Contribution and Claim Reduction Among Antitrust Defendants: An Economic Analysis

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In private antitrust actions against multiple defendants, a prevailing plaintiff may obtain the entire damage judgment from any one defendant or may arbitrarily apportion the judgment among many defendants.[1] Recently, the federal courts have considered whether an antitrust defendant that pays damages disproportionate to the harm it has caused may, in a separate action, obtain contribution from other defendants—either those who have litigated but received disproportionately small judgments, or those who have settled.[2] Some courts have considered, as an alternative to contribu-

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1. *See, e.g.*, City of Atlanta v. Chattanooga Foundry & Pipeworks, 127 F. 23, 26 (6th Cir. 1903) (dictum), *aff'd*, 203 U.S. 390 (1906).

2. The Eighth Circuit has held that defendants may obtain contribution in antitrust cases. Professional Beauty Supply, Inc. v. National Beauty Supply, Inc., 594 F.2d 1179 (8th Cir. 1979). The Seventh Circuit has cited *Professional Beauty Supply* with approval in a securities case. Heizer Corp. v. Ross, 601 F.2d 330, 333 (7th Cir. 1979).

However, the Fifth Circuit recently has denied contribution in antitrust cases. *In re* Corrugated Container Antitrust Litigation, 84 F.R.D. 40 (S.D. Tex.), *aff'd*, 606 F.2d 319 (5th Cir. 1979), *cert. granted sub nom.* Westvaco Corp. v. Adams Extract Co., 100 S. Ct. 3008, *cert. dismissed pursuant to Rule 53*, 101 S. Ct. 311 (1980); Wilson P. Abraham Constr. Corp. v. Texas Indus., Inc., 604 F.2d 897 (5th Cir. 1979), *cert. granted sub nom.* Texas Indus., Inc. v. Radcliff Materials, Inc., 101 S. Ct. 351 (1980); *In re* Beef Industry Antitrust Litigation, 607 F.2d 167 tion, a system of claim reduction: reduction of the litigating defendants' liability by the share of damages attributable to settling defendants, regardless of the actual settlement amount.[3] The federal courts currently disagree on the desirability of contribution and claim reduction,[4] and the Supreme Court has recently agreed to hear a case involving contribution.[5]

The three rules—no contribution, contribution, and claim reduction—have also recently been the subject of much discussion in the legal literature. Most commentators have favored contribution over no contribution;[6] claim reduction has been less widely discussed.[7]

(5th Cir. 1979), *petition for cert. filed sub nom.* Iowa Beef Processors, Inc. v. Meat Price Investigators Ass'n, 48 U.S.L.W. 3538 (U.S. Feb. 6, 1980) (No. 79-1214).

The Tenth Circuit also has denied contribution in antitrust cases. Olson Farms, Inc. v. Safeway Stores, Inc., [1977] 2 Trade Cas. (CCH) 72,860 (D. Utah 1977), *aff'd*, [1979] 2 Trade Cas. (CCH) 79,699 (10th Cir.), en banc rehearing granted and pending (Dec. 27, 1979). The Third Circuit much earlier suggested a rule of no contribution in dictum in Goldlawr, Inc. v. Schubert, 276 F.2d 614, 616 (3d Cir. 1960). District courts in the Second, Third, Ninth, and District of Columbia Circuits have also refused to allow contribution among antitrust defendants. *In re* Ampicillin Antitrust Litigation, 82 F.R.D. 647 (D.D.C. 1979); Hedges Enterprises v. Continental Group, Inc., [1979] 1 Trade Cas. (CCH) 77,993 (E.D. Pa. 1979); El Camino Glass v. Sunglo Glass Co., [1977] 1 Trade Cas. (CCH) 72,110 (N.D. Cal. 1976); Sabre Shipping Corp. v. American President Lines, Ltd., 298 F. Supp. 1339 (S.D.N.Y. 1969).

3. One district court in the Eighth Circuit has held that claim reduction in antitrust cases is consistent with the rule of contribution announced in Professional Beauty Supply, Inc. v. National Beauty Supply, Inc., 594 F.2d 1179 (8th Cir. 1979). *See* Little Rock School Dist. v. Borden, Inc., [1980] 1 Trade Cas. (CCH) 77,251 (E.D. Ark. 1979). The court in *Professional Beauty Supply* suggested that a contribution rule might properly exclude settling defendants from any further liability. 594 F.2d at 1184 (dictum). A district court in the Fourth Circuit has recognized claim reduction as an affirmative defense. Duplan Corp. v. Deering Milliken, Inc., No. 71-306 (D.S.C. Aug. 4, 1980).

4. *See* notes 2-3 *supra*.

5. Texas Indus., Inc. v. Radcliff Materials, Inc., 101 S. Ct. 351 (1980).

6. For some recent examples, see Jacobson, *Contribution Among Antitrust Defendants: A Necessary Solution To A Recurring Problem*, 32 U. FLA. L. REV. 217 (1980); Note, *Contribution in Private Antitrust Suits*, 63 CORNELL L. REV. 682 (1978); Note, *Contribution in Private Antitrust Actions*, 93 HARV. L. REV. 1540 (1980); *Contribution Among Antitrust Defendants*, 33 VAND. L. REV. 979 (1980). *See also* Note, *Contribution and Antitrust Policy*, 78 MICH. L. REV. 890 (1980).

In addition, both the Senate Judiciary Committee and the American Bar Association have proposed amendments to the Clayton Act, 15 U.S.C. §§ 12, 13, 14-21, 22-27 (1976 & Supp. III 1979), that would permit contribution among nonsettling defendants. S. 1468, 96th Cong., 1st Sess. (1979); SECTION ON ANTITRUST LAW, AMERICAN BAR ASSOCIATION, RESOLUTIONS AND REPORT OF THE SECTION ON ANTITRUST LAW OF THE AMERICAN BAR ASSOCIATION ON PROPOSED AMENDMENT OF THE CLAYTON ACT TO PERMIT CONTRIBUTION IN DAMAGE ACTIONS BROUGHT THEREUNDER (1979) [hereinafter cited as ABA REPORT]. *See also Antitrust Equal Enforcement Act of 1979: Report of the Sen. Comm. on the Judiciary on S. 1468*, 96th Cong., 1st Sess. (1979) [hereinafter cited as *Committee Report*].

7. Commentators who have considered claim reduction have generally favored it. *See, e.g.*, Jacobson, *supra* note 6 at 236-38; Note, *Contribution in Private Antitrust Actions*, *supra* note 6, at 1560-61.

Both the Senate Judiciary Committee and the American Bar Association have proposed

However, an important article by Easterbrook, Landes, and Posner[8] has endorsed, with some qualifications, the rule of no contribution, in large part because the authors found the economic consequences of contribution (and, to a lesser extent, claim reduction) undesirable—particularly in that contribution would lessen the deterrence of antitrust violations and discourage settlements.[9]

This article builds upon the basic framework developed by Easterbrook, Landes, and Posner[10] and reconsiders the desirability of contribution and claim reduction. Part I discusses the effect each rule would have on the deterrence of antitrust violations. As in Easterbrook, Landes, and Posner's paper, the analysis considers the effect of risk aversion on deterrence. However, it also considers the effects on deterrence of the "insulation" of corporate decisionmakers from the full financial burden of antitrust liability (which they discuss in a footnote), and the failure to allocate liability among defendant firms according to the damage each has caused. Part II describes how each of these rules would affect the settlement process, taking into account risk aversion, costs of litigation and differences of opinion between plaintiffs and defendants concerning the defendants' chance of prevailing at trial. (A Technical Appendix presents the analysis of Parts I and II in the context of a more rigorous mathematical model.) Part III discusses the relative desirability of the rules in light of these deterrence and settlement considerations.

