# Copyright as a Coordinating Mechanism

*Glynn S. Lunney, Jr.*

Under the conventional analysis, in the absence of copyright, we will have too few original works of authorship. Because much of what copyright protects can, as a technological matter, be readily copied, in the absence of copyright, rational self-interest will lead individuals to copy and thus have for free what they would otherwise have had to pay for. Unable to compete with free, authors, and others engaged in the production of works of authorship, will receive inadequate compensation for their creative efforts, and lacking the necessary incentives, will invest their creativity elsewhere, in relatively more remunerative endeavors.

In the conventional account, copyright helps us avoid this eventuality, however. By legally prohibiting copying and other unauthorized uses of an original work, copyright can secure for authors the incentives necessary to guarantee a vibrant and varied supply of original works. Thus, the conventional account not only justifies copyright, it manages to justify copyright in terms of the public interest, rather than merely as a tool to enrich copyright owners. As the Court wrote in *Sony Corp. v. Universal City Studios, Inc.*:

> The monopoly privileges that Congress may authorize are neither unlimited nor primarily designed to provide a special private benefit. Rather, the limited grant is a means by which an important public purpose may be achieved. It is intended to motivate the creative activity of authors and inventors by the provision of a special reward . . . .[1]

But what if we don't need copyright to provide the necessary incentive? What role does copyright then serve?

This essay explores that issue by examining the public goods account of copyrighted works that now seems the predominant basis for a public interest justification for copyright. In

[1] Sony Corp. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984); *see also id.* at 431-32.

this account, commentators have relied on a particular branch of public goods economics, one that focuses on treating additional copyrighted works as if they were a stream of undifferentiated additional units of the public good at issue ("continuous" public goods), to argue that copyright is necessary to ensure an adequate supply of original works. While this branch of public goods economics provides some support for copyright, particularly the need for additional incentives for original works, it does not fit copyrighted works very well. Copyrighted works, particularly the most popular and economically significant works, are not simply undifferentiated units of a given public good. To the contrary, each is separate and distinct, often with its own unique consumer base. They are not, at least as a general rule, homogenous, nor perfectly competitive with each other, and some probably do not compete with each other in an economic sense at all.[2]

If, instead, of treating copyrighted works as a batch of undifferentiated widgets, we treat copyrighted works as separate and individually distinct public goods ("discrete" public goods), then we must look to a different branch of public goods economics for copyright's justifications. Yet, this branch of public goods economics provides far less support for copyright, at least in its current form. This branch of public goods economics suggests that the market, driven solely by the self-interest of individual consumers, will achieve an efficient outcome. So long as consumers can coordinate their efforts to support creation of the public good at issue, neither free-riders nor the need for additional incentives remains a compelling concern. As a result, copyright's proper role in the discrete public goods account becomes much more limited.

In the discrete public goods account, we don't need copyright to stop free riding nor do we need it to punish, through exclusion, those consumers who have not paid the copyright owner's set price for access. Consumers own self-interest will lead them to contribute sufficiently to ensure the work's creation. Rather than operate as a strong property right that

[2] Market definition from antitrust guidelines.

enables copyright owners to exclude non-payers and extract additional rents from the market, as it does in the continuous public goods account, all we need copyright to accomplish in the discrete public goods account is to facilitate coordination among consumers – to help consumers do what they already want to do. The question whether copyright should reach given conduct becomes simply whether a property right on that issue will facilitate consumer coordination or impair it.

This account raises serious questions regarding the broad, long, and steadily increasing bundle of rights now encompassed by copyright. To explore these questions, Section I begins by introducing continuous and discrete public goods models and their implications for copyright. In Section II, I will consider whether works of authorship better fit the discrete or public goods model. In Section III, I attempt to apply the insights from the discrete public goods model to a number of issues, presently the subject of debate, in copyright, including the scope of fair use, copyright's duration, derivative works, secondary liability, and price discrimination. Finally, in Section IV, I offer some concluding thoughts.

## I. *The Economics of Copyrighted Works*

To determine the proper role for copyright, we turn to 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. But the models differ in the nature of the public good at issue. The first, the variable quantity public good model, evaluates the production of a public good where, as the name suggests, the amount of the public good at issue can vary. For example, national defense and spraying for mosquito control have both been analyzed as public goods.

