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**Treble Damage Awards in Private
Lawsuits for Price-Fixing**

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Treble Damage Awards in Private Lawsuits for Price-Fixing

by

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1. Introduction

In their lead article on the “Deterrent Effect of Antitrust Enforcement” (this *Journal*, 1981), Michael Block, Frederick Nold, and Joseph Sidak (hereafter BNS) analyzed the interactions between competitive buyers and collusive sellers under an enforcement regime of treble damages for antitrust violations. They concluded that the prospect of treble damage awards would inevitably cause conspiring sellers to price below the level they would choose in the absence of antitrust enforcement. Consequently, output and aggregate surplus were predicted to increase relative to *laissez-faire*.

BNS sought to formalize and test empirically the prior analysis of William Breit and Kenneth Elzinga (hereafter, BE). In their path-breaking article and book, and—more recently—in their retrospective survey on the subject of antitrust penalties, BE (1974, 1976, 1985) emphasized that the prospect of treble damage awards encourages victims to “get damaged.” They pointed out, (1974, p. 337) for example, that “In the electrical equipment conspiracy, there was evidence that the customers of this cartel were either aware (or had strong suspicions) that they were purchasing under a regime of rigged bidding.” BE emphasized (1974, p. 335) that treble-damage awards create a “perverse incentive” for buyers to purchase (at any given price) *additional* units of a good in anticipation that they may get rewarded trebly for the resulting increase in damages.

Although BNS sought to build in part on the prior work of BE, they neglected to incorporate the central insight of BE that the prospect of treble damages stimulates demand *at any given price*. BE in turn failed to note that in anticipation of this outward shift in demand, colluding sellers will adjust their price. The purpose here is to take account both of the incentive of the buyers to “get damaged” *and* its effect on the pricing strategy of the sellers. Under a plausible condition on the exogenous data, a neutrality result is shown to hold. Under this condition, imposition of a multiple-damage regime has no effect on output, aggregate surplus or its expected distribution relative to *laissez-faire* and must raise the market price. When this neutrality result does not hold, imposing multiple damages increases output and aggregate surplus while reducing the expected surplus of the sellers.

We begin by characterizing the market equilibrium in the absence of any antitrust enforcement. We then reconsider BNS’ assessment of the multiple-damage regime—taking

proper account of the buyers' "perverse incentives." The conditions when the neutrality result holds are characterized and comparative static results are derived with and without neutrality.

Having clarified the implications of the traditional model, we conclude with a more fundamental critique of the BE/BNS framework and a constructive suggestion for an alternative approach.

2. The Positive and Normative Effects of Multiple-Damages for Price-fixing

A. No Enforcement

Consider the case of a price-fixing conspiracy among sellers of an intermediate input produced at constant marginal cost (C). Competitive buyers purchase in aggregate Q units of the input at per-unit price P and earn $F(Q)$ dollars in revenue from sale of the resulting output.

