The Law and Economics of Costly Contracting

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In most of the contract theory literature, contracting costs are assumed either to be high enough to preclude certain forms of contracting or low enough to permit any contract to be written. Similarly researchers usually treat renegotiation as either costless or prohibitively costly. This article addresses the middle ground between these extremes, in which the costs of contracting and renegotiation can take intermediate values and the contracting parties can themselves influence these costs. The context for our analysis is the canonical problem of inducing efficient relation-specific investment and efficient ex post trade. Among our principle results are: (i) The efficiency and complexity of the initial contract are decreasing in the cost to create a contract. Hence the best mechanism design contracts can be too costly to write. (ii) When parties use the simpler contract forms, they require renegotiation to capture ex post surplus and to create efficient investment incentives. In some cases, parties want low renegotiation costs. More interesting is that, in other cases, parties have a strict preference for *moderate* renegotiation costs. (iii) The effect of contract law on contract form is significant but has been overlooked. In particular, the law's interpretive rules raise the cost of enforcing complex contracts, and thus induce parties to use simple contracts. Worse, the law also lowers renegotiation costs, which further undermines complex contracts and is also inappropriate for some of the simpler contracts.

1. Introduction

Contracting costs play a significant role in recent economic, finance, and law and economics analysis. Among many examples, the high costs of describing possible future states of the world in contracts and of verifying

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the realized ex post state have been cited as contributing to contract incompleteness.[1] Further, high contracting costs motivate the default rule project, in which publically supplied contract law is explained as providing private parties with terms that are not cost justified for these parties to write themselves. The models that develop these important results have two relevant features. First, contracting and renegotiation costs are treated as exogenous parameters, commonly assumed to be either *very high* or *very low*. For example, an analyst may assume that a particular contract term is too costly to write and that renegotiation is costless, and then ask what follows. Second, the legal system affects contracting and renegotiation costs, but it is unusual for an analyst to model the effect of legally induced costs on the parties' contracting choices.

This article explores the middle ground between very high and very low contracting costs and it studies how contract law affects contracting costs. We develop a model in which the costs of writing and renegotiating a contract can take on intermediate values and are partially within the parties' control. The model addresses the canonical problem of when parties can efficiently implement relation-specific investment and efficient ex post trade. Our analysis yields new insights on the relation between contracting and renegotiation costs and the parties' choice of contractual form. We also show how the courts' interpretive practices affect the parties' contracting behavior. This article thus joins the recent literature that formally incorporates transaction costs into explanations of the level of contractual complexity (Dye, 1985; Anderlini and Felli, 1994, 1999; Battigalli and Maggi, 2003) and the ability of contracts to induce efficient investment (Hart, 2001; Tirole, 2001).[2]

1.1 The Current Legal and Economic Understanding Regarding Contracting Costs

We begin with an introduction to current legal and economic perspectives on contracting costs. The law's goal is to facilitate a court's ability to ascertain and implement the parties' intentions regarding the transaction at issue. Formalism—the use of an evidentiary base to make interpretations that is largely comprised of the written words—now is thought to be at odds with this goal. The rejection of formalism implies:

(a) *Contextual interpretation*: A court's search for intent should reach beyond the contract's written words to include evidence of three kinds. (i) What parties said and did during the course of their

1. Relevant work from the transaction cost and hold-up literatures includes Coase (1937), Klein, Crawford, and Alchian (1978), Williamson (1979, 1985), Grout (1984), Grossman and Hart (1986), Hart and Moore (1990), and Spier (1992).

2. Perhaps the earliest paper in this line is Townsend (1979), who showed that when it is excessively costly to verify a firm's profits, the firm will reject equity contracts, which condition on profits, in favor of debt contracts, which do not.

negotiations. Party efforts in the writing to limit reference to precontractual evidence seldom preclude the introduction of such evidence at trial. (ii) Actions under prior contracts between the parties—the "course of dealing"—or actions under the current contract—the "course of performance." This evidence is used to ascertain the parties' obligations under their current contract. For example, a buyer's practice of accepting nonconforming deliveries under prior contracts may persuade a court to restrict the buyer's ability to reject under the current contract. (iii) Trade practice—"custom." This evidence is also used to ascertain obligations under the written agreement.

(b) *A preference for modifications*: The parties' latest expression of intent is preferred to earlier expressions because courts should implement what parties want, not what they once wanted, and also because later intentions are likely to be better informed than earlier ones. This view sustains the rule that a term in the initial agreement prohibiting renegotiation is unenforceable (see Snyder, 1999).

These implications affect contracting costs, but courts seldom take this consequence into account when creating and applying the rules.

The economic view regarding contracting costs follows from a commitment to efficiency. In the economic view, the costs of writing the initial contract ideally should be zero. When it is costless to contract and to verify relevant actions and later states of the world, parties can write a complete state-contingent contract, prescribing the optimal action for each of them to take in every possible future state. When it is costly to verify future states of the world, efficiency is more difficult to obtain, but initial contracting costs ideally should remain zero. The parties then prefer contracts that require them to send "messages" to a court; these messages can be interpreted as reports of the state. For example, a message can be "Seller will deliver 12 units because Buyer's downstream demand [the state] is high," or "Buyer will pay $5 per unit because its demand is low," or the like. The court thus can infer the true state from the parties' messages, and it then can compel the optimal action to be taken in each state. Further, this contractual form can replicate the outcome of any ex post renegotiation, in particular specifying efficient outcomes in equilibrium.

The contract theory literature studies message contracts with mechanism design theory.[3] In the typical mechanism design model, the contract specifies sets of permitted messages and it describes when the parties must send messages to the court. Such contracts require courts to be able to bind

3. Hart and Moore (1988) first analyzed message-based contracts in a setting where parties could not verify the state of the world to the court but they could renegotiate when the state materialized. The modern mechanism design approach to contracting with unverifiable states and renegotiation was developed by Maskin and Moore (1999), building from Maskin's (1999) work on Nash implementation.

parties to their commitments regarding the timing and content of messages, and to verify that the parties take the actions that the messages prescribe.

An economic approach to contract choice diverges from the legal approach in two important ways. First, the legal view ignores the effect of the courts' interpretive practices on contracting costs. An economic approach should take these costs into account. Second, the current economic approach implies that when contracting is cheap, renegotiation should be costly. This is because low initial contracting costs permit parties to write state-contingent or message-based contracts that always yield ex post efficiency. These contracts thus are renegotiated only "out of equilibrium," when a party wants to exploit a sunk cost investment of its contract partner. Very high renegotiation costs preclude this behavior. Thus, in complete contrast to the legal view, the economic approach implies that courts should enforce contractual bans on renegotiation.[4]

1.2 Results

We suppose contracting costs are increasing in contract complexity. This assumption implies the following taxonomy:

Simple noncontingent contracts specify a single price and a trading decision. These are the least complex and costly.

Option contracts specify sets of prices and trading decisions among which one of the contracting parties can choose. These are "moderately" complex.

Verified contingency contracts condition prices and trading decisions on the ex post state (and thus require verification of the state). These are complex to create and, in addition, costly when verification of the state is technologically difficult.

Coordinated message contracts condition on messages that parties simultaneously send. These are the most costly contract form.

We also let the parties' initial contract partly control the parties' ability to renegotiate. In particular, the initial contract can affect the portion of the surplus that parties can realize from renegotiation.

4. There is a question of how contractual bans on renegotiation can be enforced. A ban is convenient to enforce when the trading opportunity expires before the court intervenes. In this circumstance, the court's only role is to order the monetary transfers that the contract requires. An enforceable no-renegotiation clause would authorize the court to reinstate the monetary transfers that the original contract required rather than enforce the transfers that the renegotiated contract directs. One of the parties commonly would do better under the original contract. Consequently that party's renegotiation promise would not be credible. In the standard mechanism design context, in which the court is asked to intervene before parties trade, a contractual renegotiation ban would permit a party later to ask the court to reinstate the transfers that the parties would have made had they sent the messages the original contract required. Again, at least one party would have an incentive, after trade, to petition for the original transfers.

