Should Courts Ignore Ex post Information When Determining Contract Damages? A Re-evaluation of Contract Remedies

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* We are grateful for helpful comments from Albert Choi, Omri Ben-Shahar, Abe Wickelgren and participants at the Law and Economics Colloquium at the University of Virginia, and the American Law and Economics Association annual meeting (Columbia, 2008). Financial support from a Robinson College of Business summer research grant is gratefully acknowledged by Liu.

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Abstract

In this paper we study contracts with two-sided asymmetric information with no investment. Prior literature on contract remedies does not account for the non-breaching party's option to *not* sue for damages upon breach, when her expected payoff from suing (even absent litigation costs) is negative, given the contractual terms and her private information about her post breach loss. Once this option is incorporated into the analysis, we make three major contributions: First, we show that courts should commit to awarding fixed damages, because awarding flexible damages based on ex post information will distort the incentives to breach. This result does not rely on the information forcing effect of basing damages on ex ante expectations—*a la* Hadley v. Baxendale—which has been discussed in previous literature. Second, we show that the option of acquiescing to the breach expands the breach set under specific performance, so that a) counter-intuitively, the seller may breach *more* under specific performance than under other damages remedies, and b) that specific performance can be *more* efficient than other remedies. Third, expanding our previous work on optional versus exclusive contracts, we derive the conditions for the superiority of optional contracts over exclusive contracts, and show that courts also should ignore ex post information in optional contracts.

Key Words: Breach of Contract, Damages Measures, Asymmetric Information, Litigation
JEL Classifications: K0, K12, D82, D86

1. Introduction:

In *Eastern S.S. Lines, Inc. v. United States* ("*Eastern*"), the U.S. government chartered a vessel for use during the Second World War and promised to return the vessel in the same condition it had been in at the time the contract was signed.[1] After the war, the government returned the ship un-restored and in significantly worse condition.[2] Due to a decline in the market for old ships, and a rise in the cost of labor and materials, the restoration of the ship did not make economic sense: the cost of restoring it was $4,000,000, whereas a comparable ship in good condition could be purchased for $2,000,000.[3] At trial, the ship-owner sought $4,000,000 in damages based on cost of performance, whereas the government argued for limiting recovery to $2,000,000.[4]

This case challenges us to consider the optimal choice of remedies for breach of contract when neither of the contracting parties has superior information at the contracting stage. As the court in *Eastern* explicitly mentioned, during contract negotiations neither of the parties anticipated the circumstances that arose when it was time to return the ship. No one anticipated that the cost of performance would be so high or that the ships' value would be so low.[5] What, then, should a court do when confronted with similar disputes? More specifically, should a court ignore the ex post circumstances and simply enforce parties' contracts as written, or should the court craft a remedy that considers these circumstances?

In this paper, we address this question and advance the ball in two ways. First, we re-evaluate four types of contract remedies: a) specific performance, b) fixed ex ante expectation damages, c) ex post actual damages, and d) optimal monetary damages (damages which maximize parties' ex ante welfare) in circumstances similar to those in *Eastern*. 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 work focusing on the effects of various legal rules on a party's incentives to breach a contract (Goetz and Scott, 1977; Ulen, 1984; Shavell, 2004). The previous literature always assumes that some

[1] 112 F. Supp. 167, 168-71 (Ct. Cl. 1953).
[2] *See id.* at 171-74.
[3] *See id.* at 174.
[4] *Id.*
[5] *Id*. at 175. A similar problem exists in the well known Peevyhouse v. Garland Coal & Mining Co., 382 P.2d 109 (Okl.1962). However, it is not entirely clear that in Peevyhouse there was two-sided ignorance at the contracting stage. See Maute (1994).

particular remedy will actually be applied once breach occurs. It does not account for the possibility that a privately informed non-breaching party may choose not to file a lawsuit seeking damages if the expected compensation under the remedy regime is insufficient to put her in a position superior to the one she would occupy in the absence of a lawsuit. One important contribution of our paper is to explicitly identify the (privately informed) non-breaching party's embedded option to not seek remedies under various damages measures when comparing their efficiencies. Also, while most of the previous literature on contract remedies implicitly assumes a passive court that simply enforces parties' agreements, we apply a more modern approach that explicitly accounts for an active court and its possible welfare-enhancing proclivities (Anderlini, Felli, and Postlewaite, 2006, 2007; Shavell, 2006).[6] We rank the efficiency of the various remedies and are thus able to answer the question in the title: should courts ignore ex post information when determining contract damages?

Second, we expand our previous work (Avarahm and Liu, 2006) and analyze these damages measures in the context of both exclusive and optional contracts. By *exclusive* contracts we mean contracts where the non-breaching party is entitled to damages only as determined by default rules or explicitly provided for in the contract. By *optional* contracts we mean contracts where the non-breaching party can choose, ex post, whether she prefers specific performance or monetary damages. Optional contracts have not been widely explored, though the law and parties' agreements at times provide a variety of remedies to non-breaching parties to choose from in the event of a breach.[7]

We present a model where a buyer and a seller contract at the ex ante stage, Time 1, in which they are symmetrically informed about the *distributions* of costs and valuations of a good to be traded at Time 3. In the interim stage, Time 2, 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 3) the buyer either pays the price, if the seller delivered, or decides whether to file a lawsuit if the seller breached. The buyer in an optional

[6] As explained by Anderlini, Felli and Postlewaite (2007): " . . .the work on incomplete contracts is 'partial equilibrium,' analyzing a subset of agents' behavior taking as fixed the behavior of agents outside the model (the courts), without investigating whether the assumed fixed behavior of the outside agents is in fact optimal."

[7] Chapter 7, Article 2 of the Uniform Commercial Code ("UCC") provides a list of optional remedies, but parties can agree on any other remedy, provided they conform with some basic principles of contract law. See generally U.C.C. § 1-203(3) (1963) and, more particularly, U.C.C. § 2-719(1) (1963). The entire of Chapter 66 of CORBIN ON CONTRACTS (West, 2007)is dedicated to "election of remedies".

contract would then choose its desired remedy in court. Throughout this analysis we assume that the seller's cost and the buyer's valuations are unobservable to the other party, and therefore renegotiating the contract is prohibitively expensive (for simplicity, we assume that parties can commit to not renegotiate the contract). We also assume that seller's costs are unverifiable to the court at all times.[8] 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 by the court at no cost. Next, we assume that the buyer's valuation can be verified to the court ex post but only with costs (we compare the English rule of loser pays with the American rule).

Our investigation yielded several discoveries. First, when parties write an *exclusive* contract and the buyer's valuation is verifiable to the court ex post, the fixed ex ante expectation damages remedy is always better than the actual damages remedy and is in fact the optimal *monetary* damages. This holds even when there are no costs to verify buyer's actual damages. This result is surprising because one would think that *from the 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 *paying* damages. Thus, the seller does not, in fact, face the entire distribution of buyer's valuations under actual damages remedy. Instead, he faces a truncated distribution which has a higher mean than the ex ante expectation damages he would pay under the fixed ex ante expectation damages remedy. As a result, the seller breaches too little. 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 hear evidence in Time 3 regarding the buyer's actual damages. A black-letter rule of simply awarding fixed ex ante expectation damages would provide the seller with better incentives for efficient breach. As far as we know, this result was missed by the literature which

[8] Otherwise the court would have been able to determine the first-best allocation by verifying the two parties' private values.

implicitly assumed that the non-breaching party always seeks damages upon contract breach. Interestingly, this result does not change when we assume that verifying the buyer's valuation is costly, whether these costs are born by the buyer or by the seller. We thus answer the question in the title in the affirmative: courts should ignore ex post information when deciding contract remedies. Moreover, while 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 private information that expectation damages may provide (Ayres and Gertner, 1989; Bebchuk and Shavell, 1991; Adler, 1999).[9] In our model, as in *Eastern*, 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 damage remedies, depending on the distributions of values and costs. The conventional wisdom ranks specific performance below damages remedies because specific performance strips the seller of the flexibility to breach the contract when his costs are high, whereas damage remedies allow him flexibility to not perform, which may be efficiency-enhancing. But this argument overlooks the embedded option to breach which exists even under the specific performance remedy. Specifically, the missed point is, as was explained above with respect to actual damages, that the non-breaching party will not file a lawsuit when her ex post value from performance is lower than the price she needs to pay. 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 that the value from performance exceeds the costs (from the ex ante perspective), specific performance could be more efficient compared to other remedies.

Our next results are more nuanced and have to deal with our comparison of exclusive vs. optional contracts. For example, we show that parties will never write an optional actual-damages contract (a contract which allows the non-breaching party to choose ex post whether to receive actual damages or specific performance). Next we show that parties' joint ex ante welfare, when the remedy the court awards in an optional contract is fixed ex ante expectation damages, can be greater or lower than parties' joint ex ante welfare in an

[9] In our model parties contract at the ex ante stage (and not at the interim stage) and are assumed to be symmetrically ignorant of each other's cost and valuation.

exclusive contract with the same remedy (fixed ex ante expectation damages is also the optimal monetary damages in exclusive contracts). We thus describe the conditions under which parties subject to fixed ex ante expectation damages will write an optional contract instead of an exclusive contract. In addition, we derive the optimal damages courts should award when faced with an optional contract. We analyze all this first assuming that verifying the buyer's valuation is costless, and then assuming it is costly (and compare the English rule with the American rule).

