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AN ECONOMIC ANALYSIS OF ALTERNATIVE DAMAGE RULES FOR BREACH OF CONTRACT*

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I. INTRODUCTION

I ORDER SIX gross of customized battens from you, paying in advance. Before the delivery date I call you up and cancel the order. How much of the price should you be obliged to give back to me, and how much are you entitled to keep as compensation for my refusal to fulfill my half of the purchase contract? More generally, what is the appropriate rule for determining the damages for breach of contract?

In discussions of this question, both in the traditional legal and the more recent economic literature, one important issue is whether a buyer who breaches should be required to reimburse the seller for his lost profit. Put differently, the question is whether the damages should be sufficient to make the seller as well off as he would have been if the buyer had not breached ("expectation damages"), or only as well off as he would have been if the buyer had not purchased in the first place ("reliance damages").¹

Under the former rule, the seller would refund to the buyer whatever money was saved by not completing the battens, including anything he could get for them in their uncompleted condition. He would then be as well off as if the buyer had not breached the contract—he would receive his expectation. Under the latter rule, the seller would figure out how

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¹ Restatement (Second) of Contracts § 344(a),(b) (1981). The reliance rule is so called because the seller is compensated for costs, such as the cost of producing customized goods which cannot be resold, incurred because he was relying on the buyer to accept what he had ordered.

much he had spent so far on producing the battens net of what he could sell them for. That sum, called his reliance, would be subtracted from what he had been paid, and the remainder would be returned to the buyer. The seller, having been compensated for the cost of having the contract made and broken, would be as well off as if the battens had never been ordered.

Much of the literature on damage rules for breach of contract argues that an expectation rule leads to an economically more efficient result than does a reliance rule and that damages should therefore include compensation for the seller's lost profits.² This article argues that that conclusion is mistaken. Where the two rules lead to different results, there is no general reason to prefer the rule that reimburses the seller for his lost profits. In some cases, that rule produces a less efficient outcome than the alternative. In general, which rule is more efficient depends on the details of the particular situation.

In order to focus on the lost-profits issue, I am deliberately avoiding a number of the complications discussed in the literature, such as how to measure the amount of damage³ and how to prevent the damage rule from generating inefficient levels of reliance.⁴ In all of the examples I will consider, the amount of reliance is fixed; it cannot be varied by either party. I assume that buyers and sellers are risk neutral, that the market interest rate is zero, that the court can costlessly measure the producer's costs, and that resale by the buyer is prohibitively costly. I limit my discussion to contracts to purchase goods or services, and further limit it to cases in which reliance is by the seller and the decision to breach is made by the buyer. The applicability of the conclusions to a much wider range of situations will, I think, be clear.

As has been pointed out by a number of writers,⁵ the issue of lost profits

² Thus, for instance, the third sentence of Goetz & Scott, *Measuring Sellers' Damages: The Lost-Profits Puzzle*, 31 *Stanford L. Rev.* (1979) reads: "The answer seems simple: The seller should be awarded damages sufficient to place it in the same economic position it would have enjoyed had the buyer performed the contract." The most careful and detailed analysis of the case for expectation damages that I have seen is Steven Shavell, *Damage Measures for Breach of Contract*, 11 *Bell J. Econ.* 466 (1980).

³ For instance, Goetz & Scott, note 2 *supra*.

⁴ This is one of the central issues of Shavell, note 2 *supra*. Consider a situation where the seller is choosing between two alternative production technologies, one of which results in lower production costs than the other if the goods are produced, but higher reliance costs if the order is canceled. If the seller knows that, in case of breach, he will be compensated for any reliance costs, he will choose his optimal technology as if the probability of breach were zero; the result is an inefficiently high level of reliance.

⁵ The first reference to this point that I have come across is in Fuller & Perdue, *The Reliance Interest in Contract Damages*: I, 46 *Yale L. J.* 52 (1936). See also Goetz & Scott, note 2 *supra*. Cooter & Eisenberg, in *Damages for Breach of Contract*, 73 *Calif. L. Rev.*

only arises when there are profits to lose. Under conditions of perfect competition, price normally equals marginal cost; the producer is indifferent between selling and not selling an additional unit. In this case, the damage rule "make the seller as well off as if the purchaser had not breached" leads to the same result as the rule "make the seller as well off as if the purchaser had not bought."¹⁶

The issue of lost profits arises when, for some reason, price is not equal to marginal cost. One such situation, imperfect competition, is analyzed in Part III of this article and another, perfect competition with uncertain cost, in Part IV. Part V summarizes the conclusions.

II. THE CASE FOR LOST PROFITS AND WHAT IS WRONG WITH IT

The argument in favor of an expectation rule can be stated very simply. An individual will breach a contract if his private benefits from breach are

1434, 1449 (1985), point out that the argument that there are no profits applies only to a marginal sale. They argue that expectation and reliance damages become equal (under perfect competition) only as the probability of breach approaches zero. Their argument is based not on the fact that in competitive equilibrium there are no profits to be lost but on the fact that in competitive equilibrium the demand curve faced by a firm is perfectly elastic: if the firm did not make one sale (the one that is going to be breached), it could have made another. The argument may be summarized as follows:

"The seller contracts to produce a good at a price P . He produces it, but buyer refuses to take delivery. In a competitive market, if the seller had not made that contract he would have made an identical contract instead. That contract would have been fulfilled with a probability $1 - p$, where p is the probability of breach. As p approaches zero, the result of reliance damages (making the seller as well off as if he had made another contract with probability $1 - p$ of fulfillment) approach those of expectation damages (making the seller as well off as if he had made this contract and it had been fulfilled). As long as $p > 0$, reliance damages are less than expectation damages."

The mistake in this is that it ignores the damage payment that the seller would receive if he made another contract and it was breached. Let D be the damages for breach of contract, whether for the actual contract or the hypothetical replacement contract, and π the net gain to a firm of making a contract and having it fulfilled. If the firm had made another contract, it would have had a probability $1 - p$ of fulfillment with gain π and a probability p of breach, with gain D , so reliance damages require that

$$\begin{aligned} D &= (1 - p)\pi + pD, \\ \therefore D - pD &= (1 - p)\pi = (1 - p)\pi, \\ \therefore D &= \pi. \end{aligned}$$

So the seller is entitled to recover his lost profits, just as with the expectation rule, even if $p \neq 0$.

¹⁶ This article is concerned with damage rules in situations where reliance and expectation lead to different results. The distinction between reliance and expectation rules might also be of interest in situations where the two rules, properly applied, lead to the same result, but one is easier to apply than the other. It might, for instance, be easier to measure the price of a good and the cost of completing it and calculate expectation damages as the difference between the two than to calculate the cost of reliance.

greater than his private costs. He ought to breach (from the standpoint of economic efficiency) if social benefits—total benefits to everyone affected, himself included—are greater than social costs. The seller's lost profit is one of the costs of breach. By requiring the purchaser to bear this cost in the form of damages, we add it to the private costs which go into his decision. If his benefit from breach is still greater than his cost, then he ought to breach—doing so produces a net gain—and he will. If not, he ought not to, and will not. So including the seller's lost profits in the damages leads to efficient breach.⁷

While this rule leads to efficient breach, it does not follow that it is an efficient rule. The damage rule sets the cost of breaching the contract and thus the buyer's incentive to avoid doing so. There are, however, two ways of avoiding breach. One is not to breach the contract and the other is not to sign it in the first place. The expectation rule provides the right incentive on only one of the two margins.⁸

In some circumstances, as we shall see in Parts III and IV, the purchase price provides the correct incentive on the other margin, making the argument for expectation damages a valid one. In other circumstances it does not. In the latter case, there are advantages to both the reliance and the expectation rules; which is preferable depends on the details of the situation.

III. IMPERFECT COMPETITION

This part of the article analyzes the effect of different damage rules under circumstances of imperfect competition, concentrating on the simple case of a single-price monopoly. In order to make this analysis, more than the direct effect of the rule on the decision to breach or not to breach must be considered. If a purchaser knows that circumstances may arise in which he will want to breach the contract, then a change in the damage

⁷ This argument appears in verbal form in Cooter & Eisenberg, note 5 *supra*, and more formally in Shavell, note 2 *supra*. Its first statement may be in John H. Barton, *The Economic Basis of Damages for Breach of Contract*, 1 J. Legal Stud. 277 (1972).

⁸ I have been able to find only two articles in which the effect of the damage rule on the formation of the initial contract plays an important role. One is Peter Diamond & E. Masking, *An Equilibrium Analysis of Search and Breach of Contract, I: Steady States*, 10 Bell J. Econ. 282 (1979). It analyzes a very different problem from the one discussed here. Potential contract partners are involved in a stochastic search process; breach occurs when a searcher finds someone with whom he can form a better contract than the one he already has. The other is Barton, note 7 *supra*. On pages 296–99 he analyzes, if I correctly understand him, a situation which combines bilateral monopoly and asymmetric information. He does not assume rational expectations—the worse-informed party appears to act on an assumption which is wrong on average as well as in the particular case.

rule, like a change in price, affects whether and how much he buys, shifting his demand curve. A change in the damage rule also changes the seller's profit function by affecting how much he gets in case of breach. The result is to alter the monopolist's profit-maximizing price, the quantity initially ordered, and the quantity ultimately consumed. All of these effects must be taken into account in deciding which damage rule to prefer.

