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## Price Discrimination, Personal Use and Piracy: Copyright Protection of Digital Works

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# Price Discrimination, Personal Use and Piracy: Copyright Protection of Digital Works

MICHAEL J. MEURER†

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## INTRODUCTION

During the past twenty five years copyright holders have repeatedly preached the coming of the Apocalypse as new technologies for copying and distributing works became available.<sup>1</sup> VCR spells doom for movie producers.<sup>2</sup> Photocopiers will ruin academic publishers.<sup>3</sup> Digital audio tape means the end of the music industry.<sup>4</sup> And so on.<sup>5</sup> These prophecies mobilized lawyers and lobbyists representing the publishing industry to push for copyright expansion. They met resistance from representatives of the consumer electronics industry, librarians, and other groups opposed to copyright expansion. Sometimes concern about technological innovation moved the courts or Congress to expand copyright protection; sometimes not.<sup>6</sup> Nonetheless, technological innovation consistently put copyright on the policy-

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1. See PAUL GOLDSTEIN, *COPYRIGHT'S HIGHWAY* 29 (1994).

2. See Jessica Litman, *Revising Copyright Law for the Information Age*, 75 OR. L. REV. 19, 35 (1996).

3. See GOLDSTEIN, *supra* note 1, at 78-128.

4. See GOLDSTEIN, *supra* note 1, at 158 ("For record companies, the proliferation of unending generations of flawless copies [on digital audiotape] spelled doom for the retail sales market."); see also Litman, *supra* note 2, at 36 (noting that compromise legislation was required).

5. See Litman, *supra* note 2, at 22 (observing that personal computers, VCRs and cable all stimulated debate about the scope of copyright law); *id.* at 42 n.93 (citing testimony that uncurtailed audio and video tape recording would cripple and ultimately destroy motion picture and television industries). A prime example of the flexing of the movie industry's muscle is the delay of the introduction of Digital Versatile Discs (DVDs) into the U.S. marketplace due to demands by the movie industry that DVD units incorporate strong copy protection. By threatening not to release their products to DVD, the movie industry effectively held up introduction of DVD units for over a year. See Junko Yoshida, *Copy-protection questions delay digital roll-outs*, ELECTRONIC ENGINEERING TIMES, Feb. 3, 1997, at 1; Junko Yoshida, *DVD: Last year's bang is now more a whimper*, ELECTRONIC ENGINEERING TIMES, Jan. 13, 1997, at 10. The flexibility of DVD as a delivery medium for the movie, music, and software industries led to the formation of a multi-industry Copyright Protection Technical Working Group to decide upon standards for the new DVD decks to protect intellectual property distributed on DVD discs. See *Movie Companies, Drive Makers Agree on Copyright Protection*, OPTICAL MEMORY NEWS, Nov. 5, 1996, available in 1996 WL 8328542.

6. See *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417 (1984) (no infringement by videotaping); Audio Home Recording Act of 1992, 17 U.S.C. §§ 1001-10 (1994) (barring infringement suits for digital audio taping); *America Geophysical Union v. Texaco Inc.*, 37 F.3d 881 (2d Cir. 1994) (finding infringement by photocopying), *order amended and superseded by* 60 F.3d 913 (2d Cir. 1994); *Basic Books, Inc. v. Kinko's Graphics Corp.*, 758 F. Supp. 1522 (S.D.N.Y. 1991) (finding infringement by photocopying); *Williams & Wilkins Co. v. United States*, 487 F.2d 1345 (Ct. Cl. 1973), *aff'd by an equally divided Court* 420 U.S. 376 (1975) (per curiam) (finding no infringement by photocopying); *Princeton Univ. Press v. Michigan Document Services, Inc.*, 99 F.3d 1381 (6th Cir. 1996) (en banc) (infringement by photocopying).

making agenda and gave copyright holders an occasion to argue for broader rights.

Copyright law is again convulsed by a new media technology, and copyright holders have again issued a familiar warning: the Internet and digital information transmission threaten the survival of many publishers.<sup>7</sup> Text, software, music, and video publishers and producers have united to lobby for legislation to expand copyright protection of digital works. Copyright holders voice two main complaints about digital technology: it promotes widespread unauthorized sharing of digital works between a buyer and her<sup>8</sup> friends and family; and it promotes piracy. Publishers prefer that each user of a digital work purchase an original. Users often find it is convenient and economical to purchase a single original and share it within their social group. Software publishers are especially vocal about the effect of sharing on their profits; they claim to have lost substantial profit to widespread sharing that results from unauthorized copying.<sup>9</sup> All publishers worry about pirates making cheap and precise digital copies and easily transmitting the copies throughout the world via the Internet.<sup>10</sup>

Copyright advocates insist that it is good public policy to protect the profits of the producers of digital works.<sup>11</sup> First, they argue that fairness requires that authors and publishers should be able to keep their share of the copyright pie in the face of new technologies.<sup>12</sup> This argument is usually cast in terms of the natural right of authors to reap where they have sown. Sec-

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7. See *Copyright Protection on the Internet: Hearings on H.R. 2441 Before the Subcomm. on Courts and Intell. Prop.*, 104th Cong. 84 (1996) (statement of Garry L. McDaniels, President, Skills Bank Corporation) [hereinafter McDaniels] available in 1996 WL 7135497. "The easy reproduction of computer software, and the far-flung messaging capabilities of the Internet, have shifted the legal balance far away from copyright owners." *Id.*

8. I will use masculine pronouns for copyright holders and feminine pronouns for users and competitors.

9. See Chuck Melvin, *Pirates of the Cyber Age: Software Buccaneers are Thriving and You May be One, Too*, THE PLAIN DEALER (Cleveland), Jan. 20, 1997, at 5D (arguing that in the software industry alone lost profits from unauthorized copying are estimated to be \$13 billion a year); Litman, *supra* note 2, at 30 (stating that an estimated one-half of software copies are unauthorized). See *infra* text accompanying notes 165-70, 172-73.

10. See *infra* text accompanying notes 165-70.

11. See Jane C. Ginsburg, *Putting Cars on the "Information Superhighway": Authors, Exploiters, and Copyright in Cyberspace*, 95 COL. L. REV. 1466, 1468 (arguing that user rights are secondary to the interests of producers); GOLDSTEIN, *supra* note 1; INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE: THE REPORT OF THE WORKING GROUP ON INTELLECTUAL PROPERTY RIGHTS (1995) [hereinafter WHITE PAPER].

12. See *infra* text accompanying notes 48-49.

ond, they argue that profits from copyrighted works provide an essential incentive to produce and distribute those works.<sup>13</sup> That incentive would be undercut by the increased sharing and piracy that is forecast to arrive with the growth of the Internet.

The Clinton administration has come to the defense of copyright holders.<sup>14</sup> A task force headed by Patent and Trademark Office commissioner and former entertainment industry lobbyist Bruce Lehman released a report known as the *White Paper* in 1995.<sup>15</sup> The *White Paper* proposes a series of interpretations or modifications of copyright law to increase protection for digital works. Notably, the *White Paper* defends recent cases that limit the first sale<sup>16</sup> and the fair use<sup>17</sup> doctrines as applied to digital works. It also supports the use of contract law to displace the fair use and first sale doctrines.<sup>18</sup> In the international realm U.S. diplomats have also pushed for broader intellectual property protection for digital works.<sup>19</sup>

Internet service providers and digital equipment manufacturers join consumer electronics firms and librarians in opposing expanded protection of digital works.<sup>20</sup> The first two groups are new to copyright policy-making disputes. They worry that stronger copyright law will slow development of the Internet. In particular, they oppose indirect copyright liability for service providers which is favored in the *White Paper*.<sup>21</sup> Generally, the

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13. See *infra* text accompanying notes 50-53.

14. See Litman, *supra* note 2, at 21 (stating that the WHITE PAPER interprets copyright law in favor of copyright holders).

15. WHITE PAPER, *supra* note 10.

16. See *infra* Part I.C.1.

17. See *infra* Part I.C.2.

18. See *infra* Part I.C.3.

19. See Peter Jaszi, *Caught in the Net of Copyright*, 75 OR. L. REV. 299, 302 (1996). A treaty proposed by delegates to the World Intellectual Property Organization (WIPO) would have included temporary reproduction of a work within the reproduction right of a copyright holder. See *Treaties: WIPO Delegates Scramble to Reach Agreement by Week's End*, 53 PAT. TRADEMARK & COPYRIGHT J. 116 (1996) [hereinafter *Treaties*]. This proposal is directed at digital works that are stored temporarily in a computer for use. See *infra* text accompanying notes 77-80. The final treaty was significantly modified to accommodate the wishes of users. *Id.* The proposed treaty also created an exclusive right of communication. But the final version made it clear that telecommunication companies that merely provided a conduit for communication did not infringe this right. See *News From WIPO*, Sept. 12, 1997, <<http://www.hrrc.org/newswipo.html>> (on file with author and the *Buffalo Law Review*).

20. See *Treaties*, *supra* note 19. (noting that the WIPO proposal on temporary reproduction was strongly opposed by the U.S. Internet industry); *Europeans Push for Copyrights in Cyberspace*, *New York Times*, Oct. 20, 1997, at C6.

21. See Ginsburg, *supra* note 11, at 1492; Pamela Samuelson, *The Copyright Grab*, *HOT WIRED*, Jan. 1996, at 8, available in <<file:///libnet/libhtml/bison.html>> (on file with

critics of copyright expansion favor broad dissemination of digital works.<sup>22</sup> They argue that the status quo provides adequate incentives to authors and publishers, and that enlarged protection of digital works would come at the expense of unfairly diminished public access to copyrighted material. Such access advances educational and free speech goals as well as legitimate competition by firms who gain access to unprotected ideas contained in protected works.<sup>23</sup>

Academics and policy-makers have debated the proper copyright response to digital technology by assessing and balancing issues of profit and access, but they have largely neglected what should be a key issue in the debate: price discrimination.<sup>24</sup> I demonstrate that the proposed changes in copyright law facilitate the practice of price discrimination by sellers of digital works. The neglect of price discrimination is curious because raising the issue could advance the position of either side in the debate. Proponents of copyright expansion could argue that facilitating price discrimination is desirable because it restores lost profit to publishers and (as an appealing bonus) it promotes economic efficiency. Opponents could argue that price discrimination has undesirable effects on the distribution of wealth and (contrary to usual claims) it subverts both access and economic efficiency.

I have two goals in this Article: first, to show that the changes supported by the *White Paper* will facilitate price discrimination; and second, to show that those changes are not required to maintain the industry's profit share. I present the ar-

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author and the *Buffalo Law Review*). In contrast, the authors of the WHITE PAPER contend that it would be "premature to reduce liability of any type of service provider in the NII environment." WHITE PAPER, *supra* note 11, at 122. Since the hassle of suing an individual customer may be too great, a small number of deep pocketed service companies is an attractive target. The WHITE PAPER endorses cases that have found Internet service providers are liable under a theory of contributory infringement for copying done by their clients. *Id.* at 140-53.

22. See Litman, *supra* note 2; Samuelson, *supra* note 21; Julie E. Cohen, *A Right to Read Anonymously: A Closer Look at "Copyright Management" in Cyberspace*, 28 CONN. L. REV. 981 (1996). See also Neil Weinstock Netanel, *Copyright and a Democratic Civil Society*, 106 YALE L.J. 283 (1996) (comparing copyright expansionists and minimalists in the digital context).

23. See *supra* note 22, at 288.

24. Some exceptions include PAUL GOLDSTEIN, *supra* note 1, at 8 (explains that copyright is crucial for price discrimination by book and movie sellers); Netanel, *supra* note 22, at 293-94 nn.31 (noting that digital technology promotes price discrimination); Glynn S. Lunney, Jr., *Reexamining Copyright's Incentives-Access Paradigm*, 49 VAND. L. REV. 483 520-21 (1996); Stewart E. Sterk, *Rhetoric and Reality in Copyright Law*, 94 MICH. L. REV. 1197, 1205 (1996).

guments made by supporters of copyright expansion in Part I. First, I explain the claim that digital technology threatens the profits of copyright holders because of increased unauthorized sharing and piracy. I move next to the normative arguments stating that copyright expansion is an appropriate response to falling profits. I conclude this Part by listing the proposals for expanded copyright protection of digital works and explaining how they might alleviate the problems of unauthorized sharing and piracy.

Part II covers the mechanics of price discrimination.<sup>25</sup> My first task is to explain how sellers price discriminate. Roughly speaking, price discrimination is a tactic by which a seller charges a high price to high valuation users and a low price to low valuation users. Effective price discrimination requires satisfaction of three conditions: (1) the seller has market power; (2) the seller can sort customers according to their preferences; and (3) customers cannot arbitrage away price differentials.<sup>26</sup> In the absence of market power a seller would find that competitors would be eager to serve his disfavored customers and any price differential would collapse. The seller must have information on consumer preferences or he will not know who to discriminate against. Arbitrage means that favored customers can buy in order to resell to disfavored customers. The presence of arbitrage undermines price differentials. In most markets price discrimination is either infeasible or feasible only to a limited degree since these requirements are not fully met.

My other task in Part II is to show how copyright law affects price discrimination. The exclusive rights granted to a copyright holder are a source of potential market power that make price discrimination possible. Thanks to copyright there is a single authorized producer of MS-DOS software. If Microsoft chooses to charge different prices to different buyers of the same software, there are no competitors to woo the disfavored customers. Copyright law also contains features that hinder price discrimination. The first sale doctrine fosters indirect competition by allowing the first buyer of a work to resell it. Resale is especially detrimental to price discrimination if a low valuation user purchases a work at a low price and arbitrages by selling the work to a high valuation user. The fair use doctrine is another

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25. In Part III, I explain how price discrimination operates in the market for digital works.

26. Sporadic price discrimination may occur under any market structure in response to changing economic conditions and limited information. I am only considering persistent price discrimination.

deterrent to price discrimination. For example, the fair use doctrine allows home recording of television programming. The sharing of videotapes by friends and family works against price discrimination because it makes it harder for sellers to sort customers into homogeneous groups. In contrast, the fortunes of price discriminators may be bolstered by contract law. Resale and sharing of works by users can be suppressed by contract terms.

The conditions allowing price discrimination are not satisfied in many markets for copyrighted works. Even when the conditions are satisfied, price discrimination does not follow inevitably. If the cost of implementing price discrimination is too high, then uniform prices prevail. Further, when sellers practice discrimination, the scope and complexity of discrimination is limited by implementation costs. The law may facilitate price discrimination by reducing implementation costs. Specifically, constriction of the first sale and fair use doctrines and tolerance of contractual displacement of copyright law reduces the measurement costs and makes arbitrage more difficult. Thus, expanding legal protection of copyrighted digital works will likely increase the scope and complexity of discriminatory pricing schemes.

Part III assesses the profit impact of unauthorized sharing, piracy, and price discrimination. I argue that digital technology and the proposed changes in copyright law work in a complementary fashion to significantly raise the profits from digital price discrimination. Briefly, the primary effect of digital technology on price discrimination is to make measurement easier. The primary effect of the legal changes is to make arbitrage more difficult.<sup>27</sup> Together this is a recipe for higher profits. On the other hand, I do not see great losses associated with unauthorized sharing or piracy if copyright holders fail to win their desired changes in the law. The effect of sharing is overstated because copyright holders point to lost sales instead of the relevant measure of lost profits. Sharing has a smaller effect on profit than sales, and it is not clear how much digital technology will increase sharing for works other than software. Also, both sharing and piracy probably can be controlled by technology. To further combat piracy an appropriate regime of copyright man-

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27. I argue that digital technology and expansion of copyright law will have a variety of effects on measurement and arbitrage. In some ways digital technology makes arbitrage easier and in other ways harder. Copyright law changes will make measurement easier in some cases as well as making arbitrage harder. The details are covered in Part III.A.



agement could be implemented. A law that punished those who tamper with copyright information attached to digital works would help control piracy, but would do nothing to facilitate price discrimination.

## I. FEAR OF DIGITAL TECHNOLOGY AND DEMANDS FOR COPYRIGHT EXPANSION

### A. *The Profit Threat from Piracy and Unauthorized Sharing*

There are numerous activities that may infringe upon the exclusive rights of a copyright holder, but in this Article I focus mostly on two that I call piracy and unauthorized sharing. These are not terms defined by copyright law, rather they are terms I will use to define economically relevant categories of behavior. I use piracy to describe the unauthorized *public* distribution of literal copies of a copyrighted work,<sup>28</sup> and I use unauthorized sharing to describe the unauthorized *private* distribution of literal copies of a copyrighted work.<sup>29</sup> In economic terms, a pirate is a competing supplier of the copyright holder, while parties engaged in sharing (whether authorized or not) should be thought of as a coalition of buyers. As the boundary between public and private distribution becomes blurred unauthorized sharing starts to look like piracy, and the organizer of a coalition of buyers begins to look like a competing supplier.<sup>30</sup> I will

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28. Piracy should be distinguished from competition by a close substitute. Absent patent protection, competitors can learn ideas and imitate. See, e.g., Mark Lemley & David O'Brien, *Encouraging Software Reuse*, 49 STAN. L. REV. 255 (1997); Dan Burk, *The Market for Digital Piracy*, 205, 214, in BORDERS IN CYBERSPACE: INFORMATION POLICY AND THE GLOBAL INFORMATION INFRASTRUCTURE (Brian Kahin & Charles Nesson eds., 1997) (piracy and Internet distribution); Robert Merges, *Contracting Into Liability Rules: Intellectual Property Rights and Collective Rights Organizations* 84 CAL. L. REV. 1293 (1996).

