

# ASSET SPECIFICITY, LONG-TERM CONTRACTS, AND THE GOOD FAITH REQUIREMENT

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## INTRODUCTION

In any input supply decision, a firm must elect whether to produce the input in house (vertical integration) or to purchase the input from another firm (contract). This paper analyzes the tradeoff between contracts and vertical integration when a specialized investment is required for least-cost production. Because courts may intervene in a subsequent contract dispute and redistribute the joint gains to the contract, the paper also considers the effect of court intervention on the decision to contract or integrate. For instance, Ford Motor Company (Ford) must decide whether to make its own air-conditioner assemblies or to purchase the air conditioners by negotiating a contract with another firm.<sup>1</sup> Whether Ford chooses to purchase the air-conditioner assemblies will depend, in part, on the conditions under which Ford expects the court to intervene in any dispute.

Purchasing the input allows the firm to take advantage of economies of scale and/or the capabilities available in the market. But least-cost production of inputs often requires a specialized investment (or transaction-specific asset) to supply a particular buyer. Because the investment is specialized, the value of the investment is significantly lower outside of the relationship with that buyer. Thus, an automobile parts supplier may need to acquire specific know-how and skills to produce air-conditioner assemblies for Ford. Because the investment in know-how is specialized to Ford, it creates a bilateral monopoly between the supplier and buyer. The specialized investment implies that exit from the relationship is costly. By threatening to leave the relation, one party may take a larger share of the gains to the relationship (i.e., hold-up).<sup>2</sup> Vertical integration eliminates the hold-up problem but at a cost of losing the benefits of market contracting.

Retaining the benefits of a contract while avoiding the hold-up problem is difficult. Exit from a contractual relation of this sort may be costly for each party, and the costs of exit may change drastically over the life of the agreement. An increase in the cost of exit for one contractor shifts the bargaining power to the other contractor. Because long-term contracts are necessarily incomplete, the shift allows the more powerful contractor to take a larger share of the gains to the contract. To prevent this, courts impose a good faith requirement. The good faith requirement prohibits the abuse of bargaining power to coerce favorable changes in contract terms.<sup>3</sup>

This paper presents a model to examine the impact of the good faith requirement on the value of long-term contracts characterized by investments in transaction-specific assets.<sup>4</sup> I will show that: (1) differences in subjective probability estimates of the

future bargaining power (i.e., demand states) may cause the parties to contract when they should integrate and vice versa; (2) court intervention in the form of the good faith requirement improves efficiency by reducing the degree to which a shift in bargaining power allows a contractor to take a larger share of the gains to the contract and by compensating for differences in expected bargaining power; and (3) as the average difference between the buyer's and seller's estimates of future bargaining power increases, the net benefits of the good faith requirement rise.

The next section provides a review of the relevant literature. I then model incentives and outcomes when the court enforces only terms that are written into the contract (the no-good-faith rule). Using the model, I criticize some of the proposed solutions in the transaction-specific-assets literature. The following section considers outcomes when the court reads implied terms into contracts (the good-faith rule) and compares contract values when the court uses the good faith rule and when the court does not use the good faith rule.

## BACKGROUND

### *Specialized Investments and Contracting*

Roughly two decades of theoretical and empirical work has established the importance of specialized investments to understanding vertical integration and contracting.<sup>5</sup> In a significant early contribution, Klein et al. [1978] argue that firms vertically integrate to guard against the hazards posed by transaction-specific assets (specialized investments).<sup>6</sup> The hazards exist because opportunities to redeploy the assets in another use or with another user are highly imperfect and may not exist. For instance, specialized investments made by air conditioner suppliers in support of a relationship with Ford are less useful or useless in a relationship with another producer. Thus, the value of specialized assets is significantly lower or equal to zero outside of the exchange relationship [Williamson, 1979; Crawford, 1988].

In such a situation, the party that does not hold the specific assets may threaten not to cooperate (non-good-faith behavior) in order to force a favorable change in price. As a mechanism to protect themselves against opportunistic exit and to structure a relationship characterized by long-lived specific assets, contractors negotiate long-term contracts. But such safeguards do not completely protect contractors from opportunism. Because of the bounds to cognition, contracting parties cannot possibly specify all contingencies under a long-term contract. The contract must necessarily be silent or unclear on some contingencies. Consequently, the contractors may complete private informal arrangements to protect themselves against opportunism, including, in the limit, vertical merger.

Following Klein et al. [1978], a series of important empirical studies established that specific investments explain contracting and integration in a wide variety of industries. Studies of the motion-pictures industry [Chisholm, 1993], the automobile industry [Monteverde and Teece, 1982], rail freight shipping [Palay, 1984], coal supply [Joskow, 1985; 1987], and aerospace [Masten, 1984] confirm that increases in the degree of asset specificity increase both contract duration and the probability of vertical integration.<sup>7</sup>

### *The Good Faith Requirement*

In addition to vertical integration, the contractors may use the courts to reduce hazards posed by transaction-specific assets. Courts will intervene in contract disputes under the good faith requirement to prevent opportunistic behavior by contractors. The Uniform Commercial Code (UCC) provides that every contract or duty "imposes an obligation of good faith in its performance or enforcement" [UCC, Section 1-203] Summers [1968] notes that the good faith requirement applies in a number of situations likely to arise in a long-term contract:

- i) A contractor may not abuse bargaining power to coerce a favorable change in the contract price;
- ii) A contractor may not adopt an overreaching interpretation of contract language;
- iii) A contractor may not arbitrarily exercise a power to terminate a contract.<sup>8</sup>

But good faith is a rather amorphous concept; it means different things to different judges. Reiter [1983] catalogues the definitions of good faith found in the literature and finds good faith interpreted variously as: fairness, fair conduct, reasonable standards of fair dealing, decency, community standards of fairness and a common ethical sense. Accordingly, firms may use the requirement strategically to increase their gains under a long-term contract.

While the economics literature has not explicitly modeled the effect of the good faith requirement, the efficiency characteristics of contract law in the presence of transaction-specific assets have received some attention. Williamson [1979] suggests that parties to a contract characterized by specialized investments may use the law strategically. Williamson [1991] argues that court intervention to excuse contractual performance produces a tradeoff. On one hand, contract excuse reduces the incentive for a contractor to exploit opportunities created by unforeseen changes in the cost of performing on the contract. The threat that one contractor may seek excuse causes the other contractor to cooperate. On the other hand, contract excuse may reduce the incentive to fulfill contractual promises.

