and became the major target of copying activities. Photocopying articles was fast and cheap. Subscriptions were no longer necessary for most users. Having a photocopy of an article was such an improvement over handwritten notes taken in the library, in terms of convenience and accuracy, that articles and journals became a far more important means of transmitting information than had previously been the case. Books, on the other hand, were significantly diminished in importance.<sup>17</sup>

The price discrimination that the advent of the photocopier engendered may or may not have increased overall appropriability. Clearly, however, photocopying did not harm the copyright owners, as has been made clear by the growth in the number of academic journals and the financial health of the publishers. The claims to the contrary by journal publishers, and there were many, were false.

#### **Videocassette Recording: The Betamax Case**

The Betamax case<sup>18</sup> (so called because at the time the case was brought, the VHS format had not yet begun its obliteration of Beta) played a central role in the Napster defense. The Supreme Court ruling allowed individuals to make private recordings of television shows on their VCRs. The Betamax case represented a situation in which copying

was unlikely to harm copyright owners.<sup>19</sup>

In the early 1980s, almost all television viewing (particularly of the big three networks) consisted of over-the-air broadcasts supported by advertising. The original Betamax could accommodate only one hour of recording. The major use of VCRs was expected to be “time shifting” programs for more convenient viewing. Although VCR controls made it possible for viewers to fast-forward through commercials, close attention had to be paid to avoid fast-forwarding through the programming.<sup>20</sup> Thus, time shifting was unlikely to significantly lower the revenues that would be derived by television broadcasters.<sup>21</sup> The Court concluded that time shifting was unlikely to harm copyright owners.

Although the Court did not rely on this argument, it was also fairly clear that the amount of time shifting taking place would be small. For one thing, a single VCR could either make a recording or play one back, but it could not do both simultaneously. Combine this with the fact that the average household viewed six or seven hours of TV a day, including virtually uninterrupted viewing during prime time, and very quickly a constraint on behavior takes hold. If a family was going to watch three hours of prime time television on Monday, say, they could not also watch a tape. If they watched a tape of the previous night’s programming, they could not record the programming that was on while they watched the tape (unless they had a second VCR, which was quite rare at that time). Therefore, when it came to taping broadcast television, it was apparent that not that much taping was going to occur.

Of course, we now know that VCRs are used primarily to play back prerecorded tapes. Ridiculing the difficulty of programming VCRs to tape programs unattended has become a staple of stand-up comedians, and time shifting has not played the damaging role that copyright owners expected it to play. Nor is there much evidence that individuals have been copying prerecorded video tapes excessively, although many prerecorded tapes

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do have a fairly primitive anti-backup technology built in.

The difficulty of avoiding commercials, combined with the time limitations involved, made it apparent that videorecording was not going to harm copyright owners substantially. Fortunately, the Court managed to get it right, albeit by a narrow, five-to-four vote. Several years later, Hollywood learned that by lowering the price of popular prerecorded movies from \$100 to \$20 they could sell far more of them. Today, the sale of videotaped movies generates more revenue than theatrical showings.<sup>22</sup> Hollywood's claim of impending doom was, once again, false.

### **Audiotaping**

Although it lacked the high profile of the Betamax case, audiotaping was a significant issue in the early 1980s, as illustrated by this quote from Alan Greenspan in 1983:

Severe economic damage [is being done] to the property rights of owners of copyrights in sound recordings and musical compositions. . . . Unless something meaningful is done . . . the industry itself is at risk.<sup>23</sup>

In a world with no copying, record producers might find that consumers would be unwilling to pay as much for CDs, which could lower revenues and profits.

In response to the dire warnings from the recording industry, Congress considered legislation, but it wasn't until a decade later that the Audio Home Recording Act of 1992, which was concerned primarily with digital tape recording, was passed. The act, which was considered a compromise between creators and users, allows personal copying but requires that recording devices include systems to prevent "serial copying," that is, making second-generation copies or copies of a copy. In addition, the law has provisions to require producers of these recording devices and recording media to pay a tariff for each unit produced or imported. The original target of this law, digital audiotapes (DAT),

never achieved any serious market penetration. The devices that have achieved much greater penetration, CD writers on computers, are not considered recording devices, do not have copy protection features, and are not subject to duties. Since the anti-copying technology built into DAT players did not envision the advent of MP3 files (which are very compressed versions of the digital file format found on CDs rather than strict copies), the entire MP3 phenomenon would have bypassed those controls anyway.

## **Digitized Networked Copying: Lessons from Napster**

As mentioned earlier, the entertainment industry has often expressed the damage that each new copying technology would bring—from cassette tapes and videorecorders to MP3s and Napster. Crying wolf too many times should not, however, negate claims that a new technology will harm copyright owners. Napster and its descendants (as well as movie and electronic book-copying technologies) appear to be instances where real harm is a possibility.

The Napster program, created in 1999 by then-teenager Shawn Fanning, offered the ability to search for songs encoded in MP3 (which is near-CD quality) and identify other computer owners willing and able to transfer those songs. Programs that allow computer users to exchange files from each others' computers (which are not full-time servers) create a type of network that is known as peer-to-peer. Napster was a peer-to-peer-based program, albeit with a central server that allowed users to find one another. Napster grew at an explosive pace and soon had millions of users.<sup>24</sup> As Napster grew in popularity, so did potential investors, interested in the brand name and the millions of people reached by the Napster program and its website.

Some Napster supporters claim that the online sharing of songs is a latter-day Betamax scenario. They argue that Napster users actually purchase more CDs as a result



of sampling music with which they might otherwise be unfamiliar. But given the fact that files downloaded from the Internet are, or at least soon will be, very good substitutes for the originals, and since they can be “burned” onto CDs and copied to increasingly popular MP3 players, it seems likely that these files will substitute for the actual purchase of authorized CDs. Until most users of MP3 files are able to transfer them onto CDs, however, MP3 files are unlikely to greatly damage CD sales. Thus, empirical testing at this early stage in the development of the MP3 market is likely to find much smaller negative impacts than are likely to occur later. Also, although some sampling undoubtedly occurs, it seems unlikely that beneficial sampling could reverse the negative impacts on copyright holders that would be expected from the substitution of computer files for purchased CDs.

Napster-style copying is unlikely to allow record companies to indirectly capture the value of the copies being made from legal originals since some originals will have dozens or hundreds of copies made, and others none. Nor does it seem likely that the amount of copying will be small—there are no time constraints or confusing instructions preventing widespread copying. Finally, copies are likely to serve as substitutes for the purchase of originals in this case. The people making the copies are the very group that was expected to purchase originals (which is why surveys that indicate that Napster users are among the heaviest purchasers of CDs are so worrisome to copyright holders).

### **The Impact of Peer-to-Peer Networks on Revenues: Theory**

Napster (now largely dismantled by court order) appeared to be a clear threat to the revenues of copyright owners of recorded music. The number of individuals using Napster at its peak reached approximately 70 million.<sup>25</sup> Many of those users were in the groups most responsible for the purchase of recorded music—teenagers and young adults. It was rational for the record companies to fear

Napster: The market is political to some extent, and if enough users wanted to trade music files for free, they could get Congress to make that desire the law. That phenomenon helps to explain the urgency demonstrated by the courts and the copyright owners.

Although theory alone does not tell us what impact peer-to-peer networks such as Napster have on copyright owners, theory can provide a good deal of guidance about the likely outcome. What follows are two possible means by which Napster-style copying would not harm revenues of copyright holders—indirect appropriability and exposure effects.

*Indirect Appropriability.* First is the possibility of indirect appropriability. One can imagine a scenario wherein each individual buys half the quantity of CDs that he would normally buy and downloads the other half from the network (assuming individuals continue to listen to the same number of songs). This may not be unrealistic, since many individuals would need to have duplicate CDs, or at least duplicate files. If it were otherwise, everyone trying to download a song from a single original CD stored on one machine would run up against limited bandwidth from that individual’s machine. Even though the number of copies grows exponentially (since copies can be made from copies), it would still be much more effective to start with a large number of originals. Fewer sales of original CDs would make it more difficult for a large number of users to successfully download a song during the period of its peak popularity.<sup>26</sup>

Given that scenario, one can still imagine record companies selling half the number of CDs that they would have sold in the absence of copying. The question is whether the companies could then charge approximately twice the price (setting aside for argument’s sake that part of the “rationale” given for unauthorized downloading is the high cost of today’s CDs), allowing them to appropriate roughly the same value as they did before. This could occur if Napster enforced a rule stating that the number of files downloaded had to match the number of files uploaded.

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**The data are more consistent with the theory that online sales are replacing brick-and-mortar sales than with the claim that Napster is hurting sales.**

In such a case, having a file that was in high demand would be valuable to users wishing to generate credits with which to later download files. Under such a system, we would expect users to be willing to pay a higher price to purchase the original CDs early in the process, when it would be difficult to get a downloaded copy to make available to others. Moreover, if it were possible to change the code in recordings (as envisioned by the 1992 Home Recording Act) so that copies could be made only from an original, but not from a copy of an original, users of the system would be *required* to purchase CDs if they wanted to download songs. If the system were “balanced” sufficiently, one can imagine indirect appropriability working to keep both revenues and appropriability intact.

