

Copying and Copyright

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April 2004

Revised: June 4, 2004

Abstract

This is an overview of the economics of copying and copyright for the *Journal of Economic Perspectives*.

1 Introduction

2 The advent of inexpensive digital technology has led to a revival of interest
3 in the economics of copying and copyright. Some observers have even ques-
4 tioned whether current models for intellectual property can or should survive
5 in a digital world.

6 In this brief review we examine some of the economics of copying and
7 copyright, describing some of the insights that have emerged from this work.
8 We end with some reflections on alternative models for provision of creative
9 works.

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10 2 A brief history of copyright

11 The origins of copyright date back to seventeenth century England. Prior to
12 the invention of the printing press in the late fifteenth century, the English
13 royalty controlled information dissemination by punishing dissenting authors.
14 After the arrival of the printing press, the locus of control shifted to the
15 publishers, and royal declarations required printers to display their names,
16 cities and dates of publication on each work.

17 Several publishers banded together to form the Stationers Company,
18 which in 1662 was given the exclusive right to practice the “mystery or art” of
19 printing, in exchange for the obligation to publish only those works approved
20 by Parliament. The Stationers were given the right to enforce their monopoly
21 by burning the books and presses of any unauthorized competitors. In or-
22 der to keep track of authorized works, the Stationers created a registration
23 scheme which was a precursor to the system of copyright registration.

24 The English censorship laws expired in 1694, and the Stationers lobbied
25 for relief from the harsh competitive environment in which they found them-
26 selves. The response was the Copyright Act of 1709, also known as the
27 Statute of Queen Anne, which awarded the right to control copies to the
28 author of a work for limited period of 14 years, which was renewable for
29 another 14 years.

30 The framers of the U.S. Constitution recognized the incentive effects of
31 such a copyright system and unanimously included a clause indicating that
32 “the Congress shall have power . . . to promote the progress of science and use-
33 ful arts, by securing for limited times to authors and inventors the exclusive
34 right to their respective writings and discoveries.”

35 The U.S. Copyright Act of 1790 was modeled on the Statute of Anne,
36 and offered a 14-year monopoly to *American* authors, along with a 14-year
37 renewal. Note carefully the emphasis on “American.” Foreign authors’ works
38 were not protected by the American law.

39 In contrast, many other advanced countries such as Denmark, Prussia,

40 England, France, and Belgium had laws respecting the rights of foreign au-
41 thors. By 1850, only the US, Russia and the Ottoman Empire refused to
42 recognize international copyright.

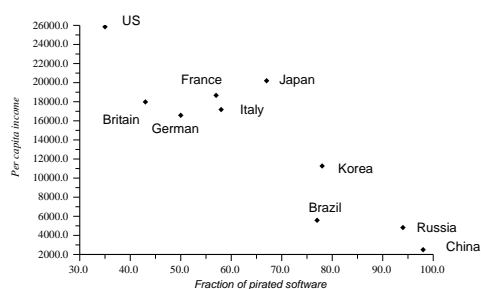
43 The advantages of this policy to the US were quite significant: they had a
44 public hungry for books, and a publishing industry happy to publish them. A
45 ready supply of market-tested books were available from England. Publishing
46 in the US was virtually a no-risk enterprise: whatever sold well in England
47 was likely to do well in the US.

48 American publishers paid agents in England to acquire popular works,
49 which were then rushed to the US and set in type. Competition was intense,
50 and the first to publish had an advantage of only days before they themselves
51 were subject to competition. As might be expected, this unbridled competi-
52 tion led to very low prices: in 1843 Dickens's Christmas Carol sold for six
53 cents in the US and \$2.50 in England.

54 Throughout the nineteenth century, proponents of international copy-
55 right protection lobbied Congress. They advanced five arguments for their
56 position: (1) it was the moral thing to do; (2) it would help stimulate the
57 production of domestic works; (3) it would prevent the English from pirat-
58 ing American authors; (4) it would eliminate ruthless domestic competition;
59 and, (5) it would result in better quality books.

