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Copyright, Private Copying, and Discrete Public Goods

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Copyright, Private Copying, and Discrete Public Goods

Glynn S. Lunney, Jr.*

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On September 8, 2003, something unthinkable happened: the recording industry began suing its own customers. Over the succeeding five years, the recording industry would threaten to sue or sue more than 30,000 of its customers for sharing music through peer-to-peer (P2P) file

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sharing networks. Faced with the prospect of financially ruinous litigation, the vast majority of those threatened settled, usually for a payment in the range of \$2,000 to \$15,000 and a promise not to do it again. Two of the lawsuits have resulted in jury verdicts, both against the file sharers.¹ In the first, on retrial, a jury found Jammie Thomas-Rasset liable for \$1.92 million for infringing twenty-four songs through a P2P system.² In the second, a jury found Joel Tenenbaum liable for \$675,000 for infringing thirty songs through a P2P system.³ In bringing these lawsuits, the recording industry's stated intention was to stop, or at least slow, what it saw as the rampant theft of its property.⁴ Of course, putting the genie back in the bottle is never easy, and there is little evidence that the lawsuit onslaught has materially slowed the use of P2P networks to exchange copyrighted music. Perhaps as a result, the recording industry has begun pushing an alternative approach. Under this approach, the recording industry has asked Internet service providers to become the new copyright police, by disconnecting Internet access for customers who are caught sharing copyrighted music under a "three-strikes-and-you're-out" approach.

Throughout this campaign, the recording industry has treated unauthorized private copying by consumers as if it both were, and should be treated as, legally equivalent to the commercial copying at which copyright was traditionally directed. This, despite the fact that only twenty-five years ago, as Justice Stevens wrote in his initial draft dissent in *Sony Corp. v. Universal City Studios, Inc.*, "no interested party has ever seriously suggested that a penalty, or any form of statutory liability, should be imposed upon an individual for making a single copy of any copyrighted work for his own private use."⁵ Congress too has never indicated that it intended copyright to reach copying by individual consumers.⁶ Indeed, in 1992, Congress expressly added section 1008 to

1. See Special Verdict Form, *Capitol Records, Inc. v. Thomas-Rasset*, No. 0:06-cv-01497 (MJD/RLE) (D. Minn. filed Apr. 19, 2006) [hereinafter *Thomas-Rasset Jury Verdict Form*]; see also Jury Verdict Form, *Sony BMG Music Entertainment v. Tenenbaum*, No. 1:007-cv-11446-NG (D. Mass. filed Aug. 7, 2007) [hereinafter *Tenenbaum Jury Verdict Form*].

2. See *Thomas-Rasset Jury Verdict Form*, *supra* note 1.

3. See *Tenenbaum Jury Verdict Form*, *supra* note 1.

4. See Complaint at 19, *Thomas-Rasset*, No. 0:06-cv-01497 (MJD/RLE); see also Complaint at 17, *Tenenbaum*, No. 1:07-cv-11446-NG.

5. Justice John Paul Stevens, First Draft Memorandum, *Sony Corp. v. Universal City Studios, Inc.*, No. 81-1687, at 16 (*circulated* June 13, 1983) (on file with author).

6. See Jessica Litman, *Lawful Personal Use*, 85 TEX. L. REV. 1871 (2007); Brief of Amici Curiae Sixty Intellectual Property and Technology Law Professors et al. in Support of Respondents, *Metro-Goldwyn Studios, Inc. v. Grokster, Ltd.*, 545 U.S. 913 (2005) (No. 04-480) [hereinafter *Grokster Amicus Brief*].

the Copyright Act, which states that “[n]o action may be brought . . . alleging infringement of copyright . . . based on the noncommercial use by a consumer of . . . a [digital audio recording device or medium] for making digital musical recordings or analog musical recordings.”⁷ Nevertheless, over the last two decades, since the issue first came before the Court in *Sony Corp.*, courts have extended copyright’s prohibition on copying by competitors to a prohibition on private copying by end consumers.

A reexamination of the public goods account of copyrighted works suggests, however, that an extension of copyright to prohibit private copying generally is likely both unnecessary and affirmatively undesirable. As a justification for copyright, courts and commentators have treated copyrighted works as if they were public goods that would be underproduced in the absence of legal protection. Yet, unbeknownst to most of those relying on this public goods justification, this justification for copyright implicitly relies on a particular branch of public goods economics which deals with the optimal supply of so-called “continuous” public goods. With continuous public goods, we can have more or less of the public good at issue. Examples would include such things as national defense or pollution control. For these kinds of public goods, the key question is how much of the public good to supply. And the consistent answer for this type of public good is that the market will supply too little of the good, relative to the social optimum, absent government intervention.

While that conclusion tends to support the notion that government intervention in the form of copyright is necessary to ensure an adequate supply of original works, the key assumption behind the “continuous” public good model does not fit original works of authorship very well, at least not from the perspective of individual consumers. Copyrighted works, particularly the most popular and economically significant works, are not simply undifferentiated units of a common, underlying public good—“works of authorship.” To the contrary, each is separate and distinct, often with its own unique consumer base. They are not homogenous, nor perfectly competitive with each other, and some probably do not compete with each other in an economic sense at all. Instead, like a bridge, dam, or a lighthouse, they are separate and distinct (or “discrete”) public goods. For such discrete public goods, the key

7. The Audio Home Recording Act of 1992, Pub. L. No. 563, § 2, 102d Cong., 2d Sess. (1992), codified at 17 U.S.C. § 1008 (2006).

issue is not how much of the public good to produce, but whether to produce it at all.

If we shift our analysis from treating works of authorship as a single continuous public good, of which we can produce more or less, to treating each original work of authorship as an individually discrete public good, then we reach a much different conclusion regarding the need for copyright. As we shall see, and as economists have proven, the market for discrete public goods, unlike the market for continuous public goods, will not inevitably fail in the absence of government intervention.⁸ Indeed, for discrete public goods, the self-interest of individual consumers alone can achieve a socially optimal outcome. While private markets and individual self-interest will not always prove sufficient to reach a socially optimum supply of a discrete public good, the fact that they can differentiates them fundamentally from continuous public goods.

Before extending the general prohibition on unauthorized copying that copyright currently applies to commercial entities and would-be competitors to private copying consumers, perhaps we should consider the economics of discrete public goods to see if such government intervention is necessary. Given that the market can work, giving it a chance to work before we continue the barbaric practice of imposing bankruptcy on a random handful of those engaged in private copying through P2P networks to serve as examples for the rest only makes sense.

Moreover, getting the answer right on whether private copying through P2P networks should constitute copyright infringement is critically important, and not just for the use of P2P systems for sharing music today. As technology continues to advance, the issue of private copying is likely to become only more pressing in the future. Yesterday's technology made it possible for private consumers to tape songs off the radio and to make individual photocopies of particular works. Today's technology has made it easy to copy and share digital music, and other small digital files. Soon however, as more works move to digital formats and as bandwidth and memory limitations recede, consumers will find it

8. See Thomas R. Palfrey & Howard Rosenthal, *Participation and the Provision of Discrete Public Goods: A Strategic Analysis*, 24 J. PUB. ECON. 171 (1984); see also Anat R. Admati & Motty Perry, *Joint Projects Without Commitment*, 58 REV. ECON. STUD. 259 (1991); Mark Bagnoli & Barton L. Lipman, *Private Provision of Public Goods Can Be Efficient*, 74 PUB. CHOICE 59 (1992); Stefano Barbieri & David A. Malueg, *Private Provision of a Discrete Public Good: Efficient Equilibria in the Private-Information Contribution Game*, 37 ECON. THEORY 51 (2008); Mark Gradstein, *Efficient Provision of a Discrete Public Good*, 35 INT'L ECON. REV. 877 (1994); Flavio M. Menezes, Paulo K. Monteiro & Akram Temimi, *Private Provision of Discrete Public Goods with Incomplete Information*, 35 J. MATH. ECON. 493 (2001).

trivially easy to copy and redistribute virtually every kind of original work of authorship.

At the same time, the growing importance of the copyright industries to our economy has also made getting the right answer on the issue of private copying more salient as well. When copyright was a quiet backwater and the copyright industries, although extremely visible, were only a small fraction of our economy's output, the inefficiencies associated with misjudging copyright's proper scope were correspondingly small. As the copyright industries continue to become a more important component of our economy as a whole, the costs of such mistakes, whether they arise from relying on simplistic analogies to real property or from misunderstanding the underlying economics of copyright, will only increase.

Understanding if, and when, copyright should attempt to proscribe private copying deserves far more than the simplistic treatment it has so far received from a handful of courts. This Essay aims to begin that conversation. Part I begins by introducing simple models that compare the market and socially optimal production of continuous and discrete public goods models and discussing their implications for copyright. Part II will then focus on the limits of the market's ability to produce efficiently discrete public goods in the absence of government intervention. Part III will then consider the implications of the discrete public goods model for copyright. Finally, in Part IV, I offer some concluding thoughts.