For the sake of brevity in this Article I only consider piracy of literal copies, but it sometimes makes sense to include unauthorized public distribution of derivative works in the definition as well. Some derivative works do not contain much added value. The public distribution of unauthorized translations of a factual work or textbook or unauthorized anthologies might reasonably be treated as piracy. Cf. *Basic Books, Inc. v. Kinko's Graphics Corp.*, 758 F. Supp. 1522 (S.D.N.Y. 1991).

29. A similar distinction is made by Litman, *supra* note 2, at 39-41, and Richard Stallman, *Reevaluating Copyright: The Public Must Prevail*, 75 OR. L. REV. 291, 294 (1996).

30. Record and software rental stores are an interesting case. One could argue that they are profit making libraries, or that they represent a coalition of buyers who share a copyrighted work. It makes more sense to consider them pirates because the public nature of their distribution makes them effective competitors to authorized sellers of software or records. Such stores are precluded by Section 109 of the Copyright Act. Pub. L. No. 101-650, § 804(b), 104 Stat. 5136, 8518 Dec. 1, 1990. On the other hand, video rental stores flourish. What's the difference? People usually rent a movie or tape for a

not bother to fix a clear boundary between these categories, because most of the cases I consider will clearly fall into one category or the other, and because it is not essential to my main arguments.

Digital technology may expand the horizons of copyright piracy but it does not change its nature. The traditional copyright pirate would obtain a copy of a novel, song, or movie, and produce unauthorized copies of the work. She would then sell the bootleg copies in competition with the authorized seller. Digital piracy amounts to the same thing except the digital pirate might avail herself of the Internet for digital distribution of the bootleg copies. An example of piracy on the Internet is provided by *Sega Enters., Ltd. v. MAPHIA*.<sup>31</sup> In that case the defendant made unauthorized copies of Sega games available on a computer bulletin board where users could download the games for a fee.<sup>32</sup> Besides the profit seeking pirates that have always plagued publishers, the Internet creates a genuine risk of piracy without profit.<sup>33</sup> A disgruntled employee might distribute proprietary software to get back at an employer, or a teenage hacker might decode and freely distribute a game.<sup>34</sup> The low cost of distributing copies on the Internet makes mischievous or malicious piracy possible.

Copyright law must stop direct, unauthorized competition because it can wipe out the profits of the copyright holder.<sup>35</sup> A pirate distributing copies over the Internet puts pressure on the copyright holder to cut his price. If the pirate can reach much of the market for a work through the Internet, then the market price will plummet to the marginal cost of storing and transmit-

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single viewing and are less inclined to copy a movie. People usually use software and music repeatedly and want their own copies. Further, the Macrovision copy prevention system is effective in stopping home copying of rented videos. There is no equivalent system for software and records.

31. 857 F. Supp. 679 (N.D. Cal. 1994).

32. *Compare Playboy Enters. v. Frena*, 839 F. Supp. 1552 (M.D. Fla. 1993) (stating that the defendant claimed he did not know the material was infringing unlike *MAPHIA*).

33. See Andrew Sorkin, *Internet Song Use Spurs Recording Industry Suits*, N.Y. TIMES, June 16, 1997, at D6 (stating that most virtual bootleggers of music do it as a hobby); *United States v. LaMacchia*, 871 F. Supp. 535 (D. Mass. 1994) (bulletin board allowing people to get unauthorized copies of software at no charge).

34. Cf. *Religious Technology Center v. Netcom On-Line Communication Services, Inc.*, 907 F. Supp. 1361; (N.D. Cal. 1995) (the defendant made excerpts of letters available free of charge for anyone to download or browse from his web page).

35. See Litman, *supra* note 2, at 42; Michael D. McCoy & Needham J. Boddie III, *Cybertheft: Will Copyright Law Prevent Digital Tyranny on the Superhighway?*, 30 WAKE FOREST L. REV. 169 (1995).

ting the digital work (a cost close to zero). Absent a suitable lead time in marketing,<sup>36</sup> the copyright holder will be unable to cover the fixed costs of producing the original work.<sup>37</sup> The disgruntled employee or teenage hacker might be a more serious problem assuming they make the work freely available, putting even more downward pressure on the price charged by the copyright holder. The problems of the copyright holder are compounded by the possibility that third parties on the Internet might speed distribution of unauthorized copies of a work by creating links, posting information about the work, or actively redistributing the work themselves.<sup>38</sup> The best argument for expanding copyright protection of digital works builds on these fears.<sup>39</sup>

Sometimes the term piracy is used to cover what I call unauthorized sharing. For example, the Software Publishers Association defines software piracy as unauthorized copying of software.<sup>40</sup> This definition includes both the mass marketing of unauthorized spreadsheets and the unauthorized copy of a computer game that one friend gives to another. I prefer a narrower definition of piracy to distinguish it from unauthorized sharing because they are such different activities.

Sharing of copyrighted works is commonplace. Most buyers share any works they purchase within their home. Buyers often lend novels, sheet music, and videotapes to their friends. Parents teach songs, poems, and stories to their children. Magazine and newspaper buyers photocopy or clip articles and give them to friends. Music, video, and software buyers sometimes copy a work and give it away; they also lend a work knowing it will be

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36. See, e.g., Stephen Breyer, *The Uneasy Case for Copyright*, 84 HARV. L. REV. 281, 299-300 (1971) (noting that the lead time advantage and strategic pricing are sufficient to give a publisher enough incentive to introduce a new work).

37. See Netanel, *supra* note 22, at 292, n.27. Fixed costs include selecting, editing, typesetting, and some one-time marketing and distribution costs. See Keith Aoki, *Foreword: Innovation and the Information Environment: Interrogating the Entrepreneur*, 75 OR. L. REV. 1, 11 (1996).

38. See Niva Elkin-Koren, *Cyberlaw and Social Change: A Democratic Approach to Copyright Law in Cyberspace*, 14 CARDOZO ARTS & ENT. L.J. 215, 284-85 (1996).

39. Besides direct competitors, the copyright holder cares about other kinds of competitors. There are: imitators, who may copy a work to extract ideas from the work that improve their ability to make and sell a similar product; creators of derivative or transformative works; and secondary market competitors, who copy a work so that they can compete with the copyright holder in a secondary market related to the copyrighted work, for example, maintaining software. Expansion of the rights of copyright holders are also designed to limit competition from these indirect competitors.

40. See Ken Wasch, *Software Industry Gets Serious About Piracy*, COMPUTER RESELLER NEWS, Nov. 7, 1988, at 140.

copied. Institutions like businesses and schools buy reference books that are shared by employees or students. These institutions also photocopy copyrighted works and distribute the photocopies internally. Explicit authorization to share a copyrighted work is not the norm. One important instance of authorization is a site license for software that allows a purchaser to share access to the software with a specified number of other users.<sup>41</sup> Most of the time sharing is either implicitly authorized or unauthorized.<sup>42</sup>

Copyright holders complain that unauthorized sharing cuts their sales and hence their profits, and that digital technology will make the problem worse.<sup>43</sup> They claim that unauthorized sharing will increase because new digital technology makes inexpensive and faithful copying technology available to the masses.<sup>44</sup> This argument is strongest with regard to digital text. The appearance of the World Wide Web and other developments in data transmission have created whole new markets for digital text. Indeed, until recently, most text was available only in print. Additionally, digital technology was not very relevant to sharing text because it is much easier to photocopy and share a printed work than it is to scan or manually enter text into a digital file in order to make and share copies.<sup>45</sup> Regarding audio and video works, digital technology produces higher quality copies, but analog technology already produces reasonably good quality copies, so the copying technology alone probably will not increase unauthorized sharing very much. The sharing of software is intrinsically a feature of digital technology. Sharing software has been a common and favored practice from the early days of computing.<sup>46</sup>

Besides better copying technology, better data transmission might also encourage more unauthorized sharing. Local networks at schools and workplaces make it easier to share software. E-mail makes it easier to share digital files of any type of work with distant friends and family members. If con-

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41. See *infra* note 139 and accompanying text.

42. An explicit ban on sharing is becoming an important feature of software licensing agreements. See Mark A. Lemley, *Intellectual Property and ShrinkWrap Licenses*, 68 S. CAL. L. REV. 1239 (1995).

43. See McDaniels, *supra* note 7 ("One out of every five consumers recently surveyed admitted that they had copied software from friends at work or school . . . [O]ver \$1 billion in business applications alone were pirated in the United States in 1994 from all sources . . .").

44. See Ginsburg, *supra* note 11, at 1478; Netanel *supra* note 22, at 299.

45. Netanel, *supra* note 22, at 299-301.

46. Cf. Stallman, *supra* note 29, at 294

sumers grow accustomed to purchasing digital works over the Internet they might also get use to sharing them over the Internet.

### B. *Justification of Copyright Expansion*

Proponents of copyright expansion advance two theories in support of their position. The first is based on fairness and holds that the relative profit shares of the groups affected by copyright law should not be altered by technological developments. The second is based on economic efficiency and holds that incentives must be maintained to produce copyrightable works.<sup>47</sup>

Copyright holders sometimes argue that they are entitled to their current share of the surplus generated by the production and distribution of copyrighted works.<sup>48</sup> This argument derives from the view that legislation should be seen as an agreement among affected parties about how to share the surplus from some regulated activity. The entitlement claim can be supported by reference to the series of (perhaps hypothetical) legislative bargains determining the content of the Copyright Act. The provisions of the Act help determine the share of surplus that flows to copyright holders. They argue that the Internet threatens to reduce their share and copyright law should respond to offset that reduction.<sup>49</sup>

The more common argument in support of copyright expansion is based on the theory of public goods.<sup>50</sup> Copyrighted works, like other kinds of information, are classified as public goods by

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47. The expansion of copyright protection of digital works might have quite a different explanation. Instead of a response to developments in digital technology, the expansion might simply be part of a general expansion of copyright. The general expansion of copyright is explained by concerns about competitiveness and property rights. Many policy-makers argue that expanded intellectual property rights subsidize high-tech industries and promote economic growth. See Wendy J. Gordon, *On Owning Information: Intellectual Property and the Restitutory Impulse*, 78 VA. L. REV. 149, 156-57 (1992). A complementary view holds that the broadest possible property rights provide the best support for a competitive and efficient economy. Goldstein, *supra* note 1, at 178-79; see also Wendy J. Gordon, *Assertive Modesty: An Economics of Intangibles*, 94 COLUM. L. REV. 2579 (1994) (discussing theories of optimal protection of computer software).

48. See Litman, *supra* note 2, at 25. Alternatively, copyright holders argue that according to a Lockean natural rights theory they are entitled to as much of the surplus as they can appropriate with the help of the law. On this view copyright should give copyright holders the broadest possible property rights. See Jaszi, *supra* note 19, at 301-03. Users are less well organized and have not been very effective protecting their rights from adverse effects caused by new technology.

49. See EDWARD ZAJAC, *THE POLITICAL ECONOMY OF FAIRNESS* 121-23 (1995).

50. See generally JEAN-JACQUES LAFFONT, *FUNDAMENTALS OF PUBLIC GOODS* (1988).

economists. One characteristic of a public good is that the producer of the good has difficulty charging others to use the good. In the absence of a copyright an author would make little profit from his novel or other work because of the actions of free riders.<sup>51</sup> Free-riders misappropriate a market created by the copyright holder. They take a free-ride on the effort exerted by the author to create a work and the publisher to edit, produce, and market the work.<sup>52</sup> Following the public goods theory, copyright creates a property right of sufficient duration and scope to provide an incentive to authors and publishers to produce new works despite the looming threat of free riders.<sup>53</sup> Effective copyright protection thwarts unauthorized competition and preserves market power for the copyright holder. During the term of the copyright free-riding is illegal. Once the copyright expires and a work falls into the public domain, however, anyone can sell the formerly copyrighted work.<sup>54</sup>

This incentive goal clashes with another goal of the copy-

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51. Even without copyright protection there are incentives to produce works of authorship. The first publisher of a work will enjoy a lead time advantage over competitors that provides some profit. Some kinds of works are protected as trade secrets or by technology. Some works are funded on a contractual basis.

52. See Aoki, *supra* note 37, at 11.

53. Positive and negative effects arise in relation to productive incentives. An optimistic view is that price discrimination raises profits and promotes additional investment in quality works of authorship. A pessimistic view is that price discrimination generates profits that are dissipated via nonproductive rent-seeking. Supporters of price discrimination by copyright holders argue that it will increase the incentive to produce copyrighted works. A related but more subtle argument is that widespread price discrimination would allow various authors and publishers to more nearly capture the full social value of copyrighted works which would encourage a better allocation of productive effort to those works generating the highest social value. See Goldstein, *supra* note 1, at 178 (1994) (explaining that the broadest copyright assures that authors get the largest possible share of the value they create, eliminating distortions in investment decisions among possible copyrightable works). Skeptics argue that the increased profits from price discrimination may cause too much investment in copyrighted works. Excessive investment might be directed to particular entertainment projects like blockbuster movies or to duplicative factual works like popular software application programs. See Netanel, *supra* note 22, at 333-35; Lunney, *supra* note 24, at 655-56. Other forms of unproductive rent-seeking include lobbying and litigation. See generally Richard Posner, ECONOMIC ANALYSIS OF LAW 260 (1986) (explaining the efficiency effect of price discrimination is indeterminate. Even perfect price discrimination might be inefficient because it creates bigger rents that may be offset by wasteful rent-seeking).

54. Instead of copyright the government could use prizes or other payments to support the production and distribution of works of authorship. Such incentives are already used to a limited extent. The federal government provides grants through organizations like the NSF, NIH, NEA, and NEH. Also universities support authorship through salary and grants.

right system: broad and rapid dissemination of works.<sup>55</sup> Perpetual and maximally broad copyright protection is the surest way to provide incentives to produce and distribute new works, but such a strong property right would impede dissemination. Strengthening copyright protection increases the market power of the copyright holder which leads to super-competitive prices. High prices cut demand and restrict the dissemination of copyrighted works. An optimal copyright policy must balance the incentive and dissemination goals by making the right choices for scope and length.

With regard to the Internet, copyright holders argue that their productive incentive should be increased by copyright expansion to offset the harmful effects of the new technology on profits.<sup>56</sup> A key implicit assumption in that argument is that the original balance was close to optimal (or that the original incentive was too small) so Congress or the courts should act to restore it.<sup>57</sup>

There are many objections to both of the theories supporting copyright expansion.<sup>58</sup> In this Article I will challenge them in detail on only one point. Both the fairness and efficiency theories posit that digital technology will significantly cut profits through unauthorized sharing and piracy unless copyright law is changed. I argue that sharing and piracy will not be significantly greater in the digital world and that the net effect of new technology actually will be to increase the profits of publishers even without major changes in copyright law.

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55. Non-rivalrous consumption is the second characteristic of public goods. See LAFONT, *supra* note 50. This means that increasing the number of consumers of the good does not impair the utility derived from consumption of the good by the original consumers. The significance of this characteristic is that the efficient price of information is the cost of transmission which is close to zero. Thus, there is a tension inherent in copyright between responding optimally to the free-rider and to non-rivalrous consumption. Economists refer to this as a trade-off between dynamic and allocative efficiency.

56. They also argue the threat of widespread infringement justifies adoption of technical measures to control and track copying. See *infra* text accompanying notes 185-212 and 223-35. See also Cohen, *supra* note 22, at 984.

57. See Litman, *supra* note 2, at 32 (hard to determine the right incentive).

58. Limits on copyright law foster the development of new media technologies. See *e.g.* Litman, *supra* note 2, at 27. Other important incentives to produce works of authorship exist as well. *Id.* at 28-29. Unauthorized sharing contributes to the dominant position of some types of software. *Id.* at 30. The legislative bargain over copyright is not fair because no one bargains for the public. *Id.* at 35.

### C. *Proposed Expansion of Copyright Protection of Digital Works*

Sharing and piracy get different treatment from proponents of increased protection of digital works. The piracy problem is addressed mostly through legal changes that support more effective enforcement of existing rights. In contrast, the problem of unauthorized sharing is addressed mostly by expanding the rights of copyright holders and constricting the rights of users.

