Private Information and the Option to Not Sue: A Reevaluation of Contract Remedies

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In this paper, we study contracts with two-sided incomplete information. Prior literature on contract remedies does not formally account for the nonbreaching party's option to *not* sue for damages upon breach, when her expected payoff from suing is negative, given the contractual terms and her private information about her post-breach loss. With this option incorporated into the analysis, we show that: First, courts should commit to awarding fixed damages, because awarding flexible damages based on ex post information will distort the incentives to breach. This result is not driven by the information-forcing effect of basing damages on ex ante expectations, *à la Hadley vs. Baxendale*, rather it is driven by the endogenous decision to litigate breach. Second, the option of acquiescing to the breach expands the breach set under specific performance, which can be more efficient than other remedies. Third, the efficiency advantage of ex ante expectation damages over ex post actual damages is further enhanced when we account for the possibility of renegotiation. (*JEL* K0, K12, D82, D86)

1. Introduction

Not all broken promises are challenged by the promisees. When the promisee discovers that the promisor's breach made her better off, she would

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enthusiastically acquiesce. Surprisingly, with only few exceptions,[1] the literature on optimal remedies in contract law has largely ignored this fact. We show in this article that the option of acquiescing to breach has significant implications for efficiencies of different contract remedies. Specifically, we show that when parties anticipate the arrival of post-contracting private information regarding their profitability under the contract, then even if the promisee's damages are verifiable to the court at no cost, it is counterproductive for the court to seek accuracy in determining the promisee's damages and to take into account the new information. Instead, the court should commit to ignoring the new information and to awarding fixed ex ante expectation damages. Doing so would generate more efficient incentives to breach.

In this article, we reevaluate three types of contract remedies commonly used in practice, explicitly taking into account the nonbreaching party's option to acquiesce to the breach: (a) specific performance, (b) fixed ex ante expectation damages, and (c) ex post expectation damages, which we call here—actual damages. Each damages measure is considered in the context of a seller-buyer contract with two-sided incomplete information and costless (or costly) litigation. We expand on work focusing on the effects of various legal rules on parties' incentives to breach a contract (e.g., Goetz and Scott 1977; Ulen 1984; Shavell 2004). The prior work typically assumes that some particular remedy will actually be applied once breach occurs; thus, it does not account for the possibility that a privately informed nonbreaching party may choose not to file a lawsuit seeking a remedy if the expected payoff from pursuing the remedy is insufficient to make her better off compared to her payoff in the absence of a lawsuit. One important contribution of our article is to explicitly identify the (privately informed) nonbreaching party's embedded option to not seek remedies under various damages measures when comparing their respective efficiencies. In other words, most previous analyses assumed that the promisee's decision to litigate is *exogenously* given, whereas we treat it as an *endogenous* decision the promisee makes based on her post-breach private information about her valuation.

In most cases, contracting parties learn new (possibly asymmetric) information after signing the contract, and the possibility of breach and litigation may follow. An important question facing the court in such situations is whether, when determining contract damages, to incorporate the new information revealed or instead to base the damages only on the information available ex ante. We rank the efficiency of the remedies accounting for the endogenous decision to litigate the breach and find that when courts commit to a fixed

1. Che and Schwartz (1999) and Adler (2008) discussed this point while analyzing noncompensatory damages. In a dynamic repeated transaction framework, Ben-Shahar and Bernstein (2000) noticed the aggrieved party's reluctance to file a suit when seeking the available remedy requires disclosure of private information that is against her long-term interest. We distinguish our work from theirs in the literature review section.

ex ante expectation remedy the joint payoff is higher than when courts adapt damages to the information revealed ex post.

We present a simple model where a buyer and a seller contract at the ex ante stage, Time 1, in which they are symmetrically informed only about the distributions of costs and valuations of a good to be traded at Time 2. In the interim stage, Time 1.5, the seller privately learns its costs and the buyer privately learns its actual value. At this point, the seller decides whether to breach the contract. In the ex post stage (Time 2), the buyer either pays the price, if the seller delivered, or decides whether to file a lawsuit if the seller breached. Throughout the analysis we assume that the seller's cost and the buyer's valuations are unobservable to the other party, but the nonbreaching party's ex post damages are verifiable to the court.[2] We also assume that the seller's costs are unverifiable to the court at all times.[3] We vary, however, the extent to which the buyer's valuation is verifiable to the court. We first assume that the buyer's valuation can be verified ex post to the court at no cost, then assume it can be verified but only with costs (comparing the English rule of loser pays with the American rule). Furthermore, we account for parties' litigation costs and distinguish between verification costs and litigation costs.[4] Whereas costs of verifying the ex post damages are relevant only when the remedy considered is ex post actual damages, parties in litigation always bear litigation costs even when the remedies sought by the buyer are specific performance or fixed ex ante damages, which do not require verifying the buyer's ex post harm. Lastly, we repeat our analysis under the assumption that parties can renegotiate the contract.

Our study yielded several findings. First, even when verifying ex post damages is costless, the fixed ex ante expectation damages remedy is always more efficient than the actual damages remedy and is in fact the *optimal money damages*. This result is surprising because one would think that from an ex ante perspective, the seller's incentives to breach would not be affected by whether the court awards actual damages or fixed ex ante expectation damages. A risk-neutral seller should be indifferent, ex ante, to having to pay the mean of the buyer's distribution of valuations or having to pay the actual ex post manifestation of it. What this intuition overlooks, however, is that if a court awards actual damages, the buyer would file a lawsuit only when her ex post actual valuation is larger than the contracted price, otherwise, the buyer might end up, at least in theory, *paying* damages. Thus, in litigation, the seller never, in fact, faces the entire distribution of buyer's valuations under actual damages remedy. Instead, he faces a truncated

2. The verifiability of damages makes the actual damages remedy enforceable. We will discuss the effect of the cost to verify ex post damages.

3. Otherwise, trivially, the court would have been able to determine the first-best allocation by verifying the two parties' private values.

4. The analysis of the case of costly verification and/or costly litigation can be found in a companion paper, Liu and Avraham (2009), available at: http://ssrn.com/abstract=1520288.

distribution that has a higher mean than the ex ante expectation damages. As a result, the seller breaches less often than optimal. Therefore, joint welfare in an actual damages regime is reduced relative to a fixed ex ante expectation damages regime.

In such circumstances, courts are better "tying their own hands" and committing to not adapt damages using information revealed ex post. A black-letter rule of simply awarding fixed ex ante expectation damages would provide better incentives for efficient breach. Interestingly, this result does not change when we assume that verifying the buyer's damages is costly, whether these costs are borne by the buyer or by the seller (see Liu and Avraham (2009)). Moreover, although this result (that fixed expectation damages are superior to actual damages) echoes analyses of the *Hadley v. Baxendale* rule, it has nothing to do with the incentives to reveal precontractual private information that expectation damages may provide (the so-called information-forcing effect, see Ayres and Gertner 1989; Bebchuk and Shavell 1991; Adler 1999). In our model, neither party has private information at the contracting stage.

Second, we show that specific performance can be more (or less) efficient than any of the other remedies, depending on the distributions of values and costs. The conventional wisdom ranks specific performance below damages by arguing that specific performance does not give the seller the flexibility to breach when his costs are high, whereas damages allow him flexibility to not perform, which may be efficiency-enhancing. But this argument overlooks the embedded option to breach that exists even under the specific performance remedy. Specifically, as was explained above with respect to actual damages, the nonbreaching party will not file a lawsuit when her ex post value from performance is lower than the contracted price. Thus, specific performance actually *does* allow the seller some flexibility to breach as well and does not lead to 100% performance ex post, even when litigation is costless. We show that when parties' distributions of costs and value are such that it is more likely (from the ex ante perspective) that the value from performance exceeds the costs given the attempted breach, specific performance could be more efficient compared to other remedies.

