Optimal Sanctions for Antitrust Violations

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Although economic analysis of the common law, crime, and legal decision making are relatively recent areas of research in the field of law and economics, economic analysis of antitrust, particularly the analysis of business practices described in antitrust cases, has been widespread and uncontroversial for many years. What has received less attention is the use of economics to examine antitrust enforcement itself.[1] This involves analyzing, for example, what is an antitrust injury, the appropriate sanctions for such an injury, the choice between public and private enforcement of antitrust laws and related questions on standing to sue, and the relevance of the antitrust victim's conduct to his ability to recover damages. In this paper I apply economics to some of the above issues.

Economic analysis of antitrust enforcement builds on the pioneering papers of Gary Becker and Ronald Coase.[2] Becker's paper was the first formal analysis of optimal penalties and probabilities of apprehension and conviction for criminal offenses. He showed

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[1] There have been a number of recent contributions, however. These include K. ELZINGA & W. BREIT, THE ANTITRUST PENALTIES: A STUDY IN LAW AND ECONOMICS (1976); R. POSNER & F. EASTERBROOK, ANTITRUST: CASES, ECONOMIC NOTES AND OTHER MATERIALS 545-72 (2d ed. 1981); W. SCHWARTZ, PRIVATE ENFORCEMENT OF THE ANTITRUST LAWS (1981); Block, Nold & Sidak, *The Deterrent Effect of Antitrust Enforcement*, 89 J. POL. ECON. 429 (1981); Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U. CHI. L. REV. 263 (1981); Easterbrook & Fischel, *Antitrust Suits by Targets of Tender Offers*, 80 MICH. L. REV. 1155 (1982); Easterbrook, Landes & Posner, *Contribution Among Antitrust Defendants: A Legal and Economic Analysis*, 23 J.L. & ECON. 331 (1980); Landes & Posner, *Should Indirect Purchasers Have Standing To Sue Under the Antitrust Laws? An Economic Analysis of the Rule of* Illinois Brick, 46 U. CHI. L. REV. 602 (1979); Page, *Antitrust Damages and Economic Efficiency: An Approach to Antitrust Injury*, 47 U. CHI. L. REV. 467 (1980); and Note, *Rethinking Antitrust Damages*, 33 STAN. L. REV. 329 (1981).

[2] Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169 (1968); Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

that when the costs of enforcement are positive, it is generally not optimal to reduce the number of violations to zero. More surprisingly, Becker also showed that even if enforcement costs are zero, it is still not desirable to deter all violations because some offenses—where the gain to the offender exceeds the harm to the victim—are efficient. The concept of an efficient violation is the key to determining the optimal antitrust penalty. Although Coase's paper is usually cited for the proposition (known as "Coase's theorem") that in the absence of transaction costs alternative liability rules do not affect resource allocation, it marked the beginning of systematic study by economists and academic lawyers of the effects of alternative liability rules on resource allocation in high transaction cost settings. Because an antitrust violation is equivalent to an intentional tort, one can analyze many antitrust enforcement issues by applying the economic analysis of tort liability.

This paper is divided into three parts. The first part presents an economic analysis of optimal antitrust penalties. The second applies the analysis to several topics in antitrust including joint ventures, the social cost of monopoly, cartels that face competition from fringe firms, and predatory pricing. The final section applies the economic analysis of intentional torts to antitrust enforcement.

I. The Theory of Optimal Sanctions

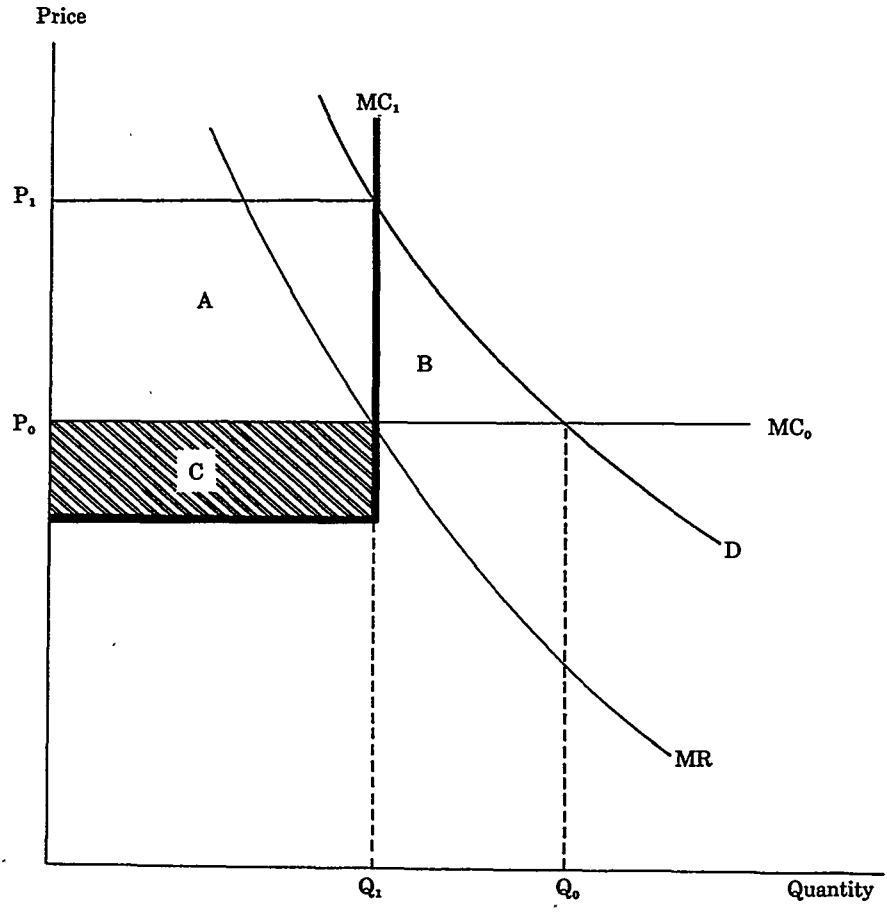
A. The Basic Model of Optimal Sanctions

I begin with a simple example that brings out the basic intuition of an an optimal sanction. In Figure 1, industry marginal cost, MC_0, is constant and equal to the supply curve under competition; the competitive output and price equal Q_0 and P_0; and a cartel would reduce output to Q_1 and raise price to P_1. I assume further that a cartel would impose a deadweight loss of \$50 (area B) and an aggregate overcharge of \$100 (area A). Total harm to consumers equals \$150, the sum of the aggregate overcharge and deadweight loss.

The standard economic rationale for making a cartel illegal is not that it charges too high a price or that it redistributes income from consumers to cartel members, but that it restricts output, causing a deadweight or efficiency loss (area B)—a loss to consumers without an offsetting gain to producers. To prevent this loss one can penalize cartel members by an amount sufficient to deter them from organizing a cartel in the first instance. To simplify the analysis of optimal penalties, I assume the following: all parties are risk neutral; enforcement costs, including legal fees, court costs,

and time costs, are zero; the penalty is a monetary fine; and, provisionally, the probability of apprehension and conviction is fixed and equal to one.[3] Given these assumptions, what is the optimal penalty?

FIGURE 1



One possible penalty is the social or deadweight loss of $50.

[3] I also assume that consumers do not take account of a possible damage recovery in deciding how many units of the good to purchase. If they did, this would complicate the analysis. Then, one would have to consider both consumer anticipations of a recovery and the response of the cartel, knowing that consumers adjust their purchases in light of the prospect of an antitrust recovery. This is considered briefly in Landes & Posner, *supra* note 1, at 606-08, and *infra* at notes 49-54 and accompanying text.

The argument might be that since enforcement costs are zero and the penalty is certain, an offender should be made to pay the deadweight or social cost of his offense. The difficulty with this rule is that despite the penalty, it still may be profitable to form the cartel. In our example, a $50 fine will be too low. Firms would not forgo cartel profits of $100 to avoid a $50 fine. Consider an analogy to theft. One would not deter a thief from stealing $100 cash by a penalty equal to the lower social cost of the theft, measured by the monetary equivalent of the services the victim forgoes by holding lower cash balances in response to the possibility of theft.

