Economic and Legal Entities as Transferable Bundles of Contracts

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Abstract

This paper develops an economic theory of the firm that adds to previous theories by providing a role for legal entities that are formally distinct from their owners. In contrast to the existing theory of the firm literature that focuses on ownership of assets, we model a firm as a bundle of contracts. We explain why entrepreneurs may want to structure the firm's contracts so that they can be freely transferred to a new owner, but only if all the contracts in the firm are transferred together. This *bundled assignability* gives entrepreneurs liquidity, while protecting counterparties (employees, suppliers, customers, etc.) from opportunistic transfers that will reduce the value of the performance they've been promised. Bundled assignability balances these competing interests, and in doing so, gives the entrepreneur the incentive to make non-contractible investments that increase the complementarity of the contracts in the bundle. Legal entities assist in this process in two ways. First, because an entity is a legal person that maintains its identity as a contracting party when its ownership changes, entities reduce the contracting costs of creating bundled assignability. Second, legal entities create asset partitioning. When an entrepreneur holds multiple businesses under common control, asset partitioning can affect the entrepreneur's incentives to keep the businesses together or separate them efficiently. An appreciation of these roles 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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I.   Introduction: What Role for Entities?

Academics in both law and economics have spent decades developing the theory of the firm. In the economics literature, the most influential theory of the firm is known as the "property rights" theory[2]. According to this theory, the firm is defined by the bundle of assets it owns. Ownership conveys "residual rights of control" over assets. Arranging these control rights optimally, in turn, helps to protect the owners' specific investments in these assets.

The property rights theory has been extraordinarily influential in economics because it offers answers to fundamental questions of economic organization that have persistently challenged economists: Which assets should be held under common ownership? When should firms make the inputs they use and when should they buy them? What differentiates an employee from an independent contractor?

Like all theories, however, the property rights theory of the firm abstracts away from some important features of firms that are commonly observed in reality. Perhaps most importantly, the theory does not provide any role for legal entities, such as corporations, partnerships, and limited liability companies, as owners of property and parties to contracts. All "owners" in the property rights theory are flesh and blood individuals. Thus, the theory cannot explain why an owner would choose to incorporate her business rather than own it as a sole proprietorship. It also cannot explain the ubiquity of firms in the modern economy that use a complicated web of legal entities to own assets that are ultimately under common control. General Electric, for example, has approximately 1500 separately incorporated subsidiaries, most of which are wholly owned by General Electric. Why are these businesses organized as distinct legal entities, rather than as divisions of the parent company? And what determines the boundaries of each of these various legal entities?

A second limitation to the property rights theory is that all assets are assumed to be owned outright by someone, which suppresses the role of contracts. As a descriptive matter, a theory of the firm that focuses on contractual rights to inputs seems increasingly necessary. Many well-known firms in today's economy do not own most of the physical and/or intangible assets they use. Consider, for example, the movie rental company Netflix. The value of Netflix is based largely on its assemblage of contractual relationships. Netflix does not own most of the DVDs it rents. Instead, it has contractual

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[2] See Sanford J. Grossman and Oliver D. Hart, *The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration* 94 J. Political Econ. 691 (1986); Oliver Hart and John Moore, *Property Rights and the Nature of the Firm* 98 J. Political Econ. 1119 (1990).

agreements with the major movie studios. These agreements require Netflix to pay a small up-front cost 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.[3] Most of its revenues come through its pool of subscriber contracts.

A noteworthy feature of these contractual agreements between Netflix and its counterparties (movie studios, landlords, and customers) is that the contracts are, simultaneously, both assets and liabilities to Netflix. It is this *bilateral* feature of contracts, and the resulting potential for two-sided opportunism, that gives rise to the theory of economic and legal entities we develop in this paper. 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.[4] 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.

With this as a starting point, we develop a theory that predicts how owners will optimally arrange these bilateral contracts into bundles, which we will call *economic entities,* or *firms.*   In our theory, owners who assemble economic entities value *liquidity* -- that is, the ability to sell their interests in the entity and cash out. A more liquid, transferable entity is valuable because the owner may have future needs for cash, or because the entity may prove to be worth more in the hands of a new owner. Cashing

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[3] Many firms own little to no physical assets at all, as our examples illustrate. 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.

