THE SOCIALLY DESIRABLE SIZE OF COPYRIGHT FEES

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ABSTRACT. Licensing of copyrighted material can contribute to welfare. But what fee is socially desirable fee? The owner's marginal cost of licensing is often near zero, but $P = MC = 0$ is arguably neither equitable nor an efficient incentive for further creative activity. Here two fee-setting approaches are described, assuming copyright rules are pre-established and determine the holder's earnings, absent licensing. One approach is Ramsey pricing, theoretically second best and able to preserve the copyholder's earnings. The second is 'parity pricing', as derived in the price-regulation literature, which can ensure effective free entry into commercial use of the licensed material.

1. INTRODUCTION

It is generally agreed that it is quite appropriate for the use of material covered by copyright to require payment of a fee by the user to the holder of the intellectual property. But that is virtually an empty statement if it entails no guidance on the magnitude of the fee. A minuscule copyright fee is tantamount to a gift of access to the material, while an extremely high price is effectively equivalent to outright refusal to license. The issue is whether there is some defensible procedure or standard for determination of some intermediate level of copyright fee for which one can lay some claim of superiority or even optimality. The purpose of this paper is to suggest one way in which such a socially desirable fee can be determined. I shall focus on the important set of cases in which the material covered by copyright is used as an input to another product sold in a downstream market, and in which the copyright proprietor competes with the licensees in that market. An example is a compact disc producer/distributor firm that owns copyrights to a large portfolio of music, some of which other such firms want to license for inclusion in their own competing CDs. The rule described below is designed to ensure that the copyright fees do not constitute an exclusionary handicap or an unjustified subsidy to rival firms. I will note, however, that a somewhat broader interpretation of the rule proposed here is also possible. But it should also be recognized that other approaches to license fee analysis are also possible, as via Ramsey theory or bargaining-model analysis.

Copyright fee determination is complicated by the propensity to consider it to be a matter of equity: What is the "just price" for, say, a composer to charge for performance of his or her work, and should that depend on the performer's ability to pay? Since we do not know how to answer these questions, the conclusion that such considerations should constitute the foundation for the price determination process is evidently a counsel of despair. Happily, there are other implications of

the choice of license fee that provide a firmer handle on the process. For that price does affect the allocation of the intellectual property as a productive resource, that is, as an input to the final product that is supplied with the aid of the intellectual property in question. The choice of fee can also facilitate or impede competitiveness in the affected markets. Both of these implications can offer us guidance for the price-setting process. In particular, as economists, we can be expected to consider the consequences for efficiency of resource allocation as a valuable guide to determination of what we may consider to constitute an "efficient" or "optimal" fee.

To see how the resource allocation issue arises, consider the following parable (which is perhaps somewhat reminiscent of the movie, Citizen Kane). Suppose a noted playwright offers to permit performance of his latest play in the commercial theater, but insists on a high license fee unless his female companion is cast in the romantic lead. Suppose a much more capable actress covets the role, but the prospective producer feels that the fee demanded precludes her from the role. Clearly, the high fee is apt to lead to resource misallocation. It may be said that, while this is true, the problem has its roots in the discriminatory character of the pricing. But a similar problem arises if the playwright offers the script to others for a fee that he can be sure no one can afford, and then decides to put the play on himself, casting himself in the lead. Of course, the second scenario entails price discrimination in that the playwright is implicitly charging himself zero for use of the script, and hence pays himself much less than the fee he proposes to others. But what fee is he really charging himself? What fee to others would eliminate the price discrimination and permit the play to be performed with the lead actor who is best suited to the role? Since there is no visible act of payment of the owner of the property to himself in exchange for its use, and it is not even obvious how such a payment can be defined, the difficulty raised by the issue here is evident. Note that what is entailed is not only the possibility of misallocation of resources, but also the creation of an impediment to competition, with a candidate lead actress or actor protected from rivalry by the fee.

Moreover, the story can be generalized to the case where others want permission to perform a piece of music under copyright protection or want to play at a school performance a song that has been recorded on a CD, or the case in which a music distributor wants to include the song in a compendium of similar music to be issued on another CD. Yet, as will be indicated next, not only is the problem amenable to solution-the solution is, in fact, known. I will describe it, and then turn to two objections that have been raised against it in other arenas where exactly the same sort of problem arises.

