

A DUAL-EFFICIENCY SOLUTION TO THE LOST-VOLUME PROBLEM

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Abstract. The Uniform Commercial Code permits a seller to recover lost profits after a buyer's breach of a contract to purchase a specific good even if the seller subsequently sells the good on the market at the contract price. The seller need show only that, but for the breach, it would have made both sales and has thus lost volume as a result of the breach. The contract literature to date calls this result into question, noting that the seller can anticipate such breaches and could thus invest efficiently *ex ante* even if the seller could not collect lost profits as a damages award. This literature is deficient, however, because it does not take into account the *buyer's ex post* incentives, which under plausible market assumptions justify full lost-profit damages. In essence, a failure to award lost-profit damages amounts to a buyer's option for which the seller is not compensated and in anticipation of which the seller will inefficiently curtail investment. In this light, the "lost-volume" problem can be seen also as a problem of industrial organization.

Introduction

The "lost-volume" profit problem has divided courts, uniform-law revisers and scholars for over three decades. The problem is to identify the compensable loss, if any, that a seller of standard goods suffers from breach when the seller resells the goods at the same price as the contract price. All agree that the seller should recover incidental damages—the costs of making two sales rather than one. Beyond that, there is division. The competing positions are "Seller Recovers Nothing" and "Seller Recovers Lost Profits." To date, advocates of each position have, in our view, misanalyzed the problem because they have misstated its premises. To reach the best result from a societal perspective, the damages award in a lost-volume case needs simultaneously to optimize the *ex post* incentives of buyers, who must decide whether to buy or breach, and the *ex*

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ante incentive of sellers, who must invest in production or services. Some proponents of each position overlook the role of incentives altogether. Even the more careful advocates of one position or another, those who well understand economic incentives, fail to address the *dual*-incentive issue that is at the heart of the lost-volume problem properly understood.

The no-recovery position has several parts. The seller's expectation interest is fully protected when the seller is awarded the difference between the contract price and the market price. When that difference is zero, the seller is entitled to nothing as a seller's volume is unaffected by breach: If the profit maximizing output is 100 units, the seller will sell 100 units, whether it entered 105 contracts and had five breached or entered 100 contracts and had none breached. A buyer who turns out not to want a good will resell the good in the seller's market if the law induces her to take delivery. The culprit thus is not breach but the buyer's change of mind: Given this change, the buyer either breaches, costing the seller a sale, or takes delivery and resells, costing the seller a sale. Therefore, awarding the seller lost profits on breach makes the seller better off than performance would have done.

The lost-profit recovery position also has several parts. Sellers seldom exhaust inventory fully. As a consequence, a breached-against seller commonly could have sold one more unit. Also, buyers seldom have access to the seller's market at the seller's cost. (Buyers cannot credibly offer warranties, for example). The changed-circumstances buyer thus rarely could compete effectively with her seller. Therefore, breach costs the seller a profit but performance does not. The law on damages should—indeed, does—award this seller the profit.

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In the simplest account of these competing positions the world begins *after the seller has ordered product and begun its attempt to make sales*. This was the perspective, for example, taken by drafters of the Uniform Commercial Code (the “UCC”).¹ In reality, however, for some sellers, such as retailers of standard goods, the world commonly begins before the attempt to attract buyers. These sellers choose a capacity and then invest to increase demand. Sales follow investment. Thus, a seller's actual problem is to choose an investment level such that expected marginal revenue equals expected marginal cost plus the marginal cost of demand-increasing investment. A failure to award such a seller lost profits truncates the effective demand she faces, and thus reduces her investment. It is no answer that, in a no-recovery world, sellers would anticipate buyers’ breaches and thus raise their prices to reflect the anticipated loss, because the higher price would inefficiently discourage purchases by consumers who, at the time of contract, presumably expect their purchases to be utility increasing on average. (At least where there is liability for breach, neither party would agree unless a contract maximized expected utility for it). Therefore, if the law denied lost-volume profits it would induce sellers to invest less and would thus cause too few welfare increasing contracts to be made each period. So the lost-profit position seems correct, though not for reasons previously understood.

Even scholars who well understand the importance of an *ex ante* perspective, and have thus analyzed the issue of seller investment incentive, have gone astray in that analysis because they have failed to identify the link between the seller’s incentive and that of the buyers. We explore that link here.

¹ See UCC §2-708 Official Comment 2.

As it turns out, the lost-volume problem is not unique, but rather an application of a standard problem in the finance of production. The problem is that perverse economic incentives arise where investment precedes the identification of consumers. Intellectual property provides a common illustration of this phenomenon. A drug manufacturer, for example, may expend large sums to create a medicine with a trivial marginal cost of production. If the manufacturer sells the drug to consumers for the marginal cost, it will not recoup its ex ante investment. If the manufacturer is able to charge a price that reflects such investment, some consumers will forgo an efficient ex post transaction as some will not pay the average cost of the drug even though they would have paid the marginal cost. While this may be the best-known instance of the tension between the exploitation of ex post transactions and the recoupment of ex ante investment, the problem is in fact far more common and extends to ordinary settings, such as that of the lost-volume seller described here.

An explanation and exposition of these claims proceed in parts. In Part I, we describe the lost-volume doctrine, which permits a seller to recover lost profits after a buyer's breach of a contract to purchase a specific good even if the seller subsequently resells the good at the contract price. We illustrate the doctrine with a standard first-year law school case, *Neri v. Retail Marine Corp.*² In Part II, we summarize the current leading scholarship on the lost-volume doctrine. This scholarship, which does address the seller's investment decision ex ante, describes hostility, or at least ambivalence, toward the lost-volume doctrine on the ground that each seller can anticipate buyer breaches and, thus, could adjust accordingly even if the seller were denied damages awards based on lost sales volume. In Part III, we take issue with the extant literature

² 334 N.Y.S.2d 165 (New York, 1972).

and demonstrate, through a simple model, that the lost-volume doctrine can in fact promote efficiency. Under plausible assumptions, although the lost-profit liability rule cannot achieve first best, it can facilitate desirable *ex post* trades that beneficially reflect a comparison of consumer value and marginal rather than average cost. The consequently greater number of efficient trades in turn yields more efficient *ex ante* investment by sellers. In Part IV, we recast the lost-volume problem as a problem of industrial organization and speculate about two retail practices—high-pressure sales tactics and frequent-flyer programs—that our observations here may help explain. The paper closes with a brief conclusion.

