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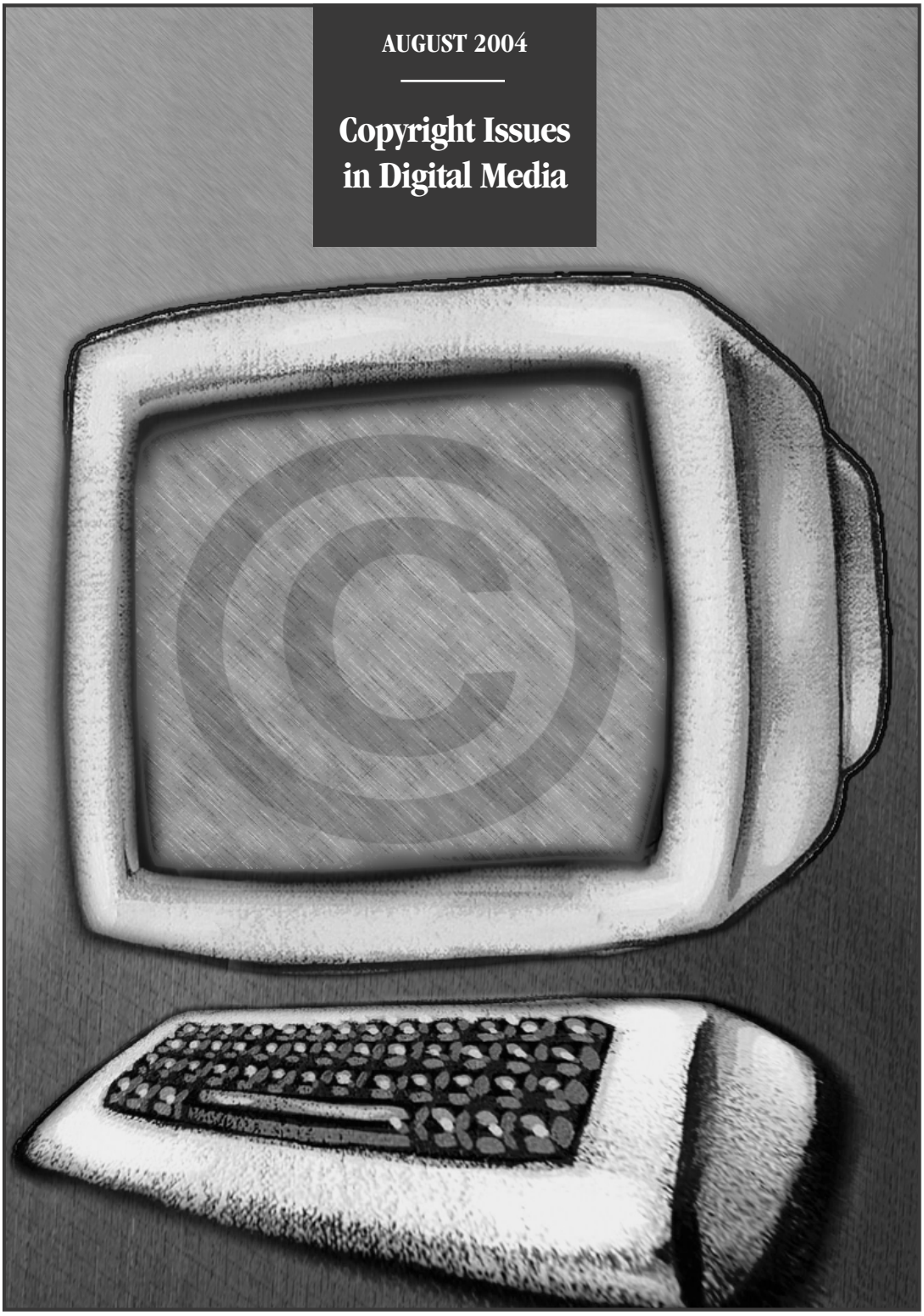
Copyright Issues in Digital Media



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Preface

Rapid technological progress in information technologies poses new issues for copyright law. Today, a digital file can be copied and instantaneously distributed worldwide through the Internet, thus potentially depriving the copyright holder of revenue from licensed sales. As a result, holders of copyright on creative works in digital format are contesting the right of consumers to make personal copies of copyrighted materials. At the same time, consumers are beginning to chafe at copyright owners' use of digital technologies to prevent or deter copying and other unauthorized uses of copyrighted works.

As digital processing grows more powerful and the high-speed distribution of digital content becomes more pervasive, the debate over copyright issues—in particular, whether copyright law has achieved the appropriate balance between incentives to engage in creative activity and the social benefits that arise from the widespread use of creative works—is likely to intensify. Yet the implications of any change to copyright law extend beyond the producers and consumers of copyrighted material to society at large. Investments in the computer hardware and communications industries, for example, are linked in part to the availability of creative content in digital form. How the current copyright debate is resolved, therefore, is likely to influence the growth of those related sectors of the economy. Potential revisions to copyright law may also have an impact on broader social concerns such as individual privacy.

Revisions to copyright law could impose mandated costs on producers and consumers of copyrighted material, as well as the providers of goods and services used in conjunction with copyrighted works. This Congressional Budget Office (CBO) paper reviews current copyright law in the United States and considers the unique aspects of digital technology's challenge to that law. It also examines the prospects for a market-based resolution to copyright disputes over digital content and explores the effect of potential revisions to copyright law on economic efficiency and equity. While this analysis suggests some issues and concerns that the Congress may wish to consider during its deliberations about any changes in copyright law, in keeping with CBO's mandate to provide objective, impartial analysis, the paper makes no policy recommendations.

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Summary

Historically, U.S. copyright law has sought to balance private incentives to engage in creative activity with the social benefits that arise from the widespread use of creative works. In the past, the emergence of new technologies—the photocopying machine and videocassette recorder, for example—has threatened to tilt the scales of the copyright regime by loosening the control that copyright owners enjoy over subsequent uses of their works. Such a development could reduce the revenues that creators of copyrighted material obtain from their efforts and thereby restrict the future supply of creative works. Over the years, however, three important factors have helped to preserve some balance in the U.S. copyright regime: the judicial interpretation of existing copyright law; the enactment of new legislation; and the ability of copyright holders and the industries that market and distribute creative products to find ways of applying those new technologies to generate sufficient returns to maintain the flow of new creative works.

An economically efficient outcome in markets for creative works is elusive. Efficiency in markets for goods and services generally requires that the cost of producing the last (or marginal) unit must equal society's valuation of it. However, once a copyrighted work has been created, relatively few costs are incurred in its reproduction and distribution—especially if the work is in digital form. Offering a creative work at the relatively low marginal cost of reproduction and distribution, therefore, would not generate the returns needed to recoup the overall expense of supplying it. To encourage creative works, copyright law has traditionally allowed for licensing rights that enable pricing above marginal cost, while placing a limit on the scope and duration of copyright protection to ensure that creative works eventually become widely available. Copyright law therefore accepts some *static* inefficiency (copyrighted works are typically not distributed as widely as is economically feasible) in the interests of beneficial *dynamic* effects (getting those works created in the first place).

It is difficult to determine how close the current copyright regime is to being efficient—that is, whether the optimal balance between private incentives and social benefits has been reached. Given society's desire for creative works, as well as its endowments of talent, technology, and other resources needed to generate and distribute those works, the question is whether current law and practice provide incentives for the greatest quantity and highest quality of original works to be created and consumed over time. Although the answer to that question is not straightforward, the magnitude of illicit consumption of copyrighted works in digital form today—music files shared over the Internet, for example, or movies and software illegally reproduced and distributed on CD-ROM—suggests that potential efficiency gains can be realized by applying advances in digital technology to legal markets for creative works.

The Challenge to Copyright Law

The digitization of creative content poses a more serious challenge to copyright law than did earlier episodes of technological advance. A particularly significant aspect of that challenge is that digital technologies continue to increase the ways in which individuals can consume and enjoy creative works—for example, by "ripping" music files from a CD to store on a computer or portable music device—despite the fact that copyright law does not explicitly permit those uses without the authorization of the copyright owner. At the same time, advances in digital technologies provide copyright owners with growing capacity to either restrict or charge for subsequent uses of their creative works.

Furthermore, copyrighted works in digital form can be flawlessly and inexpensively reproduced and instanta-

neously distributed worldwide. Copyright holders consequently fear that unauthorized copying and redistribution of their works will cause their economic returns to decline.

At the same time, copyright law today applies to a growing number of products. Although the most prominent disputes over digital copyright concern music and movies, copyright law also applies directly to other products, such as computer software. Some manufacturers of software and other products have responded to technological advances by proposing new types of product licenses to protect and extend their commercial interests. Those new licensing practices could, however, potentially run counter to consumers' interests.

Changes to copyright law, moreover, can have ramifications that extend beyond the concerns of producers and consumers of copyrighted material to the well-being of related sectors of the economy. The availability of creative content in digital form contributes to the growth of industries such as computer hardware and peripherals, as well as telecommunications goods and services. Measures to protect copyrighted works—for example, a government mandate that a particular access- or copy-control technology be used to prevent infringement of copyrighted materials in digital form—therefore require careful deliberation. When and how the digital copyright debate is resolved could influence the nature and pace of future technological progress—and hence the growth of the economy.

Economic Analysis and the Copyright Debate

Because of the growing number and diversity of interests with a stake in the digital copyright debate, many observers believe that the Congress may need to legislate a balance in copyright law between private incentives and societal gains. Economic analysis can illuminate the Congress's search for that balance, but it cannot provide unambiguous conclusions about the best weighting of the interests of copyright holders and consumers. The "best" policy implies a distribution of returns based as much on what is fair as on what is efficient. Economics does not provide answers to questions of fairness.

Although economic analysis may not be able to determine the best copyright regime in terms of fairness or other norms of society—it cannot, for example, identify which group(s) should gain and which should lose as a result of any revision in copyright law—it can provide insights into how private incentives and social benefits in markets for creative works might be structured. To make outcomes in markets for copyrighted goods as efficient as possible—that is, to enable society to obtain the most from the creative efforts of its members—economic reasoning can offer several general principles for legislative deliberations about revisions to copyright law in response to technological change:

- Property rights and other elements of a regulatory regime for creative works should be regarded as instruments for allocating creative resources. Hence, existing copyright law should not be viewed as an absolute, inviolable set of rights to which either creators or consumers are entitled.

- Revisions to copyright law should be made without regard to the vested interests of particular business and consumer groups. Instead, they should be assessed with regard to their consequences for efficiency in markets for creative works and other products.

- Property rights are not free. For a system of property rights to be accepted and upheld, the costs of establishing and enforcing that regime must not exceed the eventual benefits from it.

The usefulness of those general principles is not diminished by several additional factors that may constrain the specific contributions that economic analysis eventually makes to the digital copyright debate. The economically efficient level of copyright protection is difficult to determine, for example, because copyright applies to diverse creative works that incorporate varying degrees of creative and artistic expression—from journalism to literature, music, and movies—and to works of a more technical nature, such as software. A single property rights regime, therefore, may not produce efficiency in markets for all of those products.

Furthermore, not all aspects of markets for creative works lend themselves to economic analysis. In particular, while economists may confidently expect that abolishing copyright protection altogether will reduce the level and quality of creative output, they cannot easily predict how a less dramatic change in compensating copyright owners

will affect the number or quality of creative works being produced.[1]

Because the advances in digital technology that currently challenge copyright law are part of a broader trend in the development of information technologies, moreover, actions motivated by other concerns may have an effect on the feasibility and desirability of revisions to copyright law. For example, regulation of the peer-to-peer networks that enable file-sharing among personal computer users—the primary source of copyright infringement worries today—may eventually be justified not to protect intellectual property but rather to address concerns about other activities carried out on those networks, such as the dissemination of computer viruses and software packages that surreptitiously monitor an individual's computer use.

Legislative Options

Three primary options are among those available to the Congress in its deliberations on the current copyright debate: forbearance, compulsory licensing of digital content, and revision of copyright law in favor of either copyright holders or consumers of copyrighted material.

Under the first option—forbearance—the Congress would do nothing and allow market forces to work. Although the digitization of creative content has been the source of considerable conflict between copyright owners and consumers, it may eventually allow for a market-based solution. Recent advances in digital rights management (DRM) technology[2] and the development of business models that take advantage of those advances indicate the potential for a market-based solution.

DRM technology has the potential to enable copyright owners to engage in differential pricing—that is, to charge a price for their creative work that varies on the basis of the particular use(s) made of that work. Consumers would pay according to the particular "rights" that they are able to exercise over a copyrighted work in digital form. For example, DRM technology would prevent consumers who pay for only a few rights (say, to listen to a music file from a compact disc or the Internet) from exercising the additional usage rights (both to listen to and to make copies of the file) that are available to consumers who pay more. DRM technology could likewise be used to control consumers' ability to redistribute the copies that are made.

While DRM technology can increase copyright holders' ability to profit from their works, it can also expand consumers' access to copyrighted material by lowering the minimum price that creators and distributors of copyrighted works must charge to recoup their investment. Under a differential pricing scheme, consumers who have a low valuation of a particular usage—in the preceding example, those who simply want to listen to a music file—pay a lower price. Without differential pricing, those consumers may be priced out of the market for that music service.

Because both copyright owners and consumers benefit overall, differential pricing could increase the efficiency of markets for creative works. From a distributional standpoint, however, not all consumers would be net beneficiaries—particularly those whose valuation of copyrighted materials had previously exceeded the price they were required to pay for them.

Markets for copyrighted material in digital form are only now beginning to emerge. The feasibility and desirability of either DRM technology or the differential pricing that it enables may change. For example, the DRM technologies used to implement differential pricing may turn out to be so vulnerable that they cannot prevent or adequately restrict copyright infringement. Alternatively, if competitive pressures on markets for copyrighted works in digital form are weak, differential pricing may be less effective.

A second option available to the Congress would be to use compulsory licensing to set a price for certain types of creative works. The revenues generated could then be distributed to copyright owners according to the relative use of their works. Setting a fixed price for some types of copyrighted material, however, may be less efficient than using a differential pricing scheme. Under a compulsory licensing arrangement, the price of using copyrighted material

1. While knowledge about decisionmaking in the creative process is limited, decisionmaking in the marketing and distribution of creative works probably rests on more tangible, well-specified factors and, hence, will be more amenable to economic analysis.

2. Digital rights management technology enables owners of copyrighted material in digital form to restrict the uses that are made of it; copyright holders often use DRM to convey rights to a particular use, such as copying, in exchange for payment or another contractual obligation.

would be the same for all consumers and for all works covered by the license. A single, flat-rate fee is unlikely to be "just right" from the standpoint of economic efficiency. Administratively, the price-setting process could also be costly and protracted, leading to delays in the emergence of markets for the corresponding creative works.

From an equity point of view, levying a fee on computers and other equipment used to access certain creative works could also impose a tax on the use of that equipment for activities unrelated to the copyrighted materials in question. For example, taxing purchases of computers or other digital media to compensate recording artists for Internet downloads would force individuals who use computers for other purposes to subsidize the online music consumption of others. It is also unclear whether the usage of each copyrighted work could be tracked accurately enough for many copyright owners—particularly those offering relatively few creative works—to receive applicable royalty payments.

Because technological advances are expanding the options for consuming music, movies, and other copyrighted material, however, compulsory licensing could potentially reduce transaction costs in markets for creative content. The more comprehensive the range of uses of copyrighted material that consumers were offered under a compulsory license for a broad class of creative works, the less time they would have to spend reading exhaustive licensing agreements for different copyrighted products. In addition, the litigation costs incurred to obtain legal determinations of copyright infringement would be lower, as would the costs of enforcement.