We then check the robustness of our results. Specifically, we explore the robustness of our results as to (1) the existence of positive verification cost of ex post damages, (2) the existence of positive litigation cost and the corresponding fee shifting rule (American versus English rule), and (3) the possibility to renegotiate the contract. We find that, first, when we just account for renegotiation (maintaining the assumptions of costless litigation and verification), all our results remain, and actually the advantage of fixed ex ante expectation damages over actual damages increases. Indeed, under these assumptions, ex ante expectation damages lead to *first-best* allocation. The intuition is that because the buyer's damages are verifiable and she always sues upon breach under the fixed ex ante expectation damages, the seller will always breach to fully extract information and surplus from the buyer through renegotiation. Second, in Liu and Avraham (2009) we analyze the effect of

positive verification cost[5] and positive litigation cost (with and without renegotiation), and find that the main results are robust in those scenarios.[6]

The rest of the article is organized as follows: In Section 2, we briefly discuss the relation of our article to the previous literature. In Section 3, we present the model and compare the efficiency of various contract remedies (for both cases of with and without renegotiation). In Section 4, we summarize our results and conclude. In the Appendix, we provide a survey of the relevant Anglo-American law on contract remedies in Part A, and the proof that the buyer's participation constraint in the seller's optimization problem is binding in Part B.

2. Related Literature

There are four strands of literature that are closely related to our article: (1) literature that addresses efficiency of various contract remedies; (2) literature that compares the different information disclosure effects of these remedies; (3) literature that addresses the optimal accuracy of damages assessment; and (4) literature that analyzes the embedded options in contract damages.

First, there is a large volume of literature on the comparative advantage of various contract remedies. For example, Birmingham (1970), Barton (1972), Goetz and Scott (1977), Schwartz (1979), Shavell (1980, 1984), Miceli (2004), and Schwartz and Scott (2008), among many others, have studied various damages measures for breach of contract and compared their efficiency. Mahoney (2000) and Edlin and Schwartz (2003) provide excellent surveys of this literature. Almost without exception, these studies assume that the nonbreaching party will always pursue a remedy for the contract breach. As a result, these studies ignore the endogenous option of the nonbreaching party to *not* litigate the case if her post-breach valuation is smaller than the contracted price. In contrast, our model incorporates the embedded option to rationally acquiesce to a breach and demonstrates that this has important efficiency implications. For example, many articles naturally assume that under the specific performance remedy, the breach set is empty.[7] But actually even under specific performance, the breach set is nonempty and includes the set of situations under which the nonbreaching party chooses to not pursue a remedy for breach because her expected payoff from litigation might be negative.

5. Clearly, positive verification cost of ex post damages would add an additional disadvantage to actual damages remedy since enforcing ex ante expectation damages or specific performance does not require verifying ex post damages. So assuming zero verification cost in fact strengthens our result that actual damages are inferior to ex ante expectation damages.

6. The only exception is under the English rule when there is renegotiation and the litigation costs are sufficiently high relative to the expected trade surplus; actual damages may be more efficient in limited scenarios (see Liu and Avraham (2009)).

7. See, for example, Shavell (1984: 132). Because he assumes the nonbreaching party's value is fixed, breach is always litigated, leading to performance in all contingencies under the remedy of specific performance.

The second strand of literature analyzes the incentives that various contract remedies provide to disclose private information (see Ayres and Gertner 1989; Bebchuk and Shavell 1991; Adler 1999). Bebchuk and Shavell (1991) showed that awarding ex ante expectation damages motivates more information disclosure from the privately informed party at the contracting stage and thus makes the estimation of expectation damages more accurate, leading to more efficient breach decisions. In contrast, in our framework, parties to the contract have no private information at the ex ante (contracting) stage; thus, no information disclosure incentives need to be created at that stage. The advantage of ex ante expectation damages over actual damages in our model emerges because the seller has distorted incentives to breach under actual damages due to the nonbreaching party's option to *not* file a lawsuit.

Ayres and Talley (1995) argue that untailored liability rules facilitate more efficient trade than tailored liability rules do, with an approach similar to that of Johnston (1995) that bargaining under uncertain standards rather than under fixed rules can improve bargaining efficiency. Ayres and Talley reach the conclusion by proving that untailored liability rule obscures the boundary between "buyer" and "seller" of the entitlement during bargaining, and consequentially induces more credible signaling of private information, thus facilitating Coasean trade. Scott and Triantis (2006) explore how parties optimally tradeoff the "front end" costs of writing contracts and "back end" costs of enforcing contracts in contract design, especially when parties would write vague terms (standards) rather than specific terms (rules) in contracts. They argue that the equilibrium incompleteness (vagueness) of contracts (e.g., whether to write fixed liquidated damages at ex ante or to leave the court to determine default expectation interest at ex post) depends on the relative informational advantage of parties (at ex ante) versus of the court (at ex post). We, however, show the efficiency advantage of ex ante expectation damages over actual damages by focusing on the nonbreaching party's option to not sue for damages upon breach and, in particular, assuming that parties at the ex ante stage have no informational advantage vis-a-vis the court.

The third strand of related literature deals with the accuracy of damages assessment and its incentive effects on parties' primary behavior (see Spier 1994; Kaplow and Shavell 1996). These studies analyzed the incentive effect of the accuracy of a court's assessment of damages on an injurer's precaution effort, information acquisition, and evidence production. Their analysis focuses on a unilateral-care tort model, where, under most reasonable conditions (and ignoring litigation costs), the victim would always sue for damages. They conclude that a more accurate damages assessment, on one hand, would motivate a more efficient level of precaution effort. But, on the other hand, the more accurate damages assessment may induce parties to overdevote resources to establishing the level of damages and might aggravate the settlement process. Conversely, in our contract-based model, the victim might choose to not sue for damages when her post-breach valuation is low. As a result, accurate ex post assessment of damages would distort the breaching party's performance incentives. Friehe (2005) extends Kaplow and Shavell (1996) to a

bilateral-care model and finds that courts should utilize the information available to assess accurate damages. In addition, Friehe proposes using payments as an incentive to screen different types of victims and reduce the burden of assessment by inducing self-selection. However, even Friehe ignores the option to not sue and assumes that the filing of a lawsuit is exogenously given.

Lastly, some authors realize the embedded options in contract damages. For example, Che and Schwartz (1999) discussed the solvent party's option to exit from a contract when the other party is bankrupt and identified a problem of truncated distribution of damages driven by court's errors and manager's pursuit of private benefit from inefficient projects albeit in a narrower context of the ipso facto clause in bankruptcy law. We, however, show that truncated distribution of damages exists in every contract even when damages are verifiable to the court without costs (and therefore there are no court's errors). In a dynamic repeated transaction framework, Ben-Shahar and Bernstein (2000) identified the "secrecy interest" as one reason standing behind the aggrieved party's reluctance to file a suit when the available remedy requires disclosure of private information that might hurt her competitive position in the long run. Interestingly, Ben-Shahar and Bernstein also argue that flat damages may be more efficient than fully compensatory damages after taking into account the strategic value of hiding private information (secrecy interest). We, however, formally rank the efficiency of various contract remedies showing that even in a static framework, where parties only care about the current payoff and there is no strategic loss in the future from information disclosure, the privately informed aggrieved party's option to not sue is embedded in all contract remedies.

In a recent article, Adler (2008) provides an analysis of potential benefit from removing the restriction of negative damages (paid by the nonbreaching party to the breaching party) in contract law. Our analysis, in contrast, takes the disallowance of negative damages as given and then formally compares the efficiency of various remedies in light of the embedded option to not sue.