Of course, in its original format Napster had no rule requiring uploads before downloads could proceed. Users did not have to earn credits in order to download files. Under this scenario, Napster users who purchased legitimate copies had no incentive to pay a higher price to allow unnamed and unknown users to download their files.

Finally, some observers (such as Stanford law professor Lawrence Lessig, author of *Code and Other Laws of Cyberspace*) have argued that a mandatory indirect means of appropriability could be put in place, as described earlier in the case of taxing digital audiotapes.<sup>27</sup> Lessig used the example of cable retransmission of broadcast signals, although similar analogies could be made to cable networks’ use of music. In each of these cases, cable operators pay for the right to transmit programs or music, but the price is set by a governmental body, not by the copyright owner. Lessig argues that this is preferable to a negotiated price. These analogies, however, are inapt.

In the instances mentioned by Lessig, the users of the copyrighted material (e.g., cable networks) pay some portion of their revenues to copyright owners in the form of performance or retransmission rights.<sup>28</sup> Such indirect payments work because these uses are *additional* or *incremental* uses and they do not remove the revenues copyright owners

received in their original markets. Thus, this new source of revenue would be a net gain to the copyright owner— an instance of making the pie bigger but also increasing the absolute size of the piece going to the copyright owner, whether or not the share of the pie goes up. One can argue about whether the payments are too high or too low, but these extra uses cannot make the copyright owner worse off than before.

In the case of Napster and other peer-to-peer systems, on the other hand, this logic does not work. Getting music from peer-to-peer systems is likely in many cases to substitute for the purchase of a CD.<sup>29</sup> For this reason, it is not just a case of Napster creating additional value without payment but one of Napster reducing payments in the original markets. Napster is not a new use of copyrighted music, with the only problem being one of allocating revenues. If Napster had continued in its original guise, it is unlikely that the revenues it generated, say from advertising, would have been as large as the losses it imposed on the CD market. Thus, even a tax of 100 percent would not have made copyright owners whole, to say nothing of giving them a piece of a new market.<sup>30</sup> Napster may very well have made the pie smaller. Lessig’s suggestion is not a useful antidote for the damage done to copyright owners by the rampant copying engendered by Napster.

Alternatively, a tax could be devised on the activity of making copies. Using digitized music on one’s computer requires the computer, a hard drive, a sound card and possibly rewriteable CDs, and drives. Unlike in the case of audiocassettes, however, the vast majority of computer use is not for the purpose of duplicating copyrighted material; therefore it doesn’t make sense to tax computers, hard drives, or sound cards. That leaves the rewriteable CDs and blank recordable CDs.<sup>31</sup> It is likely that these devices are sufficiently noninfringing to prevent their being classified as infringing. So there might not even be an appropriate target on which to place a tax as a means of compensating copyright holders.

*Exposure Effects.* Then, of course, there is

the possibility that peer-to-peer systems might help copyright owners by making it easier for users to sample songs. If Napster were used to merely “try out” songs or albums (as might be done in a record store or by listening to the radio), Napster use would be a complement to a CD purchase, not a substitute for it. In fact, Napster’s experts in its court hearings have made this claim, the evidence for which will be examined in more detail in the next section. Of course, the difference between listening to a song in a store or on the radio and listening to the song using Napster is that, with Napster, an actual physical representation of the song is in the possession of the user, whereas in the case of sampling music in a store or on the radio, only the memory of the tune remains in the listener’s possession.

Even if Napster were being used for sampling only, its impact on the CD market need not be the benevolent one espoused by its supporters. The usual assumption is that if Napster merely helps people decide which CDs to purchase, it cannot be harmful and would most likely be beneficial to the copyright owner. Since Napster is only providing information to consumers, or so the argument goes, this activity must benefit society and copyright owners. From this perspective, because of Napster consumers are better able to select songs that provide the greatest enjoyment for the time and money. It seems natural that they should then be willing to pay more for the CDs they purchase.

As appealing as this story is, it is not correct and can be quite misleading.<sup>32</sup> The fact that Napster makes the consumer better able to satiate his desire for music with the CDs that he purchases implies that the number of CDs purchased quite possibly would fall.

With better sampling, CDs purchased provide greater utility because they better fit the desires of consumers; therefore consumers have a higher willingness to pay. Assuming that all CDs meet the same need for music consumption, the CDs purchased provide greater value and do a better job of satiating the desires of consumers. Therefore,

consumers may discover that they do not need to purchase as many CDs since their thirst for music can be quenched with fewer of them.<sup>33</sup> Depending on supply conditions, it can be shown that the total quantity of CDs, their price, and the total revenue in the market may go either up or down.<sup>34</sup>

### **The Impact of Napster on Revenues: Evidence**

In the Napster case (*A&M Records v. Napster*) a group of record companies brought suit in the Northern District of California against the leading online server-based peer-to-peer system, Napster. The hearing occurred in the fall of 2000 and a preliminary injunction barring Napster from allowing users to download copyrighted files was granted in March 2001. The evidence put forward in the hearings on the preliminary injunction against Napster consisted of a set of expert reports by economists, marketers, and others, which were mainly focused on two issues.<sup>35</sup> The first was whether or not Napster was likely to increase or decrease sales of CDs in the market. The second was whether or not Napster’s existence as then configured would handicap the nascent market for the legitimate *selling* of music online. Unfortunately, the evidence from these reports provides very little in the way of useful guidance on these issues. Nevertheless, a great deal of misinformation has been put forward about these reports, so examining them is worthwhile.

These expert reports were submitted for the purposes of the hearing on the preliminary injunction to stop Napster from transmitting copyrighted materials and not for a complete trial.<sup>36</sup> Therefore, it is to be expected that these reports might not have the level of sophistication and completeness that might come about in a full trial. Nevertheless, the hearing on the injunction had very high visibility and several of the experts were quite well known. Additionally, most of those reports (or their authors) were challenged according to court rules on the qualifications of experts. The lower court’s rulings on these challenges was illuminating for the hostility they showed

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toward the Napster experts, a hostility that seemingly indicated a predisposition of the judge against Napster. Additional evidence on Judge Patel's impartiality, or lack of it, came in her nonsensical and later overruled "zero-tolerance" ruling threatening to shut down Napster for any trivial illegal copying that it was unable to prevent.<sup>37</sup>

A majority of the reports focused on whether or not Napster was decreasing the sale of CDs. As already explained, one might expect Napster's impact to be quite small due to the difficulty of using Napster downloads on the home stereo. In an attempt to demonstrate harm, the plaintiffs had as their centerpiece two reports—one that examined the pattern of CD sales in stores near college campuses (the Fine report) and the other a survey of college students asking them about their views on Napster and its impact on some of their musical habits (the Jay report).<sup>38</sup> The defense had its own survey of Napster users (the Fader report) and several critiques of the Fine report.

In principle, a statistical analysis of how actual CD sales were impacted by the popularity of Napster is much preferable to a methodology based on surveys. For one thing, surveys are self-reported and most Napster users were likely aware that Napster was in legal difficulty. For this reason, survey respondents might find it in their self-interest to minimize any evidence that Napster actually decreased their purchases of CDs. Further, even if respondents were to tell the truth, it is unclear they would actually know what impact Napster had had on their behavior. Respondents very well might not know with any precision how much they spend on CDs per month. Unless they track their expenses very carefully, their impressions of the impact of Napster on their behavior may very well be incorrect. They may in fact buy some CDs because of the songs they downloaded from Napster and this may color their impressions even if they purchase fewer CDs overall.

Statistical analysis of actual sales is really the only way to determine what Napster's impact was. Unfortunately, the statistical analysis of CD sales reported by Fine pro-

vides ambiguous answers. The Fine report examines sales at CD retailers near college campuses and compares the sales trends in those stores to those of other CD retailers.<sup>39</sup> The theory is that students at college campuses use the Internet and Napster more than do typical consumers. Therefore, any differences in the behavior of sales between the two groups of stores can be attributed to Napster. Although Fader, one of the Napster experts, criticized the focus on college students, this focus is a very practical way of isolating the overall impact of Napster, even if imperfectly. Despite claims to the contrary, it seems unlikely that the behavior of Napster users who are not college students (many of whom are high school students) is so different as to counteract the measured impact on college students.

This particular design, although potentially useful, has some serious problems with its implementation. One major problem with the Fine study, as both Fader and Hall point out at length, is that it neglects to control for the impact that online purchases of CDs, as opposed to downloads of songs, might have had on brick-and-mortar record stores near college campuses. Internet merchants such as Amazon and CDNOW increased their CD sales during the period of Napster's growth. Since Internet access is a requirement for both using Napster and ordering online, it is possible that college students have merely switched their patronage from brick-and-mortar retail outlets to online retailers.<sup>40</sup>

Napster experts Hall and Fader claim the Fine report is fatally flawed by this oversight. In principle, however, it could be corrected if data were available for online retailers and the two groups of brick-and-mortar retailers on, say, a monthly basis, along with the number of songs being downloaded on Napster.<sup>41</sup> Instead, however, the Fine study presents data that are very coarse; once-a-year quarterly data from the first quarter of 1997 to the first quarter of 2000. Given Napster's brief existence (it became publicly available in August 1999) the data that are supposed to reveal Napster's influence amount to no

more than a single before and after snapshot of the impact of Napster.