This evaluation leads to three main observations about the rules. First, it is not clear which rule results in the greatest level of deterrence of antitrust violations. However, the no contribution rule achieves deterrence by imposing greater risks on innocent parties. Second, because the no contribution rule allocates liability imprecisely, it may discourage some firms from engaging in socially beneficial activities yet fail to deter other firms from violating the antitrust

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amendments to the Clayton Act, 15 U.S.C. §§ 12, 13, 14–21, 22–27 (1976 & Supp. III 1979), that would allow claim reduction. *See* S. 1468, 96th Cong., 1st Sess. (1979); ABA REPORT, *supra* note 6, at 11.

The rule of claim reduction, as used in this article, would still allow contribution among litigating defendants. The Senate Judiciary Committee and the American Bar Association have implicitly defined claim reduction this way. *See Committee Report*, *supra* note 6, at 21; ABA REPORT, *supra* note 6, at 10, 13–14.

8. Easterbrook, Landes & Posner, *Contribution Among Antitrust Defendants: A Legal and Economic Analysis*, 23 J.L. & ECON. 331 (1980).

9. *Id.* at 364–68; *accord*, Note, *Contribution for Antitrust Codefendants*, 66 VA. L. REV. 797 (1980).

10. The relationship between their paper and ours is described in notes 13, 19, 26, 34, 37, 38, 50, and 64 *infra*.

laws. Third, the no contribution rule creates a greater incentive to settle than does either of the other rules, although the rate of settlement under claim reduction, at least, may still be reasonably close to the settlement rate under no contribution. Since these considerations do not point uniformly toward any one rule, it is not possible to recommend any of the rules without making some judgments about the relative importance of the various considerations. Based on such judgments, we will recommend the claim reduction rule over the other two rules and, more tentatively, the contribution rule over no contribution.

I. DETERRENCE

This part discusses the effects of the three rules regarding the sharing of liability on the inhibition of antitrust violations. Section A considers the deterrent effects of the rules in a situation we call the "simple case." Sections B, C, and D introduce three complications into the analysis: risk aversion, insulation of firms' decisionmakers from liability, and the misallocation of liability.[11]

A. *The Simple Case*

In the simple case firms have a neutral attitude toward risk. Risk neutral firms consider only the "expected value" of a risky situation—that is, the magnitude of the risk discounted by its probability.[12] For example, the expected loss from a situation involving a 25 percent chance of losing \$60 million is \$15 million (25% × \$60 million). A risk neutral firm would, by definition, be indifferent between this situation and any other one with the same expected loss—such as a situation involving a 50 percent chance of losing \$30 million (50% × \$30 million = \$15 million).

The deterrent effects of the rules of no contribution, contribution, and claim reduction are equivalent in the simple case.[13] Under no contribution, each defendant faces some probability of having to pay the entire judgment. Under contribution, all defendants share the entire judgment, so that each faces a higher probability of having to

11. To focus on issues related to deterrence, this part does not take the settlement process into account in a detailed way.

12. Expected value is a standard concept in decision theory and economic analysis. *See, e.g.*, H. RAIFFA, DECISION ANALYSIS: INTRODUCTORY LECTURES ON CHOICES UNDER UNCERTAINTY 8-9 (1968).

13. This conclusion was demonstrated by Easterbrook, Landes & Posner, *supra* note 8, at 344-49, 363-64.

pay an amount proportionally less than the entire judgment. Under claim reduction the result will be the same as under contribution. Since a low probability of having to pay a large amount and a higher probability of having to pay a proportionally smaller amount will have the same deterrent effect on a risk neutral firm, the no contribution, contribution, and claim reduction rules all lead to the same result.

An example involving two hypothetical firms, "Acme" and "National," will illustrate this result. Assume that each firm would gain \$10 million from an antitrust violation and that each would face a 50 percent chance of being found liable if it committed the violation. (The arguments illustrated by this example—which will be used throughout this article—do not depend on there being only two defendants.[14])

Under no contribution, suppose that if both Acme and National are found jointly liable, each would be equally likely to have to pay the entire joint trebled damages of \$60 million (3 × (Acme's damages of \$10 million + National's damages of \$10 million)). Thus, if Acme were to violate the antitrust laws, its expected liability would be \$15 million since it would face a 50 percent chance of being sued and found liable and then a 50 percent chance of being selected to pay the \$60 million (50% × 50% × \$60 million = \$15 million). Because this expected liability of \$15 million exceeds Acme's possible gain of \$10 million, Acme will choose not to violate the antitrust laws. Similarly, National's expected liability would be \$15 million, and it too will refrain from the violation.

Under contribution, if Acme and National are both found liable for antitrust violations and one of them pays an amount that exceeds its \$30 million share of joint trebled damages, then that firm may seek contribution from the other. For example, if the judgment against Acme were \$31 million, Acme could obtain contribution of \$1 million from National, thereby reducing Acme's liability to \$30 million. Thus, if both are found liable, each eventually will pay \$30 million.[15] Because they face a 50 percent chance of being found liable if they violate the antitrust laws, they each face an expected liability of \$15 million (50% × \$30 million). And since each can gain

14. *See* note 51 *infra*.

15. Throughout this article we assume that each firm's share of damages can be determined with reasonable accuracy. If this is not the case, we would adopt some simpler method of computing contribution shares. (The same holds true with respect to claim reduction shares.) *See* note 50 *infra*.

only $10 million from the violation, they will decide not to commit the violation.

Under claim reduction, if either joint defendant settles, the other's potential liability is reduced by the settling defendant's share of joint trebled damages. For example, suppose National settles and Acme litigates. Then Acme's potential liability is $30 million—the joint trebled damages of $60 million less the $30 million share attributable to National. And since Acme faces a 50 percent chance of being found liable, its expected liability is $15 million. Also, because National's expected liability if it had chosen to litigate would have been $15 million,[16] it will settle for this amount.[17] Since each firm would gain only $10 million from an antitrust violation, Acme will be deterred by its $15 million expected liability and National will be deterred by its $15 million anticipated settlement.

This numerical example thus indicates why, in the simple case, the expected liability of the defendants—and, hence, the degree of deterrence—is identical under all three rules.

B. *The Effect of Risk Aversion*

Now suppose that firms are risk averse. A risk averse firm considers not only the expected value of a risky situation, but also the absolute magnitude of the risk. Such a firm, unlike a risk neutral firm, would not be indifferent between a 25 percent chance of losing $60 million and a 50 percent chance of losing $30 million even though the expected loss is $15 million in each situation. A risk averse firm would be worse off in the first situation because the magnitude of the risk is larger.[18]

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16. This result occurs because there is contribution among litigating defendants under claim reduction. *See* note 7 *supra*.

17. National would not be willing to settle for more than its $15 million expected liability, and the plaintiff would not be willing to settle for less than its $15 million expected gain from litigation.

