A Nexus of Contracts Theory of Legal Entities

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Abstract

We seek to expand on current theories of the firm by focusing on the insufficiently explored question of why firms are so commonly organized as legal entities that are formally distinct from their owners. We develop the idea that a legal entity permits an entrepreneur to create a firm as a bundle of contracts that can be transferred to someone else, but only if they are transferred together. This *bundled assignability* allows for a balancing of several potentially conflicting interests. First, the entrepreneur who assembles the contracts wants liquidity – that is, the ability to transfer the contracts and cash out her interest in them. Second, the counterparties to the firm's contracts – the firm's employees, suppliers, creditors, and customers – want protection from opportunistic transfers that will reduce the value of the performance they've been promised. And third, the entrepreneur wants long-term commitments from the firm's counterparties to prevent holdup of her noncontractible investments in the bundle. By providing that transfers of equity interests in the entity will generally not be considered assignments of the firm's contracts, organizational law provides a flexible tool that permits easy modulation of the tradeoff among these interests. We examine a sample of 287 supply and lease contracts. We find that bundled assignability is a common feature of these contracts, and that legal entities are the most common means of defining bundles.

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1 Introduction: What Role For Legal Entities?

In modern economies, firms are commonly organized as legal entities that are separate from their stakeholders, and that can enter into contracts and hold property in their own name. The role of these entities has received little attention in the literature on the theory of the firm, which has focused on relationships among individuals and has largely omitted explicit analysis of entities (e.g. Coase (1937), Alchian and Demsetz (1972), Grossman and Hart (1986), Hart and Moore (1990)). Jensen and Meckling (1976) recognize the firm as a contracting *entity*, but offer no explanation for it:

> "There is in a very real sense only a multitude of complex relationships (i.e. contracts) *between the legal fiction (the firm)* and the owners of labor, material and capital inputs and the consumers of output."

(Emphasis added.) What, then, is the value of a legal entity as the center of the nexus of contracts? We offer an answer to this question that focuses on the fact that a firm's most valuable assets are often its contractual rights. Consider, for example, the movie rental company Netflix. The value of Netflix is based largely on its assemblage of contractual relationships. In particular, the DVDs that Netflix rents to its customers are acquired via contractual agreements with the major movie studios. These contracts require Netflix to make a small up-front payment to the studio for each DVD, and then contingency payments based on the number of times the movie is rented. Netflix provides streaming video to its subscribers by licensing content owned by movie studios using similar revenue sharing arrangements. All of the real estate it occupies is owned by other parties and used by Netflix pursuant to long-term lease contracts. Most of its revenues come through its pool of subscriber contracts.[1] In essence, Netflix is a bundle of contracts of which the incorporated legal entity, Netflix, is the nexus in the sense of being a common signatory to all of those contracts.[2]

A noteworthy feature of these contractual agreements between Netflix and its counterparties (movie studios, landlords, and customers) is that they are bilateral – that is, they impose upon Netflix both rights and obligations, making the contracts simultaneously both assets and

[1] See Netflix 10-K, 2008.

[2] Many firms own little to no physical assets at all, as our Netflix example illustrates. Broadway plays offer another conspicuous example. Each play that is produced is typically formed as a separate legal entity. That entity has contracts with many individuals – including actors, musicians, stagehands, and a director – and also a rental contract with the theater where the work is performed. And of course it has contracts with ticket purchasers. But it rarely holds outright title to physical assets. The firm's net value lies entirely in its assemblage of contracts.

liabilities to the firm. We take as given that firms, for many potential reasons, find it advantageous to acquire inputs and provide outputs by contract, making their counterparties (i.e. their suppliers, employees, landlords, managers, customers, etc.) reliant on the quality of the firm's future performance. A wide variety of contracts share this bilateral feature: common examples include leases, employment agreements, supply agreements, franchise agreements, and intellectual property licenses, to name a few.

It is this two-sided feature of contracts, and the resulting potential for two-sided opportunism, that gives rise to an important role for legal entities in the model we develop in this paper. In conducting business through an entity, the firm's counterparties contract with an artificial person that maintains its identity when its owners change. This allows the owners of the firm to sell their interests freely when they have liquidity needs without requiring the consent of its counterparties to an assignment (i.e. a transfer) of the contract to a new owner. If this consent were required, the counterparties might opportunistically try to hold up the owners over the owners' specific investments in the firm. As in the property rights theory of the firm, this holdup problem reduces the incentive of the owners to make non-contractible investments in the firm at the outset.

At the same time, because the legal entity is a common signatory for all the firm's contracts, the owners can limit their own ability to act opportunistically. If allowed to assign contracts individually, the owners could threaten to assign contracts to less creditworthy firms with lower quality inputs. Less creditworthy firms have higher borrowing costs when they finance their assets at fair borrowing rates, so they see an assignment from a more creditworthy firm as an opportunity to obtain cheap financing. This, in turn, exposes counterparties to increased credit risk. In assembling a legal entity, and ensuring that the individual contracts in the bundle can not be transferred *by the entity*, an owner pledges to her counterparties that, while she may transfer her rights and obligations under the contract to a new owner, she can do so only if the firm's other contracts move along with it. The assembled value of the contracts provides, in effect, important assurance of prospective payment on the liability in question. In short, the entity in our framework provides a low-cost means of achieving *bundled assignability*.

Our analysis uses the same economic forces as in the property rights theory of the firm (non-contractible specific investments in assets, and the threat of hold-up problems), but it also emphasizes financing considerations (the liquidity needs of owners, and the provision of financing by suppliers) as a crucial driving force behind legal entities, in contrast to the exclusive emphasis on assets in most of the theory of the firm literature. It offers insight not

only into the economic and legal structure of firms, but also into the ways that restrictions on contract assignability are – and should be – affected by changes in the boundaries of the firm.

This work is not the only theory of legal entities that is based on interactions between assets and liabilities. One example is the theory of asset partitioning (Hansmann and Kraakman 2000a, 2000b; Hansmann, Kraakman, and Squire 2006). Counterparties to the contracts entered into with a given legal entity all have their contractual rights bonded by claims against a single common pool of assets, which consist of the other contractual rights and property rights held by the entity. Those claims, moreover, are made senior to the claims of the owners' other personal or business creditors (by virtue of "entity shielding"). This literature argues that entity shielding can reduce the overall costs of asymmetric information by concentrating creditors' claims on the bundles of assets that the creditors can most easily monitor. Our ongoing work in progress explores the connection between the asset partioning and bundled assignability features that entities provide.

Another example is Iacobucci and Triantis (2007), which argues that the boundaries of legal entities can be driven by legal constraints requiring that certain decisions, such as capital structure, be made on a entity-wide basis. Separation of assets into different legal entities to achieve more tailoring of liabilities, however, may undermine the benefits of common control of assets. Closer to our work, another explanation focuses on "capital lock-in" (Blair, 2003). By limiting the rights of a firm's owners to withdraw capital from the firm, corporate-type legal entities enhance the reliability of the firm's assets as a bond for long-term investments by the firm's employees, suppliers, creditors, and customers.