3. The Model

3.1 Set Up

At Time 1, a risk-neutral seller (he) and a risk-neutral buyer (she) enter a contract with an agreed price, p, for the sale of a single widget. The seller receives the payment upon performance at Time 2. Uncertainties exist at Time 1 for both the seller's cost (or alternative bids for the widget he receives after contracting) and the buyer's valuation of the widget. Specifically, the seller's cost, $c \in [0, \bar{c}]$, is drawn from a distribution $F(c)$ with density $f(c)$. $f(c) > 0, \forall c \in [0, \bar{c}]$. The buyer's valuation, $v \in [0, \bar{v}]$, is drawn from a distribution $G(v)$ with density $g(v)\,.\,g(v) > 0, \forall v \in [0, \bar{v}]$. The commonly known distributions $G(\cdot)$ and $F(\cdot)$ are independent, continuous, and differentiable. Both $\bar{c}$ and $\bar{v}$ are finite,[8] with $\bar{c} > E(v)$ and $\bar{v} > E(c)$. Between Time 1 and

8. Here, we do not consider the circumstances where performance is impossible or prohibitively costly.

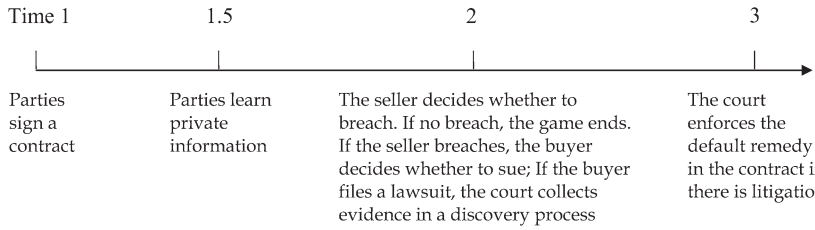

Figure 1. Time-Line for the Model.

Time 2 (which is when the seller decides whether to breach or perform), both parties learn their own valuations. However, each party's respective valuation is unobservable to the other party. Realizing the high cost of renegotiation under asymmetric information and for the sake of simplicity, in Subsection 3.2 we first assume that parties commit not to renegotiate the contract; later in subsection 3.3, we relax this assumption and allow for renegotiation at the litigation stage. If the seller breaches at Time 2, then at Time 3 the parties may litigate the case where the only question open is the remedy. Figure 1 presents the time-line.

Without loss of generality and for simplicity, we assume that the seller has all the bargaining power. However, our results do not depend on this assumption.[9] Table 1 lists the notations for various contract remedies.

We compare the contracted price, the incentives to breach, and the parties' joint expected payoff under various contract remedies and varying costs of litigation and of verification of the buyer's ex post valuation.[10] We are particularly interested in comparing the efficiency of two specific remedies: fixed ex ante expectation damages and actual damages (sometimes called ex post expectation damages), where the former commits to a fixed damages, not incorporating into the damages determination the new information learned by the parties after contracting; whereas the latter seeks accuracy, fully incorporating the new information into the damages determination. To emphasize the difference between the two approaches, we assume that the buyer's valuation is verifiable in litigation through the discovery process; thus, actual damages are totally assessable. The breaching party's private information is unverifiable.[11]

9. For the general case of both parties sharing some bargaining power, the parties still maximize the joint expected payoff when writing the contract since no one has any private information at that stage. All the results would remain, and the only change is the distribution of expected surplus between parties. This does not matter for efficiency in our model with no ex ante investment. If there is investment, the bargaining power assumption would affect the investment incentives.

10. We recognize that the contracted price, the incentives to breach, and the joint welfare are influenced by several factors. First, the default legal damages remedy a court will apply at Time 3 if a lawsuit is filed upon breach. Second, the anticipated cost of verifying damages as well as whether the English rule or American rule of litigation cost shifting applies when litigation is costly.

11. Otherwise, if both values are verifiable at low cost, it would be trivial for the court to determine the first-best allocation, no matter what remedies the parties had contracted for.

Table 1. Notations: Comparing Various Contract Remedies

Remedies	Specific performance		Ex ante expectation damages		Actual damages	
With or without renegotiation	No renegotiation	With renegotiation	No renegotiation	With renegotiation	No renegotiation	With renegotiation
Notations	SP	SP_r	ED	ED_r	AD	AD_r

Notes: SP denotes specific performance; ED denotes ex ante expectation damages remedy; and AD denotes ex post actual damages remedy. The subscript *r* denotes the case with renegotiation.

3.2 Efficiency of Contract Remedies with No Renegotiation

In this subsection, we analyze the efficiency of various contract remedies, assuming that the parties cannot (or can commit not to) renegotiate the contract after they learn new information. At Time 3, the court enforces the single remedy that the parties contracted for at Time 1. We assume that the seller's costs and the buyer's valuation are private information and nonobservable to the other party throughout the entire transaction, but that the buyer's damages are verifiable ex post in court through discovery. For the moment, we assume that there are no costs to verify ex post damages, later we discuss the case with positive verification cost.[12]

3.2.1. Specific Performance. Under the regime of Specific Performance (SP), the court is assumed to always enforce specific performance that the parties contracted for if the buyer files a lawsuit. We solve the equilibrium by backward induction. At Time 3, upon breach the buyer will file a lawsuit only if $v > p$. So the seller's expected payoff from breach is $\int_p^{\bar{v}} (p-c)\mathrm{d}G(v)$, and he will breach if $c > p$. The seller (with full bargaining power) chooses a price to maximize his expected payoff subject to the buyer's participation constraint. (Notations: π denotes parties' expected payoff, whereas $j\pi$ denotes joint expected payoff; the subscripts B and S denote buyer and seller, respectively; and the superscripts denote the remedy applied to the breach.)

$$\mathrm{Max}_p \pi_S^{SP} = \int_0^p (p-c)\mathrm{d}F(c) + \int_p^{\bar{c}} \int_p^{\bar{v}} (p-c)\mathrm{d}G(v)\mathrm{d}F(c)$$

$$\mathrm{s.t.}\pi_B^{SP} = \int_0^p (E(v)-p)\mathrm{d}F(c) + \int_p^{\bar{c}} \int_p^{\bar{v}} (v-p)\mathrm{d}G(v)\mathrm{d}F(c) \geq 0.$$

The first term of π_S^{SP} represents the seller's payoff if he voluntarily delivers, whereas the second term represents his payoff when he is forced to deliver by court. It can be shown that in equilibrium the constraint is binding (i.e., the buyer's expected surplus is fully extracted by the seller, see proof in

12. Assuming no cost to verify the ex post damages removes a disadvantage of actual damages remedy relative to other remedies, since only actual damages remedy requires accurate damage assessment to enforce the contract. We showed in this article that even with no verification cost, actual damages are less efficient than the fixed ex ante expectation damages. Thus, the assumption of no verification cost strengthens our result. See the details of the case with positive verification cost in Liu and Avraham (2009).

the Appendix), $\pi_B^{SP} = 0$. Therefore, the equilibrium price and the expected joint payoff under SP are given by:

$$p^{SP} = E(v) + \frac{1 - F(p^{SP})}{F(p^{SP})} \int_{p^{SP}}^{\bar{v}} (v - p^{SP}) \mathrm{d}G(v), \tag{1}$$

$$j\pi^{SP} = \int_0^{p^{SP}} (E(v) - c) \mathrm{d}F(c) + \int_{p^{SP}}^{\bar{c}} \int_{p^{SP}}^{\bar{v}} (v - c) \mathrm{d}G(v) \mathrm{d}F(c). \tag{2}$$

It is obvious from equation (1) that the contracted price under specific performance will always be higher than the buyer's expected valuation, that is, that $p^{SP} > E(v)$. This might look counterintuitive as it means that the contracted price is too high for the buyer to breakeven. However, in ex post the buyer enjoys some "desirable breaches" (when her ex post valuation turns out to be lower than the contracted price, and the seller breaches) and can therefore afford accepting a contract with a higher price than the ex ante "breakeven" price.

Lemma 1. $p^{SP} > E(v)$.

As will be discussed below, Lemma 1 implies that the seller would attempt to breach less often under specific performance than under the remedy of ex ante expectation damages.