A third option available to the Congress would be to revise copyright law in favor of one of the groups whose interests are at stake in the copyright debate: the copyright owners or the users of copyrighted material. Modifying copyright law to favor copyright owners could increase the feasibility of differential pricing and, hence, increase the efficiency in copyright markets. The advantages of differential pricing plans are not so clear, however, when those arrangements are facilitated either by the expansion of copyright owners' rights at the expense of consumers' ability to make "fair use" of copyrighted materials or by the imposition of a government-mandated technological measure to protect against copyright infringement.[3] Restricting fair use in applications where the benefits to society presumably outweigh the revenues denied to the copyright owner—for example, criticism, comment, news reporting, teaching, scholarship, or research—may not produce a great increase in efficiency because some socially beneficial uses of copyrighted material could become prohibitively expensive. Allowing copyright owners to have too much control could exacerbate the compromised efficiency that some differential pricing schemes can create in the presence of weak competitive pressures. The costs to society of greater enforcement of digital property rights, moreover, could potentially outweigh efficiency gains. Such a scenario could arise, for example, if digital copyright enforcement was so strict that it either prevented advances in digital hardware and communications or curtailed usage and development of the Internet.

Revising copyright law in favor of consumers, in contrast, could lead to inefficiency by making differential pricing less feasible. Potential costs to copyright owners from legislative revision of copyright law in favor of consumers could be mitigated by either cost savings or increased revenues from new business models made possible by advances in digital processing and distribution technologies. From an equity standpoint, revising copyright law in favor of consumers of creative material would represent a transfer of control from copyright owners to consumers. However, recent legislation that extended the duration of copyright protection may already have compensated some incumbent copyright holders, at least in part, for losses suffered from diminished control over their creative works.

When considering any legislative option for revising copyright law—whether one of those discussed in this paper or some other option—it is important to be mindful of the possibility that a modification to copyright law could have unintended consequences. Any revisions that are undertaken, therefore, require careful deliberation.

3. "Fair use" is any use of copyrighted material that does not infringe copyright even though it is done without the authorization of the copyright holder and without an explicit exemption from infringement under copyright law.

CHAPTER

1

The Current Copyright Debate

Copyright grants to creators exclusive rights over their original works. After a copyright expires, the creative work enters the public domain and may be used freely. Copyright law is thus characterized by the balance it seeks to achieve between private incentives to engage in creative activity and the social benefits deriving from the widespread use of creative works.

In recent years, that balance has been severely challenged. The digitization of creative content and the rapid pace of technological advances that enable the ready distribution and widespread use of that content are exerting pressure on U.S. copyright law. To support Congressional consideration of potential changes to copyright law, this paper examines the following:

- the distinguishing features of the current copyright debate;
- the economic significance of industries that are likely to be affected, both directly and indirectly, by changes to copyright law;
- the main features of copyright law;
- the continuing evolution of copyright law in response to the increasing availability of creative content in digital form;
- the economic motivation for copyright law and how it contributes to efficiency in markets for creative works; and
- the implications of proposed legislative remedies for economic efficiency and equity.

Technological progress is placing new strains on copyright law today. Indeed, revising current copyright law is more difficult now than in the past for four key reasons. First, the rapid advance of digital technology is creating new conflicts between copyright owners and consumers over the control of legally acquired creative works in digital form. Second, technological progress is posing unprecedented obstacles to copyright enforcement both domestically and internationally. Third, technological advances affect a much wider variety of creative works than in years past, when copyright disputes were more focused. Fourth, advances in digital technology affect many sectors of the economy beyond those directly concerned with copyright; consequently, revisions in copyright law that have an impact on the development or application of that technology are likely to influence innovation and the economy overall.

Disputed Control of Copyrighted Works

Technological progress has exacerbated conflicts over control of copyrighted works. The allocation of rights between copyright owners and consumers over subsequent uses of creative works, always a relatively indeterminate area of copyright law, has become even more unsettled as a result of digital technology. Advances in digital technology have increased the potential gains that either copyright owners or consumers might realize from exercising control over subsequent uses of legally acquired copyrighted works in digital form. As a result, the allocation of those gains is highly contested.

The options available for consuming creative works today are considerable. Digital media products such as MP3 players give individuals new alternatives for making, storing, and listening to copies of music that they have pur-

chased. TiVo and related digital recording devices allow individuals to personalize their television viewing, thereby freeing them from network scheduling of television broadcasts as well as advertisements. Finally, products that allow consumers to remove objectionable material during the replay of a movie are becoming widely available.[1]

While the digitization of creative works has expanded the options for consuming copyrighted material, copyright owners have begun to exploit similar technological developments to control those options. As a result, activities to which consumers of creative works have become accustomed—for example, making copies of digital music files or television broadcasts for personal use—may in the future require the copyright owner's approval and, in particular, payment of an additional fee to obtain that authorization. Any attempt to resolve digital copyright conflicts may be caught between copyright owners' desire to maintain control over their intellectual property and the ethics and expectations of consumers who have become accustomed to making relatively unfettered use of creative works in digital form.

New Obstacles to Copyright Enforcement

Copyright owners confront two primary obstacles to enforcement that appear potentially more important today than during earlier copyright disputes. Increasingly, copyright infringement is an issue both at the individual level and in the international arena.

Infringement by Individuals

The digitization of creative content is lowering the cost of copyright infringement by individual consumers. Greater computer processing power and storage capacity, as well as the proliferation of file-sharing on peer-to-peer networks, have facilitated the unauthorized use of creative works. As a consequence, private individuals, rather than commercial entities, are increasingly the targets of copyright-enforcement efforts.[2]

Infringement at the International Level

The ease of replication and redistribution of creative works in digital form facilitates the instantaneous, global availability of copyright-infringing works. Consequently, the effectiveness of any nation's efforts to protect the rights of its copyright owners depends increasingly on international coordination of enforcement efforts and the harmonization of copyright law across countries.

International copyright issues are particularly urgent for the United States, whose copyright owners earn considerable revenues from licensed distribution of their works abroad. The U.S. movie industry, for example, earns roughly the same amount of box office receipts abroad as it does domestically. The major sources of revenue for the movie industry today, however, are movie sales and rentals in digital videodisc (DVD) format.[3] Because movie DVDs are particularly vulnerable to copyright infringement by illicit manufacturing operations abroad, the U.S. motion picture industry increasingly views international harmonization and enforcement of copyright law as a key factor in its future revenue growth. The sound recording and software industries, whose music and software com-

1. See "Coming Soon: The Smut-Free DVD," *BBC News,* April 8, 2004, available at http://news.bbc.co.uk/1/hi/business/3611969.stm; and Katie Dean, "Much Ado About Smut-Free DVDs," *Wired News,* June 3, 2003 (available at http://www.wired.com/news/digiwood/0,1412,59071,00.html). The proposed Family Movie Act of 2004 (H.R. 4586) would provide an explicit exemption from copyright infringement for consumer editing of copyrighted movies to remove material deemed objectionable.

2. One implication of that development is that individual privacy may one day become less a right than a commodity, as consumers grant permission for the monitoring of their use of copyrighted materials in exchange for legal access to copyrighted materials or even for reduced prices for that access. Eventually, advances in information technology may call into question the nature of both the personal and property rights regimes that are currently in force in the economy. See J. Bradford DeLong and A. Michael Froomkin, "Speculative Microeconomics for Tomorrow's Economy," in Brian Kahin and Hal Varian, eds., *Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property* (Cambridge, Mass.: MIT Press, 2000), pp. 6-44.

3. According to the Motion Picture Association, box office receipts earned internationally were $37.9 billion for the 2000-2003 period, while domestic box office earnings totaled $35.1 billion (see MPA Worldwide Market Research, available via e-mail upon request at http://www.mpaa.org/useconomicreview). During roughly the same time, consumer adoption of the DVD format grew rapidly. Revenues from the sale and rental of movies on DVD now account for over half of total movie industry revenues; some films that were unsuccessful at the box office have generated revenues in the film-rental and -purchase markets. See Sharon Waxman, "Studios Rush to Cash In on DVD Boom," *New York Times,* April 20, 2004; and Kate Bulkley, "DVD Sets Rules for Hollywood," *Financial Times,* January 22, 2004.

pact discs are similarly vulnerable to copyright infringement abroad, share the concerns and views of the U.S. movie industry.

Potential Impact of Copyright Law Revisions on Innovation and Economic Growth

More than in the past, revisions to copyright law today may quickly become enmeshed with developments in industries not directly concerned with copyright. Technological progress continues at a rapid pace in the hardware and telecommunications products that enable the processing and distribution of creative content in digital form. As a result, those industries are making important contributions to productivity in the overall economy. Any government-imposed mandate that a particular technology—an encryption or copy-control program, for example—be used to thwart copyright infringement should weigh the implications of that mandate for future innovation.

The popular new wireless technology known as Wi-Fi provides a good illustration of the vigor of technological advance. The continuing expansion of Wi-Fi networks may enable inexpensive high-speed Internet access for many users of mobile computing devices. The emergence of those networks, however, has been facilitated by technological and commercial experimentation. Both technology standards and the business models through which Internet access is available over Wi-Fi networks continue to evolve. Depending on a mobile user's location, Wi-Fi access may be available free of charge, often paid for by a commercial establishment that the user frequents, or it may be available only to subscribers.

The technological and commercial development of Wi-Fi networks would have been significantly more difficult under a property rights regime that required those networks to authenticate the identity of all users able to access the Internet through that network—a requirement that could enable the tracking of copyright infringers, for example. That is not to argue that technological regulation is always ill-advised or that operators of Wi-Fi networks should not be held accountable for what transpires on them. Rather, it is important to recognize that the development of a new technology is often a precarious process that premature regulation can potentially threaten.

Copyright law affects different sectors of the economy to varying degrees. At first approximation, "core" copyright industries can be distinguished from "copyright-related" industries.[4] Comparisons of the economic and social importance of industries with a stake in the outcome of current copyright conflicts are not straightforward.

The computer hardware and telecommunications industries, for example, provide goods and services that do not, as a rule, benefit directly from copyright protection. Yet those copyright-related industries, which could be affected by a technology mandate aiming to protect copyrighted works in digital form, have greater economic weight (in terms of gross revenues) than do the core music and movie industries currently at the heart of the debate over digital copyright law. Innovation in computer hardware and telecommunications has played a key role in the economy's recent growth and, according to all indications, will continue to do so in the future. Hence, deliberations about modifying digital copyright law to address the concerns of a particular industry must consider the consequences for economically important, related industries. At the same time, it is important to keep in mind the fact that innovation in those copyright-related industries also benefits, through patent protection, from laws that protect intellectual property.

Core Copyright Industries

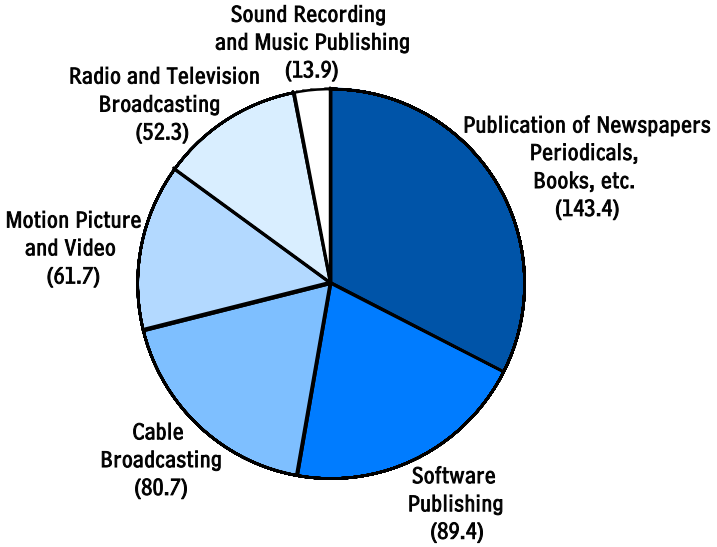
Core copyright industries are those whose revenues depend directly on the production or dissemination of copyrighted works. They have traditionally been in the news and entertainment sector—journalism; literature; sound recordings and movies; and radio, television, and

4. The categorization of "core" and "copyright-related" industries comes from Stephen Siwek, *Copyright Industries in the U.S. Economy: The 2002 Report,* produced for the International Intellectual Property Alliance (IIPA) and available at http://www.iipa.com/copyright_us_economy.html. That report includes in the core copyright sector two industries that this paper excludes from that category: advertising; and information and data processing services. This paper excludes those industries because it is unclear how many of those activities involve copyrighted, rather than trademarked or simply proprietary, materials. On the other hand, this paper recognizes providers of telecommunications goods and services as copyright-related industries because they increasingly enable both the distribution and use of copyrighted material in digital form.

Figure 1-1.

Distribution of Gross Revenues Across Core Copyright Industries, 2002

(Billions of dollars)



Source: U.S. Census Bureau, *2002 Service Annual Survey.*

Note: Two data limitations deserve mention. First, the data do not reflect the value to society of copyrighted works that are pirated, that is, copied and distributed without a license. Second, the data reflect some double-counting in that receipts from licensed broadcasts of music and movies are included in the revenues of those producing industries as well as the radio, television, and cable broadcasting industries. Employer firms reported that in 2002, for example, broadcast rights and music license fees in the radio and television broadcasting industry were $12.8 billion, while program and production costs (which include more than license fees) for the cable broadcasting industry were $24.4 billion.

cable broadcasting. More recently, computer software has become an important core copyright industry.

The gross revenues of the core copyright industries totaled $441.4 billion in 2002 and were distributed as shown in Figure 1-1. Nearly a third of that total ($143.4 billion) came from the newspaper, periodical, and book publishing industries. The music industry, which generated $13.9 billion in gross revenues in 2002, is the smallest segment. (See Box 1-1 for details on the interpretation of data on gross revenues.)

In deliberations over copyright law, it is important to keep in mind the diversity of industries that are directly affected. For example, the production and distribution of works of journalism traditionally differ from those used for music or movies. News organizations typically produce and distribute content on a more frequent or regular basis than do music and motion picture enterprises. Because journalism and news operations provide value in part through the timeliness of their efforts, they may have more options for appropriating revenues from their copyrighted works (for example, newspaper subscriptions and advertising) than do other core copyright industries. As a consequence, the importance of the rigorous application of digital copyright law may differ by industry.

Copyright-Related Industries

Copyright-related industries produce goods used in conjunction with copyrighted materials. Examples include the computer hardware and consumer electronics industries and, increasingly, telecommunications and the Internet.[5]

5. Post-2001 data for those and other copyright-related industries are not available in sufficient detail for purposes of this analysis. The figures do not reflect all of the retail and wholesale trade that takes place over the Internet and therefore could be affected by digital copyright legislation that targets Internet activity. Nor do the figures take into account the many other products, such as automotive components, that incorporate computer chips supported by software and are thus potentially subject to copyright law.

Box 1-1.

Interpreting Gross Revenue Data

Industry comparisons based on gross revenues are subject to three important qualifications. First, gross revenues do not reflect net output (or value creation), so in principle an industry could report higher-than-average gross revenues simply because it made intensive use of costly inputs. However, the U.S. Census Bureau collects input costs for the service sector, where the core copyright industries are classified, only every five years, and the most recent data available are for 1997.[1] Gross revenues, in contrast, are available as recently as 2002.

Second, the amount that a particular industry earns in revenues, either gross or net, does not necessarily indicate its importance to society. For example, the relatively low selling price of a plentiful commodity may belie its much larger contribution to society's well-being. Indeed, creative works such as literature, music, and film might eventually have a larger impact on society than the revenues earned from their production and distribution would suggest.

Finally, industry-specific revenue data do not take into account sectoral interdependencies. Innovations in digital processing and distribution technologies, such as the digital videodisc format, can enhance the production and distribution potential of core copyright industries such as motion pictures. Conversely, the widespread availability of creative content in digital form can increase the demand for goods and services from the copyright-related computing and telecommunications sectors.

Despite those qualifications, however, revenue measures do allow for some inferences about the various economic interests of participants in the copyright debate.

1. Results from the *2002 Economic Census* for the core copyright industries are scheduled for release in the fall of 2004. See http://www.census.gov/econ/census02/guide/index.html.

Computer Hardware and Consumer Electronics. According to the U.S. Census Bureau's 2001 *Annual Survey of Manufactures,* $78.7 billion of computers and peripheral hardware were manufactured in the United States in 2001, along with $8.3 billion of radio, television, and stereo equipment. Those industries have considerable weight in the economy relative to many of the core copyright industries, and their past performance and future prospects indicate rapid rates of technological advance.

