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An economic model of fair use

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Abstract

The doctrine of fair use allows limited copying of creative works based on the rationale that copyright holders would consent to such uses if bargaining were possible. This paper develops a formal model of fair use in an effort to derive the efficient legal standard for applying the doctrine. The model interprets copies and originals as differentiated products and defines fair use as a threshold separating permissible copying from infringement. The analysis highlights the role of technology in shaping the efficient standard. Discussion of several key cases illustrates the applicability of the model.

JEL classification: K11; O34

Keywords: Fair use; Copyright law; Technological improvement

1. Introduction

Copyright protection gives authors, artists, and composers an incentive to create original works by giving them exclusive control over the right to make copies. While this right overcomes the appropriability problem associated with intellectual property (owing to its public good nature), it also creates a distortion arising from the copyright holder's

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monopoly power. The limited duration of copyrights is one way that the law seeks to balance these offsetting effects (Landes and Posner, 2003, Chapter 8). Another is by application of the fair use doctrine. Originally established by the Copyright Act, fair use allows unauthorized copying for limited purposes like criticism, scholarship, news reporting, and education based on the rationale that copyright holders would consent to such uses if bargaining were possible. In this sense, the allowed uses pass a "market test" for efficiency and should be permitted, subject to the constraint that they do not substantially impair the copyright holder's incentive to create the work in the first place. According to this argument, fair use is justified by the presence of transaction costs that prevent completion of otherwise beneficial bargains between the creator of copyrighted material and potential users (Gordon, 1982).[1]

Scholars nevertheless continue to disagree about the extent to which intellectual property should be granted any special legal protection. For example, those urging limited protection (i.e., a permissive fair use standard) argue that authors can appropriate the benefits from unauthorized copying indirectly, either by charging higher prices for those originals that are more likely to be copied (assuming they can price discriminate) (Liebowitz (1985)),[2] or by charging an initial price for the original that captures the present value of all future benefits from copying it (Boldrin and Levine, 2002). Others caution, however, that these responses represent special cases and hence may not be the best guide for a general policy, especially in the face of ever-improving technologies for duplication (Adelstein and Peretz, 1985; Klein et al., 2002).

The doctrine of fair use is clearly at the center of this debate for it defines the threshold between legal copying and infringement. Despite this importance, however, there have been few attempts to model it formally. Two exceptions are the papers by Novos and Waldman (1984) and Landes and Posner (1989). Novos and Waldman (1984) develop a model in which a monopolist produces a good that consumers can either purchase, or borrow and copy. Copies are identical to the original, but the cost of copying exceeds the firm's marginal production cost, and is also increasing in the degree of copyright protection. Because consumers vary in their costs of copying, in equilibrium they sort themselves out according to which option is cheaper. It follows that increases in the stringency of copyright protection (e.g., a stricter fair use standard) induce more consumers to purchase the good than to copy it. The authors investigate the welfare effects of such a change, but they do not derive the welfare maximizing level of protection, nor do they examine how it should respond to changes in the technology of copying.

In a similar model, Landes and Posner (1989) investigate the optimal level of copyright protection, and then apply their results to various aspects of copyright law. A key result is that some amount of unauthorized copying, as permitted under fair use, is optimal.

The current paper significantly extends both of these models by deriving an explicit standard for fair use in the context of a model of differentiated products. Specifically,

[1] Depoorter and Parisi (2002) argue that, even if transaction costs were zero, the market might still fail in cases where prospective users need to acquire permission from multiple copyright holders in order to produce a derivative work. Here, the market failure (and hence the justification for fair use) is the so-called "anti-commons" problem.

[2] The example Liebowitz uses is the case of journal publishers who charge a higher price for institutional purchasers. The fact that improvements in photocopying technology have apparently not harmed publishers supports his argument.

we treat the original work and copies as different varieties lying on a continuum and assume that consumers vary in their valuations of these varieties. This is an important innovation because it captures the notion that copies are not always perfect substitutes for the original, either in terms of quality or extent. In this context, fair use emerges naturally as a threshold separating permissible copying from infringement.[3] The optimal threshold can then be derived by balancing the social benefits of the use against the cost to the copyright holder. We argue that such a model is useful as a guide for interpreting past court rulings on fair use, but more importantly, for anticipating how changes in the technology of duplication will affect future rulings.

2. The model

The model will highlight both the differential in costs between originals and copies, and the fact that copies are generally not perfect substitutes for the original, depending on the quality and extent of the copy. The cost differential is a supply-side issue that relates to the copying technology. As that technology improves, the marginal cost of producing a copy approaches that of the original. For example, photocopies of a book are cheaper to produce than are handwritten copies, and downloading music from the internet is easier than recording it off the radio. This technological aspect of the copyright issue can be isolated by treating the original and copies as homogeneous goods (perfect substitutes) but with different marginal costs of production.

