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Simple Rules for Simple Courts: Specific Performance, Expectation Damages and Hybrid Mechanisms

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Abstract

Arguments for and against property rules (roughly equitable remedies) and liability rules (legal remedies) have been largely based on efficiency considerations. Courts can clearly determine efficient remedies when they are sufficiently informed about the valuations of parties. However, courts are rarely so well informed and thus they guess—often incorrectly—which remedy will lead to an efficient outcome. This research presents conditions where uninformed courts can reach efficient outcomes using simple direct mechanisms, mechanisms that are essentially hybrids of equitable and legal remedies. The principal result here is that a court does not have to guess when it can effectively harness the private information possessed by other parties. This result holds even though the court does not actually acquire the private information, though it does require that one of the litigating parties observe *some* of the other party's information.

1   Introduction

Legal controversies are often characterized by opposing parties presenting conflicting accounts of events known to be observed by both parties. In some instances the parties' accounts conflict due to their different perspectives on the events, making their observations distinct in some material way. However, in many other instances their observations are materially the same, and the accounts that they present differ due to strategic misrepresentation by one or both parties. In these cases, judges and juries are left with the unenviable, often impossible, task of deciding which, if either, account is truthful. This research describes simple direct mechanisms that courts may use to efficiently resolve such controversies. The intuition behind these mechanisms departs from a recognition that various remedial rules encourage different forms of misrepresentations. Consider, for example, two parties competing over a legal entitlement. In some settings, equitable remedies may encourage one party to overstate her relative valuation for the entitlement, while legal remedies may encourage her or the other party to understate valuation. By using rules (or mechanisms) that are essentially hybrids of equitable and legal remedies, courts may be able to balance the incentives to overstate against the incentives to understate, so as to achieve truthful (or at least efficiency-generating) reports from the parties.[1] To achieve efficient results, these mechanisms only require that the courts know that the disputing parties share common information over some relevant aspect of the dispute, even though this information cannot itself be verified by the court.[2]

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[1]Though learning the truth is often desirable, courts care mainly about resolving these conflicts according to some criteria—e.g., fairness, justice, or efficiency—for which knowing the truth is helpful, but not always necessary.

[2]The mechanisms also generate efficient results when the court's information is more refined.

Situations involving common unverifiable information between parties abound in the legal disputes. In contract disputes, the buyer and the seller of a good often know the value of possessing the good or the costs of delivering it, while the court can only hope to learn this information through a costly discovery and litigation process. In tort litigation, an accident victim and an injurer may both know the loss to the victim as a result of an accident (perhaps in witnessing the accident both parties form the same beliefs, or perhaps they work in the same setting or otherwise share some specialized knowledge), but have incentive to overstate and understate (respectively) the loss to a court. In the area of corporate law, appropriation of corporate opportunities by managers often occur in a setting where the owners (or board) of the corporation and the managers have common knowledge about the value of the opportunity, but the parties have conflicting incentives to represent this knowledge to the court. In employment law, an employee and his supervisor may observe the costs of a wrongful termination, including hard to convey or hard to establish elements such as reputation. Yet, these parties often present conflicting announcements to the court. In partnerships, partners often share some common value for the enterprise, which are frequently distorted in disputes involving "buying out" one partner's share. In many nuisance and trespass cases, disputants know the loss due to encroachment by one party. Parties in such situations, however, frequently have incentive to report widely varying amounts. Borrowers and creditors in bankruptcy, as well as soon-to-be former spouses in divorce proceedings are among the many other examples of legal disputes often characterized by common unverifiable knowledge between conflicting parties.

In addition to common knowledge between the conflicting parties, an essential feature of the mechanisms considered here is that the courts know that the parties possess this information and the parties know that the courts know that they possess the information and so forth. That is, it is common knowledge to all parties (i.e., including the court) that the information possessed by the litigating parties is observable by them but unverifiable by the court. Utilizing this information setting, this work presents simple direct mechanisms or rules that otherwise uninformed courts may use to efficiently resolve disputes, without necessarily seeking or discovering the truth. For concreteness, the analysis focuses on a breached contract between a buyer and a seller of a well-defined good. When, for example, the seller unilaterally refuses to deliver the good, the court may order her to procure the good as stated in the contract (i.e., specific performance); or the court may order her to pay the buyer an amount equal to the buyer's valuation of the good had the breach not occurred (i.e., expectation money damages.) In terms of optimal allocation, courts can clearly determine the efficient remedy when they are sufficiently informed about costs and valuation. However, courts are rarely so well informed and thus they guess—often incorrectly—which remedy will lead to an efficient outcome. The principal result here is that courts do not have to guess when they can effectively harness the private information possessed by other parties. Again, this result holds even though the court does not actually acquire the private information, though it does require that at least one of the litigating parties observe *some* of the other party's information.