Our major results are

(a) Parties trade off the cost of creating complex contracts against the gain from inducing more efficient investment incentives. When the costs of writing the initial contract are low, parties create complex (coordinated message or verified contingency) contracts that induce efficient investment and efficient trade. The higher the initial contracting costs, the more likely parties are to shift to the simpler contract forms.
(b) Parties have preferences over renegotiation costs and will contract to affect these costs to the extent that technology and the law permit. When parties create complex contracts, they prefer very high renegotiation costs because renegotiation will undo the parties' incentive scheme. In contrast, simple contracts can only deal optimally with one of the possible ex post states and so must often be renegotiated to achieve ex post efficiency. Parties that use this contract form thus prefer low renegotiation costs. When parties use the moderately complex option contract, they likely prefer *intermediate* renegotiation costs: high to retain the parties' investment incentives, but not too high because these contracts are renegotiated with positive probability.
(c) Contract law affects initial contracting and renegotiation costs and so has an important, but overlooked, affect on the parties' choice of contract form. As an illustration, parties recognize that the costs of writing a particular contract include the expected costs of enforcing it. The enforcement costs that parties bear are influenced by the courts' interpretive style (the more evidence courts permit a party to introduce in support of its preferred interpretation, the more costly a lawsuit will be). Since complex contracts commonly present more interpretive issues than simple ones, the courts' current interpretive practices bias parties toward the use of more simple contract forms.
(d) Parties have preferences over what may be called "the rules of the game" (implications (a) and (b) summarized in Section 1.1), as well as over the substantive terms such as prices and quantities. The rules of the game currently are mandatory. Hence a major normative implication of our analysis is that contract law has more mandatory rules than it needs.[5]

Section 2 begins with an example that illustrates many of our conclusions. Section 3 sets out the model and Section 4 derives results. Section 5

5. This conclusion is consistent with an implication of the mechanism design literature, that the court should enforce whatever the contract dictates, as a function of the messages the parties send [see Schwartz (1998)]. Eggleston, Posner, and Zeckhauser (2002) also suggest, consistent with our analysis, that courts should obey interpretative instructions that parties give them.

discusses positive and normative implications of the analysis in more detail. Section 6 concludes.

2. An Example

A seller and buyer contract to trade one unit of an intermediate good. The contract specifies (i) a court-enforced mechanism that they must play later in their relationship, and (ii) a renegotiation parameter, s, which gives the share of the renegotiation surplus that the parties can capture if they renegotiate the outcome of the mechanism ($0 \leq s \leq 1$). The outcome of the mechanism, before renegotiation, is a statement of whether the good is traded and the price (a monetary transfer from buyer to seller). The contract is costly to write, as detailed below.

After the contract is made, the seller makes a private, unobservable investment that affects the buyer's valuation of the good, v. The seller either invests "high," at a cost of 20, or "low," at a cost normalized to zero. If the seller invests high, then $v = 80$ with probability $\frac{1}{2}$, $v = 20$ with probability $\frac{1}{4}$, and $v = -20$ with probability $\frac{1}{4}$. If the seller invests low, then $v = 20$ with probability $\frac{3}{4}$ and $v = -20$ with probability $\frac{1}{4}$. Thus high investment shifts probability from the lower to the higher possible values. The trading decision is costless to the seller, given investment.

After the seller invests, the parties observe the realization of the buyer's value v, which is unverifiable. This value is referred to as the "state of the relationship," or just the "state." The parties next decide whether to trade. Trade is ex post efficient in this example if $v = 80$ or 20, but is inefficient if $v = -20$. Given the example's parameters, the parties prefer high investment because it and the efficient ex post trade decision yield a joint payoff of

$$\tfrac{1}{2}(80) + \tfrac{1}{4}(20) + \tfrac{1}{4}(0) - 20 = 25,$$

while low investment, again with the optimal trade decision, yields a joint payoff of

$$\tfrac{3}{4}(20) + \tfrac{1}{4}(0) = 15.$$

The first of these expressions includes the investment cost of 20 and both expressions assume that the parties do not trade when the buyer's valuation turns out to be –20.

We consider three contract forms in this example: (i) A simple noncontingent contract, which specifies trade or no trade at a fixed price, and whose creation cost is normalized to zero; (ii) an option contract, under which the trade decision and transaction price depend on a message from one of the parties, and which costs $\alpha > 0$ to write; and (iii) a coordinated message contract, under which the trade and pricing decisions depend on messages from both parties, and which costs 2α to write. It is unnecessary to consider verified contingency contracts (which are modeled in Section 3)

for the points this example makes.[6] In order to best illustrate the parties' preferences over renegotiation costs, we let the parties costlessly specify the value that the renegotiation parameter, s, will take.[7] Finally, we assume that the parties split equally whatever surplus the contract or renegotiation permit; that is, they have equal bargaining power during renegotiation as well as during initial contracting.

2.1 The Simple Noncontingent Contract

This contract cannot induce the seller to choose the high investment level (though high investment maximizes the parties' joint payoff). To see why, let the contract provide that there is no trade ex post, but the buyer nevertheless must pay p. This contract would not be renegotiated when $v = -20$, but it would be renegotiated when v takes on either of the higher values. The parties would prefer to set $s = 1$ (renegotiation is costless) in order to give the seller fully one-half the renegotiation surplus; this expected return maximizes the seller's incentive to invest efficiently.

A simple, noncontingent contract that sets $s = 1$ yields to the seller that invests high the expected payoff of

$$\tfrac{1}{2}(p + 80/2) + \tfrac{1}{4}(p + 20/2) + \tfrac{1}{4}(p) - 20 = p + 2.5.$$

This seller receives the price p plus half the renegotiation surplus when $v = 80$, which occurs with probability $\frac{1}{2}$, and half the renegotiation surplus when $v = 20$, which occurs with probability $\frac{1}{4}$; the parties do not renegotiate, and so the surplus is zero, when $v = -20$. A seller who instead chooses the low investment level under this simple contract realizes an expected payoff of

$$\tfrac{3}{4}(p + 20/2) + \tfrac{1}{4}(p) = p + 7.5.$$

With probability $\frac{3}{4}$, the seller now receives p and splits the 20 surplus, and with probability $\frac{1}{4}$ the seller receives only the price p. The seller thus optimally chooses the low investment level. The parties' joint expected payoff under this contract is

$$\tfrac{3}{4}(20) = 15.$$

2.2 The Option Contract

A contract that lets the trade outcome depend on a message from the buyer sometimes will induce efficient investment.[8] Suppose the contract permits the buyer to trade at price p or not trade but pay price p', with these prices

6. A verified contingency contract would require parties to expend the resources necessary for the court to verify the state, which we could call H when $v = 80$, L when $v = 20$, and N when $v = -20$. The contract would then specify prices and trade contingent on the state.

7. The assumption that parties can costlessly control s is relaxed below. Note that when $s = 1$, renegotiation is costless, so the parties can capture the full renegotiation surplus; when $s = 0$, renegotiation would entirely exhaust this surplus.

8. A seller-option contract does no better than a noncontingent contract.

set so that the buyer will trade only when $v = 80$. Otherwise the buyer sends the "no-trade" message. This message leads to renegotiation when $v = 20$; parties let the no-trade outcome stand when $v = -20$. Such prices must satisfy all of the following:

$$80 - p \geq -p' + 80s/2, \tag{1}$$

$$20 - p \leq -p' + 20s/2, \tag{2}$$

and

$$-20 - p + 20s/2 \leq -p'. \tag{3}$$

Inequality (1) states that when $v = 80$, the buyer does better trading and paying p than it would do by sending a "no-trade" message, paying p', and then renegotiating to split the surplus of 80. Inequalities (2) and (3) provide that when $v = 20$, the buyer prefers renegotiating from the no-trade outcome rather than sending the "trade" message; and when $v = -20$, the buyer prefers sending the "no-trade" message and letting it stand. Rearranging these inequalities yields the following bounds on the contract prices:

$$20(1 - s/2) \leq p - p' \leq 80(1 - s/2). \tag{4}$$

This option contract gives the seller an expected payoff from high investment of

$$\tfrac{1}{2}(p) + \tfrac{1}{4}(p' + 20s/2) + \tfrac{1}{4}(p') - 20.$$

With probability $\frac{1}{2}$, $v = 80$ and the parties trade under the contract, the buyer paying p; with probability $\frac{1}{4}$, $v = 20$, the buyer pays p', and the parties split the trade value through renegotiation; and with probability $\frac{1}{4}$, $v = -20$, so the parties let the contract result stand, the buyer again paying p'. By a similar logic, a seller who chooses the low investment level would receive a payoff of

$$\tfrac{3}{4}(p' + 20s/2) + \tfrac{1}{4}(p') = p' + 15s/2.$$

The seller thus invests efficiently if and only if

$$\tfrac{1}{2}(p - p') - 5s \geq 20. \tag{5}$$

Inequality (5) illustrates that the seller's incentive to invest efficiently is increasing in the difference between the two prices, because the likelihood that the seller will capture this difference is higher when the seller chooses the high investment level. From Inequality (4), this price difference cannot exceed $80(1 - s/2)$. Substituting this value into Inequality (5) yields

$$40(1 - s/2) - 5s \geq 20,$$

which simplifies to $s \leq 4/5$.