Other papers consider court intervention to modify or complete contracts.<sup>9</sup> Klein [1996] points to a tradeoff regarding discretionary enforcement of contract terms by courts. Because rigid court enforcement of contract terms may cause hold-ups, increased discretion by courts to enforce the terms may be efficient. But, "Courts cannot employ increased discretion without losing some of the benefits associated with predictable enforcement of written contract terms, namely the ability to tie one another's hands with respect to particular behavior and to create rental streams by shifting their private enforcement capital. Therefore, attempts to use increased court discretion may have the opposite effect of increasing holdups" [*ibid.*, 462].

## LONG-TERM CONTRACTS WITHOUT THE GOOD FAITH REQUIREMENT

Williamson [1983] argued that the hold-up problem could be avoided if the buyer (or the party that does not hold the specific assets) would post a collateral bond (i.e., a hostage) equal to the value of the specific assets held by the supplier. The threat that

the seller would take the collateral bond prevents the buyer from attempting to hold up the seller. But in Williamson's model the hold-up is unilateral: the buyer holds up the seller. Later, Joskow [1987] and Klein [1988] noted that the hold-up problem is not unilateral, it is bilateral. The owner of the specific assets (seller) may hold up the party that does not own specific assets (buyer). That is, the party that does not hold transaction-specific assets has exit costs from the relationship as well because investments in transaction-specific assets are made in time, and, therefore, a holder of transaction-specific assets cannot be replaced instantly.<sup>10</sup>

In most cases, the exit costs for the party that does not hold the specific assets will be significant, and in some cases these costs may exceed the exit costs for the holder of the specific assets. Because markets for the goods or services produced by the specific assets may be extremely thin or non-existent, the party that does not hold the specific assets may lose market share, suffer damage to the firm's reputation for high quality, or be forced to shut down altogether if the agreement comes apart. Consequently, intransigent suppliers holding large transaction-specific investments can impose large costs on the other contractor. The ability to make these threats is a direct result of the impossibility of replacing the supplier instantaneously. Investments such as these are put in place over a period of months and even years.

Hold-up would not be a problem if the parties could write and enforce complete contingent claims contracts. But long-term contracts are highly incomplete for three reasons. First, transactors are boundedly rational [Simon, 1981; Williamson, 1985]. Second, Klein [1996] points out that writing something down to be enforced by a court creates rigidity which itself can create a hold-up. Third, additional contract clauses often entail wasteful search and negotiation costs as transactors attempt to gain an informational advantage over their contracting partners [Kenney and Klein, 1983]. Accordingly, I will assume that the transactors agree on price but not quantity (i.e., a fixed-price contract).<sup>11</sup>

However, the most important aspect of the hold-up problem is not that it is bilateral. Rather, it is the uncertainty associated with future states under which trade will occur. Exogenous changes alter the bargaining power under the agreement. These changes may occur for a wide range of reasons including: changes in demand for the final product, depreciation of the assets required for input supply, changes in the input supply technology and a change in the output production technology that reduces or eliminates the need for the input. If a certain contingency favors one of the contractors, that contractor will receive a larger portion of the gains to the contract.

To focus on the organization decision (i.e., contracts v. integration), I will consider changes that affect only the bargaining power between the buyer and seller. For instance, an increase in demand for the final product will raise the value of both the integration and contracting options. But suppose that some market development gives the buyer ready access to more suppliers. The buyer will experience an increase in options and bargaining power yet the value of integration at contract initiation will not change.

Klein [1996] notes that long-term contracts have a self-enforcing range. Inside this range, hold-up will not occur because of privately imposed sanctions. We may think of this sanction in two parts. One part is the loss of the relationship-specific

capital (including costs associated with temporal specificity). The second part is the effect of the hold-up on the transactor's reputation in the market [Klein and Leffler, 1981]. If the relationship remains within the self-enforcing range, there is no hold-up. But the exogenous changes noted above may move contracts outside the self-enforcing range. The magnitude of the private sanctions that each transactor can impose on the other party defines the self-enforcing range. Because the agreement is highly incomplete, either party may choose to impose an inefficient trade on the other party. The gains to imposing the inefficient trade vary with the quality of each of the party's outside options.<sup>12</sup>

Suppose that the process of long-term contracting consists of two periods. The first period, contract initiation, is the time spent negotiating terms and prices. The second period begins some time after the assets are in place and the contractors begin trade under the contract. In the second period, the input demand state of the buyer may change. The subsequent shift in bargaining power allows the advantaged party to exploit the incomplete contract to gain a greater share of the benefits to the agreement.<sup>13</sup>

For simplicity, I assume that there are two possible input demand states ( $D_1$ ,  $D_2$ ) in the second period. Under  $D_1$  the bilateral monopoly situation that existed at contract initiation continues and therefore the agreement remains in the self-enforcing range. In the self-enforcing range, we denote the seller's share as  $S_2$  and the buyer's share as  $B_2$ . In contrast,  $D_2$  removes the transactors from the self-enforcing range of the contract. Under  $D_2$ , the buyer gains several outside options which can supply in a timely manner a near perfect substitute for the good under contract. Because the buyer gains outside options under  $D_2$ , the buyer redistributes the gains to the contract in her favor. We denote the seller's share under  $D_2$  as  $S_2^L$  and the buyer's share as  $B_2^H$ . Appendix A uses prices and quantities traded under the contract to show that  $B_2^H > B_2$  and  $S_2 > S_2^L$ .

In assuming that there are only two demand states, I ignore the possibility of a third demand state that shifts bargaining power to the seller. Adding a third demand state will not affect the conclusions. In addition, I assume that the parties do not condition terms in the contract based on the realization of either demand state (i.e., non-contractible demand states) because of the difficulty that both the parties and the courts face in establishing the demand state that has actually occurred [Masten and Crocker, 1985].