Such a model, however, ignores the demand-side issue relating to the nature or content of the work itself, apart from its cost of production. For example, at what point does a parody of a copyrighted work become infringement?[4] To examine cases of this sort, we suppose that there is some underlying "good" that comes in different varieties or versions. At one extreme is the original work, while copies of differing quality or extent lie along a continuum. Some consumers will place the highest value on the original in its entirety, while others will be satisfied with inferior quality copies or with portions of the original. Consider, for example, a specialized textbook. Practitioners in the field will likely attach the highest value to the published (complete) version of the book, while students and those with a more limited interest may be satisfied with a photocopy of pertinent parts of it.

To capture this aspect of the problem, consider a quality index z that ranges from zero to one. Put the original at $z = 1$, the highest quality level, and copies of lesser quality (or extent) at correspondingly lower values of z. Now suppose that consumers attach a marginal value t to quality up to a maximum $\bar{z} \leqslant 1$, after which they receive no further benefit from increments in z.[5] Thus, consumer i's gross benefit from consuming one unit of the good as a function of its quality z is given by

[3] In this sense, the analysis is related to the literature on the optimal breadth of a patent. See, for example, Klemperer (1990).

[4] Posner (1992, p. 71) argues that infringement occurs when the parody takes "so large a fraction... of the copyrighted work as to make [it] a substitute for that work". This aspect of fair use can only be captured by a model of differentiated products.

[5] This is obviously an extreme assumption. More generally, consumers would have a declining marginal benefit of quality beyond their ideal threshold. We make this sharper assumption primarily for simplicity.

$$U_i(z) = \begin{cases} tz, & z \leqslant \bar{z}_i, \\ t\bar{z}_i, & z > \bar{z}_i. \end{cases} \tag{1}$$

This function is shown graphically in Fig. 1. We assume that all consumers have the same marginal benefit of quality, t, but that they differ in their maximum desired quality, denoted $\bar{z}$. For example, those who require the published version of the textbook have $\bar{z} = 1$, while those who are satisfied with copies of certain chapters or pages have $\bar{z} < 1$. To capture this variation across consumers, let $\bar{z}$ be distributed uniformly on the unit interval.

Assume initially that only the original is available; that is, copying is not possible or feasible. Consumers must therefore purchase the original or not consume the good at all. Since the original is located at $z = 1$, any consumer who purchases it receives gross benefits of $t\bar{z}$. If the price is p, the consumer will purchase the original if $t\bar{z} \geqslant p$, or if $\bar{z} \geqslant p/t$. Given the uniform distribution of $\bar{z}$, the demand for the original is therefore $1 - p/t$, which is downward sloping in p. The author/producer, acting as a monopolist, will therefore choose the price to maximize profit, given by

$$\pi = (p - c)(1 - p/t), \tag{2}$$

which yields the monopoly price

$$p_M = (t + c)/2. \tag{3}$$

It follows that the threshold between consumers and non-consumers is

$$z_M = (t + c)/2t. \tag{4}$$

That is, consumers on $z \geqslant z_M$ purchase the original while those on $z < z_M$ do not. Note that z_M is strictly between zero and one if $t > c$, which we assume is true. Substituting (3) into (2) and simplifying yields the maximized value of profit:

$$\pi_M = \frac{(t - c)^2}{4t}. \tag{5}$$

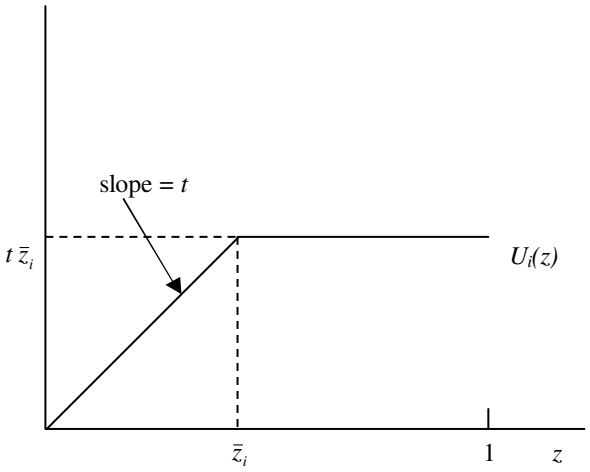

Fig. 1. Consumer i's benefit function.

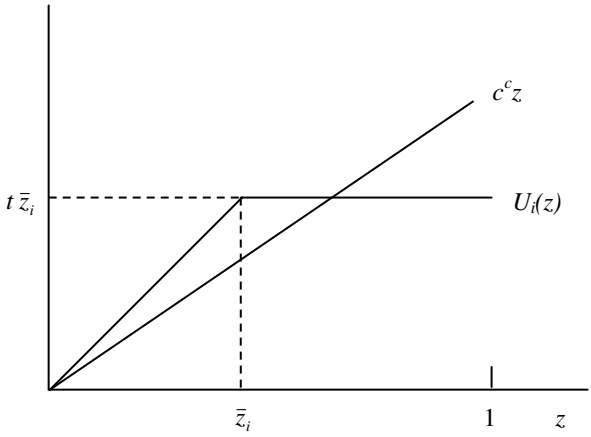

Fig. 2. Consumer i's optimal copy.