2 Legal Entities and Assignability of Contracts

A party's rights and obligations under a contract may or may not be transferable (or, as we will somewhat loosely say, assignable[3]) to a third party without the permission of the other party to the contract. For example, the rights of a promisee under a simple contract for payment of a definite sum of money are, as a default rule of contract law, generally presumed assignable. Contracts for labor services, in contrast, are generally presumed nonassignable by the employer. Whatever the default rule of law, the assignability of a contract can generally

[3]When we say that a contract is "assignable," we are using the term rather loosely from a legal point of view. In particular, by "assignable" we mean here that the transferee assumes all of the transferor's rights and obligations under the contract, while the transferor gives up all rights and is freed of all obligations. In legal terminology, this is to assume that all of the transferor's rights are assigned, and obligations are delegated, to the transferee, and in addition that the transfer is novated by the counterparty.

be altered by a specific provision in the contract itself. For example, although leaseholds are presumed assignable, it is extremely common for assignability to be curtailed by a clause in the lease prohibiting the tenant from assigning it without the consent of the landlord. Even when a promisor's obligations under a contract are assignable as a consequence of a default rule of law or a specific contractual provision, the promisor remains liable to the promisee after those obligations have been transferred to a third party, unless the promisee agrees (by means of a "novation" in the original contract or subsequently) that the original promisor will be excused from such continuing liability. When we say here that a contract is "assignable," we will take the further linguistic liberty of meaning that all of the assignor's rights and obligations under the contract can be assigned free of any residual liability for the assignor. Under the default rules of law, then, virtually all contracts are presumed non-assignable in this sense, and can be made assignable only by explicit contracting.

If a legal entity such as a corporation is a party to a contract, a transfer of ownership rights in the entity is not considered an assignment of the contract.[4] This rule is interpreted quite broadly. For example, the courts have held that the sale of all of the stock in a closely held corporation does not violate a contractual provision prohibiting the corporation from assigning the contract even when the stock is sold to a person to whom, previously, the counterparty to the contract had explicitly refused to permit the contract to be assigned.[5] Consequently, if the counterparty to a contract with a corporation wishes to limit the persons to whom control over the corporation can be sold, they must do this through specific language to that effect in the contract (a "change of control" clause); a non-assignment clause will not suffice.

These rules make it easy for contracting parties to provide that a given bundle of contracts will not be split up, while at the same time providing that control over that bundle of contracts as a whole can be freely assigned. To create bundled assignability via a legal entity, an owner could, first, set up a corporation (or some other entity), and hold the shares in the corporation. The corporation would then sign contracts with the firm's counterparties that are individually non-assignable by the corporation. This simple contracting structure would create bundled assignability; the owner could assign the contracts as a bundle by selling the stock, but could

[4]Baxter Healthcare Corp. v. O.R. Concepts, Inc., 7th Cir., 69 F.3d 785, 788 (1995) (change of ownership of stock does not constitute a variation of the selling corporation's contractual obligations and is not an assignment of the selling corporations' interest in an agreement); Institut Pasteur v. Cambridge Biotech Corp., 1st Cir., 104 F.3d 489, 494, cert. denied, 117 S.Ct. 2551 (1997) (sale of stock in corporation doesn't constitute a violation of non-assignability provision in patent license); Note (1960).

[5]Ser-Bye Corp. v. C.P. & G. Markets, 78 Cal.App.2d 915, 179 P.2d 342 (1947); Branmar Theater Co. v. Branmar, Inc., 264 A.2d 526 (Del.Ch.1970).

not separate any individual contract from the bundle without permission from a counterparty.

To be sure, the parties could try to achieve the same ends using only contracts between flesh and blood individuals, without creating a separate legal person. The owner and her counterparties might, for example, make sure that each contract in the firm contains a clause that makes it individually non-assignable, but permits assignment as a bundle with an enumerated list of the businesses' other contracts. As the business becomes more complex, however, and contracts come and go over time, this solution is unlikely to be feasible. To take one example, Boeing uses 700 different suppliers to create one of its airplanes. Attempting to identify and bundle each of the 700 supply contracts with the 699 other contracts would be messy, labor-intensive, and potentially fraught with error and ambiguities in identification. Moreover, as contracts change over time, each contract would need to anticipate these future contracts and identify them before they come into existence. In short, this is unlikely to be a practical solution in most realistic cases.

Contracts might also try to create bundled assignability using a general description of the bundle. The owner might, for example, sign contracts with her counterparties that prohibit individual assignment, but allow for assignment along with "all of the contracts of the movie rental business". But the bundle of contracts that satisfy a general description can be ambiguous, and subject to manipulation by the owner and the counterparties. A counterparty might try to argue that the bundle is underinclusive, to exploit the potential to hold up the owner. These risks of ambiguity are particularly likely if the owner also owns other businesses that use assets and contracts in common.

In comparison, a bundle that references a legal entity creates substantially less ambiguity. The counterparty who is concerned about opportunism need only prove that there are contracts written by the entity with which he contracted that are not being transferred in the sale. On the other side, the owner need only show that a contract not being assigned uses a different legal person as a signatory. This provides more assurance against opportunism on both sides of the transaction.

In short, a legal entity may not be necessary in all situations to create bundled assignability, but it is likely to be easier and more reliable than other alternatives. Creating bundled assignability with an entity requires only simple contracting terms to create, and is less subject to ex-post uncertainty when a transfer is to take place[6].

The model that follows demonstrates the economic value of bundled assignability in a

[6]In our companion piece, we discuss these issues in greater depth, including a discussion of other possibilities that would replicate bundled assignability without entities, and the advantages the legal entity would have over these possibilities. See Ayotte and Hansmann (2010).

simple model with two contracts. As the model illustrates, when a person enters into a contract with an (artificial) legal entity rather than with an individual, the attributes of the entity that are important, and that are the reason for making the contract nonassignable, often reside not in the characteristics of the entity's owner(s) but in the other parties with whom the entity has contracts. In these situations, it is the bundle of contracts of which the entity is the nexus, rather than the owner(s) of the entity, that makes the entity unique as a (legal) person.

3 Model

3.1 Setup

The basic model takes place over four dates, 0, $\frac{1}{2}$,1, and 2. At date 0, wealthless entrepreneur/managers (E) endowed with ideas for projects find suppliers with inputs required for production. At date $\frac{1}{2}$, entrepreneurs make investment decisions. At date 1, the state of the world and interim cash flows are realized, and relationships and means of production can be reorganized. At date 2, a final cash flow is realized and distributed according to the relevant contracts in place.

Suppose inputs come in two types (A and B), and two quality levels (high and low). A high quality input has a marginal cost r_h per period, while a low quality input costs $r_l < r_h$ per period. To generate cash flow at at dates 1 or 2, a project must be started at date 0, and run continuously up to that date with one unit of each type of input. Since an E has no cash, she must find a source of financing to acquire these inputs. We assume that financing of each input must come, at least in part, from the individual supplier that provides it. We will refer to such contracts as *bilateral*, because each party is exposed to risk of non-performance by the other.[7] This assumption is crucial to the model and can be justified in several ways.[8]

We suppose that the date 1 cash flow to all projects is, for simplicity, riskless, and equal to the one-period opportunity cost of the assets used in production (so if a project uses one

[7] In bankruptcy law terminology, such contracts are called *executory contracts*, but we avoid using this term because of its more general definition in contract law.