I. THE ECONOMICS OF COPYRIGHTED WORKS

To determine the proper role for copyright, we begin with two different approaches to modeling public goods. Both models focus on public goods, defined as goods characterized by nonrivalrous consumption. Both models also employ standard Nash equilibrium conditions to suggest how the market would supply the good at issue, and then compare the market result to the socially optimal production level. For both models, we assume perfect information and will evaluate the market's efficiency using the Pareto optimality standard. Under this standard, the market result is efficient if and only if there is no way to change the allocation of goods or resources available that will make at least one person better off, without making anyone else worse off.

Although our two models will thus share analytic approaches and efficiency criteria, they differ in the nature of the public good at issue. The first evaluates the production of a public good where the amount of the public good at issue can vary. For example, national defense and

spraying for mosquito control have both been analyzed as continuous public goods.⁹ These are not on-off public goods; rather, they are more-or-less public goods. Without trying to pin the "amount" to some specific numerical quantity, we can, for example, speak of the amount of national defense in more general terms, ranging from very little to quite a lot. Because we can plausibly think of the good in terms of additional units of some common, essentially homogenous underlying good, economists refer to this branch of public goods economics as dealing with a continuous public good.

In contrast, other public goods are more accurately characterized by an on-off production function. Either we produce them or we do not. A bridge or a dam or a lighthouse might fit this on-off model. Because the question is whether to produce the good or not, rather than how much of the good to produce, economists refer to this second type of public good as a discrete public good.

Of course, neither model is a perfect fit for many real world goods. A bridge or dam might be made larger or smaller. Similarly, but on the other side, many continuous public goods begin with an on-off choice. For example, in defense, we can either have a satellite missile defense system or not. Nevertheless, sometimes one or the other characterization may better fit a particular real world problem, so that we can realistically say that, given the nature of consumer preferences with respect to the public good at issue, either the continuous or discrete nature predominates. Having determined which model is more apt, we can look to that model to see how the market will function in the absence of government intervention, and thereby better identify whether government intervention is appropriate.

For both of our models, we will focus on three roommates facing a decision. In the first model, the decision is how much effort each roommate will devote to keeping the apartment's common areas clean. This decision represents our continuous public good case, as the choice is not on-off, but the degree of cleanliness which can range from filthy to immaculate. The second concerns whether the three roommates will purchase a television for their common use. This represents our discrete public good case, as the key issue is whether to purchase the television or not. As we shall see, the Nash equilibrium level for cleaning will fall below the socially optimal level, but the Nash equilibrium for the television purchase will match the social optimum—which tends, in part,

9. See Gordon Tullock, *Social Cost and Government Action*, 59 AM. ECON. REV. 189 (1969) (analyzing mosquito control as a public good).

to explain why so many college apartments have great televisions, but are filthy.

A. The Continuous Public Good: Keeping It Clean

We begin with the question of how much effort each roommate should contribute to keeping the common areas of the apartment clean. To simplify the analysis, we will assume that the three roommates have identical preferences for cleanliness and will further assume that the inverse demand curve for each has a linear relationship. Without loss of generality, we will take each individual's demand curve to be: $5 - X$, where X is the amount of cleaning undertaken. For this type of public good, the supply of X can vary from a little, 1, to a lot, 5. For the sake of simplicity, we will also assume a constant marginal cost, with each "unit" of cleaning costing 2.

Given these assumptions, if there is only one individual in the apartment, their optimal level of cleaning occurs where the marginal value of additional cleaning, reflected in their demand curve, precisely equals their marginal cost. Thus, $5 - X_{i=1}^* = 2$, where $X_{i=1}^*$ is the optimal level of cleaning for an individual living alone. Solving yields $X_{i=1}^* = 3$. Moreover, with only one individual, the cleaning of the apartment is not a public good. The Nash equilibrium for an individual living alone is therefore the socially optimal level of cleanliness as well.

Now, we can extend the model to an apartment with three roommates. Each of our individuals has the same demand curve, but cleaning efforts by one person benefit the others equally. We begin with the "market" or the Nash equilibrium case, where each individual decides on their own, based upon their own self-interest and their (correct) expectation of the other's cleaning efforts, how much cleaning they should undertake. In this case, individual A solves: $(5 - X_A^N) - X_B^N - X_C^N = 2$; individual B solves: $(5 - X_B^N) - X_A^N - X_C^N = 2$; and individual C solves: $(5 - X_C^N) - X_B^N - X_A^N = 2$, where X_A^N , X_B^N , and X_C^N are A , B , and C 's Nash equilibrium levels of cleaning respectively. Because their situations and preferences are symmetric, we can assume $X_A^N = X_B^N = X_C^N$. Substituting and solving, we find

$X_A^N = X_B^N = X_C^N = 1$.¹⁰ Because their cleaning efforts benefit each other equally, the total level of cleaning is the sum of the three individuals' cleaning efforts. Thus, the Nash equilibrium level of cleaning with three roommates is: $X_{i=3}^N = X_A^N + X_B^N + X_C^N = 3$ —precisely the same as our socially and individually optimal levels of cleaning for an individual living alone.

However, with three roommates, this is no longer the socially optimal level. To determine the socially optimal level, we must determine the three roommates' joint demand for cleanliness. Assuming that clean common areas are a public good, we determine the social demand for cleanliness by summing vertically the demand curves for the three roommates. Our social demand curve for cleanliness for the three roommates as a group becomes: $3*(5 - X)$ or $15 - 3X$. Given this demand, we can obtain the optimal level of cleaning, from society's (or a social planner's) perspective, by again setting marginal benefit (reflected in society's demand curve) equal to marginal cost, or $15 - 3X_{i=3}^* = 2$. Solving the equation yields the socially optimal level of cleaning for our three roommates, which given our assumptions, is $X_{i=3}^* = 13/3 = 4.333$.

From this result, we can immediately see that the socially optimal level of cleaning for the three roommates is higher than both: (1) the socially and individually optimal levels for an individual living alone and (2) the Nash equilibrium level for the three roommates. It is easy to see why the first is true. With a larger population, society values the public good more highly. Indeed, under the simple assumptions of our model, twice the population means twice the value, and thrice the population means thrice the value. The marginal cost of cleaning efforts, on the other hand, remains constant. The necessary result of this is that at equilibrium, the optimal supply of cleaning is larger for a population of three than for a population of one.

With respect to the gap between the socially optimal and Nash equilibrium levels of cleanliness for our three roommates, this gap reflects the, by-now, well-known result that the market will fail to achieve a Pareto optimal supply of public goods in this continuous public goods case. While the market failure is important for its own sake, three other points, often overlooked, deserve emphasis. First, despite the academic

10. Actually, there are multiple Nash equilibrium solutions to the problem. Any selection of $X_A^N \in [0,3]$, $X_B^N \in [0,3]$, and $X_C^N \in [0,3]$ such that $X_A^N + X_B^N + X_C^N = 3$ is a Nash equilibrium.

and judicial preoccupation with free-riding, the market (as reflected in the Nash equilibrium levels of cleaning) fails to achieve the socially optimal level of cleanliness even though none of the roommates is free-riding. To the contrary, all are cleaning in the amount they have determined to be individually optimal.

Second, the issue is also not simply one of incentive compatibility, where we try to devise a mechanism that will force each to divulge their true valuation of the public good at issue. In our model, none of the roommates is shirking nor otherwise lying about their true valuation of a clean apartment. To the contrary, all are setting their effort levels based upon their actual valuations, which the other roommates are assumed to know.

Third, the gap between the Nash equilibrium and the socially optimal levels increases as the population increases. Indeed, in our example, as the population approaches infinity, the market (as reflected by the Nash equilibrium level) remains stuck at 3, yet the socially optimal level of cleanliness approaches 5, as a limit. This larger gap does not arise, however, because a larger population makes it easier to engage in free riding or generates larger transaction costs. Rather, the larger gap arises because each individual's cleaning efforts now benefit more people, thus generating a larger external benefit. As the gap between the social and private value of each individual's efforts increases, the gap between the socially optimal and individually optimal levels of cleanliness control will also increase.

Because of the external benefit that each individual's cleaning efforts generates, and the resulting gap between private and social benefit, solving the market failure in this instance requires some method of internalizing this external benefit. Perhaps the easiest way is to allow a government to determine the optimal level of cleanliness and to pay for it using tax revenue generated by a benefits tax—one that taxes individuals according to the benefit they receive from the program. While such a solution can be efficient under the right circumstances, it is not the only solution. At least, in theory, private market transactions by which each individual is allowed to charge the others for the external benefits each individual's cleaning efforts generates would also solve the market failure. While the transaction costs associated with such a solution might prove insurmountable, allowing offsets would substantially reduce the transaction costs and would make such a private market solution more feasible. Specifically, with offsets, because the total external benefits each individual would be entitled to collect would exactly equal the amount each individual owed, if all individuals had

identical preference structures and engaged in the socially optimal level of cleanliness, no actual side payments would be required except from those otherwise investing too little in cleaning.

However, when we move beyond the starting assumption of known and identical preferences, either of these solutions would prove difficult to implement. If we know that preferences among individuals vary, but not how, determining both how much of the public good is optimal, and how to allocate the price for the public good, will prove problematic. If we attempt to allocate the price on a benefits basis, charging individuals more who we believe value the good more highly, individuals will have an incentive to understate their true valuation of the good. On the other hand, if we attempt to allocate the price pro rata, charging each individual who benefits an equal share of the total expenditure, individuals who value the public good more highly will have a tendency to overstate their preferences for the good, knowing their consumption of it will be subsidized by others.