Finally, we assume that π_M exceeds the fixed cost K of producing the original so that the author finds it profitable to create it in the first place. That is, $\pi_M - K > 0$.

2.1. The impact of copying

Now suppose that it is technologically possible for consumers to make copies of the original and that it is legal to do so. (Entry of competing firms, however, remains illegal.) Specifically, suppose that consumers can produce a copy of quality z at a cost $c^c z$, where c^c is the (fixed) unit cost. An exact copy of the original would therefore cost c^c (given $z = 1$). We assume that $c^c > c$, or that the author has an absolute cost advantage in producing the original. This might reflect scale economies, expertise, or experience on the part of the author/producer. (Presumably, however, technological improvements will cause $c^c \to c$ over time, as we discuss below.) We also assume that $c^c < t$, for otherwise copying would never be beneficial for consumers.

We begin by asking what quality level of the good a consumer would self-produce if copying were the only option. The problem for consumer i is to choose z to maximize $U_i(z) - c^c z$. As Fig. 2 shows, the solution to this problem will be $\bar{z}_i$ for any consumer i. That is, consumers will always copy up to, but not beyond, their maximum desired quality.

Now consider the choice between copying and purchasing the original. We have just seen that for an arbitrary consumer, the net benefits from making the optimal copy are $(t - c^c)\bar{z}$, while the net benefits to that same consumer from purchasing the original at price p are $t\bar{z} - p$. Thus, the consumer will purchase the original if $t\bar{z} - p \geqslant (t - c^c)\bar{z}$, or if $\bar{z} \geqslant p/c^c$. It follows that when copying is possible, demand for the original is $1 - p/c^c$.[6] The author's profit therefore becomes

$$\pi = (p - c)(1 - p/c^c), \tag{6}$$

[6] Note that this specification assumes that the set of copiers and the set of purchasers are mutually exclusive (i.e., copiers never purchase the original). We relax this assumption in Section 4.

which, when maximized, yields the optimal price

$$p_c = (c^c + c)/2. \tag{7}$$

The threshold separating purchase and copying is now given by

$$z_c = (c^c + c)/2c^c, \tag{8}$$

while maximized profits are

$$\pi_c = \frac{(c^c - c)^2}{4c^c}. \tag{9}$$

It is easy to verify that that $p_c < p_M$, $z_c > z_M$ and $\pi_c < \pi_M$ given $t > c^c$. Thus, as expected, copying reduces the demand for the original as well as the author's variable profit. Further, differentiating (9) shows that π_c is increasing in c^c, implying that as c^c falls (i.e., as the technology of copying improves), the author's variable profit decreases because more consumers find it desirable to self-produce the good. (This assumes no corresponding decrease in c.)

An immediate implication is that improvements in copying technology will eliminate the author's incentive to create the original if π_c falls below K. Of course, this is the economic rationale for legal protection of copyright. At the same time, however, copying by consumers who would not have purchased the original anyway is non-harmful to the author and confers a social benefit. This represents the basis for the fair use limitation on the author's copyright according to Gordon's (1982) standard. Below, we derive the optimal extent of fair use in the presence of this trade-off. First, however, we need to examine in detail how a fair use limitation affects the profit-maximizing behavior of the author.

2.2. Fair use

Fair use represents a limit on the author's copyright by allowing some copying. We capture this formally by defining z_F as the upper bound on allowable copying. That is, $z < z_F$ is fair use, but $z \geqslant z_F$ is not. This is consistent with the interpretation of z as an index of how close the copy is to the original. For example, fair use allows "partial copies" (book excerpts or limited photocopying for personal use) but does not allow nearly complete copies. In terms of the model, fair use protects the author's monopoly power over the range $[z_F, 1]$, but forces him to share the market with copiers over the range $[0, z_F]$. Given this characterization of fair use, we first examine the optimal pricing policy of the monopolist as a function of z_F. Later, we derive the socially optimal extent of fair use.

Clearly, for $z_F \leqslant z_M$, the author will adopt the monopoly pricing strategy derived above since only non-harmful copying is allowed. As noted, fair use has no effect on the behavior of the author in this range. This changes, however, as z_F is raised above z_M, for now, potential copiers overlap with potential purchasers of the original. Since the author retains monopoly power over the range $[z_F, 1]$, it is initially optimal for him to set the price so that all consumers in this range just find it desirable to continue purchasing the original, while all those who can legally make copies do so. The profit-maximizing price under this strategy is set to extract the entire surplus from the marginal purchaser. That is, $p_F = tz_F$, where $p_F > p_M$ given $z_F > z_M$. The resulting demand for the original is $1 - p_F/t$ and the variable profit is

$$\pi(z_F) = (p_F - c)(1 - p_F/t) = (tz_F - c)(1 - z_F). \tag{10}$$

Differentiating (10) shows that $\partial\pi/\partial z_F < 0$ given $z_F > z_M$. That is, the author's profits are falling as the fair use standard increases (i.e., as more extensive copying is allowed) in the range where the standard is binding. (Even though the price is rising, profit falls because demand is falling faster.)