Alternatively, why not impose a fine many times greater than the social cost? A $10,000 fine surely would deter firms from forming a cartel to earn a $100 profit. Given our assumption that the cartel causes a $50 deadweight loss, a $10,000 fine or a $10 million fine would yield the correct outcome. In general, however, large fines will not yield the correct outcome.[4] A fine of $10,000 or even a fine of $151 in our example could be too large because deterrence alone is not the aim of penalties. The purpose of penalties, following Becker's model of crime and punishment, is to deter inefficient offenses, not efficient ones. Stated differently, the optimal level of offenses is generally greater than zero.

To explain, suppose the cartel is able to reduce production costs, but cost savings can be obtained only by restricting output.[5] Returning to Figure 1, let MC_1 denote the cartel's marginal cost. Notice that MC_1 is below MC_0 until the output Q_1, and at Q_1 the cartel's marginal cost curve becomes perfectly inelastic. Admittedly, the assumption of a fixed production capacity for the cartel at Q_1 is unrealistic. It has the advantage, however, of simplifying the explanation of an optimal fine. The aggregate cost saving from the cartel equals the shaded area C. If C is greater than $50, the cartel's offense is efficient: the offense produces greater cost savings than the deadweight loss it imposes by restricting output. For example, if C were $51, there is a net gain of $1 from the cartel.

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[4] Fines of this magnitude raise two problems not considered in this paper. The first is the problem of marginal deterrence: if all fines are large and differences between them are small relative to differences in harm, offenders tend to commit the most harmful offenses. *See* Stigler, *The Optimum Enforcement of Laws*, 78 J. POL. ECON. 526, 527-28 (1970). The other is the possibility of legal error, which combined with large fines can deter socially valuable business behavior. For an application of legal error to antitrust enforcement, see Polinsky & Shavell, *Contribution and Claim Reduction Among Antitrust Defendants: An Economic Analysis*, 33 STAN. L. REV. 447 (1981).

[5] The question of how these savings could arise is discussed *infra* at notes 11-16 and accompanying text.

Because the cartel's total gain is $151 (equal to the $100 overcharge plus the $51 cost savings), a fine greater than $151 would deter its formation. This outcome would be inefficient, deterring a socially beneficial cartel. Under other circumstances, a fine less than $150 would be inefficient. For example, if C were $49 and the fine $148, the cartel would be formed ($149 profits minus $148 fine leaves the cartel with a net gain of $1), yet society would be worse off by $1 because the deadweight loss exceeds the cost savings made possible by the cartel.

The rule for determining the optimal fine or damage award is simple to state: the fine should equal the net harm to persons other than the offender.[6] In our example this harm is $150, the $100 overcharge plus the $50 deadweight loss. If we follow the net harm rule, the offense will only take place when the gain to the offender exceeds the net harm to others, and the cartel will be deterred when the gain is less than the harm.[7]

I note several additional points.

1. The imposition of a penalty in the example of Figure 1 does not depend on an actual increase in price above P_0. If it did, a cartel could avoid any antitrust liability by reducing output to Q_1 but maintaining price at P_0, for example, by rationing demand on a first-come-first-served basis.[8] Suppose the cartel's cost savings (area C) equaled $10. Without a penalty, the cartel could reap profits equal to its $10 cost savings, yet the arrangement would be inefficient; it would produce a net loss of $40, equal to a $50 deadweight loss minus a $10 cost savings. In contrast, the net harm rule yields an efficient outcome. Here the net harm is the $50 deadweight loss. Assuming no overcharge, a $50 penalty deters the inefficient cartel (whose cost saving is less than $50) but not the efficient one (whose cost saving is greater than $50).

2. Suppose there is no capacity constraint at Q_1 in Figure 1 and the cartel lowers marginal cost everywhere to MC_1. Using the net harm rule, the fine equals the aggregate overcharge plus dead-

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[6] I use the term "net" harm to allow for possible benefits to third parties that result from offenses. This has important implications for optimal penalties which I explore *infra* in part II-B.

[7] Formally, the solution to the optimal line in Figure 1 is as follows: Let B=deadweight loss to consumers from reduced output; C=cost savings brought about by a reduction in output; F=fine; and A=monopoly profit (before taking account of C and F). We want to choose a value for F such that A + C — F (=net monopoly profit) is positive only if C>B. As described in text, F = A + B, then substituting (A + B) for F, A + C — (A + B)>0 only if C>B.

[8] I ignore in this example the monetary equivalent of the costs imposed on buyers by the rationing scheme.

weight loss (areas A + B) only when output falls below the initial competitive output Q_0. This would lead the cartel to produce at least Q_0 units of output. Assuming it produces Q_0, the net harm and hence fine would be zero, and net profits would equal the aggregate cost savings up to Q_0. Any lower output would lead to a fine and to lower net profits.[9] Still, one might view Q_0 as a "second-best" outcome compared to the greater output where MC_1 intersects the demand curve. But it is unclear how to use antitrust penalties to induce the cartel to produce this more efficient output. The required penalty (which would equal the overcharge and deadweight loss computed from the point where MC_1 intersects the demand curve) would remove any incentive for firms to form the cartel that creates the cost savings.[10]

3. The optimal fine or damage rule must be modified when the probability of apprehension and conviction is less than one and enforcement costs are positive. In such circumstances, the fine would equal net harm (which includes enforcement costs per case) divided by the probability of apprehension and conviction. In Figure 1, for example, if enforcement costs per case are $10 and the probability of conviction is one-third, the cartel causes harm of $160 ($100 overcharge plus $50 ordinary deadweight loss plus $10 enforcement costs), and the fine would equal $480 ($160 divided by ⅓). Since the expected value of the fine is $160 (480 x ⅓) firms would form a cartel only if their cost savings were greater than $60. This too is the efficient outcome because the offsetting deadweight loss, including enforcement costs, is $60.

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[9] Let C equal the cost saving up to Q_0 and let k equal $Q_1/Q_0 < 1$ where Q_1 is any output less than Q_0. At Q_1 the cartel's profit equals A + kC - F. Under the net harm rule, the fine is (A + B). Substituting A + B for F yields a profit kC - B, which is less than C. Since the cartel's net profit is C at Q_0 (because the fine is zero) the cartel prefers Q_0 to any output Q_1 less than Q_0. Notice that if the reduction in marginal cost is sufficiently great and the demand curve sufficiently elastic at Q_0, the cartel's profit-maximizing output may be greater than Q_0.

[10] Patent pooling presents a comparable problem. Consider a group of firms that have valid but competing patents that enable the industry to lower marginal costs everywhere from MC_0 to MC_1. Absent cross-licensing and pooling (perhaps because of antitrust liability) the royalty rate would be close to zero, and firms would produce at the point where MC_1 intersects the demand curve. With pooling, the royalty rate would be positive, output lower, and price higher. The argument for pooling (analogous to the assumption in the text that the cartel "causes" the cost savings) is that its absence would sufficiently reduce the expected returns to innovation and, therefore, discourage firms from investing the resources necessary to develop the innovation.

B. Sanctions for a Cost-Saving Cartel

I have used the example of an efficient cartel to explain the meaning of an optimal antitrust penalty. I have not explained, however, why the cost savings shown in Figure 1 could not have been achieved without the cartel and without restricting output from Q_0 to Q_1. Consider the following example.

Suppose a group of firms pump oil from a common pool, and no firm has a property right to the oil until it is removed from the ground. This example illustrates a well-known economic problem: in the absence of property rights to a scarce resource, competition carries production beyond the efficient level because no firm takes account of the external technical diseconomies it imposes on other firms. Here an agreement among firms to restrict output and raise price can lead to a more efficient output level.[11] At the same time, if firms are free from antitrust liability, they may restrict output even further, possibly yielding a less efficient outcome than the precartel equilibrium. An antitrust penalty equal to the net harm will give firms an incentive to restrict output, but only to the efficient level.