As a result of sustained progress in manufacturing techniques, which manifests itself in continuing quality improvement coupled with stable or even declining unit sales prices, real final sales of computer and peripheral hardware displayed double-digit growth rates each year from 1990 to 2003, rising at a compound annual rate of 32.6 percent.[6] Technological advances in semiconductor and computer manufacturing are widely expected to continue well into the future. Because the use of those products is so pervasive, technological progress in those industries constitutes one of the few reliable contributors to the future growth of productivity and output in the overall economy. Realizing the full potential of that progress, however, may well depend upon finding a resolution to current digital copyright disputes.

Take the changing nature of computer demand, for example. Consumer purchases are increasingly moving away from the personal computer (PC) platform to media devices that incorporate hardware and software elements traditionally found in computers. Digital video recorders (DVRs), which permit the recording and replay of television programs, may come with hard drives of 160 gigabytes, while the typical home PC has a 40-gigabyte hard drive. Some hard disk manufacturers report that de-

6. Final sales of computers consist of total domestic production minus net imports. See Bureau of Economic Analysis, "Final Sales of Computers," June 25, 2004, available at http://www.bea.doc.gov/bea/dn/comp-gdp.xls; for a review of literature on productivity and output growth in the United States, see Congressional Budget Office, *The Role of Computer Technology in the Growth of Productivity* (May 2002).

mand from consumer electronics is growing roughly seven times faster than demand from traditional computer-related markets and could eventually account for half of their business. As demand for consumer electronics grows, the requirements of processing and displaying video in digital format are claiming processor and terminal production that would otherwise have been allocated to PCs. Purchasers of consumer electronics and PCs, meanwhile, are enjoying the same technological advances.[7]

Some observers suggest that, partly as a result of the convergence of personal computing and consumer electronics, consumer purchases may claim a greater share of total demand for computing products than business investment, which has in the past been by far the largest source of demand for computer hardware and peripherals.[8] However, owners and distributors of creative works such as literature, music, and movies are unwilling to make copyrighted material widely available in digital format unless they are sure that they can adequately protect that material from piracy.

The outcome of the current copyright debate is one of many factors, including the level of research and development, important to the future growth of information technology industries. Consequently, continued growth in consumer purchases of digital processing equipment—and, by extension, the continued enjoyment of technological progress and productivity gains from the manufacture of that equipment—is linked to the satisfactory resolution of digital copyright disputes.

Telecommunications. Goods and services from the telecommunications industry are frequently used in conjunction with copyrighted materials. Networks that transmit voice calls also carry Internet traffic, which increasingly includes copyrighted material in both licensed and pirated form. Equipment for digital networking in the home, which enables computing and digital entertainment devices to exchange data, is enjoying fast-growing popularity among consumers. Wi-Fi, the underlying technology, is considered a relatively inexpensive way of providing wireless, broadband Internet access. As part of the convergence of computing and consumer electronics, other telecommunications products, such as wireless phones, are acquiring the capacity of traditional computing devices to receive and process voice, video, and audio content.[9]

Business investment in telecommunications equipment totaled $90.6 billion in 2001, which is roughly equal to the value of domestic sales of telecommunications equipment that year. (Many consumer telecommunications products, such as cell phones, are imported.) Like innovation in computer and peripheral hardware, innovation in telecommunications equipment is robust, although not always captured by official economic statistics.[10]

The rapid growth in telecommunications investment in the late 1990s, which contributed significantly to overall economic growth during that period, was spurred by the economic potential seen in the Internet. Accordingly, continued investment in the telecommunications sector depends in part on the demand for high-speed Internet service, which in turn depends upon the availability of high-quality content that can be accessed via those networks. Again, copyright owners claim that they are reluctant to make their creative works available until their concerns about copyright infringement are satisfied.

Gross revenues of telecommunications services totaled $367.2 billion in 2001. Over $78 billion of those revenues came from cellular and other wireless communications services, the value of which more than doubled, in nominal terms, after 1998 and accounted for over half of the increase in the value of telecommunications services between 1998 and 2001.

Continuing growth in cellular communications services hinges on the availability of additional wireless frequency bands, which in turn depends upon the willingness of television broadcasters to shift from the frequency bands in which they currently transmit to smaller frequency bands suitable for digital broadcasts. The speed of that transition, television broadcasters say, is contingent on the availability in digital form of copyrighted creative

7. See John Markoff, "New Intel Chip for Digital TV Could Remake the Market," *New York Times*, December 17, 2003.

8. See Simon London and others, "The Two-Speed Tech Sector," *Financial Times*, December 1, 2003.

9. See Matthew Maier, "Mobile Entertainment Goes Hollywood," *Business2.com*, December 11, 2003; and Alex Salkever, "The Many Shapes of Tomorrow's PC," *Business Week*, November 4, 2003.

10. See Congressional Budget Office, *The Need for Better Price Indices for Communications Investment* (June 2001).

content, such as movies and sports programs, which copyright owners are reluctant to provide without satisfactory safeguards against infringement.

What constitutes copyright infringement and the challenges to copyright law from advances in digital technology are examined in the next chapter.

CHAPTER

2

Copyright Law and Technological Change

Copyright law's effort to balance private incentives to produce and distribute creative works with the benefits to society that arise from widespread access to those works is evident in the constitutional language that authorizes the Congress to establish copyrights and patents. Article 1, section 8, of the U.S. Constitution grants the Congress the "Power . . . to Promote the progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." The rights that copyright owners can claim over creative works are not always well-defined, however, and some areas of copyright law remain unsettled.

The Rights of Copyright Holders

The U.S. Copyright Act states that a copyright exists once an "original work of authorship [is] fixed in any tangible medium of expression . . . from which [it] can be perceived, reproduced or otherwise communicated."[1] However, a copyright applies only to the expression of an idea in a creative work and not to the idea itself (see Box 2-1).[2]

Reflecting the property rights regime embodied in copyright law, the U.S. Supreme Court, in *Dowling v. United States,* recognized a distinction between copyright infringement and theft.[3] The Court pointed out that "the copyright owner . . . holds no ordinary chattel. A copyright, like other intellectual property, comprises a series of carefully defined and carefully delimited interests to which the law affords correspondingly exact protections" by specifying the penalties for infringement. In that particular case, although the infringing parties caused pecuniary damage to the copyright owner, they were not guilty of theft by their unauthorized pressing and sale of vinyl albums of Elvis Presley's recordings because they did not "assume physical control over the copyright nor wholly deprive its owner of its use."

Private incentives to create are supported by the exclusive rights that owners of copyright enjoy. Copyright owners (or their assignees) have the right to carry out or authorize reproduction and distribution of their work; preparation of derivative works; and, for literary, musical, and various visually based works, the public performance or display of their work.[4] Among other advantages for creators—for example, ensuring attribution for, and the integrity of, their original work in authorized uses—those exclusive rights enable copyright owners to realize economic returns from their creative efforts.

Limitations on the Rights of Copyright Holders

In keeping with the constitutional goal of promoting science and the arts, however, several constraints are placed on the rights of copyright owners. First, copyright is granted for only a limited time. On works of individual authorship, copyright extends for the life of the author plus 70 years. On works for hire, copyright runs for 95

1. 17 U.S.C. 102(a). The U.S. copyright statute and related laws are contained in Title 17 of the *United States Code.*

2. Copyright protection is similarly denied to any "procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." 17 U.S.C. 102(b).

3. 473 U.S. 207 (1985).

4. For sound recordings, public performance includes digital audio transmissions. The scope and limitations of the exclusive rights of copyright holders are specified in greater detail in 17 U.S.C. 106 and 17 U.S.C. 107-122.

Box 2-1.

Protection Afforded to Collections of Facts

The courts have held that the terms under which the Constitution grants the power of copyright to the Congress prevent facts or collections of facts from receiving copyright protection. One exception to this ruling is a collection of facts that embodies a sufficient component of originality and creativity in the selection, coordination, or arrangement of those facts. Even then, only those original and creative components—not the facts to which they are attached—can be copyrighted. One such case—*Feist Publications v. Rural Telephone Service, Inc.*—concerned whether phone books could be copyrighted.[1]

Databases that do not contain an original or creative component, therefore, do not qualify for any protection under copyright law. Currently such databases are protected by state-level prohibitions against misappropriation and unfair business practices.[2] Database suppliers argue that the investment needed to generate databases may be compromised in the digital era by unauthorized copying and redistribution. They assert that stronger protection is needed to preempt state laws and thereby ensure uniformity of application. As an alternative to copyright protection, the Database and Collections of Information Misappropriation Act (H.R. 3261) was introduced in the 108th Congress. H.R. 3261 establishes the conditions necessary for invoking misappropriation under the Commerce Clause to enforce property rights over certain types of databases and collections of information.

1. 499 U.S. 340 (1991).

2. However, some observers have voiced concern that the inclusion of a minimal amount of copyrighted material may enable database suppliers to claim copyright protection under 17 U.S.C. 1201(a)(1). See discussion preceding Final Rule on "Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies," 65 Fed. Reg. 64556, 64566 (2000).

years from first publication or 120 years from creation, whichever expires first.[5] After copyright protection has ended, the work enters the public domain and may be used without authorization of the copyright owner.

Copyright law also imposes limitations on the exclusive rights that copyright owners enjoy during the life of a copyright. Some of those limitations apply to the use of a particular product, such as consumers' ability to make an archival copy of a computer program without authorization of the copyright owner.[6] Others are much broader in scope and apply to copyrighted works generally. The two most prominent examples of comprehensive limitations on the exclusive rights of copyright owners are the "first sale" doctrine and exemptions from copyright infringement as determined by "fair use" criteria.

The first sale doctrine stipulates that the owner of a legally obtained copy of a copyrighted work may "sell or otherwise dispose of the possession of that copy" without the authorization of the copyright owner. Thus, this doctrine concerns rights to distribute—not to reproduce—copyrighted material.[7]

Certain unauthorized uses of copyrighted material may also be exempt from copyright infringement if they satisfy fair use criteria. As examples of the types of uses of copyrighted material that typically qualify as fair use, copyright law lists "criticism, comment, news reporting, teaching (including multiple copies for classroom use),

5. 17 U.S.C. 302(a) and (b).

6. 17 U.S.C. 117.

7. 17 U.S.C. 109(a). The first sale doctrine does not apply to the "rental, lease or lending" of a sound recording or computer program for commercial advantage; see 17 U.S.C. 109 (b)(1)(A).

scholarship, or research." Determination of fair use is a legal judgment made on a case-by-case basis.[8]

Unsettled Areas of Copyright Law

Fair use is a relatively indeterminate area of copyright law that can quickly become contentious when a new technology changes how creative works are produced and used. Consumers of copyrighted works, for example, may believe that they can legally make a copy of creative material for personal use without authorization from the copyright owner. However, such activity has not been recognized as fair use. Consumers' belief to the contrary may reflect, in part, a lack of legal precedent.

For the legality of any type of personal copying to be established—that is, for either the Congress to modify copyright law or the courts to be called upon to make a fair use determination—copyright owners or consumers must have sufficient incentive to force the issue legislatively or judicially. Forcing the issue presupposes that copyright owners in particular not only feel sufficient economic injury from the unauthorized copying but also believe that an eventual prohibition against it can be implemented successfully. Both those conditions have not always been present.

Consequently, the legality of making personal copies under the fair use provision of copyright law may be unclear or misunderstood by creators and consumers of copyrighted material. Digital technologies available today allow consumers to enjoy copyrighted works in a variety of new ways and, at the same time, enable copyright owners to exercise greater control over subsequent uses of their works. As a result of technological progress, the unsettled area of fair use has become quite contentious.

The 1984 case of *Sony v. Universal Studios* is a prominent example of how a new technology for consuming creative works prompted a legal clarification of fair use.[9] Universal Studios argued that individuals' use of videocassette recorders (VCRs) to make copies of television broadcasts would lead to a loss of advertising and other revenues and, furthermore, that the production or import of VCRs should be banned on the grounds that they contributed to copyright infringement.

The U.S. Supreme Court held that making television broadcasts for later viewing—a practice known as "time-shifting"—constituted fair use. Surveys of VCR owners also found that videocassette recorders were primarily used for that purpose and that TV viewing overall—and hence the economic health of the broadcasting industry—had not declined. On that basis, the Court held that the sale of VCRs did not constitute contributory infringement of copyright despite the potential use of that equipment for infringing uses, such as making and selling multiple unauthorized videocassette copies to the economic detriment of the copyright owner.

Advances in information technology—particularly the digitization of a growing volume of creative works and the increasingly rapid processing and distribution of digital content—are forcing a reassessment of how well copyright law defines the rights of copyright owners while recognizing the interests of consumers. Judicial and legislative efforts to address copyright issues arising from digital technology are examined below.

Copyright Law Modifications for Digital Media

Legislative and judicial attempts to retool copyright law for digital media (see Box 2-2) have attempted to balance the rights of copyright owners (and hence private incentives to engage in creative activity) with the interests of consumers (and the benefits to society). With the advent of the Internet, however, copyright disputes have intensified. Copyright owners, concerned about losing control over their works in digital form, fear that their economic returns will be reduced. At the same time, users of copyrighted material argue that copyright owners may exploit digitization to expand control over those works, thereby restricting consumers' ability to enjoy them without obtaining prior consent from the copyright owner. As a result, several features of copyright law—in particular, fair use—are increasingly being contested.

8. 17 U.S.C. 107. Criteria that the courts must apply to determine fair use are the nature of the use being made of the copyrighted work (that is, whether for commercial or nonprofit purposes); the potential economic effects of that use on the value of the copyrighted work; the type of copyrighted work in question (original works are less subject to fair use exemptions than factual or descriptive works); and the amount of the creative work being used.

9. 464 U.S. 417 (1984).

Box 2-2.

Recent Legislative and Judicial Responses to Copyright Issues Arising from the Digitization of Creative Works

Legislative Revisions

- **Computer Software Rental Amendments Act of 1990** (Pub. L. No. 101-650). Prohibits the leasing of software products.
- **Audio Home Recording Act of 1992** (Pub. L. No. 102-563). Exempts from copyright infringement the making of copies for personal use of music files in digital form, provided that those copies are made with approved equipment.
- **No Electronic Theft Act of 1997** (Pub. L. No. 105-147). Establishes penalties for unauthorized sharing and redistribution of copyrighted material over the Internet.
- **Digital Millennium Copyright Act of 1998** (Pub. L. No. 105-304). Creates several protection and enforcement mechanisms for copyrighted works in digital form.
- **Technology, Education, and Copyright Harmonization Act of 2002** (Pub. L. No. 107-276). Provides an exemption from infringement for some uses of digital copyrighted materials used in distance learning.
- **Small Webcaster Settlement Act of 2002** (Pub. L. No. 107-321). Establishes guidelines and requirements for the payment, collection, and distribution of fees paid by small commercial entities for the use of copyrighted works in certain Internet transmissions.

Judicial Interpretations

- *Recording Industry Ass'n of America, Inc. v. Diamond Multimedia Systems, Inc.,* 180 F.3d 1072 (9th Cir. 1999). Found that MP3 players are not in violation of the Audio Home Recording Act.
- *Metro-Goldwyn-Mayer Studios, Inc. v. Grokster, Ltd.,* 259 F. Supp. 2d 1029 (C.D. Cal. 2003). Determined that the Grokster file-sharing service has substantial noninfringing uses and, hence, is not liable for contributory infringement.
- *Recording Industry Ass'n of America, Inc. v. Verizon Internet Services, Inc.,* 351 F.3d 1229 (D.C. Cir. 2003). Ruled against the RIAA in its use of the Digital Millennium Copyright Act's subpoena provision to obtain identifying information about individual Internet users suspected of infringing copyright.

Early Legislation

The earliest copyright legislation concerning digital content applied to software and represented an effort to balance the interests of copyright owners and consumers. In 1980, the Congress amended the copyright law to allow, for archival purposes, copies of computer software programs to be made without infringing copyright.[10] In the Computer Software Rental Amendments Act of 1990, the Congress revised copyright law to protect the interests of copyright owners by prohibiting software purchasers from renting their copies of that software.[11]

The first major legislative act devoted exclusively to digital copyright law was the Audio Home Recording Act (AHRA) of 1992.[12] An attempt to balance the rights of copyright owners and consumers is evident in that law. Prompted by the emergence of digital equipment capable

10. 17 U.S.C. 117(a).