The incentives and outcomes that the contractors expect under the contract affect their valuation of the contract at the initiation stage. That is, the contractor may choose among various ways of producing the product or opt not to produce it at all. Typically, the choice is between vertical integration and a long-term contract, but it may be possible in some circumstances to produce the product using some non-specialized technology. These options are not necessarily equal. As Langlois [1992] argues, capabilities within the firm will raise the value of the integration option. Similarly, capabilities in the market raise the value of contracts. Finally, the gap between a long-term contract supported by an investment in transaction-specific assets and producing via some generalized technology depends on the nature of the product. All of these options or none of these options may be preferred to not producing at all.

If we allow  $i = (b, s)$  to represent the buyer and seller respectively,  $V^i$  is the contractor's *ex ante* (period 1) value for the contract,  $\underline{V}^i$  is the lowest value that the contractor will accept to enter the contract, and  $r_i$  is the contractor's subjective probability estimate that  $D_2$  will occur. The seller's value for the contract is:

$$(1) \quad V^s = r_s S_2^L + (1 - r_s) S_2.$$

The buyer's value for the contract is:

$$(2) \quad V^b = r_b B_2^H + (1 - r_b) B_2.$$

Because the input demand states may change in period 2, both buyer and seller will form subjective probability estimates at contract initiation of the two possible states in period 2 ( $r_b$  and  $r_s$ ). While the buyer's and seller's subjective probability estimates of  $D_2$  may differ because of asymmetries of information, I assume that the information sets are identical. In this model, any differences in subjective probability estimates of  $D_2$  are the result of asymmetries of subjective probability formation. I will show that these asymmetries of subjective probability formation cause inefficient organization decisions and that private parties can not remedy the problem without the help of the courts.

Allowing for asymmetries of subjective probability formation, a contract will be completed if the sum of the expected benefits to the contract exceeds the sum of the values of the next best alternatives. If we define the joint value of the contract in period 2 as:

$$(3) \quad S_2^L + B_2^H = S_2 + B_2 = J_2.$$

Then, a contract will be completed if:

$$(4) \quad J_2 + (r_b - r_s) \cdot (B_2^H - B_2) \geq \underline{V}^b + \underline{V}^s.$$

If the second term in equation (4) always equals zero ( $r_b = r_s$ ), then firms will always choose contracts when contracts increase wealth more than other organizational forms (e.g., integration). In addition, firms will choose alternative organizational forms when an alternative organizational form increases wealth more than a contract.

However, the buyer and seller need not have the same subjective probability estimate.<sup>14</sup> In an important series of experiments, Tversky and Kahneman [1974] show that people rely on heuristics to make subjective probability estimates.<sup>15</sup> The heuristics, or simplifying operations, often lead to errors in judgment. Tversky and Kahneman describe three heuristics that are employed to assess probabilities: representativeness, availability and anchoring.

A representativeness heuristic implies that people form subjective probability estimates on the basis of whether event A is representative of process B. If the individual judges A to be representative of process B, then the individual judges the prob-

ability that A originates from B to be high. Such a heuristic generates typical errors. Individuals may be insensitive to the prior probability of outcomes or sample size. Essentially, the search for representativeness leads people to ignore important information. Moreover, people expect that a sequence of events will represent the essential characteristics of that process even when the sequence is short.

Because people assess probability by the ease with which instances or occurrences can be brought to mind, errors may occur due to availability. If class A is larger than class B yet instances in class B are more easily retrieved, biases in judgment occur. Similarly, the search technique may be more effective in recalling members of class B than class A. Thus, the individual judges class B to be larger.

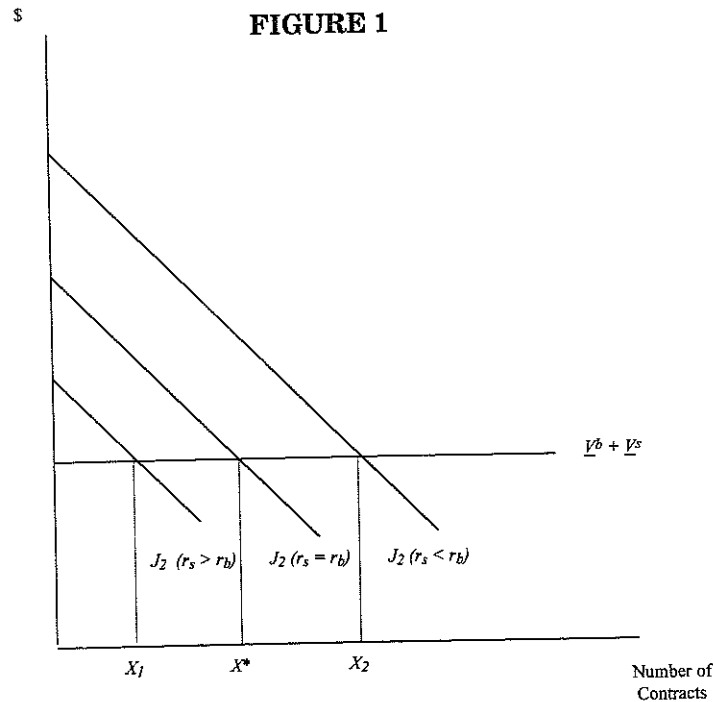
Finally, people make judgments about probability by starting from an initial value that is then adjusted to yield the final answer (i.e., anchoring). Two effects combine to cause errors: (1) the adjustment is typically insufficient; and (2) the starting point or initial value may be suggested by the framing of the problem.

If the buyer and seller do not have the same subjective probability estimate that  $(B_2^H, S_2^L)$  will occur in the second period ( $r_b \neq r_s$ ), the third term is nonzero. Differences in the subjective estimate of the probability that the buyer will have the upper hand in the second period may cause contracts when an alternative organizational mode would be more efficient or it may cause the firm to choose a mode other than contracts when contracts are more efficient. If the buyer's subjective probability estimate of  $D_2$  exceeds the seller's ( $r_b > r_s$ ), the firms may choose a contract when an alternative organizational mode is more efficient. If the seller's subjective probability estimate of  $D_2$  exceeds the buyer's ( $r_b < r_s$ ), the firms may choose an alternative organizational mode when a contract is more efficient.