The rest of the paper is organized as follows: In Section 2, we discuss the relation of our paper to the previous literature. In Section 3 we provide a survey of the relevant Anglo-American law on contract remedies. In Section 4, we present the model and the results and compare the various contract remedies for exclusive contracts assuming no litigation costs. In Section 5, we provide the same analysis for optional contracts and in Section 6, we summarize our results and present our conclusions. In the Appendix, we provide in Part B a proof for Lemma 3. In Part C of the Appendix we consider the effects of litigation costs associated with verifying the buyer's valuation ex post facto and present a numerical simulation of the comparative efficiencies of the American rule vs. the English rule under the exclusive actual damages regime, assuming the distributions are uniform.

2. Related Literature:

There are four strands of literature that are closely related to our paper: literature that addresses the efficiency of various contract remedies, literature that compares the different information disclosure effects of these remedies, literature on the optimal accuracy of damages assessment, and literature that compares the exclusive versus optional contracts.

In the first case, there is a large volume of literature on the comparative advantage of various contract damages measures. For example, Birmingham (1970), Barton (1972), Goetz and Scott (1977), Shavell (1980, 1984), and Miceli (2004), among many others, have studied various damages measures for breach of contract and compared their efficiency. Edlin and Schwartz (2003) provide an excellent survey of this literature. Almost without exception these studies assume that the non-breaching party will always pursue a remedy for the contract breach regardless of her post-breach valuation. As a result, these studies ignore the

endogenous option given to the non-breaching 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 papers naturally assume that under the specific performance remedy, the breach set is empty (see e.g., Shavell, 1984, p. 132). But actually even under specific performance, the breach set is non-empty and includes the set of situations under which the non-breaching party chooses to not pursue a remedy for breach because her expected payoff from litigation might be negative.

The second strand of literature analyzes the incentives to disclose private information that the various remedies provide (see Ayres and Gertner, 1989; Bebchuk and Shavell, 1991; and Adler, 1999). Bebchuk and Shavell (1991) showed that awarding ex ante expectation damages motivates more information disclosure at the contracting stage from the privately informed party and thus makes the estimation of expectation damage 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 non-breaching party's option to *not* file a lawsuit.

The third strand of related literature deals with the accuracy of the assessment of damages and its incentive effects on parties' primary behavior. (See Spier, 1994, and 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. However, 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. Conversely, in our contract-based model, the victim might choose to not pay the contracted price in return for actual damages, when her post-breach valuation is low. As a result the breaching party's performance incentives are distorted. 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, there are recent series of studies on optional remedies; such as Ayres and Balkin (1997), Ayres and Goldbart (2001), Ayres (2005), Avraham (2004), and Avraham and Liu (2006). Traditionally, the literature on contract remedies considered only single-remedy contracts where the non-breaching party (or the court) applied a pre-determined exclusive remedy. In contrast, the optional contracts literature studies the efficiency of contracts with optional remedies, i.e., contracts where the non-breaching party has an ex post option to choose a remedy from a pre-determined menu of remedies. The previous studies on optional remedies assumed that the non-breaching party will always sue, whereas our paper considers the case of the non-breaching party acquiescing to a breach.

3. The Law of Remedies for Breach of Contract:

Under Anglo-American law the default remedy for breach of a *silent* contract (a contract where parties do not stipulate any remedy) is to award money damages based upon the non-breaching party's subjective "expectation interest,"[10] so as to "put the injured party in as good a position as that party would have been in if performance had been rendered as promised."[11] Two factors are important in determining the size of this default remedy.[12] First, courts limit damages to the *foreseeable* results from a breach at the time the contract was made.[13] Second, courts determine damages based on plaintiff's ability to prove the

[10] *See* RESTATEMENT (SECOND) CONTRACTS § 344 (1965) (defining "expectation interest" as a party's "interest in having the benefit of his bargain;" distinguishing it from a party's "reliance interest" in "being reimbursed for loss caused by reliance on the contract" and "restitution interest" in "having restored to him any benefit that he has conferred on the other party"). *See also id.* § 347 (stating that the expectation interest should be measured by reference to "the loss in value [to the party] of the other party's performance caused by its failure or deficiency" plus "any other loss, including incidental or consequential loss," less, "any cost or other loss that [the party] has avoided by not having to perform").

[11] 5 CORBIN ON CONTRACTS § 55.3 (2007) (citing cases). *See, also* RESTATEMENT (SECOND) §344 cmt. a; U.C.C. § 1-106 (1977); WILLISTON ON CONTRACTS § 64:1 (West, 2007) (citing cases).

[12] A third issue, which often determines the availability of damages, is that the non-breaching party is also required to make reasonable efforts to avoid suffering a loss but that is beyond the scope of this paper. *See,* RESTATEMENT (SECOND) § 350. *See also* WILLISTON, *supra* note 11, § 64:27 (discussing a non-breaching party's obligation to mitigate damages and seek "cover").

[13] *See,* RESTATEMENT (SECOND) § 351 (damages unrecoverable where they were unforeseeable at the time the contract was signed) and comment a; UCC § 2-715 (limiting consequential damages for breach to "any loss resulting from general or particular requirements and needs of which the seller at the time of contracting had reason to know"). *And see* Hadley v. Baxendale 156 Eng. Rep. 145 (Ex. Ch. 1854).

extent of the loss.[14] For example, in construction contracts, where proving losses due to an incomplete or imperfect performance is a challenge, American courts generally allow a party to "recover damages based on a) the diminution in the market price of the property caused by the breach, or b) the reasonable cost of completing performance or of remedying the defects if that cost is not clearly disproportionate to the probable loss in value to him."[15] Although the Restatement outlines this test in the context of construction contracts, its principles have been extended to a variety of different situations, including service contracts and contracts governed by the Uniform Commercial Code (UCC).[16] Finally, in order to obtain "as nearly as is practicable the same effect that the performance due under a contract would have produced," a party may request "an order of specific performance" where other remedies will fail to adequately make them whole.[17] While the Restatement indicates that specific performance is still a form of equitable relief,[18] and imposes a number of substantive limitations on the discretion of courts,[19] both it and the UCC suggest that courts should focus on the "adequacy" of the remedies available at law, and suggest that a court's doubts as to whether to exercise its discretion should be resolved in favor of the non-breaching party.[20]

To sum up, while specific performance may be an option after the breach of a silent contract, the default remedy is money damages based upon harm *foreseeable* to a party's subjective expectations, followed by the diminution of value or cost of performance, depending on the circumstances.

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[14] *See* RESTATEMENT (SECOND) § 352 (stating that "damages are not recoverable for loss beyond an amount that the evidence permits to be established with reasonable certainty"); *id.* § 352, cmt. a (indicating that inability to prove entire loss is not a bar to recovery of portion that can be proved); *id.*cmt. b (noting that where lost profits are at issue, courts should look to profits from prior ventures in similar circumstances, or to testimony of experts where venture is novel). *See also* U.C.C. § 1-106.

[15] RESTATEMENT (SECOND) CONTRACTS § 348 (1965). *See also,* U.C.C. § 2-712 (1963) (allowing buyer who does not receive goods or who receives defective goods to "cover" by purchasing an adequate substitute).

[16] *See, e.g.*, International Adhesive Coating Company, Inc. v. Bolton Emerson International, 851 F.2d 540, 546 n. 7 (1st Cir. 1988) (where buyer paid for repairs to defective boiler, the court found that, "buyer is entitled to cost of repair *or* replacement"); Stelco Industries v. Cohen, 182 Conn. 561 (1980) (noting that while diminution of value is primary measure of damages, where construction supplies were accepted with notice of non-conformity, cost of repair is an appropriate measure of damages). *See, generally,* WILLISTON *supra* note 11, at §§ 66:14 & 66:17.

[17] *See* RESTATEMENT (SECOND) § 357, cmt. a.

[18] *See id.* § 357 cmt. c.

[19] *See, e.g, id.* §§ 359-69 (damages must be otherwise inadequate; terms of contract must be sufficiently certain; must not be otherwise unfair, contrary to public policy, or involve a contract for personal service; relief must be judicially manageable, etc.).

[20] *See* RESTATEMENT (SECOND) CONTRACTS § 359, cmt. a (1965); U.C.C. § 2-716, cmt. 1, (Original Official Version)

However, many contracts are not silent. Where parties anticipate the possibility of imperfect performance, they may include language varying the default remedies and a court will respect these limitations in most situations.[21] Indeed, parties can enter an *exclusive* contract (a contract in which parties explicitly provide the injured party with a specific remedy which will be her only remedy) and an *optional* contract (a contract which allows one party —usually the injured party—to choose, ex post, between two or more remedies.)[22] Indeed, both the Restatement and the UCC allow parties to provide for "remedies in addition to or in substitution for those provided" under the law.[23] In some cases, though, parties may stipulate a remedy for a breach, but do not indicate whether this remedy is the exclusive remedy. We call these contracts *ambiguous* contracts. Interestingly, in such cases the remedy is typically seen as optional "unless the remedy is expressly agreed to be exclusive."[24] Thus, when interpreting any clause pertaining to remedies in the event of a breach, courts typically require that it expressly and conspicuously declare a specified remedy to be exclusive,[25] or that the intent of the parties clearly indicated it to be so.[26] Conversely, while specific performance may be written into a contract as either an optional or an exclusive remedy, the decision on whether to grant such an order is reserved

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[21] *See* RESTATEMENT (SECOND) § 346, cmt a (while parties have a general right to damages for a breach, they may "vary the rules stated in this Section, as long as the agreement is not invalid for unconscionability . . . or on other grounds. The agreement may provide for a remedy such as repair or replacement in substitution for damages."); U.C.C. § 2-719 (party agreements "may provide for remedies in addition to or in substitution" to those in UCC). *See also* RESTATEMENT (SECOND) § 356 (discussing the availability of liquidated damages).