The difference in treatment is natural considering that piracy is squarely covered by existing law,<sup>59</sup> but unauthorized sharing is often exempted from copyright liability. For example, the first sale doctrine permits a purchaser to share a magazine sequentially with several friends.<sup>60</sup> In addition, the fair use doctrine sometimes permits an educator to photocopy a magazine article and share the copies with students in class.<sup>61</sup> In contrast, if a firm subscribes to a magazine and a manager at the firm photocopies the entire magazine and distributes the copies to other managers such sharing constitutes copyright infringement.

Whether unauthorized sharing is characterized as infringement depends on the treatment of personal copying and the scope of the personal use rights reserved to the public. Personal use rights are not precisely defined in copyright law; they include reading, listening, viewing, personal copying, private display, and transfer of a copy.<sup>62</sup> The rights may apply to home users, librarians and library patrons, and institutional users like employees of a business, government, nonprofit organization or other institution. Some of these uses are commercial and public, but none of the users engage in activities that make them suppliers in competition with the copyright holder. Personal use rights derive from the first sale doctrine (section 109) and the fair use doctrine (section 107) of Copyright Law. Some argue that personal use rights might also arise from a restrictive reading of section 106 which defines the exclusive rights of the copyright holder. One theory holds that personal use amounts to a de minimus violation of section 106 rights; another theory holds that enforcement against home use comes at too high of a privacy cost.<sup>63</sup>

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59. Under the reproduction right 17 U.S.C. § 106(1) and the distribution right 17 U.S.C. § 106(3).

60. See *infra* text accompanying notes 67-75.

61. See *infra* text accompanying notes 81-95.

62. See 2 PAUL GOLDSTEIN, COPYRIGHT § 5.1 (2d ed. 1996).

63. See Netanel, *supra* note 22 at 299. In addition, some personal use rights might be attributed in part to § 102(b) which assures the public the freedom to copy un-



The area of personal use rights is ill-defined in copyright law because in the past copyright holders rarely found it worthwhile to litigate small scale infringement of their claimed rights. But the recent developments in media technologies have prompted copyright holders to pay more attention to sharing.<sup>64</sup> The general approach of proponents of copyright expansion is to limit personal use to control sharing.<sup>65</sup> Their proposals are overbroad. The reader should note in the following description of the proposals that many are directed at purely individual behavior that does not result in sharing.<sup>66</sup>

1. *The First Sale Doctrine.* The first sale doctrine authorizes a purchaser to dispose of a copyrighted work by resale, gift or lease.<sup>67</sup> Conversely, the doctrine precludes a copyright holder from restricting distribution of a work once it is sold.<sup>68</sup> Some commentary suggests that the first sale doctrine also protects

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copyrightable elements of a work.

64. See Goldstein, *supra* note 1, at 130. Privacy concerns militate against copyright enforcement against personal users, but "cheap, fast photocopies [and] new audio and video technologies have made copying possible where it was impossible before, [as a result] the risk has grown that 'private' copies will displace retail sales and rentals of the authorized originals from which publishers, record companies, and motion picture producers earn their revenues." *Id.* Private copying by video and audio tape has growing economic importance. See Ginsburg, *supra* note 11, at 1478.

65. See *America's Libraries Call for Caution at the International Copyright Negotiations for the Digital Age*, 5 AM. LIBR. ASS'N WASH. OFF. NEWSLINE (ALA) No. 86 (Dec. 9, 1996) ("Before international copyright negotiations at the World Intellectual Property Organization (WIPO) began December 2, America's five major library associations urged U.S. delegates to reconsider their positions and not to negotiate on issues on which there is no consensus . . . . As drafted, the proposals would inhibit browsing on the World Wide Web; significantly increase exposure of online service providers—including libraries—to copyright infringement liability; restricting copying currently permitted by law and impose liability on manufacturers of lawful machines that can be used for illegal copying (e.g. personal computers and VCRs); potentially undermine the Fair Use doctrine and related exceptions created by Congress in support of education and library activities and undermine the long standing U.S. tradition of protect content, not facts.")

66. Another reason that copyright holders would like to restrict personal use has to do with Internet service providers. An action for indirect copyright infringement against an Internet service provider depends on a finding of direct infringement by a customer of the provider. See Goldstein, *supra* note 62, at § 6.3.1.2. Expanding the scope of copyright vis-à-vis noncommercial users makes it easier to prove indirect infringement. See generally LIANG, PRACTISING LAW INSTITUTE, INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE, PATENTS, COPYRIGHT, TRADEMARKS, AND LITERARY PROPERTY COURSE HANDBOOK SERIES (1995).

67. The leading case on the first sale doctrine is *Bobbs Merrill Co. v. Strauss*, 210 U.S. 339 (1908).

68. 17 U.S.C. § 109(a) (1994) codifies the first sale doctrine.

private display and personal copying.<sup>69</sup> It is limited by statutes that restrict rental of software<sup>70</sup> and sound recordings.<sup>71</sup> In addition, the doctrine can be skirted if the copyright holder leases a work instead of selling it.<sup>72</sup>

Two recent copyright amendments cut back on the first sale doctrine, but still express a healthy regard for personal use rights. The record rental and the computer software rental amendments of 1984 and 1990 succeeded in stopping the kind of retail rental that exists for videotape. Section 109(b) bans unauthorized commercial record and software rental,<sup>73</sup> but Congress exempted most software transfers by nonprofit educational institutions and lending of records and software by nonprofit libraries for nonprofit purposes.<sup>74</sup> Furthermore, certain transfers within a for profit business might also be exempt.<sup>75</sup> Importantly, in these amendments Congress distinguished free-riding competition by retailers from personal use. The piracy by the rental stores was stopped but private sharing was not impeded.

Proponents of copyright expansion push for further limits on the first sale doctrine that will obstruct sharing of digital works.<sup>76</sup> They have an attractive case because simply reading digital material requires making a transitory copy in a computer's random access memory.<sup>77</sup> One court<sup>78</sup> has held that such

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69. See Litman, *supra* note 2, at 21 (private performance, display and resale have always been outside copyright protection).

70. 17 U.S.C. § 109(b)(1)(A) (1994) prohibits a buyer from renting software for profit.

71. 17 U.S.C. § 109(b) (1994).

72. See GOLDSTEIN, *supra* note 62, at § 5.6.1. *But see id.* § 5.5.2 (If an artist lends a work to an institution for private display, the borrower is permitted to lend the work to an employee for private display).

73. See *id.* § 5.6.1.

74. See *id.* § 5.2.1.

75. See *id.* § 5.6.1.

76. See Litman, *supra* note 2, at 24. ("Under one controversial view of the copyright statute, most of the activity that takes place over the Internet, and much of the activity that takes place in individuals' homes when they turn on their computers, cannot lawfully be engaged in without the authorization of the copyright owner in the material they see, hear, read, listen to or view.")

77. See Litman, *supra* note 2, at 21.

78. *MAI v. Peak Sys.*, 1995 WL 836331 (N.D. Cal. 1995). *But see* Religious Technology Center v. Netcom On-Line Communication Services, Inc., 907 F. Supp. 1361, 1368 (N.D. Cal. 1995). *MAI* did not address the question raised in this case: whether possessors of computers are liable for incidental copies automatically made on their computers using their software as part of a process initiated by a third party. *Id.* *Netcom* correctly distinguishes *MAI* on the ground that *Netcom* did not take any affirmative action that directly resulted in copying plaintiffs' works other than by installing and maintaining a system whereby software automatically forwards messages received from subscribers onto the Usenet, and temporarily stores copies on its system. *Id.* *Netcom's* actions, to the

copying is infringement unless authorized by the copyright holder or statute.<sup>79</sup> If this approach is followed it will drive a wedge between the first sale doctrine as applied to digital works and the doctrine as applied to other types of works. Under the first sale doctrine a consumer can lend a book, painting, or analog tape to a friend. When the friend reads the book, views the painting, or listens to the analog tape no copy of the work is created. If these media are transformed to their digital counterpart, then when the friend reads, or views, or listens to the digital work a copy of the work is always created. For example, a CD player temporarily stores a copy of the digital music recorded on a CD in the memory buffer of the player, and a computer makes a similar temporary copy of a program or data input from a disk, CD-ROM or other source.<sup>80</sup>

2. *The Fair Use Doctrine.* The fair use doctrine excuses various copyright infringements in deference to competing policy concerns.<sup>81</sup> Section 107 establishes a balancing test that weighs the interests of the copyright holder against the private interests of the infringer and the general public interest in access to information. Many types of personal use are sanctioned under

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extent that they created a copy of plaintiffs' works, are necessary to having a working system for transmitting Usenet postings to and from the Internet. Unlike the defendants in *MAI*, neither Netcom nor Klemesrud initiated the copying. *Id.* "There is no logical reason to draw a line around Netcom and Klemesrud and say that they are uniquely responsible for distributing Erlich's messages. Netcom is not even the first link in the chain of distribution—Erlich had no direct relationship with Netcom but dealt solely with Klemesrud's BBS, which used Netcom to gain its Internet access. Every Usenet server has a role in the distribution . . ." *Id.* at 1372; *Triad Sys. Corp. v. Southeastern Express Co.*, No. C 92 1539-FMS, 1994 WL 446049 (N.D. Cal. 1994), *aff'd in part and rev'd in part*, 64 F.3d 1330 (9th Cir. 1995), *cert. denied*, 116 S.Ct. 1015 (1996).

79. Statutory authorization is found in 17 U.S.C. § 107 (1996). See Goldstein, *supra* note 62, at § 5.6.1 at 5:608 (Section 117 allows a purchaser to reproduce copies as "an essential step in the utilization of the computer program").

80. See Pamela Samuelson, *Intellectual Property Issues Raised by the National Information Infrastructure*, PRACTISING LAW INSTITUTE SECOND ANNUAL INSTITUTE FOR INTELLECTUAL PROPERTY LAW, Sept. 1996. (Digital Future Coalition seeks to amend Section 109 to assure that an owner can transfer a copy of a digital work as long as the original is deleted at substantially the same time); Netanel, *supra* note 22, at 371.

81. 17 U.S.C § 107 (1994 & Supp. I 1996) codifies the fair use doctrine. It provides an affirmative defense against a copyright infringement action. Fair use is made out by establishing the use is equitable on balance in light of the following four factors: (1) the purpose and character of the use, including its commercial nature; (2) the nature of the copyrighted work; (3) the proportion that was taken; and (4) the effect of the copying on the market. Notice that the fair use doctrine lends to a price differential—some users pay zero while others pay a positive price. This is not equivalent to price discrimination because the differential is not chosen by the seller.

the doctrine, for example: library photocopying for medical research;<sup>82</sup> photocopying by individual scholars;<sup>83</sup> and videotaping of television broadcasts.<sup>84</sup> In the software context fair use arguably covers movement of a program from one machine to another, modification of a program for the sake of compatibility, and archiving of programs.<sup>85</sup>

The fair use doctrine may be constricted in the digital world. A photocopying case, *American Geophysical Union v. Texaco*,<sup>86</sup> offers a line of analysis that could easily be applied to digital copying. The defendants were research scientists working for Texaco. They made photocopies of journal articles from journals purchased by Texaco and held in the company library. Texaco expected that personal photocopying by researchers would be deemed a fair use even though it was in a corporate setting. A decisive factor influencing the court to deny fair use was the recent establishment of the Copyright Clearance Center (CCC), an organization developed to collect license fees for photocopying.<sup>87</sup> The court said that the creation of the CCC created a market for photocopy licensing.<sup>88</sup> A fair use ruling would deprive publishers of revenue from this new market. The case has been construed to support the position that as transactions costs fall, the scope of the fair use defense should shrink.<sup>89</sup> Applied to a

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82. See *Williams & Wilkins Co. v. U.S.*, 487 F.2d 1345 (Ct. Cl. 1973), *aff'd* 420 U.S. 376 (1975); Goldstein, *supra* note 1, at 85, 120 (library photocopying arguably had become a custom that should be accorded fair use treatment by the time of *Williams & Wilkins*).

83. See GOLDSTEIN, *supra* note 1, at 85 (publishers and libraries reached an agreement allowing libraries to make photocopies for scholars).

84. See Ginsburg, *supra* note 11, at 1479; GOLDSTEIN, *supra* note 1, at 158 (1994). Consumers use VCRs to time shift and create a library. *Id.*

85. In addition to fair use, the provisions of section 117 offer safe harbors for personal uses of software. Section 117 limits the reproduction and derivative rights of a software copyright holder. It allows the owner of a copyrighted program to make a copy as an "essential step in the utilization" of a program and to make back-up copies. See Goldstein, *supra* note 62, at § 5.2.1 (section 117 can be read to authorize a single corporate owner to allow many employees using a network to make copies for their networked machines). Courts generally have not followed this reading. Section 117 also gives a software owner the right to alter a program so that it will run on her machine. *Id.* at § 5.4.3.

86. 37 F.3d 881 (2nd Cir. 1994), *amended and superseded by* 60 F.3d 913.

87. *Id.* at 896-97. Document delivery services are another new alternative. *Id.*

88. *Id.* at 898. See also *Princeton Univ. Press v. Michigan Document Services, Inc.*, 99 F.3d 1381, 1387 (6th Cir. 1996) (en banc) (market for permission fees for college course-packs).

89. See Ginsburg, *supra* note 11, at 1478; Jaszi, *supra* note 19, at 301-02; WHITE PAPER, *supra* note 11, at 101. See generally, Wendy J. Gordon, *Fair Use as Market Failure: A Structural and Economic Analysis of the Betamax Case and Its Predecessors*, 82

future Internet with digital commerce this development portends a much smaller role for fair use.<sup>90</sup> The Internet might feature electronic libraries of text, images, video, and sound that is accessible at posted prices for portions as well as complete works. A portion could be taken and paid for with a few clicks of a mouse. Since the transaction cost involved in excerpting from protected works will be small, the fair use defense will fail.<sup>91</sup> A harbinger of this new regime is the creation of the Authors' Union which is a copyright licensing cooperative modeled after ASCAP and BMI.<sup>92</sup> It was created to improve enforcement of copyright for digital versions of textual material. Digital technology also interacts with the fair use doctrine by increasing the demand for copies of excerpts of protected works. This is especially true for multimedia authors who might borrow small excerpts of audio and visual as well as textual material.<sup>93</sup> A greater demand for excerpts helps to cover the fixed transactions costs involved in licensing such users and organizing the Author's Union.<sup>94</sup>

The fair use doctrine plays a major role in promoting or deterring unauthorized sharing. In some cases, copying that leads to sharing is excused and in others it is not. In *Sony v. Universal Studios*, the Supreme Court exempted from copyright liability the act of making videotapes of TV programs that could be shared with family and friends. In two photocopying cases, opposite results were reached. In *U.S. v. Williams & Wilkins*, the Court exempted photocopying by a government library to in-

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Colum. L. Rev. 1600 (1982).

90. See Goldstein, *supra* note 1, at 218-19 (Copyright holders can develop licensing schemes to reduce transaction costs. Creating a fair use right undercuts the incentives for the appropriate institutions to develop).

91. In an amended opinion the court softened its analysis by affirming that photocopying for personal use is still non-infringing. *American Geophysical Union v. Texaco, Inc.*, 60 F.3d 913, 916 (2d Cir. 1994).

92. See generally Merges, *supra* note 28. The market for music licenses is largely controlled by BMI and ASCAP. They license bars, restaurants, radio and television stations and others to perform copyrighted music. The standard license gives blanket permission to perform any music covered by BMI's or ASCAP's portfolio of copyrights. The charge for a license depends on factors like the size of a bar or restaurant or the population served by the media station. These factors can be verified by BMI and ASCAP and are positively correlated to buyers' valuations.

93. See generally Alfred C. Yen, *Entrepreneurship, Copyright and Personal Home Pages*, 75 ORE. L. REV. 331 (1996) (Web pages creators often take unauthorized excerpts from other Web pages).

94. See Samuelson, *supra* note 80, at 51. The Digital Future Coalition wants to amend the Copyright Act to make it clear that the fair use defense still applies in a digital environment.

crease the effective circulation of its journals, but in *Texaco* photocopying by a corporate library for the same purpose was not allowed. If the reasoning in the more recent *Texaco* is followed then personal copying for sharing and for strictly individual purposes<sup>95</sup> will lose much of its protection under fair use.

Fair use also has an impact on piracy. Copyright expansionists would like to impose liability for browsing unauthorized material in order to chill the market for pirates. Many commentators have expressed concern that reading, viewing and listening to digital works implicates the copyright holder's exclusive right to make reproductions under section 106(1).<sup>96</sup> The issue arises in the context of the World Wide Web because a user browsing a Web page makes a temporary copy of the digital information she encounters on the Web page in her machine's screen memory.<sup>97</sup> *MAI Systems Corp. v. Peak Computer, Inc.*<sup>98</sup> holds that such a copy is fixed and therefore appropriate subject matter for copyright protection.<sup>99</sup> Thus browsing becomes infringement unless it is authorized. This may not be a problem now since the posting of material on a Web page invites browsing and amounts to implicit authorization to browse. But a problem does arise if the Web page contains unauthorized copies of digital works, and many Web pages contain unauthorized text, photos, and software. In those cases the creator of the Web page cannot authorize browsing.