I. THE LOST-VOLUME DOCTRINE

A consumer, Neri, contracts to purchase from a seller, Retail Marine, a new boat of specified model for the price of about \$12,500. Shortly thereafter, Neri requires hospitalization and on that basis rescinds the sales contract. Subsequent to Neri's repudiation, Retail Marine sells the boat, which had already been ordered from the manufacturer, for the same price Neri had agreed to pay, \$12,500. Nevertheless, Retail Marine seeks to recover (from Neri's deposit) lost profits of about \$2,500 plus incidental damages from the delay in sale of the boat. Neri argues that Retail Marine has recouped the loss on its contract when it sold the boat for the contract price. Retail Marine's theory is that it could acquire an inexhaustible supply of boats for \$10,000 each and thus, but for the breach, could have earned two profits instead of one. These are, in essence, the facts of *Neri v. Retail Marine*,³ which sided with Retail Marine and awarded lost profits over Neri's objection.

³ Id. In its opinion, the New York Court of Appeals does not explicitly characterize Retail Marine's \$10,000 cost, which was deducted from the \$12,500 contract price to determine the lost-profit damages, and so the court does not rely on any breakdown of such costs. For the purposes of this paper, however, we will assume that

The holding of *Neri* rests on UCC §2-708, which, in subsection (1) provides generally that “the measure of damages for ... repudiation by the buyer is the difference between the market price at the time and place of tender and the unpaid contract price” adjusted for any incidental damages or savings from the breach (not relevant to our discussion). This provision, which may be characterized as one for market-based damages, or as a “no-recovery” rule, seems to favor *Neri*. Subsection (1), however, is made expressly subject to subsection (2), which states that if the measure of damages provided in subsection (1) “is inadequate to put the seller in as good a position as performance would have done” then the measure of damages is the “profit” that would have resulted from the sale, again adjusted for incidental costs or savings from the breach.⁴ Read in its entirety, then, §2-708 is plain and plainly supports *Retail Marine*, as well as similarly situated sellers who suffer lost volume from buyer’s breach.

II. LOST-VOLUME DOCTRINE DETRACTORS

The law is not always sensible, of course, and the UCC’s lost-volume doctrine has its detractors. These detractors include Robert Scott, who addressed the issue once along with Charles Goetz and once on his own, and Victor Goldberg. Each recognizes that the lost “profits” awarded by the UCC in a lost-volume case may be “profits” only in the marginal sense and may in fact reflect a return to sunk investment in advertising and in physical plant, among other items.

the \$10,000 cost included only the marginal cost of sale at the time of contract, such as the price the manufacturer charges the retailer for each boat, as described in the text. This assumption comports with the formula provided by UCC §2-708, on which *Neri* relied, see note 4 below, whatever calculation was in fact used in *Neri*. In any case, *Neri* is merely illustrative of a genre.

⁴ In UCC §2-708(2) the word “profits” is followed by the parenthetical phrase “including reasonable overhead.” This parenthetical is designed to permit a damages award that will in fact “put the seller in as good a position as performance would have done” despite accounting conventions that may reduce “profits” by allocated overhead.

Nevertheless, these scholars favor market-price damages (the no-recovery rule) over a lost-profit recovery award.

The Scott (and Goetz & Scott) position is that sellers are overcompensated by the lost-volume doctrine because sellers anticipate purchaser repudiations and adjust their investment in sales efforts accordingly. As Scott puts it:

Consider the actions of sellers such as Retail Marine. If Retail Marine follows the fishing model of business conduct [where the retailer is analogized to a fisherman], it sets out a predetermined inventory of boats, invests in a preset level of selling activity, and hopes to generate X volume of sales over the relevant period. Experience also teaches Retail Marine that some statistically probable number of buyers (Y) will change their minds The seller's expectation following a contract with any buyer takes into account this probability. The seller's market is not total contracts (X), but rather total contracts less those buyers who change their minds (X minus Y). Since the court bases lost profits damages on its estimate of total contracts, the award provides more than the seller expects.⁵

Although Victor Goldberg disagrees that the lost-volume doctrine overcompensates sellers, he agrees that sellers can anticipate breaches and thus, through a relative price increase, protect themselves against any losses that would result from an inability to collect after breach:

Compare the equilibrium price/quantity combination [where customers are not liable] with what would happen if customers were liable for damages arising from the breach. Under the new liability rule, ... the supply curve shifts to the right since the firm no longer bears the expected costs of breach. On the other hand, since the buyers now bear the costs, they are willing to pay less for the good; the demand curve shifts to the left. If the expected level of breach is independent of the legal regime, if attitudes toward the risk of breach are the same for buyers and sellers, and if the perceived likelihood of breach is the same on both sides of the market, then the demand shift would completely offset the shift in the supply curve. The quantity would be the same in both regimes and the price difference ... would be exactly equal to the expected unit cost of breach. The

⁵ Robert E. Scott, *The Case for Market Damages: Revisiting the Lost Profits Puzzle*, 57 U Chi. L. Rev. 1155, 1182 (1990). The “fisherman” metaphor is from Victor P. Goldberg, *An Economic Analysis of the Lost-Volume Retail Seller*, 57 Southern Cal. L. Rev. 283, 292-93 (1984). In the ellipsis of the quoted material, Scott defines “Y” to include not only buyers who breach, but also those who purchase and resell. This is a reference to the possibility that a seller may possess market power and would thus lose a sale to a buyer who did not want a good and chose to purchase and resell rather than breach. This scenario was also developed in Charles Goetz & Robert E. Scott, *Measuring Seller's Damages: The Lost-Profits Puzzle*, 31 Stan. L. Rev. 323 (1979) and addressed by Goldberg, *id.* at 286-88. For our purposes, analysis of buyer resale is inapposite, and we thus do not address the resale scenario except to assume in Part III below that the costs of buyer resale would be prohibitive.