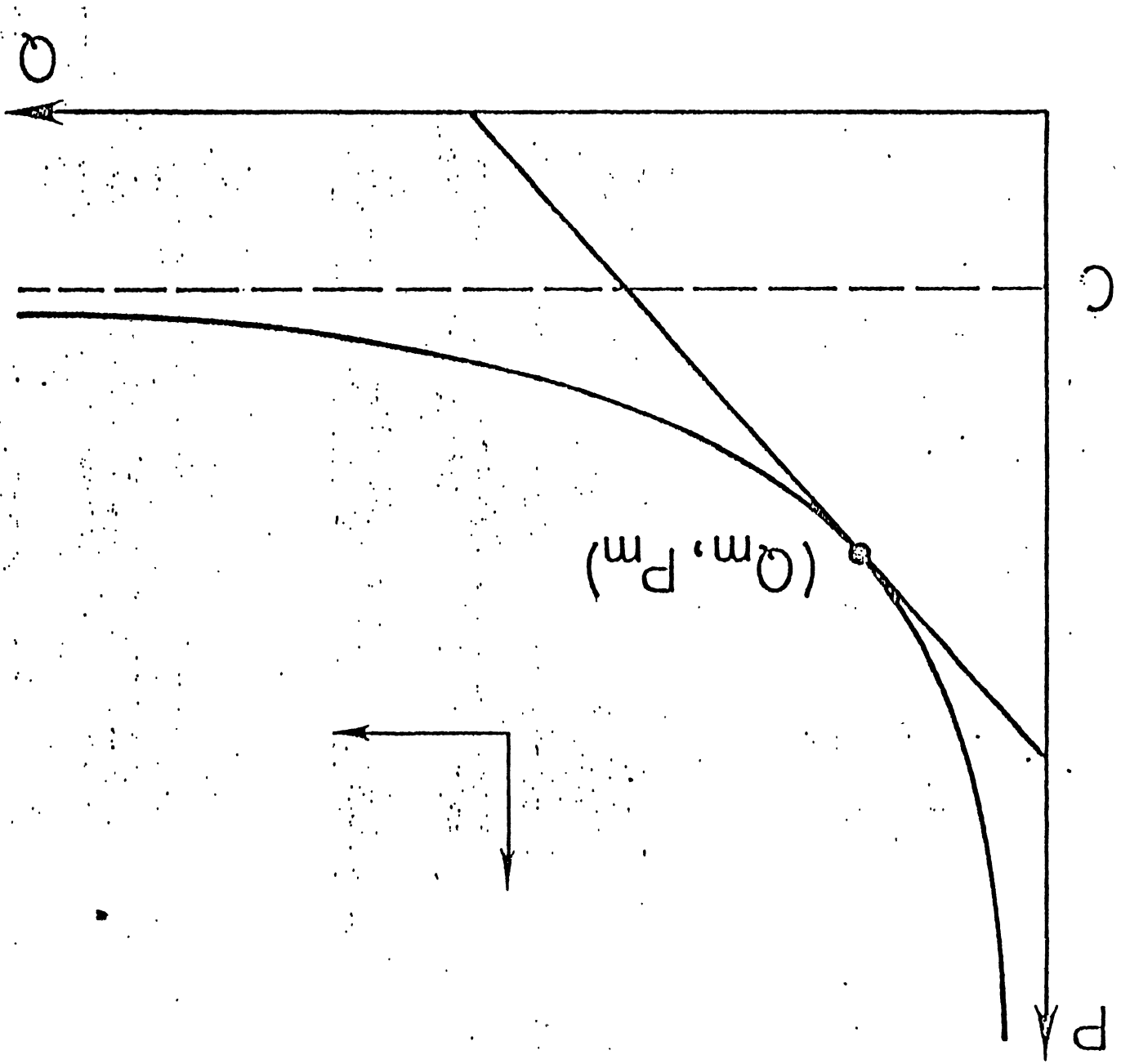
In the *absence* of antitrust enforcement, buyers will take as given the price they are charged and will select the amount they wish to purchase by equating the value of the marginal product of the acquired input to the per-unit price of that input. Anticipating this reaction, the colluding sellers will charge a price which maximizes profits. The resulting equilibrium is the solution to the following constrained optimization problem:

$$\max_{Q, P \geq 0} (P - C)Q \quad (P1)$$

$$\text{subject to: } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - PX\}.$$

Figure 1 goes here

We depict this problem graphically in Figure 1. The isoprofit contours of the firm in $P - Q$ space have the shape of conventional indifference curves. For $P > C$, increases in quantity or price (or any combination) raise profits. Hence the preference-direction is to the "northeast." For simplicity, we portray the locus of $\{Q, P\}$ combinations satisfying the downward-sloping constraint as a line. The constraint can be recognized as the familiar value-marginal-product schedule. The optimum occurs at (Q_m, P_m) —the tangency point in Figure 1. Analytically, Q_m and P_m are defined as follows:



$$Q_m F''(Q_m) + F'(Q_m) - C = 0 \quad (1)$$

$$\text{and } P_m = F'(Q_m). \quad (2)$$

B. Enforcement

Suppose now the sellers risk having to compensate buyers multiple damages for antitrust violations. Following BNS, let t denote the damage multiple (set under current law at three) and let $d(\lambda, \gamma)$ denote the probability the penalty is imposed. BNS assume that this probability is an increasing function of (1) the seller markup ($\lambda \equiv (P - C)/C$) and (2) the exogenous level of enforcement (γ); that is, $d_\lambda > 0, d_\gamma > 0$. Under this regime, the incentives of the sellers and buyers are altered and the new equilibrium can be characterized as the solution to the following constrained optimization problem:

$$\max_{Q, P \geq 0} (P - C)Q - \max(0, td(\lambda, \gamma))(P - C)Q$$

$$\text{subject to } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - PX + \max(0, td(\lambda, \gamma))(P - C)X\}.$$