Although there are some useful insights here for copyright law, and for the rhetoric of copyright more generally, before we attempt to apply these insights to copyright, let us see how our roommates fare in trying to purchase a television for their common use.

B. The Discrete Public Goods Model: Three Men and a Television

For our second model, consider the same three roommates looking to purchase a television for their joint use. In order to make the television a public good, I will assume that they have compatible viewing choices—that is they all want to watch the same programs at the same time, and any differences in viewing preferences occur when the other roommates are not around. Unlike cleaning the apartment, the choice here is not how much television to purchase, but whether to purchase the television at all.¹¹ If we assume that the television costs \$90, then following the usual vertical summation rule for public goods, the three roommates should purchase the television if and only if the total of their individual valuations exceeds the television's cost. In addition, the roommates must also decide how to allocate the price between them.

To allocate the price between the roommates, the roommates are considering two possible rules. In the first, the roommates each pay one-third of the television's price, with the threat of exclusion for those who

11. Again, we could make it a continuous public good problem by allowing the qualities of the television, such as screen size or viewing quality, to vary, or alternatively, by renting the television on an hourly basis.

refuse to contribute. I shall refer to this rule for payment as the “property-based” or uniform price approach. The second approach relies on voluntary contributions. In this approach, the roommates each announce how much they value the television, and based upon their announced values, if the sum of the announced values equals or exceeds the television’s price, they each contribute to the television’s price proportionally based upon their announced values. There is no threat of exclusion if the television is purchased under this second approach. Instead, the only threat is that if the announced contributions do not cover the television’s price, the television will not be purchased. I shall refer to this rule for payment as the voluntary contribution approach.

Given these basic assumptions and two rule systems, we can now examine three cases. In the first, the roommates value the television identically, while the second and third present somewhat more plausible scenarios where their valuations differ. For each case, we will consider the efficiency of our two price allocation rules. To be Pareto optimal, a price allocation rule must satisfy two requirements. First, it must lead the roommates to purchase the television when the sum of their individual valuations equals or exceeds the television’s price. Second, because the good at issue is a public good, it is not Pareto optimal to exclude nonpayers, and thus to be efficient, the rule system must not exclude one of the roommates from enjoying the television if the set is purchased.

Case #1: Identical Valuations of \$40 Each. In this case, the sum of the three roommates’ valuation is more than the price of the television, and the proper decision is therefore to purchase the television. As for allocating the television’s price in this category, the property-based rule works perfectly. Each roommate is willing to contribute their one-third share, because that share (\$30) is less than their reservation price for the television (\$40). Moreover, even in the absence of a threat of individual exclusion, a property-based rule is incentive compatible. If any one of the three roommates falsely asserts that they are unwilling to contribute towards the television, the roommates will not have enough to purchase the television. As a result, purely from their own self-interest, each roommate has the necessary incentive to be honest and contribute towards the television’s purchase. Finally, because everyone contributes, it is unnecessary to follow through on the threat implicit in the property-based approach that noncontributors will be excluded from watching the television. Thus, in this case, under a property-based approach, the public good is acquired, everyone contributes towards it, and everyone gets to enjoy it. The property-based approach is therefore Pareto optimal in this case.

While the property-based approach is efficient, the voluntary contribution scheme can be as well. In the voluntary contribution game, each player announces their reservation price for the television. If the total announced valuations are less than the television's price, then the television is not purchased.¹² If the total announced valuations are equal to or greater than the television's price, then the television is purchased, and each roommate contributes to the price of the television a proportionate share based upon the announced valuations. For example, if the three roommates each announce a valuation of \$30, then the sum is \$90, the television is purchased, and each roommate contributes \$30 to the price. If, on the other hand, roommates *A* and *B* announce reservation prices of \$40 each, while *C* announces a reservation price of \$10, then again the sum is \$90, the television is purchased, but in this instance, *A* and *B* contribute \$40 a piece, while *C* contributes \$10. While there may be an issue as to whether *C*'s contribution is fair in the second example, either of these allocations is Pareto optimal according to the standards we have established. The roommates purchase the television and no one is excluded from watching it.

The concern, of course, is that *C* (or *A* or *B*) will try to free ride, and that all three will announce a valuation of \$0, each hoping that the others will pick up the television's full price. As long as no individual roommate's individual valuation exceeds the price, this too is a Nash equilibrium.¹³ If *C* accurately predicts that *A* and *B* will announce valuations of \$0, then *C* has no reason to announce a valuation in excess of \$0 because *C* does not value the television sufficiently alone to purchase it.

This creates two possible Nash equilibrium outcomes.¹⁴ First, each roommate announces a valuation of \$0 and the television is not purchased. Second, the roommates announce individual valuations that exactly sum to \$90 and purchase the television.

Under this second scenario, the price of the television may be allocated among the roommates in a variety of ways, but each of the

12. This rule effectively establishes a subscription game, rather than a contribution game as those terms are used in the economics literature. In a subscription game, players commit sums to the purchase of the public good, but if the good is not purchased, those sums are refunded. In a contribution game, players make donations towards the public good, but those donations are not refunded even if insufficient donations are received to pay for the public good. See Palfrey & Rosenthal, *supra* note 8, at 173 (distinguishing between games with a no-refund rule and those with a refund rule).

13. If one of the roommate's individual valuations exceeds the purchase price, then there is only a single Nash equilibrium: the other two roommates will announce a valuation of zero and allow that roommate to purchase the television.

14. For a formal proof of these outcomes, see Palfrey & Rosenthal, *supra* note 8, at 174.

Nash equilibrium solutions in this set will fall on the Pareto efficient frontier. Moreover, for each of these equilibria, the announced valuations will sum to exactly \$90. If the total of the announced valuations is less than \$90, one (or more) of the roommates will increase their announced valuation until the sum totals \$90. Otherwise, the roommates will not get the television and each values the television enough to avoid that result. Similarly, if the total of the announced valuations exceed \$90, one of the roommates will reduce their announced valuation until the sum totals \$90. After all, as long as the announcements equal \$90 the television set will be purchased. The only thing that announcing a valuation that leads to a sum in excess of \$90 will achieve is to force one of the roommates to pay more than necessary to ensure that the television is purchased. Thus, for the second set of Nash equilibria, the voluntary contribution rule satisfies our two efficiency criteria and achieves a Pareto optimal result in this case. The television is purchased, and no one is excluded from watching.

The key question is which of the two Nash equilibrium outcomes the roommates will reach. Usually, we would expect roommates to have available a sufficient range of informal mechanisms to encourage cooperation, including initial sorting and “voting off the island,” to ensure that one of the Pareto efficient Nash equilibria is reached.

Yet, even without a mechanism to encourage informal cooperation, it is more likely that the roommates will reach one of the efficient Nash equilibria, rather than the inefficient equilibrium. To begin with, each of the efficient Nash equilibria represents a Pareto improvement over the inefficient equilibrium. At least one of the roommates will be better off, and none of them will be worse off, if they can reach one of the efficient Nash equilibria. In addition, the efficient Nash equilibria are stable, while the inefficient equilibrium is not.¹⁵ At any of the efficient Nash equilibria, any change in the announced valuations will reduce at least one of the roommate’s utility. If any roommate reduces their announced valuation, then the television will not be bought, bringing a resulting reduction in utility. If any roommate increases their announced valuation, that roommate will simply pay a larger share of the television’s price, reducing that roommate’s utility. Thus, no roommate has any incentive to move from the efficient Nash equilibria. In contrast, the inefficient Nash equilibrium is not stable. If a roommate expects the others to announce a valuation of zero, then we assumed that the

15. For a formal proof, see Bagnoli & Lipman, *supra* note 8, at 75-78. For a discussion of the concepts economists use to sort Nash equilibria, see ERIC VAN DAMME, *REFINEMENTS OF THE NASH EQUILIBRIUM CONCEPT* (M. Beckmann & W. Krelle eds., 1983).

roommate should announce a value of zero in reply, but that is not an optimal strategy. Given the expected announcements from the other two, whether the third also announces a zero value, or his true valuation, in either case, the television will not be purchased. So announcing a nonzero value entails no cost. However, announcing a nonzero valuation creates, at least, some possibility that the television will be purchased. Perhaps the roommate is mistaken in his expectations regarding his roommates' intentions, or perhaps, although correct in his expectations, the other roommates make a mistake and announce nonzero valuations when they had intended to announce zero valuations. Even if these mistakes are unlikely, announcing a nonzero valuation at least opens the door to the possibility that the television will be purchased. With some upside, and no downside, announcing his true valuation is therefore the appropriate choice even if a roommate expects the others to announce zero valuations. This holds true for the other roommates as well.

As a result, the inefficient, "everyone announces zero value" strategy, while technically a Nash equilibrium, is not a stable one. The roommates should not expect each other to announce a zero value, and even if they did have such an expectation, their own best response is not to announce a zero valuation, but to announce their true valuation. Yet, as soon as they move from the "everyone announces zero value" strategy, the only other Nash equilibria available are the Pareto efficient ones.