rule does not matter. This might appear surprising at first glance, but, in fact, it is nothing more than Demsetz' variation on the Coase Theorem.⁶

Despite this observation, Goldberg is moved from indifference to disfavor a default rule of lost-profit damages in lost-volume cases because, in his view, compared to the typical buyer, the typical seller possesses a “superior ability, gathered from his business experience, to assess the probability that an individual customer will back out of a deal[,] to know the magnitude of damages in the event of a breach, ... to spread the risk of a breach over similar transactions[, and to achieve] enforcement of the law.”⁷

Overlooked in all this analysis is an ostensibly innocuous assumption, made explicit by Goldberg, that “the expected level of breach is independent of the legal regime.”⁸ It isn't, and (along with a related assumption about whether contracts are entered at all) that makes all the difference.

III. A DUAL-EFFICIENCY MODEL

Doubtless, Scott and Goldberg are correct in their description of how retailers would react to a legal regime that denied sellers a lost-profit award in lost-volume cases. Sellers would, indeed, be indifferent to revenues that consisted of sales proceeds from high-price transactions and those of identical amount that consisted in part of sales proceeds from lower-price transactions and in part of damages awards. The difficulty with the elimination of lost-profit damages

⁶ Goldberg, *id.* at 294-95. See also See Ronald Coase, *The Problem of Social Cost*, 3 J. L. & Econ. 1, 2-8 (1960) (legal position is irrelevant to ultimate outcome if efficient bargains can be struck costlessly); Harold Demsetz, *Wealth Distribution and the Ownership of Rights*, 1 J. Legal Stud. 223, 225-26 (1972) (where bargaining is costless, legal rule on liability for workplace accidents does not affect relative wealth of employer and employees).

⁷ Goldberg, 57 Southern Cal. L. Rev. at 295-96 (cited in note 5).

⁸ *Id.* at 294.

does not originate with the sellers but with the *buyers*. In the lost-volume context, only full lost-profit damages has the potential to achieve full exploitation of efficient trades *ex post* and thus efficient *ex ante* investment by the sellers. But for lost-profit damages, buyers would breach too often and sellers would thus underinvest.

A. *A Fish Story Revisited*

Our conclusions in support of a lost-profits liability regime can be illustrated with a simple model that builds on the fish metaphor discussed by Scott and (created by) Goldberg.⁹ In basic economic theory, sellers set price equal to marginal cost. A fully competitive market reaches equilibrium when price lies on a rising portion of every competitor's marginal-cost curve and at a point equal to the average total cost for the least efficient seller in the market.¹⁰ The market clears at this price and no seller must accept a lower price or can receive a higher one. The fisher metaphor constrains price in a similar but not identical way. Each seller invests to attract potential customers (like fish to a trawler). At some point, additional investment will attract too few additional potential sales to justify the expense. At the equilibrium price, each seller's investment will yield an expected number of sales at least sufficient to cover total cost. The key to this approach, applicable in particular to retailers, is that once the customer (or fish) is attracted, the marginal cost of sale—what Goldberg calls the *ex post* marginal cost¹¹—may be substantially lower than the equilibrium price.

⁹ See Goldberg 57 Southern Cal. L. Rev. at 292-97 (cited in note 5).

¹⁰ For a more detailed description of this standard account presented in the context of the lost-volume problem, see Richard E. Speidel & Kendall O. Clay, *Seller's Recovery of Overhead Under UCC Section 2-708(2): Economic Cost Theory and Contract Remedial Policy*, 57 Cornell L. Rev. 681 (1972); Comment, *A Theoretical Postscript: Microeconomics and the Lost-Volume Seller*, 24 Case W. L. Rev. 712 (1973).

¹¹ *Id.* at 293.

Reflect on a typical seller, one of many indistinguishable sellers, in a (monopolistically) competitive market at equilibrium.¹² The seller must invest in facilities and advertising that will permit it to inform and service potential customers. Larger investment implies more information implies greater expected sales volume. At high levels of investment, however, further increases become less effective, attracting fewer and fewer additional customers. Some investment level, then, just balances the marginal cost of investment with its marginal benefit.

Once made aware of the seller's product, say boats, some potential customers will expect to value a boat at least as much as the seller's price. These customers can be expected to sign a contract for sale. Between the time of contract and the time of delivery for the boat, however, some of these buyers will realize that they value the boat by less than the price and may breach their contracts. If purchase and resale of the boat is prohibitively expensive for a buyer, who can benefit from none of a retailer's volume efficiencies, then whether the buyer will breach depends, in part, on the applicable liability rule for breach.

From a social welfare perspective, the desirable level of buyer breach and seller investment can be determined without reference to the liability rule. To say that the market is competitive and at equilibrium is to say that the seller will not waste resources if it pursues self-interest and just breaks even, as each seller will do.¹³ Subject to any prior constraint on the seller's ca-

¹² Monopolistic competition refers to an industry with a large number of firms, none with the ability significantly to affect the demand of other firms, each facing a downward-sloping demand for its product (differentiated, by information, e.g.) but making no profit because of fixed costs that exactly offset the excess of revenue over marginal cost (from downward-sloping demand) because entry continues until but not beyond the point where such cost equals such excess for the marginal firm in the industry. See Jean Tirole, *The Theory of Industrial Organization* 279 (MIT Press 1989). See generally E. Chamberlin, *The Theory of Monopolistic Competition* (Harvard University Press 1933) (introducing the concept of monopolistic competition).