3.2.2. Ex Ante Expectation Damages. Here, the court is assumed to commit itself to awarding ex ante expectation damages. Even if new information about the buyer's valuation is revealed during litigation, the court will not revise the damages award. We call this regime Ex Ante Expectation Damages (ED). The equilibrium price under this regime must be no greater than $E(v)$, otherwise the buyer's expected payoff (either from the seller's performance or from litigation over breach), $E(v) - p$, would be negative, and she will never sign such a contract. Thus, $p \leq E(v)$, which implies that the buyer always sues upon breach. As a result, the seller breaches only if $c > E(v)$. The seller's optimization problem is:

$$\mathrm{Max}_p \pi_S^{ED} = \int_0^{E(v)} (p - c) \mathrm{d}F(c) + \int_{E(v)}^{\bar{c}} (p - E(v)) \mathrm{d}F(c),$$

$$\text{s.t. } \pi_B^{ED} = E(v) - p \geq 0.$$

Obviously, $p^{ED} = E(v)$, and the joint expected payoff is:

$$j\pi^{ED} = \int_0^{E(v)} (E(v) - c) \mathrm{d}F(c). \tag{3}$$

It turns out that ED is the welfare-maximizing money damages remedy. To see this, suppose that in response to the anticipated court-imposed money

damages, the seller's optimal breach threshold is a. Then the joint expected payoff is $j\pi = \int_0^a (E(v) - c)\mathrm{d}F(c)$. A welfare-maximizing court will choose the money damages such that the induced breach threshold a will maximize the joint expected payoff. Simple calculus gives us: $a^* = E(v)$, which is exactly the breach threshold that ex ante expectation damages would induce. Therefore, among all money damages, ex ante expectation damages turns out to be the welfare-maximizing remedy.

Recall that under specific performance, the seller breaches whenever his cost is above p^{SP}, which from Lemma 1, we know, is greater than $E(v)$. This implies that the seller would breach less often under specific performance than under the ex ante expectation damages remedy. Notice, however, that this does not imply that under SP there will be fewer "final" nondeliveries than under ED, because under SP, the buyer may decide to file a lawsuit which would guarantee her a court order for specific performance, so the good would be eventually delivered.

Comparing the joint payoffs under ED versus under SP yields:

$$\begin{aligned} j\pi^{\mathrm{ED}} - j\pi^{\mathrm{SP}} &= \int_0^{E(v)} (E(v) - c)\mathrm{d}F(c) - \int_0^{p^{\mathrm{SP}}} (E(v) - c)\mathrm{d}F(c) \\ &\quad - \int_{p^{SP}}^{\bar{c}} \int_{p^{SP}}^{\bar{v}} (v - c)\mathrm{d}G(v)\mathrm{d}F(c) \\ &= \Bigg[\underbrace{\int_0^{E(v)} (E(v) - c)\mathrm{d}F(c) - \int_0^{p^{\mathrm{SP}}} (E(v) - c)\mathrm{d}F(c)}_{\text{Difference in efficiency from voluntary performance}} \Bigg] \\ &\quad - \underbrace{\big(1 - F\big(p^{\mathrm{SP}}\big)\big)\big(1 - G\big(p^{\mathrm{SP}}\big)\big)\big[E\big(v|v \geq p^{\mathrm{SP}}\big) - E\big(c|c \geq p^{\mathrm{SP}}\big)\big]}_{\text{Potential efficiency gain from involuntary performance under SP}}. \end{aligned}$$

Denote

$$\Delta_1 := \int_{E(v)}^{p^{\mathrm{SP}}} (c - E(v))\mathrm{d}F(c), \tag{4}$$

as the difference in efficiency between ED and SP due to the different incentives that the two remedies provide for voluntary performance. Since $E(v)$ is the ex ante optimal breach threshold, Δ_1 is always positive. Denote

$$\Delta_2 := \big(1 - F\big(p^{\mathrm{SP}}\big)\big)\big(1 - G\big(p^{\mathrm{SP}}\big)\big)\big[E\big(v|v \geq p^{\mathrm{SP}}\big) - E\big(c|c \geq p^{\mathrm{SP}}\big)\big], \tag{5}$$

as the potential efficiency gains emerging from the seller's involuntary performance under SP. When the buyer's conditional expected value is higher than the seller's conditional expected cost, this forced performance under specific performance creates efficiency gains (from the ex ante perspective).

The comparison of joint payoffs stipulates that if $\Delta_1 \geq \Delta_2$, then SP is inferior to ED, otherwise, SP becomes superior, as the efficiency gain from forced performance under SP more than offsets the potential efficiency loss from the inferior breach incentives it provides.[13]

3.2.3. Actual Damages. Here the court is assumed to award actual damages (usually called ex post expectation damages). In this case, which is the usual remedy under US law, the court is tuned towards accuracy; it incorporates ex post information attempting to compensate the victim of breach as accurately as possible such that her ex post payoff would be as if the contract was performed; we call this regime Actual Damages (AD). At Time 3, the buyer will sue for actual damages only if $v > p$. Anticipating the buyer's litigation decision, the seller's expected payoff if he breaches the contract is: $\int_p^{\bar{v}} (p - v)\mathrm{d}G(v)$. Therefore, the seller will breach when

$$c > p + \int_p^{\bar{v}} (v - p)\mathrm{d}G(v) = E(v) + \int_0^p (p - v)\mathrm{d}G(v).$$

We denote

$$\mathrm{Br}(p) := E(v) + \int_0^p (p - v)\mathrm{d}G(v) \tag{6}$$

as the seller's breach threshold given the contracted price, p. The seller's optimization problem is:

$$\mathrm{Max}_p\, \pi_S^{\mathrm{AD}} = \int_0^{\mathrm{Br}(p)} (p - c)\mathrm{d}F(c) + \int_{\mathrm{Br}(p)}^{\bar{c}} \int_p^{\bar{v}} (p - v)\mathrm{d}G(v)\mathrm{d}F(c),$$

$$\text{s.t. } \pi_B^{\mathrm{AD}} = \int_0^{\mathrm{Br}(p)} (E(v) - p)\mathrm{d}F(c) + \int_{\mathrm{Br}(p)}^{\bar{c}} \int_p^{\bar{v}} (v - p)\mathrm{d}G(v)\mathrm{d}F(c) \geq 0.$$

It can be shown that the equilibrium price and joint surplus are given as follows:

$$p^{\mathrm{AD}} = E(v) + \frac{1 - F\left(\mathrm{Br}\left(p^{\mathrm{AD}}\right)\right)}{F\left(\mathrm{Br}\left(p^{\mathrm{AD}}\right)\right)} \int_{\mathrm{Br}\left(p^{\mathrm{AD}}\right)}^{\bar{v}} \left(v - p^{\mathrm{AD}}\right)\mathrm{d}G(v). \tag{7}$$

$$j\pi^{\mathrm{AD}} = \int_0^{\mathrm{Br}\left(p^{\mathrm{AD}}\right)} (E(v) - c)\mathrm{d}F(c). \tag{8}$$

From the definition of $\mathrm{Br}(p)$, it is obvious that $\mathrm{Br}(p) > E(v)$ and $\mathrm{Br}(p) > p$. Since the breach threshold under AD is larger than the breach threshold under ED (i.e., $\mathrm{Br}(p) > E(v)$), in expectation there will be fewer breaches under AD than under ED. $\mathrm{Br}(p) > p$ implies that sometimes the seller voluntarily performs at a loss. The reason will be discussed below.

13. For example, when is uniformly distributed over [0,1] and v is uniformly distributed over [0,3/2], we have $j\pi^{\mathrm{SP}} = 7/23 > 9/32 = j\pi^{\mathrm{ED}}$. In this case, SP is more efficient than ED.

The joint (ex ante) payoff under AD may be smaller or larger than the joint (ex ante) payoff under SP: $j\pi^{AD} - j\pi^{SP} = \Delta_3 - \Delta_2$, where Δ_2 represents potential efficiency gain from forced performance under SP as defined in equation (5), and

$$\Delta_3 := \int_{p^{SP}}^{\mathrm{Br}(p^{AD})} (E(v) - c)\mathrm{d}F(c). \tag{9}$$

Δ_3 is similar to Δ_1. It represents the payoff difference emerging from different incentives to voluntarily perform that AD and SP regimes provide to the seller. The ranking between AD and SP depends on the size of Δ_3 versus Δ_2.

Lemma 2 summarizes the results:

Lemma 2. Assume that the parties commit to not renegotiate the contract after learning new information and that verifying damages by the court is costless, then the following hold ("$\prec$" means "is less efficient than"):

(i) AD $\prec$ ED, which is the welfare-maximizing money damages remedy;
(ii) AD $\prec$ SP, iff $\Delta 3 < \Delta 2$;
(ii-a) AD $\prec$ SP $\prec$ ED, iff $\Delta_3 < \Delta_2 < \Delta_1$;
(ii-b) AD $\prec$ ED $\prec$ SP, iff $\Delta_3 < \Delta_1 < \Delta_2$;
(iii) AD induces the seller sometimes to voluntarily perform at a loss.