Case #2: Varying Valuations, A and B \$40 Each, C \$10. Here, the valuations sum to exactly \$90, and hence the television should be purchased.¹⁶ The property-based rule fails to achieve that result, however. Although the property-based approach is incentive compatible, C's reservation value for the television is less than his pro rata share, so he will not contribute to the television's purchase. Moreover, lacking C's contribution, A and B's valuations together will no longer cover the price of the television. As a result, the roommates will not purchase the television if they try to allocate the price amongst them according to the property-based approach. Thus, the property-based approach in this case fails the first efficiency criteria: the television was not purchased when it should have been (an "insufficient incentive" market failure).

In contrast, the voluntary contribution rule remains efficient.¹⁷ In this case, each of the roommates' own self-interest will lead them to

16. Although the valuations sum to exactly \$90, economists commonly use the assumption that each individual values the good at some very slight amount in excess of the stated value to break ties, and I will follow that practice here.

17. Again, a zero announced valuation Nash equilibrium exists, but it is dominated by the Pareto efficient equilibrium for the reasons previously discussed.

announce his valuation honestly. *A* and *B* will announce valuations of \$40 apiece, and *C* will announce a valuation of \$10. The roommates will therefore purchase the television and split the price accordingly. *C* will pay less than *A* and *B*, but that is a true reflection of *C*'s lower valuation. As a result, the voluntary contribution scheme is fair, as well as efficient, though *A* and *B*, because they cannot be certain of *C*'s honesty, may perceive the allocation as unfair.

Case #3: Varying Valuations, A and B \$50 Each, C \$20. In this case, the property-based approach leads to a different type of market failure. As in Case #2, *C* will not pay a pro rata share for the television. But here, even without *C*, *A* and *B*'s valuations together are sufficient to pay for the television. Thus, *A* and *B* will purchase the television, but in order to discourage dishonesty from *C*, they will exclude *C* from watching. The property-based rule therefore fails the second efficiency criteria in this case: it excludes an individual from enjoying the television even though it is a public good characterized by nonrivalrous consumption (an "exclusionary" market failure).

In contrast, the voluntary contribution approach remains efficient, at least for the robust Nash equilibria. As in Case #1, there are an infinite number of Nash equilibrium solutions, allocating the television's price among the three roommates in different ways. But for each of these Nash equilibria, the total announced contributions will sum to exactly \$90, for the reasons explained in Case #1, ensuring that the roommates purchase the television and thereby satisfy the first efficiency criteria.

Interestingly, in some of the Nash equilibrium solutions, *C* makes no contribution to the purchase of the television whatsoever. Despite *C*'s free riding in these cases, *A* and *B* will pick up the slack and announce valuations that sum to \$90, ensuring that the television set is purchased. Of course, *A* and *B* would like *C* to contribute, but unless we modify the game in some way to include, for example, reputational concerns that might arise in a repeat game setting, if *C* refuses to contribute, *A* and *B* would prefer to cover the price of the television themselves rather than do without. Moreover, because the contribution scheme is voluntary, relying on announced intentions to contribute, even if *C* refuses to contribute, he will not be excluded from watching the television, thus ensuring that the second efficiency criteria is also satisfied.

Summary of Three Cases. The voluntary contributions approach can thus achieve a Pareto optimal outcome in each of the three cases considered. The property-based approach, in contrast, fails to achieve such an outcome in two of the three cases, and indeed, ensures an efficient outcome only in the most unrealistic case, where all consumers

value the public good identically. Moreover, while most readers are likely familiar with the “exclusionary” market failure that the property-based approach generates in the third case, the “insufficient incentive” market failure that the property-based approach generates in the second case may come as a surprise, particularly to those who tout a stronger, more property-like vision of copyright as essential to ensuring sufficient incentives.

As for the notion that a price discrimination scheme can prove just as efficient as the voluntary contribution scheme, that notion is false. An effective price discrimination scheme would require the seller either to know each roommate’s valuation, or to devise a market mechanism that separates the three roommates according to their ability to pay. Given that only one television is being purchased, it is not immediately apparent how the seller could establish such a mechanism. Even in a market setting where price discrimination schemes were available, such as the common practice of separating high value from low value consumers in the book market by offering a novel in only a high priced hardback version for a year before offering a lower priced paperback, such schemes inevitably entail transaction and other costs that the voluntary contributions approach does not.¹⁸ Moreover, in practice, even the most effective price discrimination schemes inevitably sort high- and low-valuation consumers only roughly. In contrast, with a voluntary contribution system, each consumer decides their own contribution level and necessarily has perfect information regarding their own valuation. As a result, even a near-perfect price discrimination scheme can only approximate the efficiency of a voluntary contribution system and does so at much greater expense.

C. A Comparison of the Two Models and Their Results

Although the continuous and discrete public good models point to important differences, they also agree on certain issues. Both models suggest that a focus on free riding is misguided. In the first model, the market fails without any free riding. In the second model, the voluntary contribution rule can be Pareto efficient despite the presence of free riding. Taken together, the two models thus suggest that free riding is neither a necessary nor a sufficient condition for market failure. Similarly, in the first model, the market fails even though the individuals contribute to the public good honestly based upon their true valuations of

18. See, e.g., Glynn S. Lunney, Jr., *Copyright’s Price Discrimination Panacea*, 21 HARV. J.L. & TECH. 387 (2008).

the good. In the second model, the voluntary contribution rule can be Pareto efficient even though the roommates are not invariably honest regarding their valuations of the public good. As was the case for free riding, the models taken together thus suggest that incentive compatibility is neither a necessary nor a sufficient condition to identify market failure.

Despite these similarities, the models also differ in critical respects. Under the second model, with a voluntary contribution rule, individual self-interest alone can produce sufficient incentives for the production of the discrete public good. The only question is whether the roommates will be able to reach one of the efficient Nash equilibrium solution or whether endless bickering over who should pay how much will preclude them from ever reaching one of the Pareto efficient Nash equilibria. But the issue of reaching a Nash equilibrium is a radically different one from the market failures traditionally associated with continuous public goods—a second order rather than a primary consideration. In terms of analogies, reaching a Nash equilibrium in the discrete public good model entails the same sort of strategic behavior concerns that arise in the context of bilateral monopoly negotiations. As in the bilateral monopoly case, the bluffing, posturing, and other gamesmanship that may occur as each party tries to minimize their own contribution to the public good creates the possibility that the parties will not reach the efficient outcome to which their own self-interest should lead them. Although this concern is real, it has not justified a general rule of government intervention in cases involving bilateral monopoly, where the government would force “desirable” bargains on the two monopolists and then allocate the bargain surplus between them. Nor should it justify a similar rule of government intervention in the form of copyright in the discrete public goods case.

Moreover, the two models also differ when extended from a few individuals to the large numbers case. As discussed, in the first model, as the number of individuals who enjoy the continuous public good increases, the gap between the market and socially-optimal output of the public good also increases. In contrast, the voluntary contributions approach remains efficient at ensuring production of a discrete public good, even as the model is extended from three roommates to a much larger group. As with the smaller group, self-interest alone is sufficient to generate the necessary incentives to create or acquire the public good, as long as the now much larger group of individuals who will benefit from the public good can reach an efficient Nash equilibrium allocation of the price. As the numbers increase, the transaction costs entailed in reaching a Nash equilibrium may increase somewhat, but even so, to

achieve the efficient result, no one needs to consider how their actions affect another. Unlike the continuous goods model, a set of side payments, or the threat thereof, are unnecessary to achieve a Pareto optimal outcome. In that sense, self interest alone is sufficient to generate the necessary incentives as long as one of the efficient Nash equilibrium can be reached.

II. LIMITS OF THE DISCRETE PUBLIC GOODS MODEL

Before we embrace fully the conclusions of the discrete public goods model, there are two key concerns we need to discuss. The first concern is whether works of authorship are or should be treated as a single continuous public good or as discrete public goods. The second concern is whether an efficient Nash equilibrium is attainable in the absence of perfect information.

A. *Are Works of Authorship Continuous or Discrete Public Goods?*

Given the differing conclusions of the continuous and discrete models, it becomes fairly important to determine which more accurately represents the production of works of authorship. Yet, there has been no real discussion of the issue. To the contrary, since Landes and Posner modeled works of authorship as a continuous public good in their groundbreaking article, *An Economic Analysis of Copyright Law*, subsequent commentators have fallen almost uniformly in line.¹⁹

To a considerable degree, whether we characterize works of authorship as continuous or discrete will depend on who is doing the copying, at least as a first cut. If we are focusing on competitors, or other commercial entities, then the continuous good characterization probably fits the nature of the real world demand at issue. Copying competitors see each new work simply as a profit opportunity and are relatively indifferent to the particular aspects of the work that may differentiate them to end consumers.

In contrast, end consumers are far more likely to see individual works of authorship as discrete public goods. Everyone has their favorite book, their favorite song, and their favorite movie. If we were to try and create a demand curve for "works of authorship" as if that were a relevant economic market, we would find that demand aggregation is extremely difficult. Preference structures among end consumers with respect to the different works in the market are likely to vary

19. William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEG. STUD. 325 (1989).

substantially. As a consequence, we would find consumers entering and leaving the market, as the works they happen to like become the marginal work. Yet, in order to model works of authorship as continuous goods, we must be able to identify the marginal work at each point in the demand curve. In order to create the demand curve, we would, as a practical matter, simply sum the demand for that individual work, and then place it artificially into the demand curve at the relevant point. As a result, to create the necessary continuous good demand curve, we are treating each work of authorship as an individual good, so why not evaluate their production that way directly rather than force fitting them into a continuous good model?