This work argues that careful judicial attention to the information structures of legal conflicts may aid in the efficient resolution of disputes. Recently, Talley (1998)

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demonstrated the significance of court sensitivity to information structures in corporate litigation. However, where Talley argues that it is sometimes useful to disregard the information that parties offer, this work shows that sometimes it is optimal for the courts to treat the parties' announcements as the truth. Specifically, when the relevant information is common knowledge between the buyer and the seller, direct revelation mechanisms, where the parties simultaneously announce their information to the court, may lead to efficiency (Aghion, Dewatripont & Rey 1994, Chung 1991, Rogerson 1992). These mechanisms are best understood as a type of Vickrey auction as developed in the literature on the provision of public goods.[3] d'Aspremont & Gérard-Varet (1979) first presented an efficient simultaneous mechanism like the one used here. Crémer & Riordan (1985) extended the d'Aspremont-Gérard-Varet mechanism to sequential mechanism with a more general structure on the beliefs of the agents. Building on these models, Rogerson (1992) then extended the analysis beyond provision of public goods to private contracts and also addressed investment efficiency.[4] Rogerson identified the sufficient conditions for the existence of optimal (complex) mechanisms in a variety of informational settings where renegotiation does not occur. These mechanisms, however, have been criticized for performing poorly with regards to simplicity, multiplicity of equilibria, ease of enforcement, robustness to renegotiation, and for lacking a natural interpretation (Hermalin & Katz 1993). The mechanisms described in this work avoid these critiques and they have a very natural interpretation. Indeed, this work relies on nothing more complicated (and no less natural) than the standard breach remedies of expectation damages and specific

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[3]The imperfect-information public economics literature has focused on describing the sufficient conditions for the existence of mechanisms that induce agents to truthfully reveal their private information (i.e., preferences) for implementing an optimal provision of a public good.

[4]Rogerson also relies on the work of Moore & Repullo (1988).

performance.[5] The next section introduces the model and discusses its relevant relationship to previous findings in the literature on efficient allocation and investment in contract design. Section 3 presents and analyzes the hybrid mechanisms for resolving the breach. Section 4 discusses some institutional implications of the findings and section 5 concludes the paper with a brief discussion of avenues for future research.

2   The Model

Two risk-neutral parties, a buyer (B) and a seller (S), enter a contract ($\hat{p}, \hat{q}$) for the exchange of a single unit of an indivisible good, where $\hat{p}$ is the price to be paid by the buyer and $\hat{q} \in \{0, 1\}$ represents the quantity to be delivered by the seller. After the

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[5]The properties of these remedies are well known. Research evaluating remedies to breach of contract can be first divided on the basis of whether relevant information can be costlessly verified in court. As stated earlier, when courts can verify all relevant information, contracts can be written which lead to efficient allocation and investment decisions under any remedy. The research that assumes information cannot be verified may be further broken down into two categories—*(1)* all information among the parties remains completely private, and *(2)* the parties observe some private information among themselves. The second category, referred to in the literature as *observable but unverifiable* information, is commonly made in analyses of efficient contracting, with the distinguishing feature of whether and how parties renegotiate initial contracts. Early formal analyses, assuming that parties could not renegotiate, found that standard breach remedies lead to inefficient trade or inefficient investment or both (Shavell 1980, Goetz & Scott 1977). Rogerson (1984) and Shavell (1984) then expanded the analysis by allowing for costless renegotiation. Costless renegotiation implies that trade is always optimal (Coase 1960), so efficiency is determined by the parties' investment choices. They found that parties using simple fixed-price contracts will invest inefficiently under standard remedies. To solve this problem, researchers focused on more complete contracts, such as fill-in-the-price contracts (Konakayama, Mitsui & Watanabe 1986, Hermalin & Katz 1993) and liquidated damages clauses (*see* Spier & Whinston 1995). (Others have solved the investment problem by allowing for "knife-edge" clauses that assign all the surplus to one party and allow for high punitive damages for parties that deviate from the equilibrium path (Chung 1991, MacLeod & Malcomson 1993, Aghion et al. 1994).) Unfortunately, fill-in-the-price contracts and liquidated damage clauses can be very complex, often prohibitively so. Furthermore, real-world contracts often do not contain damage schedules, and even when they do, courts are typically unwilling to enforce terms that appear excessively punitive. Returning to simple fixed-price contracts, Edlin & Reichelstein (1996) found that parties can write contracts that provide incentive for efficient investment under the expectation remedy and specific performance. (However, Che & Chung (1999) recently showed that for some types of investments standard breach remedies lead to inefficient outcomes. See also Che & Hausch (2000). Footnote 14 provides an elaboration of the findings of Edlin & Reichelstein (1996) and Che & Chung (1999).) Similarly, the mechanisms presented in this research show that simple fixed-price contracts can lead to efficiency under standard breach remedies.