[8] Possible reasons include: a required effort by the supplier; that the supplier may abscond with the money and be judgment proof; and that sellers know more about their goods than financiers do. Netflix, for example, expanded its library of DVD content dramatically after changing its business model from buying DVDs outright to negotiating revenue sharing arrangements with studios based on the quantity of rentals. (Shih, Kaufman and Spinola 2009)

high quality input and one low, the date 1 cash flow is $r_h + r_l$).[9] The value of output at date 2 is random, however, and can take the values 0 or X. The probability of the high cash flow at date 2 depends on the quality of the inputs, and the value of investments made by the entrepreneur to add value to the project.

We will assume two types of entrepreneurs in the economy, *good* and *average*. At date $\frac{1}{2}$, a good E can make an unobservable investment that adds value to her project. If a good E chooses to invest, she incurs a private cost c, drawn from a distribution $G(c)$ over the support $[c_l, c_h]$. E's individual c is observable at date 0 to all parties but not contractible. We assume that average entrepreneurs have no ability to make investments. Both entrepreneur types have an outside option we normalize to zero.

To keep notation relatively simple and limit the number of cases to consider, we will assume that assets A and B always have symmetric effects on output; only the input qualities, whether investment has occurred, and the interaction between them will affect output. With this in mind, our notation will be represented as follows. If the entrepreneur invests (does not invest), the project will have probability of success $\pi_j = q_j$ ($\pi_j = p_j$). The subscript $j \in \{h, m, l\}$ will denote total input quality. If a project uses two high (low) quality inputs from dates 1 to 2, it will have subscript h (l). If one input is high quality and the other is low, we will use subscript m. We will make the following natural parameter value assumptions:

$$\begin{aligned} \pi_h &> \pi_m > \pi_l \ , \ \pi = \{p, q\} \\ q_j &> p_j \ , \ j \in \{h, m, l\} \end{aligned}$$

The first set of assumptions say that higher input quality leads to a higher probability of success, for a given investment decision; the second says that investment always increases the probability of success, for a given input quality pair.

To simplify the analysis further, suppose that without investment, the NPV of the firm is zero, independent of the quality of input type (assumption A1):

$A1 : p_h X - 2r_h = p_m X - r_h - r_l = p_l X - 2r_l = 0$

This also implies equalities that we will use later:

$$(p_h - p_m)X = (p_m - p_l)X = r_h - r_l$$

In other words, the high quality input is more valuable in production, but is also more

[9] Equivalently, we could assume that E has some personal wealth to cover the first period cost of the supplies.

expensive. Thus, the average entrepreneur is indifferent to the two input types if she pays a fair price to acquire them.

3.1.1 Entrepreneur liquidity shocks

An additional important driving force in our model is that a good E faces a liquidity shock, which we model in the standard way. E incurs the liquidity shock at date 1 with probability λ. If the liquidity shock is not realized, E's utility is $U(C_1, C_2) = C_1 + C_2$, where C_1 and C_2 is E's consumption at dates 1 and 2, respectively. If the liquidity shock is realized, the entrepreneur derives no value from consumption at date 2, so she must consume all her wealth at date 1 ($U(C_1, C_2) = C_1$). We will consider the extreme case that $\lambda = 1$, so that all good E's must consume at date 1, before the final cash flow is realized.

We will restrict consideration to assignment of contracts (for cash) as the exclusive means by which good E's can obtain liquidity. This assumption simply helps us to highlight the key trade-offs in the model in a simple way.[10] We will assume a competitive pool of financiers, who provide liquidity by lending money to other wealthless entrepreneur/assignees who acquire contracts. These financiers can observe the quality of the assets and the productivity of investments at date 1. We assume financier claims on the entrepreneurs who acquire contracts will be junior in priority to the claims of suppliers.[11]

3.1.2 Contracts

When a supplier contracts with an entrepreneur, we allow them to write bilateral contracts in one of the four classes below:

- *One-period contracts.* If a one-period contract is written, E agrees to pay r_k to the supplier who supplies an input of type k. If she wants access to the input from dates 1 to 2, she must negotiate new terms at date 1.

[10] E might try to borrow against the cash flow from the project to satisfy her liquidity needs without assigning the contracts. In a richer model, however, this would have limitations. A creditor might not be willing to lend against the full value of the cash flows if a (non-contractible) action were required between dates 1 and 2 to realize the cash flows, and only a party to a contract could take that action. If E pledged the entire cash flow to a creditor, she would have no incentive to require that a faulty input be replaced by the supplier, for example.

[11] By virtue of asset partitioning, the suppliers to a legal entity would be senior in priority to the personal creditors of its owners. Thus, if the suppliers contracted with an entity created by the original entrepreneur, these suppliers would have a claim to the project's cash flows that is senior in priority to the claims of a financier who loaned money to the assignee personally to purchase the stock of the entity.

- *Two-period, non-assignable contracts.* In exchange for the right to use the input until date 2, E promises to repay r_k at date 1, and some amount F_n when the contract expires. E is not free to assign the contract at date 1 without the permission of the supplier.

- *Two-period, individually assignable contracts.* The contract has the same structure as above, but after paying r_k at date 1, E may assign the contract to another party. She may do this in one of two ways: she may assign a contract individually to another entrepreneur/assignee who holds a right to the other input type, or she may assign the two contracts together to an entrepreneur/assignee who holds no other rights to inputs.[12]

  Assignment implies that the assignee assumes the full rights and obligations remaining under the contract. Specifically, the assignee has the right to use the input from dates 1 to 2, and must pay the supplier F_a at date 2.

- *Two-period, bundled-assignable contracts.* The contract is similar to the two-period, individually assignable contract, except that E can transfer the contracts without the permission of either supplier only if she transfers both contracts together to the same assignee.

This contracting environment is admittedly restrictive. In particular, one restriction on our contracting space is that we do not allow E to commit to being *residually liable* for the suppliers' debts if the assignee fails to perform. In other words, if an assignee's project fails at date 2 and the suppliers' claims are not satisfied, they can not expect to recover any money from E. Allowing for this possibility in our model might limit individual assignment for the purposes of shifting credit risk to suppliers. To provide an effective guarantee to her suppliers, however, E would need to set aside proceeds from assigning contracts at date 1 to bond claims that may arise at date 2. Even if this commitment were contractible, it would likely limit E's ability to satisfy her liquidity needs at date 1[13]. Hence, we restrict consideration to possibilities that allow E to spend the full proceeds of assigned contracts freely at date 1.

[12] This rules out the possibility that entrepreneurs might have other assets and liabilities that would affect the value of suppliers' claims. For example, an assignee might own other firms whose assets and liabilities might affect the value of a supplier's claim. This would introduce issues of asset partitioning (the priority of claims between two different businesses) which we leave for future work.