Even from the perspective of end consumers, however, there may be some classes of works for which the continuous public good model fits reasonably well. Terry Fisher used the examples of pornography and law review case notes as instances where additional works might be considered, even by end consumers, as an undifferentiated stream of widgets.²⁰ Romance novels, pulp fiction, and other read-and-toss novels might also satisfy the assumptions implicit in the continuous public good model. News and factual information might satisfy the assumptions as well. For these types of works, consumers might not care about which particular work they receive. Instead, they may simply want another unit in a relatively homogenous stream of works.

How end consumers perceive works is thus crucial. Dividing public goods into either discrete or continuous for the convenience of economic modeling is a trivial and neat exercise. We simply adopt one set of assumptions or the other. Yet, mapping those models, and their archetypes, onto real world markets is ultimately an empirical issue likely to prove neither trivial nor neat. Yet, there are clearly gradations in the extent to which end consumers consider a work distinct. At one end of the spectrum, we have those popular and iconic works, instantly recognized, often imitated, sometimes parodied, but still unique. At the other, we have works that consumers consider effectively indistinguishable from other similar works.

This suggests that the discrete public good model best fits instances of alleged copyright infringement by end consumers of popular and distinctive entertaining works. This is precisely the sort of unauthorized copying and distribution most likely to occur through P2P networks.²¹

20. William W. Fisher, *Restructuring the Fair Use Doctrine*, 101 HARV. L. REV. 1661, 1795 n.208 (1988).

21. See Glynn S. Lunney, Jr., *The Death of Copyright: Digital Technology, Private Copying, and the Digital Millennium Copyright Act*, 87 VA. L. REV. 813, 885-86 (2001).

B. *Information and Equilibria*

The second key limitation on applying the discrete public goods model to works of authorship is information. With perfect information, as in our roommates hypothetical, all of the stable Nash equilibria are Pareto efficient because each roommate knows the others' valuations and so knows whether they have to up their bid in order to ensure the purchase of the television. Without that information, an inefficient Nash equilibrium becomes possible.²² However, as it turns out, to achieve an efficient outcome, the would-be consumers of a discrete public good do not need perfect information regarding each others' preferences. Rather, they only need three pieces of information: (1) their own valuation of the good, v_i ; (2) the cost or price of the good, P , and (3) the total valuation of all of the goods' consumers, $V = \sum v_i$. Given these three pieces of information and assuming that $V > P$, there is a perfect and dominant Nash equilibria that is also Pareto efficient: each consumer should contribute their pro rata share of the good's cost, defined as $c_i = (v_i/V)P$.²³

In order for this strategy to achieve efficient outcomes, it is not necessary for consumers to know each others' valuations. The mechanism does not rely on one consumer policing another's contribution. Self-interest alone will lead each consumer to contribute appropriately. If each consumer adopts this strategy, a failure or refusal by anyone to contribute their share means that the public good will not be produced.²⁴ As long as $V > P$, each consumer values the public good more than their pro share. Given a choice between making the pro rata contribution and having the public good, or not making the contribution and not having the public good, each consumer should rationally choose

22. Even with imperfect information regarding the other consumers' preferences, an inefficient outcome is not inevitable. For a discussion of when an efficient outcome remains achievable, see Barbieri & Malueg, *supra* note 8; Menezes, Monteiro & Temimi, *supra* note 8.

23. As in the roommates hypothetical, other strategies, where for example one person contributes less than their share, while another contributes more, may still constitute Nash equilibria as long as they result in contributions equal to the price of the public good. However, unless we are willing to assume that some individuals have a taste or preference for self-sacrifice, such equilibria likely entail additional transaction costs compared to the pro rata contribution strategy, and are therefore not as attractive over a repeated series of contribution games.

24. In that sense, the mechanism represents a form of Lindahl taxation. See E. Lindahl, *Just Taxation—A Positive Solution*, in CLASSICS IN THE THEORY OF PUBLIC FINANCE 168-76 (Richard A. Musgrave & Alan T. Peacock eds., Elizabeth Henderson trans., 1958); see also Bagnoli & Lipman, *supra* note 8, at 65-66 (describing the Pareto efficient Nash equilibria as forcing each consumer to choose between "the status quo point (chosen by contributing less than the agent's equilibrium contribution) and a Pareto preferred point (chosen by contributing the equilibrium contribution)").

to make the contribution simply to maximize their own utility. Of course, a consumer can contribute less and hope that some other consumer will pick up the shortfall, but hope is not a rational economic strategy in this case. And for the other consumers, picking up the shortfall, even if it seems sensible in a particular case, is also not rational as it will interfere with reaching efficient outcomes in repeated cycles of the contributions game.

Accepting that a voluntary contribution system is Pareto efficient given these three pieces of information, the question still remains whether consumers will have even this minimum level of information. A consumer presumably knows their own valuation of a work. There is, of course, the risk that a work will not bear out a consumer's initial valuation of its worth, but that risk is common to both a property-based system and a voluntary contribution system. Indeed, some voluntary contribution mechanisms permit a consumer to make their contribution after obtaining access to the work, thereby minimizing the risk of such mistakes. As for the second piece of information necessary for the mechanism to work, the author or publisher will also presumably state the total cost or price for creating and disseminating the work, though this is not as clear cut as it at first appears. That leaves only the total of all consumers' valuations.

Outside the roommate scenario, it may seem difficult or even impossible for consumers to know enough regarding other consumers' preferences that each consumer can determine the sum of all consumers' valuations of a given discrete public good. Nevertheless, there are several proxies that a consumer could reliably use to approximate a popular work's total value. For music, radio airplay, together with concert and merchandise revenues, may provide a reasonable basis for estimating a given work's total value. For established authors and artists, in particular, consumers may also look to the popularity of the author's previous work.

Like any other industry, the entertainment and recording industries already make estimates of this sort every time they invest in a work. While they undoubtedly get the answer wrong from time-to-time, their answers must come reasonably close most of the time, or else they would not remain in business. There is little reason to expect that consumers would be unable to make similar estimates.²⁵

25. This approach to estimating the total value of the work raises the possibility that an author or artist will try to extract the full surplus associated with a work from consumers by setting the price of the work equal to the estimated total value, so that every consumer will estimate their pro rata share as 100% of their individual valuation.

Undoubtedly, consumer attempts at estimating any given work's value will likely prove imperfect and will thereby render the voluntary contribution mechanism an imperfect solution to the public goods problem. Yet, any other solution is also likely to prove imperfect, as well. Numerous commentators over the years, including myself, have extensively documented the problems that arise from granting a right to exclude with respect to a public good characterized by nonrivalrous consumption.²⁶ The question becomes which of two necessarily imperfect solutions is less imperfect. While that is an impossible question to answer in the abstract, the fundamentally different conclusions that the discrete public good model reaches suggests that we ought, at the very least, to consider those conclusions as we structure copyright law, particularly in cases involving consumer copying of popular works by established authors and artists where the discrete public goods model is most applicable.

C. *Working Examples*

While the notion of voluntary contributions may seem unduly utopian, there are any number of working examples of such systems. Consider the case of lighthouses. While often cited as a paradigmatic case of a public good that requires government provision,²⁷ some of the first lighthouses built in this country, including the Sandy Hook Lighthouse at the south entrance to the New York harbor, relied entirely on voluntary contributions.²⁸ Lighthouses are, after all, discrete, rather than continuous, public goods. Moreover, particularly for lighthouses associated with a specific harbor, the three pieces of information needed for a voluntary contribution system to work were readily available. Each shipowner who used the harbor knew their own valuation of the lighthouse, as well as the likely price for the lighthouse. Moreover, like the roommates, the shipowners for a given harbor were a close and small enough group that each shipowner had a pretty reasonable sense for the extent and nature of the cargoes, and the associated profitability of the other shipowners. Thus, each shipowner was reasonably able to estimate

26. See, e.g., Lunney, *supra* note 18; Jeremy Waldron, *From Authors to Copiers: Individual Rights and Social Values in Intellectual Property*, 68 CHI.-KENT L. REV. 841 (1993); David McGowan, *Copyright Nonconsequentialism*, 69 MO. L. REV. 1 (2004).

27. See, e.g., PAUL A. SAMUELSON, *ECONOMICS: AN INTRODUCTORY ANALYSIS* 45, 151 (6th ed. 1964); Richard A. Posner, *Nobel Laureate: Ronald Coase and Methodology*, 7 J. ECON. PERSP. 195, 200 (1993) (recognizing the lighthouse as a "classic (perhaps hackneyed would be a better term) example of a public good").

28. U.S. COAST GUARD, *HISTORICALLY FAMOUS LIGHTHOUSES* 63-64 (1972).

the total value of the lighthouse and determine their appropriate pro rata share of its cost.