Copyright expansionists believe that temporary copies should be treated like other copies.<sup>100</sup> Personal use defenders would reverse the holding in *MAI Systems* so that temporary copies are not infringing.<sup>101</sup> Alternatively, they support broad protection of temporary copying under fair use. Dicta in an in-

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95. Sharing is only one aspect of personal use. Modification, archiving, choice of field of use, browsing, and the creation of derivative works for personal use are also covered by personal use rights and also impinged by proposals for digital copyright expansion. The justification for cutting protection of individual acts is not to stop sharing. It is consistent with the purpose of promoting price discrimination.

96. See Litman, *supra* note 2, at 45.

97. Exclusive rights over temporary reproductions would cover browsing the Internet, catching data during the operation of a telecommunications network, and copying to memory buffers in a CD audio player. See *News From WIPO*, Oct. 2, 1997, <<http://www.hrrc.org/newswipo.html>> (on file with author and the *Buffalo Law Review*).

98. 991 F.2d 511, 518 (9th Cir. 1993) ("[P]eak's loading of copyrighted software into RAM creates a 'copy' of that software in violation of the Copyright Act.").

99. See Aoki, *supra* note 37, at 12.

100. See Ginsburg, *supra* note 11, at 1476-79.

101. See Samuelson, *supra* note 80, at 51 (Digital Future Coalition sought amendments to section 106 that protect temporary copies made incident to an otherwise lawful use).

fringement action against an Internet service provider makes the argument that browsing is fair use even when the reader browses unauthorized copies:<sup>102</sup>

The temporary copying involved in browsing is only necessary because humans cannot otherwise perceive digital information. It is the functional equivalent of reading, which does not implicate the copyright laws and may be done by anyone in a library without the permission of the copyright owner. However, it can be argued that the effects of digital browsing are different because millions can browse a single copy of a work in cyberspace, while only one can read a library's copy at a time. Absent a commercial or profit-depriving use, digital browsing is probably a fair use; there could hardly be a market for licensing the temporary copying of digital works onto computer screens to allow browsing. Unless such a use is commercial, such as where someone reads a copyrighted work online and therefore decides not to purchase a copy from the copyright owner, fair use is likely.<sup>103</sup>

3. *The Copyright and Contract Law Intersection.* Some commentators believe that contract law is as important as copyright law in exploiting digital works.<sup>104</sup> The reason is that many digital publishers contract around the first sale and fair use doctrines. The practice is common for mass marketed software.<sup>105</sup> Software companies insist that they license rather than sell their products<sup>106</sup>—because of the shrink-wrap packaging of the software these licenses are known as shrink-wrap licenses. Restrictive licenses that abrogate personal use rights are also negotiated in arms length transactions. License terms may preclude a buyer from doing the following to her software:

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102. See *Religious Technology Center v. Netcom On-Line Communication Services, Inc.*, 907 F. Supp. 1361, n.25 (N.D. Cal. 1995) ("Additionally, unless a user has reason to know, such as from the title of a message, that the message contains copyrighted materials, the browser will be protected by the innocent infringer doctrine, which allows the court to award no damages in appropriate circumstances. In any event, users should hardly worry about a finding of direct infringement; it seems highly unlikely from a practical matter that a copyright owner could prove such infringement or would want to sue such an individual.").

103. *Id.*

104. See Lemley, *supra* note 42, at 1239.

105. See, e.g., *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1450 (7th Cir. 1996) ("Every box containing its consumer product declares that the software comes with restrictions stated in an enclosed license. This license, which is encoded on the CD-ROM disks as well as printed in the manual, and which appears on a user's screen every time the software runs, limits use of the application program and listings to non-commercial purposes.").

106. See Lemley, *supra* note 42, at n.23 (Microsoft chooses to license rather than sell all of its software to defeat the first sale doctrine.).

transferring, sublicensing, leasing, copying, modifying, migrating, translating, disassembling, decompiling or converting to another programming language.<sup>107</sup> Some of these terms are designed to block software sharing or discourage piracy, but other terms appear designed to control strictly individual uses.<sup>108</sup>

The legal foundation for copyright license restrictions is not completely secure. The chief issue is whether and to what extent federal copyright law preempts licenses effectuated through state contract law.<sup>109</sup> The limited case law has been mostly hostile to the enforcement of shrink-wrap license terms.<sup>110</sup> They have been voided on grounds of preemption and also because of failure of mutual assent or based on a policy against adhesion contracts.<sup>111</sup> In contrast, courts have generally enforced contract terms that do not constrict personal use rights.<sup>112</sup>

Despite the possibility of contractual limits on personal use, digital publishers have reason to push for expanded copyright

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107. See *id.* at 1246-47.

108. License terms work against piracy and sharing by limiting access and by stopping software modifications designed to thwart copy prevention. Copy prevention is discussed *infra* notes 120-121 and accompanying text. Terms that abrogate the first sale doctrine obviously restrict sharing. Except transferring, sublicensing, and leasing, the other restrictive terms might affect purely individual use of a work. The terms governing disassembling, decompiling, and modifying are especially troubling because they might contribute to entry barriers blocking legitimate competition. See Julie E. Cohen, *Reverse Engineering and the Rise of Electronic Vigilantism: Intellectual Property Implications of "Lock-Out" Programs*, 68 S. CAL. L. REV. 1091, 1128 (1995).

109. Statutory preemption requires: (1) the state right in question must be equivalent to any of the exclusive rights within the general scope of the copyright as specified by section 106; (2) the right must cover a work that is fixed in a tangible medium of expression; and (3) the work must come within the subject matter definition of copyright as specified by sections 102 and 103. See Goldstein, *supra* note 62, at § 15.2.

110. See *Vault Corp. v. Quaid Software Ltd.*, 847 F.2d 255 (5th Cir. 1988) (holding unenforceable the provision in a license that requires decompilation or disassembly); Lemley, *supra* note 42, at 1248-59. *But see* *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447 (7th Cir. 1996) (holding that the Copyright Act did not preempt state law enforcement of shrinkwrap license); WHITE PAPER, *supra* note 11, at 58-59; Maureen K. O'Rourke, *Copyright Preemption After the Pro Cd Case: A Market-Based Approach*, 12 BERKELEY TECH. L. J. 53 (1997).

111. See Lemley, *supra* note 42, at n.55-59. Specific terms have been voided on the grounds of unconscionability. *Id.* at 1254.

112. See Goldstein, *supra* note 62, at § 15.2.1.2 (stating that contract law is generally immune from preemption). *But see* Netanel, *supra* note 22, at 306 (stating that First Amendment limits and copyright preemption may apply to database access contracts); Lemley, *supra* note 42 at 1273-74 (copyright holders should not be allowed to enjoy both copyright advantages and contract law benefits; they should be forced to choose as is the case with patents and trade secrets); David Rice, *Public Goods, Private Contract and Public Policy: Federal Preemption of Software Licensing Prohibitions Against Reverse Engineering*, 53 U. PITT. L. REV. 543, 629 (1992) (contract limits on reverse engineering may be preempted).



protection. The advantage of copyright law is that it provides more generous remedies than contract law. A successful copyright plaintiff routinely gets injunctive relief (often including a preliminary injunction). There are also statutory damages, and for willful infringement, treble damages and attorneys' fees.<sup>113</sup>

4. *Enforcement Issues.* The authors of the *White Paper* and other supporters of copyright expansion advocate three measures to improve enforcement of the copyright on digital works: allow indirect copyright liability to be imposed on Internet service providers;<sup>114</sup> prohibit technology designed to defeat copy prevention techniques;<sup>115</sup> and outlaw tampering with copyright management information.<sup>116</sup> There are a few cases yielding mixed results on the question of indirect copyright liability of Internet service providers.<sup>117</sup> Copyright holders hope they can use indirect liability to find deep pockets to cover losses from piracy and sharing.<sup>118</sup> In addition, imposing liability for unauthorized sharing complements the policy of indirect liability. Indirect infringement is predicated on the occurrence of direct infringement. Copyright holders will have a much easier time enforcing their rights against a few large Internet service providers than against the thousands or millions of small scale infringers.<sup>119</sup>

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113. See Lemley, *supra* note 42, at 1273.

114. See Ginsburg, *supra* note 11, at 1492-99.

115. See McDaniels, *supra* note 7 (H.R. 2441 prohibits "black boxes" that are used to circumvent technical protection for computer programs. H.R. 2441 would prohibit goods and services with the primary purpose or effect of circumventing technical means of preventing or inhibiting copyright infringement).

116. See *id.* at 88 (H.R. 2441 prohibits removal or alteration of copyright management information).

117. See, e.g., *Playboy Enter., Inc. v. Frena*, 839 F. Supp. 1552 (M.D. Fla. 1993) (direct infringement by service provider); *Sega Enter. Ltd. v. MAPHIA*, 857 F. Supp. 679 (N.D. Cal. 1994) (indirect liability); *Religious Tech. Ctr. v. Netcom On-Line Communication Servs., Inc.*, 907 F. Supp. 1361 (N.D. Cal. 1995) (no indirect liability).

118. See McDaniels, *supra* note 7, at 90 ("[The Software Publishers Association] relies on current copyright law—including liability for indirect infringement—to protect hundreds of software companies from piracy . . .").

119. Besides any direct benefit to copyright holders from contributory infringement suits, the threat of liability might help copyright holders in their broader contest with Internet service providers. These are the two industry groups that will most profit from the rise of the Internet. Contributory infringement might become a bargaining chip in a political deal concerning property rights on the Internet. The threat of lawsuit might also be used to induce service providers to monitor users to detect and prevent copyright infringement. See Ginsburg, *supra* note 11, at 1488; *Why Internet Service Providers Should be Copyright Guardians*, *Software Law Bull.*, May 1996, at 78. See generally Goldstein, *supra* note 62, at § 6.2.1.1. The WHITE PAPER states that the service providers

The other two measures have been considered by Congress. Copy prevention techniques use software and sometimes special hardware or media to stop copying.<sup>120</sup> These methods are quite effective in stopping copying for the purpose of sharing. They have been less effective in stopping piracy. One reason is that technological countermeasures can usually be developed to circumvent the copy prevention technique. Copyright management information is used to track the disposition of copyrighted works once they leave the possession of the copyright holder.<sup>121</sup> The information is valuable evidence of infringement and can be used to combat piracy.

## II. FACILITATING PRICE DISCRIMINATION

### A. *Price Discrimination Fundamentals*

Economists have analyzed numerous sophisticated marketing strategies. At the core, many turn out to be types of price discrimination. Price discrimination means that consumers of an identical product are charged different prices by the same seller, or that consumers of similar products made by the same seller are charged a price differential unrelated to cost.<sup>122</sup> The advantage of price discrimination to the seller compared to a uniform sale price is that more revenue is generated.<sup>123</sup> In the ideal case of perfect price discrimination, every customer is charged her maximum willingness to pay for the items she purchases.

The issue of price discrimination was prominent in *ProCD v Zeidenberg*.<sup>124</sup> ProCD manufactured and sold CD ROM telephone directories. The defendant Zeidenberg violated a condition in his license that limited him to consumer uses. He copied the directories and used them to make his own product that he marketed in competition with ProCD. In his opinion, Judge Easterbrook explained how ProCD discriminated:

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are in "the position to know the identity and activities of their subscribers and to stop unlawful activities." See WHITE PAPER, *supra* note 11, at 117. However, the service providers claim that they would have difficulty identifying infringing material. *Id.* at 115-16.

120. See *infra* notes 174-214 and accompanying text.

121. See *infra* notes 225-37 and accompanying text.

122. *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1450 (7th Cir. 1996) ("A producer of movies segments the market by time, releasing first to theaters, then to pay-per-view services, next to the videotape and laser disc market, and finally to cable and commercial TV").

123. Speaking of price discrimination, an antitrust casebook says "[t]here is no more profitable way to sell a product." MILTON HANDLER, ET AL., *TRADE REGULATION: CASES AND MATERIALS* 1221 (4th ed. 1997).

124. 86 F.3d 1447 (7th Cir. 1996).

The database in SelectPhone™ . . . is much more valuable to some users than to others. The combination of names, addresses, and [SIC] codes enables manufacturers to compile lists of potential customers . . . . People with nothing to sell could use the database as a substitute for calling long distance information, or as a way to look up old friends who have moved to unknown towns, or just as [an] electronic substitute for the local phone book. ProCD decided to engage in price discrimination, selling its database to the general public for personal use at a low price (approximately \$150 for the set of five discs) while selling information to the trade for a higher price. It has adopted some intermediate strategies too: access to the SelectPhone™ database is available via the America On-line service for the price America Online charges to its clients (approximately \$3 per hour), but this service has been tailored to be useful only to the general public.<sup>125</sup>

Effective price condition requires: (1) measurement of consumer preferences; (2) a means to stop arbitrage by favored consumers; and (3) market power.<sup>126</sup> Are the conditions for price discrimination met in *ProCD*? The passage above illustrates how the seller measures preferences. Buyers are segmented into commercial and consumer categories. Judge Easterbrook explains that commercial buyers have higher valuations. Elsewhere in the opinion he explains that a term in the software license precludes consumer buyers from making commercial use of the product. Such a term limits arbitrage. One can only speculate about whether ProCD has sufficient market power to successfully discriminate. Judge Easterbrook comments that ProCD has rivals. Market power declines as the number of rivals increases.<sup>127</sup> But a firm does not have to be a monopolist to price discriminate. Some measure of market power is provided by the copyright which protects the search engine used in the software and the high fixed cost of selecting and maintaining the database. Time will tell. Persistent discriminatory pricing suggests sufficient market power.

Missing from the list of conditions is any mention of compliance with antitrust law. Price discrimination is not effectively

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125. *Id.* at 1449.

126. See generally JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 133-52 (1988).

127. *Id.* at 220-21. Generally, publishers will have rivals selling related but not equivalent works. In economic jargon publishers usually operate in differentiated product markets. *Id.* at 212. Product differentiation gives some measure of market power and may be sufficient to support price discrimination. There are two factors that may limit the market power of digital publishers, and thereby limit price discrimination. First, digital technology may encourage entry into the publishing industry. Second, the profits from broader price discrimination may also encourage entry.

regulated. The Robinson-Patman Act outlaws price discrimination in certain cases, but "it will not apply to just those cases in which systematic price discrimination is most likely to exist and to have potent economic effects."<sup>128</sup> Three important limitations are: it applies only to physical commodities,<sup>129</sup> it applies to sales but not leases,<sup>130</sup> and it does not cover discrimination involving quality variations.<sup>131</sup> The few antitrust cases involving intellectual property and price discrimination do not have much bite.<sup>132</sup>

## B. Preference Measurement

Sellers have devised ingenious methods of measuring buyers' valuations. They must be ingenious because most buyers hide their valuations. In a negotiated transaction, the seller can observe general demographic characteristics but cannot force a prospective buyer to divulge her valuation any more than the buyer could force the seller to divulge his cost. In anonymous mass market transactions, the seller does not even observe the age or gender of the buyer. Sellers use what information they can glean from buyers to support inferences about valuations. When inferences are weak and the cost of gathering information is too high, then price discrimination may not be worth the bother.

Economists use a three way classification scheme for price discrimination depending on how preferences are measured.<sup>133</sup> In third degree price discrimination, price differentials are tied to a characteristic of a buyer that is correlated with the buyer's valuation. An example is a senior citizen who gets a discounted movie ticket.<sup>134</sup> The seller observes the characteristic and infers that on average this type of buyer has a lower valuation. In second degree price discrimination, price differentials are tied to actions chosen by the buyer. The seller believes that certain actions reflect the preferences of a low valuation buyer and other

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128. HANDLER ET AL., *supra* note 123, at 1222.

129. *Id.*

130. *Id.*

131. *Id.* at 1229.

132. In *BMI v. CBS*, 441 U.S. 1 (1979), the Court allowed BMI to discriminate in the blanket licensing of musical compositions. Discrimination was implemented by charging a royalty that varied with a buyer's revenue. Buyers with higher revenue and bigger audiences are likely to be willing to pay more for a license. See HERBERT HOVENKAMP, *ECONOMICS AND FEDERAL ANTITRUST LAW* 123 (1985).

133. See, e.g., TIROLE, *supra* note 126, at 135.

134. See *id.* at 73 (discussing price discrimination over time using examples of first versus second run movies and hard cover versus paperback books).

actions reflect the preferences of a high valuation buyer.<sup>135</sup> In the movie example, a Tuesday night discount illustrates second degree price discrimination. In first degree price discrimination, the seller knows or learns the exact valuation of all buyers. This, of course, is an idealized benchmark.