11. 17 U.S.C. 109(b)(1)(A).

12. Pub. L. No. 102-563, 106 Stat. 4237 (codified in scattered sections of 17 U.S.C.).

of making flawless reproductions of musical recordings, the AHRA prohibited the manufacture or import of "digital audio recording devices" unless such equipment incorporated a mandated technology (or its equivalent) to prevent serial copying. It also imposed a levy on the sale of that equipment and on the digital recording media, such as digital audiotapes, associated with it, with receipts from that levy going to copyright owners. In exchange, the AHRA explicitly granted consumers an exemption from copyright infringement for their use of either an approved digital audio recording device or analog equipment to make personal copies of musical recordings.

Subsequent digital copyright legislation has focused on emerging Internet-based activities. For example, the No Electronic Theft (NET) Act of 1997 established penalties for certain types of sharing or distribution of copyrighted materials over the Internet regardless of whether that exchange is commercial or personal in nature.[13] Unlike the NET Act, which emphasized enforcement, the Technology, Education, and Copyright Harmonization (TEACH) Act of 2002 expanded the provisions for exemptions from copyright infringement. In particular, TEACH specified the conditions for extending an earlier exemption that applied to certain performances and displays for educational purposes to the use of copyrighted materials in distance learning.[14]

The Digital Millennium Copyright Act

The digital copyright legislation featured most prominently in current disputes is the Digital Millennium Copyright Act (DMCA) of 1998.[15] The DMCA modified the details of copyright law in a variety of ways, including instituting a royalty-setting process for Internet music broadcasts (Webcasts) and specifying exemptions for library and archival copying. It also established two major provisions of current digital copyright law—the anticircumvention prohibitions and the safe-harbor requirements for Internet Service Providers (ISPs)—that are intended to enhance the ability of copyright owners to protect their work from infringing uses and to identify and prosecute those users found to be infringing copyright.

Anticircumvention Clause and Antitrafficking Provisions. The DMCA makes it illegal to circumvent a technology that controls access to copyrighted materials—for example, an encryption program that prevents unauthorized viewing of a movie on the Internet.[16] Like the purchaser of a movie ticket, an Internet consumer would have to obtain the copyright owner's authorization to view the movie by paying for the decryption key needed to view the digitized video file. The DMCA further prohibits manufacturing or trafficking in products "primarily designed or produced for the purpose of circumventing" technologies that are designed either to control access to copyrighted material (as in the previous example of a movie distributed via the Internet) or to prevent the use of such material in an infringing way.[17]

In contrast, the DMCA does permit some circumvention activities or products that do not infringe copyright. For example, copyright law explicitly recognizes copying a computer program for archival purposes as a limitation on the exclusive rights of owners of copyright on computer programs. Hence, if a manufacturer of computer programs applied a copy-control technology to prevent unauthorized copying of its product, a lawful purchaser could legally circumvent that technology to make an archival copy.

The example of software copying illustrates a central principle of copyright law: copyright owners have no legal obligation to facilitate any activity that qualifies either as a limitation on their exclusive rights or as fair use generally. At the same time, if the DMCA's prohibitions are to be effective legal instruments for deterring infringement, copyright owners must take measures to protect their intellectual property from unauthorized access and use.

13. 17 U.S.C. 506. Specifically, the NET Act made subject to criminal prosecution the willful infringement of copyright that is pursued either (i) for "purposes of commercial advantage or private financial gain, or (ii) through the reproduction or distribution, including by electronic means, during any 180-day period, of 1 or more copies or phonorecords of 1or more copyrighted works, which have a total retail value of more that $1,000."

14. 17 U.S.C. 110.

15. Pub. L. No. 105-304, 112 Stat. 2869 (codified in scattered sections of 17 U.S.C.).

16. 17 U.S.C. 1201(a)(1).

17. 17 U.S.C. 1201(a)(2) and (b).

The DMCA details a number of activities that are exempt from the circumvention prohibition.[18] Beyond those specific exemptions, the DMCA requires the Register of Copyrights to conduct a triennial rulemaking to determine whether additional activities should be exempt from the prohibitions.[19]

Safe-Harbor and Notify-and-Takedown Provisions. The safe-harbor provision of the DMCA reflects an early attempt to clarify an ISP's potential liability for contributory copyright infringement. It stipulates that ISPs cannot be held liable for copyright infringement for either the transmission or the storage of copyright-infringing materials on their networks or for supplying links to infringing material, provided that the ISP fulfills certain obligations. To benefit from the safe-harbor provision, for example, the ISP must not have had prior knowledge of the copyright infringement. Further, in the event that copyright-infringing material "resides" on its network, the ISP must comply with the notify-and-takedown terms of the DMCA. The DMCA spells out the measures that an ISP must take to ensure that it will be promptly informed about the presence of copyright-infringing material on its network. Once alerted to such copyright infringement, the ISP must remove (or "take down") from its network the copyright-infringing materials and notify the responsible party of their removal. Finally, upon receiving a subpoena issued by a court clerk, the ISP must disclose to the copyright owner the identity of the parties suspected of copyright infringement on its network.[20]

Technology's Continuing Challenge to Copyright Law

The tension between copyright owners and consumers brought about by the digitization of creative content continues to grow as computing equipment becomes more pervasive and the means of reproducing and distributing copyrighted materials in digital form become more powerful and accessible.

Technological advance is outpacing existing digital copyright legislation in two important dimensions. First, because it enables consumers to enjoy creative works in new ways while expanding the potential scope of copyright owners' control over their work, technological advance increasingly calls into question both the privileges of consumers and the exclusive rights of copyright owners. Second, it raises new obstacles to the efforts of copyright owners to limit and penalize copyright infringement. The Congress attempted to accommodate fair use and other consumer concerns, such as personal privacy on the Internet, in crafting the anticircumvention and notify-and-takedown provisions of the DMCA. However, technological progress is placing growing strains on whatever balance had previously been achieved between the rights of copyright owners and the interests of consumers.

Diminished Control over Copyrighted Works

As computer technology that allows music tracks to be "ripped" from a compact disc (CD) and transferred to a computer or other digital device has become widely available, making copies of digital music files without authorization from the copyright owner has become quite popular. However, copyright law does not explicitly exempt that particular type of copying—or any type of digital copying—from copyright infringement (see Box 2-3).

Indeed, copyright owners, concerned about losing control over subsequent uses of their works, increasingly envision the use of copy-control techniques for distribution of digital content. Copy-control techniques are already applied to CDs and DVDs distributed in Europe and to DVDs distributed in the United States. Copyright owners favor using those techniques for music distributed on CDs in the United States, but consumers accustomed to ripping audio files from the CDs they purchase are con-

18. Exempt activities include access to copyrighted material for libraries, archives, and educational institutions to make an acquisition appraisal; law enforcement actions; reverse engineering to achieve interoperability of software programs; some encryption research; protection of personally identifying information; and security testing.

19. The standard for exemption is whether "persons who are users of a copyrighted work are, or are likely to be in the succeeding 3-year period, adversely affected by the [circumvention] prohibition [of 1201(a)(1)] in their ability to make non-infringing uses under this title of a particular class of copyrighted works." 17 U.S.C. 1201(a)(1)(C).

20. To obtain a subpoena under the DMCA, copyright owners must identify the work(s) on which copyright is being infringed and the material that is claimed to be infringing; supply the location of that material on the ISP network and contact information for the copyright owner; provide statements attesting to the accuracy of the information provided (particularly the status of copyright owner or agent), as well as a "good faith belief" that the copyright in question is being violated; and make a sworn statement that the information obtained will be used only for copyright-protection purposes. 17 U.S.C. 512(h).

Box 2-3.

Is It Legal to Use a Computer to Make a Copy of a Music CD?

Although the courts have not yet determined whether copying a digital music file for personal use is a copyright infringement, they have ruled that a commercial entity's copying of a digital music file to facilitate personal use does constitute copyright infringement.

Copying for Personal Use

The Audio Home Recording Act (AHRA) of 1992 grants an exemption from copyright-infringement suits for the use of an approved digital audio recording device to make personal copies of musical recordings. Many observers invoke the decision in the Recording Industry Association of America's (RIAA's) case against Diamond Multimedia Systems to support their view that using a computer to make personal copies of digital music files is not copyright infringement. In that case, the U.S. Court of Appeals for the Ninth Circuit considered allegations that Diamond Multimedia Systems had violated the AHRA in its manufacture of portable (Diamond Rio) MP3 players, which make copies of digital audio files from a computer hard drive and store them for replay. The Court found that, since the MP3 player in question could only make reproductions of a digital music file through an attached computer and a computer did not qualify as a "digital audio recording device" under the AHRA, the manufacturer was not required by the AHRA to incorporate technology to prevent serial copying or to pay royalties.[1]

However, the Court only addressed whether the MP3 player was covered by the AHRA; it did not explicitly address whether copying from computers for personal use constitutes a general limitation—as an element of fair use—on the exclusive rights of copyright owners. Hence, that case did not establish a general precedent for personal copying but interpreted a specific clause of copyright law in the context of a particular type of digital copying.[2]

Copying for Commercial Use

The courts have, however, found that third-party copying for commercial use—in this case, to facilitate personal use by individual consumers—does not qualify as fair use. In *UMG Recordings v. MP3.COM,* the U.S. District Court for the Southern District of New York found MP3.COM guilty of infringement for making unlicensed digital copies of music files for storage on Internet servers so that the company could provide owners of legally purchased compact discs remote access to music from those CDs.[3]

1. *Recording Industry Ass'n of America, Inc. v. Diamond Multimedia Systems, Inc.,* 180 F.3d 1072 (9th Cir. 1999).
2. However, the ruling did point out that "the Rio's operation is entirely consistent with the [AHRA's] main purpose—the facilitation of personal use," and cited the Senate report accompanying the AHRA, which stated that "[t]he purpose of [the Act] is to ensure the right of consumers to make analog or digital audio recordings of copyrighted music for their private, noncommercial use." See S. Rep. 102-294.
3. 109 F. Supp. 2d 223 (S.D.N.Y. 2000).

testing such measures. In an effort to make it difficult or disadvantageous to thwart copy-control measures, owners of copyright on music and movies advocate maintaining, if not strengthening, the DMCA's prohibition against the circumvention of technologies that either control access to, or prevent infringing uses of, copyrighted works.[21]

Copyright owners' concerns about control of subsequent uses of their work are not limited to the Internet. Advances in networking technologies and electronic media devices allow consumers today to enjoy the prospect of attractive new applications for digital content. Localized networking, for example, may allow movies to be transferred from room to room within a single household, an

21. However, copyright owners have also indicated their willingness to accommodate limited consumer copying. See "Deal Set on Allowing Limited DVD Copying," *CNN.com,* July 14, 2004; and John Borland, "CD Lock Loosened for Freer Copying," *CNET News.com*, January 22, 2004.

Box 2-4.

A Particular Technology's Challenge to Fair Use

In *Sony v. Universal Studios,* the Supreme Court held that time-shifting of television viewing through videotape is fair use and, therefore, devices for recording television broadcasts do not contribute to copyright infringement.[1] Some digital equipment used for time-shifting, such as SonicBlue's ReplayTV units, enables consumers to automatically skip or remove commercials and to send copies of a recorded program over the Internet. That capability poses a serious economic threat to copyright owners of televised content, who initiated litigation against SonicBlue, which has since declared bankruptcy. Even though other digital video recorder (DVR) models do not currently promote the contested features of ReplayTV units, the technology that enabled those and other potentially copyright-infringing functions remains available to DVR manufacturers, and some have recently announced plans to offer those features in the near future.[2] In addition, forthcoming DVR models will offer larger hard drives and remote, virtually real-time programming, further weakening broadcasters' ability to shape their programming schedule to attract particular types of viewers and, hence, to earn advertising revenues.[3]

1. 464 U.S. 417 (1984).

2. See Jonathan Krim, "TiVo's Plans Lead to Fight on Copyrights," *Washington Post*, July 22, 2004.

3. See "A Farewell to Ads," *The Economist,* April 17, 2004, pp. 61-62; and Julia Angwin, Peter Grant, and Nick Wingfield, "In Embracing Digital Recorders, Cable Companies Take Big Risk," *Wall Street Journal,* April 26, 2004.

apartment building, or a college dormitory. Digital video recorders may change how television content is paid for and marketed (see Box 2-4). If copyright owners cannot maintain control over their works in digital form, they may not be able to charge for such uses and, in some scenarios, could face economic worries similar to those generated by the illicit file-swapping of audio files on the Internet.[22]

The first sale clause, which permits distribution but not reproduction of previously sold copyrighted works, provides another example of how digitization has changed the way consumers and copyright owners make use of creative works.[23] Consumers exercise their first sale rights when, for example, they sell, loan, or give away a lawfully acquired printed book or music CD. When copyrighted material is transferred over the Internet, however, an electronic copy is created; consequently, that transfer constitutes infringement unless it is authorized by the copyright owner. The first sale clause, therefore, has limited application for creative works in digital form.[24]

Copyright owners have also tried to avoid the first sale clause altogether by licensing rather than selling physical products containing digital works. Although a legally effective license can avoid creation of rights under the first sale clause, mass market licenses—for example, those on widely distributed software products—are not traditional "offer-and-acceptance" licensing agreements. The courts have not yet ruled on the viability of mass market licensing practices intended to avoid the first sale clause.[25]

The increasing use of the Internet to distribute copyrighted materials will probably lead to new licensing prac-

22. See "A Real Hollywood Horror Story," *BusinessWeek Online*, March 23, 2003 (available at http://www.businessweek.com/magazine/content/03_10/b3823088_mz063.htm?c=bwinsidermar1&n=link2&t=email).

23. 17 U.S.C. 109(a).

24. See Joseph P. Liu, "Owning Digital Copies: Copyright Law and the Incidents of Copy Ownership," *William and Mary Law Review*, vol. 42 (2001), pp. 1251-1252.

25. A notable example is a software manufacturer's attempts to prevent the unbundling of components of a software suite at resale. In that case, the U.S. District Court for the Central District of California held that the restrictive licensing practices of the defendant software maker were unenforceable, but it did so on a very narrow basis. See *Softman Products Co., LLC v. Adobe Systems, Inc.,* 171 F. Supp. 2d 1075 (C.D. Cal. 2001).

tices as copyright owners respond to consumers' frustration with legal constraints on their ability to transfer copyrighted material in digital form and as creators experiment with new product-licensing practices. As a consequence, additional legislative or judicial scrutiny may be required. For example, efforts to standardize licenses for software acquired across states through the Internet, embodied in the Uniform Computer Technology Information Act in 1999, have proven contentious, and only a few states have ratified it so far.

A related challenge to copyright law stems from the growing incorporation of computer chips, and the software that regulates them, into a variety of products. To the extent that such software is protected by copyright, an original equipment manufacturer may try to use the access-circumvention prohibition of the DMCA to prevent rivals from making their components interoperable with those of the original product. Intentionally or not, such efforts could stifle the innovation that emerges from broad experimentation by users.[26]

For example, in *Lexmark International v. Static Control Components,* currently before the U.S. District Court, Eastern District of Kentucky, Lexmark charged that Static Control Components violated the DMCA by circumventing the authentication feature that controls access to the copyrighted software that regulates interaction between the printer and the print cartridge.[27] That circumvention enabled Static Control Components to offer replacement cartridges that competed with those of Lexmark, the original equipment manufacturer. Some observers have suggested that such an application of the DMCA is contrary to the law's intention and threatens competition in numerous component markets, such as parts for automobiles, as well as technological innovation that relies on the ability to reverse engineer new products.[28]

New Obstacles to Copyright Enforcement

Perhaps the most well-known illustration of information technology's current challenge to copyright enforcement is the unauthorized sharing of digital music files on the Internet through peer-to-peer (P2P) networks. Since the late 1990s, software has been readily available from retailers and over the Internet to rip audio files from CDs and then store them, typically in compressed digital versions (MP3 format) on personal computers. During that period, both the computer processing power available for audio file conversion and the amount of storage space available on personal computers have expanded significantly. Those years also witnessed a sizable increase in individual access to broadband Internet connections and the emergence of P2P networks, which allow individual computer users to make files on their hard drive available to others through the Internet. As a result, unauthorized copying, storing, and sharing of digital files has become inexpensive and easy.