[22] *See* Ronen Avraham & Zhiyong Liu, *Incomplete Contracts with Asymmetric Information: Exclusive Versus Optional Remedies*, 8 Am. L. & Econ. Rev. 523 (2006) (discussing options available in various form contracts). A separate and interesting question that often arises in optional contracts (which is beyond the scope of this paper) is which party is entitled to choose between the pre-determined set of remedies. For example, in the context of warranty provisions for either repair or replacement (or refund), these remedies are often the only ones available to the non-breaching party. *See* U.C.C. 2-719 (1963) (providing that remedies for breach of contract may be limited to cost of repair or cost of replacement). *See also* Beal v. General Motors Corp., 354 F.Supp. 423 (D.C.Del. 1973) (upholding the validity of a warranty in an automobile purchase contract that made replacement or repair the exclusive remedies in the event of a breach of warranty)..These two remedies differ both in terms of their utility to the each of the parties and their overall efficiency. *See* Kenneth Chapman & Michael J. Meurer, *Efficient Remedies For Breach of Warranty*, 52 Law & Contemporary Problems 107, 109 (1989).

[23] And of course, to limit their liability or specify "liquidated damages" to be awarded in the event of a breach. *See* U.C.C. § 2-719.

[24] U.C.C. §2-719. While some courts operating under the Restatement have suggested that a remedy specified in a contract is exclusive *per se*, there is substantial authority suggesting to the contrary, and it has been suggested that in both cases the decision turns on an intent sensitive analysis of the contractual provision. *See* E.H. Schopler, *Contractual Provision as to Remedy as Excluding Other Possible Remedies*, 84 A.L.R. 2d 322 (Originally published 1962).

[25] *See* WILLISTON *supra* note 11, at § 40:40.

[26] *See, e.g.*, AM. JUR. *Contracts* 2D § 710 (Feb. 2008) (citing cases).

exclusively to the court.[27] However, when considering such a provision, courts must wrestle with a conflict between the freedom of contract and the discretionary nature of equitable relief.[28] While the proposed 2003 amendments to the UCC specifically provide parties with the option of contracting for specific performance "even where it would not otherwise be available,"[29] these provisions are in direct conflict with the Restatement and have not been widely adopted.[30] However, even the Restatement, and many opinions relying upon it, suggest that a court may consider the presence of a specific performance provision and the facts recited therein as persuasive evidence that equitable relief is warranted.[31]

To sum up, even when parties explicitly write a remedy into the contract, the default rule is that this remedy is not exclusive and that the non-breaching party will be allowed to ask for another type of remedy, and sometimes even to ask for specific performance, (especially if the original remedy was liquidated damages). On the other hand, when specific performance is either written in the contract (in an exclusive contract) or sought post-breach by the non-breaching party (in an optional contract) courts may use their discretion to deny the request if the conditions for specific performance do not hold.

To conclude, there are four types of contract: First, a *silent* contract where parties do not stipulate any remedy. Here the default remedy is damages for the expectation interest, with the method of calculating damages varying with the circumstances. Second, an *ambiguous* contract where parties stipulate a remedy but do not explicitly stipulate whether the remedy is exclusive or optional. Courts in such cases must interpret parties' intentions to decide whether the remedy is exclusive or optional. Unless stipulated as exclusive the default rule is that any remedy in the contract is *optional* and courts may allow the non-breaching party to receive other remedies, including sometimes specific performance. Third, in an *exclusive* contract parties explicitly agree that a remedy will be the exclusive remedy, and fourth, in an *optional* contract parties explicitly agree that one of them may choose between a specified set of remedies.

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[27] RESTATEMENT (SECOND) CONTRACTS § 357 (1965) (granted in the discretion of the court); *id.* § 361, cmt. b (noting that parties cannot contract around the inadequacy of damages requirement).
[28] *See* EDWARD YORIO, CONTRACT ENFORCEMENT: SPECIFIC PERFORMANCE AND INJUNCTIONS 440 (1989) (discussing scholarship on this conflict).
[29] U.C.C. § 2-716, cmt. 1b (proposed 2003 amendment).
[30] *See* YORIO, *supra,* note 28, at 441 (most courts have rejected the option).
[31] *See* YORIO, *supra* note 28, at 447 (citing cases). *See also,* RESTATEMENT (SECOND) § 359, cmt. a.

Unfortunately, there is no overreaching theory explaining why parties prefer one remedy over another. For instance, it is not clear why and when parties prefer an exclusive remedy over an optional one, and vice versa. This demonstrates the need for a model to show when parties would contract for exclusive damages, and when for exclusive specific performance, and when they give the non-breaching party a choice between the two. The model we present does exactly that.

4. The Model:

4.1 Set Up

At Time 1 a seller and a buyer enter a contract for the sale of a single widget and both parties are risk-neutral. 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 which arrives later) and the buyer's valuation. We assume that the seller's cost, c, is drawn from a density function f(c) with cumulative distribution function denoted F(c) in the interval $[0,\bar{c}]$. The buyer's valuation, v, is drawn from a density function g(v) with cumulative distribution function denoted G(v) in the interval $[0,\bar{v}]$. G(.) and F(.) are independent and commonly known, and both $\bar{c}$ and $\bar{v}$ are finite[32]. Between Time 1 and Time 2 (which is when the seller must decide to either 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 due to asymmetric information between the parties and for the sake of simplicity, we assume that parties can commit to not renegotiate the contract. If the seller breaches at Time 2, then at Time 3 parties may litigate the contract remedy. The following chart presents the timeline.

Chart 1- Time-line for the model

1_____2_____3

[32] Therefore, we do not consider here the circumstances where performance is impossible or prohibitively costly.

Parties enter a contract	Parties learn private information	Seller delivers or breaches	Buyer decides whether to sue; Court decides on the remedy and parties obey

Without loss of generality, and for simplicity, we assume that the buyer has all the bargaining power. Therefore, we can assume the seller's surplus from the contract is zero. However, our results do not depend on this assumption.

We recognize that the price, *p*, agreed to in the contract at Time 1 and the incentives to breach at Time 2 (and of course the joint welfare) are influenced by several factors. First, they take into account the default legal damages regime a court will apply at Time 3 if the seller does not deliver at Time 2 and a lawsuit is filed. Second, the price and incentives to breach reflect the anticipated ex post costs of verifying a buyer's valuation, as well as whether the English rule of loser pays or the American rule of shared costs applies. Third, the contracted price and the incentives to breach will be different if parties write an exclusive or an optional contract. While parties cannot decide the court's default damages remedy, we allow the parties to decide in Time 1 whether the damages are exclusive or whether the buyer can insist on specific performance at Time 3.

Table 1 presents the various contract remedies we compare; β represents the cost of verifying buyer's damages.

Table 1- Notations: Comparing various remedy regimes

(price, incentive to breach, and expected joint payoff)

	Specific Performance	Expectation Damages	Actual Damages		Optimal Damages	
			$\beta=0$	$\beta>0$	$\beta=0$	$\beta>0$
Exclusive Contract	SP	EED	EAD	EAD	EOD	EOD
Optional Contract	----	OED	OAD	OAD	OOD	OOD

* SP means exclusive specific performance regime. EED (OED) means exclusive (optional) ex ante damages regime. EAD (OAD) means exclusive (optional) actual damages regime. EOD (OOD) means exclusive (optional) optimal damages regime. $\beta=0$ ($\beta>0$) denotes the case where the buyer's ex post valuation is verifiable to the court at no (some) cost.

We now compare the contracted price, the seller's incentives to breach, and the parties' joint expected payoff under exclusive and optional contracts, considering various types of damages and varying costs of verification.

4.2 Efficiency of Damage Measures under Exclusive Remedies Regime with No Verification Costs

In this section, we analyze the efficiency of various damage measures under an exclusive remedies regime. At Time 0 the legal regime is announced and at Time 3 the court enforces the single remedy which the parties contracted for at Time 1. We assume that the seller's costs and the buyer's valuation are private information and non-observable to the other party throughout the entire transaction, but that the buyer's damages are verifiable ex post in court through discovery. We assume that there are no costs associated with the verification of the buyer's ex post valuation ($\beta=0$).