[13] In an ideal world, E might be able to assure her suppliers and satisfy her liquidity needs at date 1 under individually assignable contracts. For example, she might promise to hold any cash proceeds from assignment in escrow until date 2 for the benefit of her suppliers, and give these suppliers a senior claim on the money. She could then issue junior claims on the pot of money at date 1 to satisfy her liquidity needs. While theoretically plausible, this outcome strikes us as unrealistic. If the date 1 lender had incomplete information about the probability and/or amount of these supplier claims, for example, this solution would break down.

Frictionless, Coasean bargaining will take place between E and her suppliers at date 1 if the entrepreneur has an incentive to assign one or both contracts. If assignment of a contract to some third party is efficient, then it will take place, and the assignee will pay E (the assignor) some cash transfer price t. We assume there are many potential average entrepreneurs as assignees, so the entrepreneur has all the bargaining power with respect to an assignee.

If individual assignment is a credible threat by the entrepreneur but is inefficient (or welfare-neutral), then we assume that the suppliers will bargain with the entrepreneur by agreeing to reduce their date 2 debt obligations, from F (the required repayment to supplier A agreed upon at date zero) to some lower amount, in exchange for an agreement by E to assign the contracts as a bundle to an assignee. Multilateral bargaining outcomes will be determined by the Shapley value, as is standard in the theory of the firm literature (Hart and Moore 1990).

3.1.3 Investment and the efficiency benchmark

The following inequality tells us when investment by E is efficient, for a given total asset quality j:

$$(q_j - p_j)X - c \geq 0$$

Let $\bar{c}_j^{fb}$ denote the maximum c for which the inequality holds. This is given by

$$\bar{c}_j^{fb} = (q_j - p_j)X$$

In a first-best solution, all entrepreneurs with asset quality j would choose to invest if and only if $c \leq \bar{c}_j^{fb}$. Because we assume Coasean bargaining as of date 1, and projects are zero-NPV in the absence of investment, the only possible inefficiency in the model is that the entrepreneur may make an inefficient investment decision at date $\frac{1}{2}$. Given E's limited wealth and need for outside financing, underinvestment will occur: the highest c type such that investment can be implemented, for any contracting arrangement, will always be lower than the first-best. This occurs because E will not internalize the benefit of her investment on the supplier/creditors, who have a claim on the final cash flow and benefit from a higher probability of success. Given this underinvestment problem, when we make efficiency comparisons between the various modes of contracting (assignable, bundled-assignable, etc), we will rank them according to the highest c type such that investment by E is incentive-

compatible under that contracting mode, given that the suppliers' participation constraints must be satisfied.

3.1.4 Average entrepreneurs

We begin our analysis by considering the problem of average entrepreneurs, who have no ability to generate productive investments. These entrepreneurs will be the pool of potential assignees of contracts from good entrepreneurs.

It is straightforward to see that average entrepreneurs can maximize their expected utility by writing one period contracts with suppliers. Since there is no investment decision, and assets are not specific, there is no risk that a supplier will hold up the entrepreneur at date 1. Moreover, since financial markets are frictionless, and the average entrepreneur's type is observable at date 0, there is no benefit to long-term financing at date 0, since the entrepreneur will always have access to inputs at a competitive price. We summarize this intuition in the following lemma:

Lemma 1 *For average entrepreneurs, a (non-unique) set of optimal contracts with suppliers is a series of one-period contracts: a supplier of an asset of quality $k \in \{h, l\}$ from dates 0 to 1 is promised a repayment of r_k at date 1. At date 1, each supplier will recontract with the entrepreneur, and demand a payment of $\frac{r_k}{p_j}$ at date 2.*

The proof is straightforward and thus omitted. Though the lemma focuses on recontracting with the same supplier at date 1, the entrepreneur can also contract with alternative suppliers at date 1. For average entrepreneurs, the liquidity shock has no impact on the ultimate outcome. Continuation is zero-NPV, so the entrepreneur has nothing of value to sell at date 1.

In addition to implementing the first-best outcome, one period contracts give the average entrepreneur the chance to buy a contract at a favorable rate from a good entrepreneur who wishes to assign.[14]

3.2 Investments in complementarity

We now turn to the analysis for good entrepreneurs, who have the possibility of investing in the bundle. To convey the basic intuition about the value of bundling, we will consider

[14] In equilibrium, of course, competition among assignees to purchase contracts drives the profits from this strategy to zero.

the simplest case, in which the investment is completely input-specific and makes the two inputs work better together. We will refer to this type of investment as an *investment in complementarity*. This can be interpreted as an investment that specializes one input to another. For example, the entrepreneur who opens a restaurant might expend resources to train a manager to work with the wait staff, or to decorate the interior space to fit the unique style of the chef. Concretely, we suppose that if the entrepreneur creates a productive investment and then transfers either input individually to another project, the investment loses all value, since the inputs have been split up. We analyze the four contracting options for the entrepreneur in turn, beginning with the two contract forms that do not allow free transferability of the inputs by E at date 1.

3.2.1 Non-transferable contracts

One-period contracts For a good entrepreneur, one-period contracts expose the entrepreneur to a severe holdup problem. Suppose the entrepreneur chooses to invest at date $\frac{1}{2}$. At date 1, the entrepreneur no longer adds value to the project, and she has no legal right to use the assets after date 1. This implies that the entrepreneur's Shapley Value is zero. The suppliers could, on their own, agree to find an assignee who would purchase the equity in the project for its expected value. Anticipating this severe holdup problem, the entrepreneur will never take any costly investment at date $\frac{1}{2}$, since it will never increase her ultimate payoff.

Non-assignable contracts A second alternative is to guarantee that the entrepreneur has control rights over the input for two periods, by signing a long-term contract. This would completely prevent the suppliers from holding up the entrepreneur if she were never liquidity-constrained. Because of the liquidity shock, however, the entrepreneur can be held up under non-assignable contracts when she must consume at date 1. In this scenario, the entrepreneur must cash out her interest in the project by assigning both contracts. Since the contracts are non-assignable by their terms, this transfer requires the consent of both suppliers.

As in the case of one-period contracts, the suppliers will hold up the entrepreneur when she invests. The holdup problem is less severe in this case, however, because the entrepreneur has the contractual right to use the assets from dates 1 to 2, which gives her some bargaining power. In this case, bargaining leaves the entrepreneur with only $\frac{1}{3}$ of her original equity stake in the project: if the suppliers each have claims on the project F_n, and E invests, she will receive a date 1 payoff equal to $\frac{1}{3}q_j(X - 2F_n)$.

3.2.2 Transferable contracts

Individually assignable contracts Under one-period contracts and two-period non-assignable contracts, we have shown that the entrepreneur is exposed to holdup that reduces her incentive to make a valuable, but privately costly investment. Now suppose that, as a means of eliminating the holdup problem caused by E's liquidity needs, the entrepreneur contracts for the ability to freely assign the two bilateral contracts at date 1. Given E's certain liquidity needs at date 1, she will always choose to assign her contracts to cash out of the project in some form. She will either assign the contracts individually (to two different assignees) or as a bundle (to the same assignee).