If $td(0, \gamma) \geq 1$, then $td(\lambda, \gamma) > 1$ and for *any* $P > C$ ($\lambda > 0$) the cartel would expect to pay in fines more than it receives in profits. It would then be optimal to set price *equal* to marginal cost. We refer to this uninteresting case as “complete deterrence” and, following the literature, do not consider it further.

In the more interesting case where $td(0, \gamma) < 1$, the cartel has an incentive to price *above* marginal cost and deterrence is said to be “incomplete”. The foregoing maximization problem then reduces to:

$$\max_{Q, P \geq 0} (P - C)Q - td(\lambda, \gamma)(P - C)Q$$

$$\text{subject to } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - PX + td(\lambda, \gamma)(P - C)X\}. \quad (P2)$$

Note that we have departed from BNS by taking proper account of the buyers' incentives under a treble-damage regime to get damaged (the last term in the right-hand side of the constraint).¹ We maintain BNS' assumption that the cartel is risk-neutral and assume that buyers are likewise risk-neutral.

To analyze (P2), define $\hat{P} = P - td(\lambda, \gamma)(P - C)$. Then (P2) can be re-written as:

$$\max_{\hat{P}, Q, P \geq 0} (\hat{P} - C)Q$$

$$\text{subject to } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - \hat{P}X\} \quad (P2')$$

$$\text{and } \hat{P} = P - td(\lambda, \gamma)(P - C).$$

Note that the objective function and *first* constraint involve only the variables \hat{P} and Q . Indeed—if we replaced \hat{P} by P —both the objective function and the first constraint in (P2') would be *identical* to their counterparts in (P1). Hence, in $\hat{P} - Q$, space, the isoprofit contours would be identical to those in Figure 1. Moreover, the locus of (Q, \hat{P}) combinations satisfying the *first* constraint in (P2') would be identical to the locus of (Q, P) combinations depicted as the constraint in Figure 1. However, the constraint *set* in (P2') may be *smaller* since a *second* constraint must simultaneously be satisfied. Since this second constraint involves \hat{P} and P , it potentially further restricts what values of \hat{P} are feasible.

As long as $\hat{P} = P_m$ is feasible, the optimal solution to (P2') involves setting $\hat{P} = P_m$ and $Q = Q_m$. Intuitively, the program which is optimal for (P1) will be optimal for (P2') (with P replaced by \hat{P}) since the objective functions are the same and the only alternatives deleted from the feasible set of (P2') were suboptimal in (P1). Thus, as long as $\hat{P} = P_m$ is feasible, increases in the damage multiple or the intensity of enforcement will have *no effect* on output.

This result may seem surprising at first but will become obvious after a moment's reflection. Although P may nominally be the price charged, the "true" price to *both* buyers and sellers is instead \hat{P} —the market price *net* of the expected per unit revenue to

be transferred through the courts. If the sellers can indirectly set the net price at P_m by suitable choice of the market price, demand will be unchanged (Q_m) and seller profits will still be maximized.²

Since market efficiency depends on the amount produced (Q_m), variations in the level of antitrust enforcement will not affect total market surplus as long as $\hat{P} = P_m$ can be achieved. Hence, if enforcement involves any resource costs no enforcement is strictly preferable to a level which induces *incomplete* deterrence.

Similarly, the distribution of surplus net of expected court transfers will be unchanged. Consumers will continue to expect $F(Q_m) - P_m Q_m$ and sellers will continue to expect $(P_m - C)Q_m$. In the event that no court transfer occurs, buyers are worse off than in the absence of multiple-damage enforcement; when a court transfer does occur, they are better off than under *laissez-faire*.