What does the Fine study find? Fine focuses on the fact that from the first quarter of 1999 to the first quarter of 2000, a 12-month period during which Napster came into existence at about the midpoint, sales at brick-and-mortar CD stores near colleges fell by from 2 to 3 percent but rose at other brick-and-mortar CD stores by approximately 7 percent. From this Fine concludes that Napster led to a decrease in sales of CDs. Fine's conclusions are undermined, however, by his data for earlier years. From 1998 to 1999, a year preceding Napster's existence, sales near colleges fell by about 5 percent while rising elsewhere by approximately 3 percent. Since year-to-year sales at brick-and-mortar CD retailers near colleges were lagging behind those of other brick-and-mortar CD retailers prior to Napster's introduction, the fact that they continued to do relatively poorly after Napster's introduction can hardly be taken as evidence that Napster is responsible for the difference.

The data, in fact, are more consistent with the theory that online sales are replacing brick-and-mortar sales than with the claim that Napster is hurting sales.<sup>42</sup> The fact that Napster could at most have influenced these figures for about six months, a period during which it would have had the smallest number of users, makes their data less useful than data based on later time periods. It is unfortunate that Fine chose only four time periods to examine, but it is fortunate, although not for his client, that he provides more than two years' worth of data.

Napster's experts preferred to focus on the continued robust growth of CD sales overall, even after Napster's birth. Certainly, this growth, the 7 percent figure at brick and mortar stores reported above, is inconsistent with the idea of "irreparable" harm claimed in the preliminary injunction, particularly considering that Napster downloads were reported to be four times as large as the number of legitimately purchased songs. But it hardly demonstrates that Napster had a benign impact on CD sales since there might

well have been other factors at work and the increase in CD sales might have been even larger without Napster's impact.

A major impediment to measuring Napster's long-term impact during this period is that MP3 files, the format of music files used on Napster, were not initially very good substitutes for CDs (though they have since become better substitutes and continue to improve). At first, MP3 files could generally be listened to on computers only and could not be played on a home audio system (unless the computer was hooked up to the home system). That may help explain why Napster's negative impact on sales was not apparent. As MP3 use has increased, however, more and more audio components have been converted to play MP3 files. Also, most users were downloading files over slow telephone modems so the impact was probably not as large as it would have been had higher bandwidth connections been more readily available.<sup>43</sup> As more computer users adopt CD writing hardware, MP3 files are being converted back into CD formats that are playable through normal audio systems. Over time, it is likely that MP3 files would have become better substitutes for CDs and would have been played more frequently on primary audio systems. If this had happened, then the true negative impact of Napster would have been felt had it not been shut down.

The other category of report presented in the Napster case is based on surveys. As noted earlier, the results from surveys should be regarded with great skepticism. The Recording Industry Association of America presented a survey of college students by Deborah Jay, a marketing consultant, that attempted to infer whether Napster increased or decreased the purchase of CDs from answers given to questions that do not directly address the point. Jay concluded that 41 percent of Napster's subscribers used it in ways that displaced the purchase of CDs. But the fact that Jay does not ask this question directly of her subjects makes her conclusions suspect. Furthermore, her interpretations seem biased against Napster's impacts. On the other hand, the bias of respon-

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dents trying to support Napster might work in the other direction.

Consider her classification of responses to an open-ended question asking respondents why they use Napster. Two of the categories of answers, "buy fewer CDs" and "make my own CDs," are classified as indicating a substitution of Napster files for CD sales. The first answer obviously fits this characterization. The second, however, is not at all clear. If someone wished to sample music for later purchase, and created a CD to sample the music on a stereo system, Jay would classify that answer as indicating that the respondent uses Napster to decrease CD purchases. The fact that Jay doesn't provide separate numbers for each of these two answers makes it impossible to determine whether this is a potentially serious problem or not. Further complicating this issue is the fact that 22 percent of respondents say they either buy fewer CDs or make their own CDs, whereas 8.4 percent say they purchase more CDs.<sup>44</sup> This classification seems capricious. Why not just tell us how many say they purchase fewer CDs instead of lumping them in with those who make their own CDs?

Peter Fader, a marketing professor from Wharton hired as an expert by Napster, criticized Jay for using only college students and also for her interpretation of open-ended questions. Although I do not believe his criticism on the use of college students is valid, the concern with Jay's interpretation of open-ended questions seems quite legitimate.

Fader conducted his own survey for Napster that tries to answer the same question. He concludes that Napster decreases CD sales for 8.1 percent of the respondents but increases sales for 28.3 percent of the respondents, virtually the opposite of the conclusion reached by Jay. Fader, however, was harshly criticized by Judge Patel who questioned his credentials and the degree to which he participated in the conduct of the study bearing his name.<sup>45</sup> It appears that he did not supervise the execution of the study as closely as he might have. Nevertheless, the harshness of the court's criticism of Fader contrasts with its

generally benign view of the problems in the Jay report.

There were other reports, particularly those by economists David Teece on behalf of record companies and Robert Hall on behalf of Napster. Teece's report is unavailable due to its use of confidential information. Teece appears to have examined the impact of Napster on the current CD market as well as nascent or planned online sales of music by copyright owners. He concluded that damage to copyright owners is clear. Hall, on the other hand, concluded that Napster increased CD sales because, in his view, it largely allows users to sample music before purchase.<sup>46</sup> Once again, the court was much harsher in its discussion of the Napster expert Hall than in its discussion of Teece.<sup>47</sup> Without seeing Teece's report, however, it is hard to gauge the validity of the court's relative rankings.<sup>48</sup>

All in all, my reading of the reports in the case indicates that the plaintiffs in the case failed to make as persuasive a case for harm as the defense did for the lack of harm.<sup>49</sup> Nevertheless, I believe Napster was likely dangerous to the industry. The inability of the experts to demonstrate harm may be due to the fact that MP3 files were not yet good substitutes for CDs—most ordinary stereo systems cannot yet play MP3 files and CD writers are not yet prevalent enough to allow most users to convert MP3s to audio CDs. Even with the proper equipment, the conversion takes some effort.

Nevertheless, although the courtroom decision was technically a victory for the record industry, it isn't clear that the record industry's strategy was a wise one.

## **Peer-to-Peer Technologies: The Devil You Don't Know**

Napster is not the only game in town. A new generation of programs plays by a somewhat different set of rules. These are programs based on the Gnutella protocols or some variation thereof—programs such as BearShare, Aimster, Limewire, Morpheus (FastTrack), and others. The important difference between these programs and Napster is that these sys-

tems are more decentralized—there are often no central servers keeping track of the downloads and uploads.<sup>50</sup>

Obviously, songs downloaded using these programs are likely to have the same type of direct impacts on revenues as does Napster. One question is whether they could be as popular as Napster. Current evidence, if it is to be believed, indicates that they already are more heavily used than Napster was at its peak.<sup>51</sup>

This poses an extremely serious problem for copyright enforcement. Because there is no centralized location, firm, individual, or server that can be monitored and controlled by legal authorities, copyright enforcement is going to be very messy at best, and impossible at worst. There is a provision in the Digital Millennium Copyright Act that requires Internet service providers (ISPs) to block access when notified that users are serving up copyright material using the ISPs' facilities. The Motion Picture Association of America has brought action asking ISPs to crack down on users providing movies on pure peer-to-peer-based systems when the MPAA is able to monitor those systems and determine the Internet Protocol addresses of those allowing movies to be copied.<sup>52</sup> This is not likely to be a successful long-term tactic since it would seem to require static IP addresses. Users have a choice of ISPs and it would be possible for many users to move to systems that use dynamic IP addresses on high-speed lines, such as EarthLink's DSL (Digital Subscriber Line) service. Also, the vast majority of users still use slow dial-up access, and these also have dynamically assigned IP addresses.

It is painful to imagine the authorities trying to monitor individual computer users and then prosecuting copyright infringers, often teenagers, for downloading music and other files. Yet that is exactly the specter that faces the copyright owners, who do seem willing to undertake it. They might do well to consider, however, the public relations fiasco that the American Society of Composers, Authors, and Publishers created when it decided to enforce copyright against summer camps, including the Girl Scouts, who believed they were no

longer allowed to sing copyrighted songs around the campfire.<sup>53</sup> The blizzard of negative publicity engendered by that action required ASCAP to backpedal at full speed. Teenagers trading copyrighted songs may not create the same degree of empathy as young girls singing around the campfire, but lots of parents have such teenagers and the record industry will have to be very careful not to alienate the public while punishing otherwise law-abiding infringers.