As z_F increases and profits fall further below the unconstrained monopoly level, a point may be reached where the author no longer finds it profitable to set the price equal to p_F. Instead, he may lower the price in order to attract some consumers who can legally make copies. If such a point is reached for $z_F < 1$, fair use ceases to be a binding constraint, and the optimal price, as derived above, is p_c. The switch point occurs when $\pi(z_F) = \pi_c$, which is shown graphically by point z' in Fig. 3. The corresponding price of the original over the various ranges is shown in Fig. 4.

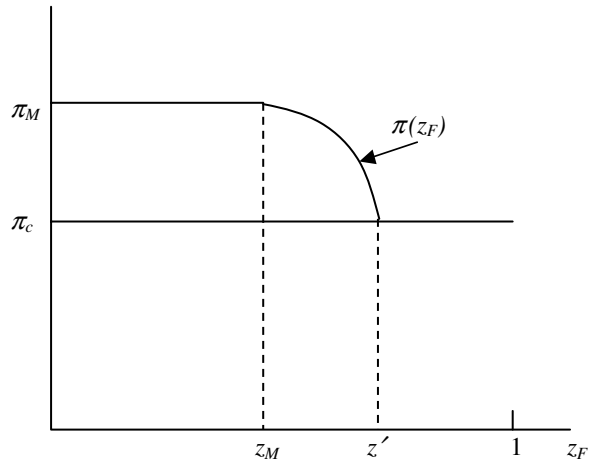

Fig. 3. Author's profit as a function of the fair use standard, z_F.

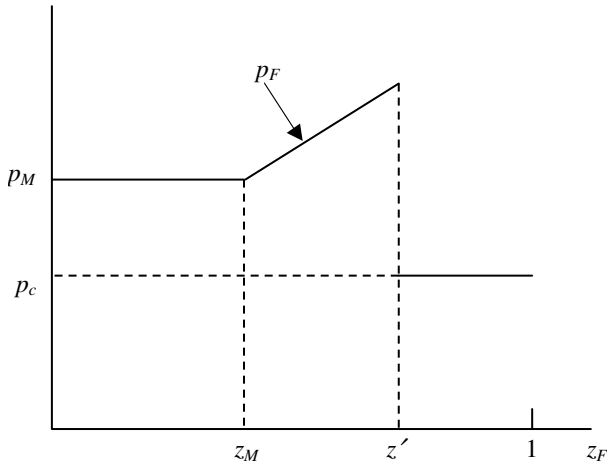

Fig. 4. Price of original as a function of z_F.

To summarize, the imposition of a fair use standard creates three ranges, as determined by the author's profit-maximizing response. In the first range, defined by $z_F \in [0, z_M]$, the author sets the monopoly price p_M and earns maximum profits. Fair use copying in this range is non-harmful to the author and therefore poses no threat to his incentive to create the work (given our assumption that the unconstrained monopoly profit exceeds K). In the second range, defined by $z_F \in [z_M, z']$, the fair use limit is binding, causing the price to increase above p_M and profits to fall. Allowable copying in this range is harmful to the author and will result in non-creation of the work if variable profit falls below K. Finally, in the third range, defined by $z_F \in [z', 1]$, the fair use limit is sufficiently permissive that it ceases to be a binding constraint. Here, the author lowers the price of the original and competes directly with copiers.

In this final range (if it exists), the author's profits are no longer affected by increases in z_F, thus placing a lower bound on profit (given the copying technology as embodied in c^c). Thus, if variable profits in this case, given by π_c, exceed K, legal prohibition of copying is not needed to induce creation of the work.[7] Even in this case, however, copyright protection would be needed to prevent entry of competing *firms* that would enjoy the same technological advantages that the author has over mere copiers (as captured by the fact that $c < c^c$).

3. Welfare analysis

The preceding analysis characterizes the monopolist's optimal reaction to different levels of legally allowable copying. In this section, we consider the socially optimal level of fair use, taking this reaction as given. As a benchmark, we first derive the efficient dividing point between copying and purchase of the original.[8] Denoting this dividing point by z^*, we write social welfare as

$$W = \int_0^{z^*} (t - c^c)\bar{z}\,d\bar{z} + \int_{z^*}^1 (t\bar{z} - c)\,d\bar{z}. \tag{11}$$

In this expression, the first term is consumers' surplus from copying, while the second is the sum of the producer's profit and consumers' surplus from production and sale of the original. Maximizing (11) with respect to z^* yields the optimal threshold

$$z^* = c/c^c \tag{12}$$

where $z^* < 1$ given $c^c > c$. Note that this point occurs where the total cost of producing a copy of quality z^*, $c^c z^*$, equals the cost of producing the original, c. Thus, the optimal division between copying and consumption of the original minimizes the cost of production. This is true because the benefits of consumption are equal for the two options (given maximization of benefits by copiers).[9]

Generally, this first-best outcome will not be achievable, however, because of the monopoly power granted to the author. As a result, optimal fair use will maximize social

[7] We show in the next section, however, that it is never optimal to raise the fair use standard to the point where this case becomes relevant.