¹³ Under the assumptions of monopolistic competition, investment is socially optimal. See, e.g., Gerard Butters, *Equilibrium Distribution of Prices and Advertising*, 44 Rev. Econ. Stud. 465 (1977). We recognize that in

capacity, then, the seller should make as many contracts as it can afford to attract at the market price. (This number of contracts will not be limitless, of course, and may not even match the seller's capacity, because the return in customers on investment diminishes as investment increases.) Each buyer, in turn, should perform on the contract, and buy a boat, whenever the buyer values the boat by what is then the seller's marginal cost of performance. The seller's investment, sunk at the time of the buyer's breach decision, should not come into play.

It is now relatively straightforward to see that a lost-profit liability rule maximizes social welfare. Our seller, who is marginal, can expect just to break even, as noted. For such a seller, the price of goods sold, which equals average total cost, comprises two components: the expected average fixed cost (or the expected sunk investment per sale) and the marginal cost of each sale. After a buyer enters a contract subject to the lost-volume doctrine of UCC §2-708(2), the buyer becomes responsible for the seller's lost profit, which equals the difference between the contract price and the seller's marginal cost. That is, in expectation, upon contract the buyer becomes responsible for that contract's portion of the seller's sunk investment whether he breaches, and pays that amount in damages, or performs and pays that amount as part of the contract price. At the time of performance or breach, the buyer, therefore, will consider only a comparison between the value he places on the good and the seller's marginal cost. If the value of the good to the buyer exceeds the seller's marginal cost, the buyer will perform on the contract but

oligopoly models of spatial differentiation competition among firms may yield either too much or too little investment. See, e.g., G. Grossman and C. Shapiro, *Informative Advertising with Differentiated Products*, 51 Rev. Econ. Stud. 63 (1984). But this level of nuance is beyond the scope of our inquiry. We accept that the conclusions we draw in this paper are subject to modification where an industry's level of advertising is inefficient, but we believe it useful to explore the lost-volume puzzle subject to the plausible assumption that a zero-profit industry's investment in advertising may be efficient, or nearly so, even where price exceeds marginal cost. Except in the formal model we present later in the paper, we make no further distinction among different forms of competition through product differentiation.

will breach if the buyer's valuation is less than the marginal cost. This comparison is optimal as a matter of social welfare. The seller will thus anticipate an efficient yield of sales from contracts attracted and invest accordingly, which is to say optimally given the assumptions used here.

A no-recovery rule would not work as well. Under such a rule, a buyer would not be responsible for any portion of the contract price—save that for incidental damages—unless he decided to purchase the good, which he would do after he realizes the value of the good to him. As a result, at the time that each buyer determined whether to breach or perform, each would compare the value of the good to the *entire* contract price and not merely the portion that reflects the seller's marginal cost. Therefore, if one assumes that renegotiation is not possible (an assumption we address below in Part III(C)), some buyers faced with this price that exceeds marginal cost will forgo efficient purchases. The seller will thus anticipate an inefficiently low yield of sales from contracts attracted and will invest suboptimally from a social perspective.

This observation is subject to a qualification. Under a no-recovery rule, some potential buyers who *do not* expect to value an item as much as its price might enter contracts anyway, as there is no potential liability—save that for incidental damages—for doing so. Some of these potential buyers would be surprised to learn that they did, after all, value the item enough to pay the price and they would thus make a purchase that would not have been possible under a lost-profit liability rule, as under such a rule perhaps few of these buyers would have entered a contract. However, the benefit in a no-recovery rule from such surprise purchases must be weighed against the costs of forgone purchases among *all* potential buyers, including those who have higher expected valuations. Therefore, although it is theoretically possible for a no-recovery rule to be superior, our intuition is that our analysis supports a lost-profit liability rule after all.

We now turn to a more formal presentation of this model and these results. The reader who is already convinced, however, can skip to Part III(C) and will not miss any of our argument.

B. Formal Presentation

The analysis described above can be specified more formally in two parts. In the first part we assume that whether a buyer enters a contract, as opposed to whether a buyer breaches, is independent of the liability rule for breach. In the second part, we relax this assumption.

1. Contracts Independent of Liability Rule

We begin our analysis here with a standard model of monopolistic competition through advertisement. This model is taken from a 1977 article by Gerard Butters.¹⁴ In the Butters' model homogenous firms manufacture undifferentiated products and advertise the sale of these products randomly to homogeneous consumers, each of whom will purchase only a single unit of the product, if any, only if an ad reaches that consumer. A consumer who receives more than one ad will purchase the product from the firm that offers the lowest price. In addition (or more formally):

- Where the lowest price a consumer is offered by an ad, if any, is p and each consumer's valuation of a good is \bar{s} , if a consumer receives an ad offering a price $p < \bar{s}$, each consumer's utility is $U = \bar{s} - p$; her utility is 0 otherwise.
- A firm's cost of production consists of c , which is the constant and marginal cost of production, plus c' , which is the constant unit cost of sending an ad.
- For each consumer, $\bar{s} > c + c'$.

¹⁴ See Butters, note 13 above (discussed and largely reproduced in Tirole 290-94, note 12 above).

- Let $x(p)$ denote the probability that an ad at price $p < \bar{s}$ is accepted by the consumer who receives it, i.e., the probability that this consumer does not receive another ad specifying a lower price.
- Each firm is free to set p as it chooses and in doing so faces a downward sloping demand curve, as higher (lower) price implies greater (lesser) revenues per sale, $(p - c)$, but lower (higher) probability, $x(p)$, that each ad will result in a sale as a higher (lower) price will compete less well (better) against ads from other firms.
- Free entry constrains all firms in equilibrium to earn zero profits so that for all p in $[c + c', \bar{s}]$, $(p - c)x(p) - c' = 0$.

From these assumptions, Butters shows (proof not shown here) that in equilibrium the firms collectively make a socially optimal investment (here in advertising), with different firms offering different prices and where, in all cases, p in $[c + c', \bar{s}]$.¹⁵ (An offer of $p < c + c'$ would assure a firm a loss on each sale, while an offer of $p > \bar{s}$ would assure a firm of no sales and loss of c' for each ad.) That is, Butters shows that the firms collectively send just the right number of ads (each with $c + c' < p < \bar{s}$) as any fewer ads would leave an opportunity for a seller profitably to reach a consumer who otherwise would not make a purchase while any more ads would too likely be wasted on a consumer who has already received an ad from another firm.