The distinction between second and third degree discrimination is important because second degree discrimination is usually more costly to implement. The greater cost arises from the need to get buyers to sort themselves in a manner that makes discrimination possible. Economists call this a sorting condition.<sup>136</sup> The price and characteristics of the good intended for the low end of the market must not attract the high end, and the price and characteristics of the good intended for the high end must not attract the low end. The sorting condition imposes an implicit cost on the seller because it restricts the freedom of the seller to set efficient prices. With third degree price discrimination the seller can choose prices for the two classes of consumers independently. With second degree price discrimination the prices are linked. Economic theory shows that a monopoly seller should set the efficient price for the high valuation consumers and an inefficient price for the low valuation consumers.<sup>137</sup> This inefficiency yields the implicit cost of sorting.<sup>138</sup>

Second degree price discrimination is common in the software market. A simple method is to grant a site license.<sup>139</sup> A site license authorizes a customer to install a certain number of copies of software on stand alone machines at a site, or allow a certain number of networked users to access the software on a server. By making licensing fees sensitive to the number of users at a site, the seller can profitably discriminate as long as the number of users has a positive correlation to value.

Software publishers also use product design to facilitate second degree price discrimination. Educational versions of software may sell for a fraction of the price of standard versions. Sellers disable some of the features in the standard version so the quality is reduced. A similar strategy is to include documentation and customer support with the standard version and not

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135. Easterbrook gives an example in *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1450 (7th Cir. 1996): "An air carrier sells tickets for less to vacationers than to business travelers, using advance purchase and Saturday-night-stay requirements to distinguish the categories."

136. They also call it a self-selection or incentive compatibility condition.

137. See DREW FUDENBERG & JEAN TIROLE, *GAME THEORY* 246-50 (1991).

138. See *id.*

139. See *CMAX/Cleveland, Inc. v. UCR, Inc.*, 804 F. Supp. 337 (M.D. Ga. 1992).

with the educational version. Buyers who prize quality must pay more for the standard version, and students who are less sensitive to quality buy the cheaper version. Sorting will not occur unless the discount is large enough to justify the quality reduction to the low valuation buyers. But the discount cannot be too large or both types of buyers will purchase the cheap version.

If it is feasible to check student IDs before selling a cheap version then third degree price discrimination is possible. Comparing optimal second and third degree discrimination: both lead to the same price for the expensive version, while third degree price discrimination leads to a *lower* price on the cheap version and *higher* profits to the seller. The important intuition behind the economic theory is that the sorting condition reduces the seller's freedom and less freedom means lower profit. This discussion shows that sellers prefer third degree discrimination. But in many markets sellers are forced to rely on second degree discrimination because they cannot condition sales terms on directly relevant buyer characteristics.

A more sophisticated version of second degree price discrimination requires metering. In some cases metering can approximate first degree price discrimination. A classic example is provided in the antitrust case *International Business Machines v. United States*.<sup>140</sup> IBM tied the sales of its tabulator machines to purchases of punch cards that were used in the machines. The likely purpose of this tied sale was to implement price discrimination.<sup>141</sup> Discrimination was accomplished by charging a relatively low price for the tabulators, and a price above the competitive price for the punch cards. The purchase of punch cards meters (or measures) the frequency of use of the tabulator. The effect of the tied sale is to charge a high price to those who use the machine frequently and a low price to infrequent users. IBM reasonably believed that frequent use was positively correlated with high valuation.

Suppliers can sometimes directly meter the use of their product. Photocopy machines have counters that record the number of copies that have been made. Lease agreements often charge rates that depend directly on measured usage.<sup>142</sup> Digital technology will expand the use of direct metering.<sup>143</sup> For example, rather than selling hard copies of encyclopedias at a fixed

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140. 298 U.S. 131 (1936). See Ward Bowman, *Tying Arrangements and the Leverage Problem*, 67 YALE L.J. 19 (1957).

141. See *Hovenkamp*, *supra* note 132, at 229-33.

142. Car rental agreements are another familiar example.

143. See *infra* notes 160-63 and accompanying text.

price, a digital publisher could offer access to a digital encyclopedia and charge based on usage. Frequent users pay more for access and infrequent users pay less. As long as use is linked to value, metering can implement price discrimination.<sup>144</sup>

### C. Arbitrage

Arbitrage is limited by many factors;<sup>145</sup> I concentrate on the role of transaction costs, technology, and law because they are especially relevant to digital works. Even though arbitrage is feasible sometimes it does not happen because the transaction costs are too high. In the movie example, even if the ticket taker is not very vigilant arbitrage would be limited by the hassle of setting up a secondary market in movie tickets. Further, theaters would resist arbitrage by limiting ticket sales to a small number per customer. In a digital world where it may be possible to buy individual songs or newspaper articles or photographs for pennies, small scale arbitrage might be too costly and large scale arbitrage<sup>146</sup> too easily detected to be feasible.

When quality differentials are the source of price discrimination, arbitrage may be blocked by technology. As described above, educational discounts accompany software that has limited features compared to the higher priced version. Arbitrage is only possible if an educational user can alter the software to add or restore the missing features at a cost less than the dis-

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144. There are other purposes served by metering. Usage information determines a lessor's maintenance schedule. A producer of a variety of products can alter the product mix based on usage information. According to Hovenkamp, tied sales generally can serve many other purposes besides price discrimination. Often a particular marketing practice can simultaneously advance many goals for the seller. HOVENKAMP, *supra* note 132, at 233-36.

145. In some cases arbitrage is intrinsically infeasible. Services are a good illustration. The favored customer of a hair stylist cannot purchase an extra haircut for resale. The favored customer of a dentist cannot resell a filling. Younger movie patrons cannot use senior movie tickets as long as the tickets indicate that they are for senior use and the ticket taker is vigilant. Similarly, appropriately marked Tuesday night tickets cannot be used on Friday night. Transportation cost is an important factor preventing arbitrage when sellers price discriminate between different geographic markets. This is of little relevance to copyrighted works since transportation costs range from small to trivial. Suppliers often lease rather than sell computer hardware and software. A lessee is not allowed to purchase and resell computer services, so arbitrage is impossible. See JOHN SHEPARD WILEY JR. ET. AL., *The Leasing Monopolist*, 37 UCLA L. REV. 693, 717-18 (1990) ("By leasing rather than selling, the monopolist can retain control over the machines, prevent arbitrage, and thus succeed in price discrimination").

146. Arbitrage must be distinguished from piracy. Under the first sale doctrine resale on any scale should be protected as long as authorized copies are resold. To stop large scale arbitrage sellers are likely to insist on contractual limits on resale.

criminatorial price differential.<sup>147</sup>

New digital distribution technologies promise to limit arbitrage opportunities for digital works. Many transactions involving copyrighted works are being converted from sales of goods to sales of services. Text published in encyclopedias or legal digests can be resold, but a subscription to a database cannot.<sup>148</sup> Videotapes can be resold but video that is delivered over the Internet by streaming technology cannot.<sup>149</sup> On the other hand, the transaction costs that block arbitrage will fall as digital commerce appears.

The possibility of contract or copyright lawsuits raises the barrier to arbitrage of copyrighted works. The link between the first sale doctrine and arbitrage is obvious. If favored buyers can purchase a work and then sell or lease it to disfavored buyers then price discrimination may be defeated. Contract restrictions on resale or other transfers deter arbitrage.

Contract terms can impede arbitrage in other ways. In *ProCD* a field of use restriction in the software contract did the job.<sup>150</sup> Customers were sorted into the commercial and consumer categories and charged different prices. The favored consumer buyers were discouraged from making commercial use of the database by the threat of contract litigation.<sup>151</sup> The tying contract in *IBM* was designed to prevent high valuation customers from buying low cost punch cards in the open market. Contracts often limit the modification of software or the movement (migration) of software from one platform to another. One purpose of

147. Besides the technical challenge, a would-be arbitrageur may face licensing terms that ban alterations to the software. Similarly, the auto industry is well known for setting much higher mark-ups on luxury cars than on economy cars. Arbitrage is impossible because high value customers cannot buy an economy car and add the luxury features on their own.

148. More precisely, the first sale doctrine applies to the owner of an encyclopedia or digest, but not to the database subscriber. See GOLDSTEIN, *supra* note 62, at § 5.6.1.

149. See *infra* notes 187-95 and accompanying text.

150. Easterbrook explains that preventing arbitrage is necessary for price discrimination:

To make price discrimination work . . . [vendors of computer software] must be able to control arbitrage . . . Anyone can walk into a retail store and buy a box. Customers do not wear tags saying "commercial user" or "consumer user." Anyway, even a commercial-user-detector at the door would not work, because a consumer could buy the software and resell to a commercial user. That arbitrage would break down the price discrimination . . .

*ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1450 (7th Cir. 1996).

151. A more direct contractual approach to limiting arbitrage is simply to prohibit resale. A familiar example is price discrimination directed at airline passengers. Airline contracts which prohibit resale, coupled with FAA security regulations calling for identification checks, make arbitrage very difficult.



this limitation is to reduce arbitrage possibilities.<sup>152</sup> For example, an application program like a statistics package can be designed to run on a DOS or UNIX operating system. The UNIX buyers tend to have more powerful machines and higher valuations for the software. If the price charged for UNIX versions is higher, then UNIX buyers may want to purchase a DOS version and modify it to run on UNIX. This arbitrage can be deterred if the price differential is less than the cost of modification. But the seller might want a larger price differential which makes the contract limitation valuable.

### III. COPYRIGHT LAW, DIGITAL TECHNOLOGY AND PROFIT

The argument for expansion of copyright protection of digital works that I presented is premised on the assumption that developments in digital technology will erode profits to copyright holders. The premise is probably false. Digital technology will encourage more price discrimination<sup>153</sup> and greater profits to copyright holders regardless of the direction of copyright law in the digital world. Digital technology is also likely to create new markets and new profit opportunities for authors and publishers.<sup>154</sup> In contrast, the growth of unauthorized sharing and piracy can be mitigated by copy prevention and copy tracking technology.<sup>155</sup> Furthermore, the losses from unauthorized sharing of digital works and the probability that the practice will grow are likely overstated.<sup>156</sup> Finally, it is important to realize that the most significant economic effect of expanded copyright protection of digital works will be to facilitate even more price

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152. A second, very different role is played by limits on modification and migration. These limits reduce the useful lifetime of certain software. The limit on migration keeps a buyer from moving the software to new hardware even if she deletes the version on the old hardware. The limit on modification might impair use of software in combination with a new operating system. Such contract induced obsolescence can increase profits to a durable goods monopolist. See generally TIROLE, *supra* note 126.

153. In this Article, I only discuss discrimination against end-users, but discrimination against input purchasers is also likely. For example, multimedia producers may need authorization from many copyright holders covering relatively small excerpts. They may wind up turning to some collective rights organization like the Authors' Union. They might be subject to the kind of price discrimination used by music licensing organizations against broadcasters and bars.

154. Digital technology will improve the marketing of copyrighted works. One marketing improvement is more effective price discrimination. Others include better research, product design, selection and advertising which will all flow from better information. The resulting profit gains could easily offset any losses from increased unauthorized sharing or piracy.

155. See text accompanying notes 174-214, 219-37.

156. See text accompanying notes 166-71.

discrimination. The ostensible goal may be to restore lost profits, but the result is likely to be a vast gain in profits by copyright holders.

#### A. *Price Discrimination and Profit*

Copyright expansion and digital technology will create a windfall of profit for copyright holders. Both make arbitrage harder and preference measurement easier, which facilitates more price discrimination. More price discrimination means more profit to the sellers of digital works.

Price discrimination is a potent method of increasing a seller's profit, because the seller can squeeze more revenue out of existing customers.<sup>157</sup> Consider an example. Assume that there are two types of buyers in the market for a particular novel. Type H has a high valuation of \$20 for the novel, and type L has a low valuation of \$10. There are two million type H buyers and six million type L buyers. Assume that the marginal cost of printing and distributing the novel is \$5. The uniform monopoly price for the novel is \$10 which yields a profit of \$40 million.<sup>158</sup> A price discriminating monopolist would charge \$20 to the H types and \$10 to the L types which yields a profit of \$60 million.<sup>159</sup> Thus profit rises by 50%.

A second example is illustrated in Figure 1. It shows a smooth downward sloping demand curve. Unlike the first example, buyers' valuations take on a continuum of values. Again I assume that the marginal cost (given by the line XY) of a novel is \$5. The uniform monopoly price is shown as M. The profit is the area of the rectangle VWXM. Next suppose that first degree price discrimination is possible so that the monopolist can identify the maximum willingness to pay of every user. The monopolist charges a different price to every user corresponding to their position on the demand curve. The monopolist serves every consumer up to the one with a valuation of \$5. The profit is the area of the triangle XYZ. Price discrimination doubles the profit of the seller.

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157. Output and production costs might rise given price discrimination. Also, there are costs of implementing price discrimination, but a producer would not choose to discriminate unless he expected discrimination to raise his profit.

158. This profit is the gross of the fixed costs of production like writing, editing, and typesetting.

159. I assume that the monopolist can identify the two types, and arbitrage is not possible.

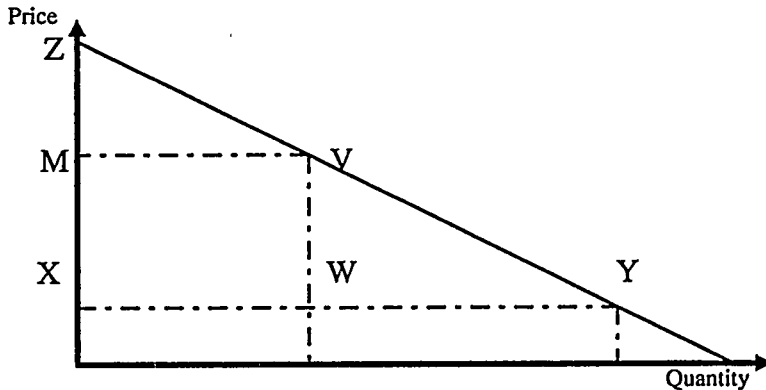


Figure 1

Digital technology will directly facilitate price discrimination by allowing low cost metering of the usage of digital works.<sup>160</sup> Technology for metering a customer's usage of a product occurs outside of the digital realm. Photocopy machines are equipped with counters that record the number of copies made. This information is useful for maintenance, but it also can be used to determine charges under a lease agreement. Similarly, the odometer in a rental car records mileage information that is useful for maintenance and linked to rental charges. Within the digital realm, probably every reader of this Article is familiar with legal research databases. The database providers record information on how much time each user spends on-line and how many pages of text each user downloads. This information is useful for managing access to the database and determining its contents, but it also can be used to determine charges.

In the future, methods like streaming of audio and video or cryptographic envelopes will make usage metering widespread.<sup>161</sup> Metering systems will allow copyright holders to charge for every access to and use of their work.<sup>162</sup> Goldstein

160. See Goldstein, *supra* note 1, at 200 (It is now feasible to measure factors like frequency and duration of the use of a work.); WHITE PAPER, *supra* note 11, at 219; Cohen, *supra* note 22, at 1038; Netanel, *supra* note 22, at 295 (digital technology allows highly refined price discrimination).

161. See Goldstein, *supra* note 1, at 224 (Technologies might emerge that allow copyright holders to charge for the value of each element used not just a time based charge.) *Id.* at 28 (musing about the satellite delivery of digital works [celestial jukebox] facilitated by sophisticated price discrimination).

162. See Elizabeth Corcoran, *A Digital Duel: Whose Property Is This? Business and Net Cruisers Debate How and Whether Copyright Applies in Cyberspace*, WASH. POST,

speculates that because new transmission technology will be able to "keep a record of every selection a subscriber makes, and the price he paid for it, copyright owners will have a far more precise measure of the demand for their products than they do today."<sup>163</sup> Improvements in measuring usage allow better measurement of user valuations and lead to more profitable price discrimination.

Some more good news for copyright holders is that arbitrage can be discouraged with copy prevention technology. Currently, music producers use CD-ROMs to distribute music because it is difficult for the typical user to make digital copies from them. Electronic game manufacturers sell game cartridges that are difficult to copy. Soon other techniques will be available to impede personal digital copying.<sup>164</sup> Regardless of whether they price discriminate, copyright holders will try to stop personal copying that leads to unauthorized sharing. Sellers charging a uniform price want to get every user to pay that price. But price discriminators especially dislike sharing because it is an avenue for arbitrage. More price discrimination will now be feasible because copy prevention methods can discourage sharing and arbitrage.<sup>165</sup>

Returning now to copyright law, I have shown in Part II that expanded legal protection of digital works will ease measurement of preferences and discourage arbitrage. To summarize the impact on preference measurement: field of use restrictions in copyright licenses segregate buyers by type; and software site licenses allow the counting of users. An impact on arbitrage arises because: restriction of the first sale doctrine means less sharing and fewer arbitrage opportunities; a diminished fair use doctrine means that users may not be able to decompile, modify, or migrate software in such a way as to defeat second degree

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Sept. 3, 1995, at H1; McDaniels, *supra* note 7 (software agents could be used to measure software use on the Internet and collect royalties); Julie F. Cohen, *Some Reflections on Copyright Management Systems and Laws Designed to Protect Them*, 12 BERKELEY TECH. L. J. 161 (1997).