Regarding the intuition, the parties face a trade-off regarding the renegotiation parameter s. Since the parties renegotiate with positive probability (when $v = 20$), they prefer zero renegotiation costs ($s = 1$) in order to capture the full surplus. But when the renegotiation surplus is reduced by

positive renegotiation costs, the wedge between what the parties obtain when $v = 80$ and when $v = 20$ widens; this encourages the seller to choose the high investment level and thereby increase the probability that $v = 80$ occurs. Combining these incentives, the best option contract, on the parameters in this example, sets $s = 4/5$. Recalling that an option contract is assumed to cost α to write, the parties realize an expected joint gain of

$$\tfrac{1}{2}(80) + \tfrac{1}{4}(20)(4/5) + \tfrac{1}{4}(0) - 20 - \alpha = 24 - \alpha.$$

2.3 The Coordinated Message Contract

As is well known, any contingent split of the investment surplus can be achieved under this type of sophisticated contract, so long as renegotiation is or can be made to be sufficiently costly ($s \to 0$). These contracts rely on messages that the parties send after uncertainty has dissipated, and punish parties jointly if their messages regarding the ex post state differ.[9] Since the contracts achieve efficiency in every state of the world, renegotiation would only disrupt the mechanism. If $s = 0$ and the other parameters of the example are retained, and recalling that a coordinated message contract costs 2α to write, we thus have that parties to this contract can realize a joint expected gain of

$$\tfrac{1}{2}(80) + \tfrac{1}{4}(20) + \tfrac{1}{4}(0) - 20 - 2\alpha = 25 - 2\alpha.$$

This example illustrates two of our positive themes: the parties' preferences over contract form are partly a function of trading off the costs of contract writing against the gains of inducing more efficient investment; and the parties' preferences over renegotiation costs are partly a function of their choice of contract form. In the example, when $\alpha \leq 1$, the parties write a coordinated message contract, set $s = 0$, and maximize their joint gain. When $\alpha \geq 9$, the parties write the simple noncontingent contract, set $s = 1$, choose the inefficient investment level, and realize the lowest possible joint gain. And when $1 \leq \alpha \leq 9$, the parties write an option contract, set s at the intermediate value of 4/5, induce efficient investment, and achieve an intermediate joint gain.[10]

9. The following message-based contract induces the seller to invest high. The contract would require the parties simultaneously and independently to send messages to the court. The possible reports are H (representing $v = 80$), L (for $v = 20$), and N (for $v = -20$). If both parties send message H, the contract would require the court to enforce trade and to order the buyer to pay 60 to the seller. If both parties send L, trade would again be enforced and the buyer must pay 20. If any other message profile is sent, the court would prohibit trade and transfers. It is easy to check that with this contract and $s \leq \frac{2}{3}$, it is a Nash equilibrium for both parties to report truthfully. The seller thus obtains the full value of high investment (30 in expectation) and so has the efficient incentive to invest high. Although s does not have to be very close to zero in this example, it must be arbitrarily close to zero in other examples.

10. Our article is similar to Bajari and Tadelis (2001), who ask when firms will use a "fixed-price contract" or a cost-plus contract. When parties can describe completely the performance the seller is to render and conveniently verify deviations to a court, they use the fixed-price

The example also illustrates our normative theme that contract law's mandatory rules sometimes yield inefficiency. For example, the law prohibits contractual bans on renegotiation (see Implication (b) in Section 1.1), thereby shifting the renegotiation parameter s upward and making it prohibitively costly for the parties to reduce it. When this parameter increases, it becomes more difficult to create efficient investment incentives with coordinated message and option contracts.

Contract law's interpretive rules also can reduce efficiency. The costs of contract creation include the expected costs of enforcing the contract that is written. When courts do not restrict themselves largely to the written words, but rather consider contextual evidence, a party cannot easily win a contract action on summary judgment. The primary evidence in a summary judgment motion will be the written contract. Context evidence, in contrast, is often verbal and commonly contested. The ability of a party to introduce and contest evidence, especially testimonial evidence, is increasing in the complexity of the contract. Hence parties to more complex contracts may anticipate needing expensive trials to enforce their deals. To illustrate the effect of this expectation, suppose that the contract creation cost α in the example is less than 1 (or less than 9) when courts are formalist (they largely reject context evidence). Then α could be made to rise above 1 (or above 9) when courts make extensive reference to context. In sum, the probability that parties will use the efficient contract form is decreasing in the intensity of the courts' ex post search for the true contractual interpretation.

Parties often would prefer judicial formalism even if a court's accuracy were increasing in the size of the evidentiary base the court considers.[11] Uncertainty regarding court outcomes is usually modeled by assuming that courts are unbiased, but that some legal rules generate more variance than others [see Calfee and Craswell (1986), Che and Schwartz (1999)]. This approach is appropriate here because parties need to make clear to their future selves and to decision makers what it is that they agreed to do; it is inconsistent with the nature of a contract that no one can know what it directs. Contracting costs are positive and words are ambiguous, however, so that what the contract directs seldom can be made perfectly clear. Parties instead write down enough to permit later readers to make correct

contract. When the performance cannot be completely described (perhaps what actually is needed will be learned later), the parties use a cost-plus contract and renegotiate as they go. A fixed-price contract in their model is equivalent to a complete state-contingent contract because the contract says what performance should be in (just about) every future state. Using our terminology, the parties thus will write a fixed-price contract when α is low and will then prefer s to be low as well, since renegotiation requests likely would be strategic. When α is high, the parties write the cost-plus contract, and since the parties anticipate renegotiation under that contract, they implicitly prefer s to be high so that renegotiations do not dissipate surplus. Bajari and Tadelis's result thus falls within our general framework.

11. This position is contested in the law and economics literature. See Schwartz and Scott (2003), which analyzes the relation between legal doctrine and firm preferences over judicial interpretive styles less formally, though at greater length, than is done in this article.

interpretations on average. Adding context in an adjudication—for example, admitting evidence of what was said during negotiations—thus may be conceptualized as shrinking the interpretive variance around the contract's true meaning. Risk-neutral firms nevertheless commonly prefer the evidentiary restrictions implicit in a formalist interpretive style because these firms are less concerned with variance than with choosing contractual forms that, if interpreted correctly on average, would maximize expected surplus on average.

3. The Model

We analyze a straightforward extension of the standard model of mechanism design with an external enforcement authority (the court), who acts to implement the parties' contract.[12] Contractual mechanisms prescribe trading outcomes as functions of information that the court can access. Contracting and renegotiation are costly, but parties can influence these costs by their choice of contractual form.[13]

3.1 Model Details

The relationship between the buyer and seller takes place over five time periods:

Time 1. The parties make a contract, denoted f, with two components. The externally enforced component specifies a mechanism that the parties are to play at time 4. The outcome of the mechanism is a tuple (d, p, s), as explained below. The self-enforced component specifies an equilibrium of the mechanism (for each contingency) on which the parties coordinate. A contract f costs $\alpha(f)$ to write.

Time 2. The seller makes an unverifiable and private investment decision x, that is chosen from a finite set X at an immediate cost of $\sigma(x)$.

Time 3. A random event determines the *state of the relationship* θ, which is an element of a finite set Θ and whose distribution partly depends on the seller's investment choice. The probability that state θ occurs is denoted $q(\theta, x)$. The state θ affects both the seller's costs and the buyer's valuation, and is observed by the parties at this time.[14]

12. In Anderlini, Felli, and Postlewaite (2002), the court maximizes expected ex ante gains from contracting. Our court plays a more passive role, as is commonly assumed.

13. This article adds contracting and renegotiation costs to the standard "mechanism design with ex post renegotiation" model (Maskin and Moore, 1999; Segal and Whinston, 2002). This is the "complete contract" approach in the sense that mechanisms are permitted, but it is the "incomplete contract" approach in the sense that contracting entails a cost. Tirole (1999) provides a technical discussion of these approaches. An accessible review is Schmitz (2001).

14. Our model thus includes pure cooperative investment as a special case, when the seller's investment level x affects only the buyer's valuation, but the model is sufficiently general to include investment that has both cooperative and self-effects.

Time 4. The parties play the mechanism that their contract specifies. The outcome of the mechanism is a joint trade decision d, a price p, and a recontracting parameter s. The decision d is an element of a finite set D, and the parties' preferences over the trade decision are partly a function of θ. Thus in some ex post states it may be efficient to trade in a certain way, while in other states the same trading decision would be inefficient.