Butters does not and need does not address the lost-volume problem for two reasons. First, he treats consumer valuation of a product, \bar{s} , as certain, so that there is no reason for a consumer to change her mind about a purchase. Second, he treats each sale as occurring in an instant, i.e., without a contract, and thus there is no opportunity for a consumer to change her mind. We need to relax each of these assumptions and make some additional assumptions that correspond to the lost-volume setting:

¹⁵ For a formal proof, see Butters note 13 above.

- Let \bar{s}_0 be the expected value of a good to a consumer at the time she receives any ad, at t_0 , at which time she will either (costlessly) enter a contract for purchase of a single unit or choose not to purchase the product.
- Let \bar{s}_1 be the realized value of a product to a consumer at the time she must perform, at t_1 , on any contract she entered at t_0 .
- Let \bar{c} be the average total cost of all ads (whether or not the ads result in a contract) per sales contract entered.
- Retain (for now) the Butters' assumption of consumer homogeneity so that for all consumers:
 - $\bar{s}_0 > c + c'$ a_1 (following Butters)
 - \bar{s}_1 in $[\bar{s}_0 - \bar{c}', \bar{s}_0 + \bar{c}']$ a_2 (for simplicity)
- Assume also that renegotiation or consumer resale at t_1 is costly; (for the sake of simplicity) assume that such cost is prohibitive.

Based on these assumptions, it is socially optimal for firms to advertise at the same prices and to the same extent here as they would under the Butters assumption that \bar{s} is certain and that all sales are instantaneous. This is because, given a_1 and a_2 , every consumer who receives an ad should enter a (costless) contract then perform on the contract and purchase a unit of the product. The optimal level of investment here (the number of ads issued), therefore, should be the same as in the Butters model because here it is efficient for every consumer to purchase a unit of the item subject only the cost of reaching the consumer, such cost a function of c' but *not* \bar{s} . In the Butters model there was no variation in \bar{s} as there is here, but here any such variation is irrelevant to the socially optimal level of investment. The models do not otherwise differ.¹⁶

¹⁶ One might consider the combination of a_1 and a_2 strong, but it is no stronger than the Butters assumption that for all consumers $\bar{s} > c + c'$. In each model, the domain assumptions ignore the fact that some consumers who receive an ad: (i) will in fact not expect to be candidates for a sale (by itself not very interesting); (ii) that some will not in the end be candidates for a sale (again, by itself, not very interesting); and (iii) that some will in the end

Now let's consider the role of legal rules on remedy for breach, or attempted breach, of a sales contract. Although specific performance is not in fact a candidate for a remedy, it will be useful to include that remedy in our discussion along with lost-profit damages and a no-recovery remedy.

Specific Performance. If the remedy for breach is specific performance—that is, if breach is not an option—the results will be identical to that in Butters, which is to say socially optimal. To see this, note that because in our model for all consumers $\bar{s}_0 > c + c'$ there is an incentive for firms to send ads such that $c + c' < p < \bar{s}_0$, just as in the Butters model firms send ads such that $c + c' < p < \bar{s}$, and in our model as in the Butters model there is an incentive for every consumer who receives an ad to purchase a unit of the product. Given a specific performance remedy for attempted breach, then, in our model for every p a firm's $x(p)$ would be the same as in Butters. In other words, the specific performance remedy effectively eliminates the distinction between \bar{s} in the Butters model and \bar{s}_0 in ours. The outcome would be socially optimal investment in either case (as shown by Butters).

Lost-Profit Damages Remedy. Given the assumptions of our model, the results for a lost-profit recovery remedy are identical to those that would obtain under specific performance, which is to say are socially optimal. Working backward in time, consider the incentive at t_1 of a consumer who has entered a contract at t_0 for the sale of a product. The consumer has a choice between performance and a return of $\bar{s}_1 - p$ or breach with a return of $-(p - c)$. Note that under a lost-profit remedy each firm will earn a return of $p - c$ on every contract, whether performed

be candidates even if they expected not to be. The interesting consequences of observation (iii) are addressed below.

or breached. This combined with the zero-profit constraint (from Butters) implies that $p = c + \bar{c}'$. (To reconcile this observation with the Butters assumption that p merely satisfy $c + c' < p < \bar{s}$, note that even though $\bar{c}' \geq c'$, at the limit, where $\bar{s} = c + c'$, the industry would consist of a single firm that sent a single ad offering a price of $p = c + c'$; the offer would be accepted by the single consumer who received the ad and $\bar{c}' = c'$. As \bar{s} exceeds $c + c'$ there is room for \bar{c}' to exceed c' .) Thus, the consumer's choice can be restated as perform with a return of $\bar{s}_1 - c - \bar{c}'$ or breach with a return of $-\bar{c}'$. That is, whether the consumer performs or breaches, she must pay for her share of the firm's overhead (here advertising expenditure) represented by \bar{c}' . Consequently, under the lost-profit damages remedy, the consumer will perform whenever $\bar{s}_1 > c$ and breach whenever $\bar{s}_1 < c$, a socially optimal outcome, which yields our first proposition:

Proposition 1. The lost-profit damages remedy promotes ex post efficiency—i.e., promotes sales to buyers who value a good at above the marginal cost of producing that good.

Moreover, given the combined effect of our assumptions a_1 and a_2 , for every consumer $\bar{s}_1 > c$. Thus, given our assumptions, consumers will perform on all contracts entered. (If one relaxed just a_2 , consumers would not necessarily perform on all contracts entered, but the lost-profit remedy, though not specific performance discussed above, would remain a socially optimal rule.)