(i) stipulates that seeking ex post accuracy in damages (AD) is inferior to awarding fixed ex ante expectation damages (ED), even when the victim's ex post damages can be verified without cost. The reason is that the expectation damages are ex ante optimal: the seller will breach if and only if his costs are higher than the buyer's expected valuation, $E(v)$, which is, from the ex ante perspective, an efficient breach. In contrast, under actual damages the breach threshold, $\mathrm{Br}(p^{AD})$, is higher than the buyer's expected valuation, $E(v)$. This means that from the ex ante perspective, efficient breach happens less often.

The question then becomes why under actual damages the breach threshold is higher than $E(v)$, which is the breach threshold under fixed ex ante damages? The answer is that under fixed ex ante damages, the seller's expected damages payment (gross of the contracted price) in case of a breach is fixed at $E(v)$, regardless of the buyer's ex post valuation. In contrast, under actual damages, a buyer will file a lawsuit upon breach only if her ex post valuation is higher than the price, $v > p$. *This means that under actual damages, from the ex ante perspective the seller faces a left-truncated distribution of possible damages awards with a mean larger than* $E(v)$. *He will therefore breach less often and only when his costs are high enough to justify it*. Indeed, as claimed in (iii), AD induces the seller sometimes to perform at a loss.

The analysis so far assumed that the consideration is paid upon performance. However, the superiority of ex ante expectation damages over actual damages remains even if price is assumed to have been paid in advance. In such a case, one would initially think that the buyer will always file a lawsuit against breach, and that, therefore, the distribution of possible damages the seller faces

is no longer truncated. Yet, since courts observe the buyer's ex post actual damages, they will not make the buyer pay damages for the seller's breach when the buyer's valuation is lower than the price of the widget (no negative damages in contract law). Rather, they will award the buyer restitution, returning to her the money she paid for the widget. As a result, the seller still faces the truncated distribution that our analysis above suggested.

The superiority of expectation damages over actual damages is not due to the fact that expectation damages may induce parties to disclose precontractual private information as demonstrated in previous literature (see Ayres and Gertner 1989; Bebchuk and Shavell 1991; Ayres and Talley 1995; Adler 1999). In our model, at the contracting stage (Time 1) parties do not have private information. It is after contracting that they learn private information.

(ii) stipulates that the efficiency ranking of ED and AD relative to SP depends on the distributions. To better understand this point, recall that under SP there are two cases under which the seller performs. First, the seller performs voluntarily when his costs are low. Second, the seller performs when a court orders specific performance. If the distributions of costs and valuation suggest that the buyer's expected valuation (given a breach) is sufficiently higher than the seller's expected cost, this second type of performance—forced performance—is efficiency-enhancing. In this instance, SP might be superior despite the adverse breach incentives it originally provides to the seller. Therefore, depending on the distributions, SP can be ranked anywhere when compared with ED and AD.

The previous literature usually assumes that by definition the breach set (the states of the world under which the seller breaches the contract in equilibrium) under SP is empty. However, once we take into account the victim's option to not sue for damages upon breach, the breach set under SP is no longer empty, rather it is $\{(v, c) \mid v \leq p^{SP} \leq c\}$.

In Liu and Avraham (2009), we performed a similar analysis of these contract remedies, but under different assumptions regarding the verification cost and litigation cost. First, we assume the costs of verifying the buyer's ex post damages during litigation are *positive.* Second, we assume parties face positive litigation costs if a lawsuit is filed. (We compare the American rule that each party pays his own litigation cost with the English rule under which the loser pays all the litigation costs.) Not surprisingly, positive verification costs or more generally positive litigation costs further strengthens the advantage of ex ante expectation damages over actual damages, since the ex ante expectation damages remedy does not require verifying the ex post damages, it entails a much less costly litigation or enforcement.[14] Proposition 1 summarizes all

14. In terms of informational demand, the remedies of specific performance and ex ante expectation damages are less costly than the actual damages remedy, since SP and ED do not require verifying ex post damages, they are the type of "*ex post information—free*" remedies. Even when the damages are unverifiable private information, it will not affect the enforcement of SP or ED as default remedies. In contrast, AD relies on verification of ex post damages. Therefore, it has this informational-demanding disadvantage compared with SP and ED.

the results so far (including the results from the analyses for the case of positive verification costs and positive litigation costs):

Proposition 1. Assume that the parties commit not to renegotiate the contract after learning new information. Then with verifiable damages the following holds:

(i) Awarding ex ante expectation damages is the welfare-maximizing (money) remedy, no matter whether verifying the ex post damages is costly or not and no matter whether there are positive litigation costs, under either American rule or English rule; in particular, awarding actual damages (incorporating post-contracting information into damages determination) is inferior to awarding the fixed ex ante expectation damages.
(ii) The efficiency comparison with specific performance, however, depends on the distributions of costs and valuation.

We have demonstrated that when parties commit to not renegotiate the contract ex post, the court had better stick to the fixed ex ante expectation damages, rather than seeking accuracy in damages, even when verifying ex post damages is costless. This is not due to the information disclosure incentive effect identified in previous literature (Ayres and Gertner 1989; Bebchuk and Shavell 1991; Adler 1999) but due to the distortion of incentives to breach under actual damages.

3.3 Efficiency of Contract Remedies with Renegotiation

So far we have assumed that the parties can commit to not renegotiate after they acquire new information. We now relax this assumption and allow for renegotiation. Parties sign a contract with a default price, p, and anticipate that pretrial renegotiation might take place after the discovery process.[15] In the renegotiation, the seller (who has full bargaining power by assumption) makes a take-it-or-leave-it offer. If the offer is accepted by the buyer, the seller is exempted from performing the original contract. If renegotiation breaks down, the court will enforce the default remedy. The time-line of the game with renegotiation is depicted in Figure 2.

Given that buyer's ex post damages are revealed through the discovery process, the seller's optimal renegotiation strategy is quite straightforward regardless of the contract remedy: If $v \geq c$, the seller will seek to trade at a price that guarantees the buyer her status quo payoff from trial; If $v < c$, the seller will

15. There are many different assumptions one can make about the informational structure of the renegotiation game. For example, one may consider renegotiation after the parties learned their private information but prior to the discovery process in litigation. However, as the discovery process will unveil one party's private information (the damages are ex post verifiable to the court), from the ex ante perspective parties would prefer to renegotiate only post-discovery, because renegotiation with one-sided asymmetric information can lead to first-best allocation if the party with private information makes the offer.

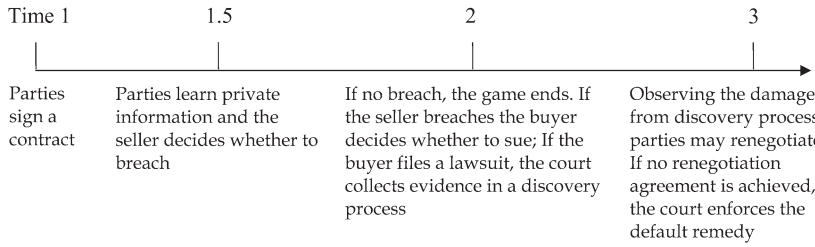

Figure 2. Time-Line for the Model with Renegotiation.

seek to breach the contract, paying money damages to ensure the buyer obtains her status quo payoff from trial. Notice that this simple renegotiation scheme maximizes the ex post joint payoff given that the litigation exists. Also notice that, as the only party with private information at the renegotiation stage, the seller extracts all the renegotiation surplus. This is also consistent with the assumption that he has full bargaining power.