In the case of imperfect competition, an expectation-damages rule fixes only part of the problem. The purpose of the rule is to give the consumer the right incentive to breach or not to breach. But the consumer still has the wrong incentive to buy or not to buy. The efficient rule for that decision is to buy if the value of a unit of the good to the consumer is greater than the cost of producing it. The rule the consumer will follow, however, is to buy if the value is greater than the price. If the price of the good is greater than the cost of producing it, the consumer will sometimes fail to buy even though, from the standpoint of economic efficiency, he should—whenever the value of the good to him is more than its marginal cost but less than its price. This inefficiency is the traditional economic argument against monopoly. If the price were not greater than the cost of production, expectation and reliance rules would yield the same result, so the inefficiency of monopoly pricing is intimately related to the evaluation of the two rules.

The same fact—price greater than cost—that makes the consumer buy too little also, under reliance damages, makes him breach too often. The consumer fails to buy if, at the time of purchase, the value to him of the good is less than its price. He fails to take delivery if, between the time of purchase and the time of breach, something happens that lowers the good's value to him below its price. In both cases, the efficient decision would be to consume the good if its value is greater than the marginal cost of producing it.

The argument that implies that efficient breach requires the consumer to pay damages equal to lost profits if he breaches also implies that he should pay the same damages if he fails to purchase in the first place. That decision also results in lost profit to the seller, and will be made efficiently only if that cost is taken into account by the buyer.

Single-Price Monopoly

The argument can be made more concrete by applying it to a specific case. Assume a producer with a monopoly of a particular good. His marginal cost curve is horizontal; for simplicity, fixed cost is assumed to

be zero. He sells at a single price to a large number of identical consumers. Units are customized; a unit produced for one consumer cannot be resold to another.⁹

The good is produced in a two-step process. The first stage, which occurs after the order but before the consumer decides whether to breach, costs the producer R per unit; this is his reliance. If the contract is breached, the unit is junked; it has no scrap value.¹⁰ Completing the good costs an additional $MC - R$ per unit.

Each consumer faces an uncertain future. There is a probability p that, between the time he orders and the time he takes delivery, an event will occur that will lower the good's value to him. The event occurs separately for each consumer and the probabilities are independent; since there are many consumers, the fraction for whom the event does occur will be very close to p . In Figures 1-7, p is .5.

Each consumer's total value function for the good is $TV_1(Q)$ if the event does not occur and $TV_2(Q)$ if it does; the corresponding marginal-value functions are MV_1 and MV_2 . Since the event lowers the value of the good, we assume that MV_2 is below MV_1 for all values of Q . $MV_{1,2}$ are assumed continuous and monotonically decreasing.

We consider two possible damage rules: reliance and expectation. Under the reliance rule, a consumer who takes delivery of fewer units than he ordered must reimburse the seller only for his reliance; the seller refunds to the buyer $P - R$ for each unit that the buyer has decided he does not want. Under the expectation rule, the consumer receives back only $MC - R$ for each unit he chooses not to accept. In this case, the penalty for breach is the difference between the contract price and the cost of completing the good—the breaching consumer must reimburse the seller for his lost profits.

I will show that the problem defined by TV_1 , TV_2 , and R can be converted, under either rule, into an equivalent problem with new total value

⁹ An example of a real firm that comes fairly close to fitting the description of this section would be an elite university such as Harvard or MIT. It has a considerable degree of monopoly since, as any (Harvard) man will gladly explain, there is no substitute for a Harvard education. Many students drop out before receiving their degrees for personal reasons which, from the university's standpoint, may be viewed as random events. Unlike the firms analyzed here, however, universities engage in extensive discriminatory pricing. There is also some question whether they behave like profit-maximizing firms.

¹⁰ More generally, R represents whatever costs the producer bears as a result of a consumer ordering and then canceling. These might include modifying a customized unit to resell, finding a customer for a unit that was not customized, or simply adjusting to the additional uncertainty due to one consumer being willing to breach one more unit if the event occurs. If the good is not customized and the number of customers is large, this last case should involve a very small R , due to the law of large numbers.

curves, TV_1^* , TV_2^* , and zero reliance. By solving that problem in the case where MV_1^* and MV_2^* are parallel straight lines, a situation that happens to lead to a particularly simple solution, I will show, for each rule, that there exist circumstances in which that rule produces the superior outcome.

Reliance Damages

We start with reliance damages. The consumer orders a quantity Q_1 . If the event does not occur, he accepts delivery and receives a benefit $TV_1(Q_1)$ at a cost PQ_1 . If the event does occur, he breaches a quantity equal to $(Q_1 - Q_2)$, consumes Q_2 , and receives a benefit $TV_2(Q_2)$ at a cost $PQ_2 + R(Q_1 - Q_2)$; the final term is the damage payment. If NB_r is the consumer's net benefit under a reliance rule,¹¹ we have

$$\begin{aligned} NB_r(Q_1, Q_2) = & (1 - p)[TV_1(Q_1) - PQ_1] \\ & + p[TV_2(Q_2) - PQ_2] - pR(Q_1 - Q_2). \end{aligned} \quad (1)$$

The consumer chooses Q_1 , Q_2 to maximize NB_r . He does so subject to the constraint $Q_1 \geq Q_2$, since he does not have the option of ordering Q_1 at a price P and then breaching a negative quantity by ordering additional units at a cost of $P - R$.

I consider two alternatives: case 1, where the constraint is not binding, and case 2, where it is. I start with case 1, where

$$0 = dNB_r/dQ_1 = (1 - p)[MV_1(Q_1) - P] - pR, \quad (2)$$

$$\therefore P = MV_1(Q_1) - Rp/(1 - p) \equiv MV_1^*(Q_1), \quad (3)$$

$$0 = dNB_r/dQ_2 = p[MV_2(Q_2) - P] + pR, \quad (4)$$

$$\therefore P = MV_2(Q_2) + R \equiv MV_2^*(Q_2). \quad (5)$$

Ordinarily an individual's demand curve is equal to his marginal-value curve, since he maximizes his net benefit by buying the quantity for which price equals marginal value.¹² We have a similar result here, except that the demand curve showing the quantity consumed in state 1 (event does not occur, probability $1 - p$) is equal to $MV_1^*(Q_1)$, shifted down from $MV_1(Q_1)$ by $pR/(1 - p)$, while the demand curve for state 2 is the corresponding marginal-value curve shifted up by R .

¹¹ Here and elsewhere, benefits and costs are expected values, since both consumers and producers are assumed risk neutral.

¹² Provided that the marginal-value curve is monotonic down, as we have assumed. When I say that a demand curve equals a marginal-value curve, I mean that they are the same line. Considered as functions, D shows quantity as a function of price, and MV shows marginal value as a function of quantity.

Under the reliance rule, damages for breach just compensate the producer for the cost of producing units that are not accepted; the producer is in the same position as if the consumer had ordered the number of units that he ends up accepting. So we have

$$\pi = (1 - p)Q_1(P - MC) + pQ_2(P - MC) = D^*(P)(P - MC),$$

where

$$D^*(P) \equiv [(1 - p)Q_1 + pQ_2].$$

The producer makes the same profit as if he had sold a quantity $D^*(P)$ at a price P . The curve $D^*(P)$ is simply the horizontal weighted average of the demand curves corresponding to MV_1^* and MV_2^* , with weights $(1 - p)$, p .¹³

So far we have considered the case in which the constraint $Q_1 \geq Q_2$ is not binding. The consumer orders Q_1 ; if the event occurs, he cancels part of the order and gets back $P - R$ on each unit canceled. If, however, $MV_2(Q_1) > P - R$, the consumer will choose not to breach, and equations (2)–(5) no longer hold. We have instead

$$NB_r(Q_1, Q_2) = (1 - p)TV_1(Q_1) + pTV_2(Q_1) - PQ_1,$$

$$Q_2 = Q_1.$$

Maximizing NB_r with respect to Q_1 yields

$$0 = dNB_r/dQ_1$$

$$= [(1 - p)MV_1(Q_1) + pMV_2(Q_1)] - P,$$

$$\therefore P = (1 - p)MV_1(Q_1) + pMV_2(Q_1) \quad (6)$$

$$= (1 - p)MV_1^*(Q_1) + pMV_2^*(Q_1).$$

Here the consumer, knowing that he is not going to breach, chooses Q_1 in the knowledge that he has a probability $1 - p$ of getting $TV_1(Q_1)$ and a probability p of getting $TV_2(Q_1)$. His (expected) marginal-value curve, and therefore his demand curve D^* , is the vertical average of MV_1 and MV_2 with weights $1 - p$, p .

The seller knows that, whether or not the event occurs, he will sell the quantity calculated from that demand curve, so he picks his price to

¹³ The curve D^* is the (average) demand curve for one customer; for N customers the demand curve should be D^* multiplied N times in the horizontal direction. Profit is then also multiplied by N . Similarly, consumer surplus should be multiplied by N since there are N identical consumers. Conclusions about what rule maximizes the sum of profit and consumer surplus are unaffected, so we can ignore these points and proceed as if N were equal to one with no loss of generality.