60 It was not until 1891 that Congress passed an international copyright
61 act. The arguments advanced for the act were virtually the same as those
62 advanced in 1837. However, the intellectual climate was quite different. In
63 1837 the US had little to lose from copyright piracy. By 1891 it had a lot
64 to gain from respecting international copyright, the chief benefit being the
65 reciprocal rights granted by the British.

66 On top of this was the growing pride in homegrown American literary
67 culture and the recognition that American literature could only thrive if it
68 competed with English literature on an equal footing. Although the issue
69 was never framed in terms of "dumping" it was clear that American authors



Source: /Users/hal/Books/StrategicTech/figures/piracy_quantix

Figure 1: Per-capita income v fraction of software that is pirated for various countries.

70 and publishers pushed to extend copyright to foreign authors in order to limit
 71 cheap foreign competition—such as Charles Dickens.

72 The only special interest group that was dead opposed to international
 73 copyright was the typesetters union. The ingenious solution to this problem
 74 was to buy them off: the Copyright Act of 1891 extended protection only
 75 to those foreign works that were typeset in the US! This provision stayed in
 76 place until 1968.

77 The U.S. was a developing country in the nineteenth century, and it was
 78 hardly surprising that it found it attractive to free ride on the intellectual
 79 products of other, more developed countries. The same phenomenon can be
 80 observed today. Figure 1 depicts estimates of the amount of pirated software
 81 versus per capita income. The pattern is apparent: lower per capita income
 82 is associated with a higher fraction of pirated software. The history of the
 83 United States recounted above suggests that increased income will likely lead
 84 to increased adherence to international intellectual property norms.

85 **3 Parameters of intellectual property protec-** 86 **tion**

87 Intellectual property protection generally has three dimensions: length, width,
88 and height.

89 The “height” is the standard of novelty required for a work to be pro-
90 tected. For copyright, this is very low—virtually anything one creates is au-
91 tomatically copyrighted when it is “fixed in tangible form.” It is important to
92 understand that neither copyright or patents offer intellectual property rights
93 for *ideas*. Rather it is the *expression* of ideas that is subject to copyright.

94 One does not have to put a notice of copyright on a work for it to be
95 protected. However, doing so confers some legal advantages in case of a
96 subsequent infringement suit. The U.S. Copyright publication on *Copyright*
97 *Basics* offers a useful introduction to the mechanics of copyright law and
98 practice. (Office [2003].)

99 Similarly the “width” refers to the breadth of coverage that the intellec-
100 tual property protection offers. As indicated above, copyright is relatively
101 narrow in that it is only the expression that is protected; it does not protect
102 facts, ideas, concepts, or methods of operation.

103 Furthermore, under certain conditions, extracts from works that have
104 been copyrighted may be reproduced. The US Copyright Act of 1976 in-
105 dicates that reproductions for purposes such as “criticism, comment, news
106 reporting, teaching (including multiple copies for classroom use), scholarship,
107 or research, is not an infringement of copyright.”

108 This “fair use doctrine” is essentially a *defense* against an infringement
109 claim and US law indicates several factors that can be taken into account in
110 such a defense, including the purpose of the use, the nature of the work, the
111 proportion of the work copied, and the economic impact of the use on the
112 market. The fair use exemption is notoriously vague, but perhaps intention-
113 ally so, as it allows the law to deal flexibly with cases as they arise.

114 Finally, the “length” of intellectual property protection refers to the term
 115 of copyright. Unlike the other two dimensions, the length of copyright is
 116 easily quantified.

117 3.1 The optimal term of copyright

118 The simplest possible model for the term of protection of intellectual property
 119 compares the social benefits and costs that accrue under two regimes: the
 120 protected period and the unprotected period.