These are not on-off public goods; rather, the amount supplied can vary considerably. 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. 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 might fit this second, on-off good model. The second model focuses on the market's production of such on-off or discrete public goods.

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 variable quantity 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 fit better a particular real world problem, and by suggesting how the market will function in the absence of government intervention, better identify when intervention is or is not appropriate. Because its results are likely more familiar to most readers, I'll begin with the variable quantity public good model.

A. *The Variable Quantity Public Good: Kill the Bugs*

In one of the early articles analyzing public goods, Gordon Tullock used the example of mosquito control.[3] Two individuals, one on each side of an island, both would like to control the mosquitoes emanating from a swamp in the middle of the island between them. Given their geographic proximity, mosquito control will prove to be a public good. That is mosquito control efforts by one of the individuals will benefit the other individual just as much. Each individual has the identical downward sloping demand curve for mosquito control, and for the sake of

---

3 Gordon Tullock, *Social Cost and Government Action*, 59 AM. ECON. REV. 189 (1969) (Papers and Proceedings of the Eighty-first Annual Meeting of the American Economic Association).

simplicity, we will assume 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 mosquito control undertaken. For this type of public good, *X* can vary from a little, 1, to near-total eradication, 5. Again, for the sake of simplicity, we will assume a constant marginal cost, with each "unit" of mosquito control costing 2.

Given these assumptions, if there is only one individual on the island, her optimal level of mosquito control occurs where the marginal value of additional mosquito control, reflected in her demand curve, precisely equals her marginal cost of additional mosquito control. Thus, $5 - X^*_{i=1} = 2,$ where $X^*_{i=1}$ is the optimal level of mosquito control for an individual on the island living alone. Solving yields $X^*_{i=1} = 3$. With only one individual living on the island, the individual is the island society as a whole, and this is therefore also the optimal level of mosquito control for the island society as a whole.

Now, we can extend the model to two individuals. Each of our individuals has the same demand curve, but mosquito control efforts by one person benefit the other equally. We begin with the Nash equilibrium case, where each individual decides on her own, based upon her own self-interest and her (correct) expectation of the other's mosquito control efforts, how much mosquito control effort she should undertake. In this case, individual A solves: $(5 - X^N_A) - X^N_B = 2$; and individual B solves: $(5 - X^N_B) - X^N_A = 2$, where $X^N_A$ and $X^N_B$ are A and B's Nash equilibrium levels of mosquito control respectively. Because their situations and preferences are symmetric, we can assume $X^N_A = X^N_B$. Substituting and solving, we find $X^N_A = X^N_B$ =1.5. Because their mosquito control efforts benefit each other equally, the total level of mosquito control is the sum of the two individual's mosquito control efforts. Thus, the Nash equilibrium level of mosquito control with two individuals in our island society is:

$X^N_{i=2} = X^N_A + X^N_B = 3$ – precisely the same as our socially and individually optimal levels of mosquito control for an island population of one.

However, with two individuals, this is no longer the socially optimal level of mosquito control. To see this, we begin by determining society's demand curve for mosquito control, which, given that mosquito control is a public good, is obtained by summing vertically the demand curves for the individuals (here, two) in our society. Thus, with two individuals, our society's demand curve for mosquito control is: 10-2*X*. Given this demand, we can obtain the optimal level of mosquito control, from society's (or a social planner's) perspective, by again setting marginal benefit (reflected in the demand curve) equal to marginal cost, or $10 - 2X^*_{i-2} = 2$. Solving yields the socially optimal level of mosquito control, which given our assumptions, is $X^*_{i=2} = 4$.

From this result, we can immediately see that the socially optimal level for a society of two is higher than both: (i) the socially and individually optimal levels for a society of one; and (ii) the individually optimal level for a society of two. It is easy to see why the first is true. With a larger population, society values mosquito control efforts more highly. Indeed, under the simple assumptions of our model, twice the population means twice the value. The marginal cost of mosquito control efforts, on the other hand, remains constant. The necessary result of this is that at equilibrium, the optimal supply of mosquito control efforts is larger for a population of two than for a population of one.