Moving now to t_0 , given a_1 (which follows Butters), every consumer who receives an ad will enter a contract (even though, from the foregoing, each consumer will anticipate performance and an expenditure of p). Firms, for their part, will expect performance on every contract that a consumer enters—that is each firm will expect a sale from every ad that is the low-bid a

consumer receives. Consequently, for every p a firm's $x(p)$ would be the same in our model as in Butters and the lost-profits recovery remedy is thus shown to converge with the socially optimal result in Butters. This yields our second proposition:

Proposition 2. Ex post efficiency under the lost-profit liability rule promotes ex ante efficiency—i.e., the prospect of efficient sales provides sellers with the right incentive to invest in production, including advertisement

This leaves only consideration of the no-recovery remedy, to which we turn next.

No-Recovery Remedy. Having shown that the lost-profit remedy is socially optimal, given our assumptions, all that's left for us to show is that the no-recovery remedy is suboptimal, and this is trivially easy to do. Under a no-recovery remedy, at t_1 , each consumer who has entered a contract at t_0 will face a choice of perform and earn a return of $\bar{s}_1 - p$ or breach and earn a return of 0. Because $p > c$, some consumers will breach even when performance is efficient (as it is assumed to be, by the combination of a_1 and a_2 , in all instances). There is thus distortion ex post, as not all efficient sales will occur, and this will reflect backwards to induce inefficient (insufficient) investment by firms ex ante, as for any p , a firm's $x(p)$ will be lower than in Butters—where $x(p)$ remains as in Butters the probability of a *sale* rather than of a contract. This result from a no-recovery rule is the equivalent of each firm facing a downward-sloping demand curve that has shifted down and to the left from optimal, yielding of course suboptimal results with too little production in equilibrium. This leads to our third proposition:

Proposition 3. A no-recover remedy leads to insufficient trade ex post and thus insufficient investment in production ex ante.

Even under a no-recovery rule, the zero-profit constraint would hold and consumers would simply suffer as a result of that rule.

2. *Contracts Dependent on Liability Rule*

We assume above that contract formation is independent of the liability rule. This assumption is a byproduct of the assumption in the Butters model that consumers are homogeneous. That is, if sellers can provide a product at a cost some consumers are willing to pay, and if consumers are homogeneous, then every consumer would be willing to purchase the product for that price. In the Butters' model, as in our modification of it, each seller faced a downward sloping demand curve not because of diminishing consumer utility but because an increase in price yielded a lower probability, $x(p)$ that an offer would be accepted.

In reality, however, consumers are not homogeneous, and a buyer subject to a lost-profit remedy would not necessarily accept an offer that another buyer would accept. More formally, that that $c + c' < p < \bar{s}_0$ for one consumer does not imply the same for all. Consequently, a seller who wishes to maximize profits would not necessarily set price as in the Butters models and insist on a full lost-profit remedy for breach, but might establish some portion of the contract price as a nonrefundable deposit or liquidated damages (also discussed in the next subpart of this paper). In the face of consumer heterogeneity, a seller might choose a liquidated damages amount, D , that would be less than lost profits, as the lower D the greater the number of contracts the seller would earn from buyers with an individual $\bar{s}_0 < p$.¹⁷ In the extreme, where $D = 0$ —that is

¹⁷ One might imagine that if the law did not impose any constraint, a seller might set D at an amount *above* lost profits, regardless of the assumption on consumer homogeneity or heterogeneity. In our modified Butters model above, such a move would be the equivalent of a price increase that would reduce $x(p)$ if we relaxed a_2 and would not be in the interest of the seller with respect to contracts formed unless a buyer might breach despite the higher D . This is because if the higher D merely induces the buyer to perform the seller collects p and incurs c , which is the equivalent of a breach and a collection of lost profits. In any case, this analysis along with Propositions 1 and 2 above *may* suggest a justification of the law's limitation on liquidated damages where the seller is monopolist. More work would be required to confirm this conjecture. For a description of where high liqui-

where D is set to the no-recovery rule—every consumer who received an ad for any price would enter a contract and a seller would collect p whenever $\bar{s}_1 > p$. At least some of this return to the seller would be lost were a higher D to discourage contracts at t_0 . Such gain, of course, would not be costless as the lower D , the lower the return to the seller under contracts that would be breached at t_1 under a low D but not a high D and that would have been entered even subject to a high D at t_0 .

Efficiency requires a minimization of the combined deadweight loss from foregone contracts ex ante and inefficient breach ex post. Because the seller must invest in production prior to contract, first-best may not be possible,¹⁸ and the constrained optimum depends on the characteristics of the consumer pool. It is relatively straightforward to conclude that the closer the pool is to homogeneous and the higher the initial valuation of the mean consumer, \bar{s}_0^m , the better the lost-profit damages rule (or the better for D to be set equal to lost profits) as compared to the no-recovery rule (or $D = 0$). This is so because under these conditions, few buyers would be attracted to a contract by a low D as compared to those buyers lost to inefficient breach in the face of a low D . Propositions 1 to 3 above would thus hold (or nearly so). Where buyer valuations are

dated damages might be appropriate, see See Aaron Edlin and Alan Schwartz, *Optimal Penalties in Contracts*, 78 Chi. Kent L. Rev. 33 (2003).

¹⁸ Compare Lorne Carmichael and Bentley MacLeod, *Caring About Sunk Costs: A Behavioral Solution to Holdup Problems with Small Stakes*, 19 J. L. Econ. & Org. 106 (2003) (suggesting that sharing conventions regarding sunk costs might permit efficient arrangements despite sunk cost). For our purposes, however, and only provisionally, we assume here and elsewhere in this paper that conditions for first-best do not apply.

more dispersed, or where $\overline{s_0^m}$ is lower, there is an increasing likelihood that a no-recovery rule (or lower D) would and should attract more buyers to a contract.¹⁹

Inasmuch as the nature of the contracting process provides each buyer a purchase option with a strike-price of D , the buyers' variance of $\overline{s_1}$ around $\overline{s_0}$ would seem also to be a factor in a determination of the optimal liability rule. This consideration is complex, however, as an increase in such variance increases both the ex ante deadweight loss to a high D and the ex post deadweight loss to a low D . Similarly, a low variance makes each such loss less significant. We do have some conjectures as to the role of variance, nonetheless.