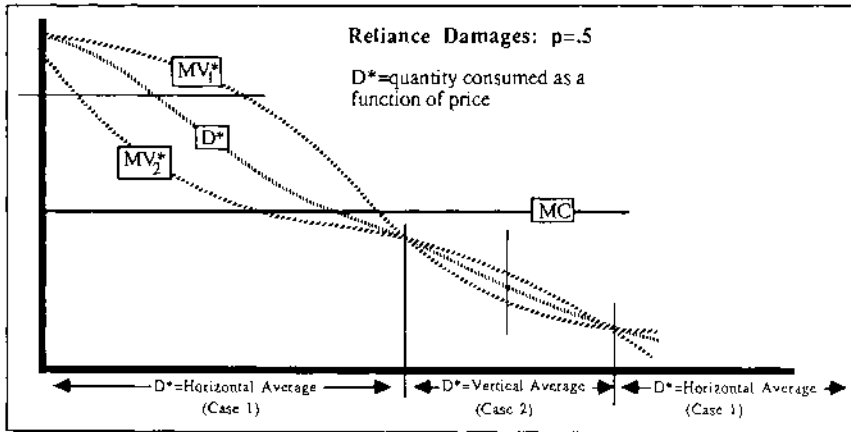


FIGURE 1.—Calculating the demand curve faced by a monopoly under a rule of reliance damages.

maximize his profit on D^* in the usual way. The situation is shown on Figure 1 for $p = \frac{1}{2}$. For quantities for which $MV_1^*(Q) > MV_2^*(Q)$, the constraint $Q_1 \geq Q_2$ is not binding, and D^* is the horizontal weighted average of MV_1^* and MV_2^* ; elsewhere the constraint is binding, and D^* is the vertical weighted average. At the boundary of the two regions $MV_1^* = MV_2^*$; vertical and horizontal averages are the same, so D^* is continuous at the boundary. In order to maximize his profit, the producer calculates marginal revenue from D^* , intersects it with MC to find the profit-maximizing (average) quantity, and goes up to D^* to find the corresponding price.

I have now converted our original problem, with $MV_{1,2}$ and $R > 0$, into a new problem with $MV_{1,2}^*$ and $R = 0$; I have eliminated R by a shift of the marginal-value curves. The new problem yields the same demand curve as the original problem, so the profit-maximizing price, quantity consumed, and profit are the same. From the standpoint of the producer, the outcome is identical to the outcome of the original problem.

We may rewrite equation (1) as

$$\begin{aligned} NB_r(Q_1, Q_2) &= (1-p)[TV_1(Q_1) - RpQ_1/(1-p) - PQ_1] \\ &\quad + p[TV_2(Q_2) + RQ_2 - PQ_2] \\ &= (1-p)[TV_1^*(Q_1) - PQ_1] + p[TV_2^*(Q_2) - PQ_2]. \end{aligned} \quad (1')$$

Here $TV_{1,2}^*$ are the total-value curves corresponding to the marginal-value curves $MV_{1,2}^*$. The right-hand side of equation (1') is what total benefit would be if reliance were zero and the marginal value curves were $MV_{1,2}^*$.

So the problem defined by $MV_{1,2}^*$ and $R = 0$ is equivalent to the original problem from the standpoint of the consumer as well.

Expectation Damages

The analysis for expectation damages is similar. The essential difference is that, since the buyer must reimburse the seller for his lost profit, he receives back only $MC - R$ for each unit canceled. So his net benefit is

$$\begin{aligned} NB_e(Q_1, Q_2) = & (1 - p)[TV_1(Q_1) - PQ_1] \\ & + p[TV_2(Q_2) - PQ_2] \\ & - p[P - (MC - R)](Q_1 - Q_2). \end{aligned} \quad (7)$$

As before, we start by considering the case where, if the event happens, the consumer chooses to cancel at least part of his order. Maximizing with respect to Q_1 and Q_2 we have

$$\begin{aligned} 0 = dNB_e/dQ_1 = & (1 - p)[MV_1(Q_1) - P] \\ & - p[P - (MC - R)], \end{aligned} \quad (8)$$

$$\begin{aligned} \therefore P = & (1 - p)MV_1(Q_1) + p(MC - R) \\ = & (1 - p)MV_1^*(Q_1) + pMC, \end{aligned} \quad (9)$$

$$\begin{aligned} 0 = dNB_e/dQ_2 = & p[MV_2(Q_2) - P] \\ & + p[P - (MC - R)], \end{aligned} \quad (10)$$

$$\therefore MC = MV_2(Q_2) + R = MV_2^*(Q_2). \quad (11)$$

Looking at equation (10), we observe that the optimal value of Q_2 does not depend on P . If the event happens, the consumer cancels $Q_1 - Q_2$ units, getting back $MC - R$ on each. He maximizes his net benefit by canceling back to the point where the marginal value of the last unit equals what he gets for canceling it.

It is easy to see when the constraint $Q_1 \geq Q_2$ is or is not binding. If the consumer purchases a quantity Q_1 such that $MV_2(Q_1) \leq MC - R$, then the constraint is not binding (case 1); otherwise it is (case 2). In the latter case, the consumer orders Q_1 and consumes it all, whether or not the event occurs.

Under the reliance rule, the producer's profit depended on how much was consumed. Under the expectation rule, the consumer who chooses to cancel part of his order must make the producer as well off as if he had not canceled, so the producer's profit depends only on Q_1 , the quantity ordered. From equation (9), we know that in case 1 that quantity is ordered

for which $P = (1 - p)MV_1^*(Q_1) + pMC$. So the producer maximizes his profit by acting as if he were facing a demand curve $D^* = (1 - p)MV_1^*(Q_1) + pMC$.

In case 2, everything ordered is consumed. The result is the same as in case 2 under reliance damages. The curve D^* is the vertical average of MV_1 and MV_2 with weights $1 - p, p$. That is the same as the vertical average of MV_1^* and MV_2^* with the same weights.

I have now done the same thing under expectation damages that I earlier did under reliance damages—converted a problem with $MV_{1,2}$ and $R > 0$ into a new problem with $MV_{1,2}^*$ and $R = 0$ and shown that the two problems are equivalent from the standpoint of the producer. Just as in the earlier case, the final step is to show that the problems are also equivalent from the standpoint of the consumer. We rewrite equation (7) as

$$\begin{aligned} NB_e(Q_1, Q_2) &= (1 - p)\{TV_1(Q_1) - RpQ_1/(1 - p) - Q_1[P + (P - MC)p/(1 - p)]\} \\ &\quad + p\{TV_2(Q_2) + RQ_2 + (P - MC)Q_2 - PQ_2\} \quad (7') \\ &= (1 - p)[TV_1^*(Q_1) + p[TV_2^*(Q_2)]] - PQ_1 + p(MC)(Q_1 - Q_2). \end{aligned}$$

This is the same net benefit we would get from equation (7) for $R = 0$, $TV_{1,2} = TV_{1,2}^*$. So the new problem is equivalent to the old from the standpoint of the consumer as well.

Comparing the Two Rules

Figures 1 and 2 show the results from the standpoint of the producer; in each case, he calculates price, quantity, and profit as if he were faced with a demand curve D^* . To calculate the effect of each damage rule on price and quantity, we must learn in each case where the marginal-revenue curve derived from D^* intersects MC . Doing so is complicated by the fact that the two rules imply both different ranges of Q_1 for which the constraint $Q_1 \geq Q_2$ is binding and, if it is not binding, different relations between D^* and the marginal revenue curves $MV_{1,2}$.

Fortunately, the objective is not to prove a general result but to disprove one. My thesis is that neither rule is, in general, superior. To prove that, it is sufficient to find one class of curves for which reliance damages lead to a superior outcome and one class for which expectation rules lead to a superior outcome.

In doing so, we will make use of the results of the previous two sections. The situation we are considering is defined by $MV_{1,2}, R$, but we will analyze the equivalent problem defined by $MV_{1,2}^*, 0$. Since the solutions to both problems have the same value of NB and π , whichever rule is superior for one must be superior for the other as well.

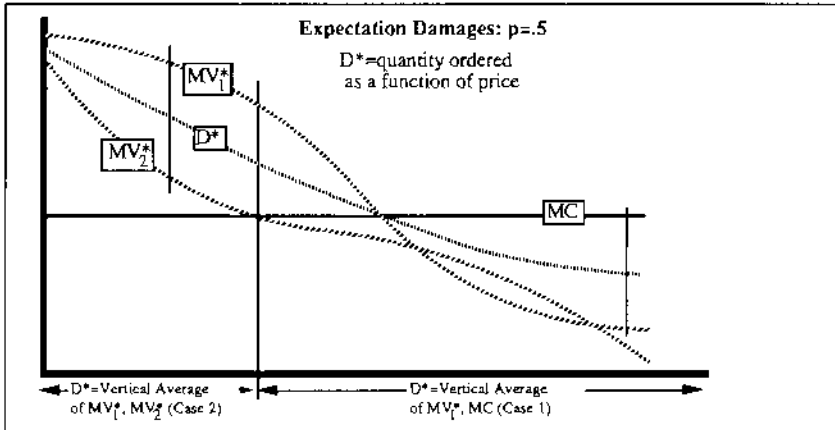


FIGURE 2.—Calculating the demand curve faced by a monopoly under a rule of expectation damages.

It is particularly easy to analyze the situation in which MV_1^* and MV_2^* are parallel straight lines, since horizontal and vertical averages are then identical.¹⁴ Three of our four alternatives (reliance case 1 or 2 and expectation case 2) then yield the same D^* , which greatly simplifies the comparison of the two rules. That situation is analyzed in Appendix A.

The conclusion of that analysis is that, for a given set of marginal value curves, there is some MC_{ab} such that for $MC > MC_{ab}$ the reliance rule is superior to the expectation rule, and for $MC < MC_{ab}$ the expectation rule is superior to the reliance rule. It follows that neither rule is, in general, superior.

In working through situations such as that analyzed in Appendix A, it becomes clear why reliance is sometimes superior to expectation. For a given quantity ordered, expectation is superior because it results in the efficient quantity breached; units are breached only if their marginal value is less than the cost of completing them. But for a given quantity consumed, reliance is superior because it results in the efficient allocation of that quantity between consumers with MV_1 and consumers with MV_2 —the allocation which makes the marginal value of the last unit consumed the same for all consumers.¹⁵

¹⁴ This is not quite correct; since a marginal-value curve only exists for nonnegative values of Q , it cannot be a straight line from $-\infty$ to $+\infty$. For sufficiently high values of P , we have a horizontal average of the high demand curve and zero, which is not equal to a vertical average of the high and low demand curves. The implications of this are worked out in Appendix A.