E's incentives to assign contracts will depend on the total input quality. First, consider an entrepreneur who starts with two low quality inputs, and agrees to repay each supplier some amount F_a at date 2. If E chooses to assign her contracts as a bundle at date 1, she will receive a sale price equal to the expected value of the project:

$$\pi_l(X - 2F_a)$$

If the entrepreneur attempts to assign the inputs individually, an assignee would be willing to pay some transfer price t_l. Given that E has all the bargaining power with respect to assignees, this price is equal to the increase in the assignee's expected payoff from using the assigned contract instead of acquiring a contract in the marketplace at a fair rate. If the assignee has total asset quality j between dates 1 and 2, this value is given by

$$t_l = p_j(\frac{r_l}{p_j} - F_a) = r_l - p_j F_a$$

Intuitively, this is the expected value to the assignee of the subsidized financing that comes from using the assigned contract instead of a market-rate contract. It is clear from the expression that an assignee whose other asset is low quality is willing to pay more for the assigned contract ($r_l - p_l F_a > r_l - p_m F_a$), because this makes the subsidy larger. Hence, E will always choose an assignee who will use low quality assets. Because investments are in complementarities, a productive investment has no effect on the assignee's project when she takes on one but not both of the inputs, so it has no effect on t_l. Thus, E's expected payoff from assigning both of her contracts individually is $2t_l$.

This leads to the following lemma:

Lemma 2 *If a good E starts a firm with low quality inputs, then there is no risk of opportunistic individual assignment. When E does not invest at date $\frac{1}{2}$, she is indifferent between*

bundled and individual assignment at date 1 . When she invests at date $\frac{1}{2}$, she strictly prefers bundled assignment at date 1.

Proof. The entrepreneur's date 1 expected payoff after individual assignment is $2t_l$, irrespective of whether the investment was made. The lowest possible date 1 expected payoff from bundled assignment occurs when the investment is not made, which is given by $p_l(X - 2F_a)$. Applying A1, this can be rewritten as $2(r_l - p_l F_a) \geq 2t_l$. Thus, the expected payoff from bundled assignment is always at least as large as the payoff from individual assignment. ■

The lemma demonstrates that if the firm's initial creditworthiness is no better than its potential assignees, there is no opportunistic assignment problem. As a result, there is no benefit to preventing assignment of contracts.

With this in hand, we now consider the opposite extreme, when the entrepreneur starts with two high-quality assets. If the entrepreneur chooses to assign her contracts as a bundle at date 1, her payoff is

$$\pi_h(X - 2F_a)$$

Now, suppose the entrepreneur chooses to assign her contracts individually. Each assignee is willing to pay up to the increase in his expected payoff, t_h:

$$t_h = p_m(\frac{r_h}{p_m} - F_a)$$

So the entrepreneur's total payoff from individual assignment is

$$2t_h = 2(r_h - p_m F_a)$$

The difference between the entrepreneur's payoff from individual and bundled assignment is the following:

$$2t_h - \pi_h(X - 2F_a) \tag{1}$$

The entrepreneur prefers individual assignment if and only if this value is positive. Using A1 and rearranging, E will prefer individual assignment if and only if

$$(p_h - p_m)\frac{2F_a}{X} - (\pi_h - p_h)\frac{X - 2F_a}{X} > 0 \tag{2}$$

for any $F_a \leq \frac{r_h}{p_l}$. The expressions $\frac{X-2F_a}{X}$ and $\frac{2F_a}{X}$ are the equity-to-assets and debt-to-assets ratios, respectively. They reflect the initial capital structure of the project, and thus the percentage share of the final cash flow allocated to E (indirectly, by way of the payoff from assignment) and the suppliers, respectively. Note that the first term in the expression is always strictly positive, and reflects the expected value redistributed from the suppliers by individual assignment at date 1, normalized by the maximum project payoff. Both suppliers' claims lose value from assignment, because each is now paired with another input of lower quality and thus exposed to greater credit risk.

The second term, also normalized by X, reflects the entrepreneur's share of the added value from the investment when the contracts are kept together. If E did not invest, then the second term is zero, so E always prefers to assign. The following lemma notes some of the comparative statics that drive the entrepreneur's incentive to assign contracts individually rather than as a bundle:

Lemma 3 *Suppose the entrepreneur starts a project with two high-quality assets. If E does not invest at date $\frac{1}{2}$, then she always prefers individual assignment at date 1 to bundled assignment. If E invests at date $\frac{1}{2}$, she may or may not prefer individual assignment to bundled assignment at date 1. Conditional on investment, E is more likely to prefer individual assignment when:*

a) The value of the investment is lower ($q_h - p_h$ is lower);

b) The gains from opportunistic assignment are higher ($p_h - p_m$ is higher)

c) E's equity stake in the project is lower ($\frac{X-2F_a}{X}$ is lower, or equivalently, $\frac{2F_a}{X}$ is higher)

Proof. Obvious by inspection of (2). ■

Parts (a) of the lemma is intuitive: given that the value lost by individual assignment is the value of the complementarity investment, individual assignment is more likely to be optimal for E when the investment adds less value. Part (b) is also intuitive, since E balances the lost investment gains with the payoff from opportunistic assignment. The larger the increase in credit risk shifted to the suppliers, the larger the subsidy the assignee receives from the contract. Because E has the bargaining power with the assignees, E will capture this subsidy. Thus, opportunistic assignment ultimately transfers wealth from the suppliers to E.

Part (c) of the lemma suggests that the identity of the firm's claimholders is an important determinant of E's incentive to assign. Though the total benefit of the complementarity investment is $(q_h - p_h)X$, E only receives a fraction $\frac{X-2F_a}{X}$ of this value, through her equity stake in the project. The rest of the benefit of the investment accrues to the suppliers. As a

result, higher leverage increases E's incentive for opportunistic assignment. Conversely, the larger the project leverage ($\frac{2F_a}{X}$), the larger the transfer payments $2t_h$ would be as a fraction of the project value. This effect also biases E in favor of individual assignment.

When individual assignment is a credible threat, E will bargain with her suppliers. When no investment was made, assignment is welfare-neutral. Given that there is no surplus to be distributed, and E strictly prefers to assign, the payoffs in renegotiation will correspond to the payoffs E and the suppliers would receive if individual assignment occurred. Thus, applying A1, E receives

$$p_h X - 2p_m F_a$$

and the suppliers each receive

$$p_m F_a$$

Since an investment in complementarity is always valuable and is non-transferable, individual assignment after investment is strictly inefficient. Thus, the entrepreneur and suppliers will bargain to an outcome that keeps the inputs bundled together. There are two possible Shapley values, depending on the following inequality:

$$\frac{q_h - p_h}{q_h - p_m} \leq \frac{F_a}{X} \tag{SV}$$

If (SV) holds, the joint payoff of the sub-coalition of E and one of the two suppliers is higher under individual assignment than bundled assignment. Thus, E requires concessions from both suppliers before agreeing not to assign individually. If (SV) does not hold, the sub-coalitions of E and one of the suppliers would renegotiate to prevent individual assignment, even if the other supplier did not agree to any debt reduction. This difference affects the functional form of the Shapley values for E and the suppliers. Since none of our results depend importantly on this distinction, we will give the players' payoffs in the main text only when (SV) holds, for ease of exposition. The solution when (SV) does not hold is given in the appendix.