Time 5. The parties may recontract to change the outcome of the mechanism. The disagreement point for renegotiation is this outcome. The recontracting parameter s specifies the share of the gains from recontracting that transaction costs do not exhaust. The outcome of recontracting is a new trade decision d' and a new price p'.[15]

The parties' payoffs depend on the state, the seller's investment, the trade decision and price, and the costs of contracting and recontracting. Let $v(d, \theta)$ be the buyer's value from trade and $c(d, \theta)$ be the seller's cost of producing the traded goods. For example, if the time 4 decision, d, specifies "no trade," then $v(d, \theta) = 0$ and $c(d, \theta) \leq 0$.[16] Payoffs are linear in the price transfer. Thus the buyer's payoff from trade is $v(d, \theta) - p$, and the seller's payoff is $p - c(d, \theta)$. The ex post optimal trade decision in state θ, denoted $d^*(\theta)$, maximizes the joint value of the trading decision, $v(d, \theta) - c(d, \theta)$, by the choice of d. We assume that $d^*(\theta)$ is unique for each state θ, and make the following assumption:

Assumption 1. For each x, there exists at least two states $\theta, \theta' \in \Theta$, such that $d^*(\theta) \neq d^*(\theta')$ and $q(\theta, x)$, $q(\theta', x) > 0$.

Assumption 1 requires that at least two different trading decisions will be optimal with positive probability, no matter the level of investment the seller chooses. This assumption ensures a role for contractual flexibility.

The *renegotiation surplus* is given by

$$r(d, \theta) \equiv [v(d^*(\theta), \theta) - c(d^*(\theta), \theta)] - [v(d, \theta) - c(d, \theta)].$$

The first bracketed term on the right-hand side is the gain from making the optimal trading decision; the second bracketed term is the *lower* gain that would have been realized had the parties allowed the outcome of the mechanism to stand. There is no gain from recontracting when the mechanism specifies the efficient outcome $d^*(\theta)$; then $r(d^*(\theta), \theta) = 0$.

Uncertainty is resolved by time 4, so renegotiated contracts always take the simple noncontingent form, specifying a price p' and a trade decision d'. It must be that $d' = d^*(\theta)$, and parties choose p' to divide the fraction s of the renegotiation surplus $r(d^*, \theta)$ that remains after recontracting costs

15. For simplicity, we focus on proportional renegotiation costs; our results would not change substantially if we specified a more general cost (including a fixed element). See Brennan and Watson (2001) for an analysis of general renegotiation costs (without initial contracting costs).

16. It is possible to have $c(d, \theta) < 0$ because the seller could incur a "negative cost" from selling the intermediate good to another party on the spot market (an outside option).

are incurred. We normalize the cost of writing a simple noncontingent contract to zero. Therefore renegotiation is costly only when the renegotiation friction parameter $s < 1$.

Renegotiation is resolved according to fixed bargaining weights π_B and π_S for the buyer and seller, respectively.[17] Thus, in state θ, if the outcome of the parties' initial contract is (d, p, s), then from time 5 the buyer obtains

$$z_B(d, p, s, \theta) \equiv v(d, \theta) - p + s\pi_B\, r(d, \theta)$$

and the seller obtains

$$z_S(d, p, s, \theta) \equiv p - c(d, \theta) + s\pi_S r(d, \theta).$$

The parties' total payoffs are these amounts minus the seller's investment cost $\sigma(x)$ and the initial contracting cost $\alpha(f)$. How the parties split $\alpha(f)$ does not affect the analysis.

The mechanism played at time 4 is static: Each party sends a message to the court, which then prescribes the outcome (d, p, s) that the contract dictates given these messages. Let M_B denote the buyer's message space and let M_S denote the seller's message space. In addition to sending unrestricted messages, the parties also can directly verify none, some, or all aspects of the ex post state to the court. M_D denotes the set of variables that the court can directly verify.[18]

A message profile is denoted $m = (m_B, m_S, m_D)$, where m_B is the buyer's message, m_S is the seller's message, and $m_D = \theta$ is what the court can directly verify. For any message profile m, the parties' initial contract prescribes the outcome $(d^f(m), p^f(m), s^f(m))$.

Thus, from time 5 in state θ, the parties receive the payoffs given by

$$z_B(d^f(m), p^f(m), s^f(m), \theta) \quad \text{and} \quad z_S(d^f(m), p^f(m), s^f(m), \theta).$$

These payoffs, along with the message spaces, define a game the parties play at time 4. We assume that a Nash equilibrium is played in each state and that, if there is more than one Nash equilibrium in any given state, the parties' initial contract specifies the Nash equilibrium on which they coordinate.[19]

17. The generalized Nash bargaining solution has this representation, as do other standard bargaining solutions.

18. The model collapses verification costs into initial contracting costs for convenience. Because courts only know what parties are able to prove, parties that cannot verify the state would face a cost $\alpha(f) = \infty$ to create any contract f that conditions directly on θ; that is, f cannot be written. This modeling strategy permits analysis of cases when parties make the state verifiable by installing a monitoring technology. In such cases, a contract f that conditions directly on θ would cost $\alpha(f)$ to write, where $\alpha(f)$ includes the cost of the technology. We do not explicitly separate ex post and ex ante costs or address strategic aspects of evidence disclosure. For research on these, see Bull (2001) and Bull and Watson (2004).

19. In technical terms, this is "weak implementation." Existence of equilibrium is assured because Θ is finite. However, it is generally not the case that, for a given state, any two equilibria of the message game are equivalent (yield the same payoffs). Equivalence holds in models with free renegotiation [see, e.g., Segal and Whinston (2002)], but may not hold here

By the revelation principle, we can restrict attention to direct revelation mechanisms and equilibriums with truthful reporting. Thus we assume that $M_B = M_S = \Theta$ and look for equilibria in which, in state θ, the parties report that θ is indeed the state. Letting $m_B(\theta)$ and $m_S(\theta)$ denote the messages sent by the parties in state θ, truthful reporting means $m_B(\theta) = m_S(\theta) = \theta$ for each state. Thus, in state θ, the equilibrium message profile is $m(\theta) = (\theta, \theta, \theta)$. To establish an equilibria with truthful reporting, we must analyze what would happen if players unilaterally deviate, leading to such message profiles as $(\theta', \theta, \theta)$ or $(\theta, \theta', \theta)$.

Let $u_B(x|f)$ and $u_S(x|f)$ denote the parties' expected payoffs from time 3, under contract f and investment level x,

$$u_i(x|f) \equiv \sum q(\theta, x) z_i(d^f(m(\theta)), p^f(m(\theta)), s^f(m(\theta)), \theta),$$

for $i = B, S$, where the summation is taken over Θ. Given a contract f and anticipating behavior at times 4 and 5, the seller chooses the investment level at time 2 that maximizes her payoff. This is the x^f that maximizes

$$u_S(x|f) - \sigma(x).$$

Note that x^f may differ from the first-best level of investment x^*, which maximizes

$$\sum q(\theta, x)[v(d^*(\theta), \theta) - c(d^*(\theta), \theta)] - \sigma(x),$$

where the summation is taken over Θ. At time 1, the parties select the initial contract f^* that maximizes the joint value of their relationship which, as a function of their contract f, is

$$u_B(x^f|f) + u_S(x^f|f) - \sigma(x^f) - \alpha(f).$$

3.2 Contracting Costs: Interpretation and Assumptions

Contracting and recontracting costs are represented by the function α and the variable s. The former gives the cost of writing an initial contract f, which generally comprises intrinsic elements as well as elements that the law influences.[20] The variable s represents recontracting costs that partly

because renegotiation is costly. We do not allow the contract to specify arbitrary randomization over the outcomes (other than by using the state) for three reasons. First, randomization schemes can be costly to set up; implicitly we are assuming that the setup costs are prohibitively large. Second, with positive contracting costs, detailed randomization schemes may be of little use. Third, the law also imposes constraints. For example, the rule in UCC §2-716 that conditions a court's ability to award specific performance on the occurrence of "proper circumstances" may prevent parties from conditioning outcomes on random events that a court would consider irrelevant to the contractual relationship.