If enforcement against the pure peer-to-peer systems does prove more difficult, how does the possibility of indirectly appropriating revenues stack up? At first blush, one might think that these pure peer-to-peer systems are rather like the more traditional exchanges of music or CDs that occur between friends, since there is no central server. But that is not the case. Peer-to-peer networks are able to find an enormous number of computers, far more than the number of people in anyone's circle of personal friends. On the other hand, there is some indication that users downloading but not uploading files may be ostracized by other copyright violators since several of these programs have "anti-freeloading" tools (a delicious irony) to prevent users who are not sharing large numbers of files from being able to download files.<sup>54</sup>

If an "anti-freeloading" rule became prevalent, it is possible that the type of balance discussed earlier might arise, so that the value of new and popular CDs to users who need to upload songs to "qualify" would increase and some level of indirect appropriability might be possible. Nevertheless, it seems unlikely that decentralized systems could provide sufficient constraints to reduce "freeloading" and thereby facilitate indirect appropriability on behalf of copyright holders, as would a centralized system like Napster.<sup>55</sup> Thus it might have been somewhat shortsighted of the copyright owners to have brought aggressive action against Napster, a relatively easy target, when they may have wound up with a much more vibrant decentralized system that will prove far harder to stop or from which to wrangle indirect revenues. Napster should have been much easier for copyright holders to deal with.

**For DRM to achieve the type of power its critics are so concerned with, the technology would have to be nearly invulnerable to cracking**

**Because low prices can be charged to consumers who would not have purchased the item at the high monopoly price, price discrimination will generally increase the total output sold.**

Although the record industry appears to be making peace with Napster, Napster's users have largely gone on the more decentralized systems. The record industry has won the battle against Napster, but it may be losing the war against decentralized copying.

## **Digital Rights Management**

In the face of seemingly unstoppable piracy, the solution tantalizingly held out to copyright owners, whether the product is music or the written word, is digital rights management (DRM), also known as automated rights management (ARM). DRM refers to technologies that seek to prevent unauthorized copies of copyrighted materials from being made. These mechanisms, buried deep within the digital code of the music or other copyrighted material, also have the ability to allow copies to be made upon payment, or to charge "micropayments" for each small use of the product.<sup>56</sup> In principle, such technology could restrict copying, or even using a copyrighted product, unless there were a payment.

Of course, copy protection has existed in a variety of forms (computer software, videotapes, digital audiotapes, scrambled cable TV signals, etc.) for some time. But none has proven to be invulnerable. Even the new technologies are prone to being cracked.<sup>57</sup> Critics of DRM as an encroachment on fair use assign far too much power to this technology. The reason that pirated versions of software, music, and videos have not dominated usage is as much the law-abiding nature of users as it is the difficulty of copying. The fact that digital copies of music are technically better than analog copies is a trivial difference to most listeners not using an extremely high-end audio system.<sup>58</sup>

Copy protection doesn't have to be perfect to do the job. To be successful it merely has to limit the number of pirated copies that actually replace sales. Nevertheless, this modern anti-copying technology has aroused concerns that it might abridge our freedoms

and tilt the historical balance that exists between users and creators too far in favor of the creator. I now turn to the fulcrum of this balance, known as fair use.

Fair use is a legal defense against claims of copyright infringement. Four factors are considered in determining whether a use is fair; and if a use is deemed fair, no copyright payment is required.<sup>59</sup> Certain activities are listed in the copyright statute as exemplars of fair use, such as criticism, comment, news reporting, teaching, scholarship, or research. There is a debate currently raging about what the impact of DRM will be on fair use and what the consequences will be for society if fair use is largely eliminated.

This newest change in technology has led to an outpouring of commentary and analysis, with two very distinct schools of thought emerging. On one hand, some academics responded to perceived dangers to copyright owners by lobbying for passage of the Digital Millennium Copyright Act. On the other hand, scholars such as Pamela Samuelson of Berkeley suggest that these dangers are dramatically overstated and that the attempt to strengthen protection has been overdone.<sup>60</sup> Following in this vein, Lawrence Lessig has suggested that the digitizing of artistic works coded with DRM systems will lead to a far higher level of appropriability than has historically been the case and that technology may have shifted the balance of economic power too far in favor of copyright owners if the government doesn't step in to limit it.<sup>61</sup> Tom Bell of Chapman University, on the other hand, has argued that systems based on DRM, what he calls "fared-use," are logically and legally sound.<sup>62</sup>

For DRM to achieve the type of power its critics are so concerned with, the technology would have to be nearly invulnerable to cracking, and analog versions of the material would have to be considered poor substitutes for the original. The latter condition does not seem to exist in the real world, making many of the claims of the anti-DRM camp seem unreasonable. For example, one can record digital music played on a computer using a



microphone and tape recorder, if one is so inclined. And even if DRM made it impossible to cut and paste electronically from an e-book, one could always type the material into another document.

History tells us that the zero-cracking requirement cannot be achieved through technical sophistication alone. Instead, the powers of the state have to be brought into play, and the Digital Millennium Copyright Act does just that. The DMCA has some draconian provisions to prevent copying, in particular a provision that makes it illegal not only to make copies but to circumvent, or to create tools that allow the circumvention of, copyright protection technologies. To violate these provisions of the DMCA, it is not even necessary to make copies of the copyrighted materials. These aspects of the DMCA have raised troubling free speech and civil liberties concerns that go beyond the scope of this paper.

Can DRM shift the balance too far in favor of copyright owners? Since Lessig couches his argument against DRM in terms of economics, it is fair to analyze this claim on that basis.<sup>63</sup> The concern that DRM will somehow cause economic inefficiency—defined as a reduction in the amount of intellectual property produced and used—is based on two largely false premises.

### **DRM and Fair Use**

First, the specter of DRM that seems to haunt its critics most is the version in which micropayments must be made for every single use, no matter how small. This would appear to eliminate fair use in its traditional role as a mechanism for allowing copying when the costs of collecting payment are greater than the payment itself, a view of fair use most often associated with Boston University professor Wendy Gordon.<sup>64</sup> She has argued that fair use provides a mechanism whereby copying may occur when the transactions costs of getting permission might have been too great to allow even worthwhile copying to occur. That argument is similar to that put forward in my 1981 study, which views fair use as a form of cost/benefit analysis. The critics of

DRM correctly note that, in general, the strengthening of copyright, and the concomitant reduction in consumption of the copyrighted good (since consumption of unauthorized copies would no longer be allowed), might decrease the value to consumers by more than the value of any increased production that might be brought about by the stronger copyright. Fair use, they claim, is a mechanism that must be retained to keep an efficient balance.

What the critics of DRM fail to notice in this instance is that the micropayment that they so fear would not reduce the consumption of copyrighted goods. By charging for each minor instance of use, each paragraph read or minute of listening to music, say, or each page printed, consumers can be charged amounts that are closely related to their usage of the copyrighted product. This extreme form of DRM becomes, virtually, an instance of what economists refer to as “perfect price discrimination,” wherein each user is charged a price strongly related to his willingness to pay.<sup>65</sup> There would be no more “missed opportunities” (where people would forgo copying because the transaction costs of getting permission were too high relative to the value).

This is in contrast to the normal textbook representation of a market that has but a single price charged to all consumers for identical units of a product. Although a textbook monopolist charges a higher price than is found in a competitive market, it is still a single price. This monopoly market results in a smaller quantity being sold and consumed. It is the decrease in quantity consumed that is the harm engendered by monopoly, what economists refer to as economic inefficiency.<sup>66</sup> On the other hand, when a seller is able to charge several different prices—such as airlines that charge higher ticket prices for business travelers whose trips usually do not include a Saturday night stay over—it is known as price discrimination. Because low prices can be charged to consumers who would not have purchased the item at the high monopoly price, price discrimination will generally increase the total output sold. The more

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successfully and completely a seller can match prices to the maximum prices consumers are willing to pay, the closer the total output will be to the ideal (competitive) level.

Unlike simple monopoly, which restricts output from optimal levels, perfect price discriminators do not restrict output at all. Therefore, they are every bit as efficient as a competitive market, a perfectly standard result that can be found in any textbook.

DRM is not perfect price discrimination. DRM does not charge each consumer an amount exactly equal to his maximum willingness to pay. That ideal can never be achieved. Nevertheless, by tying the usage closely to the payment, DRM will move a good way toward perfect price discrimination. Much of the difference in willingness to pay is a function of how much and how often an item is going to be used. In those instances where there is only a small use of the copyright material, DRM can charge a very low price and usage (copying) will not be deterred. Consequently, fair use no longer has an important role to play in the cost/benefit analysis.

Admittedly, some of the differences in valuation of the copyrighted good are due to income or taste differences, which DRM doesn't address. The aspect of DRM that most concerns its critics, however, is its ability to charge for each small transaction and to keep copies from being made if payments are not forthcoming.

This is, of course, a purely economic argument, and it turns on the concept of efficiency. Perfect price discriminators, while efficient, remove the "surplus" received by consumers. In layman's terms, the seller sucks up all the difference between the value the consumer puts on the product and its cost of production (what is known as surplus) and turns it into profits. Critics of DRM might argue that this is "unfair" to users. But such an argument is not based on economic efficiency and is not the one that is made by the critics of DRM.

The harm that DRM critics envision—the reduction in use, fair or otherwise, of a copy-

righted good—is not in fact a likely outcome.

### **DRM and New Works**

DRM critics, after incorrectly asserting that DRM will reduce consumption of copyrighted materials, then argue that there will be no countervailing benefit, which would usually be the additional production of copyrighted materials brought forth by additional revenues. This notion that additional revenues will not bring forth additional output arises from an influential paper by Landes and Posner.<sup>67</sup> Prior to their paper it had been generally accepted that increasing copyright protection increases appropriability and, thus, incentives to produce. Greater copyright protection led to more payments to creators, which led to more creative works being produced. It seemed clear enough.