When (SV) holds, the Shapley Value gives each party what she would receive under the status quo (opportunistic assignment), plus $\frac{1}{3}$ of the surplus $(q_h - p_h)X$ from keeping the contracts together. Thus, the date 1 expected payoffs of the entrepreneur after renegotiation is given by

$$2t_h + \frac{1}{3}(q_h - p_h)X \;=\; p_h X - 2p_m F_a + \frac{1}{3}(q_h - p_h)X \tag{3}$$

Given our assumption that E requires liquidity and must sell, E will receive this payoff by assigning the contracts together to a new owner, after each supplier agrees to a reduced F. This new F will be set so that each supplier receives an expected payoff equal to

$$p_m F_a + \frac{1}{3}(q_h - p_h)X$$

Importantly, these expression show that E receives only a fraction of the surplus ($\frac{1}{3}$) created by her investment when contracts are assignable. This result flows from a holdup problem by suppliers, albeit an unusual one. When E has a credible threat to assign individually, the value of her investment would be lost. Though it is the suppliers that are agreeing to reduce their debts under this opportunistic assignment threat, the amount of this debt reduction is less, for a given F_a, when the bundled value of the contracts is larger. As a result, the suppliers capture a share of the investment's value and E's incentive to generate that value is reduced.

To analyze the effects of assignability on efficiency, there are two cases to consider: one in which the entrepreneur has an incentive to assign whether or not she invests (call this Case 1), and one in which E has incentive to assign if and only if she does not invest (call this Case 2). We analyze the two cases in turn.

Case 1: E always has incentive to assign By inspecting E's bargaining payoff (3), we can see that the difference between the entrepreneur's payoffs with and without the investment is simply $\frac{1}{3}(q_h - p_h)X$. Thus, E's IC constraint for investment is

$$\frac{1}{3}(q_h - p_h)X \geq c \tag{4}$$

if (SV) holds.

The cutoff type, which we will call $\bar{c}_a^1$, is the largest c type that satisfies the above inequality:

$$\bar{c}_a^1 = \frac{1}{3}(q_h - p_h)X$$

Case 2: No incentive to assign after investment Next, consider the case in which the entrepreneur has the incentive to assign only if she does not invest. From (2), we can see that this occurs if and only if $(p_h - p_m)\frac{2F_a}{X} - (q_h - p_h)\frac{X-2F_a}{X} < 0$. This can be rewritten as

$$\frac{2F_a}{X - 2F_a} < \frac{q_h - p_h}{p_h - p_m}$$

The left-hand side of the inequality is the debt-to-equity ratio of the project. The right-hand side is a ratio of E's potential gains from keeping the contracts together and the potential gains from opportunistic assignment. Thus, Case 2 is more likely to occur when the project has lower leverage, and when the value of the investment is high relative to the gains from assignment. The entrepreneur's IC constraint for investment is the following:

$$q_h(X - 2F_a) - 2t_h \geq c \tag{5}$$

Substituting for t_h, this can be rewritten as

$$(q_h - p_h)(X - 2F_a) - 2(p_h - p_m)F_a \geq c \tag{6}$$

Given that there is no credible threat of opportunistic assignment in Case 2 when the investment is productive, the suppliers' participation constraints will be satisfied by setting $F_a = \frac{r_h}{q_h}$, as long as (6) is satisfied when $F_a = \frac{r_h}{q_h}$. Thus the cutoff type in this case, which we will call $\bar{c}_a^2$, satisfies

$$\bar{c}_a^2 = (q_h - p_h)(X - 2\frac{r_h}{q_h}) - 2(p_h - p_m)\frac{r_h}{q_h}$$

With these efficiency benchmarks in hand, we can now turn to bundled-assignable contracts and compare cutoff types, to see which class of contracts give the strongest incentives for investment by E.

Bundled-assignable contracts When contracts are bundled-assignable, the entrepreneur can freely transfer them without the permission of her suppliers. Thus, the holdup problem is eliminated and the entrepreneur can satisfy her liquidity needs by assigning the contracts as a bundle. At the same time, the bundling can limit some of the opportunism problems inherent in assignable contracts and preserve E's incentive to invest in complementarities.

To see this, consider the entrepreneur's incentive compatibility constraint for investment if individual assignment is not possible:

$$(q_h - p_h)(X - 2F_n) \geq c \tag{7}$$

As above, the suppliers' participation constraints will be satisfied at $F_n = \frac{r_h}{q_h}$ as long as (7) is satisfied when F_n takes that value. Thus, the cutoff type $\bar{c}_n$ is

$$\bar{c}_n = (q_h - p_h)(X - 2\frac{r_h}{q_h})$$

Comparing cutoff values and rearranging, we can see that in Case 1, bundled assignability is efficient ($\bar{c}_n > \bar{c}_a^1$) if and only if

$$\frac{X - 2\frac{r_h}{q_h}}{X} > \frac{1}{3}$$

This suggests that when the entrepreneur always prefers to assign, the ability to assign individually may or may not enhance her incentive to invest. Under bundled assignability, the entrepreneur has weak incentives to invest when the firm is highly leveraged: E receives only a small fraction of the proceeds, with the rest going to the supplier/creditors. If leverage is high enough, the entrepreneur can keep a larger share of her investment through ex-post bargaining under individual assignability.

Comparing the cutoff value under bundled assignability to Case 2, we can see that $\bar{c}_n > \bar{c}_a^2$ if and only if

$$2(p_h - p_m)F_a > 0$$

which is always true. This implies that individual assignability will always reduce E's incentive to invest if individual assignment is not a credible threat after investment. We formalize this set of results and their implications in the following proposition:

Proposition 4 *If E has no incentive to assign after investment (Case 2), then bundled-assignable contracts are strictly more efficient than individually assignable contracts ($\bar{c}_n > \bar{c}_a^2$). Case 2 is more likely when*

a) The value of the complementarity investment is higher ($q_h - p_h$ is higher)

b) E's potential gains from opportunistic assignment are lower ($p_h - p_m$ is lower)

c) The project's leverage is lower/E's equity stake is higher ($\frac{2F_a}{X-2F_a}$ is lower)

If E has an incentive to assign individually after investment (Case 1), then assignable contracts may be more efficient ($\bar{c}_n < \bar{c}_a^1$). Conditional on Case 1, assignable contracts are more likely to be efficient when E's equity stake under bundled assignability is lower (lower $\frac{X-2\frac{r_h}{q_h}}{X}$), all else equal.

Proof. Evident by inspection of the definitions of $\bar{c}_n, \bar{c}_a^1$, and $\bar{c}_a^2$. ■

The proposition tells us that bundling of contracts is most valuable when the entrepreneur's investment has a large effect on the combined value of the assets, and when the project has lower leverage. In this region (Case 2), assignability weakens the entrepreneur's incentive to add value to the bundle of contracts. This happens because assignability improves the entrepreneur's payoff only in states of the world where she shirks. This, in turn, increases her incentive to shirk.

Intuitively, in Case 2, bundling is superior because it forces the entrepreneur to commit to a particular group of inputs in constructing a firm, and ties her payoff to the bundled value of those inputs. Individual assignability, on the other hand, gives the entrepreneur the option to cash out profitably by splitting up the inputs. If E shirks on investing and the assets have low complementarity as a result, she can simply liquidate the firm for an attractive price by splitting up the contracts and shifting credit risk to suppliers. The reduced penalty for E in shirking reduces her incentive to invest in complementarities.