[8] It is worth emphasizing that some copying is efficient, despite the author's cost advantage, because of the assumption that the author offers only one variety of the original at $z = 1$, while some consumers prefer $z < 1$.

[9] This result therefore reflects the nature of preferences as defined in (1).

welfare subject to the constraints that: (i) the author sets his price to maximize profit; and (ii) the author's maximized profit must cover his fixed cost of creation. To derive this constrained welfare maximum, we need to consider three cases.

Case one: $z^* < z_M$. In this case, the first-best optimum is not attainable because the monopolist, by raising the price above marginal costs, overly limits the market for purchase. As a result, $z_F^* = z_M$ in order to maximize the consumer surplus from copying. The outcome in this case is second-best in the sense that there is too much copying. That is, consumers in the range $[z^*, z_M]$ would be more efficiently served by purchasing from the author at the competitive price $p = c$ than by making copies, but monopoly pricing by the author makes copying cheaper. (That is, constraint (i) is binding.) Extending fair use up to z_M is therefore welfare-enhancing while not being harmful to the author.

Case two: $z^* > z_M$, and the author's variable profit evaluated at $z_F = z^*$ is at least as large as his fixed cost of creation, K. In this case, the optimal level of fair use is $z_F^* = z^*$, and the first-best outcome is achieved. Although copying in this range is harmful to the author, it does not reduce profit enough to deter creation.

Case three: $z^* > z_M$, but the author's variable profit at z^* is less than K. In this case, fair use should be set such that $\pi(z_F) = K$. As a result, $z_M < z_F^* < z^*$. Fair use falls short of the first best in this case because the constraint that the author's profit must cover K (constraint (ii)) is now binding.

We conclude this section by asking how changes in the marginal cost of copying, c^c, affect the optimal fair use standard. Specifically, how should z_F^* vary in response to technological changes that lower the cost of copying over time? It turns out that the above cases, in sequence, describe the optimal progression as c^c decreases.

Recall that the relevant range for c^c is between t (the point at which copying becomes beneficial) and c (the author's cost of producing copies of the original). Fig. 5 graphs z_M and z^* over this range and also shows the resulting optimal fair use standard, z_F^* (the darkened segments). Moving from right to left in the graph, note that for high values of c^c, $z_M > z^*$, as in case one, implying that $z_F^* = z_M$. Copying is excessive in this range, but

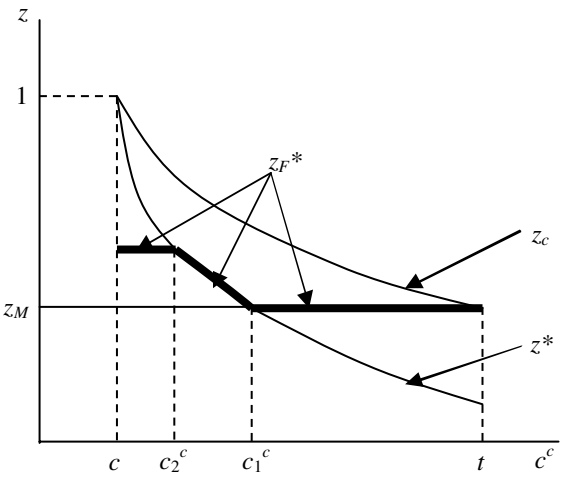

Fig. 5. Optimal fair use standard in each of the three cases.

the author's profits are unaffected because the fair use standard is not binding. As a result, no infringement claims should occur. As c^c continues to fall, however, z^* rises until it intersects z_M at c_1^c in Fig. 5, at which point case two becomes relevant. In this range, $z_F^* = z^*$, and the division between copying and purchase of the original is efficient (first-best). However, because the fair use constraint is binding, the author's profits are falling (and z_F^* is rising) as c^c decreases. Thus, although variable profits remain strictly greater than K over this range, copyright holders may nevertheless seek legal protection of their monopoly by challenging unauthorized uses.

Finally, when variable profits reach K, the author's fixed cost, case three becomes operative. (This occurs when $c^c \leqslant c_2^c$ in Fig. 5.) Since profits can fall no further without impeding the incentive to create, the fair use standard must remain fixed regardless of any additional decreases in c^c. Thus, in the range where $c \leqslant c^c \leqslant c_2^c$, $z_F^* < z^*$, and there is too little copying from a social perspective.[10] Nevertheless, copying is very threatening to copyright holders in this range because they are just covering their costs of creation. Thus, vigorous legal action is likely to prevent further increases in z_F^*.