Consider now the effect of the multiple-damage regime on the market price. Whenever the neutrality result holds, increased enforcement will result in unchanged output. Since buyers have increased incentive to "get damaged," demand will shift outward and the market price will always exceed the monopoly level under *laissez-faire*. Suppose, for example, the probability of detection were *insensitive* to changes in the markup: $d(\lambda, \gamma) = g(\gamma)$. In this case, \hat{P} is an increasing, linear function of P and setting $\hat{P} = P_m$ is always feasible. Using the second constraint in (P2'), we can solve explicitly for the market price:

$$P = (P_m - tg(\gamma)C)/(1 - tg(\gamma)). \quad (3)$$

Since the monopoly price exceeds the marginal cost of production, $(P_m - C > 0)$, $dP/d\gamma > 0$ and $dP/dt > 0$ —provided deterrence is incomplete ($1 - tg(\gamma) > 0$).³ Hence, increases in either the level of enforcement or the damage multiple will *raise* the market price monotonically above the monopoly level.

If the probability function ($d(\lambda, \cdot)$) is sufficiently elastic, it may be *infeasible* to set the net price $\hat{P} = P_m$. In that case, the neutrality result does not hold and the multiple-damage regime will have real effects.

To determine these effects, reconsider the second constraint in (P2'). $\hat{P} = C$ can always be achieved by setting $P = C$. If $\hat{P} = P_m$ is infeasible, there will be some highest net price,

$\hat{P}_{\max} < \hat{P}_m$ which can be achieved. Continuity of $d(\lambda, \cdot)$ insures that any $\hat{P} \in [C, \hat{P}_{\max}]$ is feasible.⁴

The optimum to (P2') then occurs at $\hat{P} = \hat{P}_{\max} < \hat{P}_m$ and $Q = \operatorname{argmax}_{X \geq 0} \{F(X) - \hat{P}_{\max} X\} > Q_m$. Compared to *laissez-faire*, consumers will buy more since the expected net price (\hat{P}_{\max}) is reduced. Total surplus will rise since the reduced net expected price still exceeds marginal cost. Since the sellers can no longer achieve (Q_m, P_m) , expected producer surplus must decline. This in turn implies that expected consumer surplus must rise. Finally, since output will expand the market price need not rise despite the outward shift in demand.

It remains for us to characterize necessary and sufficient conditions for the neutrality result to hold. Let $\hat{\lambda} = \frac{\hat{P}-C}{C}$. Then the second constraint of (P2') can be rewritten as

$$\hat{\lambda} = \lambda[1 - td(\lambda, \gamma)].$$

Let $\lambda_m = \frac{P_m - C}{C}$. If—for some P —the second constraint of (P2') implies $\hat{P} = P_m$, then $\hat{\lambda} = \lambda_m$ and λ must solve the following equation:

$$d(\lambda, \gamma) = \frac{1}{t} [1 - \lambda_m / \lambda].$$

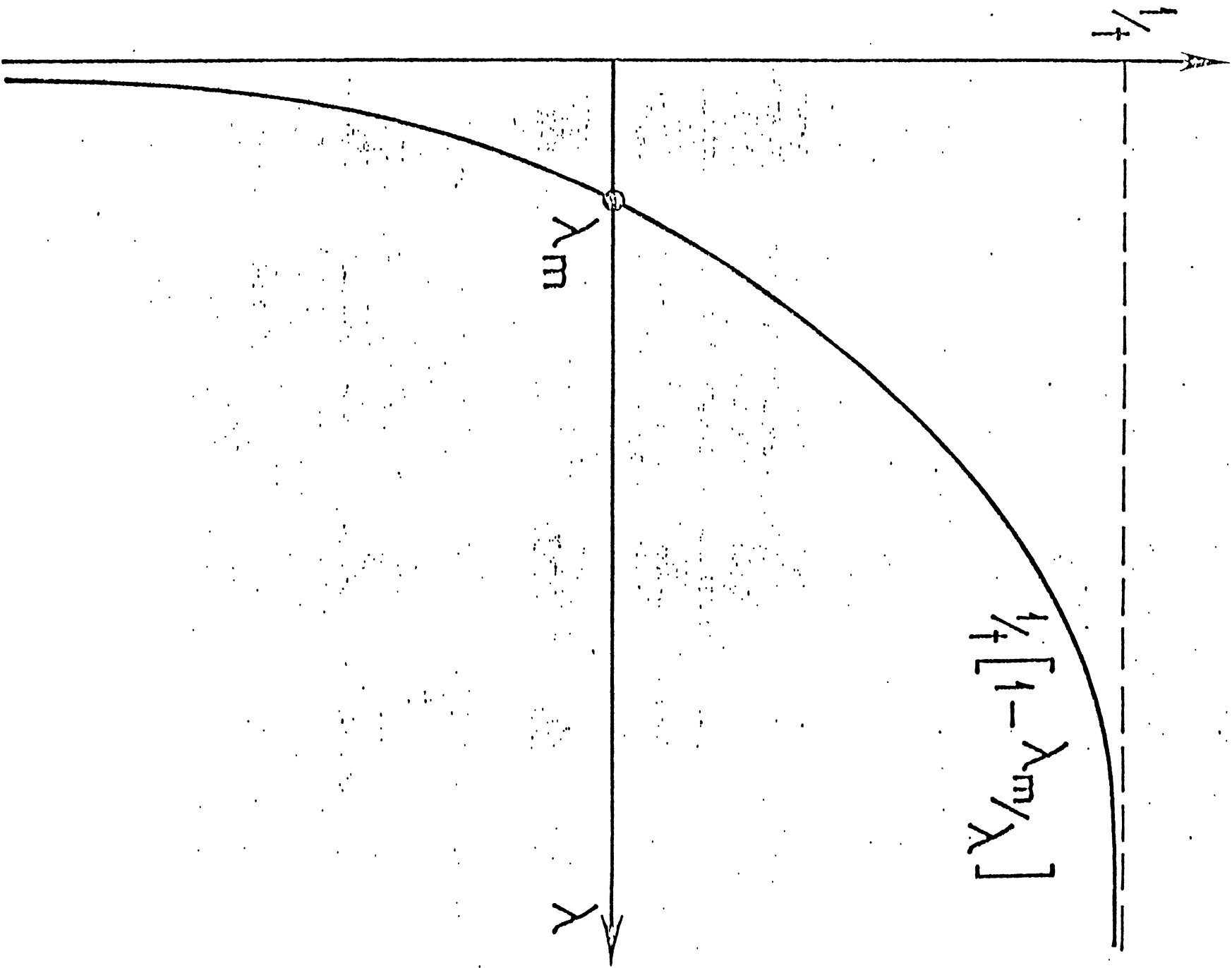
As Figure 2 depicts, the right-hand side of this equation monotonically increases in λ , crosses the horizontal axis at λ_m and asymptotes to the horizontal line of height $1/t$. The curve shifts down by a constant proportion if the exogenous damage multiple is increased.

Figure 2 goes here

The neutrality result holds *if and only if* $d(\lambda, \gamma)$ crosses the curve in Figure 2 (for $\lambda > 0$). For example, it holds if the probability function is constant ($d(\lambda, \gamma) = d < 1/t$) and, more generally, for any $d(\lambda, \gamma)$ function such that $\lim_{\lambda \rightarrow \infty} d(\lambda, \gamma) < 1/t$. On the other hand, for any non-constant $d(\lambda, \gamma)$ function, there exist damage multiples sufficiently large for the enforcement regime to have real effects.⁵

3. Conclusion

The purpose of this paper has been to review and correct the existing literature on the effects of treble-damage penalties. At a deeper level, however, the severe limitation of the



received framework should be clarified. Central to the received model is the assumption that buyers and sellers share a *common* expectation about the subsequent damage award. However, both the probability of this award and its magnitude depend in part on the costs of the sellers. Sellers have better information about their own costs than buyers. Buyers can only make educated guesses about these costs. When buyers are charged a lot for an item, they try to infer whether they are dealing with a high cost but competitive industry on the one hand or alternatively whether they are being ripped off by a low-cost collection of price fixers.⁶ How treble-damage awards affect prices and welfare when buyers have incomplete information about costs will be explored in a subsequent paper.⁷

4. Footnotes

This research benefited greatly from the insight of Glenn Gotz. Comments from Mark Bag-noli, Ted Bergstrom, Severin Borenstein, Jonathan Cave, Sam Peltzman, Mitch Polinsky, Dick Porter and Joseph Swierzbinski were useful in revising an earlier draft. An indepen-dent analysis by Jonathan Baker (1985) makes some of the same points; I am grateful to Steve Salop for identifying the similarities and putting us in contact.