121 Let us suppose that various works can be created, each of which has the
 122 same value to users. Think of romance novels, or pop songs, or whatever
 123 repetitive genre you prefer.¹

We assume that the fixed cost of creating the works differ. Order the works by fixed cost, and let $K(n)$ be the fixed cost of the work with the n^{th} largest fixed cost. Let R_M be the monopoly revenue received during the protected period. Then if the number of years of protection is T , the supply of works will be determined by the condition

$$\int_0^T e^{-rt} R_M dt = K(n).$$

124 We write $n(T)$ for the number of creative works that will be created if the
 125 copyright term is T . Clearly, this is an increasing function of T .

126 Let U_M be the benefits per period that accrue to consumers under monopoly
 127 pricing and let $U_C > U_M$ be the benefits that accrue to the consumers per
 128 period when the intellectual property is competitively supplied.

The present value of welfare is the sum of the welfare over the two periods, minus the fixed costs of production.

$$W(T) = \int_0^T e^{-rt} U_M dt + \int_T^\infty e^{-rt} U_C dt - K(n(T)).$$

¹Economics textbooks are not an appropriate example.

129 If the term is increased to $T + \Delta T$, society loses the benefits from com-
130 petition that would have accrued during the period ΔT . On the other hand,
131 extending the term makes the production of intellectual property more prof-
132 itable, increasing the supply of works. The optimal T balances out these two
133 effects. In other words, at the optimal term, the marginal value of the incre-
134 mental piece of intellectual property will equal the social cost of the delayed
135 availability of the property that has already been created.

136 Much more elaborate models of this sort have been developed by Nord-
137 haus [1969] for patents, and by Landes and Posner [2003] for copyright. How-
138 ever, there are few theoretical insights that emerge.

139 It is important to recognize that works are not only outputs of the cre-
140 ative process but are also inputs. Increasing the number of creative works
141 presumably stimulates the production of yet more such works. This point has
142 been forcibly made by Scotchmer [1991] in the case of patents, but it applies
143 equally well to copyright. We should interpret the social benefits from the
144 creative works in the above analysis a net benefit, taking into account this
145 stimulative effect.

146 **3.2 Recent extensions to the copyright term**

147 As mentioned above, the initial term of copyright in the United States was
148 for 14 years. In the United States the term of copyright was lengthened to
149 28 years in 1831, with a 28 year renewal option added in 1909. In 1962 the
150 term became 47 years, and 67 years in 1978. In 1967 the term was defined
151 as the life of the author plus fifty years, or 75 years for “works for hire.” The
152 1998 Sonny Bono Copyright Term Extension Act lengthened this terms to
153 95 years.

154 Some might question whether 95 years should really be considered as
155 consistent as a “limited time” as described by the U.S. Constitution.

156 In Akerloff et al. [2002], seventeen economists (of which I was one) argued
157 that the economic benefits of the 20 year extension were trivial. A simple

158 present value calculation shows that at a 7% rate of interest, the value of a
159 twenty-year extension is about 0.33 percent of the present value of the first
160 80 years of copyright protection.

161 This is a very conservative calculation, as it assumes a constant flow of
162 returns from the intellectual property. In reality there are very few works
163 that produce such a royalty stream. Fewer than 11 percent of the copyrights
164 registered between 1883 and 1964 were renewed after 28 years. Further-
165 more of the 10,027 books published in 1930, only 174 were still in print in
166 2001. (Landes and Posner [2003], p.212)

167 The interest rate of 7% is also very low, given the riskiness of the income
168 stream from copyrighted works. But the conclusion is not very sensitive to
169 this choice—even relatively low interest rates give very little weight those
170 last twenty years.

171 But if the extension was worth so little to the owners of copyright, why
172 would anyone bother to extend the term?

173 The answer is that the copyright term was extended *retroactively* so that
174 existing works that were near expiration were given a new lease on life.
175 Retroactive copyright extensions in this way makes no economic sense, since
176 what matters for the authors are the incentives present at the time the work
177 is created. If there were no such grandfathering it is unlikely that anyone
178 would have bothered to ask for copyright extensions.