contract is formed, the buyer or the seller or both make sunk investments $\beta \in [0, \bar{\beta}]$ and $\sigma \in [0, \bar{\sigma}]$ respectively.[6] These investments, along with the subsequent realization of the state of the world, ω, determine the buyer's valuation of the good, $v(\omega, \beta)$, and the seller's costs of procuring the good, $c(\omega, \sigma)$.[7] The variable ω is distributed according to $F(\omega)$, which is continuous on compact support Ω and mutually known by the buyer and the seller. Following the realization of ω, the parties renegotiate or complete the contract, or otherwise seek a court-ordered remedy. Court-ordered remedies are binding unless the parties renegotiate an alternative final outcome (Figure 1 illustrates the sequence of events.)

$\longleftarrow$ renegotiate the existing contract $\longrightarrow$

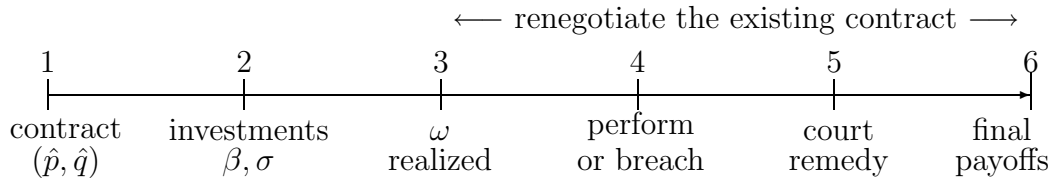| 1	2	3	4	5	6
contract $(\hat{p}, \hat{q})$	investments β, σ	ω realized	perform or breach	court remedy	final payoffs

FIGURE 1

The court will remedy the situation in two principal ways: specific performance (e.g., order the seller to deliver $\hat{q}$ if she breached) or expectation money damages (e.g., order the seller to pay the buyer v.)[8]

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[6]Investments are assumed to be one dimensional and relationship-specific (i.e., $v(0, \omega, \beta) = 0$ and $c(0, \omega, \sigma) = 0$). The following technical requirements are imposed: $v_{q\beta} \geq 0$, $v_{\beta\beta} < 0$, $c_{q\sigma} \leq 0$, $c_{\sigma\sigma} < 0$, $v_q > 0$, $v_{qq} < 0$, $c_q > 0$, $c_{qq} < 0$.

[7]This model specification restricts the analysis to *selfish* investments, that is, a party's investment choices directly affects only her valuation or costs (formally, $v(\beta, \sigma, \omega) = v(\beta, \omega), \forall \sigma$ and $c(\beta, \sigma, \omega) = c(\sigma, \omega), \forall \beta$.) *Cooperative* investments, where one party's investment choices affects the other party's valuation or costs ($v(\beta, \sigma, \omega) \geq v(\beta, \omega)$ and $c(\beta, \sigma, \omega) \geq c(\sigma, \omega)$, with at least one of the two inequalities holding strictly for some β or σ), will be discussed where it leads to different implications than the selfish investments model.

[8]Money damage awards may follow a rule of *restitution*, *reliance* or *expectation*. The restitution damages rule compels the seller to return any benefits conferred upon her by the buyer. In the model, this means the seller returns the buyer's payment $\hat{p}$. Under the reliance damages rule the seller must return any compensation she received and recompense the buyer for all reasonable investments, β, that the buyer made while relying on the seller's performance. In the model, this means the seller pays the buyer $\hat{p} + \beta$. The expectation damages rule (the rule employed here) is the most commonly used rule in practice, requires that the seller pays the buyer the monetary equivalent of $v(\hat{q}, \beta|\omega)$. This work will not consider restitution or reliance damages.