163. See Goldstein, *supra* note 1, at 220. See also Cohen, *supra* note 22, at 1038 (prototype systems now exist that allow monitoring and charging for every use of a copyrighted work).

164. See text accompanying notes 174-214.

165. One factor works against greater profit from price discrimination: entry. New profit possibilities and publishing technologies might encourage entry of new digital content providers. Entry erodes the market, which reduces profit and makes price discrimination more difficult. See *University Establishes Policy to Post-Work on the Internet*, N.Y. TIMES, July 28, 1997, at A9 (entry of a university into digital publishing of dissertations).

price discrimination; contract terms may abrogate the personal use rights that remain and thereby discourage sharing; and prohibition of technology that circumvents copy prevention lessens opportunities for sharing and arbitrage.

Would-be price discriminators are delighted by the prospect of shrinking personal use rights combined with digital metering technology. These two developments have a complementary effect. To see why suppose that some genre of work X is distributed via some new technology A. It might be the case that technology A allows for easy metering of use of X, but does nothing to discourage arbitrage. Price discrimination might be enabled because changes in copyright law cutting back on personal use rights help the seller block arbitrage. Better measurement is worthless to a price discriminator who cannot stop arbitrage. Similarly, there is no reason to price discriminate or try to block arbitrage if one cannot measure user valuations. Both technology and expansion of copyright could induce new or more elaborate price discrimination on their own, but together they should lead to much more.

### B. *Unauthorized Sharing and Profit*

Proponents of copyright expansion fear that personal use rights in the digital age will lead to rampant small-scale, informal sharing and copying that will devastate publishers.<sup>166</sup> There are three reasons why I doubt that fear will be realized. First, the loss in profits from personal use is probably exaggerated. Second, digital technology will not necessarily increase the exercise of personal use rights. Third, technical measures are also available to restrict exercise of those rights.

Personal use rights limit the distribution rights of a copyright holder. This irritates publishers who would like to have complete control over distribution channels.<sup>167</sup> They complain that personal copying, lending, and sharing cuts into sales and revenue. This seems like an obvious grievance but it is actually quite complicated. Part of the complaint holds that personal use cuts *sales*—that is probably true. Part of the complaint holds that personal use cuts *revenue*—that is also probably true, but it

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166. See Deborah Shapley, *Corporate Web Police Hunt Down E-Pirates*, NEW YORK TIMES, May 19, 1997 at D5. ("The Business Software Alliance estimates that of the 523 million new business software applications used globally in 1996, 225 million, or nearly one in two are pirated.")

167. Cf. GOLDSTEIN, *supra* note 62, at § 5.6.1 ("The relevant principle is that the distribution right assures the copyright owner no more than the opportunity to realize the full value of each copy or phonorecord upon its distribution").

is less clear and less dramatic than people usually think. An unspoken part of the complaint is that personal use cuts *distribution cost*—unspoken, because it is a benefit to publishers.

Personal use cuts sales because a user does not make a commercial purchase if they get software, music or video from a friend. The sales decline might be offset by favorable word-of-mouth advertising associated with personal use that increases demand.<sup>168</sup> The sales decline is limited because many of the users who could not get the work from a friend would simply drop out of the market.<sup>169</sup> Personal use cuts revenue because sales fall. This cut in revenue might be completely offset by a higher sales price. If a copyrighted work would sell for \$5 per copy in a world with no sharing, it might sell for \$10 in a world in which every purchaser shares the work with one other person. The total sales revenue is the same.<sup>170</sup> Of course, the price is not apt to rise to \$10 if the purchaser does not charge her friend and does not fully value her friend's use.<sup>171</sup> Finally, personal use cuts distribution costs, because the purchaser bears the cost of distributing a copy to her friend and the publisher avoids this cost. The net effect on the profit of publishers is undoubtedly negative, but the size of the effect is overstated by the emphasis on sales rather than revenue and cost.<sup>172</sup> Further, this is just as much a problem for hard copy and analog publishers as it is for digital publishers.

It is easy to see that the Internet raises the threat of piracy, but it is not so easy to see that personal use rights will be exercised more frequently in a digital world. Given the current state of technology, borrowing or sharing a hard copy newspaper or magazine or novel is more likely than borrowing or sharing the digital equivalent.<sup>173</sup> On the other hand, clipping

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168. See, e.g., Thomas Petzinger Jr., *Copyright Imbroglia Entangles a Work that Web Gave Away*, WALL ST. J., Oct. 10, 1997, at B1 (selections from books available online to increase demand).

169. See Stallman, *supra* note 29, at 294. Cf. *American Geophysical Union v. Texaco, Inc.*, 37 F.3d 881, 896-97 (2d Cir. 1994) (eliminating photocopying at Texaco would not result in a large increase in journal subscriptions).

170. See Netanel, *supra* note 22, at 374. Here I am analyzing a market with uniform and not discriminatory prices. Sharing disrupts price discrimination by way of arbitrage. See *supra* text accompanying notes 150-51.

171. If the purchaser is a business or some other institution the purchasing agent is more likely to fully account for all users' valuations.

172. See Litman, *supra* note 2, at 37 (The number of copies made in a digital environment is not a good measure of the damages suffered by the copyright holder); Netanel, *supra* note 22, at 375.

173. See *Religious Tech. Ctr. v. Netcom On-Line Communication Services, Inc.*, 907 F. Supp. 1361, 1378 n.25 (N.D. Cal. 1995) ("Until reading a work online becomes as easy

digital articles and sending them via e-mail is easier than clipping a newspaper or magazine. As video on demand becomes available it will probably displace personal copying to time-shift TV programming and trips to the video store. On the other hand, patrons of a digital library will probably do more personal copying, and the library will probably avoid purchase of duplicate copies of digital works.

Regardless of people's desire to copy different kinds of media, publishers can control copying of digital works using technical measures that have no counterpart for hardcopy works and few counterparts for analog works.<sup>174</sup> Publishers might either prevent copying or make unauthorized copies of digital works unusable.<sup>175</sup> Movie and music producers have worked in concert with consumer electronics manufacturers to make it impossible for ordinary consumers to make useful copies of digital movies or serial copies of digital music.<sup>176</sup> Software and digital text publishers also have techniques to stop personal copying, although they are less effective.

When videotape machines began to appear in homes the first response by movie producers was to sue Sony and other manufacturers for contributory infringement. Their hope was that equipment manufacturers would be forced to pay copyright royalties to cover the cost of personal copying and sharing. When litigation failed the producers turned to technology. The sharing of videotape has been effectively controlled by stopping VCR owners from taping movies using two VCRs, sometimes called back-to-back recording.<sup>177</sup> A process called Macrovision protects analog video by embedding a signal onto videotapes that interferes with copying.<sup>178</sup> Movie producers secured the co-

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and convenient as reading a paperback, copyright owners do not have much to fear from digital browsing and there will not likely be much market effect.”)

174. See McDaniels, *supra* note 7, at 20 (It is expensive and inconvenient for users to copy from a CD-ROM disk).

175. See Aoki, *supra* note 37, at 12-13 (copy protection technology).

176. See Terry Costlow, *How SCMS scheme works*, ELECTRONIC ENGINEERING TIMES, July 31, 1989, at 4.

177. The Macrovision process also can be used to protect pay-per-view movies, video Compact Disks, and movies released for digital VCRs from copying by analog VCRs. Digital VCRs are a more thorny problem. See Peter Lambert, *Digital chips to carry Macrovision anti-copy system*, MULTICHANNEL NEWS, June 6, 1994, at 8, available in 1994 WL 12927138; *Video Copy Protection*, Sept. 29, 1997, <<http://www.macrovision.com/vcp.html>> (on file with author and the *Buffalo Law Review*).

178. See Videocassette Anticopy Process, Sept. 29, 1997 <<http://www.macrovision.com/acp.html>> (on file with author and the *Buffalo Law Review*). The key to the Macrovision process is the imbedding of a fluctuating electronic signal within the recording on the video tape to be protected. This signal is not detectable and does

operation of VCR producers who agreed to design and sell only VCRs that implement the Macrovision process.

Macrovision set a precedent for inter-industry cooperation that has been followed for the new Digital Versatile Discs (DVD) technology.<sup>179</sup> Any digital work can be distributed via DVD, including video, music, text, and any combination of the three.<sup>180</sup> Since DVD movies are stored as digital works, the danger of copying is arguably greater than the danger of copying for analog VHS tapes. DVD units that allow recording could easily become home video production factories. As a result, Hollywood studios have demanded strong copy prevention technology before agreeing to release movies to DVD.<sup>181</sup> To protect the content on DVD discs from digital-to-digital copying, the content of DVD discs will be encrypted so that the contents cannot be easily copied directly on to another digital medium.<sup>182</sup> Chips in the DVD players will decode the encrypted contents and allow playback.<sup>183</sup> Later DVD decks with recording capabilities will also be equipped with a special anti-copying chip.<sup>184</sup> If a user tries to record a DVD movie on one of these decks, the anti-copying chip in the deck will detect the encrypted signal embedded in the movie and will shut down.<sup>185</sup> The DVD standards also guard against copies from DVD to videotape.<sup>186</sup>

Distribution of video and audio over the Internet instead of by DVD presents new problems for copyright owners. In essence, the Internet has the potential to detach digital works from the

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not degrade picture quality when the tape is played. However, when an individual attempts to tape the signal using another VCR, the signal results in image and sound degradation including loss of picture quality and color distortion. This effectively renders the resulting copy unusable for home video playback.

179. See *Movie Companies, Drive Makers Agree on Copyright Protection*, OPTICAL MEMORY NEWS, Nov. 5, 1996, available in 1996 WL 8328542; John Simpson, *Wading through the DVD hype*, COMPUTING CANADA, Mar. 3, 1997, at 42; Paul McGoldrick, *At Last: DVD Is Available To The Consumer*, ELECTRONIC DESIGN, Feb. 17, 1997, at 105.

180. See Simpson, *supra* note 179, at 42; McGoldrick, *supra* note 179, at 105.

181. *Movie Companies, supra* note 179.

182. *Id.*

183. *Much Work Remains on DVD Copy Protection*, AUDIO WK., July 1, 1996, available in 1996 WL 6828883.

184. *Macrovision Eyes Future DVD Copy Shield*, CONSUMER ELECTRONICS, Apr. 14, 1997.

185. *Id.*

186. With respect to digital-to-analog recording, the CPTWG recently agreed to incorporate a new version of the Macrovision process into DVD players. Dennis Taylor, *Firm Aims to Skewer Disc Pirates*, THE BUS. J.—SAN JOSE, Feb. 3, 1997, available in 1997 WL 7813859; *Digital Video Disc (DVD) Copy Protection Process*, Sept. 29, 1997, <<http://www.macrovision.com/dvd.html>> (on file with author and the *Buffalo Law Review*).



physical media which have traditionally been used to distribute digital works. With the Internet, a digital work is simply copied into memory or onto disk and then played by the user's computer. Copyright owners fear that they will lose revenue if users are able to make copies of digital works and store them on their home computers for later retrieval, reuse, and/or further copying and distribution without the payment of additional revenue to the copyright holder. On the other hand, copyright owners realize that dispensing with physical media as the primary distribution system for digital works would result in enormous cost savings since the costs of production, shipping and storage would be eliminated if these works were distributed over the Internet.

One solution is to take advantage of specific distribution protocols which incorporate means of protecting against copying. An example is streaming audio and video. Streaming audio and video are relatively new to the Internet.<sup>187</sup> Before streaming was invented, a user who wanted to listen to an audio clip or to view a film clip often had to wait a long time for the entire clip to download to her computer before she could play the clip.<sup>188</sup> Once the file was downloaded, she typically had a copy of the file accessible on her system which she could redistribute to other users. By moving to streaming audio and video copyright owners have been able to solve two problems at once. Instead of waiting for the entire file to download, the streaming process requests the work from the remote server, buffers a portion of the file, and then begins to play the buffered portion while still receiving the rest of the file from the remote server.<sup>189</sup> For the user this means less wait time since a large portion of the downloading can be accomplished while the user is already watching the clip.<sup>190</sup>

The implications of streaming for copyright protection are equally impressive. Companies currently developing streaming applications typically distribute free copies of the software required to listen to or view the audio or video stream.<sup>191</sup> The free

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187. The leading company developing streaming audio and video applications, Progressive Networks, Inc., introduced its first version of its RealAudio audio streaming software in 1995. M. Sharon Baker, *Progressive Networks Wins \$18 Million in Funding*, PUGET SOUND BUS. J., Dec. 13, 1996, available in 1996 WL 11477543. In 1997, Progressive Networks introduced RealVideo, a streaming application that handles video content. M. Sharon Baker, *Progressive Networks Enters Internet Video Race*, PUGET SOUND BUS. J., Feb. 14, 1997, available on 1997 WL 7329200.

188. See Steve Plain, *Streamlining*, COMP. SHOPPER, Dec. 1, 1996, at 620.

189. *Id.*

190. *Id.*

191. See, e.g., *Progressive Networks Announces RealStore.com*, Sept. 5, 1997, <<http://>

player software typically does not include a record option.<sup>192</sup> If a user wants to be able to record streaming audio or video she must pay for the full version of the software.<sup>193</sup> Even if she purchases the full version, however, a copyright owner has the final say over which portions of a work she can copy.<sup>194</sup> This selective recording allows a copyright owner to determine on his server whether or not the user can use the player software on her own computer to copy the audio or video.<sup>195</sup> Thus a copyright owner can ensure that the work is used or enjoyed only once per purchase.

Software publishers have tried several copy prevention strategies. In the early 1980s, the computer software industry relied almost exclusively on the copy prevention strategy in attempts to protect software from unauthorized copying. Often copy prevention simply relied on computer disks holding a program that could not be copied without special software.<sup>196</sup> In an era when hard drives were in their infancy, this strategy made sense. For users without hard drives, possession of the original physical media was necessary to use the program at all. Even users who had hard drives were prevented from making additional copies of the program disks,<sup>197</sup> although they could potentially perform multiple installations of the same program. To prevent the practice of sharing software many manufacturers not only made the program disks uncopyable, they also required the user to have the original disk in their computer's disk drive

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www.realaudio.com.> (spot: Progressive Networks) (on file with author and the *Buffalo Law Review*).

192. For example, RealPlayer from Progressive Networks is available for free download and allows playback of RealAudio and RealVideo files, but does not allow recording of these files. See *Download Replayer 4.0 or RealPlayer Plus 4.0*, Sept. 5, 1997, <<http://www.real.com/products/player/choice.html>> (spot: Progressive Networks) (on file with author and the *Buffalo Law Review*).

193. RealPlayer Plus, available for purchase through the Progressive Networks Web Site, allows users to record RealAudio and RealVideo files if the copyright owner has designated them as recordable. *Id.*

194. Progressive Networks refers to this option as Selective Record. *Id.* See also PROGRESSIVE NETWORKS, REALAUDIO SERVER ADMINISTRATION AND CONTENT CREATION GUIDE 198 (1996), available in *RealAudio Server Administration and Content Creation Guide*, Sept. 5, 1997, <<http://www.real.com/help/library/>> (spot: Progressive Networks) (on file with author and the *Buffalo Law Review*).

195. PROGRESSIVE NETWORKS, REALAUDIO SERVER ADMINISTRATION AND CONTENT CREATION GUIDE 198 (1996).

196. See generally *Software Firms Ease Stance on Copies*, SAN DIEGO UNION-TRIBUNE, Sept. 6, 1986, at C4 (discussing use of copy protection on software and user response to such protection).

197. *Id.*

before they could run the program from their hard drive.<sup>198</sup>

The problem with preventing copying of the physical media was twofold. First, users found the copy protection annoying.<sup>199</sup> Copy protection prevented legitimate copying of the software for archival and backup purposes.<sup>200</sup> If anything happened to the original disks, or if the media itself failed, users were unable to rely on backup copies of the software they had purchased.<sup>201</sup> Resentment in the marketplace was so strong that organizations started boycotting software that used these types of copy prevention.<sup>202</sup> These marketplace revolts against early copy protection were a prime cause of its abandonment by most software manufacturers by the end of the 1980s.<sup>203</sup> A second reason copy protection on physical media was largely abandoned was the fact that the copy protection was often easily circumvented.<sup>204</sup> The release of a new copy protected program was typically followed by the immediate release of a new "cracking" program ca-

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198. See John C. Dvorak, *Jet Fighter Simulators: State of the Deadly Art*, PC MAG., June 27, 1989, at 412; *What to Look for in Microcomputer Communications Software*, DATA COMMUNICATIONS, Dec. 1, 1985, at 127.