2. ECPR: The Pro-Competitive License Fee and The Level-Playing-Field Theorem

The solution to the problem is a form of pricing that, in a significant sense, can be said to be nondiscriminatory as between licensor and licensee, even though there is no direct way of observing what the licensor can be said to be "paying itself" when it uses the item covered by copyright for itself. This price is referred to in the regulatory literature as the parity price, or as the price that follows the efficient component-pricing rule (ECPR). To understand the logic of what follows, it is convenient to think of the material covered by copyright as an input to some final

product, for instance, a script for a play whose performance is the final product, or a song to be included in a final-product CD. Then the license fee that is derived from the parity pricing formula can be shown to have the following three relevant features, two of which are no more than corollaries of the third:

Feature 1. Defining superior efficiency in the supply of a final product of a given quality as the ability to do so at a lower cost than a rival supplier, the parity license fee permits a supplier who can make more efficient use of the copyrighted material to provide the final product at a lower price than is financially feasible for a less efficient rival.

Feature 2. This parity price thereby ensures that an inefficient supplier of the final product cannot take the market away from the more efficient rival. This also means that the price does not exclude any efficient entrants whose activities require use of the material covered by copyright.

Feature 3. Feature 1 also means that the parity price is not discriminatory, in the following sense. Suppose the copyright owner uses the copyrighted material in a final product. Then the owner cannot underprice a rival final-product supplier who is also a licensee unless the owner is the more efficient supplier.

The parity-price solution to the problem of determining an efficient price for access to material covered by copyright is based on a result that has been called the "level-playing-field theorem".[1] This theorem has a very simple proof, given below. It asserts that only by using the following formulas [in equivalent equations (1) or (2) below] can we neutrally price a monopoly-owned input that is required by both the owner of the input and its final-product competitors, giving neither a market or pricing advantage in the market aside from any differential made possible by superior efficiency.

All of this can be described formally, giving explicit formulas for an efficient license fee. For brevity, we will refer to the owner of the copyright in question as "the IP (intellectual property) owner." We use the following notation:

$P_{f,i}$ = the IP owner, I's, given price per unit of final product;

$\min P_{f,c}$ = tthe competitor, C's, minimum viable price of final product;

P_i = the price charged for a license to use the IP, per unit of final product;

$IC_{r,i}$ = the incremental cost to the owner of the remaining final-product inputs, per unit of final product;

$IC_{r,c}$ = the corresponding figure for the competitor;

IC_i = the incremental cost to the IP owner of use of the IP by itself or by others.

As will be demonstrated presently, the efficient component-pricing rule requires that the licensing price satisfy either (and, hence, both) of two equivalent rules. The first is expressed in the formula:

$$P_i = P_{f,i} - IC_{r,i} \tag{1}$$

In words, license price = I's final-product price - I's incremental cost of remaining inputs.

Alternatively, and equivalently (as will be shown), the ECPR price of the bottleneck input must satisfy:

$$P_i = IC_i + \text{ the IP owner's profit per unit of final-product output.} \tag{2}$$

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[1] This result was originally contributed by Robert D. Willig, with the current author participating in dissemination and adaptation of the result to particular regulatory and analytic issues. For an early description of the analysis, see Willig (1979).

Equation (1) tells us that the ECPR establishes a tight link between the price, $P_{f,i}$, that the IP owner charges for its final product and the price, P_i, it charges its rivals for the license to use the IP. If incremental production costs do not change, efficiency requires that a rise in one of these prices must be matched dollar for dollar by a rise in the other. Equation (2) tells us that the efficient price of the license is the direct incremental cost to the owner of the IP resulting from use of the invention by others, plus the associated incremental opportunity cost. This opportunity cost is the loss of profit made possible because the IP has been licensed to the rival, which can then take final-product business away from the licensor. Thus, the second form of the ECPR asserts that the price of the license should equal any direct incremental cost incurred in supplying it to a competitor, plus any incremental opportunity cost incurred as a result of that transaction.[2] Standard economic analysis tells us that this is a proper way to price-that is, the price should equal marginal (incremental) cost including marginal (incremental) opportunity cost-so that, at least at first, this result should not be surprising.