179 Liebowitz and Margolis [2003] offer a critique of the 17 economists' po-
180 sition. They point out that one can construct examples where the supply
181 curve of creative works is sufficiently elastic that a small increment in copy-
182 right benefits induces a substantial increase in output. More interestingly,
183 they present some empirical evidence that best-sellers were in a given year
184 were likely to remain in print for a long time. In their sample of bestsellers
185 published in the 1920s more than half remained in print after 58 years.

186 However, one must still ask how much incentive is created by the revenue
187 received 58 years after publication. In all likelihood it is rather small. Fur-

188 thermore, works that are still read after 58 years would likely have sufficient
189 merit that their movement into the public domain would create substantial
190 social value. The fact that a few books have long lives seems to cut both
191 ways with respect to copyright extensions.

192 Landes and Posner [2003] argue the case for a indefinite but renewable
193 copyright term. They emphasize the important point of a copyright registry.
194 The fact that pretty much everything an author creates is automatically
195 copyrighted significantly increases the transactions cost of compliance for
196 copyrighted works. Merely locating the legal holders of a copyright may be
197 exceedingly costly. Surely a registration requirement is a minor burden on
198 authors in exchange for a likely very substantial benefit to those who seek
199 to republish that author's work. Given today's technology, the creation of a
200 "universal" copyright repository, perhaps in exchange for some incremental
201 benefits to authors, would be highly attractive.

202 4 Other terms and conditions

203 Copyright is, specifically, a prohibition against copying a work. What about
204 loaning a work, or selling a used copy? What about home copying for per-
205 sonal use? What about quoting a work, or satirizing a work?

206 The last two uses of a work run up against free speech issues, and are
207 normally counted as "fair use." Home copying for personal use of TV broad-
208 casts has been held to be legal in *Sony v Universal Studios*. Home copying
209 is also explicitly allowed for certain other sorts of purchased works.

210 Loaning a work generally falls under the "doctrine of first sale," which
211 allows the purchaser of a work to do with it what he desires. Renting a work
212 falls under the same doctrine. In the early history of the video tape, the
213 movie industry floated some trial balloons about licensing tapes for purposes
214 of sale or rental, but these never went very far since the doctrine of first sale
215 was presumed to apply to video tapes.

216 The right of first sale can be modified by legislative or judicial action.
217 In the US, you cannot legally rent software or music CDs but you can rent
218 DVDs and prerecorded video and audio tapes. Though you can photocopy a
219 journal that you have purchased for your own use, an employee of a company
220 may not be able to photocopy an article in a journal that the company has
221 purchased for its library. (*American Geophysical Union v. Texaco*, No. 92-
222 9341 (2d Cir. October 28, 1994). However such restrictions do not appear
223 to apply to educational institutions.

224 As these examples illustrate, there are many points in intellectual prop-
225 erty law that may strike economists as peculiar.

226 4.1 Impact on profit of terms and conditions

227 As these examples illustrate, the purchase or licensing of a work may involve
228 a whole set of terms and conditions regarding its subsequent. We might well
229 ask what economic factors determine these terms and conditions.

230 Imagine a world where a music publisher, say, can determine the terms
231 and conditions under which the products it sells can be consumed. There is
232 some perfect rights management system that allows them to enforce restric-
233 tions against copying, resale, rental, and so on.

234 We must distinguish between the number of works produced (x) and the
235 number consumed (y), due to the fact that works may be shared, for example.

Let $p(y)$ be the inverse demand function, which we interpret as the value of the music to the marginal consumer. Suppose the marginal cost of production is zero and let F be the fixed cost. Initially, with no copying, $y = x$ and the publisher chooses its production level x to maximize profit:

$$\max_x p(x)x - F.$$

236 Now consider moving to a more liberal set of terms and conditions. The
237 amount consumed can now exceed the amount produced, so we write $y = bx$,

238 where $b > 1$. The work also is more valuable to consumers due to the more
 239 liberal terms and conditions, we write $q(y) = ap(y)$, for $a > 1$.