Exclusive Specific Performance:

The court is assumed to always grant specific performance if the buyer files a lawsuit. We call this regime *Exclusive Specific Performance* (SP). We solve the equilibrium by backward induction. At Time 3, upon breach the buyer will file a lawsuit only if $v > p$; the

seller's expected payoff from breach is $\int_{p}^{\bar{v}}(p-c)dG(v)$. Therefore, the seller will breach if $c > p$. Since the buyer has all the bargaining power, she will offer a minimum price to extract all the seller's expected surplus (*Notation: π denotes parties' expected payoff, while $j\pi$ denotes joint expected payoff ; subscripts B and S denote buyer and seller, respectively; and the superscripts denote the remedy applied to the breach).*

$$\pi_{\mathrm{S}}^{SP} = \int_{0}^{p^{SP}}(p^{SP}-c)dF(c) + \int_{p^{SP}}^{\bar{c}}\int_{p^{SP}}^{\bar{v}}(p^{SP}-c)dG(v)dF(c)$$

$$= [1-G(p^{SP})][p^{SP}-E(c)] + G(p^{SP})\int_{0}^{p^{SP}}(p^{SP}-c)dF(c) = 0 \qquad (1)$$

$$\pi_{\mathrm{B}}^{SP} = j\pi^{SP} = \int_{0}^{p^{SP}}(E(v)-c)dF(c) + \int_{p^{SP}}^{\bar{c}}\int_{p^{SP}}^{\bar{v}}(v-c)dG(v)dF(c). \qquad (2)$$

Remarks:

a) The first term of the first line in equation (1) represents the seller's payoff if he voluntarily delivers, whereas the second term represents his payoff when he is forced to deliver by court. The first term of the second line of equation (1) denotes the seller's payoff when the buyer's valuation is above the contracted price (in this case, performance is the only outcome; either the seller voluntarily delivers or the seller breaches but the buyer sues for specific performance). The second term of the second line in equation (1) represents the seller's payoff when the buyer's valuation is below the contracted price (in this case, either the seller's cost is low and he voluntarily performs or his cost is high and he breaches but the buyer does not sue).

b) It is obvious from the second line of equation (1) that the contracted price under exclusive specific performance will always be smaller than the seller's expected costs, i.e. that $p^{SP} < E(c)$.[33] This might look counterintuitive as it means that the contract price is not high enough for the seller to recover his expected costs. However, the seller enjoys some "free" breaches and can therefore afford receiving a lower price.

[33] Proof: In the second line of equation (1), the second term is positive, which implies that the first term is negative, thus, $p^{SP} < E(c)$.

c) In contrast, the sign of $p^{SP} - E(v)$ is ambiguous. However, as stated in Lemma 1 below, if trade between the parties is ex ante efficient (i.e., if $E(v) - E(c) \geq 0,$) then it follows from $p^{SP} < E(c)$ that $p^{SP} < E(v)$.

Lemma 1 *If* $E(c) \leq E(v)$, *then* $p^{SP} < E(v)$.

As will be discussed below in more detail, Lemma 1 surprisingly implies that when trade is ex ante efficient, the seller would breach *more often* under a regime of specific performance than under a regime of ex ante expectation damages.

Exclusive Optimal Damages:

Here we assume that the court will choose, ex post, the monetary damages that maximize parties' ex ante welfare.[34] We call this regime *Exclusive Optimal Damages* (EOD). When choosing damages, the court is not bound by any standard damages measure. In particular, we allow the court to "decouple" damages—i.e the buyer may be awarded damages which are different from the damages the seller pays (see Polinsky and Che (1991) and Choi and Sanchirico (2004) for analyses of decoupling), if necessary. Recall that the court can verify without costs the buyer's valuation, *v*, as well as the contracted price, *p*. Therefore, we assume that the court-imposed optimal damages award (if the buyer files a lawsuit) would be for the seller to pay $S(v, p) - p$, and for the buyer to receive $B(v, p) - p$.[35] Taking into account the possibility that the buyer might choose not to file a lawsuit upon breach given the anticipation of the damages award, we denote the seller's breach threshold derived from the damages award function as μ_a, (i.e., the seller will perform if and only if $c < \mu_a$.)[36] Then, the joint payoff is: $j\pi^{EOD} = \int_0^{\mu_a} (E(v) - c)dF(c)$.

In this scenario, the court will choose the damages award $S(v, p)$ and $B(v, p)$, such that the induced breach threshold for the seller, μ_a will maximize $j\pi^{EOD}$. Since the first

[34] Here we assume that the breach is final and therefore that the court's task is to find the optimal (monetary) damages which will induce optimal breach incentives.

[35] If $S(v, p) = B(v, p)$, we are back to regular (non-decoupling) damages, which is the equilibrium outcome as we will see below. .

[36] That is, given $S(v, p)$ and $B(v, p)$, and taking into account of the buyer's option not to sue, the seller's expected payoff from breach is $p - \mu_a$.

order condition yields $\mu_a^* = E(v)$, the ex-ante first best breach threshold is $E(v)$. And the simplest way to induce such a breach threshold is for the court to simply set the damages award function $S(v, p) = B(v, p) = E(v)$.[37] (*i.e.*, a welfare-maximizing court will commit not to verify the buyer's valuation and adapt the damages award to the learned ex post information, rather, the optimal damages is a fixed value, E(v)). Hence, the equilibrium joint payoff is:

$$j\pi^{EOD} = \int_0^{E(v)} (E(v) - c)dF(c). \qquad (3)$$

Remarks:

The court's welfare-maximizing damages award in this case is exactly the ex ante expectation damages, $E(v) - p$. We provide more details about this remedy below.

Exclusive 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, the court will not revise the damages award. We call this regime *Exclusive Ex Ante Expectation Damages (EED)*. Under this regime, at Time 2, the seller will breach if $c > E(v)$.[38] We have the following equilibrium results:

$$\pi_S^{EED} = \int_0^{E(v)} (p - c)dF(c) - \int_{E(v)}^{\bar{c}} (E(v) - p)dF(c) = 0 \Rightarrow$$

$$p^{EED} = \int_0^{E(v)} cdF(c) + \int_{E(v)}^{\bar{c}} E(v)dF(c) \qquad (4)$$

$$\pi_B^{EED} = j\pi^{EED} = E(v) - p^{EED} = \int_0^{E(v)} (E(v) - c)dF(c) \qquad (5)$$

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[37] The court can also set $S(v,p)$ and $B(v, p)$ to be any symmetric distribution with mean equal to $E(v)$, and with the lower bound larger than p (this latter condition guarantees that the buyer will always file a lawsuit). Since damages are greater than p and has mean of $E(v)$, the derived seller's breach threshold, and thus the expected joint payoff would remain the same as simply setting $S(v, p) = B(v, p) = E(v)$. The random damages award function may be used to improve ex post equity (allocation of ex post payoffs between parties by judges' discretion) without impairing the ex ante efficiency. Unfortunately, this alternative damages award function is more complicated and less robust, in the sense that once we include in the model even tiny verification cost, this damage award function becomes inefficient (while setting as fixed $E(v)$ does not require verification of values, and therefore remains efficient).

[38] We assume that $\bar{c} > E(v)$. Otherwise, under expectation damages, the seller would never breach.

Remarks:

a) Since the seller's expected payoff is zero, the buyer's expected payoff is also the joint payoff, $j\pi^{EED}$. Recall from the previous subsection that this joint payoff is the best parties can achieve under any monetary damages remedy.

b) Consistent with the assumption that the buyer has all the bargaining power, the equilibrium price (shown in equation (4)) is set exactly to compensate the seller's expected cost, which is the sum of the expected cost of performance in voluntary delivery in the low-cost state and the expected damages award that the seller has to pay when he breaches ($E(v)$) in the high-cost state.

c) The equilibrium price is always smaller than the buyer's expected value: $p^{\text{EED}} - E(v) = \int_0^{E(v)} (c - E(v))dF(c) < 0.$ Thus, if the seller breaches the buyer will always file a lawsuit because her expected recovery is larger than the price she would then have to pay.

d) Recall that under a regime of specific performance, the seller breaches whenever $c > p^{SP}$. Further recall from Lemma 1 that when trade is ex ante efficient, the contracted price under a regime of specific performance is smaller than the buyer's mean valuation (*i.e.*, $p^{SP} < E(v)$). This means that when trade is ex ante efficient, the seller's breach threshold under specific performance is lower than the seller's breach threshold under exclusive ex ante expectation damages (which equals $E(v)$). This means, counter-intuitively, that the seller would breach *more often* under Specific Performance than under an exclusive ex ante expectation damages regime.