¹⁵ This assumes the transformed problem where $R = 0$. The condition for efficient divi-

Déjà Vu: Damage Rules as Discriminatory Pricing

Some readers may suspect that they have seen some of this analysis somewhere before. They are probably correct. Both the analysis and the conclusions correspond to a special case of Pigou's third-degree price discrimination.¹⁶ The seller of the previous section is in the same situation as a monopolist choosing prices in two separable markets, with the relation between the two prices constrained by the damage rule. The two markets consist of consumers in situation 1 with demand curve $D_1 = MV_1$ and consumers in situation 2 with demand curve $D_2 = MV_2$. Reliance damages correspond to a rule forbidding discrimination between the two markets; expectation damages correspond to a rule requiring the monopolist either to sell the same amount in both markets or to set the price in the market where the lower quantity is purchased equal to marginal cost.¹⁷

Viewed as a special case of third-order price discrimination, the results of the previous section are what one would expect. The standard efficiency argument against price discrimination is that charging the same price in all markets results in the efficient allocation of a given volume of output. That is the advantage of reliance damages. The standard efficiency argument for price discrimination is that under some circumstances it results in a larger volume of output, producing a benefit that more than balances the cost of inefficient allocation. Whether permitting price discrimination results, on net, in a better or worse outcome than forbidding it depends on the details of the demand and cost curves—as suggested by our examples.

Choice of Damages by the Monopolist: The Case against Freedom of Contract

Figure 3 shows the situation of Figures 1 and 2 with one important difference: the monopolist is free to set his own damage rule. In keeping with the discussion of the previous section, the situation is graphed as a

sion between the two situations is more complicated for $R > 0$, but the reliance rule still satisfies it—as it must, given that any problem with $R > 0$ has an equivalent problem with $R = 0$, as shown above.

¹⁶ A. C. Pigou, *The Economics of Welfare*, part 2, ch. 17 (4th ed. 1950). First-degree price discrimination is perfect price discrimination; every unit of the good is sold at the highest price the consumer of that unit will pay, leaving no consumer surplus. Under second-degree price discrimination, the monopolist sets n different prices and arranges things so that every unit is sold for the highest of those prices at which the consumer is willing to buy it. Under third-order price discrimination, the monopolist separates his customers into a number of different groups and charges a different price to the members of each different group.

¹⁷ Here again, the discussion applies directly to the transformed problem with $R = 0$ and must be modified to apply to the case $R > 0$.

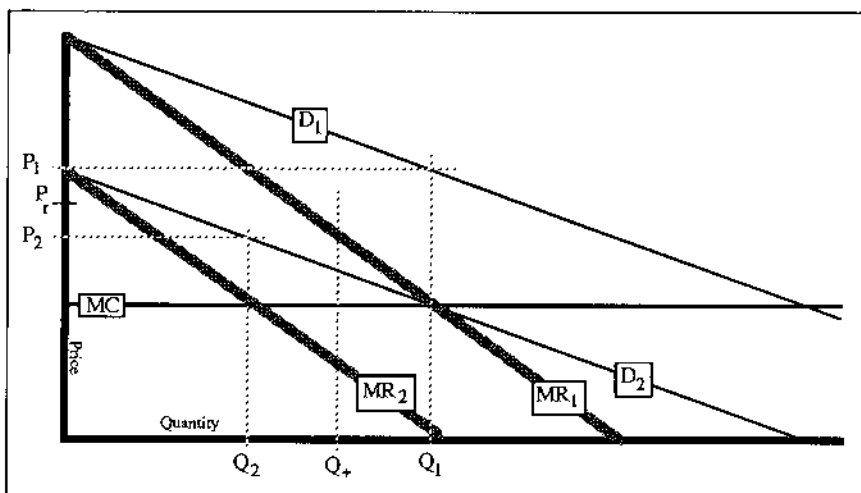


FIGURE 3.—Calculating the profit-maximizing damage rule and quantity, for a monopolist free to choose both, analyzed as a problem in discriminatory pricing.

problem in discriminatory pricing. The curves $MR_{1,2}$ are the marginal-revenue curves corresponding to all customers being in situations 1 and 2, respectively. The monopolist sells separate quantities $Q_{1,2}$ in the two "markets," following the usual profit-maximization rule: choose the quantity for which $MC = MR$. The total quantity Q_+ is the average of the two since each customer has an equal chance of being in either situation. Customers in situation 1 pay price P_1 ; customers in situation 2 pay price P_2 .

How can this be converted into the language of damages for breach of contract? We have the prices on the separate margins of situations 1 and 2; it is necessary to deduce the corresponding price P for purchasing the good and damages D for breaching the contract. Viewed in terms of two markets, the cost of buying Q_1 at a price P_1 with a probability of .5 and Q_2 at a price P_2 with a probability of .5 is

$$C(Q_1, Q_2) = [(P_1)Q_1 + (P_2)Q_2]/2. \quad (12)$$

Viewed in terms of contract and breach, the consumer orders Q_1 units, paying $P(Q_1)$ for them. He then has a 50 percent chance of finding himself in situation 2, returning $(Q_1 - Q_2)$ units, and getting a refund of $(P - D)$ —price minus damages.

$$\begin{aligned} C(Q_1, Q_2) &= P(Q_1) - (P - D)(Q_1 - Q_2)/2 \\ &= \{[2P - (P - D)]Q_1 + (P - D)Q_2\}/2. \end{aligned} \quad (13)$$

Equating the coefficients of Q_1 and Q_2 in equation (12) with those in equation (13), we get

$$P_2 = P - D; \quad P_1 = 2P - (P - D) = 2P - P_2.$$

Solving for P and D gives us

$$P = (P_1 + P_2)/2;$$

$$D = (P_1 - P_2)/2.$$

So the monopolist sells at a price $P = (P_1 + P_2)/2$ and charges damages for breach of $(P_1 - P_2)/2$.

A rule of reliance damages corresponds, as pointed out before, to a rule requiring the monopolist to sell at the same price in both markets. The monopolist faces a demand curve that is the horizontal average of D_1 and D_2 . From that demand curve he calculates a marginal-revenue curve MR_+ . He maximizes his profit at the quantity at which MR_+ intersects MC . The result is shown in Figure 4.

As can be seen from Figure 4, this is the same quantity, Q_+ , as in Figure 3. The amount produced is the same (for these demand and cost curves) under a legal rule of freedom of contract, in which the monopolist picks the damage rule that maximizes his profit, as under a rule in which damages are zero. The difference is that in the former case the monopo-

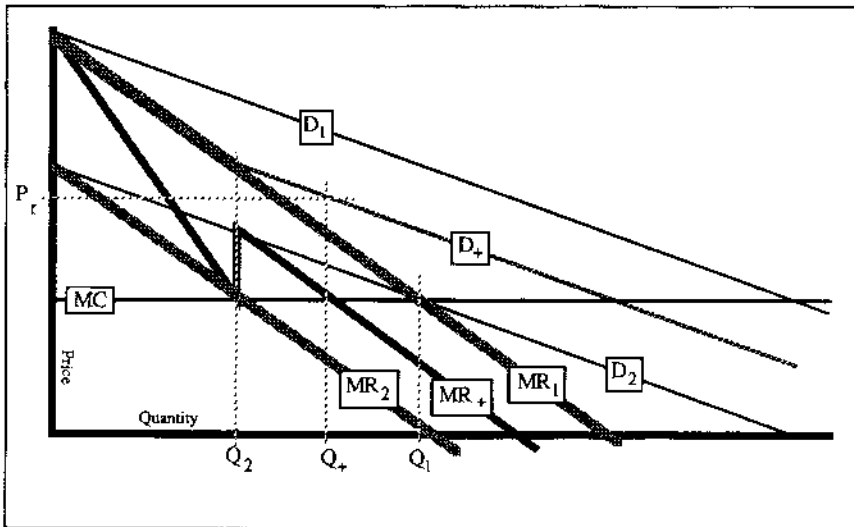


FIGURE 4.—Calculating the profit-maximizing quantity for a monopolist under a rule of reliance damages, analyzed as a problem in discriminatory pricing.

list, in effect, charges a high price ($P_1 > P_r$) to customers in situation 1 and a low price ($P_2 < P_r$) to those in situation 2. So freedom of contract leads to a less efficient allocation of the same output than does the reliance rule.

What about the expectation rule? The situation shown corresponds to $MC < MC_{ab}$, as the reader can easily check by comparing Figure 3 with the figures in Appendix A. That implies that expectation damages are superior to reliance damages and, hence, also superior to the outcome of freedom of contract.

So if the monopoly is free to specify damages in its sale contract, the result may not be the most efficient damage rule. This suggests a justification for courts refusing to accept damage rules agreed to by the parties, where one of the parties is a monopoly. That conclusion must be qualified by the observation that the court may lack the information or the incentives to produce a better rule. Even if the court can choose a better rule, it may be unable to enforce it; the court, after all, gets to rule on the contract only if the parties choose to go to court. An attempt to impose a damage rule other than that which would result from freedom of contract may merely result in costly—and successful—efforts by the seller to contract around it.