The court can neither observe nor verify v, c, β, or σ. Additionally, it is assumed that investments (β, σ) and the buyer's valuation (v) are private information, while the seller's costs (c) are observable to the buyer and the seller but not verifiable to the court. The court, however, knows that both the buyer and the seller observe c. Additionally, the court can observe the initial contract and determine when non-delivery of $\hat{q}$ or $\hat{p}$ occurs.[9] The final payoffs to the buyer and seller are

$$\pi^B = qv(\beta, \omega) - p - \beta \tag{1}$$

$$\pi^S = p - qc(\sigma, \omega) - \sigma. \tag{2}$$

These payoffs sum to form the joint surplus function[10]

$$S(q, \beta, \sigma, \omega) = q[v(\beta, \omega) - c(\sigma, \omega)] - \beta - \sigma. \tag{3}$$

First-best efficiency requires that the parties (1) exchange the good if and only if $v(\cdot) \geq c(\cdot)$ and (2) invest $\beta^\star$ and $\sigma^\star$, where[11]

$$(\beta^\star, \sigma^\star) \equiv \underset{\beta, \sigma}{\operatorname{argmax}} \int_{\{\omega | v(\cdot) \geq c(\cdot)\}} [v(\beta, \omega) - c(\sigma, \omega)] dF(\omega) - \beta - \sigma. \tag{4}$$

Before describing and evaluating this work's alternative breach remedy, let's review properties of the expectation damage remedy and specific performance against the first-best efficient benchmark. Recall that early research established that both remedies will lead to allocative efficiency, as long as *ex post* negotiation costs are sufficiently

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[9]For ease of exposition, assume that all court-related expenses are zero other than the costs of verifying v, c, β, and σ (which are, by assumption, infinitely costly to verify.)

[10]The joint surplus function is strictly concave based on the assumptions on v and c.

[11]Assume that $\beta^\star$ and $\sigma^\star$ are positive and unique.

small (Coase 1960).[12] When *ex post* negotiation (renegotiation) costs are prohibitive, the expectation damage remedy leads to efficient allocation, though over-investment may occur,[13] and specific performance leads to too much performance (i.e., inefficient allocation) and inefficient investment (Shavell 1980). Rogerson (1984) and Shavell (1984) demonstrated that when renegotiation is costless, parties will invest too much under both remedies.[14]

To illustrate these results, consider a simplified version of the model where *only* the buyer makes a selfish investment. The buyer is assured v under either expectation damages or specific performance.[15] When the parties cannot renegotiate, then the

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[12]However, recent experimental and other empirical evidence suggests that the efficient allocation may not be achieved, even when transaction costs are very small. For instance, Kahneman, Knetsch & Thaler (1990), in an experimental setting show that the assignment of property rights had a significant effect on the allocation of good. They found that subjects endowed with certain property rights were reluctant part with these rights even at prices well beyond what they would pay to acquire the rights in the first place—the so-called endowment effect. The endowment effect has also been identified in real-world legal settings: Farnsworth (1999) interviewed attorneys involved in nuisance cases where injunctions were granted. He found no instance where the litigating parties so much as attempted to negotiate after the ruling, even in situation where objective third parties agreed that there was considerable room for mutually agreeable side-deals and the transaction costs appeared to be zero. The attorneys interviewed, stated that their clients were reluctant to negotiate, in part, because they unwilling to confer any benefits to the other side, even at a personal costs.

[13]Two qualifying statements should be offered here: first, the expectation remedy will lead to efficient trade only when the damage award is unbiased (Shavell 1984, Edlin 1996); second, the over-investment problem can be mitigated if the damage award is based on *reasonable* investments (*see* Goetz & Scott 1980, Cooter 1985, Cooter & Eisenberg 1985).

[14]Rogerson (1984) and Shavell (1984) also formally demonstrated that parties will under-invest when contracts are unenforceable—a point first introduced in the more descriptive literature by Klein, Crawford & Alchian (1978) and Williamson (1979). [check Williamson (1975) for reference to hold-ups!] Balancing this under-investment phenomenon against the over-investment generated by standard breach remedies, Edlin & Reichelstein (1996) were able to demonstrate that parties can write simple contracts that lead to efficient selfish one-sided investments under the expectation remedy and efficient one-sided and bi-lateral selfish investments under specific performance. Edlin & Reichelstein also showed that the Rogerson-Shavell over-investment result was an artifact of the discrete choice framework of their models (i.e., if contracts allow for continuum of units then under-investment or even optimal investment may occur under the standard remedies.) Recently, Che & Chung (1999) show that when investments are purely cooperative, the parties tend to underinvest and the best initial contract is no contract at all.