But Landes and Posner broaden that basic model by assuming that new works are often derived, at least in part, from old works, so that making it more difficult for the authors of new works to build upon old works might actually reduce the number of new works.

In spite of the originality of this claim, there are several reasons to believe that the traditional expectation that increasing copyright protection increases the body of copyrighted works still holds true. The Landes and Posner article was examining fundamental questions about copyright, such as whether ideas should be copyrighted, and many of their results make the most sense in a legal setting very different from the actual one. For example, if someone were able to claim ownership over the phrase "good morning" and to receive payment each time it was used, the cost to users of this phrase could be great, with no concomitant benefits. Similar problems might arise if someone could copyright ideas, such as the idea of two young people falling in love even though their families disliked one another.

Actual copyright law limits its protection to the "expression" of ideas. Individuals may create a particular expression, even if it has already been created and copyrighted by someone else, as long as it was not copied

from someone else's work. Unlike in the case of patent law, the first person to copyright a work cannot prevent others from creating the same expression of an idea as long as the later expressions are independently created. For example, if you can prove that a sonnet you wrote, which happens to be identical to one written by Shakespeare, was created entirely on your own, it will not be considered a copyright infringement. (In patent law, by contrast, even if later inventors were entirely independent in creating their invention, if it turns out to be similar to the first one patented it will not be allowed to stand as an independent patent. This can be contrasted with trademarked characters, which can not be copied. Trademark law, for example, may result in fewer stories that have Mickey Mouse in them. But the profits generated by Disney's rodent provide incentives for others to create their own animal icons.)

Thus, the major problem for creators of new works comes when they wish to copy direct passages from older works. Such copying is only legitimate with attribution, however, and such writings tend to be in the nature of reviews or academic works. In these cases, there is little reason to believe that an accommodation would not be made by the creator of the original, unless the derivative work were hostile to the original. But it is unusual to have more than a paragraph or two directly quoted at a time, and this can be done the old-fashioned "analog" way (i.e., typing by hand) if necessary. Then we are back in the realm of old-fashioned fair use, even if it now serves a somewhat different purpose.<sup>68</sup>

Another concern about DRM is that it appears capable of extending protection indefinitely. In reality, all DRM schemes can be broken, just as all copy protection on software has been broken during the last two decades. Traditional copyright enforcement, and the desire of users to remain within the law, should limit the distribution of these "cracked" items while the term of copyright is still in force. Once the statutory copyright protection period is over, however, everyone can in good conscience distribute "cracked" items.

DRM, therefore, will not lead to permanent copyright protection. The fact that copyright protection doesn't last forever might be one reason to oppose DMCA provisions that attempt to prevent all circumvention of protection schemes, since such provisions might extend protection indefinitely.

It is fair to conclude, therefore, that the increased appropriability brought about by DRM will enhance the production of new copyrighted works. If DRM allows a very strong degree of price discrimination, then there would be very little loss from the possibility of users being disenfranchised from purchase by the extra appropriability given to copyright owners. Even if it eliminated fair use (and Bell claims that it wouldn't), DRM would be economically efficient.<sup>69</sup> Of course, one could always argue that DRM would make authors too rich and readers too poor. Or perhaps that it might lead to some form of censorship.<sup>70</sup> But these arguments are not based on economic efficiency, nor do they seem reasonable.

Finally, although DRM, if it works, would be a salutary development, proposed legislation that appears to require DRM (the Security Systems Standards and Certification Act) is misguided.<sup>71</sup> There is no need to have the government certify which security technologies are to be used or to force a decision on market participants regarding the choice of which, if any, of these technologies should be used. This is just another case of the government meddling in an area where it serves no useful purpose.

#### **Other Alternatives for Copy Protection**

Whether embodied in a CD or a stream of bits over the Internet, copyrighted items (hereinafter to be called "titles," a shorthand to distinguish them from reproductions of goods) are public goods, which, as defined above, means they don't get used up when consumed. Efficient consumption of the title requires that any consumer with a value for the title (e.g., a collection of songs) that is above the cost of producing its physical embodiment or reproduction (the CD) be

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allowed to consume it, since allowing such consumption deprives no other consumer of possible consumption. Assume for the moment that the *cost* of making reproductions is zero. If the *price* of reproductions were low enough to allow all potential users to purchase them (in other words, zero), there would be no money to pay the creator of the title.

This tradeoff is known to exist in the creation and distribution of public goods. Efficient consumption of reproductions requires a price close to the cost of making reproductions, whereas efficient production requires that producers receive sufficient payment to compensate them for the act of creating titles. Traditional market mechanisms are not expected to produce the theoretically ideal quantity of titles. In reality, too few titles are likely to be produced and too little consumption of any single title is likely to occur, compared to the theoretical ideal.

Ironically, the sole market mechanism that can theoretically produce the ideal level of public goods is perfect price discrimination. That is because the perfect price discriminator, by definition, charges each consumer exactly the amount that consumer is willing to pay, thus deterring no consumer from consuming. The ideal consumption level for any title is thus a by-product of perfect discrimination. Furthermore, since the perfect discriminator generates revenues equal to the value the product provides to the consumer, all titles with total values greater than the cost of production are likely to be produced, leading to the optimal number of titles produced.

That is the direction in which DRM promises to take us. DRM promises to make payment a function of use. Those who listen to a song more frequently are likely to also have the higher values. Thus it approaches perfect discrimination. So even if critics of DRM were to change their argument to one based on the equity or inequity of having producers taking so much and consumers so little, they would then be arguing against economic efficiency, which would be a turnabout of one hundred and eighty degrees.

Although DRM may prove central to resolving the issue of unauthorized copying, there are other potential solutions that might incorporate some of DRM's anti-copying characteristics, although not the payment mechanisms that are normally associated with DRM.

Some copyright markets, for example television and radio broadcasts, use a device known as a "blanket license." A blanket license allows the purchaser of the license to use any amount of the copyrighted material contained in the repertoire covered by the license for a single fee that is not tied to usage. The best-known instances of blanket licenses have been sold by performing rights those organizations such as ASCAP and BMI.

These licenses are sold to television and radio stations, with the price of the license being tied to the revenues earned by the broadcaster. Blanket licenses have some very useful economic characteristics. First, since the cost of using another copyrighted item in the repertoire is zero, consumers who purchase the license use the optimal amount of these public goods. From an economic efficiency vantage, this is much better than selling the individual items in the repertoire one at a time (unless the seller is a perfect price discriminator).

It is, of course, possible that some users would not purchase the blanket license, creating an inefficiency on the consumption side, although in the case of television and radio, all stations have purchased such licenses, and the artificial restriction on the number of stations tends to ensure that the blanket license fee doesn't reduce the number of stations. Also, since a price based on revenues is likely to be related to willingness to pay (i.e., approaches perfect price discrimination), the system would appear to have excellent efficiency characteristics, given that the products are public goods. There is no reason that a record company could not just as easily employ a similar device in selling music to individual consumers, what we might call a blanket subscription.

Sellers of music, among them the new Napster, are publicly discussing subscription systems whereby users are charged some

monthly fee for access to some amount of music. A monthly subscription fee would be like a blanket license as long as it allowed unrestricted usage of the material covered by the license and didn't limit the number of downloads each month.

It doesn't appear that this is the initial route that is going to be taken by the record companies. News reports indicate that monthly subscription fees are going to apply to only a fixed number of downloads per month.<sup>72</sup> These reports also indicate that record companies envision a pricing structure of at least \$10 a month for a limited number of downloads. The downloaded songs, according to initial plans, will not be playable on any devices other than PCs and will be limited in terms of how many times they can be played or copied. At higher prices, a small number of songs can be "burned" onto CDs.<sup>73</sup>

This is quite different from the blanket license and doesn't have the same efficiency consequences. One might argue that it would be foolish for the record companies to allow unlimited access to their repertoire, since consumers would seem to have an incentive to download everything they want all at once and then stop paying. This concern, however, ignores the fact that the vast majority of sales are of new music and that it is the new additions to the repertoire that consumers now purchase. These additions would provide continued incentive to subscribe to a monthly service.

The original pricing plans appear somewhat misguided, but perhaps the record industry knows something others do not. On the other hand, it is possible that they will follow the lead of the movie industry, which initially overpriced prerecorded videotapes because they thought that video rental stores were the primary market. Only when it was discovered that individual movie viewers actually wanted to purchase videotapes did the price come down to levels that made it affordable for individuals. It isn't really a question of *whether* the sellers will get the price right—but of *when* they will get it right.

Further complicating the issue is the fact that web sales compete with brick-and-mor-

tar retail outlets. The brick-and-mortar retail outlets that sell CDs should pressure record companies to keep online prices at a level high enough not to discourage retail sales. The initial restriction on the number of burns from a single artist is also consistent with an attempt to keep web sales from cannibalizing CD sales. Large retail chains have significant leverage on the recording industry. To the extent that a large fraction of sales is done through brick-and-mortar retailers, web sales policies may be forced to remain poor substitutes for CD sales. This would be in spite of the fact that web sales are inherently more efficient since they do not incur the costs of packaging, shipping, distribution, or physically producing the CD. This may help explain the seeming unreasonableness of current prices and restrictions.