18. Although, to our knowledge, there are no systematic empirical studies of whether firms act in a risk averse way, many aspects of business behavior suggest that they often do. For example, the widespread purchase by firms of insurance—such as property and liability insurance—can best be accounted for by aversion to risk. Economists sometimes assume that firms are risk averse. *See, e.g.*, Leland, *Theory of the Firm Facing Uncertain Demand*, 62 AM. ECON. REV. 278 (1972). Antitrust commentators occasionally make this assumption as well. *See, e.g.*, K. ELZINGA & W. BREIT, THE ANTITRUST PENALTIES 126-29 (1976).

However, there is a theoretical argument why firms would act in a risk neutral way. This argument presumes that stockholders have diversified portfolios and therefore do not care about the riskiness of a particular firm's activities. It also presumes that the stockholders of a firm can perfectly control the firm's activities and therefore would direct the firm to act in a risk neutral way—namely, to maximize expected profits. While this argument is impor-

If firms are risk averse, the deterrent effect of the no contribution rule exceeds that of the other two rules because the no contribution rule imposes more risk on a potential antitrust violator.[19] To illustrate this conclusion, suppose now that Acme and National would face a 25 percent chance of incurring liability if they were to violate the antitrust laws.[20] Then, under the no contribution rule, each firm would have an expected liability of $7-½ million. Each would face a 12-½ percent chance of having to pay the joint trebled damages of $60 million because there is a 25 percent chance of being found liable and a 50 percent chance of being selected by the plaintiff to pay the joint trebled damages. Under contribution, each firm would also have an expected liability of $7-½ million, but now it is because each firm would face a 25 percent chance of incurring liability and, then, a certainty of having to pay $30 million—its share of joint trebled damages. The result under the claim reduction rule is similar to that under the contribution rule.[21]

Since each firm would gain $10 million from violating the antitrust laws and would face an expected liability of only $7-½ million under each of the three rules, each firm would view the violation as a favorable opportunity if it were risk neutral. However, a risk averse firm might decide against the illegal action—especially under the no contribution rule because that rule exposes the firm to a $60 million risk rather than the $30 million risk the firm would face under the contribution or claim reduction rules. Thus, a risk averse firm might be deterred under the no contribution rule but not under the contribution or claim reduction rules.

C. *The Effect of "Insulation"*

Although a firm that violates the antitrust laws may bear liability, the extent of this *corporate* liability does not directly determine the

tant, it should be noted that stockholders are often not well diversified, in part because of transaction costs (or because of superior information about a firm), and therefore would want the firm to act in a risk averse manner. Moreover, stockholders generally can control the firm's activities only imperfectly because of the cost of monitoring managerial behavior. Consequently, the aversion to risk of individual managers will often influence the firm's activities.

19. This point was shown by Easterbrook, Landes & Posner, *supra* note 8, at 351-52.

20. The probability has been changed from 50% to 25% in order to show in a simple way that the rules may have different effects on firms' decisions whether to violate the antitrust laws. If the probability were 50%, then firms would choose not to violate the antitrust laws under all three rules (although if they were to violate the antitrust laws, they would be worse off under no contribution).

21. Under claim reduction, a firm would face a 25% chance of paying $30 million if it litigates or a certainty of paying $7-½ million if it settles.

likelihood of a violation. Rather, it is the consequences of this liability for the decisionmakers of the firm which primarily determine the likelihood of a violation. These consequences might take the form of a salary reduction, diminished promotion opportunities, or outright termination. The important point is that the firm's decisionmakers generally "pay" much less than the firm's trebled damages. Thus, the effect on the decisionmakers of the firm's having to pay a large amount may not be much different from the effect of the firm's having to pay a smaller amount. Consequently, the certainty of liability will be more of a deterrent to the decisionmakers than the magnitude of that liability.

If the firm's decisionmakers are partially insulated from corporate liability in this sense, the deterrent effect of the contribution or claim reduction rules exceeds that of the no contribution rule.[22] This is because the probability of the firm's having to pay some amount is greater under the contribution or claim reduction rules than under the no contribution rule.

To see this point in the numerical example, assume that Acme and National are each managed by a risk neutral[23] decisionmaker, that the maximum financial liability that can be imposed on each decisionmaker is $1 million,[24] and that each decisionmaker's gain (as opposed to the firm's gain) from an antitrust violation is $400,000.[25] Recall from the simple case that Acme and National each faced a 25 percent chance of paying $60 million under no contribution, and that they each faced a 50 percent chance of paying $30 million under contribution. Now, however, since each decisionmaker's liability is limited to $1 million, each decisionmaker faces a 25 percent chance of losing $1 million under no contribution and a 50 percent chance of losing that amount under contribution. Thus, under no contribution, each decisionmaker's expected liability is $250,000 (25% × $1 million). Since they each gain $400,000 from the antitrust violation, they will not be deterred from the illegal action. However, under contribution, since each faces expected liability of $500,000 (50% ×

22. This point is suggested in Note, *Contribution in Private Antitrust Actions*, *supra* note 6, at 1545-46 & n.30 (citing Whiting, *Antitrust and the Corporate Executive II*, 48 VA. L. REV. 1, 7 n.22 (1962)).

23. Risk neutrality is assumed here in order to isolate the effect of insulation from that of risk aversion.

24. This $1 million loss might result, for example, from a permanent $100,000 a year reduction in salary. Such a reduction, discounted at a 10% rate of interest, has a present value approaching $1 million.

25. A permanent $40,000 a year increase in salary, for example, would have a present value of $400,000 if discounted at 10%.

$1 million), they will both be deterred.[26] Again, the outcome under. claim reduction is similar to that under contribution.[27]

D. *The Effect of Imprecise Allocation of Liability*

By the allocation of liability we mean the relationship between a firm's expected liability and the damages it causes. Two problems generally arise if liability is not allocated according to damages. Firms which face an expected liability greater than the damages they cause may be discouraged from engaging in certain socially beneficial activities.[28] At the same time, other firms which face an expected liability less than their damages may not be deterred from antitrust violations.

Under no contribution, the allocation of liability is likely to be imprecise because there is no reason to expect a plaintiff to collect from a particular defendant a portion of the judgment proportional to that firm's share of damages. For example, a firm with large assets

26. The conclusion that deterrence under contribution is greater than under no contribution due to the effect of insulation does not depend on there being an absolute ceiling on the decisionmaker's liability. The conclusion would follow as long as increases in the firm's liability do not lead to comparable increases in the decisionmaker's liability. This point is discussed in the Technical Appendix.

Two potentially important qualifications to the insulation argument have been suggested to us by Frank Easterbrook, William Landes, and Richard Posner. First, they point out that the internal sanction imposed on a firm's decisionmaker should in principle be based on the *expected* liability resulting from the decisionmaker's behavior, rather than, as we implicitly assume, on the actual liability incurred by the firm. Easterbrook, Landes & Posner, *supra* note 8, at 349 n.46. To the extent that the sanctions imposed on the decisionmaker are based on expected liability, the rules of no contribution and contribution are equivalent since they lead to the same expected liability. However, because of the difficulty of determining which actions of a decisionmaker increase the firm's expected liability, some internal sanctions are probably imposed only on the basis of actual liability.

Second, Easterbrook, Landes, and Posner have pointed out to us that, even if internal sanctions are imposed on the basis of actual liability, our insulation argument might go the other way. This would be true if there is a threshold level of liability, below which a firm might not bother with internal sanctions. Then, if the level of liability is below this threshold under contribution but above it under no contribution, no contribution would have a greater deterrent effect on the decisionmaker. There are undoubtedly some cases in which the level of liability under contribution would not lead to internal sanctions. However, because the amounts at stake under contribution would typically be at least in the hundreds of thousands of dollars, liability under that rule would seem generally to exceed the threshold above which some type of internal sanction would be used—in which case, our insulation argument would apply.