[15]Assuming that expectancy is perfectly determined. We might otherwise say that the buyer may expect v under the expectation remedy assuming that the court doesn't make systematic errors in its determination of the award.

buyer's expected payoff is

$$
\begin{aligned}
E\pi^B &= \int_{\{\omega|v\geq c\}} v(\beta,\omega)dF(\omega) + \int_{\{\omega|v<c\}} v(\beta,\omega)dF(\omega) - \hat{p} - \beta \\
&= \int_\Omega v(\beta,\omega)dF(\omega) - \hat{p} - \beta \tag{5}
\end{aligned}
$$

We can find the buyer's investment choice, β', by deriving the first order condition of equation 5:

$$
\int_\Omega v_\beta(\beta,\omega)dF(\omega) = 1. \tag{6}
$$

Compare β' to the first-best investment level $\beta^\star$, which is determined from the first order condition of equation 4 with respect to β:

$$
\int_{\{\omega|v\geq c\}} v_\beta(\beta,\omega)dF(\omega) = 1. \tag{7}
$$

Since $v_{\beta\beta} < 0$ it follows that $\beta^\star < \beta'$. Intuitively, buyer overinvests because the court remedies assure her $v(\beta,\omega)$ regardless of her investment level—even when the likelihood of breach calls for more restrained investing.

If renegotiation is not prohibitively costly, then parties will attempt renegotiate the contract whenever $c(\cdot) > v(\cdot)$, i.e., they will choose $q^\star = 0$. Let Δ represent the total surplus from renegotiation (renegotiation surplus),

$$
\begin{aligned}
\Delta &= S(q^\star,\sigma,\omega) - S(\hat{q},\sigma,\omega) \\
&= -[v(\omega) - c(\sigma,\omega)], \tag{8}
\end{aligned}
$$

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and let γ represent the buyer's share of this renegotiation surplus.[16] Given that breach is efficient (i.e., $v(\cdot) < c(\cdot)$) the buyer's payoff is $v(\cdot)$ when the contract is not renegotiated and $\gamma[-v(\omega, \beta) + c(\omega)]$ when the contract is renegotiated. Thus, when renegotiation is possible the buyer's expected payoff is

$$
\begin{aligned}
E\pi^B &= \int_{\{\omega|v\geq c\}} v(\beta, \omega)dF(\omega) + \int_{\{\omega|v<c\}} \{v(\omega, \beta) + \gamma[-v(\omega, \beta) + c(\omega)]\}dF(\omega) - \hat{p} - \beta \\
&= \int_{\{\omega|v\geq c\}} v(\beta, \omega)dF(\omega) + \int_{\{\omega|v<c\}} \{(1-\gamma)v(\omega, \beta) + \gamma c(\omega)\}dF(\omega) - \hat{p} - \beta \quad (9)
\end{aligned}
$$

We can derive the buyer's investment choice, β', from the first order condition of equation 9 with respect to β:

$$
\int_{\{\omega|v\geq c\}} v_\beta(\beta, \omega)dF(\omega) + \int_{\{\omega|v<c\}} (1-\gamma)v_\beta(\beta, \omega)dF(\omega) = 1. \quad (10)
$$

Again the buyer overinvests, unless $\gamma = 1$. Intuitively, the marginal cost of investment is borne fully by the buyer, while she only receives a fraction (γ) of the marginal benefit when the contract is renegotiated (i.e., when $q^\star \neq \hat{q}$). The buyer thus seeks to increase the marginal benefit beyond the social optimum to match her marginal costs. The general insight is that when $q^\star \neq \hat{q}$, investments will be optimal only if the investing parties receive the full marginal return of their investments.[17] This insight has lead to the development of class of efficient mechanisms that give the entire renegotiation surplus to one party—the so-called knife-edge mechanisms.[18] The

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[16]The sharing rule γ may depend on the remedy, the state realization, the initial contract price and other variables.

[17]It is easily shown that underinvestment occurs for $\hat{q} = 0$ when it is efficient to trade—i.e., $q^\star = 1$—due to the hold-up problem.

[18]Edlin & Reichelstein (1996) have shown that it is not necessary to convey all of the surplus to one party so long as a party's average marginal return from investment is equal to the marginal social return.

hybrid remedies presented in this work operates similarly. One party, it will be shown, will get the full surplus generated by the remedy. Thus the hybrid remedies will lead to efficient investment in the same situations as the knife-edge mechanisms.

3   Hybrid Remedies for Simple Courts

This section considers default rules that allow simple courts (i.e., courts with no knowledge of the costs and value of performance) to efficiently impose either specific performance or expectation damages. Of course, sophisticated courts (i.e., courts that know costs and value) can trivially impose efficient remedies. However, courts are generally not so sophisticated—they generally do not know costs and value and their estimates of these variables often inaccurate and biased.[19] Additionally, courts often cannot assess the relative magnitude of costs and value, and therefore cannot determine whether trade (i.e., specific performance) is optimal. In real world settings with costly renegotiation, an order of specific performance may lead to inefficiencies.[20] Therefore, this section develops rules that allow simple courts to resolve disputes efficiently.