Figure 2 illustrates the problem. To simplify, I assume that firms are equally efficient, each firm produces one unit of output, and there is free entry. Competition among equally efficient firms and free entry will eliminate any profits. Hence firms will enter the industry until each firm operates where its cost (equal to its average cost) equals price. This occurs at the output Q_0 and price P_0, where demand intersects the industry supply schedule, S. S is also the industry average cost curve because each point on it measures the firm's cost of producing one unit of output. As demand shifts to the right, new firms will enter and impose external technical diseconomies on the old firms, raising their cost. The entrant, however, only considers its cost and not the added cost it imposes on other firms. Thus, marginal cost of producing an additional unit of output (via a new entrant) is greater than average cost (the cost incurred by the new entrant). Therefore, at Q_0 the value of an additional unit of output, measured along the demand curve, is less

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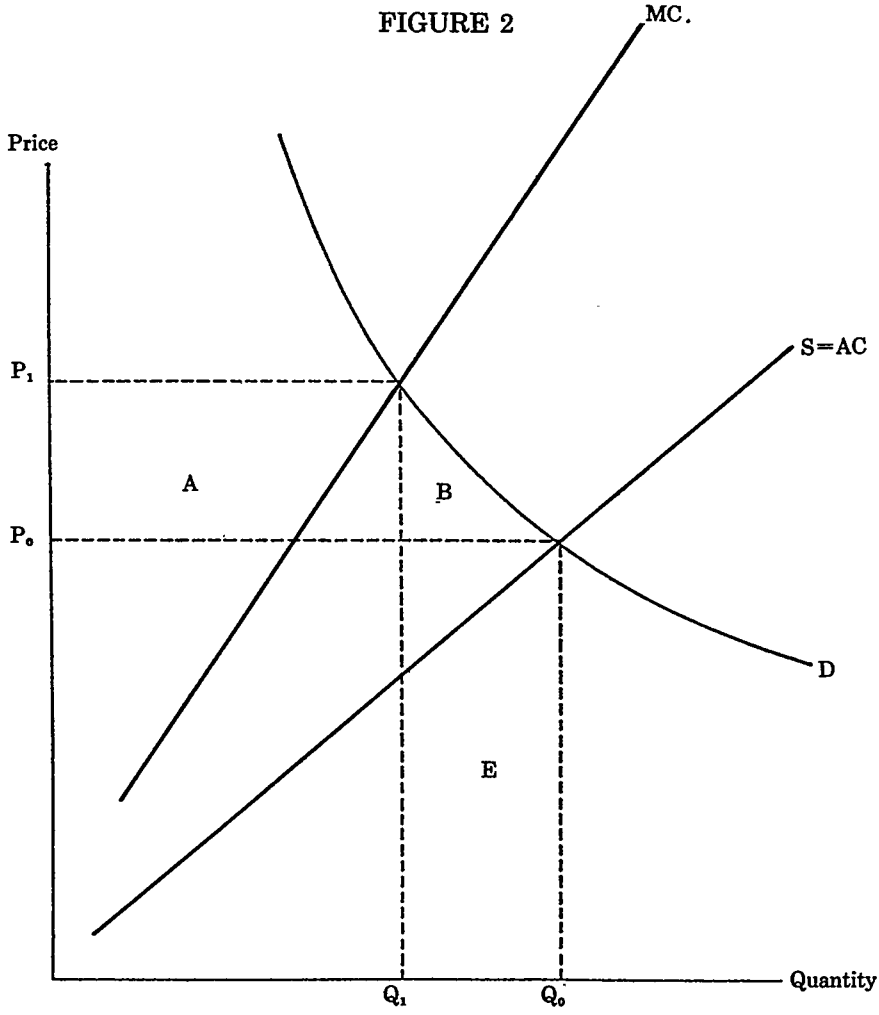
[11] The classic article on this subject is Knight, *Some Fallacies in the Interpretation of Social Cost*, 38 Q.J. Econ. 582 (1924), *reprinted in* Readings in Price Theory 160 (G. Stigler & K. Boulding eds. 1952). Knight analyzed the problem of transporting goods along a narrow but well-graded road. *Id.* at 584-88. The main point of Knight's article was to show that if someone owned the road, he would charge a price for access that led to its efficient use. An alternative mechanism to achieve efficiency is for firms to agree to limit their use of the road.

than the marginal cost of producing that output. Observe that Q_0 exceeds the efficient output level Q_1 which occurs when demand intersects marginal cost. Thus, an agreement among firms to restrict output to Q_1 would yield a more efficient allocation of resources. But in the absence of a fine, firms would have an incentive to restrict output below Q_1, to the point where marginal revenue equals marginal cost. This would produce the usual deadweight loss from a cartel or monopoly.

FIGURE 2



The solution is to set a penalty small enough to provide firms with an incentive to reduce output to Q_1 but not so small that they reduce output below Q_1. That fine equals the aggregate overcharge plus deadweight loss measured from the initial output Q_0. This is

the same net harm rule analyzed earlier. I will give an intuitive explanation for this result.[12] If firms continue to operate at Q_0, there is no fine and each firm would earn zero profits (price equals average cost by assumption). Firms would not operate at an output greater than Q_0 because average cost would exceed price and the firms would lose money. Now suppose the firms form a cartel and restrict output to Q_1, the point at which marginal cost equals price. Under the net harm rule presented in this paper, the cartel will be assessed a fine equal to the deadweight loss and net overcharge. After deducting the per-unit overcharge fine of $P_1 - P_0$,[13] each firm will receive the same net price as it did when output was Q_0. On the units no longer produced, Q_0-Q_1, firms forgo revenues equal to P_0 times Q_0-Q_1[14] and in addition incur penalties equal to the deadweight loss from restricting output.[15] In short, the revenue

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[12] A formal proof of this result follows: Let the fine (F) equal the sum of the aggregate overcharge and deadweight loss to consumers measured from the initial zero profit equilibrium Q_0 and P_0. Note that at Q_0 and P_0 the fine equals zero, and it becomes positive and increases as the cartel restricts output and raises price. We can write F as

$$F = (P\text{-}P_0)Q + \int_Q^{Q_0} (P\text{-}P_0)\, dQ$$

where P and Q are the cartel's price ($>P_0$) and output ($< Q_0$) respectively. The cartel's profit (π), after deducting F, is $\pi = PQ - C(Q) - F$, where PQ is the cartel's total revenue and C(Q) is its cost function. Substituting for F yields

$$\pi = P_0Q - C(Q) - \int_Q^{Q_0} (P\text{-}P_0)\, dQ$$

The first-order condition for maximizing profits is obtained by taking the derivative of π with respect to Q and setting it equal to zero. This yields $\partial\pi/\partial Q = P_0 - C' + (P\text{-}P_0) = 0$ or $P = C'$, where C' is marginal cost and P is the price along the demand curve in Figure 2. The cartel maximizes profits by setting price equal to marginal cost—i.e., producing at the efficient output Q_1 in Figure 2.

I add that there is no single unique value for the optimal fine. A fine equal to the aggregate overcharge plus deadweight loss computed on *any* initial point between (P_0, Q_0) and (P_1, Q_1) will yield the efficient outcome. For example, imposing a fine on the cartel only if it reduces output below the efficient level, Q_1, will also yield the efficient solution. *See supra* text following note 8.

[13] At Q_1, price is equal to P_1, but after deducting the overcharge fine of $P_1 - P_0$ the net price will be P_0, the same net price as when output was Q_0.

[14] Represented by Area E in Figure 2.

[15] Represented by Area B in Figure 2.

loss to firms from restricting output is the area under the demand curve between Q_1 and Q_0 in Figure 2.[16] At the same time, however, costs fall by the area under the marginal cost curve between Q_1 and Q_0. Since marginal cost is above the demand curve everywhere in this interval, costs fall by more than revenues decline. Therefore, by restricting output the cartel earns a profit equal to the difference between the areas under the marginal cost and demand curve in the Q_0-Q_1 interval.

I have shown that firms earn positive profits at Q_1 compared to zero profits at Q_0, even though they incur an antitrust penalty at Q_1. Hence the penalty would not deter firms from forming the cost-saving cartel. To show that the cartel will produce at Q_1, I must show that Q_1 is the profit-maximizing output, given the penalty. If the cartel were to produce more than Q_1, its additional revenue would consist of two components: (1) a net price P_0 (after deducting the overcharge penalty) on each unit beyond Q_1, and (2) a reduction in the penalty for deadweight loss for the additional units produced. The sum of (1) and (2) is the area under the demand curve beyond Q_1. This is less than the costs of producing the additional units, the area under the marginal cost curve in Figure 2. Hence profits fall when output is greater than Q_1. Similarly, when firms lower output below Q_1, profits decline because costs fall by less than do revenues. In short, the cartel will produce at the efficient output when the penalty equals the aggregate overcharge and deadweight loss computed from the output Q_0 and price P_0.