What if the monopolist is free to choose between the expectation and reliance rules but not free to set any damage rule he likes? If $MC > MC_{ab}$, the monopolist operating under an expectation rule chooses to sell a quantity Q_b^* at a price $MV_b(Q_b^*)$. If $Q_b^* < Q_r$, then we know from Figure 5 that $MV_a(Q_b^*) > MV_b(Q_b^*)$; the monopolist operating under a reliance rule

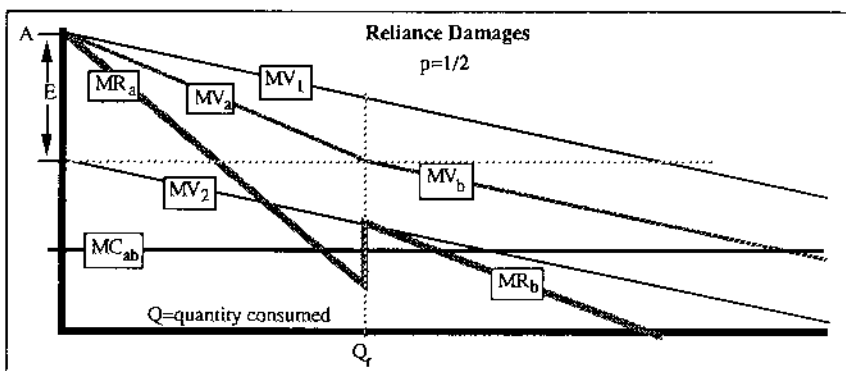


FIGURE 5.—The analysis of a monopoly selling under a rule of reliance damages, as modeled in Appendix A. Curves MV_a and MR_a are shown only for values of Q to the left of Q_r ; MV_b and MR_b are shown only for values of Q to the right of Q_r . The demand curve and the resulting marginal revenue curve faced by the monopolist are identical to the parts of $MV_{a,b}$ and $MR_{a,b}$ shown.

could sell the same quantity at a higher price, yielding a higher profit, so he would prefer the reliance rule. If $Q_b^* > Q_r$, on the other hand, then a monopolist operating under a reliance rule could also choose to sell Q_b^* at a price $MV_b(Q_b^*)$. The fact that he maximizes his profit by instead selling Q_a^* at a price $MV_a(Q_a^*)$ implies that the reliance rule is again preferred by the monopolist. Essentially the same argument can be used in the opposite direction for $MC < MC_{ab}$. It follows that for the situation where $MV_{1,2}$ are parallel straight lines and $R = 0$, or for any situation equivalent to it (remember that any $R > 0$ situation can be transformed into an equivalent situation with $R = 0$), freedom of contract leads to the efficient choice between expectation and reliance rules. How wide a range of other situations this result applies to I do not know.

The main purpose of this article is to analyze damage rules from the standpoint of economic efficiency. There is another way in which what we have just done can be viewed—one which carries us beyond the subject of this article and into a more general discussion of monopoly pricing. One of the implications of this article is that a monopolist may choose to sell goods in advance and charge damages for breach of contract even when reliance is zero and breach therefore costs him nothing.

Consider the situation from the standpoint of a monopolist choosing a damage rule. A reliance damage rule when reliance is zero is equivalent to letting the consumer decide whether to buy the good after he knows how much of it he wants. That rule does not maximize the monopolist's profit; he does better with advance contracts and a penalty for breach of contract. The combination of advance purchase and damages functions not to prevent inefficient reliance but as a device for price discrimination. It would be interesting to search for real-world examples of such a phenomenon.

Oligopoly, Bilateral Monopoly, and Monopolistic Competition

So far, the analysis has been limited to the case of single-price monopoly, although the breach rule itself can be viewed as equivalent to charging different prices to two different groups of customers. The reason for concentrating on that case is not that it is the only form of imperfect competition where price is not equal to marginal cost but that it is the one most tractable to economic analysis. While I will not attempt any equally detailed examination of other forms of imperfect competition, it is worth saying a little about oligopoly, bilateral monopoly, monopolistic competition, and discriminatory pricing.

In the case of both oligopoly and bilateral monopoly, equilibrium price and quantity are typically indeterminate, which makes it hard to discuss

the relative efficiency of different rules. One can note that, just as with the simple monopoly we have discussed, the damage rule will affect the buyer's incentive to sign the contract as well as his incentive to breach it, and that both effects should be taken into account in evaluating alternative rules.

A particularly simple case of bilateral monopoly occurs if one party is in a much better position to commit himself than the other. Suppose, for instance, that the seller is going to be in similar situations with other buyers many times, while the buyer will be in such a situation only once. The seller quotes a price and explains that he will stick to it whatever the buyer does. He can plausibly argue that to give in to the buyer's insistence on a lower price will weaken his bargaining position in future transactions with other buyers.

If the seller knows the value of the good to the buyer, he sets the price one cent below the full value and ends up with essentially all of the surplus. Suppose, however, that the seller has imperfect information about the buyer, in the form of a cumulative probability distribution $\rho(P)$ showing the probability that the value of the good to the buyer is at least P .

The analysis of this situation is the same as the analysis of an ordinary single-price monopoly. The function $\rho(P)$, which shows the probability that a seller who insists on a price P will sell the good, corresponds to the demand curve $D(P)$, which shows the number of units of the good the monopolist can sell at a price P . Marginal cost is the value of the good to the seller—the price at which he is indifferent between selling and not selling. Under these circumstances, the seller in bilateral monopoly is simply a monopolist whose (expected) quantity sold is between zero and one. The analysis of single-price monopoly carries over intact, and the conclusion is the same.

While single-price monopoly is the simplest kind of imperfect competition to analyze, monopolistic competition is probably the most important in the real world. If we limit ourselves to firms that are unable to price discriminate, the analysis is very much the same. The one difference is that under monopolistic competition the density of firms is endogenous; the higher the profit an individual firm is able to get, the more firms crowd in, driving down the profit. So if two damage rules result in different profit levels for the same demand curves, they will, in equilibrium, result in different numbers of firms.

Shavell, Coase, and Perfect Discriminatory Pricing

Readers familiar with Shavell's 1980 article on damages for breach of contract may at this point be wondering how its results can be consistent

with those of this article. Shavell, after considering breach under a variety of assumptions, concluded that "[t]he expectation measure is Pareto superior to the reliance measure independent of the nature of the contractual situation."¹⁸ He further concluded that, in the situation where the same party decided about reliance and breach, "the expectation measure is . . . a perfect substitute for a Pareto efficient complete contingent contract."¹⁹ A situation in which one party decides on breach and the level of reliance is fixed should be a trivial case of the same party deciding both. It seems to follow that, according to Shavell's analysis, the expectation rule not only dominates the reliance rule, it is the optimal rule for the cases we have been considering. Yet it seems clear from the analysis in this article that it is not.

The reason for the discrepancy is that Shavell, in his article, assumes away the central problem discussed here—the effect of the damage rule on the quantity initially purchased. He states (in a footnote) that "issues concerning contract formation (encompassing how parties meet and, if so, whether they reach agreement) are not studied here."²⁰ He thus analyzes different damage rules while ignoring any effect they may have on whether the good is purchased in the first place. In effect, he assumes that the quantity initially sold is always efficient—or, at least, equally efficient under all of the alternative damage rules being considered. Under that assumption the problem I have been discussing—and, indeed, the standard efficiency problem of monopoly—vanishes.²¹

One way of defending Shavell's assumption is to assume that the Coase Theorem applies to the formation of a contract but not to its breach. If the Coase Theorem applies to making a contract, then we can ignore any

¹⁸ Shavell, *supra* note 2, at 482, proposition 5. This is demonstrated in Shavell's "First Case," with one party deciding on reliance and the other on breach. As the next quote shows, he reaches an even stronger result when the same party decides both. In his concluding remarks he qualifies the conclusion somewhat in cases involving risk aversion, and mentions the possibility that the court may lack the information necessary to apply one or the other damage measures, but neither of these points has anything to do with the central argument of this article.

¹⁹ Shavell, *supra* note 2, at 485.

²⁰ Shavell, *supra* note 2, at 469 n.13. Similarly, in Steven Shavell, *The Design of Contracts and Remedies for Breach*, 99 Q. J. Econ. 123 (1984), Shavell writes, "The parties are assumed already to have met . . . they will make a contract themselves if doing so would result in a higher expected utility for each than not making any contract, and this will generally be presumed to be the case."

²¹ This is also true of the quite different analysis of the problem by William P. Rogerson in his article, *Efficient Reliance and Damage Measures for Breach of Contract*, 15 Rand J. Econ. 39 (1984). He eliminates the problem of inefficient breach by assuming that it will always be solved by ex post negotiations between the two parties. His analysis hinges on the effect that the expectation of such renegotiation has on the level of reliance chosen by one party; he concludes, like Shavell, that expectation damages are superior to reliance damages. Also like Shavell, he ignores in his analysis any effect that the damage rule will have on whether the initial contract occurs and at what price.

effect of damage rules on what contracts get made; whatever the damage rule, all contracts that produce net gains—and only such contracts—will be signed. If the Coase Theorem also applied to breaching a contract, we could ignore damage rules there as well; whatever the rule, only efficient breach would occur. But if the Coase Theorem does not apply to breach, then damage rules affect the decision to breach and the expectation rule leads to the efficient outcome.

While this is a possible set of assumptions, it does not seem a particularly plausible one. There is no particular reason why, if buyer and seller can bargain to an efficient outcome in drawing up the original contract, they cannot also bargain to an efficient outcome when one party wishes to breach. It seems more reasonable to assume that the Coase Theorem applies to both parts of the transaction or neither. In the former case, the outcome is always efficient and the damage rule is irrelevant. In the latter case, which we have been assuming in this article, both formation and breach are conducted without individual bargaining. The result is the standard textbook model of monopoly. The seller sets one price at which all customers may buy. The buyer decides whether to breach according to the costs implied by the applicable legal rule.