Not all lighthouses were located near harbors, however. For remote locations, such as the Outer Banks, we would not expect the contribution mechanism to work as well—and not because of the risk of free riders, at least not as traditionally understood. Rather, the remoteness of the location would make it difficult to identify everyone who benefits from the lighthouse, and hence to estimate the lighthouse's total value. Perhaps for that reason, the federal government took over responsibility for providing lighthouses as one of its very first acts.²⁹ Yet, government provision was not notably more effective at providing lighthouses where they were needed than the private system it replaced. Responding at least as much, if not more, to political concerns, we ended up with multiple and redundant lighthouses near populous cities, making lighthouses an early form of pork. Lighthouses for navigationally dangerous, but remote areas, such as the Florida Keys or Cape Hatteras, were not a priority.³⁰ The lighthouse example thus serves as a useful reminder both that the private market can supply discrete public goods in some circumstances, and that even where the private market does not work perfectly, government intervention may not improve the situation very much.

Moving closer in time and context, we also find several recent examples of contribution systems for works of authorship that take advantage of the power of the Internet. Stephen King was one of the first established authors to venture outside the boundaries of traditional publishing with his novella, *The Plant*. He made each chapter of *The Plant* freely available for download, and promised to publish the next chapter if he received an effective contribution rate of seventy-five cents per download.³¹ As I have explained elsewhere: “The contribution rate

29. Act of Aug. 7, 1789, § 1, 1st Cong., 1st Sess., 1 Stat. 53, 53-54.

30. See FRANCIS ROSS HOLLAND, JR., *AMERICA'S LIGHTHOUSES: THEIR ILLUSTRATED HISTORY SINCE 1716*, at 29 (1972) (noting that inspectors both in 1838 and again in 1851 found that “whereas the comparatively safe shores of heavily populated areas were liberally dotted with lighthouses, the unsafe shores of unpopulated areas did not have many lights even though those shores saw heavy traffic”). Even with government provision, a private market solution is still possible. If the government fails to supply a lighthouse where it is needed, shipowners could still come together and arrange for one. However, the government intervention in such situations often seems to crowd out, or remove the impetus for, a private market solution. See James Andreoni, *An Experimental Test of the Public-Goods Crowding-Out Hypothesis*, 83 AM. ECON. REV. 1317, 1325 (1993) (finding that government provision of a public good resulted in incomplete crowding out).

31. King actually requested one dollar per download, but required only seventy-five percent of people who downloaded a chapter to contribute.

hovered at over seventy percent for the first few installments, as consumers voluntarily contributed in order to ensure the availability of future installments. The contribution rate fell below King's threshold only when he announced the series' end and removed the incentive for consumers to contribute."³²

Given the economics of discrete public goods, that such a contribution mechanism should work is unsurprising. King did rely on a different approach than pro rata contributions to reach a Nash equilibrium. Under his approach, he provided: (1) a public statement of the price for the next chapter and (2) a continuously updated public statement of current contribution levels. With this information, each consumer could immediately perceive whether sufficient contributions had been made to ensure continuation of the work and could respond appropriately. If necessary, those who valued additional chapters could (and did) make additional contributions up to their reservation value to ensure that the next chapter was made available.³³ While we should expect a certain degree of brinkmanship with this approach, as some consumers may hold back on contributing hoping that another consumer will pick up the necessary slack, it represents an alternative mechanism to reaching a Nash equilibrium outcome that is also Pareto efficient.

In the musical world, Nine Inch Nails and Radiohead have both recently released albums using a contribution model. While Radiohead's digital release of its album, *In Rainbows*, was a low quality stream intended primarily to boost sales of its subsequent CD release, Nine Inch Nails has released nine of its songs from its album *Ghost I-IV* for free.³⁴ For five dollars, a fan can get the remaining twenty-seven songs and has the option of getting the files in lossless formats.³⁵

Importantly, a contribution mechanism for paying for a discrete public good is not a gift or tipping economy. In fact, as the King

32. See Lunney, *supra* note 21, at 863-64.

33. See Don O'Briant, *'Plant' Fans Pay Their Way*, TIMES UNION (Albany, NY), Aug. 27, 2000, at J4, available at www.lexis.com/research (follow "Find a Source" tab; search "The Times Union"; then follow "the Times Union (Albany)" hyperlink; search "Plant Fans Pay Their Way") ("Amazon.com, which is processing payments for King, reports that some readers have been sending in extra money for the \$1 installments—from \$2 to \$20—to make up for deadbeat downloaders.").

34. See, e.g., Dan Goodin, *Nine Inch Nails Cracks Net Distribution (Maybe)*, THE REGISTER (U.K.), Mar. 3, 2008, http://www.theregister.co.uk/2008/03/03/nine_inch_nails_album_released_online/ ("Unlike the much-ballyhooed online release a few months ago of the most recent Radiohead album, the Nine Inch Nails experiment is a lot easier to take seriously. That's because Reznor has made the album available in both lossless and high-bit rate formats. Radiohead's *In Rainbows*, by contrast, came as only a 160 kbps MP3, which hardly seemed worth the time it took to download it.").

35. *Id.*

example reflects, a contribution scheme might look little different in some respects from existing copyright-based payment systems. The author still sets the price. The key difference is that consumers, who have better information regarding their own valuation of the work, decide for themselves whether and, if so, how much to contribute towards the price the author has set. Moreover, consumers contribute not out of a sense of generosity or gratitude, but for the same reason that they purchase a good in more traditional markets—to ensure access to the work. True, the connection is a little less direct, in that some consumers can obtain the work without contributing. The essential *quid pro quo*, however, remains. Consumers, as a group, must meet the author's price in order to receive the work.³⁶

III. REWIRING COPYRIGHT TO REFLECT THE ECONOMICS OF DISCRETE PUBLIC GOODS

A. *Radical Revision?*

The discrete public goods model thus suggests a need to revisit some of the assumptions behind copyright. Taken to its full logical extent, the model indicates that radical revision of copyright may be desirable. Indeed, it raises the question whether we need copyright at all. Even with respect to competitor copying, those competitors must still turn around and sell their unauthorized copies to the end consumers. As long as consumers can distinguish authorized from unauthorized copies, and even if the unauthorized copies are less expensive, the discrete public goods model suggests that consumers will purchase the authorized copies to the extent necessary to ensure the creation of the original work.

Consider again the Stephen King novella, *The Plant*. King conditioned the availability of the next chapter on receiving a certain price based on the number of downloads. To ensure the integrity of his pricing condition, he necessarily had to control downloading and the distribution of unauthorized copying. His per-download pricing method, however, was tied to the old business model of the traditional publishing industry where the production and distribution of each additional copy of a work entailed some significant costs. When translated onto the Internet, no cost-based justification for such pricing exists. Instead, it reflects an attempt by King to extract a return based upon the value of the work to consumers, rather than based merely on his costs. The number of hours required to write a given chapter may vary somewhat depending

36. In the Stephen King example, while the contributions are tied to the download of one chapter, they are not in fact payments for that chapter, but for the next one.

on how popular King expects the work to be, but they are unlikely to vary in a linear fashion. Whether a given chapter turns out to be mildly popular or wildly popular, King's effort in writing it will likely have been relatively constant. In today's copyright-based economy, pricing systems attempt to extract from consumers a much higher payment for wildly popular works, even where no additional costs are involved. This represents an attempt to extract the work's value from consumers, and is a pricing approach fundamentally inconsistent with competitive markets.

However, in a true voluntary contribution model, an author or artist would set payment level based upon their own cost, not based upon the value of the work to consumers. Thus, instead of setting a per-download charge that aims to capture some percentage of the demand for the work, King should have stated his own reservation price—a total number of dollars necessary to persuade him to write and release the next chapter. Had King done so, then a prohibition on copying, whether by competitors or by end consumers, would have been not only entirely unnecessary, but affirmatively undesirable.³⁷ The more consumers who read the initial chapter, the more consumers there would be to contribute to the production of later chapters. Moreover, whatever unauthorized copying occurred, it would merely shift some part of the marginal cost of making and distributing copies of the work from the author to the copiers. A prohibition on consumer copying would therefore be affirmatively undesirable. Under such an approach, King would not even need a prohibition on competitor copying; he would only need a prohibition on the copier misattributing the authorship of the work.³⁸

Accepting the discrete public goods model suggests that to the extent we need copyright at all, we need to turn it on its head. Today, copyright protects most extensively those iconic works of fiction or

37. As the theory and practice with respect to discrete public goods is still developing, I leave open the possibility that the per-copy pricing may have helped consumers reach a Nash equilibrium by establishing a standard against which each consumer could measure their contribution. Alternatively, knowing the contribution level expected may have led some consumers to contribute more. For example, some consumers may derive satisfaction from knowing that they have done more than their share. With a per-copy contribution standard, such consumers will know how much they should contribute and can therefore contribute more than that amount in order to experience the extra satisfaction they receive from doing more than their share. If King simply stated a total contribution amount from all consumers, that satisfaction from doing more than their share would not be available.