For example, suppose that Ford must make a series of decisions about which inputs to purchase and which inputs to make. The choice that Ford (buyer) makes for any input (e.g., air-conditioners) will reflect Ford's subjective probability estimate of the way that the bargaining power may shift over the life of the contract. Suppose that an alternative technology may be developed in the future that will allow alternative suppliers to meet Ford's need for air-conditioners immediately. Ford's decision to contract will depend on its subjective probability estimate of the new technology. If Ford's subjective probability estimate of the introduction of the technology increases, contracting will become more attractive relative to other alternatives. As the subjective probability estimate falls contracting becomes less attractive to Ford.

On the other hand, the supplier will place a lower value on the contract as its subjective probability estimate of the introduction of the technology that will expand Ford's options increases. If Ford places a high probability on the technology while the supplier places a low probability, the firms may contract when they should have chosen to vertically integrate. If the reverse occurs and Ford places a low probability on the technology while the supplier places a high probability, they may vertically integrate when they should have chosen a contract.

In the absence of any differences in the subjective probability estimates, the gains to a contract may still not equal the gains to vertical integration. For instance, economies of scale in air conditioner production may cause the gains to a contract to exceed the gains to vertical integration. As the gap between the gains to a contract and the



gains to vertical integration grows, an inefficient organization decision is less likely for a given difference between Ford's and the supplier's subjective probability estimates.

We may illustrate the decision to contract with a simple graph. Assume that buyers and sellers in a particular market must choose between a contract and their next best alternative. Assume also that there is a uniform distribution of possible contract values ( $J_2$ ) shown by the downward sloping line in Figure 1. The payoff to the next best alternative is shown by the horizontal line  $\underline{V}^b + \underline{V}^s$ . If  $r_b = r_s$ , buyers and sellers will negotiate  $x^*$  contracts. But if  $r_b \neq r_s$ , firms will make inefficient decisions at the margin. When  $r_b > r_s$ , firms will complete contracts for  $(x_2 - x^*)$  transactions that should have been organized using alternative modes. The remainder of the transactions will be organized efficiently. When  $r_b < r_s$ , firms will organize by alternative modes  $(x^* - x_1)$  transactions that should have been completed by contract.

Because buyers and sellers have different subjective probability estimates of their period 2 payoffs, we may think of  $r_i = (r_b, r_s)$  as a normally distributed random variable. As the variance of the distribution increases, the average difference between  $r_b$  and  $r_s$  increases and firms will choose inefficient forms of economic organization more often.

Finally, an increase in the difference between the possible payoffs in period 2 ( $B_2^H - B_2$ ), amplifies the effect of differences in the subjective probability estimates. If the demand state shifts dramatically, the difference between the payoffs in period 2 will be large. Thus, for a given difference in the subjective probability estimates of period 2 payoffs ( $r_b, r_s$ ), a larger increase in the probability of inefficient organization will occur when the difference between the period 2 payoffs ( $B_2^H - B_2$ ) is also large.

Private parties cannot cure problems associated with different estimates of future demand states without the help of the courts. The exchange of a performance bond described above will simply alter the expected gains to the contract. Recall that performance bond exchange must take place at the contract initiation stage. Once the contract is signed and the transaction-specific assets are in place, the advantaged party has no incentive to equalize bargaining power by giving a performance bond not required by the agreement. The buyer may weaken her bargaining position in the second period by offering a performance bond. By offering the performance bond the buyer will not only reduce  $B_2^H$ , but  $B_2$  as well. If the buyer offers a performance bond, both  $S_2$  and  $S_2^L$  will rise. The same is true for the seller. Offering a performance bond reduces both  $S_2$  and  $S_2^L$ . This implies that performance bonds are an effective way to alter the expected gains to a contract but they will not in any way alleviate the problem associated with differing expectations of future demand states. If the second term in equation (4) is negative, one firm will be unable to exactly meet the other firm's performance bond demand. Still, the firms may choose to complete a contract. Despite a third term that is negative, the value of the contract may still exceed the next best alternative.

Changes in the payment schedule serve a purpose similar to a performance bond. By front-loading the payment schedule (i.e., a high initial payment followed by low incremental payments) the buyer may weaken her *ex post* bargaining power. Back-loading the payment schedule will strengthen the buyer's bargaining power. Vertical integration, on the other hand, avoids the adaptability issues associated with changes in input demand states that affect bargaining power.

It ought to be clear that choosing  $D_1$  as the demand state in the self-enforcing range is arbitrary. A performance bond could put  $D_2$  in the self-enforcing range and  $D_1$  out of the range. If  $D_2$  is the initial demand state, the buyer has outside options. To put  $D_2$  in the self-enforcing range, the buyer may offer a performance bond (i.e., hostage). But if  $D_1$  occurs and the buyer loses the outside options, the seller may exploit this advantage. As above, the hostage exchange lowers both  $B_2^H$  and  $B_2$ .

#### LONG-TERM CONTRACTS WITH THE GOOD FAITH REQUIREMENT

If courts impose a good faith requirement, firms may now file suit to force a redistribution of the gains under the contract. Now the model contains three periods. In period 1, the contract is initiated. In period 2, the input demand states of the transactors may change and the buyer and seller may reapportion the contract benefits based on the shift in bargaining power. In period 3, a firm may file suit to force a redistribution of the period 2 allocation. Because good faith is not directly observable, neither firm is certain of the the court's decision.

I assume that breach is possible only if the contract drops out of the self-enforcing range and that the courts award expectation damages in the event that they find a breach under the good faith requirement. Because the model contains only one demand state outside of the self-enforcing range ( $D_2$ ), the seller always sues the buyer in this model. When  $D_2$  occurs, the buyer gains outside opportunities and attempts a redistribution of the surplus. The seller may sue in response. I assume that all cases

settle (see Appendix B). Ignoring the possibility of a suit by the buyer does not affect the conclusions. Simply adding another demand state outside the self-enforcing range that shifts bargaining power to the seller rather than the buyer would cause the seller to attempt the redistribution of the surplus and the buyer to threaten a suit.