(e) Observe, however, that this does not imply that under specific performance there will be more "final" non-deliveries than under an exclusive ex ante expectation damages regime, because the buyer may file a lawsuit and get a court order for specific performance so the good would be eventually delivered. The reason the seller will breach more often under specific performance is that unlike under the ex ante expectation damages regime, where the buyer will always file a lawsuit, under specific performance the seller has a chance to breach and not be sued.

f) Comparing the joint payoff under EED with the joint payoff under SP yields:

$$j\pi^{EED} - j\pi^{SP} = \int_0^{E(v)} (E(v)-c)dF(c) - \int_0^{p^{SP}} (E(v)-c)dF(c) - \int_{p^{SP}}^{\bar{c}} \int_{p^{SP}}^{\bar{v}} (v-c)dG(v)dF(c)$$

$$= \underbrace{[\int_0^{E(v)} (E(v)-c)dF(c) - \int_0^{p^{SP}} (E(v)-c)dF(c)]}_{\text{Difference in efficiency from voluntary performance}} - \underbrace{(1-F(p^{SP}))(1-G(p^{SP}))[E(v|v \geq p^{SP}) - E(c|c \geq p^{SP})]}_{\text{Potential efficiency gain from involuntary performance under SP}}$$

Denote $\Delta_1 \equiv \int_0^{E(v)} (E(v)-c)dF(c) - \int_0^{p^{SP}} (E(v)-c)dF(c)$ as the difference in efficiency between the EED and SP regimes due to the different incentives that the two regimes provide for voluntary performance. Since E(v) is the ex-ante optimal breach threshold, Δ_1 is always non-negative. Denote, $\Delta_2 \equiv (1-F(p^{SP}))(1-G(p^{SP}))[E(v|v \geq p^{SP}) - E(c|c \geq p^{SP})]$ 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 can create efficiency gains (from the ex ante perspective). The expression above stipulates that if $\Delta_1 \geq \Delta_2$, then SP is inferior to EED; otherwise, SP becomes superior, as the gain from forced performance under SP regime more than offsets the inferior breach incentives it provides.

g) Observe that if parties' distributions are identical, then Δ_2=0 and EED becomes the superior remedy. This is because there is no expected gain from forced performance, so the better incentives to breach that EED provides make it the better remedy. Consider the following example: The buyer's valuation and the seller's costs are uniformly distributed between 0 to 1 $, v, c \sim U[0,1]$. From equations (1) and (2) we get that $p^{SP} = 0.43; j\pi^{SP} = 0.12$. From equations (4) and (5) above we get that $p^{EED} = 3/8; j\pi^{EED} = 1/8 > 0.12 \equiv j\pi^{SP}$. In this case the joint payoff under EED is larger than under SP. However, when we assume that $c \sim U[0,1]; v \sim U[0,3/2]$, then we get that $p^{EED} = 15/32; j\pi^{EED} = 9/32; p^{SP} = 0.45; j\pi^{SP} = 0.33 > 9/32 \equiv j\pi^{EED}$. In this case the joint payoff under EED is smaller than under SP.

Exclusive Actual Damages:

Here, the court is assumed to award actual damages (sometimes called ex post expectation damages). In this case, the court is tuned towards accuracy; it incorporates ex post information attempting to compensate the buyer as accurately as possible; we call this regime *Exclusive Actual Damages* (EAD). At Time 3 the buyer will sue for actual damages only if her ex post valuation is larger than the price she would need to pay for the widget. Anticipating the buyer's litigation decision, the seller's expected payoff if he breaches the contract is: $\int_p^{\bar{v}}(p-v)dG(v)$. Therefore, the seller will breach when $c > E(v) + \int_0^p (p-v)dG(v) \equiv Br(p)$, where $Br(p)$ denotes the seller's breach threshold given the contracted price, p. The equilibrium price and joint surplus are given in the following expressions:

$$\pi_S^{EAD} = \int_0^{Br(p)}(p-c)dF(c) + \int_{Br(p)}^{\bar{c}}\int_p^{\bar{v}}(p-v)dG(v)dF(c) = 0 \Rightarrow$$

$$p^{EAD} = \int_0^{Br(p^{EAD})} cdF(c) + \int_{Br(p^{EAD})}^{\bar{c}}[\int_0^{p^{EAD}} p^{EAD}dG(v) + \int_{p^{EAD}}^{\bar{v}} vdG(v)]dF(c). \quad (6)$$

$$\pi_B^{EAD} = j\pi^{EAD} = \int_0^{Br(p^{EAD})}(E(v)-c)dF(c) \quad (7)$$

Remarks:

a) Since the breach threshold in this case is larger than the breach threshold under EED (i.e., $Br(p) > E(v)$), in expectation there will be fewer breaches under EAD than under EED.

b) The joint (ex ante) payoff in this case may be smaller or larger than the joint (ex ante) payoff under SP:

$j\pi^{EAD} - j\pi^{SP} = \Delta_3 - \Delta_2$, where Δ_2 represents potential efficiency gain from forced performance as defined above, and $\Delta_3 \equiv \int_0^{Br(p^{EAD})}(E(v)-c)dF(c) - \int_0^{p^{SP}}(E(v)-c)dF(c)$. Δ_3 is similar to Δ_1 above; it represents the payoff difference emerging from different incentives to voluntarily perform that EAD and SP regimes provide to the seller.

c) EAD is Pareto dominated by EED, which we proved above is the optimal monetary damages.[39] Consider the following example: $v, c \sim U[0,1]$*:*

$$Br(p) = (1+p^2)/2;\ \pi_S^{EAD} = 0 \Rightarrow (p^{EAD})^4 - 2(p^{EAD})^2 + 8p^{EAD} - 3 = 0 \Rightarrow p^{EAD} = \sqrt{2} - 1 > 3/8 = p^{EED};$$

$$j\pi^{EAD} = \int_0^{Br(p^{EAD})} (E(v) - c)dF(c) = \int_0^{2-\sqrt{2}} ((1/2) - c)dc = (3\sqrt{2} - 4)/2 < 1/8 = j\pi^{EED}.$$

Lemma 2 summarizes the results:

Lemma 2 *Under exclusive contracts, where verifying damages is costless, the following hold:*

(i) $EAD \prec EED\ (\approx EOD)$*;*

(ii) $EAD \prec ESP$ *iff* $\Delta_3 < \Delta_2$*;*

(ii-a) $EAD \prec ESP \prec EED$ *iff* $\Delta_3 < \Delta_2 < \Delta_1$;

(ii-b) $EAD \prec EED \prec ESP$ *iff* $\Delta_3 < \Delta_1 < \Delta_2$.

Remarks:

a) (i) stipulates that seeking ex post accuracy in damages (EAD) is inferior to awarding fixed ex ante damages (EED), even when buyer's ex post damages can be verified without cost. The intuition 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, Br(p), is higher than the buyer's expected valuation, $E(v)$. This means that from the ex ante perspective, efficient breaches happen less often.

b) The question then becomes why under actual damages the breach threshold is higher than $E(v)$; which is the breach threshold under fixed expectation damages? The answer is that while under the expectation damages regime, the buyer will always file a lawsuit (recall that $p^{EED} < E(v)$), while under actual damages regime the buyer will file a lawsuit only if her

[39] One might think that the inferiority of EADa rises from the fact that if the buyer always files lawsuit for damages, she might end up with negative damages (whenever v-p<0). However even if we modify EAD to let the buyer receive $0 in such states, our results remain unchanged, since under such regime the seller's expected payoff from breach is still $\int_p^{\bar{v}} (p - v)dG(v)$. This implies that the seller's breach incentives remain the same.

ex post valuation is higher than the price, $v>p$. This means that 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.

c) The analysis so far assumed that the consideration is paid upon performance. However, the superiority of 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, courts 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 our analysis above suggested.

d) The superiority of expectation damages over actual damages is not due to the fact that expectation damages may induce parties to disclose pre-contractual private information (Ayres and Gertner, 1989; Bebchuk and Shavell, 1991; Adler, 1999). In our model, at the contracting stage (Time 1) parties do not have private information. It is only at the breach-or-deliver point (Time 2) that they possess private information.

e) *(ii)* stipulates that the efficiency ranking of EED and EAD relative to SP depends on their distributions. To better understand this point one needs to observe 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. When parties' distributions of cost and valuation suggest that the buyer's expected valuation (given a breach) is sufficiently higher than the seller's expected cost, then 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 EED and EAD.

(f) The previous literature usually assumes that by definition the breach set (the states that the seller breaches the contract in equilibrium) under SP is empty. However, once we

take into account the buyer's option to not sue for damages upon breach, the breach set under SP is no longer empty, rather it is $\{(c,v)|c \geq p^{SP} \geq v\}$.

In Appendix C we perform a similar analysis of various damages measures but under the assumption that verification costs are *not* zero. Proposition 1 summarizes all the results for exclusive contracts (including the results for the case of positive verification costs presented in Appendix C):

Proposition 1, *Under exclusive contracts with verifiable damages the following holds:*
(i) Awarding ex ante expectation damages is the welfare-maximizing (monetary) remedy, no matter whether verifying the buyer's valuation is costly or not; In particular, awarding actual damages (incorporating post-contracting information in damages) is inferior to awarding the fixed ex ante expectation damages;
(ii) The efficiency comparison with specific performance, however, depends on parties' distributions.

5. Optional Regime:

We now assume that the non-breaching party can choose, ex post, whether to ask the court to determine a monetary damage for the breach (including enforcing the damage remedy the parties contracted for), or to ask the court to grant specific performance.[40] As before, the seller's costs and buyer's valuations are private information and non-observable to the other party, and, again, we assume that the buyer's damages are verifiable ex post in court through some costless discovery process (β=0).

Optional Optimal Damages:

We again assume that the court is independent in that it is not bound by any of the standard damages measures. Rather, the court will choose the damages that maximize parties' ex ante welfare, *unless the buyer insists on specific performance;* we call this regime *Optional Optimal Damages* (OOD).

[40] Of course, optional contracts make sense only when the stipulated remedy is not already specific performance.

Observe that under optional regimes there are two relevant thresholds which determine the joint payoff: the seller's cost threshold, which if his ex post costs are above, he will breach, and the buyer's valuation threshold which if her ex post valuation is above, she will insist on performance. We call the seller's threshold the "breach threshold" and the buyer's threshold the "insistence threshold". The breach threshold determines the payoff from voluntary performance, where the seller voluntarily performs when his cost is below the threshold. The insistence threshold determines the payoff from involuntary performance where the buyer insists on delivery when her valuation is above the threshold. To find the optimal damages under this regime we will first characterize the optimal thresholds, and then define the optimal damages that can induce the parties to behave (breach or insist) based on the optimal thresholds we derived before.