In Case 1, E has an incentive to assign contracts individually whether or not she invests. But suppliers will capture 2/3 of the gains from that investment in bargaining under E's threat to assign. This hold up effect also reduces E's incentive to invest under individual assignability. Bundled assignability will be superior in this case as well, unless E's stake in the firm would be less than 1/3 under bundled assignability.

4 Law and Assignability

In this model, the reason why counterparties wish to restrict the firm's ability to assign their contracts essentially lies in credit risk. And it is the collection of other contracts to which the firm is a party that keeps its credit risk low. This is only one of various reasons why a firm's counterparties may be concerned about the other contracts in the bundle held by the firm.[15] It is perhaps the most important reason, however, and it seems to help explain the

[15] Another reason might be that counterparties to a firm's contracts derive personal – and perhaps nonpecuniary – value from their association with each other. A professor of economics, for example, might insist on only a relatively modest salary for a position on the Harvard faculty, since the major benefit of that position will be the personal rewards of associating (and being associated) with other members of that faculty. If Harvard were free to assign her contract to an aspiring state university with a mediocre faculty, Harvard might find that a profitable action – though the loss to the professor might exceed the price that Harvard could extract from the state university, rendering the assignment inefficient.

law's presumptions as to whether various corporate transactions constitute assignments of the firm's contracts.

4.1 Assignments in Bankruptcy

Under bankruptcy law, contracts that are otherwise nonassignable by their explicit terms are held to be assignable in bankruptcy. Our model helps illustrate why the law might favor assignability in bankruptcy states.[16] In the model, the owner of the firm has the strongest incentive for opportunistic assignment when her contractual rights are to higher quality assets, and when her capital structure is less leveraged. In other words, the benefits of bundling contracts are largest for firms that are both economically and financially healthy. The model demonstrates that, if leverage is severe, individual assignability can actually enhance investment incentives, because the threat of assignment enables the entrepreneur to keep a larger share in her investment than her highly-leveraged equity stake would provide.[17]

A rule making contracts assignable in bankruptcy, even though those contracts would otherwise be nonassignable, is in effect a means of putting a clause in the contract that says it is assignable if and only if the outcome for the firm is poor. Conditional assignability of this sort involves a smaller threat of opportunistic assignment, and hence is less of a threat to the interests of the firm's counterparty. Moreover, the decision to assign contracts in bankruptcy is overseen by a judge charged with permitting assignments only if there is "adequate assurance of future performance."[18]

The exception helps prove the rule. Some types of contracts that are nonassignable outside of bankruptcy are also generally held to be nonassignable in bankruptcy. Licenses for intellectual property are an example. This is understandable. The incentive for opportunistic assignment of such licenses is different from those considered in this model. The threat is that the original licensee will assign the license to another firm that will make broader or differ-

[16] We should be careful to note here that our model does not explain why the bankruptcy code makes this contingent assignability in bankruptcy states a mandatory rule, as opposed to a default rule that parties could contract around.

[17] In our informal companion piece, we consider the possibility that the investment in an input (or bundle of inputs) could be more valuable if the input(s) are separated from their current bundle. This provides a different justification for permitting assignment in bankruptcy, since it is more likely in bankruptcy states that going-concern value is negative, and contracts are more valuable when split up. Over-riding an anti-assignment clause in these states can prevent holdup, and hence enhance investment incentives, when an investment is worth more outside the bundle.

[18] Bankruptcy Code 365(f)(2)(B)

ent use of it than the original licensee would have, thus effectively taking from the licensor more than was intended to be granted by the contract with the original licensee. Since this threat is no less severe in bankruptcy, there is less reason to alter the rules of assignability in bankruptcy with respect to these types of contracts.

4.2 Asset Sales

A merger of two firms effectively involves giving a common nexus to two bundles of contracts that were formerly held separately. Hence it doesn't provide an opportunity for the kind of opportunistic separation of complementary contracts explored by our model. This illustrates why a merger or consolidation is generally presumed not to offend non-assignability provisions in a firm's contracts.

But the courts' approach to a sale of a firm's assets is more flexible. While an attempt to transfer contracts to a new entity in a sale of corporate assets is generally considered an assignment of the contracts involved, the courts will sometimes hold otherwise when the sale involves substantially all of the firm's assets, on the grounds that the effect on the firm's contractual counterparties is essentially equivalent to that of a merger. The law might have chosen a different rule here, holding that a sale of assets always involves an assignment of the contracts involved, on the grounds that the firm can choose the formal procedure for merger if it wants to avoid triggering nonassignment clauses, and that insistence on treating these transactional forms differently makes it easier for contracting parties to specify when assignment is or is not acceptable (for example, by explicitly providing that certain types of mergers are or are not to be considered permissible assignments of the contract). This would parallel the approach taken to sales of stock. The reason for taking a less formal approach to asset sales, apparently, is that tax considerations (and perhaps corporate governance considerations, such as shareholder voting rights, that don't directly affect the interests of contractual counterparties) may make it very expensive for the firm to structure a transaction is a merger rather than as a sale of assets. Consequently, it's understandable that courts are sometimes prepared to hold that a corporate asset sale can proceed without triggering the holdup rights that nonassignment clauses give to the firm's counterparties.

5 Empirical Evidence

Our theory explains why parties might prefer to structure their contracts to prevent individual assignability yet permit bundled assignability. We have also argued that legal entities

are useful in creating and identifying the bundle of assets and contracts that can be freely transferred. In this section, we present preliminary evidence from the assignment clauses of commercial contracts. For the purposes of this draft, we restrict consideration to two basic questions. First, do contracting parties actually contract for bundled assignability in practice? Second, do they use entities as a means of achieving bundled assignability?

We examine 287 supply and lease contracts from public firms, gathered from the SEC Edgar database, between 2007 and 2009. We restrict consideration to supply contracts and leases. These contract types are likely to fit the underlying assumptions of our theory, since they are typically bilateral executory contracts, with inputs that have potential to become specific and complementary to the firm. For this draft, we also restrict attention to the "debtor" side of the contract (the tenant or buyer).

Table 1 presents the results on individual anti-assignment clauses. The data show that contracting parties routinely contract out of individual assignability: the "debtor" side of the contract is prevented from individually assigning its rights and obligations under the contract in 95.5% of the contracts in our sample. The percentage of leases that are non-assignable by the tenant is higher than the percentage of supply contracts that are non-assignable by the buyer (99.2% vs. 91.7%, respectively). This may be true because leases, having a larger pool of potential users, are more subject to an opportunistic transfer problem than a supply contract.

Table 2 reports summary statistics on bundled assignability. We define a contract as "bundled assignable" if the contract restricts individual assignability, yet permits free assignment (under some conditions) if the contract is assigned along with some other asset(s) or contract(s) in the firm. We create two definitions of bundled assignability. In the first, the contract is coded as explicitly bundled assignable if the contract is individually non-assignable and explicitly permits assignment with a designated bundle. In the second, the contract is coded as implicitly bundled assignable if the contract is individually non-assignable, but does not explicitly restrict assignability in the event of a merger, acquisition, or change in control. As we have discussed, this generally creates bundled assignability under the default rules of law, since mergers and acquisitions are not held to be violations of individual anti-assignment clauses.