3.3.1. Specific Performance with Renegotiation. We solve the equilibrium by backward induction. At Time 3, parties completed the discovery process where the buyer's valuation, v, is revealed to all parties. The seller decides on renegotiation strategy. The buyer's and seller's status quo payoff from litigation are $v-p$ and $p-c$, respectively, since the default remedy is specific performance. So the buyer will accept an offer only if her guaranteed payoff is at least $v-p$. Given v, the seller's optimal strategy is to not make any renegotiation offer if $c \leq v$ and to make a take-it-or-leave-it damages offer $v-p$ to breach when $c > v$. Then at Time 2, upon breach the buyer will sue only if $v > p$. The seller will breach when $c > p$.[16] Therefore, the seller's optimization problem is:

$$\text{Max}_p\, \pi_{\text{S}}^{\text{SP}_r} = \int_0^p (p-c)\text{d}F(c) + \int_p^{\bar{c}} \left\{ \begin{array}{l} \int_p^{\min(c,\bar{v})} (p-v)\text{d}G(v) \\ +\int_{\min(c,\bar{v})}^{\bar{v}} (p-c)\text{d}G(v) \end{array} \right\} \text{d}F(c);$$

$$\text{s.t. } \pi_{\text{B}}^{\text{SP}_r} = \int_0^p (E(v)-p)\text{d}F(c) + \int_p^{\bar{c}} \int_p^{\bar{v}} (v-p)\text{d}G(v)\text{d}F(c) \geq 0.$$

Similarly, it is straightforward to show from Kuhn-Tucker conditions that the constraint is binding. Therefore, the equilibrium price and expected joint payoff are:

$$p^{\text{SP}_r} = p^{\text{SP}}, \tag{10}$$

16. We know that the seller's payoff from performance is $p-c$. There are two cases: (1) when $c < p$, the seller's expected payoff from breach is $\int_p^{\bar{v}} (p-c)\text{d}G(v) < (p-c)$. Therefore, he will perform in this case, (2) when $c \geq p$, the seller's expected payoff from breach (taking into account renegotiation given attempted breach) is $\int_p^c (p-v)\text{d}G(v) + \int_c^{\bar{v}} (p-c)\text{d}G(v) > (p-c)$. Therefore, he will breach in this case.

$$j\pi^{\mathrm{SP}_r} = \int_0^{p^{\mathrm{SP}}} (E(v) - c)\mathrm{d}F(c) + \int_{p^{\mathrm{SP}}}^{\bar{c}} \int_{\min(c,\bar{v})}^{\bar{v}} (v - c)\mathrm{d}G(v)\mathrm{d}F(c). \tag{11}$$

The equilibrium price is the same as under SP without renegotiation. The reason is that in both cases the buyer is guaranteed an ex post payoff of $v - p$, whereas the seller extracts the entire ex ante surplus. However, the joint expected payoff is larger when renegotiation is possible because renegotiation prevents the occurrence of the inefficient (forced) performance when the seller attempted to breach but the buyer nonetheless sought performance.[17] In other words, the opportunity of renegotiation post-discovery allows the seller to pay actual damages rather than to perform when delivery is inefficient.

3.3.2. Ex Ante Expectation Damages with Renegotiation. At Time 3, the buyer's valuation, v, is revealed to all parties through the discovery process. The seller chooses a renegotiation strategy. The buyer will accept an offer only if her guaranteed payoff is at least $E(v) - p$. The seller's optimal strategy is to renegotiate to trade at price $p - E(v) + v$ when $v \geq c$ and to not make any renegotiation offer when $v < c$. Anticipating the strategies in Time 3, then back at Time 2, the seller always chooses to breach because his payoff from performance is $p - c$, whereas his expected payoff from breach is $\int_0^{\min(c,\bar{v})} (p - E(v))\mathrm{d}G(v) + \int_{\min(c,v)}^{v} (p - E(v) + v - c)\,\mathrm{d}G(v) = p - E(v) + \int_{\min(c,v)}^{v} (v - c)\mathrm{d}G(v)$, which is never smaller than $p - c$[18]. *This implies that the seller* sometimes *strategically breaches* (*breaches when* $p - c > 0$) *in order to take advantage of the litigation and renegotiation process to extract the buyer's private information and surplus.* The seller's optimization problem is:

$$\mathrm{Max}_p\, \pi_{\mathrm{S}}^{\mathrm{ED}_r} = p - E(v) + \int_0^{\bar{c}} \int_{\min(c,\bar{v})}^{\bar{v}} (v - c)\mathrm{d}G(v)\mathrm{d}F(c),$$

$$\text{s.t. } \pi_{\mathrm{B}}^{\mathrm{ED}_r} = E(v) - p \geq 0.$$

Obviously, $p^{\mathrm{ED}_r} = E(v)$, and the joint expected payoff is:

$$j\pi^{\mathrm{ED}_r} = \int_0^{\bar{c}} \int_{\min(c,\bar{v})}^{\bar{v}} (v - c)\mathrm{d}G(v)\mathrm{d}F(c). \tag{12}$$

Again, the equilibrium price is the same as under ED with no renegotiation, but the joint payoff is increased with the opportunity to renegotiate. In fact, as can be seen from the expression of $j\pi^{\mathrm{ED}_r}$, *when post-discovery renegotiation is*

17. $j\pi^{\mathrm{SP}_r} - j\pi^{\mathrm{SP}} = -\int_{p^{\mathrm{SP}}}^{\bar{c}} \int_{p^{\mathrm{SP}}}^{\min(c,\bar{v})} (v - c)\mathrm{d}G(v)\mathrm{d}F(c) \geq 0.$

18. $p - E(v) + \int_{\min(c,\bar{v})}^{\bar{v}} (v - c)\mathrm{d}G(v) - (p - c) = \begin{cases} c - E(v) > 0 & \text{if } c \geq \bar{v} \\ \int_0^c (c - v)\mathrm{d}G(v) \geq 0 & \text{if } c < \bar{v}. \end{cases}$

possible, the ex ante expectation damages remedy induces first-best allocation. Under the case of no renegotiation, ED is the best *money* damages remedy, whereas under the case with renegotiation, ED_r is the best remedy among *all* remedies, including money damages and specific performance.[19]

3.3.3. Actual Damages with Renegotiation. At Time 3, the parties in litigation observe the buyer's actual damages through the discovery process. The buyer will accept an offer only if it guaranteed her a payoff no less than $v - p$. Given this, the seller's optimal strategy is to renegotiate to trade at price p when $v \geq c$ and to not make any renegotiation offer when $v < c$. Anticipating the strategies in Time 3, the buyer upon breach at Time 2 will sue for damages only if $v > p$. The seller's payoff from performance is $p - c$ and his expected payoff if he breaches the contract is $\int_p^{\min(\max(c,p),\bar{v})} (p - v)\mathrm{d}G(v) + \int_{\min(\max(c,p),\bar{v})}^{\bar{v}} (p - c)\mathrm{d}G(v)$. Therefore, the seller will breach only when $c > p$. Comparing with the remedy SP_r, we can see that the parties have exactly the same breach and litigation thresholds, the same status quo payoffs, and the same renegotiation strategies.[20] Therefore, the seller's optimization problem here is exactly the same as under SP_r and we have:

$$p^{AD_r} = p^{SP_r} = p^{SP}, \tag{13}$$

$$j\pi^{AD_r} = j\pi^{SP_r} = \int_0^{p^{SP}} (E(v) - c)\mathrm{d}F(c) + \int_{p^{SP}}^{\bar{c}} \int_{\min(c,\bar{v})}^{\bar{v}} (v - c)\mathrm{d}G(v)\mathrm{d}F(c). \tag{14}$$

In the model with renegotiation the joint payoff under AD_r is again lower than under ED_r, since ED_r induces the first-best efficient breach. Proposition 2 summarizes the results for the model with renegotiation:

Proposition 2. Assume that after discovery, the parties may renegotiate the contract. If there is no verification cost and no litigation cost, the following hold:

19. In Liu and Avraham (2009), we provide an analysis of the case with renegotiation when there are positive litigation costs, thus affecting the parties' incentive to litigate. We show numerically in that case ED is still more efficient than AD under American rule. Only in very limited scenarios under English rule, that result may change.

20. The intuition is the following: when there is no renegotiation, given a same price level, the parties' breach and litigation thresholds would be totally the same under both AD and SP. The only difference between the two remedies is what happens after breach and litigation, which is performance under SP, whereas money transfer between parties under AD. It is this difference that leads to different equilibrium prices and joint payoffs under the two remedies without renegotiation. However, when there is renegotiation, that post-breach difference disappears. After breach, the same Pareto optimal allocation will emerge in the equilibrium through renegotiation. Thus, the equilibrium prices and joint payoffs under AD_r and SP_r are the same when there is renegotiation.