Consider the situation where the buyer and the seller both observe valuation and cost, and it is common knowledge that they make such observations. That is, the parties and the court all know that realizations $\hat{v}$ and $\hat{c}$ are known by the buyer and the seller, and each knows that the others knows, and so forth *ad infinitum*. When either party is able to cost-effectively verify the observations, the court may use that evidence to determine the better remedy. However, even when neither party is able to verify the observations to the court, the court may be able to use the common knowledge of

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[19][cite literature to on systematic biases in jury awards.]

[20]Selecting the wrong remedy can be costly. For example, the court may order specific performance when the true cost of performance is greater than the true value of performance. This leads to one of three inefficient outcomes: (i) the lower-valuing party receives and keeps the good, (ii) costly renegotiation is undertaken to release the seller from inefficient performance, or (iii) another transaction involving the buyer reselling the good occurs. In order to avoid these types of inefficient outcomes, it is important that the court makes the correct choice.

the parties to extract the requisite information to impose the better remedy. One method the court may use is the so-called *shoot-em both* rule. The rule requires that the buyer and seller simultaneously report the buyer's valuation and then the seller's cost. If they truthfully reveal this information, then their answers will match, since they both know $\hat{v}$ and $\hat{c}$. If their answers do not match, then the court will "shoot" both of them.[21] Under this rule, there exists a Nash equilibrium where both the buyer and the seller truthfully reveal their information. The court can use the equilibrium responses to arrive at the efficient remedy. This equilibrium, however, is not compelling for a variety of reason—for example, it is not robust to small changes in each party's knowledge, and there are multiple competing equilibria. The rule itself is also troubling because it punishes truth-telling as well as lying.[22] Perhaps the most troubling aspect of the shoot-em both rule is the restrictive information structure upon which the desired equilibrium relies. Common knowledge among the parties is a strong, generally unattainable, requirement. Therefore, that requirement is weakened for the rest of the analysis. The following considers situations where at least one party's realization ($\hat{v}$, $\hat{c}$, or both) remains private.

ASSUMPTION **1** *All parties, including the court, know (and it is common knowledge) that the buyer observes the seller's costs.*

3.1 Efficiency of Hybrid Rules

In much the same way that the court is able to use the parties' common knowledge under the shoot-em both rule to reach an efficient resolution, other rules may be

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[21]This representation could be made slightly more realistic by asking the buyer and the seller to confidentially report the value of $\hat{v}$ and $\hat{c}$, respectively. And the penalty of being shot could be thought of as some very high monetary fine.

[22]The rule also does not provide a balanced budget, see Hermalin & Katz (1991).

used in less restrictive information settings to obtain similar results. One such rule, a hybrid default rule of specific performance and money damages, is considered here. This rule is initiated, following a breach, when the court asks the seller to report her costs of performance, $\tilde{c}$, and asks the buyer to report his valuation of performance, $\tilde{v}$. Before the parties respond, the court informs them of the *buyer's hybrid rule*: specific performance will be the chosen remedy if the reported costs are less than the reported valuation, and expectation damages in an amount equal to the reported valuation will be chosen otherwise:

$$\text{buyer's hybrid rule} \equiv \begin{cases} \text{if } \tilde{c} < \tilde{v}, & \text{then specific performance is ordered} \\ \text{if } \tilde{c} \geq \tilde{v}, & \text{then payment of } \tilde{v} \text{ is ordered.} \end{cases}$$

Let's consider the case where renegotiation costs are somewhere between zero and infinity and asks the following: *(1)* would parties enter contracts with the hybrid rules as a default? *(2)* is there breach in equilibrium with positive probability (i.e., does the rule trigger observed behavior?) and *(3)* does the rule lead to efficient trade and investment decisions? The answer to all three questions is yes. The proposition below demonstrates the efficiency properties of this rule. The other considerations are left for the discussion.

PROPOSITION 1 *For any level of renegotiation costs, under the buyer's hybrid rule simple fixed-price contracts with one-sided selfish investments by the buyer lead to first best efficiency.*

Proof: First note that the seller will have incentive to truthfully report her cost under this rule, i.e., $\tilde{c} = \hat{c}$ is a weakly dominant strategy. To see this, suppose $\tilde{c} < \hat{c}$,