27. Under claim reduction, the firm either settles for $15 million or litigates and faces a 50% chance of losing $30 million. Thus, the decisionmaker faces at least a 50% chance of losing $1 million.

28. The Supreme Court has referred to this problem as the deterrence of "gray zone" behavior. *See* United States v. United States Gypsum Co., 438 U.S. 422, 440-41 (1978).

might expect to pay a disproportionately large share of joint damages since it might predict that the plaintiff will choose to collect a disproportionate share of joint damages from it.[29] Thus, such a firm may face a prohibitively high expected liability even if it undertakes some socially beneficial activity. Conversely, a firm with small assets may face an expected liability insufficient to deter it from an antitrust violation.

Under contribution, the allocation of liability is more precise because the fraction of the judgment paid by a particular defendant firm—after contribution has occurred—will correspond more closely to that firm's share of damages. Under claim reduction, the same is true.[30] Thus, the rules of contribution or claim reduction are less likely to produce overdeterrence or underdeterrence caused by the misallocation of liability than the rule of no contribution.

An expanded version of the numerical example demonstrates these conclusions. Suppose that Acme and National are independently considering whether to engage in some socially desirable business that would increase each of their profits by $5 million. As before, if either firm chooses to engage in this business, that firm will gain an additional $10 million from an antitrust violation and will face a 50 percent chance of being sued and found liable. However, unlike before, assume that even if the firms do not violate the antitrust laws, they face a 10 percent chance of being sued and mistakenly found liable.[31] Finally, assume for simplicity that Acme and National believe that if they are found liable, the plaintiff will obtain the entire joint trebled damages of $60 million from Acme.[32]

29. Alternatively, a large firm might expect to pay a small share of damages (perhaps because plaintiffs believe larger firms can undertake stronger defense efforts). Another reason why a defendant might expect to pay a disproportionately large (or small) share of joint damages is that other defendants (or it) may have a continuing business relationship with the plaintiff. *See, e.g.*, Professional Beauty Supply, Inc. v. National Beauty Supply, Inc., 594 F.2d 1179, 1185 (8th Cir. 1979). It will be clear that the misallocation argument does not depend on the particular reasons why a defendant may expect to pay a disproportionate share of liability.

30. This is because, if a defendant firm litigates, its expected liability is the same as under contribution, and if it settles, the settlement amount reflects its expected liability.

31. A firm that does not intend to violate the antitrust laws might nonetheless be subject to liability for several reasons: A court may not be able to obtain complete information about the firm's behavior; the firm may find perfect compliance difficult because of the complexities and changing interpretations of antitrust law; and the firm may have less than absolute control over the actions of its employees.

32. The basic point of this example would not be affected if the defendants believed that the plaintiff would obtain anything other than $30 million, their share of the joint trebled damages, from each of them. *See* the Technical Appendix.

Under no contribution, Acme's expected liability if it were to engage in the business would be \$6 million even if it did not violate the antitrust laws (10% × \$60 million). Thus, since Acme's profits from this business would be only \$5 million, it will choose not to pursue this socially beneficial activity. Because National does not expect to pay any part of a judgment, it will decide to undertake this activity; however, it will not be deterred from an antitrust violation.[33]

Under contribution, neither of these problems arises. If Acme engages in the business, its expected liability will be \$3 million if it does not violate the antitrust laws (10% × its liability after contribution of \$30 million) and \$15 million if it does (50% × \$30 million). Since Acme would gain \$5 million from the lawful business and \$10 million more if it violates the antitrust laws, it will choose to pursue the business and not to violate the laws. National, which is in the same position as Acme, will act in the same way.[34] The outcome under claim reduction is identical to that under contribution.[35]

II. SETTLEMENT

This part first analyzes the settlement process in the "simple case" and then considers the effects of risk aversion, litigation costs, and

33. If National were certain that Acme would be deterred, National would also be deterred because it would then pay in full any judgment. However, for reasons explained in the Technical Appendix, Acme will not remain forever out of this business activity. Once Acme reenters the activity, National will not be deterred because National will realize that Acme faces a chance of mistakenly being found liable along with National and then having to pay the joint trebled damages.

34. Although the numerical example used here to illustrate the effects of imprecisely allocating liability relied both on mistake and on different expectations among firms with respect to their share of liability under no contribution, it is the expectations of firms which is central to the misallocation problem under no contribution. As Easterbrook, Landes, and Posner have argued, mistake alone does not imply a preference for no contribution or contribution. Easterbrook, Landes & Posner, *supra* note 8, at 353. If firms are risk neutral, the different rules create the same expected liability among those firms which have actually violated the laws and another uniform level of expected liability among those firms which might be mistakenly found liable (putting aside the effects of the settlement process on deterrence). If firms are risk averse, no contribution leads to more deterrence than contribution of both classes of firms, which may or may not be desirable, depending on the number of firms in each class. *Id.* Thus, the possibility of mistake by itself does not imply a general preference for one rule or the other.

However, once different expectations about the share of liability under no contribution are also included, there is an a priori case against no contribution in terms of the allocation of liability. We discuss in note 65 *infra* a different "model" in which, even in the absence of mistakes, differential expectations about liability would generate underdeterrence and overdeterrence under no contribution but not under contribution.

35. This is because if Acme engages in the business, its expected liability will again be \$3 million if it does not violate the antitrust laws and \$15 million if it does.

differences of opinion concerning the defendant's chance of prevailing at trial.

A. *The Simple Case*

Each of the three rules has a different implication for the settlement process in the simple case. Under the no contribution rule, each firm would desire to settle early because a defendant firm which has not settled before other defendants will be exposed to a magnified share of the joint trebled damages.[36] In contrast, under the contribution rule each defendant firm has a motive to litigate because settling does not protect it from further liability—other firms may litigate and seek contribution. And under the claim reduction rule each firm has no motive either to settle or to litigate because the liability of one firm is not affected by another firm's behavior.

To illustrate these points, assume that both Acme and National have violated the antitrust laws and have been sued. Under no contribution, it is easy to see why each firm would rather be the first to settle. Suppose that National settles first for $15 million. If Acme were to then litigate and lose, Acme would have to pay $45 million—the joint trebled damages of $60 million less the amount of National's settlement. And since Acme faces a 50 percent chance of losing if it litigates, its expected liability would be $22-½ million (50% × $45 million). Because Acme would not want to be left facing an expected liability of this magnitude, it would prefer to settle before National.[37]

This desire to settle early also generates large settlements. These settlements, together with the high expected liability faced by those defendants who fail to settle, increase the deterrent effect of no contribution.[38]

Under contribution, suppose that National litigates.[39] To see why Acme has an incentive to litigate as well, consider the consequences for Acme if it settled. If National loses, Acme will pay enough in contribution to National to raise Acme's total payment to $30 million. This is the same amount Acme would have paid under

36. However, if all but one firm have settled, the last firm would not have a definite motive to settle or to litigate in the simple case.

37. This desire to settle early is the major aspect of settlement under no contribution discussed by Easterbrook, Landes & Posner, *supra* note 8, at 356–58.