The profit maximization problem for the new, liberalized, product is

$$\max_x q(y)x - F.$$

Substituting $x = y/b$ and $q(y) = ap(y)$ we can pose this problem as

$$\max_y \left(\frac{a}{b}\right) p(y)y - F.$$

240 It is easy to see that profit increases if $a > b$ and decreases if $a < b$. In
 241 plain language, more liberal terms and conditions increase profit if the value
 242 to the marginal consumer goes up by more than the sales decline.

243 The important point that the price will respond to more liberal conditions
 244 (specifically the right to copy) was first pointed out by Leibowitz [1981]; he
 245 called this the concept of *indirect appropriability*. In this same report, parts
 246 of which he later published in Liebowitz [1985], he presented empirical work
 247 that suggested that academic journals raised their prices after photocopying
 248 because they had become more valuable to consumers.

249 This is a very important point. One might also suggest that online copies
 250 of journals are even more valuable to users, and one explanation for recent
 251 journal price increases is the attempt to capture some of that additional
 252 value.

253 To take another illustration of indirect appropriability, imagine a world
 254 with 100 identical consumers of CDs. Each consumer would be willing to
 255 pay \$20 for home use and \$10 for the right to play the same CD in the car.
 256 If the seller can pick only one price, it would pick \$20 and consumers would
 257 only have home use of the CDs.

258 But if each consumer had the right to make a copy then the seller could
 259 extract \$30 from each consumer, making substantially more money.²

²The seller could also sell a bundle of two copies of the CD for \$30, but the same point

260 One could enhance this model by adding in “leakage:” some consumers
261 would sell their “extra” CDs to others, reducing demand for the bundled
262 product. But the same basic idea described above holds: if the value of the
263 right to copy exceeds the reduction in sales, the seller will increase profit by
264 allowing that right.

265 There are many variations on this model described in papers by Liebowitz
266 [1985], Besen [1986], Varian [2000] and others. Some of the variations ex-
267 plored are:

- 268 • There may be transactions costs to making copies, or the copies may
269 be inferior to the original.
- 270 • The item may be shared among different size groups.
- 271 • The size of the group may influence the transactions costs—i.e., the
272 larger the group sharing a DVD, the longer you have to wait for your
273 chance to view it.
- 274 • The willingness to pay for the item might depend on the sum of the
275 willingnesses to pay of the individuals within a group rather than the
276 willingness to pay of the marginal individual.

277 5 Price setting in the presence of copying

278 As we have seen, copyright law confers a temporary monopoly to authors
279 of works. However, enforcing copyright may be quite difficult, and it is
280 worthwhile examining outcomes in the presences of various sorts of copying,
281 sharing, renting, resale and the like.

282 Let us examine a very simple model of sharing among a group of k indi-
283 viduals, with k fixed. Suppose that there is some transactions cost of sharing

applies.

284 (i.e., waiting your turn, inferior copies, returning the book to the library or
285 CD to the rental store, etc.).

Suppose that the k individuals value the unshared item at v , but the shared item at $v - t$. The seller sets a price p , and the buyers compare the utility of buying to sharing. If

$$v - \frac{p}{k} - t > v - p,$$

the buyers would prefer to share rather than buy. This condition reduces to

$$\left(\frac{k-1}{k}\right)p > t.$$

286 Given that the share, the monopolist sets a price $p_m = v - t$, and achieves
287 revenue $(v - t)/k$ per person.

288 Hence, it is a Nash equilibrium for the seller to price at $v - t$ and the
289 consumers to share. Note that this solution is socially inefficient. The con-
290 sumers get zero surplus if they share or not, but the monopolist gets lower
291 profit under sharing due to the adoption of the inefficient sharing technology.³

292 It is also worthwhile pointing out the rather perverse dynamics in this
293 model. If the monopolist initially sets the monopoly price, it will encourage
294 the consumers to share. As the consumers begin to share, the monopolist
295 will want to raise its price, providing even stronger incentives to share. In
296 the final equilibrium, the consumers end up with an inferior product, and
297 the monopolist ends up with less profit than in the no-share equilibrium.