P2P file-sharing has grown dramatically in recent years (see Box 2-5). According to one estimate, an average of 8 million users were online and sharing 10 million gigabytes of data on those networks at any given time during June 2004.[29]

In contrast, the value of music sales in the United States fell approximately 4 percent in 2001, 8 percent in 2002, and 6 percent in 2003 (see Figure 2-1). The persistence and magnitude of those revenue declines are exceptional in recent history and are regularly attributed to unauthorized file-sharing across P2P systems.

However, some people argue that the impact of P2P sharing on music sales is overstated. They emphasize that the growth in music sales during the mid-1980s and early 1990s was unsustainable for several reasons: the introduction of the CD format; high CD prices; a reduction in the number of music titles available for purchase; and competition from other entertainment, such as DVDs

26. See Hal Varian, "New Chips Can Keep a Tight Rein on Consumers," *New York Times,* July 4, 2002.

27. 253 F. Supp. 2d 943 (E.D. Ky. 2003).

28. In the latest triennial rulemaking required by the DMCA, Static Control Components requested an anticircumvention exemption. On October 28, 2003, the Register of Copyrights denied Static Control's request, pointing out that the DMCA's statutory exemption for reverse engineering provided sufficient guidance for the courts to make a determination about copyright infringement. 17 U.S.C. 1201(f). Regardless of the legal outcome, the case of *Lexmark International v. Static Control Components* illustrates the potential for unintended consequences from modifying copyright law in the digital era.

29. See John Borland, "Survey: Movie-Swapping Up; Kazaa Down," *CNET News.com,* July 13, 2004 (available at http://news.com.com/2100-1025_3-5267992.html).

Box 2-5.

Peer-to-Peer File-Sharing Networks

Peer-to-peer (P2P) networks allow individual computers to share files on the Internet. The original P2P networks were administered by a central server, which managed access to the files available on the network. Users who sent a search request to the central server for a particular file, such as a music track, would receive a list of available files and their location on the P2P network. The user would then download the file directly from one of the individual computers connected to the network.

Current P2P networks, in contrast, operate in a decentralized fashion—that is, without a central server. The software that connects each computer on the network conducts the search-and-retrieval process. When a user searches for a file, the request is transmitted sequentially to individual computers connected to the P2P network. The responses from each computer are then sent to the requester, who receives a list of files and locations available for downloading.[1]

Because P2P networks enable unauthorized file-sharing, they are currently a significant source of copyright-infringement concerns. Eventually, however, P2P technology is expected to make the Internet less vulnerable to disruption and to allow greater efficiency in transferring data and information online—for example, by facilitating collaboration among a company's geographically dispersed workers or by reducing the cost of voice calling.[2]

1. See Appendix II, "Description of File-Sharing and Peer-to-Peer Networks," in General Accounting Office, *File-Sharing: Selected Universities Report Taking Action to Reduce Copyright Infringement,* GAO-04-503 (May 2004), pp. 24-29.

2. See Simson Garfinkel, "Pushing Peer-to-Peer," *Technology Review,* October 3, 2003.

and electronic games. Indeed, even music industry executives have recently begun to acknowledge that file-sharing may not be the entire cause of declining sales.[30]

The popularity of music file-swapping shows the ease with which copyrighted material can be obtained and redistributed on the Internet today. The rate of data transfer that the Internet allows currently makes the distribution of movie-length video files much more time-consuming than that of audio files; hence, illicit sharing is less common for video content than for audio files.

Nevertheless, movie and software companies (especially computer-game makers) are increasingly worried that technological advances in digital compression, transmission, and file-sharing will soon lead to piracy of their copyrighted content.[31] According to the Motion Picture Association of America, the number of Web sites offering pirated movies increased from 143,000 in 2002 to approximately 200,000 by the end of 2003. In March 2004, video files accounted for 31.9 percent of bytes transmitted over P2P networks, up from 16.4 percent in March 2003.[32]

Although the DMCA explicitly provided copyright owners with the means to enforce their intellectual property rights on the Internet, the law was promulgated in an era of server-based rather than P2P network distribution. As a result, copyright owners' ability to prosecute unauthorized reproduction and distribution of copyrighted materials on the Internet by suing the enabling file-sharing services has come into question. Such measures were successful against the Napster service, which used its own

30. See Neil Strauss, "Executives Can See Problems Beyond File-Sharing," *New York Times,* September 9, 2003. For links to recent academic research on Internet file-sharing, see http://www.utdallas.edu/~liebowit/intprop/main.htm.

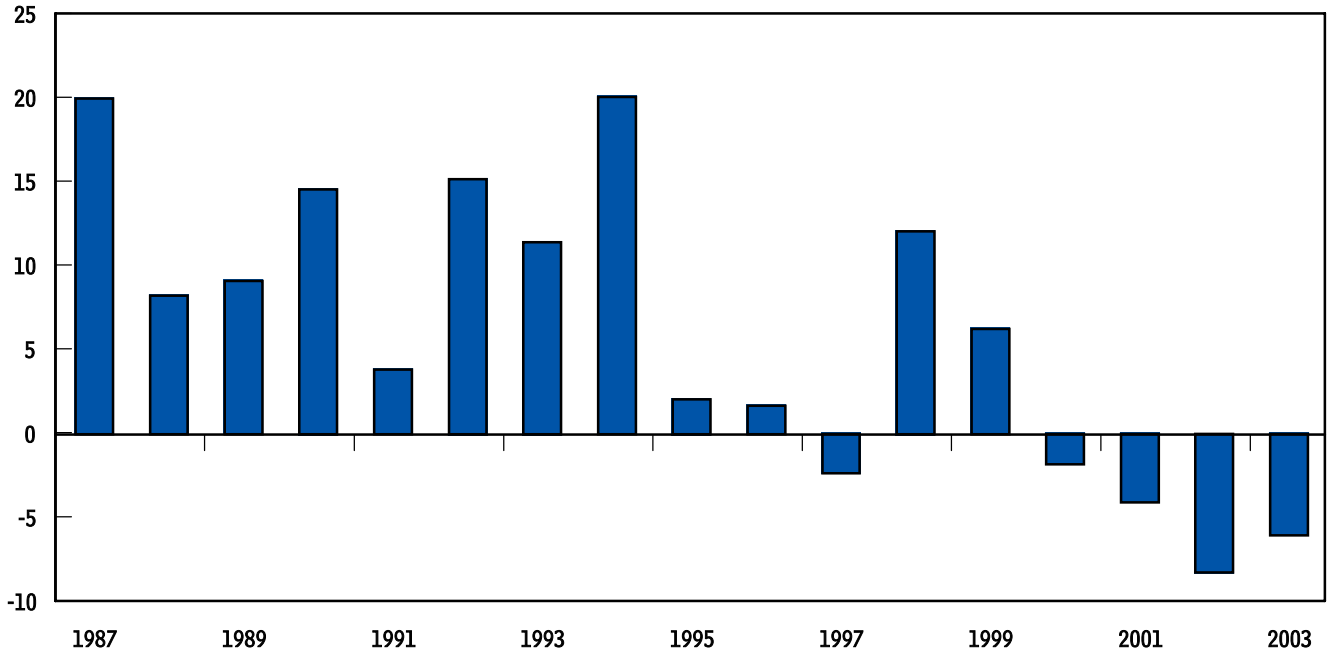
31. See, for example, "Hollywood's Piracy Epic," *FT.com,* September 12, 2003.

32. See Lorenza Muñoz and Jon Healy, "Pirated Movies Flourish Despite Security Measures," *Los Angeles Times,* December 4, 2003; and "Streaming Media," *Wired,* June 2004 (available at http://wired.com/wired/archive/12.06/free).

Figure 2-1.

Annual Change in Value of Recording Industry Shipments, 1987 to 2003

(Percentage change from previous year)



Source: Recording Industry Association of America.

computer servers to direct file requests to available content on individual computers; however, newer P2P services do not rely on centralized servers but rather on enabling software that is not administered by a single entity. Further, in the recent case of *MGM Studios v. Grokster,* the U.S. District Court for the Central District of California held that because the Grokster file-sharing service had substantial noninfringing uses, it was not liable for contributory copyright infringement.[33] That ruling is currently being appealed.

As a result of the proliferation of P2P file-sharing, individuals rather than larger, Web-hosted entities have become the target of the subpoena provisions of the DMCA. Until recently, the courts have upheld the ability of copyright owners to obtain from ISPs identifying information about individuals suspected of infringing copyright. Beginning in September 2003, the Recording Industry Association of America (RIAA) used that information to file 382 lawsuits. However, that subpoena power was checked—at least temporarily—by a December 19, 2003, decision by the U.S. Court of Appeals for the District of Columbia Circuit.[34] The Court ruled in favor of Verizon Internet Services, Inc., which was contesting the application of the DMCA's subpoena provisions to cases of copyright infringement in which the infringing material resided not on an ISP's server but, rather, on an individual's PC.

In response, the RIAA initiated "John Doe" lawsuits, which target groups of suspected copyright infringers. As of June 22, 2004, the RIAA had filed 3,047 such lawsuits. Only after considering the merits of each lawsuit will the courts issue a collective subpoena for identifying information on individuals in the group. This contrasts sharply with the options for legal action thus far afforded by the DMCA's subpoena provisions, under which identifying information was obtained first and individual lawsuits filed thereafter.

33. 259 F. Supp. 2d 1029 (C.D. Cal. 2003).

34. *Recording Industry Ass'n of America, Inc. v. Verizon Internet Services, Inc.,* 351 F.3d 1229 (D.C. Cir. 2003). That decision is currently being appealed, with both the U.S. Department of Justice and the Copyright Office filing legal briefs in support of the RIAA.

Copyright owners may attempt to obtain subpoenas under the DMCA from other courts, or they may petition the Congress to revise copyright law to allow explicitly for subpoenas in the context of P2P networks. Given concerns for individual privacy, the subpoena provisions of the DMCA are likely to remain controversial.

Finally, enforcement abroad is becoming increasingly important for U.S. copyright owners. Manufacturing advances are enabling even small-scale piracy operations to produce large numbers of unauthorized CDs and DVDs. Such illicit activity is particularly common in Asia, where it is often connected to organized crime.

Piracy abroad has become increasingly harmful to copyright owners of movies as well as music. For example, the Motion Picture Association of America claims that global piracy of DVDs cost it $3.5 billion in revenues during 2003. Another concern of U.S. copyright owners is increasing Internet penetration in Europe and Asia, where copyright laws are in some ways less stringent than those in the United States.[35] As a consequence of those developments, the protection of intellectual property has become prominent in both multilateral and bilateral trade negotiations between the United States and other nations, most notably China and other developing countries.

To better understand the economic rationale for copyright law and the economic interests of copyright owners and users of copyrighted materials, the next chapter addresses the role of property rights in the economy. In particular, it examines why creative works, such as those covered by copyright law, call for a different system of property rights than those applied to most other types of property. It also considers, from an economic perspective, how markets for copyrighted works in digital form might evolve to provide broad benefits to society.

35. See Geoffrey A. Fowler, "Hollywood's Burning Issue Is Piracy of DVDs and CDs," *Wall Street Journal,* September 18, 2003; and Mark Landler, "U.S. Is Only the Tip of Pirated Music Iceberg," *New York Times,* September 26, 2003.

CHAPTER

3

Copyright and the Economics of Intellectual Property Regulation

Copyright is a subset of the larger category of property rights that govern both tangible and intangible property. Intangible property—also known as intellectual property—includes creative works, which are protected by copyright and trademark law, as well as technical and scientific works, which are protected by patent law. Well-defined and -administered property rights are fundamental to the functioning of market economies. The ownership of traded goods and services—and the recourse that the parties have in a dispute arising from any exchange—must be established for arms-length transactions among individuals to be feasible. In addition, a variety of decisions—on whether to save and invest, for example, or to undertake education, engage in skill building, or pursue research and development—depend on the likelihood of being able to claim the wealth that those activities may eventually generate.

Government policy that regulates and enforces property rights, as copyright law does for creative works embodied in a tangible means of expression, plays a crucial role in economic well-being. However, the unique features of intellectual property argue for a different type of government regulation than that applied to most other forms of tangible property.

The Regulation of Intellectual Property

One way to assess the performance of a particular set of property rights is to examine its capacity to promote economic efficiency. The markets for most goods and services can achieve an efficient allocation of resources under a standard set of property rights and regulations. Some goods and services, however, have characteristics that require additional regulations so that a private market can generate an efficient outcome. Creative work is one of those products and, as a consequence, it is subject to a different property rights and regulatory regime than are most tangible goods.

A general condition of efficiency is that the marginal cost of producing any good or service should equal society's marginal valuation of it. If it does not, society could obtain valuable output by reallocating some of the resources at its disposal. Efficiency requires that the production of goods and services whose marginal value to consumers is greater than the additional resource cost to produce them should be increased at the expense of goods and services that impose a cost on society that is greater than their valuation by consumers.

The basic property rights that lead to efficient outcomes in most markets for goods and services would not produce an efficient outcome in the market for creative works. Two distinctive features of creative works account for this result. First, once a work is created, the cost of its reproduction and distribution will typically not reflect the expenses incurred during its creation. Prices that were set equal to the low marginal cost of reproducing and distributing creative works would—once those works had been created—efficiently supply them to consumers. The revenues generated by those prices, however, would not compensate creators economically for their efforts to produce those works in the first place. As a result, a less-than-efficient amount or quality of creative works would be produced.

As the costs of reproduction and distribution of creative works in digital form continue to fall, copyrighted material can be made available to consumers at a very low marginal cost. Copyrighted works are becoming effectively "nonrivalrous" in consumption—that is, when a person acquires a creative work in digital form, that individual does not diminish its availability to other consumers.

Once the costs of creating a software program or computer game have been incurred, for example, those files can be transferred to a CD-ROM or distributed over the Internet very inexpensively and at a cost that continues to fall with ongoing advances in digital reproduction and distribution technologies. Pricing that product at the low marginal cost of supplying it would not allow the software manufacturer to recoup the entire expense of production and distribution and would lead to an inadequate supply of new software products. By granting copyright owners an exclusive right for a limited period of time, copyright law enables software manufacturers and other producers of intellectual property, such as publishers and the recording and movie industries, to charge prices above marginal cost to recoup their total costs. Copyright law thereby enhances the supply of creative products that would be brought to market without copyright protection.

The second distinguishing characteristic of creative work is that it is often quite difficult for society to prevent a person from consuming the work once it is created. Some types of intellectual property are particularly vulnerable to theft or misuse. Once a copyrighted photograph or work of graphic art is published, for example, a reproduction can be readily made and redistributed without the authorization of the copyright owner. Licensing terms for the use of some types of intellectual property are often more strict than those for tangible property. For works of visual art, for instance, copyright owners have exclusive rights not just to reproduce, distribute, and make derivative works, but also to receive attribution whenever a particular image is published.

In myriad ways, creative works today supply the intellectual foundation for future creativity. In cases where the benefits of the knowledge underlying creative works and the works themselves are cumulative, it may not be feasible for society to prevent the consumption of creative works. For example, readers of fiction by a particular writer may benefit from that author's knowledge of earlier works of literature, even though the readers themselves have not purchased those books. Because of those "spillover effects," copyright owners may not be able to appropriate all of the gains to society from the underlying creative efforts.

The socially beneficial element of that circumstance argues for eventually making intellectual property widely available. The compromise struck in property rights governing creative works, as noted, is to place a time limit on the exclusive rights of the creator or owner of intellectual property. Once the work enters the public domain, its price should reflect the low marginal cost of production and distribution. Charles Dickens's *A Tale of Two Cities,* for example, can be bought at a price far lower than that of even the last entry on the current bestsellers list.

Efficiency in the distribution of a copyrighted work occurs when the marginal purchaser pays a price equivalent to the incremental cost of providing that product. Current copyright law does not produce such prices, however; the need to ensure an adequate return for creators leads to prices for creative works that, over the life of the copyright, exceed the costs of reproduction and distribution. As a result, some consumers who value the product at less than the market price—yet would be willing to pay a higher price than the marginal cost of supplying it—may be priced out of the market until the work enters the public domain. Hence, copyright law currently accepts some *static* inefficiency (that is, copyrighted works may not be distributed as widely as is economically feasible) in the interest of beneficial *dynamic* effects (that is, in the interest of getting those works created in the first place).