As a final point, we note that it is never optimal to raise the fair use standard to the point where it ceases to be a binding constraint. To see why, recall that when fair use is not binding, the author sets the price of the original at p_c and copying occurs up to z_c (as defined in (8)). As Fig. 5 shows, however, $z_c \geqslant z_F^*$ throughout the relevant range.[11] Thus, setting the fair use standard high enough to allow unconstrained copying would result in too much copying for all values of c^c.

4. Extension: the case where copying stimulates demand

To this point, we have assumed that copying can only be harmful to authors by crowding out demand for the original, but in some cases, copying may actually stimulate demand. For example, air play or file sharing of a copyrighted song may induce listeners to buy the album, and excerpts in a book review may cause readers to buy the book. In this section, we extend the model to account for this possibility and suggest how it affects the preceding conclusions regarding fair use.[12]

The simplest way to allow a spillover from copying to demand for the original is to assume that a fixed fraction α of copiers also end up purchasing the original, $0 \leqslant \alpha \leqslant 1$.[13] Thus, if all consumers in the interval $[0, z_F]$ make copies (as we have assumed), then the spillover demand for the original is αz_F. Assuming initially that $z_F < z_M$ (i.e., there is no overlap of copiers and purchasers), the overall demand for the original becomes $1 - p/t + \alpha z_F$.[14] The resulting profit for the author is

[10] By "too little copying" we mean that it would be more efficient in a static sense for consumers to be allowed to make copies over this range. In a broader sense, of course, such copying would be harmful to incentives and hence is not socially desirable.

[11] To prove this, note that $z_c \geqslant z^*$ for $c^c \geqslant c$ from (8) and (12), and $z_c \geqslant z_M$ for $c^c \leqslant t$ from (4) and (12).

[12] Oberholzer and Strumpf (2004) provide evidence on the magnitude of this effect for downloaded music. Using data from 2002, they find a small and statistically insignificant effect of downloads on album sales over the period studied.

[13] It is conceivable that copying could also cause a negative spillover effect on sales of the original; that is, $\alpha < 0$. The results in this section easily generalize to that case.

[14] We assume for simplicity that α does not depend on p.

$$\pi = (p - c)(1 - p/t + \alpha z_F), \tag{13}$$

which, when maximized, yields the key expressions

$$p_M = (t + c + \alpha t z_F)/2, \tag{14}$$

$$\pi_M = \frac{(t - c + \alpha t z_F)^2}{4t}, \tag{15}$$

$$z_M = (t + c + \alpha t z_F)/2t. \tag{16}$$

(The corresponding expressions in Section 2 are special cases of this more general formulation.)

Note that, in contrast to the case where $\alpha = 0$, all values here are increasing in the fair use standard, reflecting the beneficial impact of copying. In particular, profits are increasing in z_F, suggesting that authors should actually favor, at least initially, a more permissive fair use standard. Further, the fact that z_M is increasing in z_F implies that copiers and purchasers may never overlap over the relevant range, in which case authors would never seek legal protection of their copyright. If, however, the spillover effect is weak (i.e., if α is small), then increases in z_F will eventually cause it to exceed z_M.[15] Even in that case, however, a more permissive fair use standard has offsetting effects on the author's profit.[16] On one hand, profits will fall with z_F due to the crowding out effect, but on the other, profits will rise with z_F due to the spillover demand from new copiers. Eventually, however, the crowding out effect will dominate, but it will be delayed relative to the case where there is no spillover. Thus, authors will tolerate a much more permissive fair use standard compared to the case where $\alpha = 0$. The difference in the author's response, however, is quantitative rather than qualitative.

Finally, in order to properly specify the welfare function in this case we would need to add more structure to the model. (In particular, we would need to say something about which copiers choose to purchase the original and why.) It seems clear, however, that the existence of beneficial spillovers would cause the optimal fair use standard to be everywhere higher compared to the case where $\alpha = 0$.[17] Nevertheless, we expect that our basic conclusions from Sections 2 and 3 would remain qualitatively valid.

5. Application of the model to copyright law

The law of fair use is based on Section 107 of the Copyright Act, which codified for the first time the factors determining fair use. These factors are: (a) the purpose and character of the use, including whether such use is of commercial nature or is for non-profit educational purposes; (b) the nature of the copyrighted work; (c) the amount and substantiality of the material used in relation to the copyrighted work as a whole; and (d) the effect of the use on a copyright owner's potential market for and value of his work.[18] Factor (a), the extent to which the use in question is commercial, and factor (d), the effect of the use on the value of the copyright, are both concerned with the role

[15] This is true because $\partial z_M/\partial z_F = \alpha/2 < 1$.
[16] Profits in this case are given by $\pi(z_F) = (tz_F - c)(1 - (1 - \alpha)z_F)$, which reduces to expression (10) when $\alpha = 0$.
[17] In particular, both z_M and z^* would shift up in Fig. 5.
[18] 17 U.S.C. Section 107.

of copyright protection in promoting creation of original works.[19] Further, since factor (b), the nature of the copyrighted work, has been interpreted by courts to afford greater protection to "creative" works,[20] it also relates to this aspect of fair use. Taken together, these factors represent the legal counterpart to the author's profit constraint in the model.