20. Examples of ex ante contracting costs are (i) the effort and time that parties spend determining possible contingencies, calculating optimal terms, and drafting language; (ii) payments to third parties, such as attorneys, who facilitate this activity; and (iii) technological investments that make messages or state verification possible. Examples of ex post costs (that we collapse into ex ante costs) are (i) expenditures of time and money that the parties make during litigation, and (ii) risk premiums that risk-averse parties forfeit when enforcement has a random element.

occur naturally but also are a function of the parties' contract and the legal rules. Complex contracts—those having a greater number of clauses or requiring a court to evaluate information from many different sources—are assumed to be more expensive to write than are simple contracts. To capture this idea, we adopt a formulation that is along the lines of Dye (1985), Anderlini and Felli (1994, 1999), MacLeod (2000), and Battigalli and Maggi (2003) [see also, Gray (1978)]. In Battigalli and Maggi's analysis, for example, a contract is a series of clauses linking combinations of various possible "inputs" (that they call "elementary events") to prescriptions of behavior (that they call "elementary actions"). In our model, the inputs are message profiles and the prescriptions are the possible outcomes of the mechanism (d, p, s). For example, individual elementary events are $m_{\mathrm{B}} = \theta$ ("the buyer sends message θ"), $m_{\mathrm{S}} \neq \theta$ ("the seller does not send message θ"), and $m_{\mathrm{D}} = \theta$ ("the court verifies that the state is θ").

It is helpful to isolate certain components of contract creation costs on which the model depends.[21] There is a cost α_{B} associated with sending message m_{B}, a cost α_{S} associated with sending the message m_{S}, and a cost α_{D} associated with the message m_{D} that directly verifies the ex post state. A cost α_i is *not* paid if and only if the functions d^f, p^f, and s^f are *all* constant in m_i—that is, if the trading and pricing decisions and the renegotiation parameter do not depend on the message from channel i.[22] Parties also incur a contracting cost γ in order to specify a value of the renegotiation parameter s that differs from the default parameter $\underline{s}$.[23]

The costs α_{B}, α_{S}, α_{D}, and γ relate to the "stark" aspects of contracts—whether the outcome is contingent on messages and whether the contract affects the renegotiation parameter. To see what is meant by "stark," consider a contract that specifies trade of five units if and only if the buyer sends the message, "The state is H; send five units;" otherwise, the contract specifies no trade. We let α_{B} be the cost of sending such a single-buyer message; hence this contract costs α_{B} to write. The parties could write a more complicated contract that also conditions only on buyer messages. Such a contract could recite: "The buyer takes 12 units if he announces that the state is H; the buyer takes 5 units if he announces that the state is L; there is no trade if the buyer sends any other message (or none)." Parties would incur a cost greater than α_{B} to write this more

21. Battigalli and Maggi (2003) associate a cost with each separate instance in which the contract refers to an elementary event or action. Further, they differentiate between the cost of the initial reference and the cost of later references. In our model, any contract f with externally enforced components d^f, p^f, and s^f can be analyzed by considering the cost of creating a series of clauses that represent f. Parties are assumed to choose clauses that minimize the cost of creating f.

22. This is the formal reasoning underlying our assumption that it is costless to write a simple noncontingent contract, which does not require messages or verification.

23. In some of what follows, we assume that parties can choose the renegotiation parameter freely, but this choice actually is subject to two constraints: (i) some recontracting costs may be exogenous, and (ii) the legal rules may restrict the parties' freedom. Section 5 discusses the second constraint.

complicated contract because the contract partitions the buyer's message space more finely. Contracting costs not captured by α_B, α_S, α_D, and γ are denoted "complexity costs." We do not analyze complexity costs in detail, but do make one simplifying assumption about the contracting cost structure:

Assumption 2. It is costless to specify an *outcome* (d, p, s).

Our model permits us to rank the set of possible contract forms from least to most costly.

Simple noncontingent. This contract costs $\alpha(f) = 0$ to write if $s^f = \underline{s}$, and costs $\alpha(f) = \gamma$ if $s^f \neq \underline{s}$.

Options. An option contract gives one party the option of trading at the specified prices or renegotiating. Contracting costs thus comprise α_i, α_D (if the contract requires the court to verify a datum directly), γ (if parties vary the default renegotiation parameter), and possibly complexity costs.

Verified contingency. Parties must incur at least α_D to create this contract form. They will also incur γ if $s^f \neq \underline{s}$ is specified in at least one contingency, and complexity costs if they contract on several ex post states.

Coordinated message. Since both parties send messages under this contract form, contracting costs must include $\alpha_B + \alpha_S$, and may also include α_D, γ, and complexity costs.

Our formal analysis makes

Assumption 3. Complexity costs are zero; that is, all contracting costs are summarized by the variables α_B, α_S, α_D, and γ.[24]

4. Results

Our first result shows that parties prefer very high renegotiation costs when they use coordinated message or verified contingency contracts. The former contract form must deter parties from dishonestly reporting the ex post state, an opportunity that is heightened when parties can renegotiate. Also, both contract forms yield ex post efficiency and so are only renegotiated out of equilibrium. We summarize this logic in

Proposition 1. If it is optimal for parties to use either a coordinated message contract or a verified contingency contract and to specify $s^{f^*}(m) \neq \underline{s}$ for some message profile m, then there is an optimal contract f^* (of the same form) that specifies $s^{f^*}(m) = 0$ for all m. Further, $d^{f^*}(\theta, \theta, \theta) = d^*(\theta)$ for each state θ.

24. The appendix proves that versions of the results in the text hold for the more general setting in which Assumption 3 is relaxed.

The first sentence in Proposition 1 holds that parties to the specified contracts would prefer renegotiation to be infinitely costly. The second sentence says that this preference is held because f^* prescribes the ex post optimal trading decision for each state. As a consequence, a party would only initiate renegotiation strategically, to exploit the other party's sunk investment. Regarding notation, recall that the equilibrium message profile is (θ, θ, θ) in state θ.[25]

Our next result addresses the contractual form on the other side of the complexity spectrum: the simple noncontingent contract.

Proposition 2. The following conclusions hold generically.[26] If the optimal contract f^* takes the simple noncontingent form and if the parties choose s to differ from the default parameter $\underline{s}$, then they select s to be strictly positive; that is, they prefer that renegotiation *not* be infinitely costly. Furthermore, the parties will adjust the renegotiation parameter (setting $s^{f^*} \neq \underline{s}$) if the cost γ is sufficiently small.

Proposition 2 holds that parties to simple noncontingent contracts want the renegotiation surplus to exceed zero. As is illustrated in the example in Section 2, the investing party must anticipate receiving sufficient surplus or it will not invest.[27]

We denote a contractual relationship as having *pure cooperative investment* when $c(d, \theta)$ is constant in θ (so that the seller's investment only affects the buyer's value of trade). We have for this case:

Proposition 2′. In a setting of pure cooperative investment, there is a function $B(x, d)$ with the following property: If parties use a simple noncontingent contract specifying d' and s', and the contract induces the seller to invest x', then it must be that s' is bounded from below by $B(x', d')$. Further, unless x' minimizes $\sigma(x)$, $B(x', d') > 0$. Finally, if x' is the highest-cost investment (it maximizes $\sigma(x)$) and $s' \neq \underline{s}$, then it is optimal to have $s' = 1$.

Proposition 2′ holds that when investment is purely cooperative and parties use simple noncontingent contracts, parties never prefer renegotiation to be infinitely costly, and sometimes prefer it to be costless. Regarding the intuition, cooperative investment directly benefits the buyer, so the seller must be motivated to invest. Since the investment outcome is stochastic, simple noncontingent contracts are renegotiated with positive probability, which implies that renegotiation serves the dual purpose of achieving ex post efficiency and ensuring the seller enough surplus to invest efficiently.[28]

25. This and the following propositions are proved in the appendix.

26. By "generically," we mean that the conclusions may fail to hold only in special knife-edge cases of the contracting environment. See the proof of the proposition for elaboration.

27. This result is related to Huberman and Kahn's (1988) conclusion that having the ability to renegotiate can allow parties to write simpler contracts.

28. Thus Proposition 2′ echoes the themes of Che and Hausch (1999) and, less directly, Edlin and Reichelstein (1996).

Propositions 1, 2, and 2′ together show parties prefer moderate to low renegotiation costs when they use simple noncontingent contracts. In this event, parties would not impose high barriers to renegotiation if they could control the recontracting parameter. On the other hand, parties prefer very high renegotiation costs when they use the more sophisticated verified contingency or coordinated message contracts. Parties to these contracts would ban renegotiation (set $s = 0$) if law and the technology permitted.

The parties' preferences over renegotiation also depend on the nature of their investment. In the setting of *pure self-investment*, where $v(d, \theta)$ is constant in θ, a seller-option contract with $s \equiv 0$ will induce the first-best level of investment x^*. However, with cooperative investment, the optimal option contract generally specifies $s > 0$, as the example in Section 2 demonstrated.

Turning to the contracting stage, Proposition 3 relates initial contracting costs to contractual form when these costs are sufficiently low to enable parties to use more sophisticated contractual forms.