38. *But see* Dastar Corp. v. Twentieth Century Fox Film Corp., 539 U.S. 23, 33 (2003) (holding that section 43(a) of the Trademark Act does not encompass a cause of action for authorial misattribution). I have explained the doctrinal and policy reasons why section 43(a) should be read to encompass misattributions with respect to authorship. *See* Glynn S. Lunney, Jr., *Distinguishing Dastar: Consumer Protection, Moral Rights, and Section 43(a)*, in CONSUMER PROTECTION IN THE AGE OF THE 'INFORMATION ECONOMY' (Jane K. Winn ed., 2006).

entertainment that best match the characteristics of a discrete, rather than continuous, public good. At the same time, it provides little protection to factual, useful, or run-of-the-mill fictional works that from the perspective of end consumers look more like the undifferentiated units of a single public good—works of authorship—of the continuous public goods model. Yet, the present emphasis in copyright law is precisely the opposite of what the economic models of public goods suggest is desirable. Given that the ordinary workings of the market can ensure the efficient production of discrete, but not continuous public goods, copyright should reserve protection, or perhaps protect more extensively, those works that better match the assumptions of the continuous public good model. In other words, iconic works should receive little, if any, protection from copyright. Rather, they should be left to fare on their own in the marketplace, where the discrete public goods model suggests that they will be efficiently produced.

B. *Incremental Change?*

In addition to raising questions about the propriety of copyright *vel non*, the discrete public goods model suggests, as an intermediate step, that we should recognize a clear distinction in copyright between competitor or commercial copying and end user copying. Until the P2P controversy, copyright seemed to recognize that distinction.³⁹ In the United States, although there is no specific exemption for private copying, for more than two hundred years, no copyright owner successfully asserted an infringement claim against an individual who without authorization copied a work for their own personal or private use.⁴⁰ This despite copyright owners' repeated complaints over the last forty years that private copying was costing them billions in lost sales.⁴¹

39. The following paragraphs are taken from the amicus brief I drafted in the *Grokster* litigation. See Glynn S. Lunney, Jr., Brief of Amici Curiae Law Professors in Support of Respondents, *Metro-Goldwyn-Mayer Studios, Inc., v. Grokster, Ltd.*, 545 U.S. 913 (2005) (No. 04-480).

40. Having persuaded the Seventh and Ninth Circuits that P2P users should be branded copyright infringers *in absentia* in the *Aimster* and *Napster* litigation, copyright owners have begun applying the direct infringement rulings of these secondary liability cases to individual P2P users. See *BMG Music v. Gonzalez*, No. 03 C 6276, 2005 U.S. Dist. LEXIS 910 (N.D. Ill. Jan. 7, 2005) (granting summary judgment against individual P2P user and awarding \$22,500 in statutory damages against user for downloading thirty music files).

41. See, e.g., Office of Tech. Assessment, U.S. Cong., Intellectual Property Rights in an Age of Electronics and Information, OTA-CIT-302, at 101 (Apr. 1986) (citing testimony of Alan Greenspan presented on behalf of the RIAA that the recording industry lost more than \$1.4 billion in revenue in 1982 as a result of home taping); Office of Tech. Assessment, U.S. Cong., Copyright and Home Copying: Technology Challenges the Law, OTA-CIT-422, at 170-71 (Oct.

Whatever excuses copyright owners may have offered for their longstanding failure to police what they now claim as their rights, the fact remains that copying privately, for one's own use, as opposed to commercially, became an accepted and widespread practice well before the advent of P2P file sharing.⁴² In its 1989 report, *Copyright and Home Copying*, for example, the Office of Technology Assessment estimated: "Americans tape-record individual musical pieces over 1 billion times per year."⁴³ While as much as one-fifth of this taping may have substituted for authorized purchases, the OTA nevertheless found "an underlying set of social norms that were supportive of home taping of music."⁴⁴ "There seemed to be agreement among the public that a person who purchased a recording had the right to make copies for his own, or a friend's use. The public did, however, draw the line at using home taping for profit, i.e. making copies to sell."⁴⁵

Although it did not include a specific private or personal use exemption in the Copyright Act of 1976, Congress has generally acted consistently with this well-established social norm. For example, when Congress extended copyright protection to sound recordings in 1971, the House Committee report expressly stated Congress's intent to allow home taping to continue.⁴⁶ Similarly, when the Court in *Sony Corp.* recognized time shifting as a fair use, Congress refused to overrule the decision.⁴⁷ And when digital taping technology became available,

1989) [hereinafter OTA, *Copyright and Home Copying*] (citing similar testimony estimating losses of \$1.5 billion in 1984 for the recording industry as a result of home taping).

42. See OTA, *Copyright and Home Copying*, *supra* note 41, at 7, 12 ("In general, both tapers and nontapers believed that it was acceptable to copy a prerecorded item for one's own use or to give to a friend. The only copying that was considered universally unacceptable—by tapers and nontapers—was copying a tape to sell it."); see also *id.* at 139-65.

43. *Id.* at 3, 11; see also *id.* at 11.

44. *Id.* at 158, 164.

45. *Id.* ("This survey finding paralleled qualitative findings from focused group discussions in which tapers and nontapers agreed that taping 'to save money' was acceptable, but taping 'to make money' was wrong.").

46.

In approving the creation of a limited copyright in sound recordings it is the intention of the Committee that this limited copyright not grant any broader rights than are accorded to other copyright proprietors under the existing title 17. Specifically, it is not the intention of the Committee to restrain the home recording, from broadcasts or from tapes or records, of recorded performances, where the home recording is for private use and with no purpose of reproducing or otherwise capitalizing commercially on it. This practice is common and unrestrained today, and the record producers and performers would be in no different position from that of the owners of copyright in recorded musical compositions over the past 20 years.

H.R. REP. NO. 487, 92d Cong., 1st Sess. 7, reprinted in 1971 U.S.C.C.A.N. 1566, 1572.

47. See *Grokster* Amicus Brief, *supra* note 6, at 10.

Congress formally exempted the practice of privately copying music from copyright infringement in the Audio Home Recording Act of 1992 (AHRA).⁴⁸ This provision exempted private copying of music in both analog and digital formats⁴⁹ and reflected Congress's general intent to establish the legality of privately copying music both finally and completely.⁵⁰

In the P2P context, however, courts have refused to follow this longstanding understanding of copyright law. Instead, they have branded P2P file sharers copyright infringers en masse. This radical change in the law came not from Congress or our elective representatives, nor from judicial proceedings in which these citizens had the right and opportunity to be heard. Rather, this change came from judicial proceedings strategically orchestrated by copyright owners to exclude the relatively sympathetic P2P users in order to focus judicial ire on the relatively unsympathetic P2P service providers, such as Napster, Aimster, and Grokster.⁵¹ Given the defendants actually before the courts in *Napster*

48. Pub. L. No. 102-563, § 2, 102d Cong., 2d Sess. (1992), *codified at* 17 U.S.C. § 1008 (2006) ("No action may be brought under this title alleging infringement of copyright . . . based on the noncommercial use by a consumer of such a device or medium for making digital musical recordings or analog musical recordings.").

49. See 17 U.S.C. § 1008 ("No action may be brought under this title alleging infringement of copyright . . . based on the noncommercial use by a consumer of [a digital audio recording device, a digital audio recording medium, an analog recording device, or an analog recording medium] for making digital musical recordings or analog musical recordings."). Lower courts have held that this exemption does not cover P2P file sharing on the grounds that a computer is not a digital audio recording device. See, e.g., *A & M Records, Inc. v. Napster, Inc.*, 239 F.3d 1004, 1024-25 (9th Cir. 2001). Yet, if we treat the P2P file sharing software itself as the relevant device, then it would seem to satisfy the definition of a "digital audio recording device." 17 U.S.C. § 1001(3).

50. See, e.g., Audio Home Recording Act of 1992, 102d Cong., 2d Sess. (Sept. 22, 1992), 138 CONG. REC. H9029, 9033 (Statement of Rep. Moorehead) ("Mr. Speaker, H.R. 3204 would make it clear that noncommercial taping of music by consumers is not a violation of copyright law. The debate over home taping of records goes back to 1970 when Congress first extended copyright protection for records but this legislation will end the 22-year-old debate and make it clear that home taping does not constitute copyright infringement."); *id.* (statement of Rep. Hughes) ("H.R. 3204 removes the legal cloud over home copying of prerecorded music in the most proconsumer way possible: It gives consumers a complete exemption for noncommercial home copying of both digital and analog music, even though the royalty obligations under the bill apply only to digitally formatted music. No longer will consumers be branded copyright pirates for making a tape for their car or for their children."); *id.* at 9035 (statement of Rep. Collins) ("There are three basic provisions of the legislation. First, [the AHRA] guarantees consumers the legal right to make analog or digital copies of musical recordings for noncommercial use."); *id.* at 9036 (statement of Rep. Fish) ("The bill makes clear that the home taping of music is not a violation of copyright law.").

51. In the ongoing litigation against digital video recorders, copyright owners unsuccessfully sought to preclude a group of the alleged direct infringers from using a declaratory judgment proceeding to join the proceeding. See *Newmark v. Turner Broad. Network*, 226 F. Supp. 2d 1215, 1220 (C.D. Cal. 2002) ("The Entertainment Defendants contend that [they] did

and *Aimster*, the key issue was the question of secondary liability; the casual overturning of the longstanding legality of private copying was little more than an afterthought.⁵²

Consistent with the insights of the discrete public goods model, Congress should now move to limit end consumer liability for copyright infringement for the distribution and copying of discrete public goods. There are three approaches Congress could use. First, Congress could exempt private copying and distribution from the reach of copyright altogether. This is the approach most of the rest of the world has adopted on the issue, formally exempting personal or private use copying from the scope of their statutes.⁵³ However, as we have discussed, not all works

not even know about the *Newmark* Plaintiffs until they filed this action, and that they did not name any individual Doe defendants in the *RePlayTV* action and point out that they make these allegations [of direct infringement] only because these allegations are necessary to state a claim against RePlayTV for contributory and vicarious copyright infringement.”).