To begin, suppose that the seller's breach threshold and the buyer's insistence threshold for performance are x and y, respectively. The court seeks monetary damages with induced decision-thresholds, x and y, to maximize the joint ex ante payoff:

$$\max_{x,y} \quad j\pi^{\text{OOD}} = \int_0^x (E(v) - c)dF(c) + \int_x^{\bar{c}} \int_y^{\bar{v}} (v - c)dG(v)dF(c)$$

Simple calculation gives the optimal decision-thresholds as follows[41]:

$$x^* = E(v \mid v \le y^*) \text{ and } y^* = E(c \mid c \ge x^*) \qquad (8)$$

Before we derive the optimal damages that will induce parties to breach and insist based on x^* and y^*, we notice that under the optional regime, we do not need to consider the buyer's implicit option of not filing a lawsuit upon breach; because, if in equilibrium, the contracted price is above the buyer's damages awarded by the court, then the buyer's only resort upon breach is specific performance (i.e., we are back to an exclusive specific performance contract). If parties' ex ante distributions of values are such that negative payoff will be the result from an optimal damages award, they will never sign such an optional contract but will write an exclusive one.

[41] One would expected that the breach threshold will be smaller than the insistence threshold, i.e., $x^* \le y^*$, since this resembles an ascending auction. Indeed

$$x^* - y^* = \int_0^{y^*} v dG(v) / G(y^*) - y^* = -\int_0^{y^*} G(v)dv / G(y^*) \le 0.$$

With this in mind we turn to calculating optimal damages under OOD. As under an exclusive regime, we allow a welfare-maximizing court to decouple the damages, so that what the seller pays may be different from the damages the buyer receives. Specifically, we assume that once the buyer sues for damages, the court awards *B(v,p)-p* to compensate the buyer, but requires the seller to pay damages *S(v,p)-p*, which might be different from *B(v,p)-p*. In such a case the buyer will insist on specific performance whenever *v>B(v,p)*, and the seller will attempt to breach whenever *c>S(v,p)*.

Therefore, the court can simply set $B(v,p)=y^*$ and $S(v,p)=x^*$. This will induce the parties to behave according to the decision-thresholds specified above[42].

We now compare the optional optimal damages with exclusive optimal damages and with specific performance regime. We have the following Lemma,

Lemma 3

(*i*) *If* $E(v|v \geq E(v)) \geq E(c|c \geq E(v))$, $j\pi^{OOD} \geq j\pi^{EOD} \equiv j\pi^{EED}$;

(ii) $j\pi^{OOD} \geq j\pi^{SP}$.

Proof. In Appendix Part B.

Remarks:

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[42] Conditional that in equilibrium, $B(v,p)-p=y^*-p>0$ is satisfied. This condition guarantees, as we explained above, that under OOD the buyer will always sue upon breach. (Otherwise, if $B(v,p)<p$ then in equilibrium, the buyer will never sue for damages but may only sue for specific performance. But in that case, the parties will not sign an OOD contracts in the first place, but rather they will write exclusive contracts). This condition ensures that the buyer will insist on performance when $v>B(v,p)$. We now check that this condition is indeed satisfied in equilibrium.

Proof: The seller's expected payoff is

$$\pi_S^{OOD} = \int_0^{S(v,p)} (p-c)dF(c) + \int_{S(v,p)}^{\bar{c}} [\int_0^{B(v,p)} (p-S(v,p))dG(v) + \int_{B(v,p)}^{\bar{v}} (p-c)dG(v)]dF(c) = 0 \Rightarrow$$

$$p^{OOD} = E(c) - G(B(v,p))\int_{S(v,p)}^{\bar{c}} (c-S(v,p))dF(c)$$

Therefore,

$$B(v,p) - p^{OOD} = E(c|c \geq S(v,p)) - E(c) + G(B(v,p))\int_{S(v,p)}^{\bar{c}} (c-S(v,p))dF(c)$$

$$= F(S(v,p))[E(c|c \geq S(v,p)) - E(c|c \leq S(v,p))] + G(B(v,p))\int_{S(v,p)}^{\bar{c}} (c-S(v,p))dF(c) > 0.$$

a) The *optional* optimal regime may be better or worse than the optimal *exclusive* regime, depending on parties' distributions. Parties are better off writing an optional contract if the buyer's conditional expectation is larger than the seller's. The intuition is that in those cases the buyer is more likely, from the ex-ante perspective, to be the higher valuer of the widget even though the seller breached, and therefore allowing the buyer to insist on performance can increase efficiency.

b) The optional optimal regime is unconditionally superior to specific performance.

c) Observe that just as under the optimal exclusive regime, the court in the optimal optional regime does not need to verify the buyer's ex post values in order to seek welfare maximizing damages. In other words, the optimal damages are information-free remedies, under both exclusive and optional regimes.

Optional Ex ante Expectation Damages:

In this case, the court is assumed to be committed to awarding ex ante expectation damages (thus not hearing evidence about buyer's ex post valuation) *unless the buyer asks for specific performance*; we call this regime *Optional Ex ante Damages* (OED). As usual, we solve the equilibrium by backward induction. At Time 3 the buyer will insist on specific performance when $v > E(v)$.[43] At Time 2, the seller will breach if $c > E(v)$. Since the buyer has all the bargaining power, he will offer a minimum price in order to extract all of the seller's expected surplus:

$$\pi_S^{OED} = j\pi^{OED} = \int_0^{E(v)} (p-c)dF(c) + \int_{E(v)}^{\bar{c}} [\int_0^{E(v)} (p - E(v))dG(v) + \int_{E(v)}^{\bar{v}} (p - c)dG(v)]dF(c) = 0 \Rightarrow$$

$$p^{OED} = E(c) - G(E(v)) \int_{E(v)}^{\bar{c}} (c - E(v))dF(c) \qquad (9)$$

$$\pi_B^{OED} = j\pi^{OED} = \int_0^{E(v)} (E(v) - p^{OED})dF(c) + \int_{E(v)}^{\bar{c}} [\int_0^{E(v)} (E(v) - p^{OED})dG(v) + \int_{E(v)}^{\bar{v}} (v - p^{OED})dG(v)]dF(c)$$

$$= \int_0^{E(v)} (E(v) - c)dF(c) + \int_{E(v)}^{\bar{c}} \int_{E(v)}^{\bar{v}} (v - c)dG(v)dF(c) \qquad (10)$$

Remarks:

[43] For reasons similar to the case of OOD, if in equilibrium $p^{OED} > E(v)$, parties will never sign OED contracts but an exclusive one. Therefore whenever OED contracts are signed, the buyer always files lawsuit upon breach since at least the damages awarded will earn her positive payoff.

a) From equation (9) we know that the equilibrium price is always smaller than the seller's expected cost, i.e., $p^{\text{OED}} < E(c)$; Also as explained in footnote 21, $p^{\text{OED}} \le E(v)$, and the buyer will always file a lawsuit upon breach.

b) Comparing the joint payoff under OED with the joint payoff under exclusive expectation damages (EED) yields:

$$j\pi^{OED} - j\pi^{EED} = \int_{E(v)}^{\bar{c}} \int_{E(v)}^{\bar{v}} (v-c)dG(v)dF(c) = [1-F(E(v))][1-G(E(v))]\{E[v|v \ge E(v)] - E[c|c \ge E(v)]\}$$

Therefore, if $E(v|v \ge E(v)) > E(c|c \ge E(v))$ the optional regime with default ex ante expectation damages is more efficient than a regime where ex ante expectation damages are the exclusive remedy. The intuition is simple. Recall that E(v) is the (optimal) breach threshold under EED. This result implies that if the buyer's conditional expected valuation (given a breach) is larger than the seller's conditional expected costs, then giving the buyer the option to enforce is efficient. Indeed, in these cases, from the ex ante perspective, the buyer is more likely to be the higher valuer of the widget, and therefore performance would be efficiency-enhancing.

c.) Comparing the joint payoff under OED with the joint payoff under specific performance (SP) yields:

$$\begin{aligned} j\pi^{OED} - j\pi^{SP} &= \int_{p^{SP}}^{E(v)} (E(v)-c)dF(c) + \int_{E(v)}^{\bar{c}} \int_{E(v)}^{\bar{v}} (v-c)dG(v)dF(c) - \int_{p^{SP}}^{\bar{c}} \int_{p^{SP}}^{\bar{v}} (v-c)dG(v)dF(c) \\ &= \Delta_1 + \Delta_4 - \Delta_2, \end{aligned}$$

where Δ_1, Δ_2 are as defined before and $\Delta_4 \equiv \int_{E(v)}^{\bar{c}} \int_{E(v)}^{\bar{v}} (v-c)dG(v)dF(c)$.

d.) Comparing the joint payoff under OED with the joint payoff under exclusive actual damages (EAD) yields:

$$j\pi^{OED} - j\pi^{EAD} = \int_{Br(p^{EAD})}^{E(v)} (E(v)-c)dF(c) + \int_{E(v)}^{\bar{c}} \int_{E(v)}^{\bar{v}} (v-c)dG(v)dF(c) = \Delta_5 + \Delta_4,$$

Where Δ_4 is as above and $\Delta_5 \equiv \int_{Br(p^{EAD})}^{E(v)} (E(v)-c)dF(c)$.

e.) Thus, the efficiency comparison of optional ex ante damages (OED) with exclusive specific performance, exclusive actual damages and exclusive expectation damages depends on parties' distributions.