38. This point was made by Easterbrook, Landes and Posner. *Id.* at 359–60.

39. The assumption that firms litigate under contribution but settle under no contribution is made plausible by an examination in the Technical Appendix of defendant firms' expectations of what other defendant firms will do.

the rule of contribution if it had litigated (and lost along with National). On the other hand, if National wins, Acme will have paid its settlement amount unnecessarily. Under contribution, then, Acme can only be made worse off if it settles, and so it will want to litigate.

Under claim reduction, observe first that Acme's situation is the same as if it were the sole defendant. If Acme settles, it will escape any further liability since there is no right to contribution from settling defendants. And if Acme litigates and loses, it will pay $30 million regardless of what National does. This is because Acme's liability if National settled would be $30 million—the joint trebled damages of $60 million less the $30 million share attributable to National.[40] And if National litigates and loses along with Acme, Acme still pays $30 million since there is contribution among litigating defendants under claim reduction.

Because Acme's situation under claim reduction is the same as if it were the sole defendant, Acme has no incentive either to settle or to litigate in the simple case.[41] To be more precise, since Acme is risk neutral, it would be indifferent between litigating, thereby bearing an expected liability of $15 million (50% × $30 million), and settling for that amount.[42]

B. *The Effects of Risk Aversion and Litigation Costs*

Risk aversion implies that defendants in an antitrust suit would have an incentive to settle under claim reduction, in contrast to the simple case, and would have another reason to settle under no contribution besides the one discussed in the simple case. Risk aversion encourages settlement under claim reduction and no contribution, but not under contribution, because settlement eliminates the uncertainty inherent in litigation under the first two rules, but not under the third. However, litigation costs encourage settlement under all

40. Under claim reduction, the share attributable to National does not depend on the actual amount of National's settlement.

41. To explain fully why a single defendant is indifferent between litigating and settling for his expected liability would require consideration of the plaintiff's motives. This complication is taken into account in the Technical Appendix.

42. It may be helpful to mention another way of understanding the general point about claim reduction—that there is not a definite motive to settle or to litigate. The incentive to settle that arises under no contribution is not present because, under claim reduction, a defendant which has not settled when other defendants have will not be exposed to a magnified liability. And the incentive to litigate that arises under contribution is not present because, under claim reduction, settling does prevent a defendant firm from having further liability imposed upon it.

three rules for the obvious reason that settlement avoids such costs.[43]

The effects of risk aversion and litigation costs on the settlement process may be seen in the numerical example. Under no contribution, recall from the simple case that, if National settled for $15 million and Acme litigated and lost, Acme would be liable for $45 million; since Acme faced a 50 percent chance of losing, its expected liability was $22-½ million. Now, if Acme is risk averse, it would rather settle for its expected liability of $22-½ million than litigate and face the risk of having to pay $45 million.[44] Of course, since Acme would also avoid the cost of litigation by settling, Acme would have an even stronger reason to agree to pay $22-½ million. Thus, Acme would have an incentive to settle not only to avoid the magnified liability discussed in the simple case, but also to avoid risk and litigation costs.

Under contribution, recall that Acme had an incentive to litigate. If Acme is risk averse, this incentive is not affected because, as in the simple case, Acme can only be made worse off by having settled. However, Acme's desire to avoid litigation costs would provide an incentive to settle.[45]

Under claim reduction, Acme was indifferent between settling and litigating in the simple case. However, Acme's aversion to risk and its desire to avoid litigation costs would lead it, like a sole defendant, to prefer to settle.

C. *The Effects of Differences of Opinion About Winning*

A defendant firm may have an opinion about its chance of success in litigation that differs from the plaintiff's opinion about that defendant's chance. The defendant might be *relatively* optimistic—believing that its chance of prevailing is better than the plaintiff be-

43. The effects of risk aversion and litigation costs on the settlement decision in a 2-party dispute (one defendant, one plaintiff) have been discussed by, *e.g.*, R. POSNER, ECONOMIC ANALYSIS OF LAW 434-37 (2d ed. 1977); Gould, *The Economics of Legal Conflicts*, 2 J. LEG. STUD. 279, 285-86 (1973); and Landes, *An Economic Analysis of the Courts*, 14 J.L. & ECON. 61, 66-69 (1971).

44. Acme would be willing to settle for more than $22-½ million in order to avoid this risk. Its maximum settlement offer would depend on its degree of aversion to risk.

45. Under contribution, settling does not necessarily eliminate all litigation costs since a settling defendant may incur costs in connection with a contribution claim against it. However, even if the litigation costs resulting from a contribution claim were of the same magnitude as the costs that would have been incurred in the original litigation with the plaintiff, the defendant's *expected* litigation costs would be less if it settled. The settling defendant faces only the *possibility* of litigating a contribution suit since if all other defendants settle, or if they litigate and win, there will be no contribution claim.

lieves it to be—or the defendant might be *relatively* pessimistic—believing the opposite.[46]

One reason for divergence of opinion between the defendants and the plaintiff is that the defendants may have better information than the plaintiff concerning possible antitrust violations. Defendants who are confident that they have committed no violations, or that any violations committed cannot be established at trial, will tend to be relatively optimistic in the sense discussed, whereas defendants who have reason to think they will lose are likely to be relatively pessimistic.[47]

The effects of differences of opinion are similar under no contribution and claim reduction. Under both rules, if a defendant firm is relatively pessimistic, there will be a tendency toward settlement because it would be willing to pay what the plaintiff will demand. However, if it is relatively optimistic, litigation might well result because it would be reluctant to settle for the amount that the plaintiff will demand.

These effects can be illustrated in the numerical example. Under no contribution, Acme had an incentive in the simple case to settle early since if National were to settle for $15 million and Acme were to litigate, Acme's expected liability would be $22-½ million. Suppose now that Acme is relatively optimistic and believes its chance of winning is 90 percent, whereas the plaintiff believes Acme's chance of winning is only 50 percent. In its eyes, Acme therefore faces an expected liability of $4-½ million (10% x $45 million) and will refuse to settle for more than this amount. However, the plaintiff perceives an expected gain from litigation of $22-½ million (50% x $45 million) and will not settle for less. Since Acme and the plaintiff cannot reach a settlement, they will litigate. Alternatively, if Acme is relatively pessimistic and believes its chance of winning is only 10 percent, then it would settle for any amount up to $40-½ million (90% x $45 million). Thus, Acme and the plaintiff would reach a settlement.

Under claim reduction, Acme was indifferent in the simple case

46. The effects of differences of opinion in a 2-party dispute have been discussed, for example, by R. POSNER, *supra* note 43, at 435-36; Gould, *supra* note 43, at 285-86, 288-91; and Landes, *supra* note 43, at 68.

47. To be more precise, suppose a plaintiff cannot distinguish well among different defendants' chances of winning. He will then have to base his opinion on a typical or "average" defendant's chance of winning. Thus, he will underestimate a defendant's chance of winning when it is greater than the average and overestimate a defendant's chance when it is less than the average.

between settling and litigating. Thus, if Acme is relatively pessimistic, it will settle, and if Acme is relatively optimistic, it will litigate.

Under contribution, Acme had an incentive in the simple case to litigate. Differences of opinion do not alter this incentive because, as in the simple case, Acme can only be made worse off by settling.

III. EVALUATION AND CONCLUSION

This part summarizes our analysis of the individual effects of no contribution, contribution, and claim reduction on deterrence and settlement, evaluates the implications of each effect for the choice among the rules, and presents a final recommendation.