Then the task is to prove the following:

Proposition 1. *The "Level-Playing-Field" Theorem. The parity price, as given by (1) or (2), for use of a bottleneck input such as a legally protected innovation is both necessary and sufficient in order for the "playing field" to be level. This term is defined to mean that, at the selected license fee, the maximum difference between the remunerative prices of the perfect-substitute final-products of the two firms, the IP owner (I) and its final product competitor (C), will be exactly equal to the difference in the firms' remaining incremental costs (other than the license fees), that is, any pricing advantage must equal the cost-saving made possible by any superior efficiency of the firm in question.*

Proof. The level playing field is defined by

$$\min P_{f,c} - P_{f,i} = IC_{r,c} - IC_{r,i} \tag{3}$$

That is, the lowest compensatory price the competitor can afford to charge should differ from the IP owner's price exactly by the amount (positive or negative) that the competitor's remaining costs are below the IP owner's. But the lowest price that is financially viable for the competitor clearly is given by:

$$\min P_{f,c} = P_i + IC_{r,c} \tag{4}$$

That is, the price must cover the IP licensing cost plus the remaining cost of supplying the final product (of course, including the cost of the required capital, made up of depreciation and normal competitive profit).

Comparing the two equations, we see at once that the level-playing-field condition (3) will be satisfied if and only if:

$$P_i = P_{f,i} - IC_{r,i} \tag{5}$$

But this is the parity-pricing formula (1). Thus, parity pricing is both necessary and sufficient for a level playing field. ∎

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[2]Notice that the relevant opportunity cost here is average profit forgone-the total profit forgone by the IP holder as a result of the transaction, per unit of final product sold. It is not the marginal opportunity cost, which is likely to be zero, because a profit-maximizing IP holder that produces the final product in which the innovation in question is used will produce the quantity of final product at which marginal profit falls to zero.

The parity-pricing formula (5) is also identical to the opportunity-cost variant of the rule, (2), since, by definition,

$$P_{f,i} = IC_i + IC_{r,i} + \text{I's profit per unit of final-product output}, \qquad (6)$$

or, by (5),

$$P_i = P_{f,i} - IC_{r,i} = IC_i + \text{I's profit per unit of final-product output}. \qquad (7)$$

This is the parity-pricing formula (2).

This completes the proof that parity pricing of an IP license is a necessary and sufficient condition for a competitively neutral license fee. It also follows that ECPR is necessary for economic efficiency in the provision of a final product by competing suppliers. If this rule is violated, a less-efficient supplier of the remaining inputs can win the competition for the business of supplying those inputs, instead of the task going to a more efficient rival. That is, violation of (1) or (2) permits a less-efficient supplier of the inputs other than the required IP to underprice its more efficient competitors.

One can add to this that ECPR mimics the prices of inputs such as intellectual property that would emerge in a fully competitive market where, as we know, the license fee would be set to cover the direct marginal cost of providing the input plus any marginal opportunity cost that is entailed in its provision by the owner to the licensee. This is clearly the same, for all practical purposes, as the parity pricing formula.[3] Hence, it can be asserted, that since the public interest is served by competitive market pricing, this can be presumed true of parity pricing as well. There are also arguments suggesting that these prices, ultimately, are consistent with the interests of all the immediately affected parties. Specifically, (3) tells us that if the licensee of the copyright-protected material prices final product at a level close to the price for that product charged by the copyright proprietor, then the former will retain any and all of the rent that derives from whatever superior efficiency it may possess, so that the ECPR price in that sense serves the interest of the licensee. But it also serves the licensor who is protected from loss as a result of the licensing, since the fee covers the opportunity cost. Moreover, in the process the copyright owner, in effect, reaches a make-or-buy decision on the final-product inputs other than those covered by copyright, because, as usual, it pays the copyright owner to buy rather than make those inputs if and only if their seller is the more efficient supplier and so provides them at lower cost than the copyright holder can provide them for itself. But that is exactly what ECPR accomplishes, giving the task of supplying those remaining inputs to the licensee if and only if it is the more-efficient provider.