II. Applications of the Model

Setting the expected fine equal to the net harm is a simple and, once explained, obvious rule for bringing about the efficient level of offenses.[17] Yet as applied it yields some surprising results, as the following examples show.

A. Joint Ventures

Assume competitors form a joint venture to sell their product. Suppose the joint venture has characteristics that one typically associates with a cartel; for example, competitors set up a common sales agency that makes all sales, or they agree not to sell in each

[16] This area under the demand curve is the sum of areas B and E.

[17] To simplify the exposition I continue to assume, unless stated otherwise, that the probability of apprehension and conviction is one and enforcement costs are zero.

other's territory. At the same time, assume that the cost savings associated with the joint venture are so large that the entire marginal cost curve shifts down, thereby increasing output. In terms of Figure 1, output now is greater than Q_0, and net harm, relative to the previous competitive output, is negative. Does this imply that the optimal fine should be zero and the joint venture does not violate the antitrust law? In general the answer is "yes," though two situations must be distinguished: the first is a hypothetical example; the second is the recent ASCAP litigation.[18]

First, suppose that at the time the automobile was introduced, automobile manufacturers formed a common sales agency enabling them to raise price and restrict output. Assume that the cost savings in transportation made possible by the substitution of the automobile for the horse and carriage were so large that in terms of Figure 1 (where the horizontal axis now denotes transportation services) cartel output is greater and price lower than the normal price and output of the pre-automobile period.

Second, consider ASCAP, an association of composers, lyricists, and publishers of music, which acts as a clearing house between its members and those who wish to perform copyrighted works from ASCAP's repertory. Under the typical arrangement between ASCAP and a user, such as a radio or television station, ASCAP issues a nonexclusive blanket license that permits the licensee to perform all of the songs in ASCAP's repertory for an annual fee without any limitation on the number of times each song is performed. Because ASCAP acquires only nonexclusive rights to its members' compositions, each member still retains the right to license performance rights for his compositions. Thus, a user can choose between an ASCAP license or a direct license of performance rights from the copyright holder of songs he wishes to perform.[19] The main advantage of ASCAP's blanket license is greatly reduced transaction and monitoring costs compared to the cost of negotiating and monitoring contracts with individual copyright holders to acquire performance rights to the thousands of songs used each year. In Figure 1 the horizontal axis would denote public performances, and the higher marginal cost curve would represent cost conditions when performance rights are licensed individually. With the blanket license, the marginal cost curve would be lower and coincident with the horizontal axis, resulting in a greater out-

[18] Broadcast Music, Inc. v. CBS, 441 U.S. 1 (1979) (commonly known as the *ASCAP* case).

[19] ASCAP's licensing system is described in *id.* at 4-5.

put and lower price (at the margin), compared to the case of individual licensing of performance rights.[20]

In both the automobile and ASCAP examples, output is greater and price lower than at the original competitive equilibrium position. Does it follow, therefore, that the antitrust law should treat both situations identically? And should the optimal fine be zero to free each group of any liability?

In the automobile example, the commercial development of the technology, not the common sales agency, is the source of the reduction in transportation costs. Comparing the level of output when both the technology and the sales agency exist to its level when both are absent would be relevant only if the sales agency, not the automobile, caused the reduction. The relevant comparison to make for determining whether there is an antitrust injury is between output with and without the common sales agency, *given* the innovation. Without the sales agency, price would have been even lower and output even greater. Therefore, the common sales agency of automobile manufacturers should be treated as an ordinary cartel. The penalty would equal the aggregate overcharge plus the deadweight loss computed on the assumption that the automobile would exist in the absence of the cartel.

In contrast, optimal damages are zero and there should be no antitrust liability in the *ASCAP* case. In *ASCAP* the source of the innovation was the blanket license that reduces transaction and monitoring costs. This makes the blanket license a more attractive option than the alternative of acquiring performance rights individually.[21] Without ASCAP and the blanket license's pooling of performance rights, costs would be higher and output of musical performances would be lower.[22]

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[20] In effect, the blanket license is an example of two-part pricing: an access charge for performing songs in ASCAP's repertory, and a variable charge equal to zero for additional performances. Since the licensee is entitled to unlimited use, he will expand the number of performances until the added revenue from an additional performance is approximately zero. Because the social cost of using an existing composition is zero, this leads to efficient utilization of compositions (assuming the access charge is not so high that it discourages a potential user from acquiring licenses). This and other efficiency features of the blanket license, however, are not considered here.

[21] The fact that licensees choose the blanket license over the individual licenses means that the charge for the blanket license is less than the costs they would incur if they acquired performance rights individually.

[22] Consider the distinction between a patent pool of competing and complementary or blocking patents. A pool of competing patents is similar to a cartel among automobile manufacturers. By agreeing not to challenge competing patents, the pool enables patent holders to restrict output and increase royalties. In the case of blocking patents, the pool is what enables firms to take advantage of the full benefits of the innovation. Without a pool either

The treatment of the two examples under the antitrust laws is consistent with the economic analysis. The automobile manufacturers would be found guilty of a per se violation of section 1 of the Sherman Act. In the *ASCAP* case CBS argued that the blanket licenses of ASCAP and BMI[23] fixed prices and therefore were per se violations of the antitrust laws.[24] In rejecting this argument, the Supreme Court focused on the transaction cost savings of the blanket license and the alternative of CBS negotiating individual licenses with copyright holders. The Court held these considerations required that the case be judged under the rule of reason, a standard that balances the efficiency or output-enhancing features of a practice with possible restraints on competition.[25] To state this conclusion in terms of the analysis I have developed in this paper, the ASCAP combination causes no net harm, and it is essential to the cost savings. The automobile sales agency, however, is not essential to the cost savings, but it is the source of harm to consumers.

United States v. Sealy, Inc.,[26] illustrates another example of an output-enhancing joint venture. In *Sealy* a group of small mattress manufacturers (Sealy licensees) adopted a common trademark and allocated exclusive territories among themselves to manufacture and sell mattresses under the Sealy trademark. The licensees imposed no territorial restrictions on their sales of non-Sealy mattresses. The licensees accounted for about twenty percent of mattress sales in the United States.[27] The Supreme Court held the territorial allocation to be part of a horizontal scheme to fix prices and found it unlawful. Although territorial allocation

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the innovation would not be developed commercially or potential licensees would incur large transaction costs to acquire rights to individual patents. This is similar to the added costs that radio and television stations would incur if they acquired performance rights from individuals instead of from ASCAP.

[23] BMI provides essentially the same service as ASCAP. *See* Broadcast Music, Inc. v. CBS, 441 U.S. at 5.

[24] *Id.* at 6.

[25] *Id.* at 2. On remand, ASCAP's blanket license policy was found lawful. *See* CBS v. ASCAP, 620 F.2d 930 (2d Cir. 1980), *cert. denied*, 450 U.S. 970 (1981). In subsequent litigation against ASCAP, a district court has held unlawful the blanket license acquired by television stations because it found that, unlike CBS, the local television stations did not have a commercially realistic alternative to the blanket license. Buffalo Broadcasting Co. v. ASCAP, 546 F. Supp. 274 (S.D.N.Y. 1982). In terms of my analysis this implies that the cost savings from the blanket license were even greater for television stations than for CBS. For this reason, and because the blanket license did not restrict output, the economically correct result would have been to hold lawful the blanket license in *Buffalo Broadcasting*.

[26] 388 U.S. 350 (1967).

[27] R. POSNER & F. EASTERBROOK, *supra* note 1, at 248.

among competitors is a classic antitrust device, its effects here were different. It provided an incentive for each licensee to promote and develop the Sealy trademark in its territory. Each licensee would be constrained from exercising market power within its territory both by non-Sealy manufacturers and other licensees. Viewed in this way the practice in *Sealy* is equivalent to a cost reduction (the trademark lowered the cost of providing information to consumers) that lowers price and increases output. In short, the Sealy arrangement enabled a small group of firms to expand output by overcoming free-rider problems associated with developing a trademark or brand name and therefore optimal damages are zero. Since the net harm was negative, the correct result would have been no liability.