A. *Deterrence*

With regard to the overall level of deterrence, several factors determine which of the three rules has the greatest effect. Risk aversion and the desire to settle early to avoid magnified liability increase deterrence under no contribution relative to that under contribution or claim reduction. However, the insulation of firms' decisionmakers from liability may increase deterrence under contribution or claim reduction relative to the level of deterrence under no contribution. Therefore, it is not possible to conclude in general which rule has the greatest overall deterrent effect.

Although a greater overall level of deterrence reduces socially undesirable behavior, the choice among the rules is indeterminate in this respect for the reasons just reviewed. However, to the extent that greater deterrence is achieved by imposing large financial risks, it has socially undesirable consequences. All individuals whose welfare depends on a firm's profitability—such as employees generally as well as poorly diversified stockholders—are subject to the uncertainty of antitrust liability. Such uncertainty creates disutility for risk averse individuals.[48] This disadvantage is greatest under no contribution, where the risks imposed are larger than under either contribution or claim reduction.

With regard to the allocation of deterrence (as opposed to its overall level), either contribution or claim reduction is preferable to

48. *See generally* K. ARROW, ESSAYS IN THE THEORY OF RISK-BEARING 134-43 (1971). For a discussion of the importance of this consideration in deterrence theory, see Polinsky & Shavell, *The Optimal Tradeoff between the Probability and Magnitude of Fines*, 69 AM. ECON. REV. 880 (1979). And for an application to antitrust enforcement, see Block & Sidak, *The Cost of Antitrust Deterrence: Why Not Hang a Price Fixer Now and Then?*, 68 GEO. L.J. 1131, 1135-39 (1980).

no contribution, since the latter's imprecise allocation of liability may discourage certain socially desirable activities while nonetheless failing to deter some antitrust violations.

B. *Settlement*

There is an underlying tendency toward settlement under no contribution and toward litigation under contribution, although there is no underlying tendency either way under claim reduction. However, the desire to avoid litigation costs encourages settlement under all three rules, and the wish to avoid risk also promotes settlement under no contribution and claim reduction. Differences of opinion about winning may increase or decrease the desire to settle under no contribution and claim reduction.

Based on these underlying tendencies, no contribution would be preferable to claim reduction, and claim reduction would be preferable to contribution, assuming that higher rates of settlement are socially desirable.[49] The effects of risk aversion, litigation costs, and divergence of opinion narrow the differences suggested by the underlying tendencies, especially between no contribution and claim reduction.

C. *Conclusion*

Although the rules cannot be ranked in terms of their overall levels of deterrence, the difference in the risks they impose in order to achieve deterrence argues against no contribution. The rules can be ranked in terms of their allocation of deterrence among firms, and this factor favors a rule of contribution or claim reduction. Ranking the rules in terms of their effects on settlement rates supports no contribution over claim reduction, and claim reduction over contribution, although there are important factors that diminish the differences in settlement rates.

Since no rule is favored by all of the considerations, any conclusion must be based on assumptions about their relative importance. Assuming that the considerations of the imposition of risk and the allocation of liability outweigh in importance the consideration of differences in settlement rates and the possible consideration of the overall level of deterrence, we recommend the use of claim reduction

49. It is widely presumed that higher rates of settlement are socially desirable because of the savings in litigation costs and judicial resources. *See, e.g.*, Note, *Contribution in Private Antitrust Actions*, *supra* note 6, at 1551 & n.63.

over contribution or no contribution, and as between the latter two rules, prefer, more tentatively, contribution.[50]

TECHNICAL APPENDIX

In this appendix, we will refer to two firms, "A" and "N," each of which decides whether to engage in a certain business activity and, if it does engage in the activity, whether to jointly violate the antitrust laws.[51] The analysis of this situation will be based on the following

50. As noted before, Easterbrook, Landes and Posner recommend, with some qualifications, the use of no contribution over either contribution or claim reduction (although they do prefer claim reduction to contribution). *See* text accompanying notes 8-9 *supra*. The different conclusions may be explained by comparing their analysis of deterrence and settlement with ours.

We agree with them that the desire to settle early to avoid magnified liability and the effect of risk aversion both tend to increase the overall level of deterrence under no contribution relative to that under contribution or claim reduction. However, we attach more importance to the undesirable consequences of the greater risks created under no contribution. Moreover, Easterbrook, Landes and Posner discount the effect of insulation of firms' decisionmakers from liability, Easterbrook, Landes & Posner, *supra* note 8, at 349 n.46, which may lead to greater deterrence under contribution or claim reduction. They do not discuss the allocation of liability, which generally favors contribution or claim reduction.

With regard to the settlement process, we agree with Easterbrook, Landes and Posner about the underlying tendencies under the three rules. However, they do not discuss how the effects of risk aversion, litigation costs, and divergence of opinion may narrow the differences suggested by these tendencies.

An additional consideration noted by Easterbrook, Landes and Posner in favor of no contribution is its apparent administrative simplicity relative to contribution or claim reduction. Although we do not believe that this consideration is of sufficient importance to change our general recommendation, there may be classes of antitrust cases in which the measurement of contribution or claim reduction shares is particularly difficult. In these cases, we would recommend a simple pro rata rule for determining contribution or claim reduction shares (or some other easily implemented rule), even though such a rule would lead to imprecise targeting of liability to some extent (*e.g.*, small firms might be overdeterred). The degree to which administrative cost considerations are thought to be important varies among commentators. *See, e.g.*, Note, *Contribution in Private Antitrust Actions*, *supra* note 6, at 1549-51; Note, *supra* note 9, at 823-25.

51. It will be clear to the reader of the Technical Appendix that the model to be studied could easily be extended to allow for more than two defendant firms without changing the qualitative nature of the results. With regard to deterrence, in the simple case the expected liabilities of each of several defendant firms would still be identical under all three rules. The arguments explaining the effect of risk aversion and the insulation effect obviously will not be altered by the number of defendant firms. The argument concerning the allocation of liability will still apply, given appropriate modification (such as allowing a subset of the potential defendant firms to commit the violation). Similarly, the analysis of settlement will not be changed in any essential way. In the simple case, it will be clear that there will be equilibria in which all firms settle under no contribution and in which all firms litigate under contribution. *See* text accompanying notes 67-68 *infra*. And under claim reduction, the liability of one firm is not affected by another firm's behavior regardless of the number of firms. Also, it should be clear from the text that the general effects of litigation costs, risk aversion, and differences of opinion do not depend on the number of defendants.

assumptions:

(i) Each firm's earnings are zero if it decides not to engage in the activity, e if it chooses to engage in the activity but not to violate the antitrust laws, and e + g if it does decide to violate them. (Also, e and g are positive.)

(ii) A firm causes positive harm if it violates the antitrust laws.[52]

(iii) The firms and the plaintiff (only one plaintiff will be assumed) are risk neutral, unless otherwise noted.

(iv) Social welfare is the sum of the firms' expected profits (or, if they are not risk neutral, of their expected utilities of profits) and the monetary equivalent of consumers' welfare.[53]

Since $e > 0$ and the harm from a violation is positive, the "ideal" or social-welfare-maximizing outcome is clearly for both firms to engage in the activity but not to violate the antitrust laws.[54]

Other assumptions concerning suit, settlement, and the outcome of litigation—including the possibility of mistake—will be introduced below.