Finally, a bill, the Music Online Competition Act, recently proposed by Rep. Rick Boucher (D-Va.), contains a mandatory form of nondiscriminatory licensing between record companies and distributors in the midst of some useful provisions.<sup>74</sup> The concern is a perennially misguided one that says that having a monopoly on both the wholesale and retail segments of a single market is somehow worse than just having a monopoly on the wholesale side. Economic analysis does not support this concern.<sup>75</sup> It is quite possible that the music industry, for example, will no longer need the services of a separate distribution channel. If there is little competition in the wholesale segment, the retail segment can do little to change that, and it serves no useful purpose for the government to try to tinker with the contractual relationships that are likely to arise. It is possible that joint ventures between the different record labels might allow a degree of collusive behavior with regard to setting prices. Yet, the nondiscriminatory pricing clause of Boucher's act is of no value if the nondiscriminatory price is a monopoly price.

The government should not try to prevent the withering of the current separate retail segment since its existence, competitive or otherwise, serves no particular competition

**It isn't really a question of *whether* the sellers will get the price right—but of *when* they will get it right.**

enhancing function. If there is no longer a useful economic function to be served by a separate retail segment, and there might no longer be one, consumers would be better off without it.

## Conclusion

The impact of pirating has often been misunderstood, and copyright owners have frequently claimed harm when little or none was being done. This was true for many copying technologies. Nevertheless, record companies and copyright owners are right to fear Internet-based copying of digitized products. It is a potentially serious threat to their well-being. Still, the arguments against Napster and its relatives remain basically theoretical. As strong as they appear to be, it is somewhat premature to say we know what will happen one way or another, since there is as yet no compelling empirical support. The evidence that has been put forward to this point does not clearly point to the direction of the impact, to say nothing of the magnitude.

Even if Napster had been as serious a threat to record companies' and copyright holders' revenues as is implied by theory, it is not the most formidable threat facing copyright owners. Pure peer-to-peer pirating would seem to be far more dangerous—Napster could have been tamed by changing its rules, but peer-to-peer networks cannot. By crippling Napster, copyright holders may have strengthened a far more fearsome foe, diminishing their chances to appropriate revenues from activities that they might not be able to stop.

In the not too distant future, DRM technology should allow copyright owners to reduce large-scale unauthorized copying and any harm to copyright owners brought about by unauthorized copying. At that point, websites and technologies that allow unauthorized copies should be of far less importance as long as the DRM technology proves difficult enough to break.

Many scholars and commentators fear that DRM is dangerous because its practical

elimination of fair use would seem to upset the delicate balance between creators and users. These fears are largely unfounded, at least in terms of economic efficiency. Because price discrimination is enhanced, there is every reason to believe that efficiency is enhanced as well. These critics imagine DRM providing more power to authors than DRM will in reality be able to deliver.

Inexpensive copying technologies, which have been with us for at least 40 years, have not as yet caused great damage, notwithstanding the claims of the recording and film industries. Although it is possible that the current generation of copying technologies will in fact live up to the dire predictions of doom coming from the copyright owners, there should have been some powerful evidence to support this claim before we considered the type of legislation that has already been enacted, not to mention any new proposals that further trample on individual freedom.

As has been the case for many other technologies, the Internet should prove a boon, not a blight, to record companies and copyright owners once they learn how to use it effectively. It provides a wonderful improvement in distribution. As was true in the videocassette industry, however, record companies will need to experiment to find the appropriate pricing levels for their products. It is possible that startups with better business plans will replace the incumbents, but that is largely irrelevant to copyright issues. Internet distribution should make brick-and-mortar record stores almost obsolete, and when it does, the old distribution methodology will seem as primitive as horses and buggies seem today. DRM is likely to be a useful tool in this process.

## Notes

1. The concept of indirect appropriability, discussed in more detail later, was first propounded in Stan Liebowitz, "The Impact of Reprography on the Copyright System," Copyright Revision Studies, Bureau of Corporate Affairs, Ottawa, 1981, but the actual term "indirect appropriability" was coined in Stan Liebowitz, "Copying and Indirect Appropria-

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bility: Photocopying of Journals," *Journal of Political Economy* (October 1985): 945–57. The 1981 monograph is available at [http://papers.ssrn.com/sol3/papers.cfm?cfid=565423&cftoken=13632430&abstract\\_id=250082](http://papers.ssrn.com/sol3/papers.cfm?cfid=565423&cftoken=13632430&abstract_id=250082).

2. This focus leaves aside the *moral rights* to that value that are so important under Napoleonic legal systems, but is in keeping with the practical purpose of intellectual property laws in countries such as the United States.

3. One school of thought at the extremity of these debates is populated by those who believe that no copyright at all is required for an efficient functioning market for artistic and creative goods. The members of this group believe that either (1) being first in the market provides sufficient appropriability that no additional legal protection is required or (2) other forms of remuneration (perhaps of a nonpecuniary nature) provide sufficient incentive to produce these products, making legislation that restricts the control of these products to their creators unnecessary. The former school of thought is represented by Arnold Plant in "The Economic Aspects of Copyright in Books," *Economica* (May 1934): 167–95, and R. Hurt and R. Schuchman in "The Economic Rationale of Copyright," *American Economic Review* (May 1966). The latter school of thought is represented by organizations such as the Free Software Foundation, [www.gnu.org/fsf/fsf.html](http://www.gnu.org/fsf/fsf.html).

4. In truth, there is virtually no empirical evidence on the extent to which copyright owners require remuneration to create their artistic works. However, the claim that production requires, to at least some extent, remuneration of the producers, is fully consistent with the usual market principle. Adam Smith's famous quote about how production does not come from the "benevolence" of butchers, bakers, or candlestick makers, but instead derives from their self-interested behavior, certainly has a plethora of empirical evidence to support it.

5. See Edmund W. Kitch, "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property," *Vanderbilt Law Review* 53 (November 2000): 1727.

6. There are actually two definitions of public goods in the economics literature. The first defines them as goods that do not get used up when consumed (known as nonrivalrous consumption). The other, more prevalent, definition is attributed to Paul Samuelson. It adds to the nonrivalrous consumption definition the inability to exclude individuals from consuming the good, as would be the case for national defense or any good without defined property rights. I believe this latter definition to be far less useful since it conflates two independent ideas that need not have anything to do

with one another. Any good for which nonexcludability is a property will not be efficiently produced in markets. And nonexcludability usually has more to do with the laws and technology than with the good itself.

7. This might seem to complicate the policy issues, but it actually simplifies them. If a technology decreased appropriability but increased payments to copyright holders, it would provide both greater incentives to create the copyrighted material and greater value to consumers who get to keep the nonappropriated value. Removing this technology would decrease value regarding both the number of titles and the value received for each produced title, and could not be economically beneficial.

8. For a review of the economic impacts of copying, see Richard Watt, *Copyright and Economic Theory: Friends or Foes?* (Cheltenham, England: Edward Elgar, 2000). This is the most thorough review of this material that I have found. My only quibble is that he attributes most of the modeling that was originated in Liebowitz, "The Impact of Reprography," to Stanley Besen and Sheila Kirby (1989), "Private Copying, Appropriability, and Optimal Copying Royalties," *Journal of Law and Economics* 32 (1989): 255–80.

9. One point that has been neglected is the price that is proffered to the pirate that would lead to his decision to forgo the product as opposed to making a legitimate purchase. There is presumably some price above zero at which the pirate would make a purchase when confronted with this choice.

10. See Liebowitz, "The Impact of Reprography," for a discussion of the exposure effect.

11. See Lisa N. Takeyama, "The Welfare Implications of Unauthorized Reproduction of Intellectual Property in the Presence of Demand Network Externalities," *Journal of Industrial Economics* 42 (1994): 155–66; K. R. Conner and R. P. Rumelt, "Software Piracy—An Analysis of Protection Strategies," *Management Science* 37 (February 1991): 125–39; and Oz Shy and Jacques-Francois Thisse, "A Strategic Approach to Software Protection," *Journal of Economics and Management Strategy* 8 (1999): 163–90.

12. See, for example, Stan J. Liebowitz and Stephen E. Margolis, "Network Effects and Externalities," *The New Palgrave's Dictionary of Economics and the Law*, vol. 2 (New York: Macmillan, 1998), pp. 671–75.

13. Unless, that is, the extra value that the marginal purchaser of originals receives is zero. This would seem unlikely, however.