From the point of view of economic efficiency, the benefits and costs to society of specific copyright laws have probably always been less than perfect. Today, however, digital technologies may offer the prospect of improving the benefits and costs of the copyright regime by allowing producers to adopt refined pricing practices that permit more consumers to purchase creative products at prices that approximate their willingness to pay while, at the same time, enabling copyright owners to realize higher revenues for their work and thereby obtain greater resources for future creative efforts.

More Efficient Copyright Markets: Price Discrimination and Technology

Current copyright markets are unlikely to produce an economically efficient outcome. Instead, the prices for creative products, which are set in part by current copyright laws and policies, are likely to produce an inadequate supply of those products or to overcharge for them. Yet economic analysis of markets with attributes similar to those of intellectual property—where pricing at marginal cost calls forth too little supply—yields a potential solution that produces an efficient outcome called "perfect price discrimination." Under perfect price discrimination, each consumer is charged a price that corresponds to what the individual is willing to pay for a particular use of the intellectual property in question.

Using that type of pricing, the problem of covering the cost of creative products can be solved by charging a higher price to those consumers with relatively strong demand for their products. Similarly, the objective of wide dissemination can be achieved by charging a reduced price to those consumers with a lower demand for the product. Price discrimination can occur only when consumers in a market with higher prices are unable to purchase the identical product in markets where lower prices are charged. Yet the basic economic idea behind price discrimination holds if variants of the original product are offered. Advances in information technologies increase the potential for offering numerous variants of products with the same underlying creative content and thereby enhance the feasibility of such pricing arrangements.

Although markets for creative content in digital format may offer the prospect of an improved balance between the returns necessary to encourage new creative effort and the wide availability of creative works, those markets are only now emerging and their economic efficiency is not foreordained. Markets governed by rules consistent with digital rights management need not, in practice, produce a more efficient outcome.

Price Discrimination and Digital Rights Management Technology

Developments in DRM technology suggest that perfect price discrimination—or simpler variants known generally as differential pricing—may soon become feasible for copyrighted works in digital format. In particular, DRM would enable copyright owners to charge a price for their creative works that varied according to the particular use(s) made of them. Literally, consumers would pay a price that depended on the amount of "rights" that they were able to exercise over a copyrighted work in digital form.

Take, for example, two individuals who purchase a music CD—one simply to listen to it on a standard CD player and the other to listen but also to make copies of the CD for transfer to a digital device.[1] Although both consumers would pay the same price for the CD, one of them would most likely enjoy greater benefits. Even though the cost, at the margin, of reproducing the musical recording physically on a CD is minimal, consumers who envision more limited use of the CD may be priced out of that market. On the supply side, some creative music projects that would be distributed on a CD may not be undertaken because setting a common price for all units would not yield adequate revenues. In that scenario, differential pricing would be more likely to generate sufficient revenues. The efficient outcome is one of perfect price discrimination in which each consumer pays exactly his or her own valuation of each type of use.[2]

Potential Qualifications

Notwithstanding its strengths when viewed in the context of economic theory, several potentially important qualifications to the advantages of perfect price discrimination and DRM technologies should be noted.

Incentives to Create. Although perfect price discrimination may be efficient in a static sense—that is, in distributing a creative work among as many consumers as is economically feasible—its dynamic effects on creativity are less clear. By enabling copyright owners to engage in differential pricing and thereby realize higher revenues for their work, DRM should provide greater resources for future creative efforts. However, those greater resources may not always lead to an increase in the number or quality of creative works that improve social welfare.

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1. For another example relevant to copyrighted works in digital form, see Hal R. Varian, "Buying, Sharing, and Renting Information Goods," August 5, 2000, available at http://www.sims.berkeley.edu/~hal/Papers/sharing.pdf.

2. See the discussion of the Lindahl price mechanism in Agnar Sandmo, "Public Goods," in John Eatwell, Murray Milgate, and Peter Newman, eds., *New Palgrave Dictionary of Economics* (London and Basingstoke: Macmillan Press, 1987), pp. 1061-1066.

Some creative works, for example, are too new or demanding to be commercially successful. Those works can continue to be funded by public resources or private endowments, and the creative output they represent will not be altered by the introduction of market-based pricing schemes.

In addition, relatively little is known about what motivates people to engage in creative activity and how those influences differ from the perhaps more pecuniary motivations of those who acquire the copyright to creative works for purposes of reproduction and distribution. In other words, economic theory has not yet specified a "creative production function." That is not to argue that copyright protection is not important to the financial ability of individual creators to devote themselves to their craft. Economists may with some confidence predict that abolishing copyright protection altogether would reduce the level and quality of creative output.[3] However, they cannot easily predict exactly how a less dramatic change in compensating copyright owners—through differential pricing schemes, for example—would affect the number or quality of creative works being produced and distributed.

Some commentators emphasize the distinction between the creation of a work and related activities such as its distribution. Both creators and distributors may be owners of copyrighted works, but the two groups differ in their objectives and hence the importance that they place on various copyright protections. Creators, for example, may be more likely than distributors to be motivated by nonpecuniary factors—creative drive, a desire for attribution and recognition, and the need to ensure the integrity of their work, for example—while distributors may be more likely to respond to monetary incentives. As a result, the existence of copyright—in particular, exclusive rights over subsequent use—may simply motivate distributors of copyrighted works to engage in marketing and promotional activity, which do little to ensure the future supply of creative works.[4]

Even if creators were to respond strongly to economic incentives, perfect price discrimination in digital copyright markets—combined with the exclusive rights that copyright law already provides to copyright owners—will not necessarily produce greater beneficial dynamic effects. It is possible, for example, that too many creative projects will be undertaken. Allowing copyright owners to exploit differential pricing for the duration of the copyright protection that U.S. law grants them may generate returns that exceed those from, say, education or other socially beneficial activities. The supply of aspiring musicians, moviemakers, and writers could increase at the expense of the supply of doctors or scientists.[5]

Deviations from Perfect Price Discrimination. Where perfect price discrimination is not feasible, other types of differential pricing arrangements are likely to emerge. One particular pricing strategy is likely to arise in markets for creative content in digital format. That strategy applies prices that vary not across individuals but rather across groups of consumers on the basis of their shared type of use (listening to versus making copies of music tracks, for example, or renting versus buying a book or movie). The criterion for a more efficient outcome from such differential pricing arrangements is relatively straightforward: the loss to customers who find themselves priced out of the market for a relatively feature-rich product variant—a product identical to one they were able to purchase when it was available as a uniform commodity—must be offset by the gains to customers who are newly able to consume a lower-priced variant of the product.[6]

Such differential pricing is already widely applied to some digital copyrighted works. Because of the low marginal

3. For a discussion of how widespread copyright infringement may reduce creative activity in an economy, see Ien Cheng, "Pirates Drain the Life from the HK Film Industry," *Financial Times,* April 13, 2004; and Graham Gori, "In Mexico, Pirated Music Outsells the Legal Kind," *New York Times,* April 1, 2002. For a historical example, see the discussion of the removal of copyright protection in post-revolutionary France in part 3 of Charles C. Mann's "Who Will Own Your Next Good Idea?" *Atlantic Monthly,* September 1998, pp. 57-82.

4. See Mark S. Nadel, "How Current Copyright Law Discourages Creative Output: The Overlooked Impact of Marketing," *Berkeley Technology Law Journal,* vol. 19 (Spring 2004), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=489762.

5. See Glynn S. Lunney, Jr., "Re-examining Copyright's Incentive-Access Paradigm," *Vanderbilt Law Review,* vol. 49 (1996), pp. 483-656.

6. For a more complete, theoretical discussion of differential pricing regimes, see Jean Tirole, *The Theory of Industrial Organization* (Cambridge, Mass., and London: MIT Press, 1988). For an assessment of the efficiency and welfare impacts of differential pricing on a variety of markets for creative works, see Michael J. Meurer, "Copyright Law and Price Discrimination," *Cardozo Law Review,* vol. 23 (November 2001).

cost of distribution, moreover, that differential pricing can lead to greater consumption. The per-user cost of site licenses for software products, for example, often declines with the number of users at the site. Consequently, the client has an incentive to purchase a license for users who would make only marginal use of the software. Since the cost to produce and distribute the software is independent of the number of users, software companies can reduce the per-user price to sell as comprehensive a license as possible to an organization and still profit. Another type of differential pricing of software products takes the form of price rebates for customers who purchase particular bundles of software packages. Again, the price rebate provides customers with an incentive to purchase additional software packages for which they might not be willing to pay the stand-alone price.

Concerns About Competition. To prevent differential pricing schemes from forcing existing consumers to purchase an inferior variant of a product they had purchased previously, diverse versions of a given copyrighted work in digital form must be provided. The availability of those variants, though, hinges on sufficient competitive pressures in markets for creative works. Almost by definition, however, creative products are unique: something that is distinctive to each either appeals to or displeases consumers. As a result, creative works of a given type may not be as interchangeable as other commodities grouped similarly, and competitive pressures may be weaker in markets for copyrighted works than elsewhere.

For example, some digital videodiscs have embedded technology that prevents the viewer from skipping the promotional materials that precede the film. Economic efficiency would suggest that DVDs with and without promotional material should sell at different prices, reflecting both the copyright owner's value from advertising and viewers' willingness to pay to avoid the delay in getting to the featured programming. Competition in the market for movies in DVD format should produce that outcome. However, to the extent that movies are poor substitutes for one another, such competitive pressures may be weak. For example, distributors of popular movies may simply opt not to offer DVDs without promotional material (because doing so would implicitly reveal the value of that advertising to them), leading to a less efficient outcome than the differential pricing model would predict.

One software maker's recent, aborted attempt to force consumers to register their purchase of its popular tax software—an effort to circumscribe the number and type of installations possible from a given purchase—provides an illustration of a competitive outcome. Consumers resisted such restrictions on their potential use of purchased copyrighted material, perhaps because of the implicit price increase that the new installation constraint represented. Even though the previous price presumably included some premium to recoup losses from the unauthorized copying that the new registration process was intended to prevent, the new sales price of that software was not substantially lower. Confronted with consumer outrage and competing products, the company rescinded the registration policy.[7]

Equity. The introduction of differential pricing schemes may also provoke consumers' concerns about equity. Many may view the enhanced ability of copyright owners to profit from their works as unfair. That could be especially true for consumers who previously enjoyed creative material at a lower price than they would have been willing to pay but now, under a differential pricing scheme, must pay the higher price that corresponds to their greater valuation. The excess benefit in consumption over purchase price that those consumers enjoyed is transferred to copyright owners.[8] At the same time, however, the differential pricing outcome does enable other consumers, previously priced out of that market, to purchase the copyrighted material. Indeed, charging customers with higher valuations a commensurate price is important both to recoup the costs of creation and to provide access to that creative content to consumers with lower valuations. Differential pricing benefits consumers with lower valuations insofar as they are no longer priced out of the market for that creative work, and they can enjoy a wider range of options when allocating their available resources.

7. See Eric Hellweg, "Intuit's Lesson for Microsoft and Hollywood," *Business 2.0,* May 19, 2003 (available to subscribers at http://www.business2.com/articles/web/0,,49577,00.html).

8. In the case where differential pricing is applied to groups of consumers by type of use of copyrighted material, rather than to individual consumers as under perfect price discrimination, the monetary transfer from consumers to copyright holders is mitigated. Each group of consumers engaging in the same use of copyrighted material pays the price acceptable to the marginal consumer among them, even when other members of that group value that particular use more highly. See Hal Varian, "Differential Pricing and Efficiency," *First Monday,* August 5, 1996 (available at http://www.firstmonday.dk/issues/issue2/different/).

The larger potential revenues that copyright owners may realize from their creative efforts through differential pricing, moreover, could provide financing for additional creative efforts that benefit all consumers.

Technological Feasibility, Implementation, and Transaction Costs. Because markets for creative works in digital format are only beginning to emerge, it is unclear how those markets will function and whether they will impose costs on society that exceed the expected efficiency gains.

For example, it might be very costly to develop and implement DRM technologies powerful enough to enable differential pricing—that is, technologies that would either prevent copyright infringement entirely or suppress it to a sufficiently low level that copyright owners still find it in their interest to make their creative works available in digital form. Alternatively, antipiracy protections, such as those that currently prevent music CDs from working in some car stereos and computers, may impose unexpected burdens on consumers.[9]

Another consideration is the magnitude of transaction costs. If the consumption of creative works is priced according to each type of use, then suppliers and consumers may have to make different, perhaps more complex, calculations than they did previously. For example, rather than buying a collection of songs by a single artist on CD, a consumer might choose from individual tracks by that artist and others. How readily might the terms of use of a copyrighted work be renegotiated by consumers after their initial purchase if they subsequently chose to use the copyrighted material in a different way than initially envisioned? What types of payment systems will be required for pay-per-use business models to work, and will they introduce large transaction costs? Will different types of DRM technologies be interoperable and standardized, so that a consumer can use copyrighted materials from diverse sources and with a variety of software and digital processing equipment?[10] More generally, will consumers be required to read and comply with the lengthy and complex licenses for using copyrighted digital products that they now so often ignore?

Other concerns about large transaction costs are broader. Will the measures that copyright owners employ to discourage illicit use of their works on the Internet—for example, "spoofing" copyrighted works with decoy files containing admonitions against copyright infringement—pose obstacles to Internet usage in general? A related issue is the amount of privacy that consumers will have to cede for a copyright owner to be able to charge according to the particular use that a consumer makes of a creative product.[11]

The next chapter considers in more detail the obstacles to resolving digital copyright disputes, along with the efficiency and equity effects of a variety of potential legislative responses to the digital copyright debate. Those responses range from allowing market forces to work within the existing framework of copyright law to revising copyright law in significant ways to accommodate the increasing digitization of creative content.

9. See Andrew Orlowski, "Copy-Crippled CDs Launch in UK, Baffling Auntie Beeb," *The Register,* February 13, 2004 (available at http://www.theregister.co.uk/2004/02/13/copycrippled_cds_launch_in_uk/).

10. See Gregory T. Huang, "The Web's New Currency," *Technology Review,* December 2003-January 2004, pp. 28-36; and John Borland, "Stalemate on Digital Content?" *CNET News.com,* November 6, 2003 (available at http://news.com.com/2100-1025-5103601.html?part=dht&tag=ntop).

11. See Robert Lemos, "Digital Rights Group Knocks 'Trusted' PCs," *CNET News.com,* October 2, 2003 (available at http://news.com.com/2100-7355_3-5085442.html?tag=fd_nbs_ent).

CHAPTER

4

Economic Implications of Prospective Legislative Action

Participants in the ongoing copyright debate often look to the Congress to resolve the dispute through legislative action. During recent sessions of Congress, bills have been introduced to correct perceived imbalances in how the benefits of creative works are distributed between copyright owners and consumers. The titles of some of that legislation—the Protecting Intellectual Property Against Theft and Expropriation Act of 2004, the Artists' Rights and Theft Prevention Act of 2003, the Public Domain Enhancement Act of 2003, and the Digital Media Consumers' Bill of Rights Act of 2003—indicate the concerns of copyright stakeholders.

At the same time, legislation has been enacted that seeks not to redefine the basics of copyright law in the digital age but rather to extend current policies to digital media by establishing guidelines and requirements for the payment, collection, and distribution of fees to be paid to owners of copyright on musical works that are distributed via certain types of Internet transmissions.[1] Indeed, prior to the advent of the Internet, the Congress on numerous occasions created compulsory and other licensing regimes for the distribution of copyrighted material. Finally, policymakers always have the option of forbearance—that is, to wait and see whether the current copyright debate will be resolved by legislation already enacted, new judicial determinations, or market-based solutions.

The wait-and-see approach, as well as strategies that would enact additional legislation to bring some balance to the copyright scales or create licensing fees, can be evaluated against the standard of economic efficiency. It is also possible to identify which groups might gain or lose under those different options. Indeed, the equity consequences of different legislative approaches to the current copyright debate—that is, how a particular strategy might redistribute benefits between copyright holders and consumers—are often easier to infer than are the impacts on economic efficiency. The evaluation that follows is not an assessment of the benefits and costs of specific legislative proposals but rather an examination of three broad approaches that the Congress may wish to consider: forbearance, compulsory licensing of digital content, and revision of copyright law (see Table 4-1).