1. *Deterrence*

In order to focus on deterrence, it will be assumed that if a firm is sued, litigation will be costless and will always result; settlement will, for now, be assumed never to occur. Under contribution or claim reduction, a firm that is sued and found liable will pay treble damages, that is, 3g.[55]

The simple case: Here several additional assumptions will be made. First, the firms will not be sued unless they have violated the antitrust laws; in other words, there are no mistakes. Second, the only type of violation will be a joint violation—either both firms will be found liable or neither will be. The probability of suit and a finding of liability is $r > 0$. Third, if there is a finding of liability under

52. The harm would include the "deadweight" loss from monopoly pricing. *See, e.g.*, J. HIRSHLEIFER, PRICE THEORY AND ITS APPLICATIONS 344-46 (2d ed. 1980).

53. It is assumed for simplicity that consumers are risk neutral. The qualitative nature of the points made would not be affected if consumers were risk averse.

54. Note that gains to firms from violations are losses to consumers and that liability payments made by firms are received by consumers. Thus, the fact that there is positive harm means that violations reduce social welfare.

55. The justification for this assumption is clear. As discussed in the text, the ultimate effect of allowing contribution is that each of two liable defendants pays 3g; and the ultimate effect of claim reduction is the same, presuming a right to contribution among litigating defendants.

no contribution, each of the firms will face a probability of ½ of being liable for the joint trebled damages of 6g.

Since a firm that does not violate the antitrust laws will not be sued, both firms will choose to engage in the business activity. If a firm violates the antitrust laws, its expected liability under no contribution will be $(r)(\frac{1}{2})(6g) = 3rg$; and its expected liability under contribution or claim reduction will be $(r)(3g) = 3rg$. Thus, *under the different rules the expected liabilities from a violation will be identical, and both firms will violate the antitrust laws under the same circumstances*. Specifically, since if the firms do not violate the laws they earn e, and if they do violate them, their expected earnings are $e + g - 3rg$, they will violate the laws if $r \leq \frac{1}{3}$.[56]

The effect of risk aversion: While maintaining all of the other assumptions of the simple case, suppose now that the firms are risk averse—each having a strictly concave utility of profits function U. Then, as before, the firms will choose to engage in the activity. If a firm violates the antitrust laws, its expected utility under no contribution, EU_n, will be

(1) $EU_n = r[\frac{1}{2}U(e + g - 6g) + \frac{1}{2}U(e + g)] + (1 - r)U(e + g).$

Under contribution or claim reduction, its expected utility, EU_c, will be

(2) $EU_c = rU(e + g - 3g) + (1 - r)U(e + g).$

Since $EU_c > EU_n$,[57] *the firms might violate the antitrust laws under contribution or claim reduction, but not under no contribution.*. Specifically, since a firm's utility will be U(e) if it does not violate the laws, if $EU_c > U(e) > EU_n$, the firms will choose to violate the laws under contribution or claim reduction and will be deterred under no contribution. (Of course, if $EU_n > U(e)$, they will violate the laws under all the rules; and if $U(e) > EU_c$, they will be deterred under all the rules.)

The effect of insulation: Suppose now that each firm is managed by a risk neutral decisionmaker whose earnings are an increasing function f of his firm's profits,[58] that each decisionmaker pays m, where m

56. If the gain from a violation equals the expected liability, firms will be assumed to violate the laws; similar assumptions will be made below without further comment.

57. This is true since by the strict concavity of U, $U(e + g - 3g) > \frac{1}{2}U(e + g - 6g) + \frac{1}{2}U(e + g)$.

58. The assumption that the decisionmaker's earnings are based on the firm's actual profits rather than its expected profits might be explained by the fact that shareholders cannot easily determine its expected profits (because of difficulty in monitoring the decisionmaker's behavior or the firm's set of opportunities).

$< 3g$, if his firm is found liable, but maintain all of the other assumptions of the simple case. Then, again, the firms will engage in the activity. And if a decisionmaker violates the antitrust laws, his expected wealth under no contribution, EW_n, will be

(3) $EW_n = f(e + g) - r(\frac{1}{2}m)$.

Under contribution or claim reduction, his expected wealth, EW_c, will be

(4) $EW_c = f(e + g) - rm$.

Since $EW_n > EW_c$,[59] *the firms might violate the antitrust laws under no contribution but not under contribution or claim reduction*. This will be the case if $EW_n > f(e) > EW_c$. (If $EW_c > f(e)$, the firms will violate the laws under all the rules, and if $f(e) > EW_n$, they will violate the laws under none of them.)[60]

The effect of imprecise allocation of liability: In this subsection, several of the assumptions made in the simple case are altered. First, if both firms are sued and found liable under no contribution, one of them, say A, will pay the entire judgment with probability $p > \frac{1}{2}$, and the other firm, N, will pay the entire amount with probability $1 - p$.[61]

Second, a firm that engages in the business activity but does not violate the antitrust laws might be sued and, by mistake, be found liable.[62] More precisely, if both firms engage in the activity, the assumptions will be as follows. If one firm is a violator and the other is not, the violator will be found liable with probability r; *conditional* on that event, the other firm mistakenly will be found liable of a joint violation with probability s. This other firm, however, will never be found singly liable of a violation. (Thus, for example, suppose N is a violator and A is not. Then the probability of N alone being liable is $r(1 - s)$; that of N and A being liable is rs; and that of neither being

59. This would also be true under the assumption that the decisionmaker pays up to m and that $3g < m < 6g$. In this case, (3) would not be changed, but (4) would become $EW_c = f(e + g) - r3g$. Since $m < 6g$, it follows that $EW_n > EW_c$.

60. The claims of this subsection would also hold if what the decisionmaker pays if his firm is found liable is an increasing and strictly concave function q of what the firm pays. In this case,

$$EW_n = f(e + g) - r(\tfrac{1}{2}q(6g)),$$
$$EW_c = f(e + g) - r(q(3g)).$$

Since (by concavity of q) $\frac{1}{2}q(6g) < q(3g)$, it follows that $EW_n > EW_c$.

61. Recall from the text that such factors as the assets of a firm and the nature of its business relationship with the plaintiff may affect the likelihood of its having to pay more than its share of damages. *See* text accompanying notes 28-29 *supra*.

62. Recall from note 31 *supra* that there are reasons other than a mistake on the part of a court why a firm that does not intend to violate the antitrust laws might be found liable; the term "mistake" is used here only for convenience.

liable is $1 - r$.) Also, if both firms are violators, then the only type of violation will be a joint violation, and the probability of the firms being found liable is r. Finally, if neither firm is a violator, then neither will ever bear liability.

We will now show that *whenever the ideal outcome* (A and N both engage in the activity and are both deterred from antitrust violations) *would result under no contribution, it would also result under contribution or claim reduction. However, the converse is not true; the ideal outcome might result under contribution or claim reduction but not under no contribution.*

To establish the first result, assume that under no contribution, A and N engage in the activity and neither violates the antitrust laws. Assume also that each firm's behavior is in its self-interest, given that it takes the other's behavior as fixed; and its expectations are correct. Thus, since N does not violate the laws and believes A did not either, N's expected liability, given its beliefs about A, must exceed its potential gain from a violation:[63]

(5) $r(1 - s)3g + rs(1 - p)6g > g.$

Inequality (5) may be rewritten as

(6) $r3g + rs3g(1 - 2p) > g.$

Since $p > \frac{1}{2}$, (6) implies that

(7) $r3g > g.$

Thus, since each firm's expected liability under contribution or claim reduction is r3g (regardless of what the other firm does), neither firm will violate the laws under these rules. It remains to observe that both firms will engage in the activity under contribution or claim reduction, since they each earn a positive amount e and face no expected liability if they decide not to violate the law.