Shavell does not discuss whether the market he is discussing is competitive or monopolistic or why expectation and reliance rules lead to different results. He is concerned with the situation only after the contract has been formed—at which point those questions are no longer relevant. Another way of justifying his approach might be to assume that the market he discusses is a competitive one and to argue that under perfect competition the market price already reflects any cost that the buyer may impose on the seller by buying with some probability of breaching. With the quantity on one margin optimized by the price, one can then use an expectation-damages rule to optimize the quantity on the other margin.

In the next section, I will show to what degree that argument holds. Before doing so, it is worth noting that there is at least one form of imperfect competition for which the assumption necessary to Shavell's analysis is correct and to which his conclusions therefore apply.

In the usual monopoly context of one seller and many buyers, Shavell's assumption would be true if the seller engaged in perfect discriminatory pricing—charging each buyer for each unit the highest price he is willing to pay. Under perfect discriminatory pricing the quantity produced is efficient, since the seller can and will cut price on marginal units all the way down to marginal cost without losing revenue on his higher priced inframarginal units. Under such circumstances, freedom of contract would lead to expectation damages and would be efficient. The seller would choose the damage rule that set the marginal cost to the consumer in

situation 2 at its efficient level (MC), and set the purchase price (differently for each unit sold to each consumer) at the level that collected all of the resulting surplus.

IV. PERFECT COMPETITION WITH UNCERTAIN COST

So far, we have only considered imperfect competition. Reliance and expectation rules lead to different conclusions because price is not equal to marginal cost; price is not equal to marginal cost because the market is not competitive.

A difference between price and marginal cost might also arise in a perfectly competitive market with uncertainty, where the seller discovered his production cost only after contracting to produce the good. The contract price would equal average cost *ex ante*, so average profits would be zero. By the time the buyer decides whether to breach, however, both parties would know the actual cost of completing the good. Since it would generally not equal the contract price, a reliance rule would produce a different result than an expectation rule.

In choosing between the two rules, one crucial question is who knows what when. In the case of symmetric information, where, at the time the contract is signed, both buyer and seller have the same information about the probability of cost and of breach, it is simple to show that expectation damages not only are superior to reliance damages but result in an efficient outcome.²² In other situations, the advantage of an expectation rule (efficient incentive for the buyer to breach) must be balanced against the advantage of a reliance rule (efficient incentive for the buyer to include the cost of ordering and then breaching when he decides how much to order). But with symmetric information the seller has the same information about the potential costs of sale followed by breach as the buyer, so those costs are fully reflected in the purchase price, leading to an efficient quantity ordered even under an expectation rule.

If all sellers know (and buyers do not know) the cost of producing units for a particular buyer, then in a competitive market the varying costs will be reflected in the prices charged to different buyers; price equals cost *ex post* as well as *ex ante*, and the distinction between expectation and reliance damages vanishes.

Finally, consider the case where the buyer knows more than the seller

²² The proof is contained in a longer version of this article available from the author. By describing an outcome as efficient, I mean that no better outcome can be produced given the information available when the relevant decisions are made. I am still assuming a fixed level of reliance; with variable reliance the outcome may be inefficient, for reasons explored in Shavell, note 2 *supra*.

about the cost of production, perhaps because what is being sold is work on material provided by the buyer—repairing a car or a house, for example, or educating a child.²³ In this case, as in the earlier discussion of imperfect competition, expectation damages give the correct incentive to breach a contract but the wrong incentive to sign it. Under expectation damages, a buyer who cancels is refunded what the seller saves by not producing the good. A high-cost buyer—a buyer who knows that producing units for him will be unusually costly—also knows that if he chooses to cancel he will receive a large refund. He is getting a more attractive package—the same price and a lower penalty if he decides to cancel—than a low-cost buyer. The result, under expectation damages, is that a high-cost buyer orders more than a low-cost buyer—the precise opposite of the efficient pattern. Under a reliance rule, high-cost and low-cost buyers pay the same damages and purchase the same quantity.²⁴

A reliance rule gives buyers the efficient incentive with regard to ordering the units they are going to breach. Buying and then breaching imposes a cost of R (the amount of reliance) on the seller, which is what the buyer must pay as damages. Under either reliance or expectation, the buyer still has an inefficient incentive with regard to ordering units he is going to accept. All buyers are charged a price reflecting the average cost of producing for both high-cost and low-cost customers, so high-cost customers buy more than the efficient quantity and low-cost customers less.²⁵ Once a unit is ordered, the reliance rule gives high-cost customers an inefficiently high and low-cost customers an inefficiently low incentive to breach; the expectation rule gives the correct incentive. The analysis is worked out formally in Appendix B.

The conclusion here, as in the discussion of imperfect competition, is that there are advantages to both rules. The reliance rule gives the buyer the correct incentive to avoid breaching a contract by not signing it—or, more generally, to take into account the cost of buying and then breaching

²³ Here again, a university is a good real-world example; both a student and his parents are likely to have some private information about the probability that he will drop out.

²⁴ It might seem more natural to consider situations in which the buyer's special knowledge concerned probability of breach rather than cost of production. But if cost of production is known *ex ante*, then there are no profits *ex post*, so reliance and expectation rules imply the same damages. With uncertain costs but symmetrical knowledge about them, the expectation rule is superior even if the buyer has special information about the probability of breach since under the expectation rule the seller does not care whether or not the buyer breaches, and the seller is therefore uninterested in the probability of breach.

²⁵ This is the same problem known as adverse selection in the context of insurance markets. In that case, the problem is made worse by the fact that the good is more valuable to high-cost (that is, high-risk) customers and less valuable to low-cost customers, with the result that if the seller charges the average cost, high-cost customers buy more than low-cost customers, raising the average cost.

in deciding how much to buy. The expectation rule gives the buyer the correct incentive to avoid breach by fulfilling the contract once it is entered into.

Under both perfect and imperfect competition, we can expect one rule to be unambiguously superior to the other if we have some reason to expect that one decision or the other—the decision to buy or the decision to breach—will be made efficiently under both rules. Under imperfect competition, the decision to buy is made efficiently with perfect discriminatory pricing or perfect Coase Theorem bargaining; in those situations expectation damages are unambiguously superior. Under perfect competition, the same is true for symmetric information. Similarly, under perfect competition, reliance damages are superior for all-or-nothing breach—the situation where, if the event which might trigger breach occurs, the value of the good drops to zero and the purchaser breaches the entire contract under either rule.²⁶

V. CONCLUSION

In this article, I have tried to establish two things. The first is that, in order to evaluate different damage rules correctly, one must consider their effect on the decision to buy as well as on the decision to breach, since failing to sign a contract is one way of avoiding damages for breaching. The second is that, once one includes that effect, the case for the general superiority of expectation damages disappears.

In establishing these results, I have looked at two large classes of problems—imperfect competition and perfect competition with uncertain costs. Within each class, I have tried to establish general principles by looking at a variety of possible situations.

In the case of imperfect competition, one conclusion is that the analysis of damage rules can be viewed as an application of the theory of third-order discriminatory pricing. A rule of reliance damages is like a rule prohibiting discriminatory pricing; the arguments for the efficiency of reliance damages, and the limitations to those arguments, are the same as for the efficiency of a prohibition on price discrimination.

In discussing perfect competition I have limited myself to situations in which production cost is uncertain, since with perfect competition and full information there are no profits to be lost and expectation and reliance rules therefore yield the same damages. The results of the analysis then depend on whether buyer and seller have the same information.

²⁶ This case is discussed briefly in Appendix B. Under single-price monopoly, all-or-nothing breach results in identical outcomes under both damage rules.

In the case of symmetric information, the market price includes all the information about costs of breach available at the time the contract is signed. There is no advantage to reliance damages since at the time when the buyer is deciding how much to order he knows nothing relevant to breach that the seller does not. The results of Shavell can then be expected to hold, just as they can be expected to hold for perfect price discrimination and for the same reason.

If the buyer knows more about the cost of production than the seller, however, inefficient ordering is a potential problem and a reliance rule serves a useful function in limiting it. The benefit of the reliance rule in generating an efficient quantity ordered, given the (inefficient) level of breach anticipated, must be balanced against the benefit of the expectation rule in generating an efficient level of breach given the (inefficient) quantity ordered.

In establishing these results, I have deliberately avoided many of the complications associated with the issue of damages for breach, both in the real world and in the existing literature. My purpose was to show that even in simple cases the conventional analysis omitted an essential point and, as a result, reached a conclusion that was, in many situations, incorrect.

What do these results imply about how an efficient legal system would deal with breach of contract? The clearest implication is that the presumption in favor of expectation damages should be limited to cases in which the contract is formed in a competitive market with symmetric information between buyer and seller. Beyond that, the most one can say is that an expectation rule is a solution to the problem of inefficient breach and a reliance rule a solution to the problem of inefficient purchase. Which is more appropriate for a particular contract will depend on which problem is more likely to be serious—a matter that courts may or may not be competent to judge.

APPENDIX A

DAMAGE RULES UNDER MONOPOLY: THE FORMAL ANALYSIS

We consider the choice between reliance and expectation rules in the case of a single-price monopoly. The consumer faces two states of the world, 1 and 2, with probabilities $(1 - p)$ and p . In state i , his marginal value for the good is MV_i . Reliance equals zero.²⁷ Marginal cost is constant at MC , fixed cost is zero. We assume

$$MV_1(Q) = A - BQ; MV_2(Q) = A - E - BQ; A, B, E > 0.$$

²⁷ Here and in Appendix B, although I am analyzing the transformed problem (reliance = 0), I drop the asterisk and write $MV_{1,2}$ instead of $MV^*_{1,2}$ for purposes of simplicity.