3. Two Criticisms of Parity Pricing

Still, it is important to make clear, parity pricing of access to inputs hardly commands general approval. It has elicited considerable disagreement in the courts, the regulatory agencies and in political arenas, as well as in the economic literature.[4]

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[3]The only difference is the substitution in ECPR of incremental cost (the cost of the pertinent increment of output) for marginal cost.

[4]Among the most directly critical pieces are Economides and White (1995) and Tye and Lapuerta (1996). Laffont and Tirole (2000) are more sympathetic to ECPR, but nevertheless express reservations and propose what are at least theoretical alternatives. The discussions in the courts and before regulatory agencies are profuse and an assembly of references is beyond the scope of this article.

Much of the opposition to ECPR can be dismissed as mere pursuit of self-interest by those who hope to obtain prices more favorable than parity prices to themselves, even though the last argument of the previous section may suggest that such attempts are misguided, resting on misunderstanding of where the parties' true interests lie. Yet there remain two more-persuasive grounds for opposition. The first asserts that the public interest requires prices to be set at the levels required by the Ramsey theorem, and that those prices will generally differ from the ECPR levels. Second, the opportunity-cost element of the ECPR result is a major focus of current debate over use of a parity pricing standard in the regulation of firms deemed to possess monopoly power. The problem is that the bottleneck owner is a monopolist, and its final-product price may therefore be set at a level that yields monopoly profits. These monopoly profits are among the profits forgone as a result of sale of final product lost to a licensee who might have been unable to supply that product without the license. Consequently, these forgone monopoly profits constitute a part of the opportunity cost for which, according to (2) (at least without further modification of the ECPR regime), the bottleneck owner will be compensated when it sells the bottleneck input to a rival. In other words, the argument here is that ECPR is an instrument for the protection of any monopoly profit of the input supplier. Let us examine each of these arguments in turn.

3.1. **Ramsey Pricing Versus ECPR Pricing.** Ramsey pricing is defined at the second-best pricing for quasi-optimal resource allocation where scale economies prevent marginal-cost pricing from being feasible financially, or where it is deemed desirable to provide the supplier with some pre-selected level of economic profits other than zero. A vastly oversimplified derivation of the Ramsey theorem for the easiest relevant case will suffice to indicate how the problem arises.[5] Consider a vector of outputs whose quantities are $y = \left(Y^1, ..., Y^n\right)$; assume that the cross elasticities of the demands for these products are all zero; and that there is a well-defined social utility function $u(y)$. Then optimality requires maximization of the net utility:

$$\max \ u(y) - c(y), \tag{8}$$

where $c(y)$ is the total social cost of y (the opportunity cost of the resources needed to produce it) and the maximization is subject to the constraint:

$$\sum_{i=1}^{n} P^i Y^i - c(y) = k, \tag{9}$$

that is, the prices, P^i, are determined as to permit the supplier to obtain the fixed and pre-selected amount of economic profit k (where k may be zero).

Then the Lagrangian obviously is

$$L = u(y) - c(y) - v \left[\sum_{i=1}^{n} P^i Y^i - c(y) - k \right], \tag{10}$$

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[5] The oversimplifications here are numerous, and the mathematical argument is offered only to suggest the character of the logic. Among the oversimplifications are the implied direct comparability of social welfare and consumer expenditure, the failure to deal with the regularity conditions needed to guarantee the existence of a unique maximum, and avoidance of an inequality form of the revenue requirement.