At contract initiation, both buyer and seller realize that demand state  $D_2$  may occur in period 2. If  $D_2$  occurs, the buyer receives  $B_2^h$  and the seller receives  $S_2^l$  in period 2. The buyer and seller use their projections of the buyer's expected settlement payment, the probability that the seller will file and the probability that demand state  $D_2$  will occur to determine their contract values. If we allow  $t_s$  to represent the contractor's period 1 subjective probability estimate that the seller will file suit,  $\sigma_s$  to represent the contractor's period 1 expected settlement payment (or receipt), and  $\gamma_s$  to represent the contractor's filing costs, the seller's value for the contract is:

$$(5) \quad V^s = r_s S_2^l + (1 - r_s) S_2 + r_s [t_s (\sigma_s - \gamma_s)]$$

The buyer's value for the contract is:

$$(6) \quad V^b = r_b B_2^h + (1 - r_b) B_2 - r_b [t_b (\sigma_b + \gamma_b)]$$

To assess the benefits of a good faith requirement, we compare the efficiency of the organization decisions with and without the good faith requirement. Because of the threat of litigation, we may express  $(B_2^h - B_2)$  as  $\alpha(B_2^H - B_2)$  where  $0 < \alpha \leq 1$ . That is, by taking a larger share of the benefits to the agreement, the buyer increases the expected costs of suits and therefore  $(B_2^H - B_2)$  shrinks. See Appendix B.

Using equation (3), we can show the condition under which a contract will be completed:

$$(7) \quad J_2 + \alpha (r_b - r_s)(B_2^H - B_2) + r_s t_s (\sigma_s - \gamma_s) - r_b t_b (\sigma_b + \gamma_b) \geq V^b + V^s.$$

We may use equations (4) and (7) to make a comparison between the case in which the court does not require good faith and the case in which the court imposes a good faith rule. Court intervention improves efficiency if it causes economic agents to choose the least-cost organizational form more often. If the left side of equation (4) always equals  $J_2$ , economic agents will always make the appropriate organizational choice. To the extent that the left side of the equation deviates from  $J_2$ , firms make inefficient organizational choices. The central question then is under what conditions will the good faith requirement cause economic agents to make the efficient organizational choice more often.

At first, court intervention under the good faith rule appears purely redistributive. But when we consider the value of the contract at contract initiation, the redistribution serves to increase efficiency in many cases. The good faith requirement increases efficiency by reducing the difference between the possible payoffs  $(B_2^H - B_2)$  in period 2. Under a good faith rule, firms must take into account the expected costs of suits and settlements when they divide the gains to the contract in period 2.

The expected costs of suits and settlements will rise as the buyer takes a larger portion of the total benefits to the agreement because the expected damages that the

court awards to the plaintiff rise as the defendant takes a larger share of the agreement's benefits in period 2. Because there is a preferred outside option under demand state  $D_2$ , the buyer must threaten to reduce the amount traded under the agreement below the efficient trade to take a larger share of the agreement's benefits. But taking a larger share of the benefits increases the expected damage payment and the probability that the seller will file suit. The expected damage payment rises because the court uses an expectation measure of damages. The probability that the seller will file suit rises because the seller files whenever the expected award at trial exceeds filing costs. Thus, the expected costs of suits and settlements under the good faith rule causes the buyer to take less when demand state  $D_2$  occurs ( $B_2^H > B_2^h$ ). We refer to this as the deterrent effect of court intervention.

The good faith requirement also increases efficiency through the expected settlement payments (e.g.,  $r_b t_b \sigma_b$ ). In effect, period 1 misperceptions of period 2 demand states are offset by period 1 misperceptions of period 3 expected settlement payments. At contract initiation, the expected settlement payment is a function of the share of the gains that the buyer or seller expects to receive in period 2. If the buyer's period 1 subjective probability estimate of  $D_2$  rises, the expected settlement payment in period 3 ( $r_b t_b \sigma_b$ ) will rise as well. Alternatively, the expected settlement payment and filing costs fall as the buyer's period 1 subjective probability estimate of  $D_2$  falls. We may refer to this as the compensation effect of the good faith requirement.

If courts do not require good faith, a buyer and seller might choose an alternative organizational form rather than a contract when the buyer's subjective probability estimate of demand state  $D_2$  falls relative to the seller's ( $r_b < r_s$ ). Because the second term is negative, there is a positive probability of an inefficient organizational choice. But if courts require good faith, the subjective probability estimates of damage awards in period 3 offset the inefficiency that results from the negative second term. In a sense, the parties' overly pessimistic projections of period 2 payoffs are offset by overly optimistic projections of period 3 damage awards. As the buyer's subjective probability estimate of demand state  $D_2$  falls relative to the seller's ( $r_b < r_s$ ), the buyer's expected period 2 payoff falls. In addition, the buyer's expected period 3 settlement payment falls. The reduction in the settlement payment increases the total expected contract payoff to the buyer and makes the efficient organization decision (i.e., contract) more likely.

A similar effect occurs for the seller. As the seller's subjective probability estimate of demand state  $D_2$  falls relative to the buyer's ( $r_b > r_s$ ), the seller's expected period 2 payoff rises. In addition, the seller's expected period 3 settlement receipt falls. The reduction in the settlement receipt decreases the total expected payoff to the seller and increases the probability that the parties will choose a more efficient alternative organizational form rather than a contract. Once again, the good faith requirement diminishes the probability of inefficiency. Of course, we may tell a similar story for increases in the subjective probability estimates of demand state  $D_2$ .

To illustrate, suppose Ford's decision to contract with the air-conditioner producer will reflect not only Ford's subjective probability estimates of how their bargaining power may shift over the life of the contract but also the effect of the good faith requirement. As before, an alternative technology may be developed in the future that will allow alternative suppliers to meet Ford's need for air-conditioners

immediately. Ford's decision to contract will depend on its subjective probability estimate of the new technology. But with the good faith requirement in place, Ford must account for the possibility of a suit by the air-conditioner producer.

Courts will award damages in a suit based on their good faith interpretation of the contract. Consequently, the expected damages from a suit will rise as Ford uses their increased bargaining power to take a larger share of the gains to the contract. Ford is therefore forced to accept a tradeoff between a larger share of the benefits to the contract and larger expected damage payments. As compared to the situation with no good faith requirement, this tradeoff causes Ford to reduce the degree to which they use their increased bargaining power to take a larger share of the gains to the contract.