298 A clever monopolist might well think about ways to avoid this vicious
299 circle. One way is for the seller to move first and set a price low enough
300 to discourage sharing. This is a type of limit pricing, where the intent is to
301 discourage entry of a certain type of competitor—users copying the produce.

³One could also imagine a model where the transactions costs of sharing was negative. For example, a library might have lower total storage costs than the sum of the storage costs of a group of individuals. In this case, sharing is the more efficient technology.

The price that just discourages sharing is the price $p_n = t \frac{k}{k-1}$. At this price, the monopolist makes revenue per person of

$$t \frac{k}{k-1}.$$

If k is relatively large, so that $k \approx k - 1$, the revenue from the limit pricing will exceed the revenue from Nash pricing when

$$t > v/(1 + k).$$

302 6 Heterogeneous values

303 Suppose now that consumers have different values for the item being sold.
 304 Let us summarize those tastes by some probability distribution function,
 305 $F(v)$, which indicates the fraction of the population that has a valuation less
 306 than v . If the total size of the population is n , the demand function is then
 307 given by $D(p) = n(1 - F(p))$.

308 If k consumers share the item among themselves, what is the group de-
 309 mand function?

310 There are (at least) two answers offered in the literature. One sugges-
 311 tion, put forth by Armstrong [1999], Bakos et al. [1999], and Bergstrom and
 312 Bergstrom [2004] is that the willingness to pay by the group is the sum of the
 313 willingnesses to pay of the individuals. That is, the group has some way to
 314 “solve” the public goods problem and elicit contributions from the members
 315 that cover the cost of the item being purchased.

316 This specification makes sense for, say, household members jointly trying
 317 to decide whether to purchase a DVD, or a librarian that is trying to decide
 318 whether to buy a book for the patrons of the library. To the extent that the
 319 librarian is familiar with the tastes of the patrons, the relevant number is the
 320 sum of the valuations of the borrowers.

321 The other specification, proposed by Varian [2000] is that the item will
 322 only be purchased if the value to the member of the group that values the
 323 item least exceeds the cost that he or she has to pay. This is motivated by a
 324 sharing institution like a video rental store. The store has to set a uniform
 325 rental price, and that price has to reflect the value of the marginal purchaser.

326 To see the difference between the two valuation assumptions, suppose that
 327 the individual valuations are (1,2,3,4). The first two individuals and the last
 328 two individuals form “buying clubs,” with individual valuations (1,2) and
 329 (3,4). Under the “library” assumption assumption, the two groups would
 330 have willingnesses-to-pay of $3 = 1 + 2$ and $7 = 3 + 4$, respectively; under the
 331 “video store” assumption the two groups would have willingnesses to pay of
 332 $2 = 2 \min(1, 2)$ and $6 = 2 \min(3, 4)$, respectively.

333 6.1 Video store model

334 Suppose that consumers get utility from viewing a video and that the inverse
 335 demand function for viewing is given by $p(x)$. If the marginal cost of the video
 336 is c , then the monopolist will choose x^* to maximize profit, $p(x)x - cx$.

Suppose now that groups of size k form so that if y items are sold, there
 will be ky items viewed. The willingness to pay of the marginal individual
 is $p(ky)$, so the willingness to pay of the marginal group is $kp(ky)$. The
 monopolist now wants to chose y to maximize

$$kp(ky)y - cy/k.$$

337 If $c = 0$, then $y^* = kx^*$. That is, the monopolist just produces $1/k^{th}$ as much
 338 when sharing is possible, and the marginal user ends up paying the same
 339 amount as he or she did before.

340 When $c > 0$, the monopolist produces less when sharing is allowed, and
 341 makes more profit, due to the savings on production costs. Think of a situ-
 342 ation where the users band together to form a private library and purchase

343 some very expensive reference book. The publisher is better off printing a few
344 of them and selling them to libraries at a high price than printing more and
345 selling to every individual. In this case, sharing is a more efficient industry
346 for selling downstream.