199. Software Firms ease stance on copies, SAN DIEGO UNION TRIBUNE, Sept. 6, 1986 at C4. "Of all the software publishing policies seemingly designed specifically to drive the user up the wall, probably none has proved more irritating than that of copy protection . . ." *Id.* The resentment towards copy protection on software seems to remain fairly constant amongst software users. See, e.g., *Online: XT Battery*, PC QUEST, May 1, 1996, available in 1996 WL 11752555 ("[T]he best software would not use copy protection at all."); Barry Nance, *Reviews: One-Size-Fits-All Code with Lattice C*, BYTE, Nov. 1, 1990, at 245; Ezra Shapiro, *Readers Rise to Defend the Mac and Offer Solutions to System Snafus*, BYTE, Apr. 1, 1989, at 129.

200. Sharon Fisher, *Special Report: Application Licensing: The Licensing Game, How Can You Play by the Rules When There are so Many Different Ones?*, LAN TIMES, Apr. 1, 1991, at 65.

201. *Id.* See also Jerry Pournelle, *Expert Advice: Computing at Chaos Manor, Disasters and Diversions, the Agony of a Drenched Disk and the Thrill of New CD-ROMs*, BYTE, Oct. 1, 1989, at 115 (recounting the difficulties of getting a replacement disk for an uncopyable boot disk required to run a program following the destruction of the original boot disk in an uncontrolled orange soda spill).

202. See Fisher, *supra* note 200, at 65; see also Stan Gibson, *Subscriptions May Supplant Piracy*, PC WK., Dec. 9, 1996, at 69; *Under Pressure, Publisher Removes Copy Protection*, MACWEEK, Feb. 28, 1989, at 5. In one interesting example, IRS officials were even quoted as saying that the IRS always either bought software without copy protection or used programs to remove copy protection from the software they purchased. Richard A. Danka, *IRS Planning Officer Warns Against Trailblazing*, GOVERNMENT COMPUTER NEWS, Apr. 1, 1988, at 54.

203. See Melvin, *supra* note 9, at 5D; *Making the Internet Safe for Copyright*, SEYBOLD REP. ON DESKTOP PUB., July 8, 1996, at 18, available in 1996 WL 9310609; Shapiro, *supra* note 199; *Software firms ease stance on copies*, *supra* note 194.

204. See Robert Gebeloff, *Software Pirates Elude Authorities*, THE REC., N.N.J., Feb. 10, 1997, at B01.

pable of defeating the copy protection on the new program.<sup>205</sup> Software manufacturers and cracking software manufacturers engaged in a type of arms race over copy protection that ultimately discouraged copy protection on the physical media.<sup>206</sup>

A more robust copy protection system was adopted by manufacturers of high-end software applications such as CAD software.<sup>207</sup> Instead of relying on software-based copy protection these manufacturers chose to use a hardware-based copy protection. Hardware-based copy protection used physical keys which were required to unlock software applications.<sup>208</sup> These keys, commonly known as dongles, had to be attached to a port on the users computer in order for a particular software application to operate.<sup>209</sup> During operation the software checks for the presence of the dongle and stops operating if the dongle is not detected.<sup>210</sup>

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205. See, e.g., Jerry Pournelle, *Pournelle Travelling Light*, BYTE, Aug. 1, 1994, at 193 (discussing general purpose cracking program called Neverlock); Frank Ruiz, *Trans-Sec Product strips copy protection*, GOVERNMENT COMPUTER NEWS, May 27, 1988, at 56. There were also companies which produced cracking hardware to defeat copy protection. See, e.g., Michael W. Ecker, *Board makes backups of copy protected disks*, GOVERNMENT COMPUTER NEWS, Jan. 30, 1987, at 62. The WHITE PAPER supports legislation that would make it illegal to produce and distribute technology that is designed to defeat anti-copying technology included in software. See *supra* text accompanying note 16.

206. Copy protection on computer programs became a subject of ridicule within the industry by the late 1980s. One tongue-in-cheek definition of copy protection proclaimed it to be "[a] clever method of preventing incompetent pirates from stealing software and legitimate customers from using it." *Taking a Second Glance at Computer Terminology*, GOVERNMENT COMPUTER NEWS, Nov. 21, 1988, at 21. An alternative approach to copy prevention was to allow users to make copies of software contained on various media, but to implement a system that made resulting copies useless to anyone except the original purchaser of the program. In its simplest form a user might be prompted by the software to input a particular word or phrase from the program's manual before being allowed to perform a particular function or at random interval. Shapiro, *supra* note 199. Photocopying obviously created a major problem for software manufacturers who tried this approach. As photocopying became more advanced, some software manufacturers began printing their manuals with paper and ink combinations which were difficult to copy in order to thwart pirates of their software. See *Software Confidential*, A, Feb. 1, 1989, at 17. (discussing use of No Copi paper by software manufacturers). This method of photocopy protection has since been discontinued by almost, if not all, software manufacturers.

207. See, e.g., Jon Udell, *Reviews: CAD and NetWare 386 Join Forces*, BYTE, Dec. 1, 1990, at 182.

208. See Alexander Wolfe, *Pirates prey on the Net*, ELECTRONIC ENGINEERING TIMES, Dec. 2, 1996, at 32; see generally <<http://www.aks.com/hasp/hasp.htm>> (The use of dongles to prevent copying of software is a common practice among high-end applications.) Dave Methvin & Alex Dunbar, *Rainbow Technologies Inc.: Sentinelscribe*, PC WK, May 27, 1991, at 111; Owen W. Linzmayer, *Unconventional 'Dongles' Help Deter Privacy, Protect Intellectual Property*, MACINTOSH NEWS, Apr. 23, 1990, at 27.

209. See Methvin & Dunbar, *supra* note 208.

210. *Id.*

Hardware-based copy protection was designed to deter all but the most determined pirates. A potential pirate would have to duplicate both the software and the hardware key in order to use unauthorized copies of the application software protected by the key.<sup>211</sup> Despite the apparent strengths of hardware-based copy protection, its use today remains confined to high-end applications such as networking software.<sup>212</sup>

Software copy prevention in the future probably will not depend on hardware and physical media. Software performs on general purpose computers unlike digital music and video which are played on dedicated machines. Software publishers and computer manufacturers are more numerous and heterogeneous than their counterparts in the movie and music industries. This makes the prospect of coordinating an inter-industry copy prevention strategy unlikely.<sup>213</sup> The likely path of copy prevention is encryption and other methods based solely on software code.<sup>214</sup>

### C. Piracy and Profit

Piracy is not a problem that is new to digital technology. For my purposes the relevant question is whether digital technology aggravates the problem of piracy, and thereby diminishes profits to copyright holders. Copyright holders argue that pirates will benefit from the ability to make cheaper and higher quality copies and from more efficient distribution via the In-

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211. See McDaniels, *supra* note 7, available in 1996 WL 7135497 (CAD/CAM applications with dongles). There were two major drawbacks to hardware based copy protection. First, the cost of the hardware based copy protection was prohibitively expensive for use with consumer software programs. See Linzmayer, *supra* note 206. Second, some users reacted negatively to the possibility of having to connect multiple dongles to their systems in order to run more than one dongle protected program. See, e.g., Jerry Pournelle, *Computing at Chaos Manor: Dr. Pournelle vs. the Virus*, BYTE, July 1, 1988, at 197.

212. See, e.g., Richard Goering, *Workstations in Turmoil*, ELECTRONIC ENGINEERING TIMES, Mar. 3, 1997, at 18; Steve Gold, *Jaguar Offers Free LAN Network Monitor Software On Web*, NEWSBYTES NEWS NETWORK, Jan. 20, 1997, available in 1997 WL 7970633. The recent introduction of cheaper alternatives to dongles, however, may bring hardware-based copy protection into the consumer marketplace. See *Buttons Join Fight Against Pirates*, AUTOMATIC I.D. NEWS, Feb. 1, 1997, at 12, available in 1997 WL 8591302.

213. Industry members have created a trade association called the Software Publishers Association which has been one of the key supporters of the WHITE PAPER and its goal of making cracking software and hardware illegal. See McDaniels, *supra* note 7. If cracking software and hardware are made illegal, we may see a resurgence of copy prevention strategy with respect to digital works in general and computer software in particular.

214. See Cohen, *supra* note 22, at 987.

ternet. The predicted result according to copyright holders will be more acts of piracy. They also worry that non-traditional pirates who are not profit-motivated will become a significant factor.

Ultimately, modest changes to copyright law are probably sufficient to contain the problem of digital piracy.<sup>215</sup> Greatly expanded copyright protection is not required because publishers have a variety of self-help measures available.<sup>216</sup> The first possibility is to avoid digital publication.<sup>217</sup> For example, publishers might not distribute digital copies of novels and photographs. For many types of work this will not be satisfactory though, because consumers will demand digital works. Furthermore, digital copies can be made from non-digital works. Nonetheless, consumers might not be willing to buy a pirated digital novel or collection of photographs because they cannot easily turn the digital file into a book or high quality print.<sup>218</sup> In addition, the copyright holder would know that any digital copy of the work is unauthorized.

Second, there are many technologies for preventing the copying of digital works.<sup>219</sup> Anti-copying technology is built into the new DVD systems, certain CAD systems, and streaming of audio and video over the Internet.<sup>220</sup> Such technological barriers might not stop sophisticated and determined pirates, but they are apt to be effective against marginal pirates like disgruntled employees and pranksters.<sup>221</sup> In the past, sophisticated pirates

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215. I conditionally support an amendment to the Copyright Act that would impose liability on anyone tampering with copyright management information. Such an amendment would be helpful in building cases against pirates, but it should be drawn carefully to preserve privacy rights. See generally Cohen, *supra* note 22 (describing privacy dangers associated with WHITE PAPER proposals to implement copyright management systems).

216. See generally Dale J. Ream, *Copyrighted Works & Computer Networks: Is Protection Possible?*, 4 KAN. J.L. & PUB. POL'Y 115 (1995).

217. See Ken Kayit & Steve Matalitz, *Controlling Cybercopies*, LEGAL TIMES, Apr. 8, 1996 at 38.

218. At least given the current technology available.

219. For example, modern software copy protection may even render the original software disks unusable if the user tries to make any copies of the software whatsoever. See, e.g., Jeff Senna, *Saje Mail 1.2 Provides a Secure Correspondence in Windows*, INFOWORLD, May 27, 1996, at N2, available in 1996 WL 10011563.

220. See *supra* text accompanying notes 187-95.

221. A lower level of technological protection is provided for Digital Audio Tape (DAT). Under the Audio Home Recording Act, equipment manufacturers are obliged to incorporate copy prevention technology in DAT recorders. Consumers will be able to make copies from an original DAT tape but will not be able to make usable "serial" copies, i.e., copies from copies. Merely blocking serial copying might have a significant effect on non-traditional piracy, because it limits availability of source copies and makes distri-

have been skilled at inventing around copy-prevention technology. Nevertheless copy prevention is apt to give the authorized publisher at least a substantial lead time advantage over unauthorized competitors.<sup>222</sup> In the future, copy prevention methods that rely chiefly on encryption might be even more successful in limiting piracy.<sup>223</sup> Professor Netanel contends: "Digital content providers enjoy an unprecedented capacity, through a combination of contract, digital encryption, and electronic monitoring, to prevent unauthorized access to and uses of expression and information stored in computer databases."<sup>224</sup>

The third and most effective response to piracy is diligent enforcement of existing rights. Enforcement depends on a method to detect unauthorized copies. Copyright holders can easily recognize the quality differences between bootleg copies and legitimate copies of analog audiotape or videotape. Since a pirate can reproduce digital works precisely, copyright holders need a way to distinguish bootleg digital copies. Unauthorized copies can be distinguished by examining the copy tracking information embedded in each copy.<sup>225</sup> Digital watermarking,<sup>226</sup>

bution more difficult.

222. See Breyer, *supra* note 36, at 299-302.

223. Encryption, metering and on-line licensing offer the potential to perfectly protect digital works. See WHITE PAPER, *supra* note 11, at 185-87.

224. See Netanel, *supra* note 22, at 384.

225. A prevalent example of tracking is the often seen requirement that a user enter her name and company information when installing new software on her system. See Diane Danielle, *Software Copy Protection: What's In a Name?*, PC WEEK, Jan. 29, 1990, at 61; Jim Seymour, *Upgrading with Lotus 1-2-3 3.0*, PC MAG., Oct. 17, 1989, at 79. This information may be copied to the original installation disks so that sharing a disk also means that the unauthorized copy will bear the original user's name and company name when it is used. *Id.* at 79. While this system remains a crude way of tracking unauthorized copying, and indeed can be easy to circumvent. *Id.*; Danielle, *supra* at 61. Future implementations of the copy tracking strategy promise to be both more effective and harder to thwart.

226. See generally Cathy Abes, *Can Digital Watermarking Protect You?*, MACWORLD, Feb. 1, 1997, at 38; Luisa Simone, *Digital Watermarks: Copyright protection for online artists*, PC MAG., Feb. 18, 1997, at 30. Digital watermarking is a method commonly associated with the distribution of digital images. *Id.* A producer of a digital image can run the image through software which watermarks the image by making visually imperceptible changes to the colors, intensity, shading, etc. of certain pixels in the image. *Id.* The changes can then be decoded by image editing software to reveal the identity of the author, copyright owner, and specific permissions granted to the user of the work. *Id.*

Although digital watermarking and digital fingerprinting make it easier to identify unauthorized uses of images, they will not prevent deliberate unauthorized copying of images. Instead, the focus of these systems is on tracking uses of a particular image. When the image shows up elsewhere without authorization, then the copyright holder can decide how to enforce their rights with respect to that image.

digital fingerprinting,<sup>227</sup> and copyright management systems<sup>228</sup> are all examples of tracking systems. While the details of each of these systems vary, the underlying principle is generally the same. Each work protected by these methods is modified to include information that typically identifies the copyright owner and the buyer of the work.<sup>229</sup> As a licensee of the work, the buyer may or may not be licensed to make copies of the work. If she makes unauthorized copies of the work and distributes them to others, the identifying information embedded in the work gives away the source of the unauthorized copies and exposes her to liability.<sup>230</sup> The tracking information can make virtually irrefutable evidence of unauthorized copying and make detection of copyright infringement and identification of infringers much easier.<sup>231</sup>

The newer and more sophisticated copy tracking systems also offer a form of copy protection. The systems rely on powerful encryption to both protect data from copying and to ensure that unauthorized copying can be traced to its source.<sup>232</sup> One prototype, the Electronic Copyright Management System (ECMS), will encode the work itself in a cryptographic envelope, or cryptolope for short.<sup>233</sup> At the same time, a plain text index section will be created so that the content can be searched for and identified without opening the cryptolope.<sup>234</sup> A user will be able to examine the index information without paying for the content, but will have to pay for a cryptographic key if they

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227. See generally *Digital image piracy: Fingerprinting with FBI*, CIP EXECUTIVE BRIEFINGS, July 1, 1996, available in 1996 WL 8412646. A variant of digital watermarking, digital fingerprinting embeds complex strings of data within the image data. See *Digital image piracy: Fingerprinting with FBI*, CIP EXECUTIVE BRIEFINGS, July 1, 1996, available in 1996 WL 8412646. These strings form a digital fingerprint which identifies owner and copyright information. *Id.* As with digital watermarking, digital fingerprinting does not perceptibly alter the image it protects. *Id.* Fingerprints remain with the file when it is opened, edited, or copied, allowing for tracking of unauthorized copies. *Id.*

228. See, e.g., Otis Port, *Halting Highway Robbery on the Internet: It will take crafty codes to curb the theft of copyright material*, BUS. WK., Oct. 17, 1994, at 212; Simone, *supra* note 226, at 30.

229. See, e.g., Andrew Sorkin, *Digital Watermarks' Assert Internet Copyright*, N.Y. TIMES, June 30, 1997, at D11.

230. See, e.g., *id.*; Simone, *supra* note 226, at 30; *Digital image piracy: Fingerprinting with FBI*, *supra* note 227.

231. See Sorkin, *supra* note 229. When a watermarked image is opened using certain image editing program the user is alerted to copyright information about the work. *Id.* Software is available that will search the Internet and report possible copyright violations. *Id.*

232. See Cohen, *supra* note 163; Port, *supra* note 228, at 212.

233. *Id.*

234. *Id.*



want to see the content itself.<sup>235</sup> The key will open the cryptolope and allow various uses depending on the terms of the license and the amount paid. For example, it would cost more to be able to view a work 100 times than it would to be able to view a work only once.