(i) ED_r is the first-best remedy, unconditionally superior to all other remedies.
(ii) AD_r and SP_r are equivalent remedies.
(iii) The opportunity to renegotiate post-discovery is valuable for parties, that is, it (at least weakly) enhances efficiency.

We had concern whether the results hinge on the assumption of costless verification and costless litigation. We therefore investigated in Liu and Avraham (2009) one case with positive verification cost and the other case with positive litigation costs under both American rule and English rule with renegotiation. We found that the main efficiency result (that ED_r is more efficient than AD_r) is robust to the modifications of the verification cost and litigation cost. With positive verification cost, ED_r remains as the first-best remedy since enforcing ex ante expectation damages does not require verification of ex post damages. The change is that AD_r and SP_r are no longer equivalent when the cost of verification is positive, since enforcing AD_r requires verification of ex post damages at some cost, whereas enforcing SP_r does not. With positive litigation costs, ED_r no longer induces exactly first-best allocations, but it still fares better than AD_r and SP_r under American rule. Under English rule, except when litigation costs are sufficiently high relative to the expected trade surplus, ED_r is more efficient than AD_r and SP_r for most ordinary cases. This is shown numerically Liu and Avraham (2009).

Therefore, interestingly, the renegotiation opportunity amplifies the advantage of ex ante expectation damages over actual damages and specific performance. Actually, with renegotiation, the ex ante expectation damages reduces the inefficiency region to the smallest, compared to other remedies, by inducing more efficient renegotiation.

4. Conclusion

The previous literature on contract remedies in large part failed to account for the nonbreaching party's option to not sue for damages upon breach. It typically starts the efficiency analysis of various contract remedies assuming, as given, that there will be litigation for breach of the contract. However, the victim of breach might choose not to sue for remedy if the expected payoff from the lawsuit is negative, given the contractual terms and her private information about her loss from breach.[21] We have shown in the article that this option of acquiescing to breach has important implications for incentives to breach and efficiencies of various contract remedies. For instance, in traditional analyses of specific performance, economists assumed that its breach set is empty, since attempted breach will be litigated and performance will

21. This could be because the state of the world, which materialized after the initial uncertainty disappeared, was not favorable for the breached-against party or, perhaps, because some "secrecy interest" (Ben-Shahar and Bernstein 2000) makes suing unprofitable in the long run due to exposures of valuable secrets.

be ordered. But, if the (privately informed) nonbreaching party's valuation is lower than the contracted price, she will not file a lawsuit. Thus, even specific performance will induce a nonempty breach set. Under specific performance, there are two cases of performance: voluntary performance, when the seller's cost is lower than the contracted price, and involuntary performance, when he attempted to breach but was litigated against and the court ordered performance. Even though from the voluntary performance component the breach threshold under specific performance is not optimal, the involuntary performance component may create some efficiency gain. Depending on the distribution of values, specific performance can be more or less efficient than other remedies.

Moreover, once we incorporate the nonbreaching party's option to not sue into the analysis, we find that the court should commit to awarding fixed damages, which are preferable to flexible damages adaptive to ex post information, since the latter will distort incentives to breach. Specifically, we demonstrated that the ex post expectation damages, which we called actual damages will induce under-breach from the ex ante perspective. The reason is as follows: if her value is lower than the contracted price, the nonbreaching party will not sue for damages. The breaching party thus anticipates that once the breach is litigated, he will face a truncated distribution of damages, which increases his expected cost of breach. This distortion of breach incentives leaves the actual damages inferior to fixed damages. Thus, even when acquiring ex post information is costless, a welfare-maximizing court should not bother to do so. Rather, it should commit to awarding fixed ex ante expectation damages. The court's commitment to ignoring ex post information when determining contract damages restores the contracting parties' efficient incentives to breach. We reach this result for different reasons from the information-forcing property of expectation damages, *à la Hadley vs. Baxendale* (see Bebchuk and Shavell 1991), as at the contracting stage in our model parties did not possess any private information. Rather, the advantage of fixed damages in our model comes from the restoration of efficient incentives to breach at the interim stage when the parties learn private information post-contracting.

We further studied the case with pretrial renegotiation and found that the advantage of fixed expectation damages over actual damages is increased when parties can renegotiate. When the litigation cost is very small relative to the joint expected surplus of the transaction, ex ante expectation damages with renegotiation induces first-best allocation. The efficiency result is robust to the modification of verification cost and litigation cost.[22]

As is explained in the legal appendix, courts often award the lower of the ex ante damages and the ex post actual damages. One implication from our results

22. Except under English rule when litigation costs are sufficiently high relative to the expected trade surplus, actual damages may be more efficient.

is that courts should not choose the lower of the two but always award the foreseeable ex ante damages,[23] regardless of the level of ex post actual damages.

To focus on the distortion of incentives to breach and the efficiency of contract remedies, we demonstrated the above points using a very simple model, leaving some interesting aspects unexplored. In the future, we plan to further explore this line of research by accounting for investment incentives and considering the problem of hold up. Also we focused on exclusive-remedy contracts instead of *optional-remedy contracts* (in the sense that the nonbreaching party can choose upon breach from a menu of different remedies, see Ayres and Goldbart [2001], Avraham and Liu [2006], Brooks [2006], and Ayres and Balkin [1997]). We plan to explore how the option of acquiescing to breach affects those optional-remedy contracts in future research.

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Appendix

Part A. The Law of Remedies for Breach of Contract

The general remedy for breach of contract is expectation damages: the amount required to put the injured party in as good of a situation as she would have been had the contract been performed.[24] The Restatement (Second) of Contracts awards damages equal to the loss in value of performance to the injured

23. One may have concern whether the courts are able to determine the ex ante expectation damages in thin markets. We believe that courts are in fact able to handle such an ex ante perspective when dealing with contracts. First, courts use the ex ante perspective when they enforce doctrines such as mistake, impossibility, and frustration. Second, many courts allow recovery of lost future profits due to a breach in both established business cases (e.g., *Denny Const., Inc. v. City and County of Denver*, 2009) and in new business cases (e.g., *Chung v, Kaonohi Center*, 1980). Arguably, proving fixed ex ante damages in court should not be much different from proving lost future profits. In both cases, courts are presented with evidence about the distribution of future damages. In the lost profits case, it is future vis-a-vis the post-breach stage, whereas in the fixed ex ante damages, it is future vis-a-vis the contracting stage. Third, when awarding actual ex post expectation damages, courts typically limit damages to the *foreseeable* results from a breach at the time the contract was made. Indeed, this exercise is required in order to operationalize *Hadley v. Baxendale* (1854). Fourth, when reviewing liquidated damages clauses, courts are required, under the penalty doctrine, to limit these damages to the reasonable ex ante estimation of the nonbreaching party's expectation interest. Lastly, to determine fixed ex ante damages, all that is required of courts is to review evidence presented to them regarding the mean of the distribution of the nonbreaching party's expectation interest. This does not strike us as more difficult than other tasks courts have routinely done in contract disputes. In fact, courts seem already trained to contemplate, at the ex post stage, the ex ante distribution of possible damages. Indeed, ex ante damages could be easily interpreted as more broadly applying the foreseeability principle, which is already utilized to override ex post damages.