We find that bundled assignability is also very common in our sample: 85.7% of the contracts in our sample create some form of bundled assignability for the debtor party to the contract. About 63% of contracts create this bundled assignability explicitly, by identifying bundles with which the contract can be assigned.

In Table 3, we report summary statistics for those contracts that explicitly permit bundled assignability, to see whether contracting parties use entities, or some other means, to define the bundles with which the contract may be assigned. If the contract permits assignment in the event of a merger, acquisition, or sale of "all or substantially all assets" of the contracting entity, then an entity is being used to define the bundle. Alternatively, if the contract allows for assignment along with a specifically identified asset or contract, or if the contract provides a general description of a bundle ("the business/segment to which this agreement relates") we consider the bundle definition to be non-entity-based. Some contracts use multiple definitions of the bundle with which the contract can travel; we record all definitions used by the parties in a given contract.

Of the contracts that create bundled assignability explicitly, 93.9% of these include an entity-based definition of a bundle; 63.5% use entity-based bundles exclusively. Nevertheless, we do find evidence that bundles are sometimes defined in a way that would not require entities: 36.5% of the bundled-assignable contracts in our sample include at least one definition of a bundle that does not use an entity, and 6.1% of these contracts use only non-entity based definitions of bundles .

These simple summary statistics provide preliminary evidence that contracting parties are aware of the economic forces underlying our theory. Contracting parties contract for bundled assignability with great regularity in practice. When parties create bundled assignability, they usually, though not exclusively, use entities to define the bundle with which the contract can travel. This suggests that legal entities are a valuable, though not unique, device used to balance the owner's need for liquidity against counterparties' demand for protection against opportunism.

6 Conclusion

A legal entity permits an entrepreneur to create a firm as a bundle of contracts that can be transferred to someone else, but only if they are transferred together. This bundled assignability allows for a balancing of several potentially conflicting interests. First, the entrepreneur who assembles the contracts wants liquidity – that is, the ability to transfer the contracts and cash out her interest in them. Second, the counterparties to the firm's contracts – the firm's employees, suppliers, creditors, and customers – want protection from opportunistic transfers that will reduce the value of the performance they've been promised. And third, the entrepreneur wants long-term commitments from the firm's counterparties to prevent them from

holding her up for the value of her investments in integrating them to the firm. By providing that transfers of equity interests in the entity will generally not be considered assignments of the firm's contracts, organizational law provides a flexible tool that permits easy modulation of the tradeoff among these interests. An appreciation of this role of legal entities not only refines our theories of the firm, but provides guidance in shaping legal doctrine concerning the effects of various types of control transactions on a firm's contractual rights and obligations.

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Appendix A: Tables

Table 1: Explicit individual non-assignability, debtor party. Table 1 reports the percentage of contracts that explicitly impose restrictions on assignment of the contract on an individual basis. The sample includes 287 lease and supply agreements from the SEC Edgar database between 2007 and 2009, filed as a "Material Contract" (Exhibit 10). The debtor party is the buyer in a supply contract, and the tenant in a lease contract.

Contract type	Number of contracts	Number of individually non-assignable contracts	Percentage of individually non-assignable contracts
Supply	145	133	91.7%
Lease	142	141	99.3%
Total	287	274	95.5%

Table 2: Bundled assignability, debtor party. Table 2 reports the percentage of contracts that allow for bundled assignability by the debtor party to the contract. A contract is coded as explicitly bundled-assignable if the contract is both (a) explicitly individually non-assignable (using the same criteria as in Table 1), and (b) explicitly permits assignment of the contract (possibly under specified conditions) if assigned to a party acquiring all or some subset of the assets or contracts of the debtor party. A contract is coded as implicitly bundled-assignable if it is both (a) individually non-assignable and (b) does not explicitly restrict assignment of the contract in the event of a merger, acquisition, or change in control of the debtor party. The sample is described in Table 1.

Contract type	Number of contracts	Percentage of explicitly bundled-assignable contracts	Percentage of explicitly or implicitly bundled-assignable contracts
Supply	145	63.4%	89.0%
Lease	142	62.7%	82.4%
Total	287	63.1%	85.7%

Table 3: Entity and non-entity bundle definitions, debtor party. Table 3 reports percentages of explicitly bundled-assignable contracts that use entity-based and non-entity-based definitions of bundles with which the contract may be assigned. The sample includes only those contracts that are coded as explicitly bundled assignable, as reported in Table 2. A bundle is defined as an entity bundle if assignment is permitted in the event of a merger, acquisition, or a sale of all or substantially all of the assets of the debtor party to the contract. A bundle is defined as a non-entity bundle if assignment is permitted with (a) specific asset(s) and/or contract(s), or (b) a general definition of a bundle that does not specifically reference the debtor entity, such as "business" or "segment".

Contract type	Number of contracts	Entity bundles only	Entity and non-entity bundles	Non-entity bundles only
Supply	92	37.0%	52.1%	10.9%
Lease	89	91.0%	7.9%	1.1%
Total	181	63.5%	30.4%	6.1%

Appendix B: Shapley Value expressions

When (SV) does not hold, E receives a Shapley value payoff equal to

$$p_h^0 X - 2p_m^0 F_a + \frac{2}{3}(p_h^1 - p_h^0)X - \frac{1}{3}(p_h^1 - p_m^0)F_a$$

and each supplier receives an expected payoff equal to

$$p_m^0 F_a + \frac{1}{6}(p_h^1 - p_h^0)X + \frac{1}{6}(p_h^1 - p_m^0)F_a$$

E's IC constraint for investment is

$$\frac{2}{3}(q_h - p_h)X - \frac{1}{3}(q_h - p_m)F_a \geq c \tag{8}$$

The cutoff type $\bar{c}_a^1$, is the largest c type that satisfies the above inequality:

$$\bar{c}_a^1 = (\frac{2}{3}(q_h - p_h)X - \frac{1}{3}(q_h - p_m)F_a^{2*}) \text{ if (SV) does not hold}$$

where the equilibrium value F_a^{2*} is given by[19]

$$F_a^{2*} = \frac{1}{p_m^0 + \frac{1}{6}(p_h^i - p_m^0)}(r_h - \frac{1}{6}(p_h^i - p_h^0)X)$$

Comparing this cutoff value to c_n, we can see that $\bar{c}_n > \bar{c}_a^1$ if and only if

$$\frac{X - 2\frac{r_h}{q_h}}{X} > \frac{2}{3} - \frac{1}{6}\frac{q_h - p_m}{q_h - p_h}\frac{2F_a^{2*}}{X} \text{if (SV) does not hold}$$

[19] This follows from solving for F_a in the supplier's participation constraint, assuming that investment occurs:

$$p_m^0 F_a + \frac{1}{6}(p_h^1 - p_h^0)X + \frac{1}{6}(p_h^1 - p_m^0)F_a = r_h$$