The ability of users to tamper with copy tracking information creates a possible limitation to the copy tracking strategy. If history is any guide, the producers of digital works may again find themselves faced with crackers who specialize in removing copy tracking information from digital works. Encryption techniques are one way a copyright owner can prevent tampering.<sup>236</sup> In addition, producers of digital works support the *White Paper's* provisions criminalizing the production and distribution of technology that is designed to remove or modify copy tracking information from digital works.<sup>237</sup>

Besides the ease of copying digital works publishers point to the Internet as another factor promoting piracy. In my view, Internet distribution does not create intractable enforcement problems. Digital publishers complain about the sheer number of possible pirates and the costs of litigation. Large publishers like Microsoft should be able to find the resources to vigorously enforce their copyrights against pirates. The example of Coca-Cola enforcing its trademark rights in thousands of restaurants and bars across the country demonstrates that a massive program of enforcement of intellectual property rights is feasible.<sup>238</sup>

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235. *Id.*

236. See generally *id.* Copyright owners have also increasingly sought legislative enactments to prevent buyers and users from tampering with or circumventing copyright management information and systems. See, e.g., *Coalition Forming to Oppose Administration on Proposed Changes to Copyright Law, Info. Law Alert*, Oct. 13, 1995, available in 1995 WL 2400000. While unsuccessful to date at the national level, recent changes to World Intellectual Property Treaties incorporate anti-circumvention provisions. See *Copyright Treaties Hailed by Recording Industry*, AUDIO WK., Dec. 30, 1996, available in 1996 WL 12622125. Australia and New Zealand had previously adopted similar measures. *The 1994 New Zealand Copyright Act: A Summary*, MUSIC & COPYRIGHT, April 26, 1995, at 11, available in 1995 WL 9764707; *Australian Copyright Protection*, COMPUTER FRAUD & SECURITY BULL., Oct. 1, 1993, available in 1993 WL 2577078. The efforts to secure legislative protection seems to be a clear response to a realization that engaging in an arms race with those who seek to circumvent technological copy protection is a battle that cannot be won. As one critic of attempts to protect works using encryption stated, "[E]very computer gamer who has been around for more than a few years knows that no encryption scheme is perfect. For every code, there is a cracker." *Custom Levels and Scenarios Under Siege*, COMPUTER GAMING WORLD, Jan. 1, 1997, at 20.

237. See Cohen, *supra* note 22, at 990-91.

238. See, e.g., *Coca-Cola Co. v. Howard Johnson Co.*, 386 F. Supp. 330 (N.D. Ga. 1974); David Thompson, *Coca-Cola Cop: He's Checking to See if It's the Real Thing*, OMAHA WORLD HERALD, April 23, 1985; John DeWitt, *Protecting Intellectual Property*

Smaller software publishers can rely to some extent on the effort of their trade association: the Software Publishers Association (SPA).<sup>239</sup> The SPA now polices corporate software licensees and enforces license agreements through legal action on behalf of individual software publishers.<sup>240</sup> Publishers can also rely on new methods for locating acts of piracy. Streaming audio and video encoders are currently capable of embedding copyright information in works distributed via streaming audio and video.<sup>241</sup> Copyright tracking systems are especially effective when combined with search services that locate files on the Internet that contain identifying marks.<sup>242</sup> As computers become increasingly networked, the creation of a copy tracking system that can "phone home" when an unauthorized copy is made becomes more feasible.<sup>243</sup> Finally, when a publisher locates a source distributing unauthorized copies of a digital work it can go after the source, and also after the Internet service provider if the provider does not act to stop infringing transmissions once given notice.<sup>244</sup>

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*Start-Ups Urged To Take Action to Shield Assets*, ARIZ. BUS. GAZETTE, Dec. 7, 1995, at 15. ASCAP and BMI have been similarly successful enforcing music performance rights on a massive scale. See Merges, *supra* note 28, at 1328-40.

239. To defray the high cost of locating piracy the software manufacturers use the Software Publishers Association (SPA) to further their interest in preventing unauthorized copying of software. See Ken Wasch, *Software Industry Gets Serious About Piracy*, COMPUTER RESELLER NEWS, Nov. 7, 1988, at 140. In 1988, Wasch was the executive director of the SPA. *Id.*

240. *Id.* The SPA also continues efforts to raise public awareness of the problem of software piracy. See, e.g., Melvin, *supra* note 9, at 5D.

241. PROGRESSIVE NETWORKS, REALAUDIO SERVER ADMINISTRATION AND CONTENT CREATION GUIDE VERSION 3.0 15 (1996), Oct. 16, 1997, <<http://www.real.com/help/library/>> (spot: server administration) (on file with author and the *Buffalo Law Review*).

242. Publishers also use firms that specialize in detecting infringement of intellectual property rights on the Internet. See Deborah Shapley, *Corporate Web Police Hunt Down E-Pirates*, N.Y. TIMES, May 19, 1997, at D5 (May 19, 1997).

243. At least one company has already implemented such a system to protect high-end network administration software. In 1995, a news story surfaced of a copyright infringement case initiated by Performix, Inc. against their competitor Mercury Interactive Corp. following the receipt by Performix of an e-mail message indicating that a copy of a Performix program was being installed on a system without authorization. Glenn R. Simpson, *Computers, A '90s Espionage Tale Stars Software Rivals, E-Mail Spy*, WALL ST. J., Oct. 25, 1995, at B1. Performix had included code in their software to send such a message in case of unauthorized copying or use. *Id.* This particular message originated from Mercury Interactive Corp., a digital smoking gun which apparently induced a quick settlement between the parties. *Id.* It remains to be seen whether such a system would be able to survive in a marketplace which appears hostile to such a concept. See David Bicknell, *The Secret Code that Plants the Enemy Within*, COMPUTER WEEKLY, Nov. 2, 1995, at 18.

244. See *Religious Technology Center v. Netcom On-Line Communication Services*,

## CONCLUSION

Copyright tradition often differentiates private from non-private copying.<sup>245</sup> It gives narrower protection to the copyright holder against private copying because private actions rarely threaten the productive incentives of authors and publishers.<sup>246</sup> Copyright holders argue that digital technology promotes widespread small scale copying and makes everyone a potential copyright pirate because digital material can be cheaply and precisely copied and distributed.<sup>247</sup> Thus they argue the reach of copyright protection in the digital age should be the same for all members of the public and all types of copying.<sup>248</sup>

A key premise supporting the call for copyright expansion is that without legal changes the profitability of authorship and publishing will decline. I have argued that the premise fails. Although some aspects of digital technology make unauthorized sharing and piracy easier others make it more difficult. A narrow reform prohibiting tampering with copyright management information is probably the only legal change needed to ward off increased piracy. Sellers who charge uniform prices might see some kinds of sharing grow and other kinds decline. The overall economic impact should not be large. Sellers who price discriminate are more likely to see buyers organize to share digital works in ways that arbitrage against price differentials.

Technology and modest changes in the law can preserve the dominant position of the copyright holder in the distribution of the copyrighted work, and that should maintain the requisite incentive to produce the work in the first place. Copyright expansion

Inc., 907 F. Supp. 1361 (N.D. Cal. 1995).

245. See, e.g., Litman, *supra* note 2, at 41 (proposing "recasting copyright as an exclusive right of commercial exploitation." An infringement would require either (1) making money from someone else's work, or (2) a large scale interference with the ability of the copyright holder to do so).

246. See Goldstein, *supra* note 1, at 29 (Congress has been "reluctant to extend copyright into the privacy of the home . . ."); *International News Service v. Associated Press*, 248 U.S. 215, 239-40 (1918) (fashioning the doctrine of misappropriation to prevent the competitive use of news stories by a copier and distinguishing personal use of the news as still protected); Goldstein, *supra* note 1, at 150 ("Quite remarkably, in the detailed revision of the entire [copyright] law, Congress studiously avoided any direct comment on the single-copy-private-use question" quoting Letter from Justice John Paul Stevens to Justice Harry Blackmun (Jan. 24, 1983)).

247. See Litman, *supra* note 2, at 37 (copying technology used to be only in the hands of potential competitors, but now typical consumers also have access).

248. See Goldstein, *supra* note 1, at 201 ("The challenge for Congress in the age of [digital transmission] will be to extend liability against private uses more promptly than it has in the past."); *id.* at 30; Ginsburg, *supra* note 11, at 1477-78.

sion that is aimed at curtailing personal copying is not really necessary to preserve productive incentives to copyright holders. Even if my judgment is wrong, it is better to err on the side of users; if serious incentive problems appear they can be dealt with later.<sup>249</sup> It is much harder to take a concession away from industry than it is to add a burden to users.<sup>250</sup> Furthermore, ameliorative action should be media or technology specific instead of across the board. Finally, there is a policy option that does not facilitate price discrimination: a sales tax.<sup>251</sup> The music industry and consumer electronics manufacturers reached a legislative compromise concerning the treatment of Digital Audio Tape (DAT).<sup>252</sup> Music producers were concerned that too much sharing would result from DAT technology which allows consumers to make cheap digital copies of recorded music. The Audio Home Recording Act absolves the equipment manufacturers of copyright liability, but a tax is imposed on the sale of DAT players and blank DAT tapes. The proceeds of the tax are distributed to sound recording copyright holders.

Moving beyond the questions of unauthorized sharing and piracy, I show that digital technology alone, and especially when augmented by expanded copyright protection will facilitate price discrimination. Four of the six proposals for expanded protection of digital works promote price discrimination. Constriction of the first sale and fair use doctrines, contractual displacement of those doctrines, and a law prohibiting technology designed to circumvent copy prevention methods all impede arbitrage. Indirect liability on Internet service providers will not have a clear effect on price discrimination unless the threat of liability leads service providers to cooperate with copyright holders in implementing price discrimination. Finally, a law against tampering

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249. Copyright holders would respond that early changes in copyright law are advantageous when it comes to negotiating international copyright agreements. See Jaszi, *supra* note 19, at 306-07 (criticizing urge to move quickly to influence international norms).

250. Since consumer interests are more diffuse it is probably harder for consumers to organize and influence legislation. See generally MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION* (1965).

251. A similar policy option is a compulsory licensing scheme. See Ream, *supra* note 214, at 122.

252. See Goldstein, *supra* note 1, at 162-03. The Audio Home Recording Act of 1992 required that digital tape players include a copy limitation feature. The serial copyright management system (SCMS) allows unlimited copies from the original but prevents copies from copies. The act also imposed a sales tax of 3% on digital tapes and 2% on digital tape players. The funds from these taxes are distributed to music copyright holders. Consumers are free to make copies from an original for private noncommercial use. See *id.*

with copyright management information does not have a direct effect on price discrimination.<sup>253</sup>

I conclude by noting that there are as many questions about the wisdom of expanding copyright that I have not raised as I have. Proponents of expansion might argue that copyright holders should get more profit. The basis for this argument could either be that current incentives for production and distribution are too small, or the politically popular mercantilist view that high-tech, export-oriented industries should be subsidized.<sup>254</sup> Another argument is that broad property rights encourage valuable efforts by copyright holders to further develop the value of their intellectual property.<sup>255</sup> Various critics of copyright expansion argue that personal use rights support free political speech, journalism, education, and scientific and scholarly research.<sup>256</sup> They might argue that the incentives to gain a copyright are too large, and that broader dissemination of copyrighted works is economically optimal.<sup>257</sup> Further, they might argue that broader property rights to copyright holders amounts to an unfair wealth transfer.<sup>258</sup>

A final issue that I have touched on tangentially is the broad normative impact of price discrimination.<sup>259</sup> Proponents of copyright expansion can argue that price discrimination is economically efficient.<sup>260</sup> Critics can make counterarguments about

253. Copyright management information may be used in future audits of copyright usage on the Internet. Such audits could be used to implement blanket licensing agreements that feature price discrimination like the BMI and ASCAP licenses in the music industry.

254. See Jaszi, *supra* note 19, at 303-04 (objecting to arguments by American content providers); Robert W. Kastenmeier & David Beier, *International Trade and Intellectual Property: Promise, Risks, and Reality*, 22 VAND. J. TRANSNAT'L L. 285 (1989).

255. See Wendy J. Gordon, *Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property*, 17 U. DAYTON L. REV. 853, 855-56 n.13 (1992); Mark A. Lemley, *The Economics of Improvement in Intellectual Property*, 75 TEX. L. REV. 989, 997-99 (1997).

256. See, e.g., Cohen, *supra* note 22, at 985 (broad personal use rights are needed to protect reader anonymity); Netanel, *supra* note 22, at 288 (intellectual property creates an asset that supports an independent creative sector, but the property right should be limited to promote education and transformative use); Elkin-Koren, *supra* note 38, at 285 (promotion of democratic values).

257. See Litman, *supra* note 2, at 42-48; Stallman, *supra* note 29, at 293-04.

258. See Netanel, *supra* note 22, at 369.

259. Others have noted in passing the mixed effects of digital price discrimination. See Julie Cohen, *supra* note 22, at 1018 n.150.

260. See Goldstein, *supra* note 1, at 178-79. Practices that appear to be, or actually are, price discrimination might have other beneficial effects unrelated to discrimination such as risk sharing or the production of information used in maintenance.

efficiency and point to distributional problems.<sup>261</sup>

The simplest and strongest observation about price discrimination is that it increases profit to the seller—else the seller would refrain from discrimination. Surprisingly, the gains of the seller do not always come at the expense of the buyers. It may happen that discrimination increases the amount of surplus generated by a transaction, leaving consumer welfare unaffected or even improved.<sup>262</sup> This rosy scenario follows from the assumption that a uniform monopoly price would be so high that the low valuation segment of buyers is driven out of the market. If that assumption is correct then allowing discrimination brings new buyers into the market. In the standard model, the high valuation consumers are unaffected by discrimination since they continue to pay the original uniform monopoly price, only the low valuation consumers benefit from the new discount price.<sup>263</sup>

Reversing the assumption about who buys under a uniform monopoly price leads to a gloomier price discrimination scenario. If both high and low valuation buyers make purchases given a uniform monopoly price, then discrimination does not increase output and does not create direct efficiency gains. The high valuation buyers will lose surplus because they face a higher price, while the low valuation buyers are unaffected by discrimination because they continue to face the old uniform monopoly price.

Adding more realism quickly makes models of price discrimination difficult to analyze. But economists do make some gen-

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261. See Harold Demsetz, *The Private Production of Public Goods*, 13 J.L. & ECON. 293, 301-04 (1970) (explanation of how price discrimination can capture surplus for the seller of a public good); Netanel, *supra* note 22, at 295 and n.32 (consumer surplus transferred to producer by price discrimination).

262. Judge Easterbrook argues that this occurred in *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1449 (7th Cir. 1996):

If ProCD had to recover all of its costs and make a profit by charging a single price—that is, if it could not charge more to commercial users than to the general public—it would have to raise the price substantially over \$150. The ensuing reduction in sales would harm consumers who value the information at, say, \$200. They get consumer surplus of \$50 under the current arrangement but would cease to buy if the price rose substantially. If because of high elasticity of demand in the consumer segment of the market the only way to make a profit turned out to be a price attractive to commercial users alone, then all consumers would lose out— and so would the commercial clients, who would have to pay more for the listings because ProCD could not obtain any contribution toward costs from the consumer market.

263. See W. KIP VISCUSI ET AL., *ECONOMICS OF REGULATION AND ANTITRUST* 279-83 (1992) (Discrimination may increase efficiency by increasing output. This is most clearly the case when discrimination results in new buyers entering a market who would be foreclosed from the market by a high uniform price).

eral claims consistent with the preceding two examples.<sup>264</sup> First, the seller gains. Second, the low valuation consumers are indifferent or benefit. Third, the high valuation consumers are indifferent or suffer.<sup>265</sup> Fourth, price discrimination can increase or decrease equilibrium output.<sup>266</sup> Fifth, an increase in output is not sufficient to guarantee that total surplus increases.<sup>267</sup> In addition to the consumption side of the market, price discrimination is also felt indirectly on the production side of the market. Inefficiency arises from the costs of measuring different customers' valuations, of writing and enforcing contracts that prevent arbitrage, and of designing different types of products or distribution systems.<sup>268</sup>

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264. See Tirole, *supra* note 126, at 137-39. The welfare effects of third degree price discrimination are: (1) quantity increase is a necessary not sufficient condition for a welfare increase, because discrimination leads to unequal marginal rates of substitution across consumers; (2) profits rises; and (3) the high elasticity customers benefit (and they are more likely to be poor). *Id.*

265. If there are more than two categories of buyers, those with higher valuations (or more precisely lower elasticity) tend to lose and those with lower valuations (higher elasticity) tend to gain.

266. An example will demonstrate that possibility. Suppose three low valuation buyers each want one unit of some good and assign a value of 2 to the good. Suppose a single high valuation buyer assigns a value of 5 to the first unit of the good and a value of 2 to the second unit. Under uniform monopoly pricing the profit maximizing price is 2, output is 5, and revenue is 10. Under price discrimination the low valuation buyers are charged 2, the high valuation buyer is charged 5, output is 4, and revenue is 11.

267. Many lawyers using economic analysis seem to think that output increases are sure to create surplus increases. That linkage does not hold in general. With regard to price discrimination the positive efficiency effect from an increase in output may be offset by a negative efficiency caused by differences in the marginal rates of substitution between favored and disfavored buyers. See VISCUSI, ET AL., *supra* note 261, at 279-83 (Discrimination causes inefficiency because it makes the marginal rates of substitution differ across buyers. Disfavored buyers have a higher marginal valuation than favored buyers. If the marginal unit of output is taken from a favored buyer and given to a disfavored buyer then total surplus rises).

268. See generally, Hovenkamp, *supra* note 132, at 345.