B. The Social Cost of Monopoly

It has been argued recently that the social cost of monopoly is far greater than just its deadweight loss.[28] Because firms spend resources to monopolize a market and to maintain their monopoly position, part of the aggregate overcharge to consumers is transformed into a resource expenditure. In the limit, these expenditures could equal the present value of the monopoly profits. Because these expenditures produce nothing of value, they add to the social cost of a monopoly. For example, in Figure 1 social cost could be greater than \$50 (area B) and possibly as high as \$150 (area A + B). Will a social cost greater than deadweight loss have any effect on the optimal sanction analysis?

Recall that the optimal fine equals the net harm to the community excluding the violator. It is irrelevant, therefore, how cartel members spend their profits. They may spend \$100 or \$1 organizing and maintaining the cartel; either way, the optimal fine is \$150. This implies further that one does not have to know the gain to the offender to set the optimal fine. Stated differently, the profitability of a violation is not a separate factor in setting the optimal fine. Information on profitability is relevant only insofar as it conveys information on net harm.

I can give a formal explanation of why the optimal fine remains at net harm. Imagine that real resources of \$100 are spent on organizing and enforcing the cartel depicted in Figure 1. Al-

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[28] *See* Posner, *The Social Costs of Monopoly and Regulation*, 83 J. POL. ECON. 807 (1975); Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 W. ECON. J. 224, 231 (1967).

though the cartel's gross profits are $100 plus any cost saving, its net profits are decreased by the $100 expenditure. By assumption, net profits equal the cost savings from the reduction in output (area C in Figure 1). Suppose the cost saving is $149. In our initial analysis the cartel would have been efficient because a $149 cost saving offsets a $50 deadweight loss. A fine of $150, equal to $100 overcharge plus $50 deadweight loss, would leave cartel members with a $99 profit from setting up the cartel. When the cost of organizing and enforcing the cartel equals the overcharge, however, net profits would equal minus $1. The $150 penalty would exceed the $149 cost saving. Hence the cartel would not be formed. This too is the correct outcome. To obtain $149 cost savings by spending real resources valued at $100 and having consumers suffer a $50 deadweight loss would be inefficient. Suppose instead the cartel lowers cost by $151. Again a $150 fine yields the correct outcome. The cartel would be established because its members gain $1 ($251 gross profits minus $100 costs minus $150 fine). This is efficient because the net resource saving of $51 offsets the $50 deadweight loss to consumers.

C. Cartels with Less than One Hundred Percent Market Share

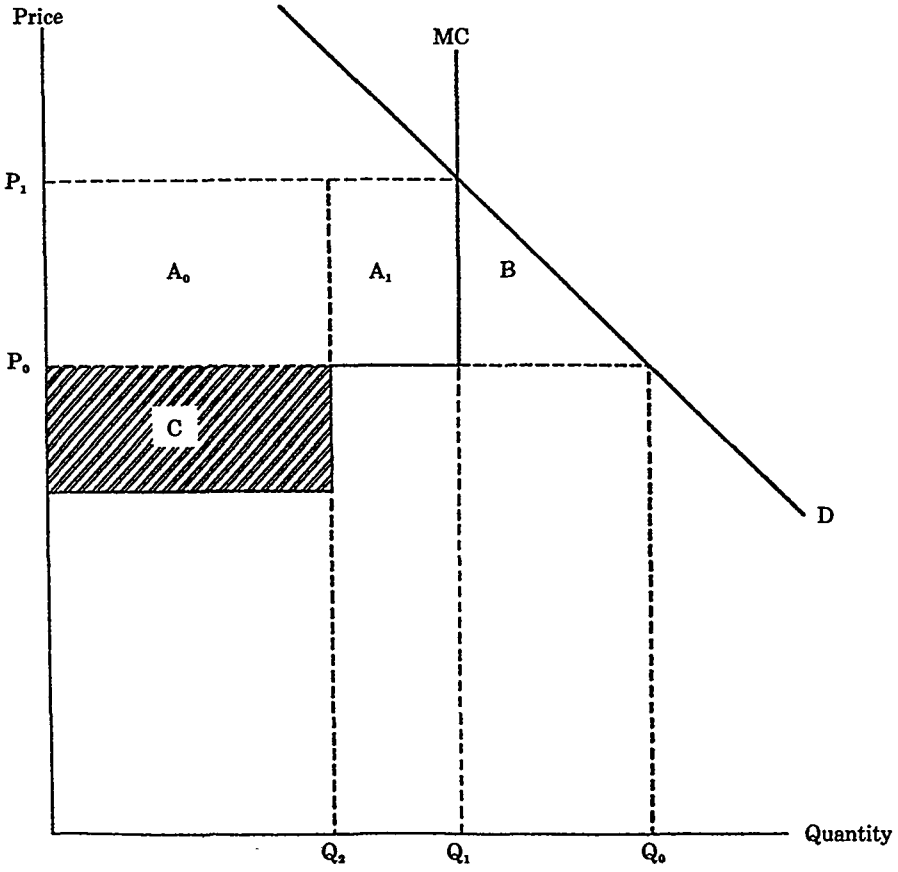
Often not all firms in an industry are cartel members. Assume that nonmembers are equally efficient, have constant marginal (average) cost equal to the prior competitive price (therefore they were not earning economic rents prior to formation of the cartel), and have a fixed capacity that limits their output. The last assumption is necessary to enable the cartel to restrict industry output and raise price above the competitive level.

Figure 3 illustrates the competitive and cartel equilibriums. Price increases from P_0 to P_1, output falls from Q_0 to Q_1, the cartel produces Q_2, and nonmembers, the competitive fringe, produce Q_1-Q_2.[29] Area B measures the deadweight loss (I ignore the possible additional element of deadweight loss analyzed in the previous subpart), areas A_0 and A_1 measure the aggregate overcharge, and area C the cost savings. As before, I assume that C would not occur without the cartel. The key question is should the optimal fine include the overcharge caused by the cartel but not received by its members (area A_1 in Figure 3). That is, should the fine equal A_0

[29] To derive the cartel's output, the cartel would maximize $P(Q)(Q - Q_f) - C(Q_c)$ where Q_f is the fixed fringe output, Q_c is the cartel's output, $C(Q_c)$ the cartel's cost function, and $Q = Q_f + Q_c$.

$+ A_1 + B$ or just $A_0 + B$?

FIGURE 3



Recall that the optimal fine equals the *net* harm to others. This requires, therefore, that any benefits to others be subtracted from the harm to consumers. Since the competitive fringe receives a benefit of A_1 from the higher than competitive price, net harm equals the harm to consumers, areas $A_0 + A_1 + B$, minus area A_1. To see why net not gross harm is the correct rule, consider the following example. Let $A_0 = \$75$, $A_1 = \$25$, $B = \$50$ and $C = \$51$. By assumption, this offense is efficient because the \$51 cost savings exceeds the \$50 deadweight loss. A fine equal to the gross harm of \$150 would yield the wrong result. Since the cartel's profit of \$126 is less than the proposed fine, the cartel would not form,

industry output would remain at the competitive level, and the cost savings would not be realized, resulting in an efficiency loss of $1. In contrast a fine equal to the net harm of $125 would leave the cartel with a profit of $1. The cartel would be formed and society would be better off by $1.

Although the net benefit rule is perfectly general, the conclusion that the cartel should not be liable for any overcharges on units sold by the competitive fringe holds only under the cost conditions illustrated in Figure 3. If the fringe's marginal cost were to exceed the previous competitive price, then their rents or benefits would be less than the harm to consumers on the units purchased from the fringe. In the limit, if the fringe's marginal cost were constant and equal to the cartel price, optimal damages would equal $A_0 + A_1 + B$, the entire overcharge plus the deadweight loss. The more typical case is one of rising marginal cost, implying an optimal fine between $A_0 + A_1 + B$ and $A_0 + B$, depending on the precise cost function.[30]

D. Predatory Pricing[31]

The economic argument against cartels is based on the deadweight loss cartels produce. This might suggest (particularly if there are no cost savings) that a deadweight loss resulting from a monopolizing activity is a sufficient reason to impose a penalty. I now show why this is false.