Imagine that few buyers would be attracted to purchases without substantial pre-contractual investment by sellers so that in equilibrium under any liability rule the market price reflects a high fixed-cost component. Imagine also that variance in buyers' valuations, while significant, are relatively low compared to the fixed-cost component of price. Under these circumstances, it seems that little would be gained, and something substantial might be lost, if the law employed a no-recovery rule (or sellers set $D = 0$), as under such a rule few buyers who would enter a contract only under a no-recovery rule would ultimately realize a valuation that at least equaled price (even if their valuations at least equaled marginal cost), while a significant number of buyers who would have entered a contract under any rule and be bound under a lost-profit rule (or high D) would realize valuations between marginal cost and price and thus inefficiently breach without compensating the seller for its investment. Conversely, if buyers' valuation variance is high, and the fixed-cost component of price low, under a no-recovery rule ($D = 0$), a sig-

¹⁹ We have identified here no efficiency justification for D greater than lost-profits, regardless of seller in-

nificant number of buyers who would not enter a contract under a lost-profit liability rule (high D) would ultimately make efficient purchases, while relatively fewer buyers who would enter a contract under any rule would realize valuations (in the hypothesized smaller space) between marginal cost and price and thus be inefficiently lost.²⁰

Although it is merely speculation, our intuition is that fixed retail investment, advertising and the like, is high, even in workably competitive markets, and that the variance in buyer valuation is relatively low. (In *Neri*, for example, the buyer became unexpectedly ill, not a typical event.)²¹ Moreover, our model assumes that (other than seller's investment) contracting is costless. In fact, however, although many consumers may obtain some gratification from window-shopping, we suspect that most disdain the time and energy required to enter a sales contract. (And as we say in the introduction, under either liability rule considered here, buyers are responsible for any incidental damages.) Therefore, perhaps few potential buyers who do not expect to value an item as much as its price will enter a contract under any liability rule. Consequently, our speculation is that the lost-profit liability rule (high D), though not first-best, is likely more efficient than the no recovery rule ($D = 0$), at least unless $\overline{s_0^m}$ is low relative to the cost of production.

centive. See our prior footnote, *id.*

²⁰ If sellers were permitted to set D higher than lost-profits, a seller might have a *private* incentive to establish a high D by contract despite any inefficiency induced by such D . But, again, this may merely be a justification for the law's limitation on liquidated damages, at least in this context. See our prior two footnotes, *id.*

²¹ See note 3 above and related text.

We want to emphasize, however, that this subpart of the paper is in its early form and has not yet been formally modeled. Thus here we offer not propositions that we believe we have established but mere conjectures subject to correction.

C. Extensions and Limitations

Until now, we have not mentioned the prospect of renegotiation. If each seller has sufficient bargaining power and renegotiation is costless, a market-based damages regime, one that offers sellers no recovery for lost profits, could do as well as one that awards lost profits. For example, in a no-recovery damages regime, a seller could set an infinitely high contract price at the time of contract, then renegotiate once each buyer had realized the value she places on the good to be sold. Costless renegotiation by itself implies that all efficient trades would occur. Seller bargaining power permits a seller to capture through those trades some or all of each buyer's consumer surplus over marginal cost. There are, of course, various sets of assumptions about bargaining power and surplus that would permit sellers to recoup at least the level of investment that would efficiently attract customers.

This observation, however, does not militate in favor of a no-recovery liability rule. Sufficient seller bargaining power may not always exist, particularly in an industry where consumers have a choice of sellers.²² Moreover, renegotiation costs are more likely to be significantly positive in this setting than they are to be zero. This is because renegotiation depends on dividing a surplus that is determined by each buyer's subjective valuation. A seller is likely to have poor means to estimate this value and bargaining could thus be plagued by substantial information

asymmetries, which can be the source of substantial negotiation cost.²³ The lost-volume doctrine, which awards a seller lost profits on breach can encourage efficient investment where sellers lack bargaining power and lack individualized information about buyers' subjective valuations.

On a related point, our model assumes that sellers operate in a (monopolistically) competitive marketplace, so that no seller possesses substantial market power, a realistic assumption in numerous retail settings. Little likely turns on this assumption, however. If a seller possesses market power (but lacks the ability to price discriminate),²⁴ it will set prices above even long-term marginal cost in order to capture what would otherwise be consumer surplus for buyers who place the highest values on the good to be sold. Indeed, such monopolistic behavior is the classic source of efficiency loss from market power. Although we have not yet modeled the market power case, and our conclusions must thus be tentative, it seems a damages rule that denied a seller an award for lost-profits would strictly reduce the number of trades ex post at any price (at least absent costless renegotiation, discussed above) for the same reasons such a reduction may occur in a competitive market: A higher effective price reduces demand. A regime that denied lost-profits as an award, therefore, could, it seems, exacerbate the social loss that a seller with market power already imposes.

²² Consider the structure of a monopolistic competition modeled above. Moreover, in richer models of monopolistic competition, not only may consumers receive ads from more than one seller, but, realistically, consumers can affirmatively engage in search. See Butters cited in note 13 above.

²³ Symmetric information is, for example, a prerequisite to a costless non-cooperative bargain in the Rubinstein solution. See Ariel Rubinstein, *Perfect Equilibrium in a Bargaining Model*, 50 *Econometrica* 97 (1982).

²⁴ Inability to price discriminate is a standard assumption given the prospect of resale, even where resale is not costless, and given the difficulty any seller would have estimating any buyer's subjective valuation, as discussed immediately above in the text.

These observations notwithstanding, our model is concededly stylized. In our model, the prospect of a lost-profits award permits an efficient result because both the seller's investment and the buyers' contractual commitment occur *before* each buyer realizes the value to her of the good. That is, our model permits buyers to act, in essence, as a buyers' cooperative, agreeing to share the fixed expenses of production, which then become sunk from the perspective of each buyer, who later can choose to purchase goods from the cooperative at a price that reflects only the cooperative's marginal cost. Outsiders, those who do not agree in advance to pay a share of the fixed cost, cannot purchase at the same price.