Proposition 3. Suppose that the optimal investment x^* cannot be supported using option contracts even when contracting is costless. (a) Fixing the other parameters at positive levels, if α_D is sufficiently small, then parties optimally write verified contingency contracts. (b) For a fixed, positive α_D, if parameters α_B, α_S, and γ are small, then parties optimally write coordinated message contracts.

To summarize, high initial contracting costs lead parties to choose simple contracts, and consequently, to have a preference for moderate or low recontracting cost. Low initial contracting costs yield more sophisticated contractual forms and a party preference for high barriers to renegotiation. Parties always would prefer the State to set $\underline{s}$ at the level that the parties themselves would choose because that would permit them to avoid paying γ. This default rule approach to recontracting would be difficult to implement in practice, however, because the optimal $\underline{s}$ varies with the contractual form that parties choose and the particular parameters of their deal.

5. Implications

5.1 Positive Implications

Contracting costs have been relatively neglected as a field of study. As a consequence, no articles we have found directly test the influence of these costs on contract form. This section sets out the empirical predictions that the propositions above support and some evidence relevant to them. Given how sketchy this evidence is, our predictions should be taken more as invitations to do research than as confirmation.[29]

29. Predictions are put as declarative sentences. We set out relevant evidence where we have it.

1. Simple noncontingent contracts: Contracts are more likely to take the simple noncontingent form when initial contracting costs are high relative to the gains the deal could create. More precisely,

(a) Parties are more likely to use simple noncontingent contracts when their relationship is one shot. Regarding evidence, parties under a recent procurement practice write a detailed "master contract" with a substantial number of terms. The buyer is expected to send a series of orders that specify only the items sought and a delivery time; all other aspects of each shipment are governed by the master contract, which is altered only when exogenous circumstances warrant. This practice suggests that complex contracts may become optimal when parties can spread fixed contracting costs over several deals, and is roughly consistent with the common observation that spot contracting is relatively simple.[30]

(b) The law encourages simple noncontingent contracting. As indicated in Section 1, contract law creates a one-way ratchet in favor of renegotiation. Courts discourage or do not enforce party efforts to make renegotiation more costly, but permit party efforts to make renegotiation cheap. This discourages use of the sophisticated contract forms that disfavor renegotiation.

(c) The costs of writing state-contingent contracts are increasing in the number of relevant future states. This implies that, in periods of high volatility, parties write relatively simple contracts and rely on renegotiation to achieve good outcomes. There is some evidence relevant to this prediction. First, an index clause indicates that parties are using a verified contingency contract; under these clauses, the transaction price in any period is a function of verifiable aspects of the ex post state. Volatility increased substantially in the petroleum coke industry after 1973. A study of post-1973 contracts (Goldberg and Erickson, 1987) reported that the contract mix shifted from a primary reliance on contract index clauses to an even split "between those [contracts] relying on indexing and those relying on renegotiation," but that "indexing ... functioned as part of the renegotiation process. The index was only expected to be in force for short periods." Second, raw material prices are short-term volatile and commodity contracts seldom condition on future states.

30. We have not pursued the implications of our analysis for the question when parties will use long-term contracts or a series of short-term contracts. We note, however, that the parties' choice may be sensitive to the courts' interpretive practices. For example, assume that parties to a long-term contract intend minor deviations from the contractual specifications to be accounted for in the price term, but want a major deviation to be treated as a breach that is compensable with damages. If a court were to infer from the contractual relationship enduring through some deviations that almost any deviation is acceptable, parties may respond by using a sequence of short-term contracts. The court's inference would become less plausible as the contracts become more independent. See Schwartz and Scott (2003).

2. Parties should prefer renegotiation to be cheap when it is costly to contract, and vice versa. More precisely:

(a) Parties will attempt to reduce renegotiation costs when they use simple noncontingent contracts or one-sided option contracts.[31] Data about renegotiation costs are hard to get, but there is a suggestive example. Fixed-price contracts are common in raw materials markets that experience considerable price volatility. Parties thus anticipate frequent requests for "adjustments"—that is, for renegotiation. The cost of renegotiating simple contracts could be high were the decision maker to treat a willingness to make adjustments under certain market conditions as a willingness to make them under all market conditions. In response to this concern, the trade association rules that regulate disputes in many commodity markets commonly exclude evidence of prior accommodations under the current contract, or of accommodations under earlier contracts [see Bernstein (1996, 1999, 2001)].

(b) Parties are more likely to use "no oral modification" terms, terms that restrict the authority of line agents to modify a deal, or other terms restricting renegotiation when they use more sophisticated contracts. As shown above, parties ex ante prefer not to renegotiate state-contingent and coordinated message contracts.

(c) Parties have an incentive to explicitly require renegotiation when they use the simpler contract forms and investment is cooperative. To understand this prediction, assume that the seller's investment permits the buyer to use the product more efficiently, and that the seller has rivals. Then, when a simple contract specifies no trade in the ex post state that materializes, the buyer can credibly threaten to purchase the product more cheaply from a rival, even though renegotiation with the original seller would yield a positive gain. The buyer's ability to make a credible exit threat may increase its bargaining power in renegotiation to the point where the seller would anticipate receiving too little surplus to invest efficiently (recall here Proposition 2′, holding that when investment is purely cooperative, the optimal renegotiation surplus is bounded from below). A possible contractual response to this possibility is to require the buyer to renegotiate in good faith. A good faith renegotiation requirement is difficult to police, and so cannot reduce the buyer's exit threat to zero. On the other hand, the requirement can increase the buyer's exit costs by prohibiting such easily verifiable practices as buying elsewhere immediately after uncertainty is resolved or threatening to make a market contract during a renegotiation. Good faith renegotiation or price

31. This prediction implicitly supposes that contract-writing costs are largely exogenous. Parties can influence these costs in the long term, for example, by using preexisting forms or in-house counsel. But it seems that complete contracts are more costly to create for some types of deal than others. Thus when optimal performance under a contract would entail a complex set of actions or be highly state sensitive, writing full contract descriptions could be prohibitively costly. In these cases, the parties' best choice may be to use a simple contract and to adjust it along the way, which is the logic behind the text's prediction.

reopener terms sometimes are seen in long-term contracts. These clauses permit a party to initiate a renegotiation when continued performance under the contract would be "grossly inequitable" [see Joskow (1990), Schwartz (1992)]. Their existence is consistent with the analysis here.

3. Party efforts to reduce initial contracting costs should be increasing in the complexity of the deals they would like to make. More precisely:

(a) Merger clauses should be more likely in complex deals. A merger clause attempts to restrict an adjudicator's interpretative base to the written words by excluding evidence of prior dealings between the parties, practice under the current contract, and written and oral statements made during negotiations. Restricting the interpretive base is cost reducing in two ways. It increases the percent of contract actions that can be decided on summary judgment rather than after full trials. Also, a restricted interpretive base reduces the ability of a party to claim, strategically, that evidence extrinsic to the written document shows that the document had a meaning different from its apparent meaning. The more terms, and the more complex terms, a contract has, the easier it is to raise such strategic claims, so the parties' incentive to write merger clauses is increasing in contract complexity.

(b) There should be a positive correlation between the use of the more complicated state-contingent or coordinated message contracts and the use of arbitrators, for two reasons:

(i) Arbitration proceedings are less costly than judicial proceedings, and specialist arbitrators are better than generalist courts at evaluating ex post states.

(ii) Arbitrators obey the parties' interpretive instructions but courts commonly do not. This article shows that efficiency is increasing in the ability of parties to affect initial and renegotiation costs. Thus arbitration becomes attractive to parties for whom it may be particularly important to affect these costs—that is, to parties who want to give interpretive instructions to the adjudicator, such as not to consider certain forms of evidence (i.e., prior negotiations) or to enforce the original contract rather than a renegotiated contract. There is some evidence that parties who use arbitration routinely give interpretive instructions [see Bernstein (1996, 2001)]. Further, such instructions seem more important in connection with sophisticated contracts, so the use of arbitration may be increasing in contract complexity.

(c) Parties should restrict the use of custom to determine the meaning of contract terms. Parties litigate because one of them contests the existence of a custom or its applicability to the instant case. Courts resolve these disputes by making independent assessments of an asserted custom's normative desirability, in general or as applied. That is, courts treat customs much as they treat precedents from other jurisdictions, that courts are free to follow, alter, or reject [see Craswell (2000)]. Thus litigation costs are increasing in the ease with which parties can introduce evidence of custom. Parties thus have an incentive to preclude resort to custom in adjudication.

And commercial parties often do attempt, in contracts and trade association rules, to restrict an arbitrator's recourse to custom as an interpretive resource (recall that arbitrators obey interpretive instructions).