Optional Actual Damages:

Here the court is assumed to be seeking, ex post, to determine accurate damages and therefore awards the buyer actual damages *unless the buyer asks for specific performance.* We call this regime *Optional Actual Damages* (OAD). At Time 3, the buyer is indifferent between insisting on performance and seeking actual damages. If the buyer always chooses damages, the result is the same as under regime EAD and the joint payoff is $j\pi^{OAD_{AD}} = j\pi^{EAD}$. If, in contrast, the buyer always demands specific performance, the result is the same as under regime SP and the joint payoff is $j\pi^{OAD_{SP}} = j\pi^{SP}$. While the buyer is indifferent (at the ex post stage) between seeking actual damages and specific performance, the joint ex ante payoff is not the same in these two cases. Specifically, $j\pi^{OAD_{AD}} - j\pi^{OAD_{SP}} = \Delta_3 - \Delta_2$. Thus, parties would stipulate that the buyer has to choose specific performance or actual damages depending on whether Δ_3 or Δ_2 is larger. This implies that parties will never write optional contracts when actual damages and specific performance are the relevant optional remedies; they will simply write exclusive contracts with the superior remedies between the two as the exclusive remedy.

The following lemma summarizes the results.

Lemma 4

(i) $j\pi^{OED} \geq j\pi^{EED}$ *iff* $E(v|v \geq E(v)) \geq E(c|c \geq E(v))$;

(ii) $j\pi^{OED} \geq j\pi^{SP}$ *iff* $\Delta_1 + \Delta_4 - \Delta_2 \geq 0$;

(iii) $j\pi^{OED} \geq j\pi^{EAD}$ *iff* $\Delta_5 + \Delta_4 \geq 0$;

(iv) $j\pi^{\mathrm{OOD}} \geq j\pi^{\mathrm{OED}}$;

(v) Parties will never agree on actual damages in optional contracts.

Remarks:

a) (i) above indicates that when the buyer's conditional expected valuation is higher than the seller's conditional expected costs, granting the buyer an option to insist on performance on top of the court's awarded ex ante expectation damages can increase the ex ante joint welfare.

b) (ii) and (iii) above state that the efficiency comparison of optional ex ante expectation damages with specific performance (ii) or exclusive actual damages (iii) depends on parties'

distributions. To understand (ii) recall that under both OED and SP there are two types of performance (the seller's voluntary and his forced performance) but a single decision threshold----the seller breaches the contract and the buyer sues for specific performance according to the same decision threshold, (which is $E(v)$ under OED, and p^{SP} under SP). Thus, which remedy is superior depends on which decision threshold—$E(v)$ or p^{SP}—generates higher joint payoff and this depends on parties' distribution of values. To understand (iii), observe that whereas under OED there are two types of performances, under EAD there is no forced performance. The forced performance under OED may be good or bad for the joint payoff, depending on parties' distributions.

c) (iv) states that OOD is always superior to OED. The reasoning is similar to that found in previous proofs: under OOD, choosing both threshold values to be equal to $E(v)$ (which will make OOD be equivalent to OED) is a possibility, but it is not necessarily the optimal choice. Therefore, OOD must be superior to OED.

d) The reason why optional actual damages do not offer any efficiency advantage compared to exclusive remedies (as (v) above entails) is that the buyer's choice of remedies does not depend on his acquired interim information.

e) As can be seen in Appendix C, when we add verification cost, the superiority of fixed ex ante expectation damages is further strengthened. With respect to fee-shifting we find that the American rule by-and-large performs better than the English rule when the values are uniformly distributed.

6. Conclusion:

The previous literature on contract remedies for breach failed to account for the non-breaching party's option to not sue for damages upon breach. They typically start 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. We have shown in the paper that this option of acquiescing to a 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 be ordered. But, if the (privately-informed) non-breaching party's valuation is lower than the contracted price, she will not file a lawsuit. Thus even specific performance will induce a non-empty breach set. Under specific performance, there are two cases of performance: one is voluntary performance when the seller's cost is lower than the contracted price; the other is 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 might not be 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 exclusive remedies.

Moreover, once we incorporate the non-breaching 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 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 non-breaching party will not sue for damages. The breaching party anticipates that and knows 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. Even when acquiring information is costless, a welfare-maximizing court will not bother to do so. Rather, it will commit to awarding fixed ex ante expectation damages. This commitment to ignoring ex post information made by the court restores efficient incentives to breach for the contracting parties. We reach this result following different reasons from *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 also show that enforcing optional contract remedies (where the non-breaching party can choose one remedy from a menu of remedies parties agreed in contracts) can improve efficiency. If the decoupling method of awarding damages is performed by the court, an optional optimal damages regime will be superior to exclusive specific performance or optional expectation damages regime. However, it might be more or less efficient than

exclusive optimal damages regime or exclusive actual damages regime, depending on the distributions of values. Interestingly, under an optional regime, parties will never sign optional contracts with actual damages in the menu of remedies.

To focus on the distortion of incentives to breach and the efficiency of contract remedies, we demonstrated these points using a very simple model. This might leave some very 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", or by relaxing the assumption that parties can commit to not renegotiate and allow post-contract bargaining. Lastly, we would like to investigate the court's optimal choice of damages under the case of non-verifiable damages, where the parties engage in a strategic signaling game trying to present evidence strategically to influence the court's damages award. We believe that our current model of one-sided verifiable values provides an important reference point for the model of totally unverifiable values.

Appendix:

Part B. Proof of Lemma 3:

Proof. (i) In Proposition 1 of Avraham and Liu (2006), we showed that if $E(v|v \geq E(v)) \geq E(c|c \geq E(v))$, $j\pi^{OLD} \geq j\pi^{EED}$, where $j\pi^{OLD}$ denotes the joint ex ante payoff under optional liquidated damages, which is very similar to $j\pi^{OOD}$ the only difference between $j\pi^{OLD}$ and $j\pi^{OOD}$ is that in the optimization process the courts under regime OOD optimize by choosing two decision thresholds (breach and insistence thresholds), while parties under regime OLD optimize by choosing a single decision threshold common to both parties. Since courts under regime OOD are free to choose the same value for two decision thresholds (i.e., choosing $x = y$), it must be the case that $j\pi^{OOD} \geq j\pi^{OLD}$. From this ranking and the proof of Proposition 1 in Avraham and Liu (2006), Lemma 3 follows naturally.

(ii) The proof here is similar. The two decision threshold values determine the joint ex ante payoff. Recall that: $j\pi^{SP} = \int_0^{p^{SP}} (E(v) - c)dF(c) + \int_{p^{SP}}^{\bar{c}} \int_{p^{SP}}^{\bar{v}} (v - c)dG(v)dF(c)$. Under specific performance, both parties' decision thresholds are the same, which is the equilibrium contracted price. While under the optional regime with optimal monetary damages, the two decision thresholds are optimally chosen, implying OOD is superior to SP.

Part C. Analysis of the Case with Verification Costs:

We continue to assume that at the interim stage the seller's costs and the buyer's valuation are private information and non-observable to the other party. The analysis in the main text assumed there were no litigation costs, and especially no costs to verify the buyer's

damages. We now assume that verifying the buyer's valuation has a cost, $\beta > 0$. [44] For simplicity, we assume that the verification cost is constant and does not depend on who bears this cost. The question of the cost of verifying damages is relevant to parties' behavior under the actual damages regime (EAD) and the optimal damages regime (EOD). We analyze both exclusive and optional regimes under the American rule and the English rule.

Exclusive Contracts:

Exclusive Actual Damages

The American Rule:

For simplicity, we assume all litigation costs fall on verifying the buyer's valuation. We first assume the American rule applies, which makes the winner (the buyer in our case) bear her own verification cost, β. In that case, the buyer will sue for damages only if $v \geq p + \beta$. The seller's payoff from performance is $p - c$; while his expected payoff from breach is $\int_{p+\beta}^{\bar{v}} (p - v) dG(v)$. Therefore, the seller will deliver if $c \leq E(v) + \int_0^{p+\beta} (p - v) dG(v) \equiv \hat{Br}(p, \beta)$; and will breach otherwise. The equilibrium price and joint payoff are:

$$\hat{\pi}_S^{EAD} = \int_0^{\hat{Br}(p,\beta)} (p - c) dF(c) + \int_{\hat{Br}(p,\beta)}^{\bar{c}} \int_{p+\beta}^{\bar{v}} (p - v) dG(v) dF(c) = 0 \Rightarrow.$$

$$\hat{p}^{EAD} = \hat{\lambda}(\hat{p}^{EAD}, \beta) E(c \mid c \leq \hat{Br}(\hat{p}^{EAD}, \beta)) + [1 - \hat{\lambda}(\hat{p}^{EAD}, \beta)] E(v \mid v \geq \hat{p}^{EAD} + \beta), \qquad (11)$$

where

$$\hat{\lambda}(p, \beta) \equiv F(\hat{Br}(p, \beta)) / \{1 - G(p + \beta)[1 - F(\hat{Br}(p, \beta))]\}.$$

$$j\hat{\pi}^{EAD} = \int_0^{\hat{Br}(\hat{p}^{EAD},\beta)} (E(v) - c) dF(c) - \int_{\hat{Br}(\hat{p}^{EAD},\beta)}^{\bar{c}} \int_{\hat{p}^{EAD}+\beta}^{\bar{v}} \beta dG(v) dF(c). \qquad (12)$$

Remarks:

[44] An assumption here is $0 < \beta \leq \min(\bar{c}, \bar{v}) - E(v)$. This ensures that $E(v) + \beta$ still falls into the intervals of the values. We also assume that there are no other litigation costs, which implies that there are no litigation costs in the case of expectation damages when buyer's ex post valuation is ignored. While this assumption is somewhat strong, we believe it is similar to assuming that all litigation costs under the actual damages regime are higher than all litigation costs under the expected damages regime by exactly β.