i.e., the seller under-states her costs. When $\tilde{c} \geq \tilde{v}$, (which implies $\hat{c} > \tilde{v}$) the seller's payoff is the same as it would have been had she reported the truth, i.e., she pays the buyer $\tilde{v}$. When $\tilde{c} < \tilde{v}$, the seller must perform at a cost of $\hat{c}$. If $\tilde{v} \geq \hat{c} > \tilde{c}$, then the seller receives the same payoff she would have gotten had she truthfully reported her costs. However, she is worse-off if $\tilde{c} < \tilde{v} < \hat{c}$, because she must now perform at costs $\hat{c}$ instead of paying the lower amount $\tilde{v}$. Thus the seller's payoff either falls or stays the same when she under-states her costs. Now suppose that the seller over-states her costs, i.e., $\tilde{c} > \hat{c}$. When $\tilde{c} < \tilde{v}$, the seller must perform at costs of $\hat{c}$, which is what she would have ended up with if she reported costs truthfully. When $\tilde{c} \geq \tilde{v}$, the seller pays the buyer $\tilde{v}$. If $\tilde{c} > \hat{c} \geq \tilde{v}$, the seller receives the payoff she would have gotten if she reported truthfully. However, if $\tilde{c} > \tilde{v} > \hat{c}$, then the seller must pay the buyer $\tilde{v}$ which makes her worse-off than she would have been had she truthfully reported $\hat{c}$ and been ordered to perform. So the seller payoff either falls or stays the same when she over-states her cost. Now it will be shown that under the hybrid default rule, under-stating valuation is a weakly dominated strategy for the buyer; and though the buyer has incentive to exaggerate valuation, such exaggerations will not lead to inefficient results. Suppose $\tilde{v} < \hat{v}$, i.e., the buyer under-states his valuation. When $\tilde{c} < \tilde{v}$, the buyer gets performance, which is what he would have gotten by truthfully announcing $\hat{v}$. When $\tilde{c} \geq \tilde{v}$, the buyer gets $\tilde{v}$ which is less valuable than the performance he would have gotten by truthfully announcing $\hat{v}$. So the buyer's payoff either falls or stays the same when he under-states his valuation. Now suppose that the buyer over-states his valuation, i.e., $\tilde{v} > \hat{v}$. When $\tilde{c} < \tilde{v}$, the buyer gets performance, which is equivalent to what he would have gotten by truthfully announcing $\hat{v}$. When $\tilde{c} \geq \tilde{v}$, the buyer gets $\tilde{v}$, which better than getting $\hat{v}$ by performance, so the buyer does better to over-state

his valuation. However, he could over-state his valuation too much (i.e., $\tilde{v} > \tilde{c}$) and get performance, in which case he would have done better to report $v + \epsilon$ for ϵ small, i.e., such that $\epsilon \leq |\tilde{c} - v|$. Since the buyer knows realized costs, he will not report a valuation, $\tilde{v}$, such that $\tilde{v} > \hat{c}$. In fact the buyer will report a valuation that allow him to extract the full surplus of non-performance, which provides the buyer with the appropriate incentive to invest efficiently. *qed.*

COROLLARY **1** *For any level of renegotiation costs, under the seller's hybrid rule simple fixed-price contracts with two-sided selfish investments by the seller lead to first best efficiency.*

Proof: Follows directly from Chung (1991).

The assumption that the buyer knows the seller's realized costs guarantees allocative efficiency. This assumption may be somewhat justified if one believes that realized costs are generally "discoverable". However, without this assumption the efficiency claims are weakened:

COROLLARY **2** *Relaxing Assumption 1, the buyer's hybrid rule is not allocatively efficient. However, as the buyer's knowledge of $\hat{c}$ improves (in the form of reduced variance) the buyer's hybrid rule approaches allocative efficiency.*

The first part of Corollary 2 is a specific instance of the so-called Myerson Inefficiency Theorem (Myerson & Satterthwaite 1983).[23] [Expand...] The second part of Corollary 2 is a continuity implication of Proposition 1. That the seller will truthfully reveal her costs and the buyer will never understate his valuation follows directly from Proposition 1. Also from Proposition 1, it is given that the buyer has incentive

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[23]Also see Fudenberg & Tirole (1993), and Spier (1994).

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to overstate his valuation but never beyond the seller's realized costs. As the buyer's information about costs gets arbitrarily close perfect information, the likelihood of an inefficient result approaches zero probability.

When the buyer does not observe costs, or when his observation of costs is not perfect, the court may use the *seller's hybrid rule* to obtain efficient results as long as the seller observes the buyer's valuation.