We define

$$\begin{aligned} Q_r &\equiv (1-p)E/B; \quad Q_e \equiv (A - MC - E)/B, \\ MV_a &\equiv A - BQ/(1-p), \\ MV_b &\equiv A - BQ - pE, \\ MV_c &\equiv (1-p)(A - BQ) + pMC. \end{aligned}$$

As shown earlier, $D_a(P)$, the inverse function of $MV_a(Q)$ (quantity as a function of price rather than marginal value as a function of quantity), is the demand curve under a reliance rule for $Q < Q_r$; $D_b(P)$ is the demand curve under a reliance rule for $Q > Q_r$ and is also the demand curve under an expectation rule for $Q < Q_e$; and $D_c(P)$ is the demand curve under an expectation rule for $Q > Q_e$. As earlier, Q is the quantity consumed under a reliance rule but the quantity ordered under an expectation rule.

Profit will be maximized where $MR = MC$. We therefore define

$$\begin{aligned} Q_a^* \cdot MR_a(Q_a^*) &= A - 2BQ_a^*/(1-p) = MC; \quad Q_a^* = (1-p)(A - MC)/2B; \\ Q_b^* \cdot MR_b(Q_b^*) &= (A - pE) - 2BQ_b^* = MC; \quad Q_b^* = (A - MC - pE)/2B; \\ Q_c^* \cdot MR_c(Q_c^*) &= [(1-p)A + pMC] - 2(1-p)BQ_c^* = MC; \\ Q_c^* &= (A - MC)/2B. \end{aligned}$$

We wish to discover the value of MC such that, under a reliance rule, the producer will be indifferent between producing to the left of Q_r on MV_a or to the right of Q_r on MV_b ; we will call it MC_{ab} . Defining $TR_{a,b,c}$ as the integral of $MR_{a,b,c}$, we have, for $MC = MC_{ab}$,

$$\begin{aligned} B(Q_r - Q_a^*)^2/(1-p) &= TR_a(Q_a^*) - TR_a(Q_r) \\ &= TR_b(Q_b^*) - TR_b(Q_r) = B(Q_b^* - Q_r)^2, \\ \therefore (Q_r - Q_a^*) &= (Q_b^* - Q_r) \sqrt{1-p}, \\ \therefore \frac{1-p}{B} \left[E \frac{(A - MC_{ab})}{2} \right] &= \frac{\sqrt{1-p}}{B} \left[\frac{(A - MC_{ab} - pE)}{2} - (1-p)E \right]. \end{aligned}$$

With a little algebraic manipulation, this yields

$$\therefore MC_{ab} = A - E(1 + \sqrt{1-p}).$$

The analysis is shown, in graphical form, in Figure 5. We define $Q_r^*(MC)$ as the profit-maximizing quantity for a producer under a reliance rule. If $MC > MC_{ab}$ then $Q_r^* = Q_a^*$; if $MC < MC_{ab}$ then $Q_r^* = Q_b^*$.

Next we wish to discover the value of MC such that, under an expectation rule, the producer will be indifferent between producing to the left of Q_e on MV_b or to the right of Q_e on MV_c ; we will call it MC_{bc} . We have, for $MC = MC_{bc}$,

$$\begin{aligned} B(Q_e - Q_b^*)^2 &= TR_b(Q_b^*) - TR_b(Q_e) = TR_c(Q_c^*) - TR_c(Q_e) \\ &= B(1-p)(Q_c^* - Q_e)^2, \\ \therefore (Q_e - Q_b^*) &= (Q_c^* - Q_e) \sqrt{1-p}, \\ \therefore 2(A - E - MC_{bc})(1 + \sqrt{1-p}) &= (A - MC_{ab}) \sqrt{1-p} + A - MC_{ab} - pE \\ &= (A - MC_{ab})(1 + \sqrt{1-p}) - pE, \end{aligned}$$

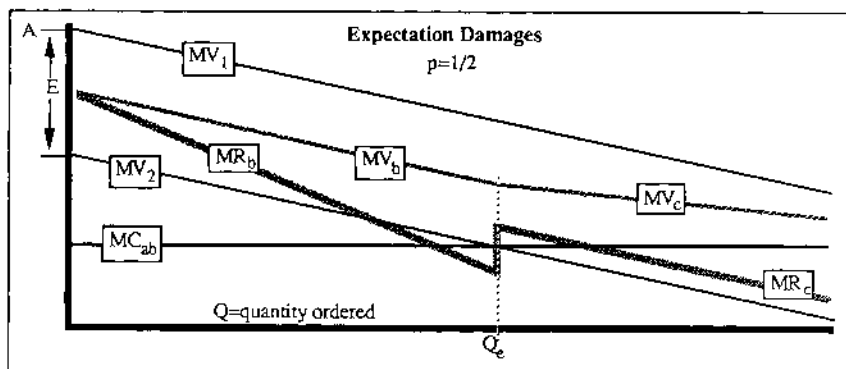


FIGURE 6.—The analysis of a monopoly selling under a rule of expectation damages, as modeled in Appendix A. Curves MV_b and MR_b are shown only for values of Q to the left of Q_e ; MV_c and MR_c are shown only for values of Q to the right of Q_e . The demand curve and the resulting marginal revenue curve faced by the monopolist are identical to the parts of $MV_{b,c}$ and $MR_{b,c}$ shown.

which simplifies to

$$\therefore MC_{br} = A - E(1 + \sqrt{1-p}) = MC_{oh}.$$

The analysis is shown in Figure 6. For $A - pE > MC > MC_{oh}$ we therefore have $Q_r^* = Q_a^*$, $Q_e^* = Q_b^*$; for $MC < MC_{oh}$ we have $Q_r^* = Q_b^*$, $Q_e^* = Q_r^*$. For $MC > A - pE$, $Q_r^* = Q_a^*$, $Q_e^* = 0$.

We next wish to find out which rule is superior—which leads to a higher total of consumer surplus plus profit. We have, for the case $MC > MC_{oh}$,

$$\begin{aligned} (NB + \pi)_r &= \int_0^{Q_a^*} MV_a(Q) - MC \, dQ = (A - MC)Q_a^* \\ &\quad - \frac{BQ_a^{*2}}{2(1-p)} = \frac{3(1-p)}{8B} (A - MC)^2, \end{aligned}$$

$$\begin{aligned} (NB + \pi)_e &= \int_0^{Q_b^*} MV_b(Q) - MC \, dQ = (A - MC - pE)Q_b^* \\ &\quad - \frac{BQ_b^{*2}}{2} = \frac{3}{8B} (A - MC - pE)^2, \end{aligned}$$

so reliance is superior $\Leftrightarrow \sqrt{1-p} (A - MC) > A - MC - pE$.

Substituting in our value for MC_{oh} , we find that $\sqrt{1-p} (A - MC) = A - MC - pE$ for $MC = MC_{oh}$, so $\sqrt{1-p} (A - MC) > A - MC - pE$ for $MC > MC_{oh}$. It follows that the reliance rule is superior for $MC > MC_{oh}$.²⁸

²⁸ The analysis does not apply to $MC > A - pE$, but the conclusion does. Expectation leads to no output, no consumption, no profit, and no surplus, so reliance, which leads to positive output, is superior.

For $MC < MC_{ab}$:

$$\begin{aligned}
 (NB + \pi)_r &= \int_0^{Q_r} (MV_a - MC) dQ + \int_{Q_r}^{Q_r^*} (MV_b - MC) dQ \\
 &= (A - MC)Q_b^* - \frac{BQ_r^2}{2(1-p)} + \frac{BQ_r^2}{2} - \frac{BQ_b^{*2}}{2} - pE(Q_b^* - Q_r) \\
 &= (A - MC - pE)Q_b^* - \frac{BQ_b^{*2}}{2} + \frac{E^2(1-p)p}{2B} \\
 &= \frac{1}{2B} \left[\frac{3(A - MC - pE)^2}{4} + p(1-p)E^2 \right]; \\
 (NB + \pi)_e &= \int_0^{Q_e} (MV_b - MC) dQ + \int_{Q_e}^{Q_e^*} (MV_c - MC) dQ \\
 &= (A - MC - pE)Q_e - \frac{BQ_e^2}{2} \\
 &\quad + (1-p) \left[(A - MC)(Q_c^* - Q_e) - \frac{B}{2} (Q_c^{*2} - Q_e^2) \right] \\
 &= p \left[(A - MC - E)Q_e - \frac{BQ_e^2}{2} \right] + (1-p) \left[(A - MC)Q_c^* - \frac{BQ_b^{*2}}{2} \right] \\
 &= \frac{1}{2B} \left[\frac{3(A - MC)^2}{4} + p \left(\frac{(A - MC)^2}{4} - 2E(A - MC) + E^2 \right) \right]; \\
 (NB + \pi)_e - (NB + \pi)_r &= \frac{1}{2B} \times \\
 &\left[\frac{(A - MC)^2}{4} + pE^2 - 2pE(A - MC) + \frac{3pE(A - MC)}{2} - \frac{3p^2E^2}{4} - p(1-p)E^2 \right] \\
 &= \frac{p}{8B} [(A - MC)^2 - (1-p)E^2].
 \end{aligned}$$

If we set $MC = MC_{ab}$, this last term is positive, so expectation is superior to reliance. The same is true a fortiori for $MC < MC_{ab}$. It follows that reliance dominates for $MC > MC_{ab}$ and expectation dominates for $MC \leq MC_{ab}$.