14. Such payments are quite common and can be found in many countries including Canada and much of Europe. These payments would normally go to an organization or collective representing copyright owners.
15. The claims in this section are documented in Liebowitz, "The Impact of Reprography."
16. It is also true that the Copyright Clearance Center came into existence to allow copiers to make direct payments to copyright holders. But the improvement in the economic well-being of journal publishers occurred quite independent of the CCC, since the CCC was not organized until well after the market for journals had experienced enormous growth. See Liebowitz, "The Impact of Reprography," pp. 64-68.
17. This is documented in Liebowitz, "The Impact of Reprography," and "Copying and Indirect Appropriability." Expenditures for books were more than three times as much as those for periodicals from the 1940s to the 1960s when the ratio began to fall dramatically. The ratio fell to about 1:1 in the early 1980s. In 1996, expenditures for serials outpaced those for books and bound periodicals by 8 to 5. See Table 11 in "The Status of Academic Libraries in the United States," U.S. Department of Education, Office of Educational Research and Improvement, NCES 2001-301, May 2001.
18. *Universal Studios Inc. v. Sony Corporation of America*, 1984. The original district court ruling was in 1979.
19. This material is based on Stan J. Liebowitz, "The Betamax Case," 1986, unpublished manuscript soon to be available on the Social Science Research Network, [www.SSRN.com](http://www.SSRN.com).
20. It was also the case that remote controls at the time were tethered by wires to the VCR, rendering them not very convenient to use.
21. Defendants in the Napster and MP3.com cases argued that their products "space shifted" music from a CD to a computer, a putative analogy to the time shifting that occurred in the Betamax case. A problem with this analogy is that without indirect appropriability, space shifting would decrease revenues to copyright owners, a result not analogous to that of time shifting since the VCR users still were exposed to commercials. A more important defect with this analogy in the case of Napster is the fact that what Napster does is not actually space shifting. Since Napster users do not download their own files into their computer, but instead download files from others, it is better described as "user shifting" than space shifting. User shifting could, in other circumstances, be considered a euphemism for "theft" except that the theft is from the copyright owner in the form of a lost potential sale, rather than the user who provides the original to be copied.
22. According to the *U.S. Statistical Abstract*, Table 909, theatrical movie revenues were \$32 per person per year in 1998, whereas revenues from pre-recorded movies were \$92.
23. Alan Greenspan, Testimony before the Subcommittee on Patents, Copyrights and Trademarks, of the Senate Committee on the Judiciary, 98th Cong., 1st sess, October 25, 1983.
24. In February 2001, 2.8 billion files were downloaded, the peak number in Napster's history. By April, after Napster was ordered to stop allowing copyrighted music to be transferred, the number had fallen to 1.6 billion. See "Napster Downloads Drop 36 Percent," Reuters, May 2, 2001.
25. This estimate was reported in "Napster Could Face Shutdown," Associated Press, April 10, 2001.
26. Given enough time, this bandwidth limitation could be overcome, but the nature of the music business is that a small number of songs are in extremely high demand for a short period of time. As long as tastes gravitate around the same small number of songs at any one time, the argument holds.
27. See Lawrence Lessig, "Just Compensation," *The Industry Standard*, April 18, 2001.
28. When music is put onto a record or CD, the creator of the music receives a small payment for each copy, which is known as a mechanical royalty. Similarly, composers receive a percentage of television, radio, cable, or concert revenues as compensation from broadcasters for the use of their music, which is known as a performing rights payment. When broadcast signals are carried on cable, that is often known as a retransmission right.
29. However, the current evidence is unclear as reported below in the section on Napster's impact on revenues.
30. It was never clear what Napster's business model was when it was merely allowing the free transfer of files, but one possibility was the sale of advertising. The possible advertising revenues were dwarfed by the potential losses that might have been imposed upon record companies.
31. The Audio Home Recording Act of 1992 provides that importers, manufacturers, or distributors of any digital audio recording device or digital audio recording medium must file quarterly statements and pay royalties on each recorder or piece of medium distrib-



uted in the United States. The royalty is 2 percent of the manufacturer's selling price for recorders and 3 percent of the manufacturer's selling price for recordable media. See Robert A. Starrett, "Copying Music to CD: The Right, the Wrong, and the Law," *EMedia Professional*, February 1998, [www.cdpage.com/Audio\\_Compact\\_Disc/rightwrong.html](http://www.cdpage.com/Audio_Compact_Disc/rightwrong.html).

32. A typical view is espoused in the expert reports put forward by Napster in its defense. One of those reports, by Robert Hall, states, "The exchanges of music facilitated by Napster stimulate the demand for the plaintiffs' CDs by allowing consumers to sample CDs and develop interest in CDs that they subsequently purchase." <http://napster.com/pressroom/legal.html>. Several, but not all, of the reports from the Recording Industry Association of America can be found at [www.riaa.com/napster\\_legal.cfm](http://www.riaa.com/napster_legal.cfm).

33. Another way of looking at this is to imagine that some CDs that are now purchased are "mistakes" due to insufficient information. With the additional information provided by the Napster experience, fewer of these mistakes are made and fewer CDs are purchased.

34. By analogy, it is as if CDs were chocolate bars. Consumers buy chocolate bars so that they can eat the chocolate. If each bar were to contain more chocolate, holding the price of a bar constant, the number of bars sold could go up or down depending on the elasticity of demand for the underlying product of interest, chocolate. If the elasticity of demand for chocolate were greater than one, the now-lower effective price of chocolate would lead to an increase in total revenue spent on chocolate, and with the price of bars constant the number of bars sold would increase. (This relationship between elasticity and revenue can be found in any introductory microeconomics text.) But if the demand for chocolate were inelastic, the number of bars sold would decrease. Although it could be argued that the demand for any particular CD is elastic, since otherwise the seller would find it profitable to raise its price, it need not be the case that overall demand for CDs is elastic. CD prices are not set individually (see Silva and Ramello), and CDs often would seem to be close enough substitutes for one another to be classified in the same market.

35. There were several other reports that were difficult to classify. Lawrence Lessig submitted a report that the court rejected out of hand, stating that "the Lessig report merely offers a combination of legal opinion and editorial comment on Internet policy. Therefore, this court grants plaintiffs' motion to exclude it."

36. The preliminary injunction preventing Napster from allowing users to download copyrighted files is in place, and Napster was effectively shut down in the form in which it had previously existed.

Napster is now planning to return as a legitimate subscription service.

37. The court told Napster to end the dissemination of copyrighted materials. Napster did this by blocking access to known copyrighted songs, which required many different variations for each title since users tried to evade being blocked by putting up alternative titles that still indicated what the song was. When Napster was only 99 percent effective in this endeavor, the judge threatened to shut it down.

38. These reports are so named in the "Memorandum and Order Re Admissibility of Expert Reports" issued by the trial judge. Plaintiffs also had a declaration by Charles Robbins, a store owner claiming that Napster had largely destroyed his business, but this report was thoroughly discredited by the Fader report (mentioned below), which pointed out that the store had changed locations and switched from selling new CDs to selling used records and CDs during the period that its sales declined.

39. Actually, the Fine study looks at three groups of brick-and-mortar retailers: the overall set, a set of retailers near the 40 most heavily wired college campuses, and a set of retailers near college campuses that have banned Napster. Napster's expert Hall makes much of the fact that this latter group of retailers shows the same decrease in sales as the others, claiming that for this group sales should have improved if Napster had been having a negative impact on sales. Such a claim is unwarranted since we do not know how long Napster had been banned at these campuses and how successful the ban was.

40. It is unfortunate that online CD retailers probably had not achieved an equilibrium market position prior to Napster since comparing the sales of online retailers to those of brick-and-mortar retailers would have provided what probably would have been a better test of Napster's impact, with changes in online sales being the proxy for Napster's impact.

41. Fine reports that online sales figures were first collected in the first quarter of 1999.

42. The court also was aware of these problems: "The Court finds some aspects of the Fine report troubling—especially the fact that it shows a decline in retail sales prior to the launching of Napster. This limitation, combined with Fine's decision not to track Internet music sales, reduces the study's probative value."

43. Nevertheless, at its peak Napster downloads were estimated to be in the vicinity of 2.8 billion files per month, which would roughly be the equivalent of

250 million CDs per month. I suspect that these data include many failed downloads. According to the Fine report, U.S. national sales ran approximately 60 million CDs per month. So even with the slow bandwidths, the potential impact may have been large. See “Music Downloads Soar,” Reuters, September 6, 2001, <http://news.cnet.com/news/0-1005-200-7080479.html>.

44. Jay includes “getting free music” and “getting music that one wants” as other answers that reveal substitution of sales. Although this might be true, it is not clearly so, and this interpretation problem could have been avoided if more direct questions were asked.

45. The court stated: “He considers himself an expert on consumer surveys. . . . However, he admitted in his deposition that he has never before prepared a consumer survey for litigation and he is unfamiliar with the standards set forth by federal courts for the reliability of such surveys.” Lack of familiarity with legal standards hardly disqualifies someone as an authority on surveys in general. The court continued, “In short, his claim to have designed and overseen the Greenfield survey appears exaggerated, and the generality of his report renders it of dubious reliability and value.”

46. Hall assumes that any music sampling by Napster users benefits the CD market, an assumption that we demonstrated to be incorrect in the above subsection on exposure effects.

47. The court stated: “Hall relied too heavily on outside studies that favored defendant without performing any analysis of the Jay report . . . these shortcomings are not grave enough to warrant exclusion of his expert opinion. Insofar as the Hall report assumes the requested injunction would put defendant out of business, it tends to corroborate plaintiffs’ argument that Napster has no legitimate non-infringing uses . . . they [the plaintiffs] would be wise not to object too strenuously to admission of the Hall report.”