347 However, note that we have assumed that there is no cost to sharing.
348 In reality, it is often inconvenient to share due to various forms of conges-
349 tion. We could modify the above model by adding in a “transactions cost
350 of sharing.” This task is pursued in Besen [1986] and Varian [2000], among
351 others.

352 6.2 The library model

353 In the library model, the value that a group of consumers places on the
354 information good is the sum of the values of the individual members. Suppose
355 that we have n consumers who form n/k groups of size k .

356 Suppose that individual values are Normally distributed. The group val-
357 ues will then be the sum of k Normal random variables. Figure 2 shows
358 demand curves for $k = 1, 2, \dots$

359 As can be seen in this example, as the size of the group increases, the
360 demand curve becomes flat at the mean value \bar{v} . This is just the law of
361 large numbers: the distribution about the mean shrinks as the sample size
362 increases.

363 Hence, for large groups, the seller should price at \bar{v} and ends up extracting
364 most of the consumer surplus. See Armstrong [1999], Bakos et al. [1999], and
365 Bergstrom and Bergstrom [2004].

366 There are a couple of difficulties with the “library model.” In the limit,
367 there should just be one big group and the seller should make a single take-
368 it-or-leave it offer to the group. Obviously, this is unrealistic, but it shows
369 that some attention should be given to the group formation issue.

370 In particular, it is clear that the assumed group formation method (ran-
371 dom) is too simplistic. One might well ask what would happen if the groups

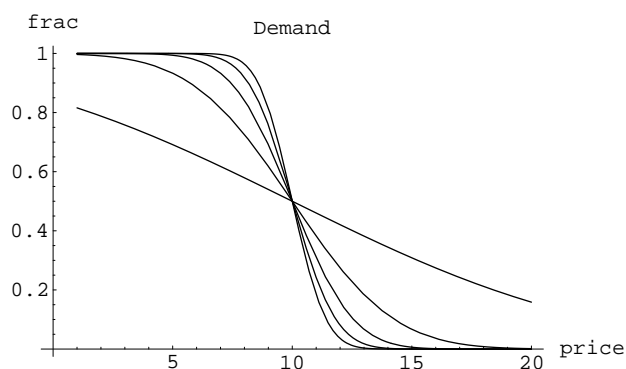


Figure 2: Demand curves by groups.

372 formed more strategically.

373 The “video store” model probably goes too far in the other direction, as
 374 it assumes pure assortive mating—groups form among members with similar
 375 willingnesses to pay. Examining more flexible models of group formation
 376 may be an attractive avenue for future research.

377 7 Non-economic motives

378 In the above models, the price of the shared item adjusted so as to reflect
 379 the value that the group placed on it. This makes sense for institutional
 380 purchases (such as libraries), video rental stores, and the like.

381 However, it may not be a very good model of phenomena such as online
 382 file sharing. It may well be that the file sharers do not get huge personal
 383 benefits from sharing but it is so cheap and easy to do that they engage in
 384 sharing even if offers little additional personal utility.

385 If this is correct, then even modest costs to sharing (congestion, threats
 386 of legal action, and so on) could be enough to discourage such activity. How-
 387 ever, the problems of detection are difficult, and attempt to single out a few
 388 consumers for punishment have not thus far been very successful in discour-

389 aging online sharing.

390 8 Business models

391 Given the fact that today most information is “born digital” and that digital
392 information is typically very easy to copy, it is conceivable that copyright
393 laws may become almost impossible to enforce.

394 Are there ways for sellers to support themselves in such an environment?
395 It is worth considering some of the options.

396 **Make original cheaper than copy.** This is basically the limit pricing model
397 described earlier. If there is a transaction cost for a copy—a direct cost
398 of copying, an inconvenience cost, or the copy is inferior to the original
399 in some way—then the seller can set the price low enough that it is not
400 attractive to copy.