¹BNS [1981, p. 432], erroneously assume that demand is independent of the damage multiple and the intensity of enforcement. Under this assumption, the sellers' problem is to

$$\max_{P \geq 0} \pi(P) = Q(P)[P - C][1 - td(\frac{P - C}{C}, \gamma)].$$

$$\Rightarrow \frac{d\pi}{dP} = [1 - td]\{(P - C)Q'(P) + Q(P)\} - Q(P)\lambda td_{\lambda}(\frac{P - C}{C}, \gamma).$$

At the monopoly price under *laissez-faire* (P_m), the expression in braces is zero and hence $\frac{d\pi}{dP}|_{P_m} \leq 0$, with equality if and only if $d_{\lambda} = 0$. Given appropriate second-order condi-tions, BNS therefore conclude that as long as the probability function has any sensitivity to the markup, the imposition of treble damages *must reduce* the market price—and, there-fore, *must increase* aggregate output and surplus. The implications of this analysis when recovery is incomplete are discussed in the appendix.

²The general point is obvious once it is properly posed. Consider first the case of a per-unit subsidy that is a constant or increasing function of P : such a subsidy to consumers will have no effect on purchases, welfare, or distribution if it is financed by a per unit tax on producers. For in that case, the market price will simply rise to offset the tax and the price paid net of the subsidy and the price received net of the tax will not change. This unchanged net price will continue to clear the market if sellers are competitive and will continue to be profit-maximizing if they are collusive.

Consider next the case where the per-unit subsidy is instead a nonlinear function of price (as in the case of expected awards for damages). The foregoing analysis then requires modification *if and only if* there exists *no* market price such that the per-unit cost to buyers—net of the subsidy—is the same as the pre-subsidy price. If none exists, the subsidy will have real effects; aggregate surplus will decline under competition (in the absence of externalities) and producer surplus will decline under monopoly.

³To illustrate, suppose $F(Q) = aQ - \frac{1}{2}bQ^2$. Then buyer demand will be:

$$Q^*(P) = \frac{a - P + td(P - C)}{b}.$$

That is, buyers will increase their demand (for $P > C$) so as to get damaged. Sellers respond to this shifted demand by setting price at

$$P^* = \frac{a + C(1 - 2td)}{2(1 - td)}.$$

Substituting into the buyer demand function, we find that the quantity demanded will be:

$$Q^*(P^*) = \frac{a - C}{2b},$$

regardless of the damage multiple or enforcement probability (provided deterrence is incomplete). Total surplus will, therefore, be invariant to exogenous changes in these parameters. As for the distribution of that surplus, sellers expect profits of

$$\Pi(P^*) = (1 - td)(P^* - C)Q = \frac{(a - C)^2}{4b},$$

which is likewise invariant to changes in t and d . Provided deterrence is incomplete, therefore, increased enforcement only affects the market price. In this case,

$$\text{sgn} \frac{dP}{dd} = \frac{dP}{dt} = \frac{(a - C)d}{2(1 - td)^2} > 0.$$

Hence, increased enforcement will raise the market price above the monopoly level.

⁴Note we assume that \hat{P}_{\max} can be achieved rather than merely approached—eliminating the open-set problem.

⁵Let

$$d = \begin{cases} \frac{1}{3} - \frac{\lambda_m}{3\lambda} + \frac{1}{4} & \text{if } \lambda \geq \lambda_m \\ \frac{1}{4} & \text{otherwise} \end{cases}$$

and $t = 3$. Since this $d(\lambda, \cdot)$ function lies entirely above the boundary in Figure 2, the treble-damage regime will in this case result in increased output and surplus. It may be verified that $\hat{P}_{\max} = \frac{1}{4}P_m + \frac{3}{4}C < P_m$ and is achieved at $P = P_m$. Hence, the outward shift in demand is just matched by the increase in output so that the market price remains at the same level as before the treble-damage regime was imposed.

⁶It is somewhat ironic that in the well-known limit-pricing model of Milgrom and Roberts (1982), it is the low-cost firms which want to distinguish themselves and the high-cost firms which want to masquerade as low-cost firms. In the model sketched the roles are reversed; it is the low-cost firms who wish to appear to have high costs.