Forbearance

The Congress may choose to wait and see if the current copyright debate resolves itself without further legislative action. This course exploits the impending increase in the supply of content-control technologies by the private sector, as well as new services providing creative content in digital format, to determine whether changes to copyright law are in fact needed. Market-based solutions might gain support among both copyright owners and consumers.

One standard for judging the effectiveness of forbearance is the case of the videocassette recorder. In that instance, many content producers viewed the new home-recording device as a threat to their intellectual property and consequently sought to undermine a technology that consumers were rapidly adopting. Yet ultimately, producers and consumers reached a consensus that defined socially and legally acceptable uses of the new technology.

1. Small Webcaster Settlement Act of 2002 (Pub. L. No. 107-321).

Table 4-1.

Primary Effects of Broad Options for Modifying Digital Copyright Law

Option	Effects on Efficiency: Positive	Effects on Efficiency: Negative	Effects on Equity
Forbearance: Allow market forces to work	Option could promote efficiency if copyright owners are able to use technologies that allow them to charge different prices for their work depending upon a customer's willingness to pay.	Option could result in additional transaction costs, as well as copyright enforcement efforts and licensing practices that impose economic and social costs.	Pricing creative works according to customers' valuation could benefit copyright owners at the expense of those consumers who would pay more for creative works than they had under uniform pricing. At the same time, however, if the technological means available to protect creative works in digital form do not succeed in preventing widespread piracy, then copyright infringers could benefit at the expense of copyright owners. To the extent that such piracy reduces copyright owners' revenues and hence the future supply of creative works, society in general would also be harmed.
Compulsory Licensing: Set a fixed price (royalty) for the use of certain types of copyrighted works	Option could reduce transaction and enforcement costs in digital copyright markets.	Option could reduce efficiency by constraining demand for and supply of creative works. It could lead to additional economic costs, depending on the price-setting, royalty-tracking, and distribution procedures that are used, as well as the source of receipts for compensating copyright owners.	If revenues for paying copyright owners are raised through levies on digital processing equipment or Internet services, the process could impose a redistributive tax; it is unclear whether royalty-tracking procedures would allow for equitable compensation of all copyright owners.

Continued

Markets adapted in such a way that the net benefits of the production of intellectual property to society probably increased.

From an efficiency point of view, once new rules were established, the market outcome was a beneficial form of differential pricing. Returns to producers were sufficient to provide a substantial supply of new content. Variants of essentially the same creative content expanded consumers' options beyond going to the movie theater to renting or buying the videocassette. Moreover, consumers with a wide range of valuation of the creative product found prices consistent with their willingness to pay: the most willing consumers exercised the option to pay more to own the movie and view it repeatedly at times of their choosing, while less willing consumers exercised the option to rent the videocassette for home viewing at a lower price in a constrained period of time.

Prospects for a New Social and Legal Consensus

A new social and legal consensus on the right of owners to defend their copyrights and the right of consumers to fair use is essential to the resolution of the current copyright debate. It is possible that such a consensus may be reached without additional legislation.

Unauthorized use of copyrighted materials has increased for several reasons. First, individuals are unfamiliar with copyright law and the kinds of activity that constitute copyright infringement. In particular, consumers may

Table 4-1.

Continued

Option	Effects on Efficiency: Positive	Effects on Efficiency: Negative	Effects on Equity
Revision of copyright law in favor of copyright owners			
Reduce or eliminate fair use provisions	Option could increase opportunities for differential pricing and, in some cases, efficiency.	Society's gain would be limited to the extent that the higher cost of copyrighted materials impeded socially useful activities that fair use provisions are intended to facilitate.	In the near term, copyright owners would benefit at the expense of consumers. However, if the additional revenues to copyright owners enabled creators to undertake more projects, consumers could also benefit from the greater availability of creative works in the long term.
Strengthen enforcement	Same as above.	Government-mandated copyright protection measures could impede technological advances.	Same as above.
Revision of copyright law in favor of consumers	Option could reduce transaction and enforcement costs.	Option could decrease opportunities for differential pricing and, hence, efficiency.	Consumers would realize near-term benefits at the expense of copyright owners. That effect could be mitigated, however, if copyright owners were able to use digital technologies to enhance their ability to produce, market, and distribute creative works.

Source: Congressional Budget Office.

have become accustomed to particular uses of copyrighted materials to which they have no explicit right under copyright law. Legal actions against consumers, such as those the Recording Industry Association of America initiated in 2003, may boost consumers' awareness of copyright law. Some polling data indicate that such awareness is growing, so rampant illegal use of digital reproduction and transmission of copyrighted material may decrease in the years ahead (see Box 4-1).

The slow emergence online of licensed copyrighted materials has also contributed to their unauthorized use. Content companies claim that their reluctance to make copyrighted content available online reflects inadequate copyright protection and enforcement. In 2004, however, the availability of online music increased significantly. Particularly notable is the recent surge in the number of commercial ventures—typified by Apple Computer's iTunes service—that are licensed for online music distribution.[2]

One reason for the emergence of online businesses offering copyrighted materials is the maturation of technologies that enable copyright owners to better control their content. Copyright owners can secure their works by using direct control, by impeding illicit activity, or by monitoring consumers' usage of their works. Digital rights management technologies now allow copyright owners to secure their creative works and, at the same time, to offer consumers a variety of uses for them and to charge by type of use.[3]

2. See Nick Wingfield, "Shakeout May Mute Music-Download Services," *Wall Street Journal,* March 23, 2004.

3. See Mike Godwin, "What Every Citizen Should Know about DRM, a.k.a. "Digital Rights Management," Public Knowledge and New America Foundation, Washington, D.C., March 19, 2004, available at http://www.publicknowledge.org/content/overviews/citizens-guide-to-drm/attachment; and "Special Report: Copy Protection," *IEEE Spectrum,* May 2003, pp. 21-35.

Box 4-1.

Internet File-Sharing: Trends and Attitudes

In a survey conducted in February 2004, the Pew Internet & American Life Project and comScore Media Metrix found that 18 percent of Internet users said that they download music files online, well below the 29 percent who reported doing so in the spring of 2003.[1] Because the music downloading activity reported for February 2004 includes not only unauthorized downloads, but also the licensed downloads that have become popular only recently, the decline in copyright-infringing music downloads might actually be larger. During the same 2003-2004 period, the number of users of the most popular file-sharing networks fell sharply. The Pew Internet Project's survey also found that 14 percent of Internet users—a share that represents more than 17 million people—reported that they had stopped downloading music files and that the Recording Industry Association of America's (RIAA's) June 2003 decision to sue individuals who offer copyright-infringing music files on the Internet played some role in that decision. Survey respondents who stated that they had never engaged in music downloading also acknowledged that the RIAA's lawsuits would deter them from undertaking such activity in the future. Groups representing the music industry, such as the RIAA and the International Federation of the Phonographic Industry (IFPI), point to those results as well as their own research to argue for the efficacy of copyright education and enforcement.

In contrast, firms that specialize in tracking Internet activity claim that there has not been a substantial drop-off in the usage of file-sharing networks. While conceding that the RIAA's legal campaign has had some impact on music file-sharing, those firms argue that the Pew Internet Project's survey results were not entirely representative of file-sharing activities. For example, the Pew survey results were based on phone interviews with individuals 18 years and older. Relative to adolescents, who are considered very active file-sharers, such respondents would be more likely either to have curtailed or, in the context of a phone interview, to deny their file-sharing activity as a result of the RIAA lawsuits.[2] Similarly, comScore Media Metrix data on usage of file-sharing networks were obtained from consensual monitoring of individuals' computers, which could also lead to an understatement of illicit activity. Internet tracking firms point out that their measures, based on anonymous monitoring of Internet traffic, show a 19 percent increase

1. Pew Internet & American Life Project, "The State of Music Downloading and File-Sharing Online," April 2004, available at http://www.pewinternet.org/pdfs/PIP_Filesharing_April_04.pdf.

2. David McGuire, "Report: Kids Pirate Music Freely," *Washington Post,* May 18, 2004.

In many ways, awaiting and then evaluating a market-based outcome is consistent with copyright law as currently constructed. It leaves the burden of the cost of property rights enforcement to the private sector. And the copyright conflicts that emerge from the digitization of creative content can be adjudicated in a number of ways.

The Digital Millennium Copyright Act, for example, requires the Register of Copyrights to convene an arbitration panel biannually to set Webcasting royalties and to conduct a triennial rulemaking process to determine the need for new exemptions to certain prohibitions in the DMCA. One consideration in determining the need for an additional exemption is the "availability for use" of copyrighted works—that is, whether the circumvention prohibition might restrict access to a copyrighted work for which there was no alternative, nondigital source. It is reasonable, therefore, that the Congress allow time

Box 4-1.

Continued

in the number of users of file-sharing networks over the past year, from 6.8 million in June 2003 to 8.3 million in June 2004. Further, file-sharing as a proportion of total Internet traffic in the United States has declined only slightly, from 70 percent to 65 percent during the past year.[3]

Surveys of attitudes toward file-sharing do not reveal a clear picture of the impact of the RIAA's recent legal actions on the popular perception of its legality. According to a survey commissioned by the RIAA, the share of respondents in the United States who consider unauthorized file-sharing illegal rose from 37 percent before the RIAA announced its litigation strategy in June 2003 to 64 percent by December 2003. In contrast, a *New York Times-CBS News* poll and a Harris Interactive poll, both conducted in September 2003, found that between two-thirds and three-quarters of respondents consider downloading or sharing music files for personal use to be "all right" or "legal." Similarly, the Pew Internet Project's February 2004 survey found that 58 percent of those who download music files said that they did not care about the copyright on those files. However, the same survey also found that 37 percent of music downloaders said that they did care about whether those music files were copyrighted, up from 27 percent in Pew's spring 2003 survey.[4]

Those conflicting survey results may reflect individuals' unfamiliarity with copyright law. In a tracking survey conducted for the Pew Internet Project in November-December 2003, only 43 percent of respondents claimed that they were "very familiar" or "somewhat familiar" with copyright law and regulations. Asked about the fair use portion of copyright law in particular, 81 percent of respondents said that they were either "not too familiar" or "not familiar at all" with it.[5]

3. Jefferson Graham, "Online File Swapping Endures," *USA Today,* July 11, 2004; and Will Knight, "Net Traffic Shows File-Sharing Undented," *NewScientist.com,* May 26, 2004 (available at http://www.newscientist.com/news/print.jsp?id=ns99995045).

4. *IFPI Online Music Report 2004*, available at http://www.ifpi.org/site-content/library/online-music-report-2004.pdf; Robert Leitman, "Americans Think Downloading Music for Personal Use Is an Innocent Act," *Harris Poll,* no. 5, January 28, 2004, available at http://www.harrisinteractive.com/harris_poll/index.asp?PID=434; and Pew Internet & American Life Project, "The State of Music Downloading and File-Sharing Online."

5. Pew Internet & American Life Project, November 2003 Tracking Survey (publication of results expected in fall 2004).

for new business models to emerge before implementing legislative remedies.[4]

The Federal Communications Commission (FCC) may also play a role in enforcing copyrights. In November 2003, the FCC adopted an antipiracy mechanism known as the "broadcast flag" to prevent the unauthorized distribution of digital television programs via the Internet. The broadcast flag must be implemented by July 1, 2005, on equipment that receives over-the-air digital television broadcasts.[5] That decision followed a standard-setting process that enables "plug-and-play" of digital television equipment with any cable provider and addresses the copy-protection measures that broadcasters of digital television can employ. Under the FCC's auspices, media and technology firms are also negotiating an antipiracy mech-

4. In October 2003, the Register of Copyrights issued its ruling from the latest triennial review. It rejected, among other requests, allowing exemptions to the anticircumvention clause of the DMCA—17 U.S.C. 1201(a)(1)—for DVD and CD-ROM access controls.

5. See Federal Communications Commission, *Report and Order and Further Notice of Proposed Rulemaking,* MB Docket 02-230, FCC 03-273, November 4, 2003, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-273A1.pdf?date=31104.

anism for digital television broadcasts that could prevent the unauthorized distribution over the Internet of digital television broadcasts that could be captured via analog outputs and then reconverted into digital format.

Will Markets Increase the Net Social Benefits of Creative Content?

Whether a new consensus about copyright will set the stage for markets to produce efficiency gains and thus net social benefits is not clear. Efficiency gains could, but need not, be associated with wider applications of those strategies in the context of DRM. Consequently, the market-based implementation of DRM technologies that would enable differential pricing offers a greater prospect of efficiency gains in markets for creative works than was possible in the past. From the standpoint of equity, the distributional issues described in the discussion of differential pricing remain. However, from a dynamic point of view, allowing the market to experiment with different business models for the digital provision of copyrighted material is likely to be a superior alternative to legislative mandates in ensuring that advances in digital technologies provide efficiency as well as increased benefits to both copyright owners and consumers.[6]

Why Forbearance Might Not Work

Several factors weigh against the success of forbearance as an approach to the current copyright debate. First, although differential pricing schemes and the DRM technologies used to implement them may, in theory, offer the prospect of greater efficiency in markets for copyrighted works, they may, in practice, prove unsatisfactory. The same DRM technology that could allow copyright owners to stop the piracy of their works could also be used to deny consumers the benefits of the lower reproduction and distribution costs afforded by that technology. If the forces of competition are weak, moreover, producers may not have an incentive to seek returns by exploring product variations that match consumers' willingness to pay. Alternatively, consumers may find that the new restrictions on their uses of creative content are unacceptable and attempt to thwart them.[7]

Some observers argue that if DRM technologies restrict consumers' usage of copyrighted materials in ways that stymie consumers' fair use rights, legislative action will probably be required. While U.S. copyright law allows for fair use, it does not require owners to facilitate it. Further, because copyright law characterizes fair use in very broad terms, its validity in specific instances must be determined legally or legislatively.

Take, for example, a researcher who legally gains access to copyrighted material and wishes to make a copy for what the user believes is a fair use purpose—archiving a Web page for future reference, for instance. If that material was copy-protected by some technological measure, the researcher would be forced to either devise or acquire a means of circumvention—in the latter case, potentially running afoul of the law. If the copyright owner contested the researcher's use of the material, the researcher would have to defend that action legally, and the courts would determine whether that particular use of the material qualified as fair use. In those circumstances, however, well-funded interests who are better able to participate and lobby may eventually prevail and skew the courts' determinations. As a result of such rulings, individual consumers who wish to make what they believe to be fair use of a copyrighted work may simply opt not to do so.

Other uses of copyrighted material may arise as the applications that enable them emerge. Although copyright law may otherwise allow for those uses, DRM technologies may restrict them. Indeed, the DMCA prohibits outright

6. The following excerpt from "Music to Their Ears," an article in *The Economist* (September 21, 2002), provides a good illustration of potential new business models, made possible by applications of DRM platforms, that could benefit both copyright owners and consumers:

   "For example, subscribers to some commercial online-music services are now given the option to send encrypted copies of songs to friends. In exchange for the key to unlock the content, record labels can choose to charge or give the song away free if the friend provides, say, demographic details about himself.

   "Another example of DRM in use is Arista's recently launched web channel for fans of the band Boyz II Men. The channel serves up unreleased tracks, early access to concert tickets, exclusive videos, lyrics and singing lessons from members of the band for an annual subscription of $25-35."

7. Indeed, soon after it patched a flaw that inadvertently allowed unauthorized sharing of downloaded files from its popular new iTunes online music service, Apple was the target of a successful hack, which disabled that patch. Consumer resistance remains, and programs that circumvent Apple's DRM technology continue to emerge. See Leander Kahney, "iTunes Music Swap Just Won't Die," *Wired News,* June 6, 2003; and Rob Pegoraro, "Restrictions and Price Remain iTunes Turnoffs," *Washington Post,* April 18, 2004.

circumvention of a technological measure that protects access to a copyrighted work, even if access was circumvented to make fair use of the copyrighted material. In such scenarios, proponents of consumer rights claim that, without legislative intervention, technology could effectively "trump" copyright law.[8]

A second reason why legislative forbearance may not be feasible is that successful application of DRM platforms may require much closer monitoring of individuals' activities online and a consequent loss of privacy. At a spring 2003 rulemaking by the U.S. Patent and Trademark Office, suppliers of DRM technologies uniformly called for strengthening the enforcement provisions of the DMCA. It is unclear, however, how much sacrifice of personal privacy is necessary for DRM technologies to work satisfactorily—that is, to prevent enough illicit activity to ensure the profitability of supplying creative content in digital form. It is also uncertain whether government intervention will eventually be needed to establish the type of personal data that may be collected; how it would be collected, stored, and kept secure; and how it may be used.