Typical sellers, by contrast, including ordinary retailers, cannot easily limit their fixed investment to reach only those potential buyers who have not yet realized their valuations. Some potential buyers may thus learn of their relatively low valuations before contracting and thus before committing to cover their share of the costs necessary to produce even the opportunity for a purchase. As a result, first-best investment may not be possible for a typical retailer though it is for the seller and buyers in our model. Still, the lost-volume doctrine, which permits sellers effectively to bind buyers prior to delivery, limits the time horizon of each buyer's free option, generated by seller investment, and thus reduces the perverse incentives created by such an option.

Finally, our model treats the alternative liability regimes—"no-recovery" and "lost-profits"—as fixed and immutable. In fact, each would be or is merely a default rule, subject to override by an explicit provision for contract damages, called "liquidated damages." (We raise this possibility through our discussion of consumer heterogeneity in Part III(B)(2) above.) Given this, there may be some reason to adopt a no-recovery rule after all (even assuming it would not be a preferable mandatory rule). As Goldberg notes in language quoted above, it is plausible to

assume that sellers are better informed than buyers about conditions relevant to an efficient agreement.²⁵ A no-recovery default rule, therefore, may induce sellers to contract explicitly for lost-profit damages, thus informing some otherwise ignorant buyers of what is, under current law, an implicit cost of the contract.²⁶ We take no position on this issue. Instead, we see our contribution as a potential defense of a damages award that includes lost profits whether the source of that award is explicit or implicit. Moreover, to the extent we have supported a lost-profits measure as an efficient part of even seemingly high liquidated damages, we have extended the results of one of us, Schwartz, and Lars Stole.²⁷

IV. INDUSTRIAL ORGANIZATION AND INSTITUTIONAL IMPLICATIONS

There has been much recent progress in the reconceptualization of contract problems as problems of industrial organization. Our analysis of the lost-volume doctrine can be cast in this way. Contract can be a substitute for the integration of business components. Where contract fails, integration becomes relatively more attractive, though integration imposes its own costs (such as those from an increased level of required coordination or the lack of sensitivity to market conditions). For the reasons stated above, the award of lost-profits under the lost-volume doctrine can be seen as a partial substitute for a vertical integration—as in a buyers’ cooperative—of seller and buyer for the purposes of funding fixed investment in information and deliv-

²⁵ See note 6 and accompanying text.

²⁶ Goldberg 57 Southern Cal. L. Rev. at 291 (cited in note 5) recommends liquidated damages, but he does not suggest that such damages should equal lost profits, as we do here. Instead, Goldberg notes in conclusion that in an “idealized world [free from concerns such as information asymmetry] ... it makes no difference which party bears the losses.” Id. at 298. We disagree.

²⁷ See Alan Schwartz, *The Myth that Promisees Prefer Supracompensatory Remedies: An Analysis of Contracting for Damage Measures*, 100 Yale L.J. 369 (1990); Lars A. Stole, *The Economics of Liquidated Damage Clauses in Contractual Environments with Private Information*, 8 J.L. Econ. & Org. 582 (1992).

ery facilities. That is, the lost-volume doctrine can be seen to support current patterns of industrial organization, which interposes an independent retailer between manufacturer and consumers.

Neither contracts subject to a lost-profit damages award nor vertical integration of the retail and consumer functions is ideal in all settings, however. Some sales practices may be seen as a means to supplement contract remedies where there is the specter of inefficiently low production from the prospect of unrecoverable sunk retail costs. Although our conclusions in this regard are merely speculations, two such practices that come to mind are high-pressure sales tactics and frequent flyer programs.

Many consumers, car buyers in particular, have long been annoyed by high-pressure sales tactics employed by some retailers. The accepted wisdom is that high-pressure tactics (such as exploding offers) persuade consumers to buy before they change their minds, either about the dealer or whether to purchase the product at all. Still, retailers surely recognize that these tactics displease consumers and must cost them some sales. One might, therefore, expect more widespread attempts by some dealers to attract customers with a low-pressure campaign. The automobile manufacturer, Saturn, for example, has taken this approach. Yet high-pressure tactics persist in the auto and other industries. The observations we make here suggest one possible answer as to why. High-pressure tactics, by design, and through whatever means, convince potential buyers to purchase earlier in their consideration process than would otherwise be the case. As we demonstrate in this paper, such earlier commitment increases the prospect of trades ex post and thus increases investment ex ante. Such trade and investment can be efficient, moreover, as we also demonstrate. High-pressure tactics, then, may not be quite the societal scourge they might at first seem.

A more thoroughly benevolent retail practice is the award by airlines of frequent-flyer miles to their customers. The holders of such miles pay full price for early flights but pay a reduced fare (or no fare) for later flights. These programs are commonly characterized as attempts by the airlines to tie together the otherwise independent purchases of passage over time. One might also characterize the practice as the airlines' front-loading the cost of air travel, charging more for early flights and less for later ones. As such, a frequent-flyer program may also be a means through which an airline charges customers an average price that covers total average costs and yet allows the airline to charge customers a lower price on some flights, a price that may better reflect marginal cost, thus (efficiently) increasing total demand for flights.

Conclusion

The award of lost profits to a lost-volume seller under UCC §2-708(2) may be efficient because it induces buyers simultaneously to finance efficient ex ante investment and to make purchases decisions based on marginal rather than average cost. Were damage awards not to include lost profits, sellers would adjust investment and price to reflect this, but the result could be a socially undesirable contraction in production. The lost-volume doctrine, therefore, can be seen as a refinement of contract law that supports current patterns of industrial organization, which interposes an independent retailer between manufacturer and consumers. The doctrine, moreover, may be seen as related to retail institution adaptations in the face of investment that is sunk in advance of consumer purchase commitments.