⁷For an early contribution to litigation games under incomplete information, see Rest and Salant (1982); for a generalization, see Salant (1984).

Appendix: Incomplete Recovery

Given the analysis in the text, it is sometimes thought that—if buyers recover only a *portion* of the damages collected from the sellers—a multiple damage regime will *always* increase surplus. Consider the case where buyers receive *no compensation* whatsoever. Then the original analysis of Block et. al. (reviewed in footnote 1) is appropriate and surplus does increase—provided $d_\lambda > 0$.

Regardless of the extent of recovery, however, a multiple damage regime can *never* affect aggregate surplus if $d_\lambda = 0$. Assume buyers receive θ times the damages paid for any $\theta > 0$ such that $1 - \theta td > 0$. Then the firm seeks to:

$$\max_{Q, P \geq 0} (P - C)Q - td(P - C)Q = (1 - td)(P - C)Q$$

$$\text{subject to } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - PX + \theta td(P - C)X\}.$$

Define $\tilde{P} = P - \theta td(P - C) \Rightarrow \tilde{P} - C = (P - C)(1 - \theta td)$. Then the firm's problem can be transformed as follows:

$$\max_{\tilde{P}, Q, P \geq 0} \frac{(1 - td)}{(1 - \theta td)} (\tilde{P} - C)Q$$

$$\text{subject to } Q = \operatorname{argmax}_{X \geq 0} \{F(X) - \tilde{P}X\} \tag{A1}$$

$$\text{and } P = \frac{\tilde{P} - \theta tdC}{1 - \theta td}. \tag{A2}$$

Note that the transformed objective function and *first* constraint (A1) involve only the variables \tilde{P} and Q (not P). Since the objective function is a scaled multiple of the objective function under *laissez-faire* while (A1) and the constraint under *laissez-faire* (P1) are identical (with P replaced by \tilde{P}), the optimum will occur at $\tilde{P} = P_m$ and $Q = Q_m$ provided

the second constraint (A2) can be satisfied for some nonnegative P . Since $1 - \theta td > 0$, satisfying (A2) presents no problem.

The welfare effects of enforcement in this example can now be compared to *laissez-faire*. Aggregate surplus depends on Q and hence will not change. Buyers will continue to receive $F(Q_m) - P_m Q_m$. Sellers now receive $\frac{(1-td)}{(1-\theta td)}(P_m - C)Q_m$. If $\theta < 1$, firm profits therefore decline (and the community benefits an offsetting amount from the receipt of lump-sum payments). If instead $\theta > 1$, firm profits increase (and the community is injured an offsetting amount from payment of a lump-sum tax). As long as buyers receive some compensation ($\theta > 0$), the demand curve will shift rightward at any given market price (P) and hence the market price must rise (above P_m) to restrain demand to Q_m .

6. References

- Baker, J. "The Effect of Private Antitrust Damage Remedies on Resource Allocation." Working Paper No. 22 (October 1985), Stanford Law and Economics Program.
- Block, M. K., Nold, Frederick, and Sidak, Joseph. "The Deterrent Effect of Antitrust Enforcement." Journal of Political Economy 89 (June 1981): 429-445.
- Breit, W., and Elzinga, K. "Antitrust Enforcement and Economic Efficiency: The Uneasy Case for Treble Damages." Journal of Law and Economics 17 (October 1974): 329-356.
- Breit, W., and Elzinga, K. The Antitrust Penalties: A Study in Law and Economics. New Haven, Conn.: Yale University Press, 1976.
- Breit, W., and Elzinga, K. "Private Antitrust Enforcement; The New Learning." Journal of Law and Economics 28 (May 1985): 405-443.
- Milgrom, P., and Roberts, J. "Limit Pricing and Entry Under Incomplete Information: An Equilibrium Analysis." Econometrica Vol. 50, No. 2 (March 1982): 443-459.
- Salant, S. "Litigation of Settlement Demands Questioned by Bayesian Defendants." California Institute of Technology Working Paper 516 (March 1984).
- Salant, S., and Rest, G. "Litigation of Settlement Claims: A Bayesian Nash Equilibrium Approach" The Rand Corporation, P-6809 (December 1982).

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