With respect to the gap between the socially and individually optimal levels of mosquito control for our island society of two, this gap reflects the, by-now, well-known result that the market will fail to achieve a Pareto optimal supply of public goods. While the market failure is important for its own sake, three other points, often overlooked, deserve emphasis. First, despite the academic and judicial preoccupation with free-riding, the market (as reflected in the Nash equilibrium levels of mosquito control) fails to achieve the socially optimal level of mosquito control even though neither A nor B is free-riding. To the contrary, both are contributing to mosquito control efforts 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, neither A nor B is shirking, or otherwise lying about their true valuation of mosquito control. To the contrary, both are setting their effort levels based upon their actual valuations. Instead, the problem arises because neither considers the benefit to the other of their mosquito control efforts. Considering only her own internal benefit from her mosquito control efforts and ignoring the external benefit her efforts create for the other, each provides too little mosquito control.

Third, the gap between the individually optimal and the socially optimal levels increases as the population increases. Indeed, in our example, as the population approaches infinity, the market (as reflected in the Nash equilibrium level of mosquito control) remains stuck at 3, yet the socially optimal level of mosquito control approaches 5. But this larger gap does not arise 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 mosquito control efforts now benefits 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 mosquito control will also increase.

Because of the external benefit that each individual's mosquito control 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 amount of mosquito control and to pay for its 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 mosquito control program generates would also solve the market failure. While the transaction costs associated with such a solution might prove insurmountable, 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 mosquito control, allowing offsets would reduce the transaction costs considerably.

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's consider the second public goods model.

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

For our second model, consider 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 the mosquito control model, the choice here is either to purchase the television or not.[4] 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 reservation prices 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, we shall consider two possible rules. In the first, the roommates each pay a pro rata share of the television's price, with the threat of exclusion for those who refuse to contribute. I shall refer to this rule for payment as the "property-based" or uniform price approach. The second approach, on the other hand, 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 proportional shares based upon their announced values. There is no threat of exclusion under this approach. Instead, the only threat is that if the announced contributions do not equal the television's price, the television will not be purchased. I shall refer to this rule for payment as the voluntary contribution approach.

[4] Again, we could make it a variable quantity problem by allowing the qualities of the television, such as screen size or viewing quality, to vary.

Given these basic assumptions and two rule systems, we can now examine three cases. In the first, the roommates value the television identically, while in the second and third, their valuations differ. For each case, we will consider the efficiency of our two price allocation rules. To be efficient, a price allocation rule must satisfy two requirements. First, it must lead the roommates to purchase the television when the sum of their reservation prices exceeds the television's price. Second, because the good at issue is a public good, it is not Pareto optimal to exclude non-payers, 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 pro rata share, because that share ($30) is less than their reservation price for the television ($40). Moreover, in this case, a property-based rule is incentive compatible. If anyone 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 his 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 non-contributors 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.

While the property-based approach therefore achieves the efficient outcome, so too does the voluntary contribution scheme, at least so long as a Nash equilibrium is achieved. In the voluntary contribution game, each player announces his reservation price for the television. If the total announced valuations are less than the television's price, then the television is not purchased. If the total announced valuations are equal to or greater than the television's price, then the television is purchased, and each roommate contributed 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 paying less is fair in the second example, either of these allocations is efficient 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 will announce a valuation of $0, with the hope that the others will pick up the television's full price. But for the set of announcements to satisfy the criteria for a Nash equilibrium, each roommate must both predict accurately what their roommates will announce and, given that they prove correct, be content with their announced valuation. Given these requirement, C's own self-interest will preclude C from announcing a valuation of $0. If C accurately predicts that A and B will be honest, and therefore announce valuations of $40 each, then C knows that announcing a valuation of $0 will mean no television because the sum of the announced values will be less than the price of the television. Because C knows his true reservation price and knows that he is willing to pay $40 for the television, C will be better off announcing a value of $10 and getting the television, than he would be announcing a value of $0 and not getting the television. While the second rule system is not therefore perfectly incentive compatible, in that C has some incentive to understate his true reservation price, it is incentive compatible enough to ensure that the television is purchased.