Factor (c) concerns the extent to which the use in question resembles the original work-uses that are closer to the original are less likely to be judged as fair. This factor is captured in the model by the index z, which measures the "proximity" of the copy to the original. Consistent with the law, the model defines fair use in terms of an optimally chosen threshold for z.

The first important infringement case to apply these factors was *Williams & Wilkins Co. v. United States*,[21] which was a claim by a publisher of medical journals that the unauthorized photocopying and dissemination of journal articles by government libraries was an infringement of its copyright. The court found for the defendant, ruling that the use was fair. In reaching this result, the court emphasized the value of the copies in promoting scientific advancement rather than for commercial use, and the limited number of copies made. Further, it noted that the plaintiffs offered little evidence of adverse financial effects. These conclusions suggest that the use in question was welfare-enhancing, while causing no harm to copyright holders. The court's finding of fair use is therefore consistent with the efficient standard as described by case two (or possibly even case one) of the model.

A decade later, the Supreme Court re-examined the fair use standard in *Sony Corp. v. Universal City Studios*,[22] which alleged "contributory infringement" by the manufacturer of home video equipment that permitted unauthorized recording of copyrighted television programs. In reversing an earlier appeals court decision against *Sony*, the Court held that the use in question was fair because it provided a clear benefit to consumers (the ability to "time-shift" programs), was non-commercial in nature, and imposed little if any harm on copyright holders.[23] Again, the use met the economic standard for fair use as prescribed by case two of the model.

Williams & Wilkins, and to a lesser extent *Sony*, involved technologies where most uses were judged to be fair in the sense of enhancing welfare without substantially harming the copyright holder's interests. Given this legal standard, Klein et al. (2002) question why plaintiffs and the court disagreed about the fair use standard, resulting in the unsuccessful legal challenges.[24] One explanation is that one or both

[19] Though Landes and Posner (2003, p. 115) point out that factor (d) fails to distinguish between uses that reduce the value of a copyrighted work by criticizing it (e.g., a negative book review or a parody) and uses that truly infringe on it.

[20] *A & M Records, Inc. v. Napster, Inc.*, 114 F. Supp. 896, 913 (2000).

[21] 487 F.2d 1345 (1973).

[22] 104 S.Ct. 774 (1984).

[23] However, Landes and Posner (2003, p. 118) argue that "in actuality copyright holders are probably harmed by video recording because advertisers pay only for viewers who are likely to watch commercials, and recording a program makes it easier for viewers to fast-forward through the commercials." This does not invalidate our interpretation of the *Sony* case as long as the harm is not sufficient to deter creation of the copyrighted work.

[24] According to the economic literature on litigation, trials should only occur when the parties to a dispute disagree about the likely outcome of trial (Cooter and Rubinfeld, 1989) or if there is asymmetric information (Bebchuk, 1984).

of the parties erred in estimating the harm from a given use. Another, favored by the authors (and consistent with case two of the model), is that some technologies allow both welfare-enhancing and harmful uses. Thus, copyright holders reasonably file suit to protect their economic interests, but the court takes a broader view and judges as fair those uses that enhance social welfare.

The court agreed with the plaintiffs about the fair use standard, however, in the recent case of *A&M Records, Inc. v. Napster, Inc.*[25] The case concerned an internet service that allowed consumers to download and share copyrighted music free of charge. In finding against fair use, the court noted that the copies were identical to the originals, and, in contrast to the previous cases, were primarily for commercial rather than private use. Further, it found that the copying adversely affected the economic interests of plaintiffs in at least two ways: by directly reducing the demand for their products, and by creating a barrier to entry into the market for digital downloading of music.[26] The court therefore found the use to be an infringement of the plaintiffs' copyright.

In contrast to the earlier cases, *Napster* falls into case three of the model, where technological advancement permits uses that, while possibly welfare-enhancing, are so damaging to the copyright holder's profit as to impair incentives to create the original. Indeed, the progression from *Williams & Wilkins* to *Napster* shows how technological change continually challenges the courts to re-define the optimal fair use standard. In the early cases, technology was the limiting factor, permitting only uses that were beneficial while imposing little harm on copyright holders. The cheapest way to get the original was simply to buy it. Efficiency clearly dictated that the uses in question be judged fair. However, continued improvements in technology have increased the threat to the value of the copyright – and hence the incentive to create original works – ultimately forcing the court to set a limit on fair use. In mirroring this progression, the ranges implied by the model reflect the evolutionary trend in fair use litigation.

The preceding cases, while illustrative, are not necessarily reflective of the broader population of fair use cases. Nimmer (2003), however, has surveyed all of the fair use cases decided from 1994 to 2002 in an effort to identify the underlying criteria employed by courts. In 24 of the 60 cases the challenged use was judged to be "fair" (40%), while in 36 it was judged to be "unfair" (60%). Nimmer further broke down the cases according to the four factors that statutorily define fair use. Specifically, for each case he determined whether the court's decision found the use in question to be fair or unfair in terms of each of the factors. His results are summarized in Table 1.