The equilibrium price in this case is a weighted average of two conditional expected private values. The first is the seller's expected cost when it is lower than his breach threshold (and thus he will voluntarily deliver). The other is the buyer's expected valuation when it is higher than her threshold for filing a lawsuit (in which case he will sue for damages upon breach).

The English Rule:

We now assume the English Rule applies, which makes the breaching party (the seller) bear the buyer's verification cost, β. In that case, at Time 3, when the seller breaches the contract, the buyer will sue for damages when v>p. Anticipating this, the seller's expected payoff from breach is $\int_p^{\bar{v}}(p-v-\beta)dG(v)$. Therefore the seller will deliver if: $c \le E(v)+\int_0^p (p-v)dG(v)+\int_p^{\bar{v}}\beta dG(v) \equiv \tilde{B}r(p,\beta)$. The equilibrium price and the joint surplus are:

$$\tilde{\pi}_S^{EAD} = \int_0^{\tilde{B}r(p,\beta)}(p-c)dF(c)+\int_{\tilde{B}r(p,\beta)}^{\bar{c}}\int_p^{\bar{v}}(p-v-\beta)dG(v)dF(c)=0 \Rightarrow.$$

$$\tilde{p}^{EAD} = \tilde{\lambda}(\tilde{p}^{EAD},\beta)E(c\left|c \le \tilde{B}r(\tilde{p}^{EAD},\beta)\right.)+[1-\tilde{\lambda}(\tilde{p}^{EAD},\beta)]E[(v+\beta)\left|v \ge \tilde{p}^{EAD}\right.], \text{ where}$$

$$\tilde{\lambda}(p,\beta) \equiv F(\tilde{B}r(p,\beta))/\{1-G(p)[1-F(\tilde{B}r(p,\beta))]\}.$$

$$j\tilde{\pi}^{EAD} = \int_0^{\tilde{B}r(\tilde{p}^{EAD},\beta)}(E(v)-c)dF(c)-\int_{\tilde{B}r(\tilde{p}^{EAD},\beta)}^{\bar{c}}\int_{\tilde{p}^{EAD}}^{\bar{v}}\beta dG(v)dF(c). \qquad (13)$$

Remarks:

The equilibrium price in this case is a weighted average of two conditional expected values. The first is the seller's expected cost when it is lower than his breach threshold (when he will voluntarily deliver). The second is the buyer's expected valuation plus the verification cost when her valuation is higher than the threshold for filing a lawsuit (in which case she will sue for damages upon breach, and thus the seller would require to be compensated through the price for the expected verification/litigation cost he is going to bear).

The following Lemma summarizes our results:

Lemma 5 *Under exclusive contracts with costly verifiable damages, the following hold:*

(i) EAD $\prec$ *EED, under both the English Rule and the American Rule.*

(ii) *For general distributions, under EAD the American rule is superior to the English rule iff*

$$\int_{\tilde{B}r(\tilde{p}^{EAD},\beta)}^{\hat{B}r(\hat{p}^{EAD},\beta)}(E(v)-c)dF(c)+\int_{\tilde{B}r(\tilde{p}^{EAD},\beta)}^{\bar{c}}\int_{\tilde{p}^{EAD}}^{\bar{v}}\beta dG(v)dF(c)\geq\int_{\hat{B}r(\hat{p}^{EAD},\beta)}^{\bar{c}}\int_{\hat{p}^{EAD}+\beta}^{\bar{v}}\beta dG(v)dF(c).$$

(iii) When both the values and costs are distributed uniformly, the American rule is almost always superior.

Proof .(i): For the case of the buyer bearing the verification cost,

$$j\hat{\pi}^{EAD}\text{ - }j\pi^{EED}=\int_{E(v)}^{\hat{B}r(\hat{p}^{EAD},\beta)}(E(v)-c)dF(c)-\int_{\hat{B}r(\hat{p}^{EAD},\beta)}^{\bar{c}}\int_{\hat{p}^{EAD}+\beta}^{\bar{v}}\beta dG(v)dF(c)<0.$$

The first expression is always negative, and the second expression is always positive. And similarly for the case of the seller bearing the verification cost.

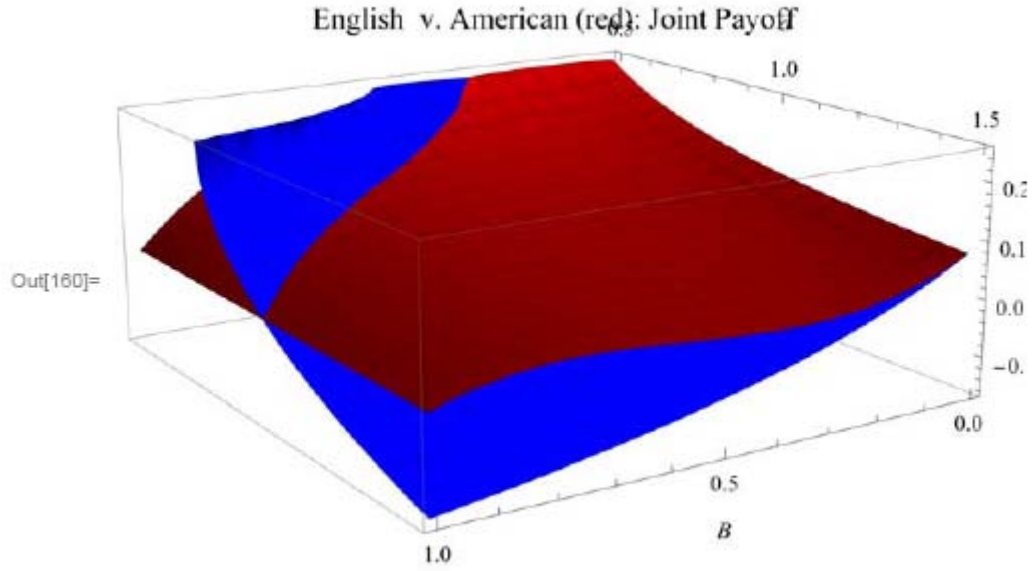
(ii) Follows from comparison of the joint payoffs when the seller or the buyer bears the verification cost.

(iii) Is based on numerical simulations.

Remarks:

(a) (i) above stipulates the superiority of EED over EAD. This is due not only to the deadweight loss which is created (because β>0), but also because seller's incentives to breach are further distorted, relative to regime EED.

(b) The graph below shows the joint payoff for EAD (American Rule, Red) and for EAD (English Rule, Blue). We assume both parties' valuations are uniformly distributed. Whereas we assume that the buyer's valuation is distributed between 0 and 1, and the seller's cost is distributed between 0 to a, where a runs from 0.5 to 1. The y-axis represents a, the seller's distribution's upper bound. The x-axis represents β, the verification costs, and runs from 0 to 1. The z-axis represents the difference in joint payoffs under the two rules. As can be seen neither rule is always better. However, unless the seller's upper bound is relatively low, and the verification costs are relatively high, the American rule is superior.



Exclusive Optimal Damages

We return to the optimal regime when the court is tuned to maximizing parties' ex ante welfare and is not bound by any standard damages measure. However, we now assume that verifying the buyer's valuation costs $\beta > 0$.

Does a welfare-maximizing court hope to verify the ex post information under this case? Recall that even when verification of damages is a costless process, the court does not need to verify the buyer's valuation and adapt the damages to the ex post information when seeking welfare-maximizing damages, rather, a fixed damages award does better than any flexible monetary damages. Now verification is costly, it is evident that a welfare-maximizing damages under this case does not involve verifying the buyer's value (and thus avoid the deadweight loss of the verification cost), rather, the optimal damages will be a fixed one, E(v). The joint payoff is still: $j\pi^{EOD} = \int_0^{E(v)} (E(v) - c)dF(c)$.

Optional contracts

As analyzed above, a positive verification cost only potentially affects the court's choice under OAD and OOD. However, we have argued that parties actually will never sign OAD contracts. And, we have demonstrated that under OOD, with zero verification cost, a joint welfare-maximizing damages award is fixed damages (information-free) and not flexible damages incorporating ex post information. Since even when acquiring information is free, a welfare-maximizing court would not bother to collect information, it is evident that when obtaining information is costly, such a court should not bother to acquire information. Thus, the analysis under OOD remains the same as under the case of no verification cost.

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