401 **Make copy more expensive than original.** The “cost of copying” is par-
402 tially under the control of the seller, who could use a “digital rights
403 management system,” some anticopying technology, or threats of legal
404 action which would increase the cost of copying and, therefore, increase
405 the price that it could charge for its product.

406 **Sell physical complements.** When you buy a physical CD you get liner
407 notes, photos, and so on. Perhaps you could get a poster, a membership
408 in a fan club, a lottery, a free T-shirt, as well. These items might not be
409 available to someone who simply downloaded an illicit copy of a song.

410 **Sell information complements.** One can give away the product (e.g., Red
411 Hat Linux) and sell support contracts. One can give away a cheap, low-
412 powered version of some software and sell a high-powered version.

413 **Subscriptions.** In this case, consumers purchases the information as a bun-
414 dle over time, with the motivation presumably being convenience and
415 perhaps timeliness of the information delivery.

416 **Sell personalized version.** One can sell a highly personalized version of a
417 product so that copies made available to others would not be valuable.
418 Imagine, for example, a personalized newspaper with only the items
419 that you would wish to read. Those with different tastes may not find
420 such a newspaper attractive. Selling works with digital fingerprints
421 (encoding the identity of the purchaser) is an extreme form of this.

422 **Advertise yourself.** A downloaded song can be an advertisement for a per-
423 sonal appearance. Similarly, an online textbook (particularly if it is in-
424 convenient to use online) can be an advertisement for a physical copy.
425 There are many examples of materials that are freely published on the
426 Internet that are also available in various physical forms for a fee.

427 **Advertise other things.** Broadcast TV and radio give away content in
428 order to show advertisements. Similarly, most magazines and newspa-
429 pers use the per copy price to cover printing and distribution, while
430 editorial costs are covered by advertising. Advertising is particularly
431 valuable when it is closely tied to information about prospective buy-
432 ers, so personalization can be quite important. In an extreme form,
433 the advertisement can be completely integrated into the content via
434 product placement.

435 **Monitoring.** ASCAP monitors the playing of music in public places, collects
436 a flat fee, which it then divvies up among its members. The shares are
437 determined by a statistical algorithm. The Copyright Clearance Center
438 uses a similar system for photocopying—a flat fee based on an initial
439 period of statistical monitoring.

440 **Site licenses.** An organization can pay for all of its members to have pre-
441 ferred access to some particular kinds of content.

442 **Media tax.** This a tax on some physical good that is complementary to
443 the information product (i.e., audio tape, video tape, CDs, TVs, hard
444 drives, etc.) The proceeds from this tax to compensate producers of
445 content.

446 **Ransom.** Allow potential readers to bid for content. If the sum of the
447 bids is sufficiently high, the information content is provided. Various
448 mechanisms for provision of public goods could be used, such as the
449 celebrated Vickrey-Clarke-Groves mechanism. This could be used in
450 conjunction with the subscription model.

451 **Pure public provision.** Artists and other creators of intellectual property
452 are paid by the state, financed out of general revenues. This is not
453 so different from public universities where research and publication is
454 considered integral to the job.

455 **Prizes, awards and commissions.** Wealthy individuals, businesses or coun-
456 tries could commission works. The patronage system achieved some
457 notable results in Europe for several centuries. Entities such as the
458 National Science Foundation or the National Endowment for the Hu-
459 manities are examples of modern day state agencies that fund creative
460 works.

461 All of these business models have their problems, of course, and none is
462 likely to yield any sort of social optimum. On the other hand, it should be
463 kept in mind that copyright is a second-best solution to intellectual property
464 provision as well.

465 Perhaps the ultimate saving grace is that the same technological advances
466 that are making digital content inexpensive to copy are also helping to reduce
467 the fixed cost of content creation. Hundreds of thousands of people are giving

468 away digital content, from blogs to open source software. No doubt this trend
469 will continue.

470 It is highly unlikely that free content alone will meet all of our needs for
471 information goods. However, it may be that free content, some combination
472 of the business models described above, and traditional copyright will do an
473 adequate job of satisfying our demand for information goods.

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