That so little data exist relating contract costs to contract form implies the need for serious empirical research. Nevertheless, little evidence appears to contradict the theory set out here. This suggests that it is appropriate to consider the normative relevance of positive contracting costs.

5.2 Normative Implications

5.2.1 The Parol Evidence Rule. This rule provides that when parties intend a writing to contain all of their rights and duties, evidence of prior or contemporaneous negotiations is inadmissible to show what the writing does. Two questions arise in litigation under this rule: Supposing that a contract can have several parts, (a) Did parties intend the writing fully to memorialize at least some aspects of what their agreement covered? (b) If so, does the writing contain only some or all of the parties' agreement? A party disadvantaged by a literal interpretation of the words thus has an incentive to introduce evidence that some or all of the writing is incomplete when read in context. Courts encourage this incentive because they permit extensive recourse to prior and contemporaneous negotiations to resolve interpretive disputes.[32] Consequently, current applications of the parol evidence rule increase the costs of enforcing contracts. As said above, this effect is more pronounced the more complex the contract is.

The parol evidence rule purports to bar courts from using evidence of prior or contemporaneous negotiations to interpret the current contract, but the rule does not bar the introduction of evidence regarding the parties' practice under other agreements, the parties' behavior under the current contract, or the customary meaning of the contract language. Section 2-208 of the UCC (and the common law) clarify the effect of this gap by providing that practice under prior contracts or under the current contract, and "usage of trade" (i.e., custom) "shall be relevant to determine the meaning of the [current] agreement." The UCC does say that an "express" term shall control if one exists, but goes on to recite that a "course of performance shall be relevant [in a litigation] to show a waiver or modification of any term inconsistent with such course of performance."

32. The courts' interpretative stance regarding question (a) is summarized in Restatement (Second) of Contracts §209(3), which provides that when "parties reduce an agreement to a writing which in view of its completeness and specificity appears to be a complete agreement, it is taken to be an integrated [that is, complete] agreement *unless it is established by other evidence* that the writing did not constitute a final expression" (emphasis added). The courts' interpretative stance regarding question (b) is summarized in the Official Comment to §2-209(3) that "a writing cannot of itself prove its own completeness, and *wide latitude must be allowed* for inquiry into circumstances bearing on the intention of the parties" (emphasis added).

These interpretive rules further increase enforcement costs (and thus contract creation costs) and so further bias parties toward the use of the simple contract forms.

5.2.2 The Merger Clause Rule. Parties attempt to respond to practice under the parol evidence rule by adding a "merger clause" to the writing that recites, in essence: "This contract contains the entire agreement of the parties." This response often is ineffective. A leading authority claims: "there has been a tendency to deny such [merger] clauses conclusive effect" (Farnsworth, 1999: 436). The inefficient contextualist interpretive regime thus is largely mandatory.

5.2.3 The No-Modification Rules. Parties prefer to restrict renegotiation when they use state-contingent or coordinated message contracts. The common law held that *any* contract could be modified by a later contract. Courts therefore would not enforce contract clauses banning renegotiation, and also would not enforce clauses requiring modifications to be in writing [see Blum (2001)]. The UCC, in §2-209, reversed the latter rule for sale-of-goods contracts, but then erected procedural and substantive barriers to the enforcement of no-oral-modification terms. Regarding procedure, such a term must be separately signed by the party that did not propose it. Regarding substance, "an attempt at modification ... can operate as a waiver." This rule means in practice that if a party takes a costly action in reliance on an oral modification promise, the no-oral-modification term becomes unenforceable. These no-modification rules are inefficient; rather, parties should be permitted to specify the renegotiation parameter that is appropriate to the contract form they choose.[33]

5.2.4 Three-Party Schemes. There is a folk theorem genre of result in the contract theory literature holding that parties now can choose the renegotiation parameter by involving a third entity. The theorem has A and B contracting with each other, that if they later renegotiate they must pay $\$y \gg 0$ to C. The required payment will deter renegotiation. Such three-party schemes actually raise the same issues as two-party contracts in which parties agree not to renegotiate. Parties to a two-party scheme have an incentive to ignore a no-renegotiation clause in order to achieve ex post efficiency. Thus the clause would be effective only if the law permitted one of the parties later to reinstate the transfers that the original contract specified (see note 7).

The law also is needed for three-party schemes. Were A and B to perform the original contract, though it is ex post inefficient, then C, the third party, would get nothing. C thus has an incentive to negotiate for a portion

33. Jolls (1997) argues that parties generally would prefer to set $s = 0$ (i.e., ban renegotiation altogether). As we show, parties hold this preference for some contract forms but not others.

of the renegotiation surplus in return for waiving his right to receive y. If a third-party scheme were legally enforceable, however, then C could sue for y *after* agreeing to waive this right, just as a party to a contract with a no-renegotiation term could renege on his no-renegotiation promise. As a consequence, C's promise to permit A and B to renegotiate in return for a payment that is less than y would not be credible: A and B would realize that renegotiation actually would cost them y, and so would prefer to perform.

No modification clauses are absent from current contracts because they are unenforceable (today, parties are held to the promises in the renegotiated contract). Three-party schemes seem not to be seen, apparently because they also cannot work without legal enforcement. Current courts are no more likely to enforce three-party schemes than two-party schemes.[34] The unenforceability of three-party schemes is particularly regrettable because these schemes may be more flexible than terms, such as simple no-modification clauses, that could be written for two-party contracts. For example, the option contract in Section 2's illustration would yield efficient investment if the renegotiation parameter were set at 4/5. Parties perhaps could approximate this parameter by setting v, the third-party payment, to 20% of the expected efficient surplus.

5.2.5 Agreements to Agree. Simple noncontingent contracts and one-sided option contracts may achieve efficiency by specifying performance in some ex post states but no trade in others. Gains from trade were assumed always to exist in the model, however, so parties were expected to renegotiate in the no-trade state. Renegotiation ensured the seller enough surplus to motivate her choice of the efficient investment level. As indicated above, this happy outcome may not occur when a buyer can use the threat to purchase from the seller's rival to capture most of the ex post surplus for himself. Parties sometimes respond to the buyer's incentive to behave strategically with terms requiring the parties to renegotiate in good faith in specified circumstances. American courts are split on the enforceability of these "agreements to agree." Some courts think it is too difficult to give content to the obligation (what is "good faith"?), and so do not enforce the clauses, while other courts think they can effectively police the bargaining process and so do enforce. The analysis here suggests that the latter practice is best: Efficiency would be increased if courts attempted always to enforce renegotiation-in-good-faith terms in the contexts modeled above.

34. The contracting parties perhaps could make a three-party scheme robust to collusion by choosing a third party who cannot accept money. For example, if the parties directed that y be paid to the state as a fine and designated a local prosecutor or attorney general to play the role of C, then for A and B to offer C a share of the renegotiation surplus in return for nonenforcement would be an illegal bribe. Public officials seldom could lawfully participate in such schemes.

The contract law rules questioned here seem attractive when the parties are individual persons. In these cases, perhaps the best normative justification for using the state's power to coerce performance is that the recalcitrant party actually consented to the deal. An effective judicial search for true consent seems to some to require consideration of *all* relevant evidence, while many of the reforms proposed here would permit parties substantially to restrict a court's interpretive base. The rhetoric of courts and many scholars regarding interpretation commonly does presuppose a picture of natural persons attempting to contract. The model here, in contrast, applies to two firms with linear utility functions who are attempting to maximize the size of the pie when information is asymmetric, and who are repeat market players. When this is the real picture, efficiency is an attractive normative goal, and it implies substantial changes in current contract law.

6. Conclusion

This article embeds positive initial contracting and renegotiation costs in an otherwise standard mechanism design model. The extension yields several interesting implications about party preferences over these costs and over the relation between them. Thus parties generally prefer low initial contracting costs because this maximizes party freedom to choose the contractual form that is optimal in their circumstances. When parties choose forms that themselves ensure efficient investment and trade (such as a complete mechanism), they strongly prefer that these contracts not be renegotiated. Initial contracting costs can be high in relation to contractual gains, however, and then parties choose more simple contractual forms that require renegotiation to ensure efficient investment and trade. Our conclusions regarding contracting costs imply the existence of contracting practices that actually are seen, such as the large number of simple noncontingent contracts that are written in apparently complex environments, the explicit contractual requirement that parties renegotiate in good faith, and party efforts to facilitate renegotiation when they use the simple contracts.[35]

Contract law encourages courts to search thoroughly for the parties' actual intentions in creating the contract and in renegotiating it. We show that this search has yielded mandatory legal rules that make it extremely difficult for parties to restrict renegotiation, and that can increase greatly the cost of creating sophisticated contracts. As a consequence, parties now have legal incentives to use the more simple contract forms, though these may be the least efficient in a world of more cooperative courts. The search

35. We have not formally considered the effect of private information ex post. As an intuitive matter, such information would raise renegotiation costs. The effect of this, in our model, would be to increase the parties' incentive to write more complete contracts initially. Also, when the law imposes low renegotiation costs, parties may prefer some incomplete information as an offset.

for actual intent rather than the intent that is most consistent with the parties' writing, we argue, is largely misplaced when sophisticated firms prefer to tie courts to the written words. Thus contract law should change materially (in ways detailed above) to reflect the fact that efficiency is the appropriate normative objective for business contracts, and that efficiency is best served by rules that minimize initial contracting costs and, more broadly, that permit parties to choose the interpretative rules that govern their relationship.