48. One potentially questionable point, according to Hall, is Teece’s use of the concept of path dependence to argue that consumers will be locked in to Napster and will not then purchase music online from the copyright owners. Hall notes that Teece cites the QWERTY keyboard as an example of such lock-in. There are two problems here. First, the keyboard story has no evidence to support it. Second, it is hard to imagine what the coordination problem might be that would have to underlie a case of lock-in since network effects are not sufficient for there to be lock-in without some form of coordination failure. See Stan J. Liebowitz and Stephen E. Margolis, “The

Fable of the Keys,” *Journal of Law and Economics* (April 1990): 1–26. (This article also cited by Hall.)

49. The judge’s readings of the reports seem to have been biased against Napster, even though I think her decision was in the end correct, even if not supported by the evidence at hand.

50. That distinction is somewhat artificial. Napster is also a peer-to-peer system, albeit one with a central server. And the pure peer-to-peer-based systems can have some specialized hardware—LimeWire, for example, has a special router that is supposed to improve performance.

51. The claim is made that the four largest Napster replacements, FastTrack, Audiogalaxy, iMesh, and Gnutella, were responsible for 3.05 billion downloaded files, although not all of those were songs. The data come from Webnoize, a company that tracks Internet usage as reported by Reuters, as discussed above.

52. See Lee Gomes, “Recording Industry Targets Gnutella amid Signs Napster Usage Is Falling,” *Wall Street Journal*, May 4, 2001, p. B6.

53. For one of the more subdued articles on this issue, see Marcus Errico, “Okay, Six Choruses of ‘Kumbaya’—That’ll Be \$1.50,” *Eonline*, August 24, 1996, [www.eonline.com/News/Items/0,1,109,00.html](http://www.eonline.com/News/Items/0,1,109,00.html). For ASCAP’s version of this public relations fiasco, see ASCAP’s memo “ASCAP Clarifies Position on Music in Girl Scout Camps,” August 26, 1996, [www.ascap.com/press/ascap-082696.html](http://www.ascap.com/press/ascap-082696.html).

54. For example, LimeWire has an “Anti-Freeloader Feature” as described in the FAQ section: “Q: Will the number of files I share affect my LimeWire experience? A: It could. If you’re not sharing enough files, users with certain connection preferences won’t let you connect to them for downloading. For this reason, we recommend all LimeWire users share generously with one another.”

55. If Napster were to have a no-freeload rule, one might think that competition between Napster and a decentralized system would favor a decentralized system since freeloaders would flock there and most everyone would want to be a freeloader. But such is not necessarily the case. The system with a no-freeload rule would have more heavily demanded files available for downloading relative to the number of downloaders and therefore should prove more attractive to users, particularly users with files to upload. What economists refer to as a separating equilibrium might come to exist, with Napster having the newer and still popular songs whereas the pure peer-to-peer networks would have older songs.

56. One problem is that credit card companies currently charge a fixed fee for each transaction, which tends to negate the usefulness of micro-payments. This will presumably be fixed someday.

57. For example, to test the effectiveness of watermarks, a technology that in principle allows the tracking of the origin of a copy, the Secure Digital Music Initiative last year sponsored a hacking challenge, offering \$10,000 to anyone who could successfully remove the watermarks while meeting certain audio-quality standards. That challenge was met and a minor brouhaha took place over whether the codebreakers (a group from Princeton) would be allowed to publish their techniques, which they eventually did. See Lisa M. Bowman, "SDMI Hack Draws Legal Threats," *ZDNet News*, April 23, 2001, [www.zdnet.com/zdnn/stories/news/0,4586,5081595,00.html](http://www.zdnet.com/zdnn/stories/news/0,4586,5081595,00.html). The report of the hackers can be found at [www.theregister.co.uk/extra/sdmi-attack.htm](http://www.theregister.co.uk/extra/sdmi-attack.htm).

58. Of course, digital copies can be used to make another generation of digital copies that remain the same quality, whereas analog copies of copies deteriorate in quality for each additional generation.

59. The four factors are (1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes, (2) the nature of the copyrighted work, (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and (4) the effect of the use upon the potential market for or value of the copyrighted work.

60. See Pamela Samuelson, "The Copyright Grab," *Wired*, January 1996, [www.wired.com/wired/archive/4.01/white.paper\\_pr.html](http://www.wired.com/wired/archive/4.01/white.paper_pr.html).

61. "Code displaces the balance in copyright law and doctrines such as fair use." Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999), p. 135.

62. Bell points out that fair-use imposes costs of its own on the copier (photocopiers, time, and so forth). It also imposes uncertainty on users since it is often unclear whether individual acts are fair use or not. He also moves a bit in the direction of the efficiency of perfect price discrimination that I put forth when he suggests that many instances of worthwhile copying would be missed because getting permission was too costly, but that ARM reduces such transactions, potentially increasing the number of such uses. See Tom W. Bell, "Fair Use vs. Fared Use: The Impact of Automated Rights Management on Copyright's Fair Use Doctrine," *North Carolina Law Review* 76 (1998): 558-618, [www.tomwbell.com/writings/FullFared.html](http://www.tomwbell.com/writings/FullFared.html).

63. "Economists have long understood that granting property rights over information is dangerous (to say the least). This is not because of leftist leanings among economists. It is because economists are pragmatists, and their objective in granting any property right is simply to facilitate production, but there is no way to know, in principle, whether increasing or decreasing the rights granted under intellectual property law will lead to an increase in the production of an intellectual property," Lessig, *Code*, p. 134.

64. Wendy Gordon, "Fair Use as Market Failure: A Structural and Economic Analysis of the *Betamax* Case and Its Predecessors," *Columbia Law Review* 82 (1982): 1600-1657.

65. I am making the assumption that the more one uses a product, the greater one's willingness to pay.

66. The harm from the reduced output is traditionally referred to as a deadweight or welfare loss in economics textbooks.

67. W. M. Landes and R. A. Posner, "An Economic Analysis of Copyright Law," *Journal of Legal Studies* 18 (June 1989): 325-63. One might argue that earlier, Plant also thought that lengthening copyright would not increase production since Plant argued that copyright wasn't even necessary. This is, I believe, a misreading of his work. Plant doesn't argue that production is generally unaffected by income, although he does point out that this is true for some authors. He also argues that the profits from being first to market (prior to 1934, when copying was still slow and costly) were great enough that authors received all the reward they needed.

68. It can be claimed that the DRM might impose a contract on the user that no copies of any sort are to be made as a condition of sale. But any book, even with no digital technology at all, could come shrink wrapped with a contract that says to open it only if you promise not to make copies. That is the nature of many software contracts. So this problem really has little to do with ARM.

69. See Bell, p. 591, where he discusses the legal impacts of ARM on cutting and pasting.

70. According to Neil Weinstock Netanel, "Copyright and a Democratic Civil Society," *Yale Law Journal* 106 (1996): 283-386, fair use is valuable to society, even if perfect metering reduced transactions costs to zero, because in his view the purpose of copyright is to promote a democratic society and not to maximize economic efficiency. He believes that fair use protects negative follow-up works (e.g., parodies) that he suggests could be

eliminated by the original copyright owner with strong enough copyright protection. This, to me, confuses censorship with the proper working of markets.

71. See Declan McCullagh, "New Copyright Bill Heading to DC," *Wired News*, September 7, 2001, [www.wired.com/news/politics/0,1283,46655,00.html](http://www.wired.com/news/politics/0,1283,46655,00.html).

72. The two leading services that have been announced, MusicNet (supported by Warner, Bertelsmann, EMI) and Pressplay (supported by Sony and Vivendi), have suggested some form of monthly subscription fee. The suggestions, however, are for a fixed amount of downloads. Reports *Newsbytes*: "Acting MusicNet CEO Rob Glaser said the lower end of a hypothetical tiered pricing plan might include a \$9.95 per month plan allowing customers to temporarily download 30 songs and stream 30 titles." That same article reports on a survey of teenage users, indicating they would be willing to pay slightly under \$3 per month for unlimited downloads. See Brian Krebs, "Plug.In: Music Services May Struggle with Napster-Era Teens," *Newsbytes*, July 26, 2001, [www.newsbytes.com/news/01/168370.html](http://www.newsbytes.com/news/01/168370.html). A more recent article discusses the problems with selling music online, particularly since these sites

intend to stream music, which brings in performing rights as well as other rights. See Jim Hu and John Borland, "Label Deal to Unclog Music Logjam," *Cnet News*, September 17, 2001, [www.msnbc.com/news/630261.asp?0na=22184D2](http://www.msnbc.com/news/630261.asp?0na=22184D2).

73. On December 19 Pressplay officially announced its pricing: \$10 per month for 30 downloads plus 300 streams (listening to a song) at the low end, and \$25 per month for 100 downloads, 1,000 streams, and 20 burns (songs put on a CD). There is also a monthly limit of two burns per month per artist. The limit of two burns per month will tend to keep the service from being a substitute for album sales.

74. For a copy of the act, which does contain some useful provisions, see [www.house.gov/boucher/moca-page.htm](http://www.house.gov/boucher/moca-page.htm).

75. The analysis tends to go the other way. Both wholesale and retail channels, if they are not perfectly competitive, tend to put their own supra-competitive markups on the product, causing more harm than would be the case for a single integrated channel, a result known as "double marginalization."

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