24. See for example, *Lar-Rob Bus Corp. v. Town of Fairfield*, 365 A.2d 1086, 1091 (Conn. 1975).

party plus consequential damages minus any cost avoided.[25] The UCC allows a buyer to collect contract-cover or contract-market damages.[26] Both common law's general expectation interest and the UCC's contract-market remedy can be measured ex ante, ex post at the time of contracted for performance, or at an interim stage, that is, at the time of the breach, provided the breach occurred before the date of performance. The UCC's contract-cover damages, however, are always measured either ex post or at the interim stage because they are determined by what the party actually spent to buy replacement performance.[27] The general rule is that courts award damages determined ex post (or at the interim stage), limiting them by what was reasonably foreseeable ex ante.[28]

That courts award damages determined ex post implies that if actual damages are smaller than what was reasonably expected, courts will award the lower damages. In *Truitt v. Evangel Temple, Inc.*, a plaintiff landlord leased property to tenants for $21,000 annually during the relevant time period.[29] Even though the building sat empty for several months after the tenants breached, the court found no damages for the landlord.[30] The court based its decision on the fact that the landlord was able to later re-lease the building for $27,000 annually.[31] The additional $6,000 per year over the term of the original lease more than made up for the anticipated (and actual) lost income during the time the building sat empty.[32] In *General Supply & Equipment Co., Inc. v. Phillips*, a Texas appellate court remanded a case because, inter alia, the jury did not take into account the actual damages suffered when it determined the buyer's consequential damages.[33] Instead of allowing the jury to determine consequential lost profits based on the buyer's projections of what he would have profited from the defective greenhouse panels he purchased, the court

25. Restatement (Second) of Contracts (RSC) § 347.

26. *See* UCC §§ 2-712 (contract-cover damages), 2-713 (contract-market damages). Contract-market damages are the differential between the price provided by the contract and the fair market value of the contracted for performance. Contract-cover damages are the differential between the contract price and the actual cost for the aggrieved party to replace the contracted for performance. Both §§ 2-712, 2-713 allow an aggrieved buyer to collect incidental or consequential damages under § 2-715, which limits consequential damages to those the seller had reason to know of at the time of contracting. The UCC § 2-716 also allows buyers to obtain specific performance or replevin under certain situations.

27. See for example, *Laredo Hides Co., Inc. v. H & H Meat Products Co., Inc.*, 513 S.W.2d 210, 221 (Tex.Civ.App. 1974) (applying § 2-712 to determine contract-cover damages as difference between cost of cover and contract price). If a court were to look at what the parties expected the replacement cost to be at the time of contract formation, then the court would in fact be awarding ex ante contract-market damages.

28. *See* Robert E. Scott, *The Case for Market Damages: Revisiting the Lost Profits Puzzle*, 57 U. Chi. L. Rev. 1155 (1990) (discussing the "tendency of courts and commentators to determine the contractual expectancy ex post").

29. 486 A.2d 1169, 1171 (D.C. 1984).

30. Ibid., at 1173.

31. Ibid., at 1171–72.

32. Ibid.

33. 490 S.W.2d 913, 921 (Tex. Civ. App. 1972).

said the lost profits should have been determined by the difference between the actual value of the flowers sold and the fair market value of flowers grown under proper greenhouse panels.[34]

The limitation of damages by what was reasonably foreseeable ex ante was famously established in the case of *Hadley v. Baxendale*.[35] Although in *Hadley v. Baxendale* the plaintiff had at the contracting stage superior information about his future possible loss,[36] this principle has since served to limit damages even in cases where both parties were symmetrically informed at the contracting stage. For example, in *Mansfield v. Trailways, Inc.*, a Missouri appellate court affirmed a lower court decision to limit damages to those reasonably foreseeable.[37] A passenger sued a bus company for injuries she sustained because she was forced, by the lack of a working bathroom on the bus, to use the bathroom inside a bus station.[38] The passenger slipped while leaving the bus station bathroom and sued the bus company under the theory that it breached the part of the contract ensuring her a functional bathroom.[39] The court reasoned: "defendant, at the time it sold plaintiff the ticket for that journey, could not have reasonably contemplated that the lack of a usable restroom on the bus would cause plaintiff to sustain bodily injuries by falling down the stairway at the Wichita terminal."[40]

The UCC, while it does not limit contract-market or contract-cover damages to those which are foreseeable, does limit *consequential damages* to those the seller had reason to know of at the time of contracting.[41] A California appellate court directly addressed this question in *Gerwin v. Southeastern Cal. Assn. of Seventh Day Adventists*.[42] In that case, the court first accepts the possibility that consequential damages can include the buyer's lost profit.[43] Nonetheless, the court determined that the buyer at issue was not entitled to consequential damages because the seller had no reason to know the purpose for which the buyer was making the purchase.[44] The court made clear that the foreseeability requirement applies only to what the parties knew ex ante, that is, at the time when the contract was formed.[45] Thus, under both the common law and the UCC, the foreseeability requirement can limit buyers' damages to those that should have been reasonably contemplated ex ante by the breaching party.

34. Ibid. The court does not make clear whether the buyer's projection was formed ex ante or ex post, but either way, the court used more recent ex post information to limit damages below the buyer's projection.

35. 9 Exch. 341, 156 Eng. Rep. 145 (1854).

36. See 9 Exch. at 344 (plaintiffs acted urgently to acquire the replacement part and presumably knew the possible loss resulting from their mill being shut down for multiple days).

37. 732 S.W.2d 547, 552 (Mo. App. 1987).

38. Ibid., at 549.

39. Ibid.

40. Ibid., at 552.

41. See footnote 26 [citing UCC § 2-715].

42. 14 Cal. App. 3d 209 (Cal.App. 1971).

43. *Gerwin*, 14 Cal. App. 3d. at 220.

44. Ibid.

45. Ibid.

In sum, courts generally measure damages ex post; but if the ex ante expectation is smaller than the ex post measure, courts will limit the remedy to the smaller amount.[46] Thus, in a way, most courts pick the "smaller of the two" approach.

Part B. Proof of Binding Constraint in Equilibrium under SP

Proof. The parties' expected payoff can be rewritten as $\pi_S^{SP} = p - E(c) - G(p)\int_p^{\bar{c}} (p-c)\mathrm{d}F(c)$, $\pi_B^{SP} = F(p)[E(v) - p] + [1 - F(p)]\int_p^{\bar{v}} (v - \mathrm{p})\mathrm{d}G(v)$. Let λ be the multiplier for the constraint, then the Lagrangian for the seller's optimization program is $\mathcal{L} = \pi_S^{SP} + \lambda\pi_B^{SP}$. The first-order conditions are:

$$\mathcal{L}_p = 1 - g(p)\int_p^{\bar{c}} (p-c)\mathrm{d}F(c) - G(p)[1 - F(p)] + \lambda f(p)\int_0^{p} (v-p)\mathrm{d}G(v) - \lambda F(p) - \lambda[1 - F(p)][1 - G(p)] = 0; \tag{A1}$$

$$\mathcal{L}_\lambda = F(p)[E(v) - p] + [1 - F(p)]\int_{\mathrm{p}}^{\bar{v}} (v - \mathrm{p})\mathrm{d}G(v) \geq 0; \tag{A2}$$

$$\lambda \geq 0;\ \ \lambda\mathcal{L}_\lambda = \lambda\left[F(p)[E(v) - p] + [1 - F(p)]\int_{\mathrm{p}}^{\bar{v}} (v - \mathrm{p})\mathrm{d}G(v)\right] = 0. \tag{A3}$$

We claim that the buyer's participation constraint is binding, that is, her expected payoff is zero in equilibrium. Otherwise $\pi_B^{SP} > 0$, which implies $\lambda = 0$ by (A3). Then (A1) simplifies to $1 - G(p)[1 - F(p)] + g(p)\int_p^{\bar{c}} (c-p)\mathrm{d}F(c) = 0$, which is a contradiction since the left-hand side is always positive. Therefore, we have

$$\pi_B^{SP} = F(p^{SP})[E(v) - p^{SP}] + [1 - F(p^{SP})]\int_{p^{SP}}^{\bar{v}} \left(v - p^{SP}\right)\mathrm{d}G(v) = 0.$$

46. The confusion increases because even just as to ex post damages, courts are inconsistent as to the best time to measure loss. Thomas Jackson in his article, *Anticipatory Repudiation and the Temporal Element of Contract Law: An Economic Inquiry into Contract Damages in Cases of Prospective Nonperformance* (31 Stan. L. Rev. 69 (1978)), discusses three options for measuring contract-market—and contract-cover—damages: ex post at the time of contracted for performance, in the interim at the time of the breach, and the interim stage at the time of the breach but measured on the futures market for performance to be completed when the contracted performance was originally due. Although there are cases to support all three options, under the UCC measuring damages at the interim stage is the majority view. The common law generally awards damages based on the original date of performance.

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