Consider a monopolist who responds to the entry of an equally efficient firm by reducing price below marginal cost to drive the

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[30] The issue of allowing customers of the competitive fringe to recover from members of the cartel was recently considered in Mid-West Paper Prods. Co. v. Continental Group, Inc., 596 F.2d 573 (3d Cir. 1979), and *In re* Beef Indus. Antitrust Litig., 600 F.2d 1148 (5th Cir. 1979), *cert. denied*, 449 U.S. 905 (1980). In *Mid-West Paper* the court denied recovery to customers of the competitive fringe, finding that the customers of the fringe lacked standing to sue the cartel. The court gave two main reasons for denying recovery. First, since the plaintiff was not in a direct relationship with the cartel, it was the fringe and not the cartel that received a benefit on the sales to the plaintiff. Second, the court asserted that the plaintiff might have bought from the fringe at the overcharge price even in the absence of the cartel, making it difficult to determine whether the plaintiff was in fact damaged. 596 F.2d at 583-87. Although the first argument is consistent with the approach of this paper, the second seems to conflict with the basic economics of cartels. If the cartel was effective, it raised the price of paper bags (the product in the suit) and thus competitors of the cartel were able to sell at a higher price. If the cartel did not raise the price, and hence customers of the cartel's competitors did not pay a higher price, then neither the customers of the cartel nor its competitors should recover. In *Beef Industry* (a monopsony case) the court allowed ranchers selling beef to nonconspiring retailers to recover from the conspirators. 600 F.2d at 1166 n.24 (claim satisfies "target area" standing test).

[31] The analysis in this part is developed in more detail in Easterbrook, *supra* note 1.

entrant from the industry. The monopolist may have acquired his initial monopoly position lawfully, by being more efficient. Below-cost or predatory pricing to maintain monopoly, however, is unlawful.[32] Instead of monopoly, suppose the industry consisted initially of competitive firms of different sizes. Now let the largest firm attempt to monopolize the market by pricing below cost and driving out other firms that are equally efficient (at the margin). This too is unlawful.[33]

A number of studies of antitrust cases where predatory pricing has been alleged indicate that successful predatory pricing is rare or nonexistent.[34] The typical private case alleging predation is brought by competitors who are still in business but who have lost sales during a period in which predation is alleged or by competitors who have left the business for reasons other than predatory pricing.[35]

In order to analyze the correct damage measure or optimal fine in a predatory pricing case, I distinguish two forms of predation. In one form, predation is attempted but unsuccessful. Rivals may be temporarily driven from the industry during a period of below-cost pricing, but they return when the predator attempts to raise price to the monopoly level. The second form, successful predation, occurs when rivals are driven from the industry for a period sufficient to enable the predator to raise price to the monopoly level and to recoup more than his earlier losses.

Suppose a monopolist temporarily delays entry of equally efficient firms by setting price below cost and expanding output. Eventually, however, new firms enter, price rises to marginal cost, and the predation fails. Figure 4 illustrates the situation. During the period of predation price is P_1 and output Q_1; after predation

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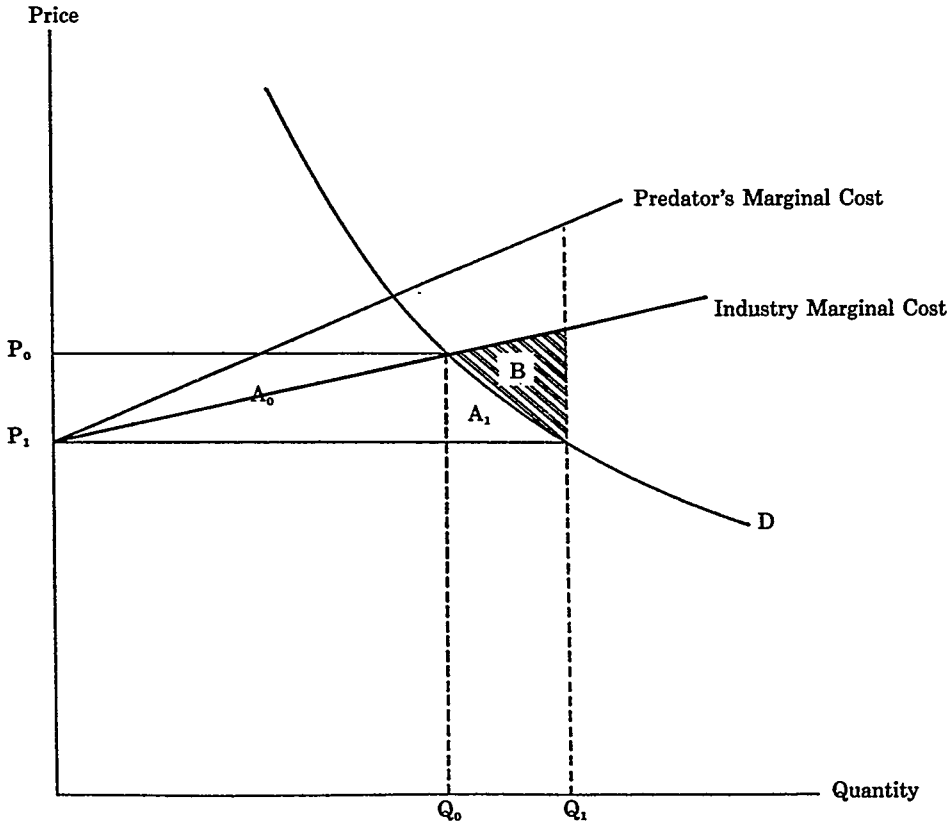
[32] *See* 3 P. AREEDA & D. TURNER, ANTITRUST LAW ¶ 711 (1978).

[33] *See id.*

[34] *See, e.g.*, Elzinga, *Predatory Pricing: The Case of the Gunpowder Trust*, 13 J.L. ECON. 223 (1970); Koller, *The Myth of Predatory Pricing: An Empirical Study*, ANTITRUST L. & ECON. REV., Summer 1971, at 105; McGee, *Predatory Price Cutting: The Standard Oil (N.J.) Case*, 1 J.L. & ECON. 137 (1958); McGee, *Ocean Freight Rate Conferences and the American Merchant Marine*, 27 U. CHI. L. REV. 191 (1960). *See generally* Easterbrook, *supra* note 1, at 312-18. In fact, most predatory pricing claims have failed for inability to show a dangerous probability of success.

[35] *See, e.g.*, United States v. Empire Gas Corp., 537 F.2d 296 (8th Cir. 1976), *cert. denied*, 429 U.S. 1122 (1977). For a discussion of this case, see Easterbrook, *supra* note 1, at 316-17.

FIGURE 4



ends and entry occurs, price returns to P_0 and output to Q_0.

To be sure, below-cost pricing causes a deadweight loss equal, in Figure 4, to the sum of (1) area B, the value to consumers of the additional output Q_1 - Q_0 in the predation period less the cheapest method of producing Q_1 - Q_0, and (2) the difference between the predator's and industry's marginal cost curves up to Q_1.[36] Deadweight loss is not a sufficient reason to impose a fine on the successful predator. Indeed, the optimal fine in this case is zero because there is no positive net harm to others. Figure 4 shows that buyers gain consumer surplus of A_0 on the units they would have purchased at the competitive price and A_1 on the added units they purchase because of predation, while competitors lose profits of

[36] Had the predator not lowered his prices to increase his market share, the output would have been produced at the lower industry marginal cost. The additional resources needlessly spent to produce the output are a deadweight loss.

kA_0, where k is the fraction of A_0 they would have received as producer surplus at the competitive price and output. Thus, during the period of below cost pricing there is a net gain of $(1 - k)A_0 + A_1$ to consumers and competitors. Figure 4 also shows that the predator's revenue is less than his costs by the difference between P_1Q_1 and the area under his marginal cost curve up to Q_1. Thus, the failed predator bears not only the full deadweight loss of his activity but much more. Because the deadweight loss is a private loss to the predator and not part of the net harm to parties other than the predator, there is no justification for imposing additional penalties. In short, the predator's activity is self-deterring because he bears its full social costs; the rest of us, on balance, are benefited. And provided this is so, the net harm, and therefore the optimal penalty, is zero.