ASSUMPTION **2** *The seller knows the buyer's valuation, $\hat{v}$, and realized costs, $\hat{c}$, remains the private information of the seller.*

This seller's hybrid rule operates exactly like the buyer's version, except any payment of damages will equal $\tilde{c}$.

$$
\text{seller's hybrid rule} \equiv
\begin{cases}
\text{if } \tilde{c} < \tilde{v}, & \text{specific performance is ordered} \\[2mm]
\text{if } \tilde{c} \geq \tilde{v}, & \text{payment of } \tilde{c} \text{ is ordered}
\end{cases}
$$

PROPOSITION **2** *For any level of renegotiation costs, under the seller's hybrid rule simple fixed-price contracts with two-sided selfish investments by the seller lead to first best efficiency.*

REMARK   The validity of the claim can be demonstrated in a similar manner as Proposition 1, and therefore only conclusory points are discussed here. Reporting $\tilde{v} = \hat{v}$ is a weakly dominant strategy for the buyer. The seller has incentive to under-state her costs, but not excessively. Given that the seller knows the buyer's valuation, as well as knowing that under this rule the buyer has incentive to reveal valuation truthfully, she will not under-state costs such that inefficient resolutions will occur. Over-stating the costs of performance is a weakly dominated strategy for the seller.

The weight against over-stating costs under the seller's hybrid rule could present conflict for sellers, who generally have incentive to report high realized costs in order to justify the breach in the first place. However, as the hybrid rules are structured, liability for the breach is determined *ex ante*. Therefore countervailing incentives to over-state and under-state costs are not present. If the liability and compensation determination stages of litigation were coupled, or if some information from the liability stage could be used to verify reports in the compensation stage, then the countervailing incentives of a scheme similar to the seller's hybrid rule might have some bite. While potentially revealing, analysis of such schemes is beyond the immediate reach of the paper.

COROLLARY **3** *Relaxing Assumption 2, the seller's hybrid rule is not allocatively efficient. However, as the seller's knowledge of $\hat{v}$ improves, i.e., approaches certainty, the seller's hybrid rule approaches allocative efficiency.*

Assuming that one party lacks certainty over relevant information of the other party, Corollaries 2 and 3 tells us that the court may be able to arrive at efficient outcomes in the limit. Another way to view the problem is the following: Take successive coarsening of the information structure until *some* relevant information becomes common knowledge to the buyer and the seller. Using similar mechanisms as those described above, the court could harness this coarser information to resolve the breach more efficiently. That is, rather than seeking greater certainty [by mandating excessive disclosure for instance] over some specific information, it may be more valuable for the court to seek less specific information, but focus on those issues about which there is certainty.

4 Discussion

This section of the paper will briefly describe applications of hybrid equitable and legal remedies in corporate and bankruptcy law. The discussion will also cover the institutional implications of these findings.

5 Conclusion

Contracting is a process: parties meet; they discuss what, how, when and where they wish to trade; they write instructions—contracts—detailing the manner by which they will trade; and they execute those instructions. The execution of the contract is simply a trade. Breach occurs when a contracted future trade is unilaterally halted. Legal rules attend to such halts. Specific performance completes the halted trade and money damages replaces it with another trade that is monetary in nature.[24]

This work is concerned with the level of knowledge required by the court to optimally choose between requiring a breaching party either to perform or to pay money damages. It was shown that neither performance nor payment of damages is unambiguously superior to the other. A perfectly informed court, i.e., a court that knows valuation and costs, could always impose the superior rule. Indeed, trans-

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[24]Legal rules also allow for the process to be abandoned, *excuse doctrines*, or repaired with outside help, *arbitration*. Additionally, these rules indirectly attend to halts by establishing the framework for parties to address and correct the matter themselves, *private ordering*. With respect to court rules, the superior breach remedy is selected according to the same efficiency criterion that determines whether parties should enter into trade in the first place: the value of the trade being greater than the costs. Selecting the wrong remedy can be costly. For example, the court may order specific performance when the true cost of performance is greater than the true value of performance. This leads to one of three inefficient outcomes: (i) the lower-valuing party receives and keeps the good, (ii) costly renegotiation is undertaken to release the seller from inefficient performance, or (iii) another transaction involving the buyer reselling the good occurs. In order to avoid these types of inefficient outcomes, it is important that the court makes the correct choice.

action costs notwithstanding, it is clear that the court need only know the relative magnitudes of valuation and costs to impose the superior rule. When valuation is greater than costs, specific performance is the superior rule; otherwise money damages are superior. However, the court's information is rarely so precise. The analysis considered situations where the court does not have sufficient knowledge to discern relative magnitudes of valuation and costs. The analysis considered simple schemes that allow a court with no independent knowledge of costs and valuation to determine the superior remedy, relying only on the unsubstantiated announcements of the contracting parties. The efficiency of these schemes is derived from the knowledge that the contracting parties have of each other's information, which in the case of repeated dealings or commercially sophisticated parties, is probably quite good and presumably better than the court's knowledge. Thus, a completely uninformed court can efficiently resolve breach case when contracting parties know something of each other's private information, even though they cannot prove it to the court.

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