APPENDIX B

DAMAGE RULES UNDER PERFECT COMPETITION: THE FORMAL ANALYSIS

We consider the choice between reliance and expectation damage rules in a perfectly competitive market with asymmetric information. We assume, as before, marginal values $MV_{1,2}$, reliance R , probability of the event leading to breach

p . Marginal cost is MC_a with probability p_a , MC_b with probability p_b , $p_a + p_b = 1$, $MC_b < MC_a$. The consumer knows marginal cost before the goods are purchased; the producer does not. Since the industry is perfectly competitive, average profit is zero.

The analysis of consumer behavior in Part II applies to this situation as well; the initial problem may be converted into an equivalent problem with transformed marginal-value curves and zero reliance.

I must now introduce explicitly a constraint which was earlier ignored. Under expectation damages, a breaching consumer must make the seller as well off as if there had been no breach. If the seller's expected profits from completing the contract are negative, a literal interpretation of the expectation rule would imply negative damages; the buyer who breaches part or all of the contract receives not only a refund but an additional payment as a reward for breaching. While that is a literal interpretation of the definition of expectation damages, it is not one that a court would follow; you cannot recover on the grounds that your breach benefited the other party.²⁹

We therefore impose the additional constraint that damage payments must be nonnegative. In the case of imperfect competition, this constraint is never binding since the monopolist never chooses a price at which his profits are negative. But in the case of asymmetric information, the seller may find that, ex post, he is receiving negative profits and would be better off if the buyer breached. So expectation damages equal $P - (MC - R)$ only for $P \geq MC - R$; otherwise they are zero.

When we transform the problem from $MV_{1,2}, R$ to $MV_{1,2}^*, 0$, we do not change P or MC , so the constraint still contains the old value of reliance (R). The usual definition of expectation damages applies only for $P \geq MC - R$. In the analysis below, I assume R large enough so that we can ignore the problem of negative damages.

RELIANCE

Figure 7 shows the relevant curves. The seller charges a price P_r . The consumer purchases a quantity Q_1 . If the event occurs which lowers his marginal value curve to MV_2 , he breaches a quantity $Q_1 - Q_2$ and accepts delivery on a quantity Q_2 . Under the reliance rule, the actual value of MC is of no importance to the buyer since it does not affect the damages he must pay for breaching, so neither Q_1 nor Q_2 depends on it.

From the zero-profit condition, we have

$$\begin{aligned} \pi &= [(1 - p)Q_1 + pQ_2][P_r - p_a MC_a - p_b MC_b] = 0, \\ \therefore P_r &= p_a MC_a - p_b MC_b. \end{aligned}$$

²⁹ Negative damages could occur through bargaining. The buyer who wants to breach realizes that doing so will benefit the seller, so he threatens to take delivery unless paid not to. That situation would not arise if expectation damages applied in both directions; the seller could initiate breach and pay damages of zero, since the buyer would not be injured. But it might arise if that solution was blocked by a contract specifying liquidated damages or by a performance rule applied to the seller, or if the court was unable to observe the event that made the buyer wish to breach. In such situations one might observe an extreme version of the problem of inefficient ordering under asymmetric information, with the high-cost buyer ordering units he knows he will not want in order to be bribed not to take delivery.

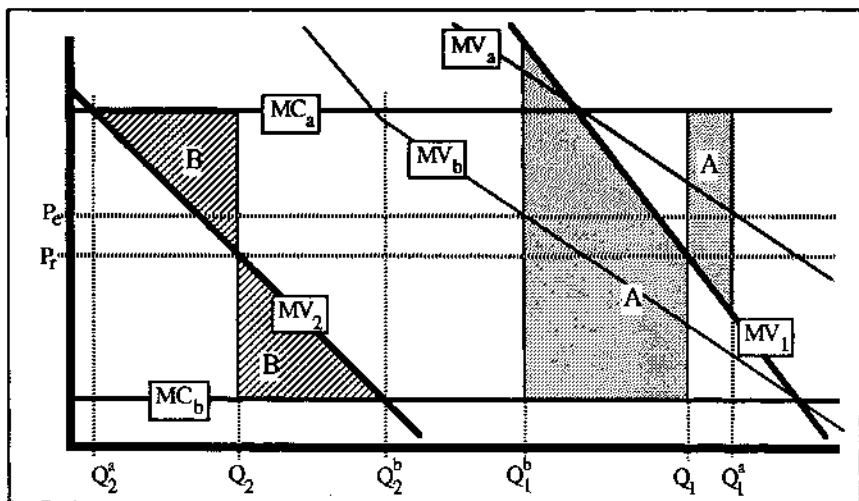


FIGURE 7.—Consumer surplus with reliance (A) and expectation (B) rules under the model of Appendix B.

Since there is no penalty for breach (we are dealing with the transformed problem, so reliance is zero), the consumer can pick Q_1 and Q_2 separately to maximize his surplus from MV_1 and MV_2 . He does so by choosing the values for which $MV_1(Q_1) = P_r = MV_2(Q_2)$. The result is shown in Figure 7.

EXPECTATION

Under expectation damages, the situation is more complicated. Damages are equal to $P - MC$. Since the buyer knows the value of MC in advance, he will buy different quantities in case a (high marginal cost) than in case b . I accordingly define Q_1^a , Q_1^b , Q_2^a , and Q_2^b as the corresponding quantities. We have

Net benefit = (value minus price in situation 1) + (value minus price in situation 2) - (damage payment)

$$\begin{aligned} &= (1 - p)\{p_a[TV_1(Q_1^a) - P_e Q_1^a] + p_b[TV_1(Q_1^b) - P_e Q_1^b]\} \\ &+ p\{p_a[TV_2(Q_2^a) - P_e Q_2^a] + p_b[TV_2(Q_2^b) - P_e Q_2^b]\} \\ &- \{p_a\{Q_1^a - Q_2^a\}[P_e - MC_a] + p_b\{Q_1^b - Q_2^b\}[P_e - MC_b]\} \\ &= (1 - p)\{p_a[TV_1(Q_1^a) - (P_e + \frac{p}{1-p}(P_e - MC_a))Q_1^a]\} \\ &+ p_b[TV_1(Q_1^b) - (P_e + \frac{p}{1-p}(P_e - MC_a))Q_1^b] \\ &+ p\{p_a[TV_2(Q_2^a) - MC_a Q_2^a] + p_b[TV_2(Q_2^b) - MC_b Q_2^b]\}. \end{aligned}$$

Maximizing net benefit with respect to Q_1^a , Q_1^b , Q_2^a , and Q_2^b gives us

$$MV_1(Q_1^a) = \left[P_e + \frac{p}{1-p} (P_e - MC_a) \right],$$

$$\therefore MV_a(Q_1^a) = \left[MV_1(Q_1^a) + \frac{p}{1-p} MC_a \right] / \left[1 + \frac{p}{1-p} \right] = P_e.$$

$$MV_1(Q_1^b) = \left[P_e + \frac{p}{1-p} (P_e - MC_b) \right],$$

$$\therefore MV_b(Q_1^b) = \left[MV_1(Q_1^b) + \frac{p}{1-p} MC_b \right] / \left[1 + \frac{p}{1-p} \right] = P_e.$$

$$MV_2(Q_2^a) = MC_a.$$

$$MV_2(Q_2^b) = MC_b.$$

The zero-profit condition is

$$\begin{aligned} \pi &= p_a Q_1^a [P_e - MC_a] + p_b Q_1^b [P_e - MC_b] = 0, \\ \therefore P_e &= [p_a Q_1^a MC_a + p_b Q_1^b MC_b] / [p_a Q_1^a + p_b Q_1^b] > P_r. \end{aligned}$$

The final inequality follows from the fact that $Q_1^a > Q_1^b$. The customer knows that his damage payment in case of breach is lower when marginal cost is higher, so he orders more units. Since the seller knows that high-cost customers order more than low-cost customers, he must set price above the average of MC_a and MC_b in order to cover cost. Under reliance, high-cost and low-cost customers order the same amount, so price is simply the average of MC_a and MC_b .

The result is shown in Figure 7. The lightly hatched area *A* is the increased surplus due to using a reliance rule; the diagonally hatched area *B* is the increased surplus due to an expectation rule. If $A > B$, the reliance rule is superior; if $A < B$, the expectation rule is superior.

Looking at the figure, it is clear where the advantages of each rule come from. The expectation rule produces the optimal level of breach, giving a gain in surplus of *B*, but it produces an inefficient pattern of ordering (more ordered when cost is higher), giving a loss in surplus of *A*.

In drawing the figure, I assumed for simplicity $Q_1^a > Q_2^a$ and $Q_1^b > Q_2^b$, avoiding corner solutions. I also assumed $Q_1^a \geq Q_1$. If $Q_1^a < Q_1$ then the area above MV_1 between Q_1^a and Q_1 represents negative surplus. It is straightforward to show that *A* is still positive in this situation, so the reliance rule still results in a more efficient quantity ordered.

All-or-Nothing Breach

One interesting special case occurs when $MV_2 = 0$. If the event occurs, all units of the good are useless to the buyer, so under either damage rule he refuses to take delivery of any of them. Area *B* then disappears, making the reliance rule unambiguously superior. The advantage of the expectation rule, as pointed out before, is that it leads to an efficient level of breach. In this situation both rules lead to the efficient level of breach, so the expectation rule has no advantage. This is just the reverse of what happens under perfect discriminatory pricing or symmetric knowledge (under perfect competition); in those situations both rules lead to an efficient quantity ordered, so the expectation rule is unambiguously superior.