Successful predation occurs when the monopolist is eventually able to raise price above marginal cost, more than recouping the losses incurred during the predation period. The preceding discussion demonstrates that net harm, and hence the optimal penalty, is the present value of the aggregate overcharge and deadweight loss during the recoupment period minus the net benefit to others during the period of predation.[37]

Two further points should be mentioned. First, at the time predation begins one may not know whether it will succeed. Yet the optimal penalty is zero in one case but positive in the other. Assuming we are able eventually to distinguish failed from successful predation, there should be no penalty or recovery until it is clear that the predation is successful. In effect, this rule would delay enforcement proceedings until the recoupment period begins. Moreover, it would probably eliminate most predatory pricing suits brought by competitors because the suits typically involve instances of failed predation.

Second, the measure of damages in private suits against successful predators should not be the competitor's lost profits but rather the present value of the ultimate overcharge to consumers and deadweight loss minus net benefits during the period of below-cost pricing.[38] The only justification for allowing competitors to sue

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[37] Where predation is successful, this is of course a positive number. The predator is able to increase future profits such that the present value of the future profits is greater than the present cost of predation.

[38] If antitrust laws are a means to increase consumer welfare, then losses only to consumers, not to competitors, are relevant. For a discussion of the consumer welfare goals of antitrust, see R. BORK, THE ANTITRUST PARADOX 66 (1978); R. POSNER & F. EASTERBROOK, *supra* note 1, at 154.

is that they are more efficient private enforcers than are consumers, because the claim of any individual consumer is small relative to his costs of bringing suit. Thus, consumer enforcement may lead to too few cases being brought and hence to underdeterrence of antitrust violations.[39] Assuming competitors, in effect, are standing in the shoes of consumers, optimal deterrence requires that the damage award to a competitor should depend on net harm, not the competitor's lost profits.[40]

III. Antitrust as an Intentional Tort

In a recent paper, Richard Posner and I developed an economic model of intentional torts, such as assault, battery, conversion, and defamation, and showed that the model explained most important common law doctrines governing intentional torts.[41] Although price-fixing and monopolization are analytically equivalent to an intentional tort, and the Supreme Court sometimes has used tort principles to analyze antitrust violations,[42] we did not examine the implications of our model for antitrust policy. I do so now, after first summarizing our intentional torts model.

A. An Economic Model of Intentional Torts

From an economic standpoint, the way to distinguish intentional from ordinary torts is that in the former the injurer spends resources to increase the probability of harming the victim, but in the latter both parties spend resources to reduce this probability.[43] The intentional tortfeasor is by definition the party able

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[39] Although there are methods for aggregating many small claims (e.g., class actions and parens patriae suits), these are considered costly enforcement methods relative to competitor suits. *See* Landes & Posner, *supra* note 1, at 607-08.

[40] If consumer enforcement is more efficient because, for example, there are several consumers with potentially large recoveries, then consumers, not competitors, should recover.

[41] *See* Landes & Posner, *An Economic Theory of Intentional Torts*, Int'l Rev. L. & Econ. 127 (1981).

[42] *See, e.g.*, Associated Gen. Contractors v. California State Council of Carpenters, 103 S. Ct. 897, 904-07 (1983); *id.* at 914 (Marshall, J., dissenting) (comparison of antitrust to intentional torts); Texas Indus., Inc. v. Radcliff Materials, Inc., 451 U.S. 630, 634 & n.5 (1981).

[43] This definition of intentional is actually too broad because it would define mistakes or self-defense as intentional torts. Our paper deals with this by including as costs the expense of avoiding mistakes or of not undertaking self-defense. Landes & Posner, *supra* note 41, at 137-38. Then the full costs of reducing the probability of injury due to a mistake or failure to undertake self-defense may be positive. In another sense our definition seems too restrictive because it excludes torts where the costs of avoidance are positive, but trivial relative to the expected harm. We deal with this under the category of reckless behavior. *Id.* at 130-32.

to avoid the tort at the lowest cost. He need only refrain from spending resources to avoid the tort; all other parties must spend resources to avoid injury. This simple difference leads to different implications concerning liability for intentional and ordinary torts. They are as follows.

First, provided the harm to the victim exceeds or equals the injurer's gain (before deducting his costs of committing the tort), the optimal or first-best solution (ignoring enforcement costs) is for the intentional tort not to take place. This saves the costs of committing the tort (i.e., the costs of avoidance are negative, while they are positive in the unintentional tort) and eliminates the harm which, by assumption, is not less than the injurer's gain. Holding the injurer liable for the victim's damages, adjusted upward if the probability of identifying and collecting damages from the injurer is less than one, will lead him not to inflict the injury.

Second, the injurer's liability should not be eliminated or reduced if the victim is contributorily negligent. For example, suppose the victim's expected harm is $75 if he spends nothing on self-protection but $50 if he spends $10. In an ordinary tort, the victim would be contributorily negligent for not spending $10 on self-protection and would not recover his damages under a negligence standard. Contributory negligence is not a defense to the injurer's liability in an intentional tort. Since expected costs are zero if the tort is not committed but positive even if the victim undertakes self-protection, the optimal outcome is for the tort not to occur. Making the victim's recovery depend on his not being contributorily negligent might lead him to spend $10 on self-protection. This sum is saved by a rule holding the injurer liable without allowing a contributory negligence defense.

Third, in ordinary torts, efficiency can be achieved without compensating the victims.[44] In contrast, efficiency usually requires compensating the victim of an intentional tort to prevent him from spending resources to avoid the tort. (Of course if the law perfectly deterred all intentional torts, there would be no occasions for compensation.) Suppose, however, certain activities are classified as intentional torts even though the expected harm is less than the injurer's net expected gain (after deducting his costs). Call these activities socially beneficial or efficient intentional torts. An example might be a hiker lost in a storm who breaks into an empty

[44] This is one of the basic results of the now standard economic analysis of a negligence system with a contributory negligence defense. *See* Landes & Posner, *The Positive Economic Theory of Tort Law*, 15 GA. L. REV. 851, 876-77 (1981).

cabin to obtain food and shelter. If the victim is not compensated (even if the offender pays a fine to the state), he would expend resources to reduce his expected harm. This, in turn, might deter the injurer from committing the tort because the victim's precautions have made it more costly to do so. To deter the tort, however, would be inefficient. In contrast, if the victim is fully compensated for his injury, he will not undertake expenditures for self-protection because he receives no benefit from them. As a result, the offender will commit the efficient tort.

B. Antitrust as an Intentional Tort

Nothing in the above analysis would be changed if we substituted "cartel" or "monopolization" for "intentional tort": the first-best, or optimal, outcome is to impose a penalty sufficient to deter the inefficient antitrust violation; there should be no defense of contributory negligence; and the victim should be compensated. I consider these conclusions in turn.

Part I examined the cartel that lowered costs by less than the deadweight loss. This is equivalent to the intentional tort that harms the victim by more than it benefits the injurer. The per se rule against price fixing, by always holding the cartel liable for the harm it does, deters firms from forming inefficient cartels. Similarly, the common law rule that holds the intentional tortfeasor liable for the victim's harm creates incentives for the efficient outcome.

As with intentional torts, the victim's conduct should not be relevant to the antitrust violator's liability. In short, there should be no defense of contributory negligence. Consider the following example. Let a manufacturer of nuclear reactors agree to provide its customers (utilities) with their future requirements of uranium at today's price plus an adjustment for future increases in mining costs. Assume the manufacturer holds a negligible inventory of uranium but plans to fulfill its contracts by making future purchases. Now suppose producers of uranium form a cartel and increase price. In response the manufacturer breaches its contracts with utilities, is sued by them, and in turn sues the cartel for treble damages.[45] The cartel argues that the manufacturer was contribu-

[45] This example is similar to the recent uranium litigation. Westinghouse, a supplier of nuclear reactors, breached its uranium contracts with utilities, was sued by the utilities, and in turn sued firms it claimed to be cartel members. The uranium dispute gave rise to a torrent of litigation. *See, e.g.*, Westinghouse Elec. Corp. v. Gulf Oil Corp., 588 F.2d 221 (7th Cir. 1978) (price-fixing suit against oil company); *In re* Westinghouse Elec. Corp. Uranium

torily negligent by failing to cover its contracts in the futures market and by signing contracts with utilities at low prices when it should have known about the cartel. Even if it is true that a well-managed or reasonably prudent firm would have covered in the futures market or obtained information on the likely formation of the cartel, however, our intentional torts analysis says the cartel's defense should not be allowed. If the defense were allowed, purchasers would avoid being contributorily negligent by incurring additional expenditures both to uncover possible antitrust violations among their suppliers and to hedge in futures markets against possible antitrust violations. Knowing this, suppliers would be deterred from forming inefficient cartels. This outcome, however, is less efficient than one where both cartels are deterred and expenditures on self-protection are avoided. We can achieve the latter outcome, as shown by our intentional torts analysis, by holding the cartel liable and rejecting a defense based on the victim's negligence.