The interaction among the new technology, bargaining power, and the good faith requirement that may occur over the life of the contract, affects the decision to contract in two ways. First, the good faith requirement reduces the difference between the payoff in the self-enforcing range and the payoff when the new technology occurs. That is, Ford takes less, and therefore the air conditioner supplier loses less, when the new technology becomes possible. Second, the expected damage payments that Ford must make if the new technology becomes possible reduce the difference between the payoff in the self-enforcing range and the payoff when the new technology arises.

Because the inefficiency results from the effect of different expectations of future gains under the contract, a reduction in the range of possible distributions increases efficiency. Suppose that without the good faith requirement the distribution under the new technology gives Ford \$3.5 million and the air-conditioner supplier \$0.5 million. Under the good faith requirement, the amount that Ford can redistribute falls. Suppose that the distribution is \$2.5 million to Ford and \$1.5 million to the air conditioner supplier. Because the range of outcomes is smaller under the good faith requirement, a given difference between Ford's and the air-conditioner supplier's subjective probability estimates has less effect on the decision to contract. An efficient organization decision is therefore more likely.<sup>16</sup>

However, we must also account for the costs of court intervention in the form of the good faith requirement. Expected filing costs decrease the value of contracts at contract initiation. Firms are, therefore, less likely to organize using contracts. At the margin, firms will choose other organizational forms when contracts would be more efficient. Thus, we must compare the benefit of reducing inefficient organization with the cost of using the court system.

Because of the costs of filing, firms will seek to minimize the probability of period 3 suits at contract initiation. Minimizing the expected filing costs will maximize the joint value of the contract. Firms may minimize the costs of suits by exchanging hostages or negotiating contract terms. If, for instance, the subjective probability estimates of demand state  $D_2$  are high, the parties may write contract terms or exchange hostages to put demand state  $D_2$  in the self-enforcing range (i.e., the buyer offers a hostage). But such actions will put demand state  $D_1$  outside the self-enforcing range. That is, if  $D_2$  does not occur, the seller may hold up the buyer using the contract terms or the hostage.

The net benefits of the good faith requirement increase as the variance of the distribution of  $r_i$  increases. If the buyer and seller have identical non-zero subjective probability estimates of demand state  $D_2$  ( $r_b = r_s > 0$ ), both parties will account for the expected costs of period 3 suits at contract initiation. But because  $r_b = r_s$ , good faith provides no efficiency benefits. While good faith will reduce the difference between the possible payoffs ( $B_2^H - B_2$ ) in period 2, the reduction will not affect the choice of organizational form. The expected filing costs associated with the suits will cause inefficient organizational choices at the margin because the aggregate value of the contract decreases by the expected filing costs. Buyers and sellers will, in some cases, choose an alternative organizational form when they would have chosen a contract in the absence of court intervention. In a world in which economic agents always have identical expectations about future demand states, good faith merely causes inefficient organizational choices.

But if buyers and sellers have different subjective probability estimates of future demand states, the good faith requirement may improve organizational efficiency. Good faith provides the greatest benefits in the cases in which the variance of the distribution of  $r_i$  (the subjective probability estimates of future demand states) is large. In the absence of a good faith requirement, an increase in the average difference between  $r_b$  and  $r_s$  causes firms to make more inefficient organization decisions. If courts require good faith, both the deterrence effect and the compensation effect decrease the probability of an inefficient organizational decision. If both firms expect a weaker bargaining position, they will also expect a larger settlement payment. Thus, the effects of settlement adjustment process vary directly with the degree of the efficiency problem.

The tradeoff between more efficient organization and filing costs informs the choice of legal rules. The good faith requirement promotes efficiency because it establishes a direct relation between damages and the share of the contract benefits. The link depends critically on expectation (rather than reliance) damages. Expectation damages are damages based on the benefits that the plaintiff would have received under the contract in the absence of breach. By using expectation damages, the court explicitly links a rising expected damage receipt to a smaller expected share of the period 2 gains. The explicit link causes both the deterrent effect and the compensation effect. As the plaintiff receives a smaller share of the contract benefits, expectation damages rise. The efficiency of the deterrent effect increases because the punishment (the settlement payment) is directly linked to the undesirable behavior (exploiting a bargaining advantage). The efficiency of the compensation effect increases because the damages more directly compensate plaintiffs for an unfavorable demand state and a small share of the gains to the agreement in period 2.

A reliance measure of damages will not have the same efficiency properties. First, it does not explicitly link a rising expected damage receipt to a smaller expected share of the period 2 gains. Second, it creates incentives for inefficient reliance expenditures. If a firm's subjective probability estimate of an unfavorable future demand state rises, the firm may increase reliance expenditures to increase their expected settlement receipt in period 3.

## CONCLUSION

Over the life of a long-term contract characterized by investments in transaction-specific assets, changes in demand states may alter the relative bargaining power of the parties. The changes in demand states occur in addition to the effects of the bilateral monopoly situation created by the transaction-specific investments. For instance, changes in the demand for the final product, the input supply technology or the output supply technology that reduce the need for the input all cause changes in input demand states. Moreover, the future demand states are uncertain. Thus, the changes in demand states allow self-interested buyers and sellers to exploit the incomplete contract to increase their gains under the contract.

Because of uncertainty, buyers and sellers will form subjective probability estimates of future demand states. Economic efficiency depends on the degree to which the subjective probability estimates differ. If both buyer and seller expect that they will enjoy a bargaining advantage in a later period, the parties may choose contract over a more efficient alternative organizational form. If, on the other hand, both buyer and seller expect that they will be at a bargaining disadvantage in a later period, the parties may choose an alternative organizational form when contract is more efficient. Only in the case in which the buyer and seller have identical subjective probability estimates of future demand states will the parties always choose the efficient organizational form.

Private parties cannot cure problems associated with different estimates of future demand states without the help of the courts. The exchange of a collateral bond will simply alter the expected gains to the contract for both parties. If the buyer offers the collateral bond, her expected gains will fall while the seller's will rise. If both buyer and seller have sufficiently different expectations concerning future demand states, neither will offer a collateral bond of sufficient size and the parties will make an inefficient organizational choice.