Third, unless other countries conform to U.S. copyright standards, negotiations on copyright law and enforcement will be necessary to regulate international commerce in digitized creative works. Such international harmonization of copyright law would require legislative approval. For example, the Copyright Term Extension Act of 1998 brought the term of copyright protection in the United States (70 years after death for individual copyright owners, and either 95 or 120 years for works for hire) into conformance with standards of the European Union (EU) and thereby facilitated reciprocal protection in Europe for works copyrighted in the United States.

In addition, the Commission of the European Communities has assessed prospective "rights management" regimes for copyrighted works, which include both compulsory licensing arrangements and DRM systems. The Commission concluded that the development of DRM systems "should, in principle, be based on their acceptance by all stakeholders, including consumers, as well as on copyright policy of the legislature." Digital copyright law in the EU resembles that in the United States; numerous countries, for example, have anticircumvention provisions similar to those of the DMCA. However, some EU countries, such as Germany and France, grant consumers greater personal copying rights than does the United States. If the EU and the United States opt to impose different sets of restrictions on consumers' use of DRM-based delivery of digital content, legislation to remove divergences in copyright law could become necessary.[9]

Extend Compulsory Licensing to Digital Content

A second approach is for the Congress to set both the price of creative content and the terms on which that content must be made available. The Congress has had considerable experience establishing compulsory and other licensing arrangements for copyrighted musical works. Once a musical work is recorded, it becomes available for other artists to record upon payment of a set fee or royalty. Peer-to-peer advocates have proposed using compulsory licensing to compensate recording artists for file-sharing and thereby legalize the use of copyrighted material on P2P networks.

The rationale for compulsory licensing is that P2P networks will never be sufficiently regulated to allow copyright owners to exercise meaningful control over their works once the material becomes available on those networks. A practical means of obtaining compensation for copyright owners in that context would be for copyright officials to monitor the number of transfers of each copyrighted work among P2P network users. Revenues assessed by either general taxation or levies on the digital processing equipment associated with P2P activity could

8. See the seminal work of Lawrence Lessig in *The Future of Ideas* (New York: Random House, 2001). Indeed, few provisions in copyright law currently allow for redress upon copyright owners' making inappropriate use of their rights. One exception is found in 17 U.S.C. 512(f), which provides that anyone who knowingly misrepresents that material on an Internet network is infringing and shall be liable for payment of court costs and damages associated with the Internet Service Provider's compliance with the "notify-and-takedown" requirements of that section of the copyright law.

9. See Communication from the Commission of the European Communities to the Council of the European Parliament and the European Economic and Social Committee, "The Management of Copyright and Related Rights in the Internet Market," Brussels, April 16, 2004; and "Part IV: Fair Use Doctrine," in Berkman Center for Internet & Society, *iTunes: How Copyright, Contract, and Technology Shape the Business of Digital Media—A Case Study* (June 15, 2004), available at http://cyber.law.harvard.edu/media/uploads/81/iTunesWhitePaper0604.pdf.

then be distributed to copyright owners according to the relative use of their works.[10]

Furthermore, because technological advances are increasing the diversity of ways in which music, movies, and other copyrighted material can be consumed, compulsory license fees could potentially reduce transaction costs in markets for creative content. The more comprehensive the range of uses of copyrighted material permitted under a compulsory license for a broad class of creative works, the less time consumers would need for reading licensing agreements for different copyrighted products within that class. In addition, litigation costs incurred obtaining legal determinations of copyright infringement would be lower, as would the enforcement costs (although those cost savings might be reduced by litigation contesting the royalty rate).

Setting a fixed price for some types of copyrighted works is less efficient, however, than a differential pricing scheme. That is because the price of using copyrighted material under a compulsory licensing scheme would be common not only to all consumers but also to all works covered by the license. A single, flat-rate fee is unlikely to be "just right" from the standpoint of economic efficiency. Using the framework developed in the previous chapter, content prices would not be well matched to consumers' willingness to pay. It is also unclear whether a single fee could generate the amount of revenues that copyright owners would obtain from differential pricing.

Setting a compulsory license fee could also carry substantial costs, from both administration of the royalty regime and losses incurred because of shortcomings in the rate-setting process. For example, registering and tracking the usage of copyrighted works accessed on P2P networks may be expensive. The process of fixing the compulsory license fee may be costly and time-consuming. The process of establishing royalty rates for certain types of Internet music broadcasts, such as nonsubscription Webcasting, dragged on for several years. A contested arbitration process to set Webcasting rates gave way to an unpopular rulemaking by the Register of Copyrights and, finally, to a last-minute, legislatively sponsored agreement among the competing groups (which spurred legal action that is still ongoing).

The uncertainty that such a process would engender could impede the development of markets for digital copyrighted goods subject to those royalty rates. By the time the royalty-setting process is completed, moreover, the Internet may be sufficiently regulated to enable strict copyright enforcement and, in particular, the emergence of private-sector licensing and royalty-collection agencies.[11] Indeed, the Internet today remains a relatively unregulated environment, and as it is integrated into business and household use, it may well become subject to greater control and monitoring.

In addition, the collection and allocation of copyright revenues under compulsory licensing could be inequitable. For example, if the compulsory license revenues were collected through a levy on computers or other multipurpose digital equipment or media, individuals who do not use those products to consume copyrighted works would be forced to pay that tax. Among consumers of copyrighted material, those who made the greatest use of the digital equipment and media subject to the levy would benefit the most.

Revise Copyright Law

Another legislative approach is for the Congress to revise copyright law in favor of either copyright owners or consumers. Current copyright law is complex, reflecting the cumulative impact of amendments designed to accommodate specific changes in technology. A broad revision of copyright law could therefore reduce the losses stemming from uncertainty about its implications. For example, businesses may not offer some types of services involving copyrighted materials, and consumers who fear litigation may be reluctant to engage in some uses of such materials.

Revise in Favor of Copyright Owners

One option is to restrict the types of uses of copyrighted material that currently qualify either as fair use or as an-

10. For examples of compulsory licensing schemes proposed for peer-to-peer networks, see Neil Weinstock Netanel, "Impose a Noncommercial Use Levy to Allow Free Peer-to-Peer File Sharing," *Harvard Journal of Law & Technology,* vol. 17, no. 1 (2003), pp. 1-84; and William W. Fisher, "An Alternative Compensation System," in *Technology, Law, and the Future of Entertainment* (Palo Alto, Calif.: Stanford University Press, forthcoming).

11. See the statement of Marybeth Peters, Register of Copyrights, before the Subcommittee on Courts, the Internet, and Intellectual Property of the House Committee on the Judiciary, March 11, 2004.

other explicit limitation on the exclusive rights of copyright owners. That approach may require consumers to pay for some uses of copyrighted material for which they currently are not charged. For example, consumers may have to pay to make archival copies of computer programs—a practice that copyright law now explicitly allows. Presumably the price for making such copies would be set to compensate for the potential losses to software manufacturers from unauthorized redistribution.

To the extent that tightening fair use restrictions increases price differentiation among consumers, those restrictions could also increase efficiency. Indeed, some commentators argue that the rationale for fair use comes not from efforts to balance private incentives and societal benefits but rather from attempts to minimize the transaction costs of obtaining authorization to use copyrighted material in particular ways. From that perspective, improvements in communications technologies and data delivery may have an unintended consequence: fair use may no longer be needed as a remedy for such costs.[12]

However, copyright law makes explicit allowance for fair use in activities such as criticism, comment, news reporting, teaching, scholarship, and research, where the benefits to society presumably outweigh the revenues denied to copyright owners. Restricting fair use in those applications may not produce as great an increase in efficiency as in other applications because some socially beneficial uses of copyrighted material could become prohibitively expensive.

The potential difficulties of setting new prices for some uses of copyrighted material also argue against tightening fair use too much or too rapidly. The music industry continues to experiment with setting prices for online music downloads, for example, even though the product is well-defined and has been marketed in other formats for many years.[13]

Such pricing difficulties may arise when the value of consumer uses is difficult to determine for technological reasons. For example, purchasers of computer software inscribed on a CD-ROM may wish to be able to make a backup copy in case the original disc becomes damaged or turns out to be defective. Because such digital media are relatively new, their durability is still uncertain. If a CD-ROM deteriorates materially and the software program stored on it becomes inaccessible, a backup copy could turn out to be unexpectedly valuable; conversely, the value of a software program that could not be archived could turn out to be unexpectedly low.[14]

Finally, where competitive pressures on markets for copyrighted works are weak, the efficiency of differential pricing schemes could be compromised if fair use was sharply curtailed. That situation could occur when consumer valuations are determined by "versioning"—that is, setting prices that vary across groups of consumers on the basis of each group's shared use of a particular version of the same product. In those circumstances, the supplier may have an incentive to take a "damaged goods" approach, in which a low-cost version of a product is purposely made inferior to induce customers to purchase a higher-quality variant.

For example, some railroads in the 19th century put third-class carriages toward the front of the train, which exposed passengers to cinders from the engine compartment. That strategy was designed to force all those who could afford to pay more into the more comfortable first- and second-class carriages.

Economic efficiency in those outcomes is compromised because the characteristics and price of the lower-quality variant are set not to respond to demand in the low willingness-to-pay market niche but rather to motivate customers to opt for variants of higher quality and price. To the extent that fair use is restricted and consumers of

12. See Benjamin Klein, Andres V. Lerner, and Kevin M. Murphy, "The Economics of Copyright 'Fair Use' in a Networked World," *American Economic Review,* vol. 92, no. 2 (May 2002), pp. 205-208. For a defense of fair use in spite of reduced transaction costs, see Ben Depoorter and Francesco Parisi, *Fair Use and Copyright Protection: A Price Theory Explanation,* Working Paper No. 01-03 (Arlington, Va.: George Mason University School of Law, 2001).

13. See Ethan Smith, "Downloading Music Gets More Expensive," *Wall Street Journal,* April 7, 2004; and Amy Harmon, "What Price Music?" *New York Times,* October 12, 2003.

14. See Peter Svensson, "CDs and DVDs Not So Immortal After All," Associated Press, May 6, 2004.

copyrighted material can enjoy only a few uses of a creative work at no cost, copyright owners could likewise manipulate the product spectrum.[15]

Another way to revise copyright law in favor of copyright owners would be to strengthen the anticircumvention and enforcement provisions of copyright law to prevent consumers from using copyrighted products in ways for which they had not paid. Again, to the extent that such a measure would increase differential pricing, economic efficiency would be increased.

How those particular anticircumvention and enforcement provisions would be implemented, however, requires careful consideration. Recent legislation has envisioned two approaches: mandating use of a specific technology to ensure the security of creative works in digital format (S. 2048);[16] and providing a limited liability for copyright owners who access the computers of individuals suspected of copyright infringement to identify and disable infringing material (H.R. 5211).[17]

From the perspective of efficiency, technology mandates could stymie innovation. Forcing new digital technologies to conform to a particular security standard for digital content, for example, could impede the development of superior products. Likewise, consumers' concerns about the ability of copyright owners to exploit a safe harbor to gain access to their computers could deter individuals from using and experimenting with the Internet.

From the point of view of equity, a technology mandate could impose costs on either manufacturers of digital hardware and software or purchasers of that equipment. If the mandated copyright protection technology is thwarted, the cost of developing that technology may be unrecoverable. If existing digital products are rendered obsolete by the mandated technology, costs would be imposed on consumers of existing products. In the case of a safe harbor, owners of computers would be forced to share some burden, in the form of potential damage to their equipment from online enforcement efforts, so that copyright owners could protect their property.

Other types of enforcement measures could, if poorly designed, have detrimental impacts on both efficiency and equity. For example, not all copyright owners may wish to prevent the same type of unauthorized uses of their creative works. The Supreme Court wrote in its *Sony v. Universal Studios* decision that, unlike copyright owners in the movie industry, some owners of copyrights on television broadcasts may in fact have wanted viewers to be able to make unauthorized tapes of their programming to expand the broadcast's audience. Declaring manufacturers of videocassette recorders liable for copyright infringement would have protected the rights of copyright holders in the movie industry at the expense of copyright owners in other media. Similarly, a poorly designed enforcement measure could deprive some copyright owners of the ability to make their content as widely available to consumers as they may wish. Such a measure would introduce inefficiency because some copyright owners and consumers would be deprived of supplying and consuming, respectively, copyrighted material at a cost that each party was willing to bear. It would also be inequitable, since one group of copyright owners would benefit at the expense of other copyright owners and consumers.

Revise in Favor of Consumers

Several bills have proposed expanding the rights of consumers of creative content. For example, H.R. 1066 would significantly expand limitations on the exclusive rights of copyright owners.[18]

Expanding fair use could be detrimental to efficiency. If copyright owners were able to charge differentially for fewer types of uses of their material, they would have to raise the price on those uses for which they could charge. Those higher prices could prohibit consumption of that material by some consumers. The decrease in overall receipts to copyright owners could also reduce the supply of creative works if creators no longer had sufficient resources to devote to their efforts.

Many popular movies, for example, are expensive to produce. A significant share of movie industry costs are covered by sales and rentals of DVDs, which constitute an

15. See Andrew Odlyzko, "Privacy, Economics, and Price Discrimination on the Internet," July 27, 2003, available at http://www.dtc.umn.edu/~odlyzko/doc/privacy.economics.pdf.

16. Consumer Broadband and Digital Television Promotion Act, 107th Cong., 2nd sess.

17. To Amend Title 17, *United States Code,* to Limit the Liability of Copyright Owners for Protecting Their Works on Peer-to-Peer Networks, 107th Cong., 2nd sess.

18. Benefit Authors Without Limiting Advancement of Net Consumer Expectations (BALANCE) Act of 2003, 108th Cong., 1st sess.

estimated half of current movie industry revenues. If movie studios were unable to price differentially for movie viewing by making their products available on DVD or in some other form, the price of admission at the box office would—holding everything else constant—have to increase to compensate for those lost revenues.

However, technological advances in the future may enable copyright owners to devise new business models to accommodate the diminished control they could exercise over their intellectual property. Advances in information technology may facilitate the development of new business models by allowing some copyright owners to enjoy cost savings or new opportunities for production, marketing, and distribution, which could offset losses of revenue.

Software companies, for example, abandoned a strategy of trying to thwart and prosecute infringers and instead opted to encourage licensed use by providing users with product updates and customer service. Similarly, recording companies could evolve from artistic development and marketing enterprises to businesses that help music listeners navigate through a catalog of essentially self-produced artists. Because of advances in digital recording techniques, the recording companies of the future could assist consumers both in finding matches for their existing music preferences and in developing new ones. Television broadcasters and moviemakers could make up for losses of traditional advertising or royalty receipts by increasing the supply of television-on-demand and using information gained in providing that service to focus and improve advertising efforts.

From the standpoint of equity, the effects of revising copyright law in favor of consumers of creative material would be to transfer control from copyright owners to consumers. However, for some incumbent copyright holders, losses suffered from diminished control over their creative works may already have been compensated, at least in part, by recent legislation that extended the duration of copyright protection.[19]

When considering any legislative option for revising copyright law—whether one of those discussed in this paper or some other option—it is important to be mindful of the possibility that a modification to copyright law could well have unintended consequences. Any revisions that are undertaken, therefore, require careful deliberation.

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19. See AEI-Brookings Joint Center for Regulatory Studies, "The Copyright Term Extension Act of 1998: An Economic Analysis," Brief 02-1 (May 2002); and Mark A. Lemley, "Ex Ante Versus Ex Post Justifications for Intellectual Property," *University of Chicago Law Review,* forthcoming.