with the first-order maximum conditions

$$u_j - c_j - v\left(P^j - c_j + Y^j\frac{\partial P^j}{\partial Y^j}\right) = 0 \quad \text{all } j, \tag{11}$$

in which the subscripts denote partial differentiation with respect to Y^j and by assumption, the derivative of any P^i with respect to Y^j is equal to zero whenever j and i are not the same. Taking consumer demand to obey the "price equals marginal utility" rule, this can be rewritten directly as

$$\left[P^j - c_j\right](1 - v) = vY^j\frac{\partial P^j}{\partial Y^j},$$

or dividing both sides by P^j and writing $-w = v/(1 - v)$ we obtain at once

$$\frac{P^j - c_j}{P^j} = -w\left(\frac{Y^j}{P^j}\right)\left(\frac{\partial P^j}{\partial Y^j}\right) = \frac{w}{E_j}, \tag{12}$$

where E_j is the price elasticity of demand of output j. In this simple case, we have obtained what is known, for obvious reasons, as the inverse-elasticity form of the Ramsey theorem, meaning that the second-best price of product j subject to a profit constraint is inversely proportionate to the elasticity of demand of that product. The intuitive explanation of the result is straightforward. It starts from the very well-known proposition that adoption of prices each of which is equal to the corresponding marginal cost is a necessary condition for "first-best" optimality in resource allocation. But from there the investigation goes on to ask, for the case where it is for some reason necessary to obtain revenues different from those that marginal cost prices would yield, what modifications from the first-best prices can yield the required revenues with minimum damage to consumer welfare? And the answer (where, for expository simplicity, I take the required revenue to be larger than that of MC prices) is to increase most the prices of the items whose demands are inelastic, since that will cause the least contraction in quantities demanded and hence yield the largest contributions to revenue from a given rise in price. In other words, Ramsey pricing can be said to yield the needed revenue via the smallest overall distortion of prices from their marginal-cost levels.

It should be clear from direct comparison that the Ramsey rule (12) and the ECPR, as contained in (1) or (2) that they do not generally yield the same price figures and are, consequently, not consistent. The Ramsey approach assigns a primary role to the configuration of demands, while it takes the cost function to be given. Thus, it pays no attention to the requirements of efficiency in production. The reverse is true of ECPR, in which demand plays no explicit role, and where the focus is upon ensuring that the task of product supply is allocated to those firms that can carry out the task most efficiently. Even the data the two approaches take into consideration are not the same, so it is clear that they will generally yield different results.

Since both of these rules are second-best, it may not even be possible to offer a general ranking of their relative preferability. One can argue that the Ramsey principle is far more difficult to put into practice, because it requires up-to-date estimates of all the pertinent demand elasticities and cross-elasticities, clearly a requirement that it is virtually impossible to satisfy in practice. Not that utilization of ECPR is a trivial and easy process. But it can be done and it has in fact been carried out and presented to courts and regulatory agencies, at least to a

reasonable degree of approximation (though not without strong criticism by those on the opposite side in the litigations).

More to the analytical point, one can argue that the Ramsey rule is not clearly superior, since by itself it patently is consistent with inefficiency in the supply process. Indeed, it has been contended that legitimate use of the Ramsey rule should confine its application to the prices of final products and that input prices should be affected only by those consequences of the Ramsey rule for the prices of the associated final products. Since input demands are derived demands, the preferences of final consumers should enter the determination of input prices through that derivation process. Or put another way, once a Ramsey calculation has determined what modifications in final-product prices should be adopted in order to meet the revenue requirement, it would damage welfare to add contributions to the revenue requirement by extracting further contributions from the purchasers of inputs. I am not prepared to argue that these observations settle the issue, but it suggests that the ideal solution to the problem of copyright fees for the use of the protected material as input is to use the Ramsey rule as the standard for the final-product prices and to use ECPR for the fees to the input users.

3.2. **ECPR as Protector of Monopoly Profits.** A far-more frequent criticism of ECPR is the claim-and it is one that has considerable validity-that parity pricing preserves any monopoly profits that may be present, and extends their reach from the exploited final consumer to the licensee user of the pertinent input. Once again, the argument is straightforward. The ECPR requires input pricing to include any opportunity cost that the licensor incurs if the licensee is enabled by the licensing transaction to take business away from the input owner. But if the owner has any monopoly power, and uses it to extract a monopoly profits from its own sales of final product, then any loss of such a sale must entail giving up the monopoly profit on that sale. Since the parity price "makes the input owner whole," by restoring any profits forgone in the transaction, the parity price will clearly restore any monopoly profit component of final-product price that the competition of the licensee might otherwise have eliminated.