Court intervention can reduce problems associated with different estimates of future demand states. Court intervention in the form of a good faith requirement provides benefits for two reasons. First, expected settlement payments increase as a firm takes a larger share of the benefits to the contract (the deterrence effect) because the other party is more likely to file suit as the firm takes a larger share of the benefits to the contract and because the expected damage payment itself will rise as the firm takes a larger share of the benefits to the contract. Thus, the firm must balance the gains from a larger share of contract benefits with the costs of expected settlement payments. The good faith requirement, therefore, reduces the benefits to exploiting contractual incompleteness. This restraint increases the efficiency of *ex ante* organizational choices. Second, the expected settlement payments serve as a correction mechanism for differences in subjective probability estimates of future demand states (the compensation effect). If a buyer or seller expects a more favorable future demand state, she will also expect to make a larger settlement payment (or receive a smaller settlement award). The offset serves to reduce the inefficiency that results from the differences in subjective probability estimates of future demand states. As compared with the case in which the court does not require good faith, the efficiency of *ex ante* organizational choice increases.

Court intervention, however, is not free. We are forced to accept a tradeoff between increases in efficiency and litigation or filing costs. As the variance of the distribution of the subjective probability estimates increases, the benefits of the good faith requirement rise. In cases in which both parties have the same subjective probability estimates of future demand states, there are no gains to a good faith requirement.

Finally, an expectation measure of damages promotes efficient organizational choices. Expectation damages are damages based on the benefits to the contract that the plaintiff would have received in the absence of breach. As the plaintiff receives a smaller share of the contract benefits, expectation damages rise. Thus, expectation damages explicitly link expected benefits (pre-litigation) with expected damage awards. This link increases the efficiency of organizational choices by compensating for differences in expectations and deterring breaches of contract.

## APPENDIX

## A. Shifts in Bargaining Power and Changes in the Share of the Contract Benefits

Using the prices and quantities traded under the contract, I can show  $B_2^H > B_2$  and  $S_2 > S_2^L$ . We may refer to the inefficient trade as  $(p_1, q)$  where  $p_1$  is the price under the initial contractual agreement,  $q$  is the lowest quantity that the buyer may accept without breaching the explicit terms of the agreement and  $q^*$  is the efficient quantity. Changes in  $q$  are a proxy for all the other actions that buyers and sellers might take to gain a larger share of the benefits to the contract (e.g., shade quality, return satisfactory product as unsatisfactory, pay late, deliver late, etc.). Because the transactors agree only on price, I assume that  $q = 0$ . But  $0 < q < q^*$  does not change the analysis.

I define a classic bargaining game for demand state  $D_2$  using  $(p_1, q)$  as the 'no agreement' point. If  $(S_2, B_2)$  is the payoff to the buyer and seller under the self-enforcing range of the contract  $(D_1)$ ,  $D_2$  must increase the payoff to the buyer and decrease the payoff to the seller. Osborne and Rubinstein [1990, 57] show that in a strategic bargaining game with perfect information that a player with an outside option must get at least the value of the outside option. Under  $D_2$ , the buyer gains several outside options which can supply in a timely manner a near perfect substitute for the good under contract at price  $p_2$  (where  $p_1 > p_2$ ). Because  $p_1 > p_2$ , the share of total contract benefits to the buyer must increase under demand state  $D_2$ . The additional gains to the buyer at price  $p_2$  are  $(p_1 - p_2) \cdot (q^* - q)$ . If  $(S_2^L, B_2^H)$  is the payoff to the buyer and seller under demand state  $D_2$ ,  $S_2 > S_2^L$  because  $S_2^L = S_2 - (p_1 - p_2) \cdot (q^* - q)$  and  $B_2^H > B_2$  because  $B_2^H = B_2 + (p_1 - p_2) \cdot (q^* - q)$ .

## B. Litigation and Changes in the Share of the Contract Benefits

A simple model shows that litigation causes changes in the threats made under demand state  $D_2$ . As a result,  $(B_2^h - B_2)$  can be written as  $\alpha(B_2^H - B_2)$  where  $0 < \alpha \leq 1$ . Because no additional insights will emerge from a model that contains trials, I simply assume that all cases settle. The cases settle after the seller files when the buyer



offers expected damages. In addition, I assume that each firm incurs costs if a suit is filed and neither firm knows the other firm's filing costs. Thus, the seller's filing costs are a random variable to the buyer. A firm will bring a good faith action anytime the expected payoff from a settlement exceeds the cost of filing.

Suppose that the seller files suit for a good faith breach by the buyer. If  $q^s$  is the amount that the buyer threatens to trade under the agreement in period 2, the buyer will extract  $(p_1 - p_2) \cdot (q^* - q^s)$  in additional benefits and the court will award that amount in expectation damages if the seller prevails at trial. In demand state  $D_2$ , the buyer must choose  $q^s$  to balance the gains from a larger share of the benefits to the agreement with increases in the expected costs of litigation. The buyer's subjective probability estimate that the seller will file suit ( $t_b$ ) is a function of  $q^s$  and is given by:

$$(B1) \quad t_b = pr [\tau_s \cdot ((p_1 - p_2) \cdot (q^* - q^s)) > \gamma_s].$$

The buyer's maximization problem is:

$$(B2) \quad \begin{array}{l} \text{Max} \\ Z = (p_1 - p_2) \cdot (q^* - q^s) - t_b(q^s) \cdot [\tau_b \cdot ((p_1 - p_2) \cdot (q^* - q^s) + \gamma_b)] \\ q^s \end{array}$$

where  $\gamma_i$  is the contractor's filing costs and  $\tau_i$  is the contractor's subjective probability estimate that the seller will prevail at trial. If  $D_2$  occurs, the buyer will use equations (B1) and (B2) to arrive at  $q^s$ . Thus, both the buyer's period 1 expected settlement payment and seller's period 1 expected settlement receipt are a function of all the parameters in equations (B1) and (B2):

$$\sigma_i = f(p_1, p_2, q^*, \tau_b, \tau_s, \gamma_b, \gamma_s) \text{ for } i = b, s.$$