In fact, under the voluntary contribution scheme, while the price may be allocated among the roommates in a variety of ways, all of the Nash equilibrium solutions will be characterized by announced valuations that sum to exactly $90. If the total of the announced valuations is less than $90, one of the roommates will increase his announced valuation until the sum totals $90. Otherwise, the roommates will not get the television and each of them values the television enough to avoid that result. Similarly, if the total of the total announced valuations exceed $90, one of the roommates will reduce his announced valuation until the sum totals $90. After all, announcing a valuation that leads to a sum in excess of $90 will lead someone to pay more than he had to to ensure that the television is purchased. Thus, the voluntary contribution rule will also satisfy the two criteria for efficiency in this case. The television is purchased and no one is excluded from watching.

*Case #2: Varying Valuations, A and B $40 each, C $10.* Here, the valuations sum to exactly $90,[5] and hence the television should be purchased. 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

[5] 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.

approach. Thus, the property-based approach in this case fails the first efficiency criteria: the television was not purchased when it should have been.

In contrast, the voluntary contribution rule remains efficient. In this case, each of the roommates' own self-interest will lead him to announce his valuation honestly. A and B will announce valuations of $40 a piece, 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 him from watching. The property-based rule therefore fails the second efficiency criteria in this case: it excludes an individual from enjoying the public good even though the television is characterized by nonrivalrous consumption.

In contrast, the voluntary contribution approach remains efficient. Again, as in Case #1, there are a very large 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.

C. *A Comparison of the Two Models and Their Results*

Although the two 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, the voluntary contribution rule is 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 the good. In the second, the voluntary contribution rule is Pareto efficient even though the roommates are not invariably honest regarding their valuations of the public good. Like 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 produces sufficient incentives for the production of the public good. The only question is whether the roommates will be able to reach a Nash equilibrium solution or whether endless bickering over who should pay how much will preclude them from ever reaching a Nash equilibrium. Moreover, extending the second model from three roommates to a much larger group does not change the nature of the problem. The incentives remain sufficient to create or acquire the public good, so long as the now much larger group of individuals who will benefit from the public good can agree on how to allocate the price. As the numbers increase, the transaction costs will undoubtedly increase as well, but even so, to achieve the efficient result, no one needs to consider how their actions affect another. In that sense, self interest alone is sufficient to generate the necessary incentives so long as a Nash equilibrium can be reached. The issue of ensuring adequate incentives for, or an optimal supply of, the public good is not the central issue; rather, the central problem is coordinating the allocation of the public good's price among the good's would-be consumers.

In contrast, ensuring adequate incentives is very much at the heart of the market failure in the first model. To overcome the market failure, it is not enough for the parties to overcome any relevant transaction costs and contribute to the public good based upon their own self-interest. Instead, the solution must enable the decision-maker to see not only how each individual's actions benefit that individual, but how they benefit others as well. Failing to internalize that external benefit leads to too little incentive and too little of the public good at issue.

## II. *Public Goods and Copyright: Which Model Makes More Sense?*

Given this difference in the two 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, *The Economics of Copyright*, subsequent commentators, including myself, have fallen almost uniformly in line. Despite this uniformity, I now find myself troubled by this characterization of works of authorship. While we can model each additional work as if it were an additional unit of mosquito control, once we have focused on the issue, the differences between these goods are immediately apparent. Works of authorship are often unique, particularly the most popular for which copyright is the most significant economically.

Demand aggregation is difficult. Consumers entering and leaving the market, as the works they happen to like become the marginal work. Preference structures among consumers are likely to differ substantially. 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 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.

Work of Christopher Yoo on monopolistically competition is a step in that direction, but I'm not sure it goes far enough.

So what would copyright look like if we approached it from the discrete public good model, rather than the continuous public good model. Incentives no longer a key issue, instead, the key issue is transaction costs, ensuring that a Nash equilibrium is likely.

## III. *Works of Authorship as Discrete Public Goods*

Do we need copyright at all? Copyright's legitimate role, and some illegitimate roles: fairness, perceived fairness, and achieving incentives in excess of a work's reservation cost.

Is the public good issue the sole issue in copyright?

--Derivative works and natural monopoly issues.

Applying the discrete public goods model's insights to some important issues in copyright today: fair use (inc. private copying, transformative uses), duration, DRM, derivative works, secondary liability, price discrimination.

## IV. *Concluding Thoughts*