Note that the percentages of overall agreement (i.e., the percentage of times that the outcome for each factor agrees with the outcome of the case) range from 42% to 57%, none of which is significantly different from 0.50 in a statistical sense.[27] However, when we break the cases down by fair and unfair uses, something more of a pattern emerges. Specifically, in cases where the court finds fair use, it judges factor (a) fair 71% of the time, and factor (d) fair 83% of the time (compared to 8% and 46% for factors (b) and (c), respectively). In contrast, when it finds unfair use, it judges factors (b) and (c) unfair

[25] 114 F.Supp. 2d 896 (2000).
[26] 114 F.Supp. 2d 896, 913 (2000).
[27] Nimmer's data apparently represent all fair use cases over the period 1994–2002. Thus, the use of statistical analysis of the data is only justified if we can interpret the cases as a random sample of the population of fair use cases over some larger time horizon.

Table 1
Percent agreement of four factors with case outcomes

Factor	Agrees with fair use	Agrees with unfair use	Agrees overall
(a)	71[a]	44	55
(b)	8[a]	64[b]	42
(c)	46	64[b]	57
(d)	83[a]	28[a]	50

Source. Calculations by the authors using data from Nimmer (2003).
[a] Significantly different from 0.50 at the 5% level in a two-tailed test.
[b] Significantly different from 0.50 at the 10% level in a two-tailed test.

64% of the time (compared to 44% and 28% for factors (a) and (d), respectively). These results suggest that when courts find fair use they tend to support their decision by referring to the purpose and character of the challenged use, and the effect on the plaintiff's profits; whereas when they find unfair use, they tend to look at the nature of the copyrighted work, and the extent to which it is used by the defendant.

There may be some rhyme or reason to this correlation from a judicial perspective,[28] but it does not reveal any obvious economic logic. The problem is that there is at best a rough correspondence between the four factors defining fair use from a legal perspective, and a proper economic analysis of it as developed in this paper.

6. Conclusion

The analysis in this paper has highlighted the role of fair use in achieving an optimal balance between the incentive effects of copyright protection on one hand, and the distortions arising from the copyright holder's monopoly power on the other. By employing a differentiated product model, we were able to develop a threshold test for fair use that balances the benefits of wider use of original works against the possible disincentive for authors to create the works in the first place. More importantly, the model underscores the role of technology in shaping the optimal fair use standard. As the *Napster* case illustrates, the emergence of technologies that permit both fair and infringing uses heightens the need for the court to delineate the optimal scope for fair use. The model in this paper offers an economic framework for performing this task.

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References

Adelstein, Richard, Peretz, Steven, 1985. The competition of technologies in markets for ideas: copyright and fair use in evolutionary perspective. International Review of Law and Economics 5, 209–238.

[28] Though Nimmer (2003) can discern none, given his conclusion that "courts tend to make a judgment that the ultimate disposition is fair use or unfair use, and then align the four factors to fit that result as best they can" (p. 281).

Bebchuk, Lucian, 1984. Litigation and settlement under imperfect information. Rand Journal of Economics 15, 404–415.

Boldrin, Michele, Levine, David, 2002. The case against intellectual property. American Economic Review 92, 209–212.

Cooter, Robert, Rubinfeld, Daniel, 1989. An economic analysis of legal disputes and their resolution. Journal of Economic Literature 27, 1067–1097.

Depoorter, Ben, Parisi, Francisco, 2002. Fair use and copyright protection: a price theory explanation. International Review of Law and Economics 21, 453–473.

Gordon, Wendy, 1982. Fair use as market failure: a structural economic analysis of the betamax case and its predecessors. Columbia Law Review 82, 1600–1657.

Klein, Benjamin, Lerner, Andres, Murphy, Kevin, 2002. The economics of copyright 'fair use' in a networked world. American Economic Review 92, 205–208.

Klemperer, Paul, 1990. How broad should the scope of a patent be? Rand Journal of Economics 21, 113–130.

Landes, William, Posner, Richard, 1989. An economic analysis of copyright law. Journal of Legal Studies 18, 325–363.

Landes, William, Posner, Richard, 2003. The Economic Structure of Intellectual Property Law. Belknap Press of Harvard University Press, Cambridge.

Liebowitz, S.J., 1985. Copying and indirect appropriability: photocopying of journals. Journal of Political Economy 93, 945–957.

Novos, Ian, Waldman, Michael, 1984. The effects of increased copyright protection. Journal of Political Economy 92, 236–246.

Nimmer, David, 2003. 'Fairest of them all' and other fairy tales of fair use. Law and Contemporary Problems 66, 263–287.

Oberholzer, Felix, Strumpf, Koleman, 2004. The Effect of File Sharing on Record Sales: An Empirical Analysis. University of North Carolina, Department of Economics Working Paper.

Posner, Richard, 1992. When if Parody fair use?. Journal of Legal Studies 21 67–78.