To show that the converse is not true, note again that if (7) holds, an ideal outcome is achievable under contribution or claim reduction. However, from (6), it is evident that (7) does not imply (5). In other words, if p is large, firm N might not be deterred under no contribution; for this reason alone, an ideal outcome may not be achievable under no contribution even when it is under contribution or claim reduction.

Moreover, it should be noted that an equilibrium might not exist under no contribution: If N is not deterred from an antitrust viola-

63. The first term in (5) is attributable to the possibility that N alone would be liable (which happens with probability $r(1 - s)$ and involves damages of 3g), while the second is attributable to the possibility that both N and A would be found liable (which happens with probability rs) and that N must pay the entire judgment (which happens with probability $1 - p$ given a finding of liability and involves the amount 6g).

tion, then A may decide not to engage in the business activity at all. This is because A's expected liability if it engages but does not violate the laws would be positive and might exceed e. But if A decides not to engage, then N's expected liability if it violates the laws would be r3g, so it would be deterred. But if N is deterred, A would be induced to engage in the activity, since if it did not violate the laws its expected liability would be zero.[64] Thus, the problems of too little deterrence and of withdrawal from socially beneficial business activities can both occur under no contribution.[65]

2. *Settlement*

In order to focus on the process of settlement, it will be assumed in this section that both firms have already been sued. The settlement process will then be assumed to proceed as follows. The defendants independently and simultaneously make settlement offers to the plaintiff, who subsequently decides whether or not to accept the offers.[66]

The rules for the sharing of liability operate exactly as before if both defendant firms litigate. However, if one firm settles for an amount w and the other litigates, then the litigating firm's liability if it loses is 6g − w under no contribution, 3g under contribution (the initial liability of 6g − w is reduced to 3g after contribution from the settling defendant), and 3g under claim reduction (the joint trebled

64. For example, suppose that $e = 5$, $g = 24$, $p = .9$, $r = .35$, and $s = .2$. Then $r3g = 25.2 > 24 = g$, so under contribution or claim reduction, there is an equilibrium with both firms engaging in the activity but not violating the antitrust laws. However, under no contribution, if N believes A did not violate the laws, then N's expected liability from a violation would, from (5), be $r(1 - s)3g + rs(1 - p)6g = 21.168 < 24 = g$, so N would not be deterred. If N is not deterred, then A's expected liability due to mistake from engaging in the activity is $rsp6g = 9.072 > 5 = e$, so A would decide against engaging in the activity, etc.

Readers familiar with the "unraveling" argument of Easterbrook, Landes & Posner, *supra* note 8, at 344-49, should note that in the sequence of events described here N might choose to violate the antitrust laws. This is because the possibility of mistake may result in A facing a positive expected liability, so N's expected liability is less than it would be if there were no possibility of mistake and N alone violated the antitrust laws.

65. It should be obvious to the reader that this outcome would be true in many natural generalizations of the model used here. For example, consider a model in which each firm can choose the extent of participation in an activity and can affect the likelihood of an antitrust violation by spending money on an internal antitrust compliance program (and assume that there are no mistakes). It can be shown that firms which expect to pay a disproportionately large share of liability under no contribution will engage in the activity to an insufficient extent and will spend too much on compliance, while firms which expect to pay a small share will do just the opposite.

66. There are, of course, many other settlement processes that could be considered, involving sequences of offers, counteroffers, and threats.

damages of 6g are reduced to 3g after subtracting the share of damages attributable to the settling defendant).

The simple case: In this case, it will be assumed that there are no litigation costs, that the firms and the plaintiff are risk neutral, and that all agree that if there is a trial, the firms will be found to have committed a joint violation with probability $r < 1$—and neither will be found to have committed a violation alone (even if it is the only litigant). Also, if both firms litigate and are found liable, under no contribution each will have to pay the joint trebled damages of 6g with probability ½.

Now consider the expected liabilities of a firm that decides to litigate under no contribution, contribution, and claim reduction. These expected liabilities will depend on whether the firm believes that the other firm will settle or litigate.

Under no contribution, if a firm believes that the other firm will settle for w, the former's expected liability if it litigates is

(8) $r(6g - w)$,

whereas if it thinks the other firm will litigate, its expected liability if it also litigates is

(9) $r3g$.

Under contribution, a firm's expected liability after contribution is also given by (9), regardless of its beliefs about the other firm's behavior. Under claim reduction, the same is true.

Let us now determine equilibria in which each firm's behavior is in its self-interest, given the other's behavior, and each firm's expectations are correct. Under each rule, we will consider two types of equilibria—where both firms settle or where both litigate.

Under no contribution, assume first that each firm believes the other will settle for w. Then the settlement offer each will make is its expected liability if it were to go to trial, $r(6g - w)$.[67] Assuming settlement offers are identical,

(10) $w = r(6g - w)$,

or, since $r < 1$,

(11) $w = (1/(1 + r))r6g > r3g$.

The plaintiff will accept the offers since his expected gain from going to trial would be only r3g from each firm. Now assume that each firm believes the other will litigate. Then the settlement offer each

67. The implicit assumption made is that the firm does not offer less than its expected liability in the hope that the plaintiff might settle for less. Relaxing this assumption would not alter the qualitative nature of the results.

will make is its expected liability were it to go to trial, r3g. Since the plaintiff will be indifferent between settling or litigating, there is an equilibrium involving litigation. Which type of equilibrium is most plausible? Since the plaintiff would prefer the settlement equilibrium (see (11)), one might expect him to promote settlement (in ways not explicitly incorporated in the model of the simple case). Thus, the settlement equilibrium might be considered to be more likely.

Under contribution, assume first that each firm believes the other will settle. Then each will make a settlement offer equal to the expected liability were it to litigate of r3g, and the plaintiff would be just willing to accept this offer. Now assume that each firm believes the other will litigate. Then its expected liability were it to settle for w would be

(12) $w + r(3g - w) = (1 - r)w + r3g$,

since if the other firm loses, $3g - w$ would be paid in contribution (so as to raise the total payment to $w + 3g - w = 3g$). If the firm litigates, its expected liability is r3g. Thus, the firm would not make a positive settlement offer, and litigation would result. Between the two equilibria, the one leading to litigation seems more plausible. This is because, as long as each firm believes there is any probability that the other will litigate, essentially the argument given above shows that both will decide to litigate.

Under claim reduction, regardless of whether each firm believes the other will litigate, its expected liability if it litigates is r3g. Thus, each firm will make a settlement offer of r3g. The plaintiff will be indifferent between accepting both offers and rejecting them. Thus, equilibria involving settlement or litigation seem equally plausible.

The effects of litigation costs, risk aversion, and differences of opinion: It is clear from earlier theoretical analyses[68] of these factors that (i) litigation costs and risk aversion make it mutually desirable for a defendant and a plaintiff to settle, other things equal; and that (ii) a defendant's optimism relative to the plaintiff may make litigation mutually attractive, other things equal, and that a defendant's pessimism relative to the plaintiff may make settlement mutually attractive, other things equal. The only qualification is that, as explained in the text, risk aversion and differences of opinion do not affect the incentive to litigate under contribution.

68. See references cited in note 43 *supra*.