52. Although the direct infringers were not parties in either the *Aimster* or *Napster* litigation, both the Seventh and Ninth Circuits, respectively, casually branded all of them as copyright infringers. See *In re Aimster Copyright Litig.*, 334 F.3d 643, 645 (7th Cir. 2003) (“Teenagers and young adults who have access to the Internet like to swap computer files containing popular music. If the music is copyrighted, such swapping, which involves making and transmitting a digital copy of the music, infringes copyright.”); *A & M Records, Inc. v. Napster, Inc.*, 239 F.3d at 1014 (“Napster users who upload file names to the search index for others to copy violate plaintiffs’ distribution rights. Napster users who download files containing copyrighted music violate plaintiffs’ reproduction rights.”).

53. See, e.g., Federal Law on Copyright in Works of Literature and Art and on Related Rights, art. 42(1) (1998) (Austria) (“Any person may make single copies of a work for personal use.”); Copyright and Neighbouring Rights Act, art. 25 (Mar. 22, 2000) (Bulg.) (“The copying of already published works shall be made without the consent of the author and without compensation only if it is done for personal use. This shall not be valid for computer software and architectural designs.”); An Act To Amend the Copyright Act, § 80(1) (Apr. 25, 1997) (Can.) (“Subject to subsection (2), the act of reproducing all or any substantial part of [a musical work, a performance, or a sound recording] onto an audio recording medium for the private use of the person who makes the copy does not constitute an infringement of the copyright . . .”); Copyright Act of 7/2000, § 30(2)(a)-(c) (July 4, 2000) (Czech Rep.) (“Copyright shall therefore not be infringed by whoever a) for his own personal use makes a recording, reproduction or imitation of a work; a reproduction or imitation of a work of fine arts must be clearly labeled as such . . .”); Act on Copyright, art. 12 (1995) (Den.) (“Anyone is entitled to make, for private purposes, single copies of works which have been made public.”); Copyright Act, art. 12 (Apr. 25, 1997) (Fin.) (“Any person may make single copies of a disseminated work for his private use. Such copies may not be used for other purposes.”); LAW ON THE INTELLECTUAL PROPERTY CODE art. L. 122-5 (Jan. 3, 1995) (Fr.) (“Once a work has been disclosed, the author may not prohibit: . . . (2) copies or reproductions reserved strictly for the private use of the copier and not intended for collective use . . .”); Law on Copyright and Neighboring Rights, art. 53(1) (July 16, 1998) (F.R.G.) (“It shall be permissible to make single copies of a work for private use. A person authorized to make such copies may also cause such copies to be made by another person; however, this shall apply to the transfer of works to video or audio recording mediums and to the reproduction of works of fine art only if no payment is received therefor.”); Copyright, Related Rights and Cultural Matters, art. 18(1) (Aug. 2, 1996) (Greece) (“Without prejudice to the provisions laid down in the following paragraphs, it shall be permissible for a person to make a reproduction of a lawfully published work for his own private use, without the consent of the

are discrete public goods, even from the perspective of end consumers. Such an exemption would be overbroad. Nonetheless, while theoretically overbroad, it may in practice prove an excellent fit, as consumers, at least so far, have used P2P networks to share almost exclusively the sorts of iconic and popular works that match the assumptions of the discrete public goods model.⁵⁴

Second, rather than exempt personal or private use copying altogether, Congress could amend the fair use doctrine to incorporate the insights of the discrete public goods model. I have argued elsewhere that courts can use the current fair use doctrine, particularly in the light of the gloss added by the Court in the *Sony* betamax decision,⁵⁵ to give greater leeway to private copying.⁵⁶ Yet, the lower courts have proven decidedly reluctant to even entertain the possibility. Instead, they have seized on the Court's statement in *Sony* that "[a] challenge to a noncommercial use of a copyrighted work requires proof either that the particular use is harmful, or that if it should become widespread, it would adversely affect the potential market for the copyrighted work."⁵⁷ As P2P sharing has

author and without payment"); Copyright Act, § 52(1)(a)(i) (Dec. 30, 1999) (India) ("The following acts shall not constitute an infringement of copyright, namely: (a) a fair dealing with a literary, dramatic, musical or artistic work, not being a computer programme, for the purposes of: (i) private use, including research"); Copyright Act, 1912, art. 16b (Oct. 27, 1972) (Neth.) ("It shall not be deemed to be an infringement of the copyright in a literary, scientific or artistic work to reproduce it in a limited number of copies for the sole purpose of the personal practice, study or use of the person who makes the copies or orders the copies to be made exclusively for himself"); Act Relating to Copyright in Literary, Scientific, and Artistic Works, art. 12 (June 2, 1995) (Nor.) ("Provided this is not done for purposes of gain, single copies of a work that has been issued may be made for private use."); Copyright Law, art. 48 (Apr. 23, 1996) (Peru) ("It shall be lawful to make copies for exclusively personal use of works, performances or productions published as sound or audiovisual recordings."); Consolidated Text of the Law on Intellectual Property, art. 31(1) (Mar. 6, 1998) (Spain) ("Works already disclosed may be reproduced without authorization from the author and without prejudice, where applicable, to the provisions of Article 34 of this Law in the following cases: . . . 2 for the private use of the copier, without prejudice to the provisions of Articles 25 and 99(a) of this Law, provided that the copy is not put to either collective or profit-making use."); Act on Copyright in Literary and Artistic Works, art. 12 (Dec. 7, 1995) (Swed.) ("Anyone is entitled to make, for private purposes, single copies of works which have been made public."); see also *BMG Can., Inc. v. Doe*, No. T-292-04, 2004 Fed. Ct. Trial LEXIS 321, at *18-19 (Fed. Ct. Can. 2004) ("Thus, downloading a song for personal use does not amount to infringement.").

54. See Lunney, *supra* note 21, at 885-86.

55. See *Sony Corp. v. Universal City Studios, Inc.*, 464 U.S. 417, 479 (1984) ("If the Betamax were used to make copies for a commercial or profit-making purpose, such use would presumptively be unfair. The contrary presumption is appropriate here, however, because the District Court's findings plainly establish that time-shifting for private home use must be characterized as a noncommercial, nonprofit activity.").

56. See Glynn S. Lunney, Jr., *Fair Use as Market Failure: Sony Revisited*, 82 B.U.L. REV. 975 (2002).

57. *Sony Corp.*, 464 U.S. at 451.

become widespread, lower courts have presumed, despite little empirical evidence, that widespread unpaid access must somehow adversely affect the market for the shared works. While an assumption that widespread unpaid access must equate with lost revenues makes perfect sense for private goods, which are characterized by rivalrous consumption, it simply does not hold for public goods, and indeed fundamentally misunderstands their character. As we have seen in our roommates hypothetical, unpaid access or free riding is perfectly consistent with, and does not undermine the incentives necessary for, the efficient production of discrete public goods.

Third, we could leave private copiers formally liable for their copying, but eliminate statutory damages for P2P file sharing. This would leave copyright owners free to pursue claims against individuals who use P2P networks to engage in file sharing, but would relegate them to only those damages or lost profits that they could prove resulted from that individual's actions. While such damages would likely be difficult to establish, perhaps in large part because they do not exist, this is the rule we follow in almost every other field of tort and property law. There is no sensible reason copyright owners should not be held to the same standard.

Of course, I am perfectly aware that in the current political climate Congress is not likely to enact any of these reforms. That is unfortunate. The lawsuits against individual consumers have done little to put the P2P genie back in its bottle. Instead, they have simply created an unseemly spectacle where copyright owners enlist the federal judiciary to bash randomly selected consumers into bankruptcy. Is this really the highest and best use of the federal judiciary's time?

IV. CONCLUDING THOUGHTS

While economic theory often trails, rather than leads the marketplace, the discrete public goods model offers insights on the path forward for the recording industry. The recording industry should stop fighting its own consumers and recognize that consumers' own self-interest will lead them to contribute to the works that they want. Some consumers will free ride, but, as the discrete public goods model establishes, free riding is not inconsistent with achieving a fair and efficient level of incentives for the creation of original works.

Rather than fight P2P, the recording industry should reflect on the key lesson from the home videotaping controversy. When a new technological complement comes along that radically reduces distribution costs for works of authorship, there will be opportunities to

monetize the resulting increase in the works' value. Formal rights and insistence on strict control is unnecessary.⁵⁸ To the extent that end consumers want the works at issue, what the recording industry should be looking for are ways to facilitate consumers in reaching the Pareto efficient Nash equilibrium they are looking for. There will undoubtedly be missteps and mistakes along this new path. Change is never easy, particularly when the need for it arises so suddenly. Nonetheless, it is simply too late to put the P2P genie back in the model, and it is well past time that the copyright industries began living in the brave new world that P2P has created.

58. With respect to videotapes and DVDs of movies, copyright owners never obtained an express right to control videotape and DVD rental, yet they have managed to make money off of that distribution mechanism nonetheless.