From equation (B1), we know that  $\partial t_b / \partial q^s < 0$ . That is, the seller will more likely file suit as the buyer decreases the value of  $q^s$ . Using equation (B2) the buyer solves for some optimal  $q^s$  where  $q \leq q^s < q^*$ . As above, the buyer must receive at least the value of the outside option. Thus, the additional gains to the buyer under demand state  $D_2$  in period 2 are  $(p_1 - p_2) \cdot (q^* - q^s)$ . Let  $(S_2^i, B_2^h)$  show the period 2 allocation under demand state  $D_2$  and a good faith requirement. If  $q = q^s$ , then  $(S_2^i, B_2^h) = (S_2^L, B_2^H)$  and the good faith requirement provides no deterrence. But this occurs only if filing costs are so high as to prevent the seller from filing suit over all possible values of  $q$ . If  $q^* = q^s$ , then  $(S_2^i, B_2^h) = (S_2^L, B_2^H)$  and the good faith requirement provides perfect deterrence. But deterrence is never perfect because of positive filing costs. Using equations (B1) and (B2), we know that  $q^s < q^*$  because  $\gamma_s > 0$ .  $(B_2^h - B_2^L)$  can be written as  $\alpha(B_2^H - B_2^L)$  where  $0 < \alpha \leq 1$  because  $q \leq q^s < q^*$ .

## NOTES

Thomas Miceli, Richard Langlois, Michele Naples, Scott Sumner, an anonymous referee, the editor of this journal and participants at the 1997 Eastern Economic Association Meetings provided helpful comments. The usual caveat applies.

1. For a more detailed analysis of input supply decisions of auto manufacturers see Monteverde and Teece [1982].
2. See Masten [1996] for examples.
3. Thus, an innovation in air-conditioner technology may allow Ford to meet its needs using a generalized technology currently available on the market. This change upsets the bilateral monopoly situation. To redistribute the gains of the contract in its favor, Ford may threaten to exploit the incompleteness of the contract. For instance, Ford may demand costly modifications to the air conditioners or threaten to reduce the number of air-conditioners traded under the contract. In response, the air conditioner supplier may file suit alleging a violation of the good faith requirement.
4. A separate literature on contract renegotiation considers the firm's investment decision in contracts characterized by investments in transaction-specific assets [Hart and Moore, 1988; Rogerson, 1992; MacLeod and Malcolmson, 1993; Aghion, Dewatripont and Rey, 1994; Edlin and Reichelstein, 1996].
5. A separate literature argues that we may explain input supply decisions using metering and monitoring costs [Alchian and Demsetz, 1972; Cheung, 1983].
6. Other important theoretical contributions include Williamson [1979]; Williamson [1983]; Riordan and Williamson [1985]; and Crawford [1988].
7. Other studies confirm links between asset specificity and contract terms (e.g. adjustment of prices) [Masten and Crocker, 1985; Joskow, 1988; Crocker and Masten, 1991].
8. The situations are based upon case law: (i) *Lingenfelder v. Wainwright Brewery Co.*, 103 Mo. 578, 595, 15 S.W. 844, 848 [1891]; (ii) *Sylvan Crest Sand and Gravel Co. v. United States*, 150 F.2d 642, 643-44 [1945]; and (iii) *J. R. Watkins Co. v. Rich*, 254 Mich. 82, 85, 235 N. W. 845, 846 [1931].
9. Hermalin and Katz [1993] analyze the effect of court intervention on the investment decision in contracts characterized by specialized investments. The authors conclude that court intervention has no benefits if the private parties are sophisticated and are symmetrically informed at the time of contracting. If, however, the parties are asymmetrically informed at the time of contracting court intervention may increase efficiency.
10. Studies of cable TV [Williamson, 1976], the auto industry [Klein, 1988], the shipbuilding industry [Masten et al., 1991] and bulk shipping [Pirrong, 1993] all show that the party that does not hold the transaction-specific investments has significant exit costs from the relationship.
11. The empirical literature on contracts generally supports the view that long-term contracts are highly incomplete. See Palay [1984], Goldberg and Erickson [1987], and Crocker and Masten [1991].
12. This is true even if the agreement does not allow unilateral quantity adjustments. Sellers may hedge quality or deliver late while buyers may return perfectly good inputs as unsatisfactory or withhold payments. Such behavior constitutes an inefficient trade.
13. It is important to note that this model specifies an additional change beyond what Williamson [1985] terms the "fundamental transformation." The fundamental transformation denotes the way in which investments in transaction-specific assets convert a competitive situation with many bidders into a small numbers bargaining problem. In this model, both period 2 demand states occur after the fundamental transformation. Under  $D_2$ , reputational capital, specific investments or hostages are sufficient to ensure that neither party attempts to adjust price to claim a larger share of the benefits to the agreement.
14. Some economists assert that individuals with identical information will form identical subjective probability estimates [Aumann, 1987]. See Kreps [1990] for an explanation and critique.
15. There is a large literature in psychology on the way that people form subjective probability estimates. See Kahneman, Slovic and Tversky [1982], Arkes and Hammond [1986]. Saks and Kidd [1980] extend the work of Kahneman and Tversky to litigation and trials.
16. Suppose that: (1) the joint value of the contract in period 2 is \$4 million; (2) in the self-enforcing range, Ford and the air-conditioner (A/C) producer each receive half of the gains (\$2 million); (3) Ford's subjective probability estimate of the new technology ( $D_2$ ) is 0.6 while the A/C producer's is

0.3; (4) with no good faith requirement, Ford receives \$3.5 million under  $D_2$  while the A/C producer receives 0.5; and (5) with the good faith requirement, Ford receives \$2.5 million and the A/C producer gets 1.5. The sum of the period 2 expected values without the good faith requirement is \$4.45 million  $[(0.4) 2 + (0.6) 3.5 + (0.7) 2 + (0.3) 0.5 = 4.45]$  while the sum of the period 2 expected values with the good faith requirement is \$4.15 million  $[(0.4) 2 + (0.6) 2.5 + (0.7) 2 + (0.3) 1.5 = 4.15]$ . Efficiency requires that the parties choose the contract only when the joint value of the contract is better than the alternative (vertical integration). This is more likely under the good faith requirement because the sum of the period 2 expected values is closer to the actual joint value of the contract.

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