The principal argument for awarding damages to private enforcers is to create powerful enforcement incentives. Awarding damages to victims, as we showed in our analysis of intentional torts, has the additional benefit of reducing socially inefficient expenditures on self-protection.[46] A component of the latter cost is the deadweight loss that arises when consumers substitute toward lower valued products. A possible benefit, therefore, of victim compensation is to reduce the incentive to substitute away from the monopolized product, thereby to reduce or eliminate the deadweight loss. This surprising result comes about in the following way.

To simplify, I make the following assumptions: the competitive price and output are $1 and 100 units; the cartel raises price by $1; the costs of discovering the cartel and prosecuting its members are zero; the probability of collecting damages is one; and consistent with my earlier analysis the penalty equals the sum of the aggregate overcharge ($1 x units purchased at the cartel price) and the deadweight loss. The latter two assumptions imply that firms will form a cartel only if the savings in costs made possible by their joint action more than offset the deadweight loss. What, however,

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Contracts Litig., 563 F.2d 992 (10th Cir. 1977) (contract breach).

[46] When it is costly to apprehend and convict antitrust violators, victim enforcement may not be the preferred policy. For example, if the victims of a cartel are consumers who individually have insufficient stakes to pursue a violator, then enforcement by injured competitors of the violator or by public agencies may be the better solution.

is the size of the deadweight loss? Since customers of the cartel, by assumption, recover their $1 overcharge in a costless legal proceeding, the *net* price of the cartel's product is the same as the competitive price. No deadweight loss occurs because consumers continue to purchase at the cartel price the same number of units they purchased at the competitive price.

Before introducing some complications, note that the typical legal measure of damages in a price-fixing or monopolization case brought by a customer is treble the illegal overcharge times the number of units purchased.[47] Trebling in part reflects the belief that some price-fixing and monopolization offenses are not detected. Finally, attorney's fees and other costs may be assessed against the culpable defendant. One criticism of this damage computation is that it does not compensate for the deadweight loss. That is, customers who reduce their purchases or make none at all do not recover on the units they would have purchased if price had been lower.[48] Although one can support this exclusion because of difficulties in proving how much a consumer would have bought but did not, there is also a theoretical reason: anticipated compensation of the full overcharge can eliminate any deadweight loss. If consumers anticipate full recovery for any overcharge, they will not reduce their purchases below the original competitive level. Thus, for a given overcharge there will be no reduction in quantity demanded, and no deadweight loss.[49] I should mention several qualifications to this result.

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[47] *See, e.g.,* Hanover Shoe, Inc. v. United Shoe Mach. Corp., 392 U.S. 481, 489-94 (1968). *See generally* R. POSNER & F. EASTERBROOK, *supra* note 1, at 549.

[48] There are other more important criticisms of damage awards. The most important is that treble damages are awarded even if the violation is not concealable and the probability of convicting the defendant is near unity. Furthermore, even if the offense is concealable and the probability less than one, there is no way of knowing whether three is the correct multiplier.

[49] Anticipated compensation for the overcharge will not always eliminate the deadweight loss. Consider first the example in Figure 1 where it was necessary to reduce output (from Q_0 to Q_1) to achieve cost savings (area C). Yet if demand is perfectly inelastic, how can the cartel reduce output? One way is to ration available supply among purchasers. Although consumers would be willing to pay any price above P_0 for the rationed output because their net price after deducting the overcharge recovery is still P_0, the net profits of the cartel is its cost saving. Since the latter can be less than the deadweight loss brought about by rationing, failure to compensate for the deadweight loss can lead to an inefficient outcome. Consider also the example in Figure 2. There we eliminated the deadweight loss caused by external technical diseconomies by reducing output from Q_0 to Q_1. But if output cannot be reduced, we cannot eliminate the deadweight loss. Alternatively, if rationing reduces output, the cartel will cut back too far, to the point where MC equals P_0 because the net demand curve faced by the cartel (after deducting the per unit overcharge) is horizontal at P_0.

(1) Customers may not anticipate any antitrust recovery. If they do not, they will substitute away from the monopolized product and a deadweight loss will occur. Yet an antitrust recovery, though uncertain, is a potential source of revenue and there is no strong reason to treat it differently than other uncertain revenue sources. (2) If customers are risk averse, uncertain damages, though compensating in terms of expected value, may not be sufficient to prevent substitution away from the monopolized product. (3) Even though the defendant pays the optimal penalty, only part may be received by the victim. For example, some of the victim's costs may not be recoverable,[50] and in a large class action suit a substantial share of the recovery may go not to victims but to lawyers.

Although points (2) and (3) imply that the deadweight loss is not eliminated, it is still reduced compared to the no compensation alternative.[51] A more fundamental objection is that I have ignored how the cartel responds to knowing that buyers anticipate an antitrust recovery. If the recovery is complete, the cartel, in effect, faces a perfectly inelastic demand curve at the competitive output. Although this leads to an indeterminate price, output remains at the competitive output and deadweight loss is zero.[52] However, if compensation is incomplete, the cartel faces, compared to the no-compensation case, a less elastic (but not perfectly inelastic) demand curve. In response, the cartel will set a higher price. If damages equal the net harm, the efficiency aspects of the rule that we analyzed earlier continue to hold.[53] Yet, if there is no compensation for the consumers' deadweight loss, then anticipated but partial recovery for the overcharge can lead to inefficient outcomes.[54]

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[50] For example, the plaintiff's time costs are not recoverable.

[51] Partial compensation has the effect of rotating the original demand curve to the right around the competitive equilibrium because the consumer will treat a given overcharge as representing a smaller net increase in price. (The net increase equals the overcharge minus partial recovery, per unit purchased.) Therefore, for a given overcharge, the reduction in quantity demanded will decrease as the partial recovery increases. And the smaller the reduction in quantity demanded, the smaller the deadweight loss. Note that we still measure deadweight loss along the original demand curve because the difference between it and the demand curve that takes account of partial recovery denotes the expected recovery per unit purchased.

[52] The conclusion is subject to the qualifications presented *supra* at note 49.

[53] One exception is the analysis depicted in Figure 2. Since the demand curve is less elastic compared to the no compensation case, the cartel equilibrium occurs where the less elastic demand curve intersects marginal cost. This leads to an output greater than the efficient output Q_1.

[54] The analysis is similar to that presented *supra* at note 49 except that here the output reduction is brought about by a higher price.

Conclusion

In this paper I have developed the economic theory of the optimal antitrust penalty. The optimal penalty should equal the net harm to persons other than the offender, adjusted upward if the probability of apprehension and conviction is less than one. This sanction encourages efficient behavior. It will only deter those violations that impose deadweight losses greater than the cost savings brought about by the violation. It will not deter efficient violations, those where the cost savings exceed the deadweight loss.

I applied the analysis of optimal penalties to the following enforcement issues in antitrust. I showed that the optimal penalty is zero for joint ventures that increase output. Similarly, whether one characterizes cooperative behavior among firms as a joint venture or as a cartel depends generally on whether cooperation expands or restricts output. I showed also that the optimal penalty is unaffected when part or all of the monopoly overcharge is transformed into a social loss by firms spending resources to organize and maintain the cartel. I examined whether customers who bought from competitors of the cartel at a higher than competitive price should be able to recover from the cartel for the overcharge. If the competitors are no less efficient than cartel members, no recovery should be allowed. In the case of predatory pricing, I showed that the optimal penalty is zero when below-cost pricing is followed immediately by entry. When below-cost pricing delays entry enough for the monopolist to more than recoup the losses incurred during the predation period, then the optimal penalty is positive and equals the net harm in the recoupment period minus the gains to consumers during the period of below-cost pricing. In the final section of the paper I applied the economic analysis of intentional torts to an antitrust violation. This enabled me to show the efficiency gains from compensating victims of an antitrust violation and to explain why it is inefficient to allow a defense of contributory negligence to an antitrust violation.