Appendix: Generalization and Proofs

This appendix analyzes contracting environments for a weaker version of Assumption 3, and it also provides proofs of the propositions in the text. We start with technical definitions. Let $M \equiv \Theta^3$ denote the message space. Given a contract f, we call a subset $K \subset M$ a *contract event* if K represents exactly the set of message profiles that the mechanism maps to a single outcome—that is, for some $m \in M$, we have

$$(d^f(m), p^f(m), s^f(m)) = (d^f(m'), p^f(m'), s^f(m'))$$

if and only if $m' \in M$.

Any contract can be written as a list of events and their associated outcomes. More precisely, a contract defines a partition of the message space and it specifies an outcome for each element of the partition. Because we assume that it is costless for parties to specify an outcome (Assumption 2), contracting cost is treated here as a function of the partition of the message space. This cost is composed of α_B, α_S, α_D, and γ, and complexity costs relating to the fineness or coarseness of the partition. In place of Assumption 3, we make the following weaker:

Assumption 3′. Contracting costs are weakly increasing in the size of the implied partition of the message space. That is, if contract f implies a partition that is a refinement of the partition implied by contract f', then $\alpha(f) \geq \alpha(f')$.

We call a contract event K, a *null event* if

$$K \cap \{(\theta, \theta, \theta) \mid \theta \in \Theta\}.$$

Finally, we call K a *state θ event* if $(\theta, \theta, \theta) \in K$ and either

$$K \subset \{(\theta, \theta, \theta') \mid \theta' \in \Theta\}.$$

or

$$K = \{(\theta', \theta'', \theta) \mid \theta', \theta'' \in \Theta\}.$$

If K is a null event, then it is a set of message profiles that would not occur in equilibrium. If K is a state θ event, then K is either a set of message profiles where the buyer and the seller both report θ, or it is the set of message profiles where θ is directly verified.

Proposition 4. There is an optimal contract f^* with the following properties. Given f^*, every null event and every state θ event for which f^* specifies $s \neq \underline{s}$ turns out to have $s = 0$. Further, if f^* admits a state θ event, then $d^{f^*}(\theta, \theta, \theta) = d^*(\theta)$.

In less formal language, the first conclusion of Proposition 4 is that, for all null and state events of f^*, whenever f^* prescribes a different renegotiation parameter than the default $\underline{s}$, the contract bars renegotiation. The second conclusion is that the contract prescribes the ex post optimal trading decision for all state events.

Proof of Proposition 4. Suppose f is an optimal contract. Represent f as a partition P of M and a list of outcomes, one for each element of the partition. Let contract f^* specify the same partition P. For each element K of partition P, we define the outcome specified by f^* in the following way.

1. If K is a null event and if f specifies $s \neq \underline{s}$ for this event, then let f^* prescribe the same outcome as specified by f except with $s = 0$.
2. If K is a state θ event and if f specifies $s \neq \underline{s}$ for this event, then let f^* prescribe decision $d^*(\theta)$ and renegotiation parameter $s = 0$ for this event; the price p is set so that the seller obtains the same payoff under f^* as she does under f, for K.
3. If K is a state θ event and if f specifies $s = \underline{s}$ for this event, then let f^* prescribe decision $d^*(\theta)$ and renegotiation parameter $s = \underline{s}$ for this event; the price p is set so that the seller obtains the same payoff under f^* as he does under f, for K.
4. Otherwise, have f^* prescribe the same outcome as does f for event K.

Finally, suppose f^* prescribes the same (truthful) behavior at time 4 as f prescribes.

Contract f^* has the same cost as does contract f. It also has all of the properties described in Proposition 4. Furthermore, the parties have the same incentives at time 4—to report truthfully—with contract f^* as they do with contract f. Finally, by the construction of f^* (in particular, the way the prices are set), we have $u_S(x|f^*) = u_S(x|f)$ for every investment level x; hence, the seller has the same investment incentive. We also have $u_B(x \mid f^*) \geq u_B(x \mid f)$. Thus, f^* and f have the same cost, f^* and f induce the same investment, and f^* has state-contingent payoffs that are at least as large as the ones under f. This proves that f^* is optimal. ■

Proof of Proposition 1. We use Proposition 4 to prove Proposition 1. Suppose that, under Assumption 3, it is optimal for the parties to use a coordinated message contract f' that specifies $s \neq \underline{s}$ in some contingency. Since complexity costs are assumed to be zero, this contract will cost $\alpha_S + \alpha_B + \gamma$. Note that, at the same cost, the parties could write a coordinated message contract f that has the finest possible partition of the message space and specifies the same outcome for each message profile as does

contract f'. Contract f thus partitions the message space into separate contract events for each of the messages sent by the parties—where every set

$$\{(\theta', \theta'', \theta) \mid \theta \in \Theta\}$$

is a separate event, for each θ' and θ''. Contract f is obviously optimal. Note further that every event in the partition implied by f is either a null event or a state event. Proposition 4 then implies the existence of an optimal contract f^* that specifies $d^{f^*}(\theta, \theta, \theta) = d^*(\theta)$ for each state and $s = 0$ whenever f' sets $s \neq \underline{s}$. In fact, we can assume that f^* specifies $s(m) = 0$ for every message profile m. The same method can be used for the case in which f' is a verified contingency contract. ■

Proof of Proposition 2. Suppose f' is an optimal simple noncontingent contract specifying $s^{f'} \neq \underline{s}$. Let the seller choose investment level x' under contract f'. Because x' solves the seller's optimization problem at time 2, it is the case that

$$u_s(x' \mid f') - \sigma(x') \geq u_s(x \mid f') - \sigma(x)$$

for every $x \in X$. From Assumption 1, it must be that $d^{f'}$ (the decision prescribed by f') is not ex post optimal in some state θ' that occurs with positive probability following investment x'. In state θ', the parties' strictly prefer to renegotiate ex post. If the parties' contract bars renegotiation ($s^{f'} = 0$), however, then allowing the parties to share in the renegotiation surplus would disrupt the seller's incentive to select x'. In other words, the seller's incentive constraint is binding:

$$u_s(x' \mid f') - \sigma(x') = u_s(x \mid f') - \sigma(x)$$

for some $x \neq x'$. However, this equality occurs only in knife-edge cases. To see this, observe that if, holding all other aspects of the technology fixed, $\sigma(x')$ were lowered, then the seller's incentive constraint would hold with slack when $s = 0$. The optimal contract would then specify a higher value of s (so the parties could realize some renegotiation surplus). Further, fixing the other aspects of the contracting environment, parties generally will not prefer the default parameter $\underline{s}$ for any investment level x because only a finite number of values of $\underline{s}$ would be optimal. This implies that if γ is low enough, parties will set $s \neq \underline{s}$. ■

Note that Proposition 2 does not require Assumption 3.

Proof of Proposition 2′. Because $d(d, \theta)$ is constant in θ, the seller has an incentive to choose investment level x' only if

$$\sum q(\theta, x')s' \ \pi_s \ r(d, \theta) - \sigma(x') \geq \sigma q(\theta, x)s' \ \pi_s \ r(d, \theta) - \sigma(x)$$

for all x, where the summation is taken over Θ. Rearranging this expression yields

$$s'\pi_s \sum r(d,\theta)[q(\theta,x') - q(\theta,x)] \geq \sigma(x') - \sigma(x).$$

The bound $B(x',d)$ can be defined as the maximum of

$$[\sigma(x') - \sigma(x)]/\pi_s \sum r(d,\theta)[q(\theta,x') - q(\theta,x)],$$

over all x for which $\sigma(x') > \sigma(x)$. The conclusion about $s' = 1$ obviously holds when $\sigma(x') \geq \sigma(x)$ for all x. ■

Proof of Proposition 3. Obvious.

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