The defenders of ECPR, including Willig and the present author, have long recognized the justice of this criticism in general. They have stated repeatedly that legitimate use of ECPR must take it into account. However, they have taken the position that modification of input license fees is not the proper way to deal with the problem. Indeed, that follows from the level-playing-field theorem, which tells us that any deviation from the parity price is an invitation to inefficiency in supply, that is, in the choice of supplier that the market will thereupon select for the role of final-product supplier. The problem is a real one, but its source is to be found in the prices of the final products, not in the prices of the input-use licenses. It is concluded that for ECPR to serve the public interest it must be included in a package that also contains measures that eliminate the monopoly profits on the final product by means such as appropriate price ceilings or other rules constraining the setting of final-product prices. Only with the aid of such a package can one really protect consumers from exploitation, prevent the allocative inefficiencies that monopoly prices introduce and ensure efficiency in the roles assigned to licensors and licensees. The conclusion here is that ECPR is, indeed, an instrument that is ineffective as a means to eliminate monopoly profits. But this is surely not the

purpose for which the instrument was designed. The rule could just as easily be criticized for inability to cure venereal disease or eliminate pollution of rivers.

But the answer to the criticism that ECPR preserves monopoly profits is even more direct in the case of copyrights and patents. After all, a central purpose of these instruments is to ensure the opportunity to earn appropriate incentive payments to creative individuals such as composers and inventors, via payments presumably legally permitted to exceed what is required for restitution of costs incurred in the creative process. It is true that in the United States the courts have held that the earnings generated by patents or copyrights cannot automatically be deemed to entail monopoly earnings. What constitutes monopoly profit in the analogous case of bottleneck industrial inputs can be interpreted simply as a socially desirable incentive for innovation protected by the intellectual property laws in the case where the bottleneck is an IP that is constituted by an innovation.

Still, a Schumpeterian point of view would lead most economists to agree that excesses of prices over some pertinent cost levels that are obtained by restriction of competition via copyright or patent protection constitutes a temporary monopoly earning, albeit one that is justified by the requirements of the public interest. If these be monopoly earnings they surely can be deemed to constitute virtue, rather than vice. Then if ECPR serves to preserve those earnings when the protected materials are used as inputs, there is no reason to deplore this result.

One last observation is pertinent here. Licensees in other arenas often complain that ECPR fees are higher than seems justified. After all, as we have seen, ECPR fees ensure that a final-product producer for whom access to the protected inputs is essential, and who is no more efficient than the licensor, will earn zero economic profit, while the licensor may earn more, and possibly considerably more, without sharing any of this surplus with the licensee. Of course, in the circumstances, it is not clear on what grounds the licensee, with its lack of superior efficiency, can lay claim to any share in those earnings. But here it may also not be irrelevant to point out that if Ramsey pricing rules for the license fees were substituted for the ECPR, the price whose magnitude is complained about is likely to become still higher. For under the inverse-elasticity rule, as we have seen, the less elastic the demand for any affected product, the larger the Ramsey adjustment will be, other things being equal. In particular, in a Ramsey regime, if there is a product whose elasticity of demand is zero, it will be assigned the entire burden of meeting the revenue requirement. But where material covered by copyright is indeed essential for the activities of the supplier of final product, then, at least within the relevant range, the demand can be expected to be extremely inelastic, and therefore is apt to lead to a license fee well above that under ECPR.

Finally, another word must be said about the special scenario upon which the ECPR solution focuses. The underlying story is that of a copyright owner who competes with licensees in a downstream market. But, in the arts, the item covered by copyright does not always serve as an input in any final product market, and holders of such copyrights often have no intention of competing in such a market (e.g., the songwriter who cannot sing). The last case still fits directly into the analysis if the composer forms a partnership with a singer, but that still is surely not the general case. Instead, we can perhaps interpret the scenario hypothetically, as dealing with the prices that would be appropriate if, contrary to fact, the composer were to sing. But perhaps, in such cases in which our scenario does not hold, one must return to Ramsey pricing as the second-best solution.

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