[4] In the Netflix example, the transition from purchasing DVDs and owning them outright to revenue sharing contracts was crucial to the growth of the company. According to the founders, these agreements made it less risky for Netflix to expand their catalog of DVD titles to include less popular titles, which in turn, led to growth in their subscription base. In theory, of course, Netflix could have negotiated with studios on a case-by-case basis and agreed upon different purchase prices for different titles, with lower prices for less popular movies. They also could have used third-party financiers to acquire the capital necessary to make these purchases. But we suspect that the device they ultimately chose involves lower negotiation and haggling costs; it also may be more sensible, if the studios have superior information about the rental value of each title, to give them a stake in the rental payments. A complete theory would endogenize these bilateral contracting arrangements, but we do not make a complete attempt to explain their existence in the theory we develop here.

out an entity as a going concern, however, requires assignment (transfer) of the bundle of contracts to a new owner.

The owner's need for free transferability creates a challenge for contracting, because the ability to assign by an owner, as well as the ability of a counterparty to prevent an assignment, can give rise to opportunism. If owners required permission to assign their contracts, this might lead to a "holdup problem" by the firm's counterparties, a well-known driving force in the property rights theory of the firm. When counterparty permission is required to transfer the contracts, counterparties may use this power to extract value from the owner in bargaining.[5] This reduces the incentive of the owners to make valuable investments in the firm at the outset.[6]

At the same time, 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. For many contracts, the quality of the performance rendered by the firm depends on the quality of the other inputs in the firm. A transfer of a customer contract, for example, to a firm that uses lower quality inputs might produce lower quality output. The difference in quality might be important to the buyer, but difficult for a contract to describe and for a court to verify after the fact. We will call this a *non-verifiable quality problem.*

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[5] The recent acquisition of Pepsi's bottlers by Pepsico, Inc. provides an example of a holdup problem in this context. The Pepsi bottling companies had a valuable contract to bottle and distribute Dr. Pepper products. This contract contained a "change in control" clause that allowed Dr. Pepper to terminate the contract in the event that the Pepsi bottlers were acquired. As a result, Pepsico had to negotiate a new contract with Dr. Pepper to provide bottling and distribution services. Dr. Pepper was able to negotiate a $900 million payment as part of this new contract. See Duane D. Stanford, *Dr Pepper Snapple Evaluating Distribution Contracts,* Bloomberg.com, August 21, 2009.

[6] Our analysis shares several common features with the property rights theory. The driving force in the property rights theory is that the owner of an asset has the right to take actions at a later date that can not be fully specified in contracts (i.e. the "residual rights of control"). These rights are allocated initially in a way that gives the best possible incentives to make specific investments by owners. In our theory, the "assets" are the firm's contracts with its counterparties. The important residual right of control over these "assets" in our theory is the right to transfer the contracts to a new owner. Crucially, as in the property rights theory, we assume that important characteristics of this new owner cannot be fully specified in the contracts themselves. Hence, control rights over this decision are allocated in a way that encourages specific investments. The key innovation in this paper is the explicit consideration of financing issues, which are left out of the property rights theory. Liquidity demand by owners creates a need to transfer contracts, and the liabilities inherent in contracts affect the incentives of owners to transfer opportunistically. In particular, the owner may find it in her interest ex-post to separate contracts that are complementary in value, which would decrease her incentive to invest in these complementarities in the first place. This incentive for opportunistic separation of contracts is caused by liabilities and thus does not occur in the property rights theory.

For input contracts, the value might also depend on the non-verifiable quality of the firm's performance. For example, a supplier might value the cooperation and flexibility of its customers to unforeseen changes in circumstances. Suppliers might also derive reputation benefits from supplying a well-known buyer. In addition, the quality of performance to an input provider often depends on the firm's creditworthiness. Suppliers often provide credit to the firm by supplying inputs in advance of payment. If allowed to assign contracts individually, the owners could threaten to assign contracts to less creditworthy firms with lower quality assets and a higher risk of defaulting on its obligations. We will call this a *credit risk transfer problem*.

We show that the non-verifiable quality and credit risk transfer problems can be mitigated by structuring the bundle of contracts appropriately. In assembling a firm, an owner can limit opportunism and gain liquidity by pledging 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 she transfers the firm's other contracts and assets along with it as a bundle. The assembled value of the bundle provides, in effect, important assurance of prospective performance to the firm's counterparties. We call this contracting feature *bundled assignability.* We show that bundled assignability gives the owner the liquidity she values. At the same time, it gives the owner incentives to assemble and hold together contracts that are complementary in value, and to make investments in the firm that generate complementarities within the bundle of contracts.

A second important contribution of our theory is to describe how the law of legal entities provides valuable assistance in the creation of economic entities. First, legal entities reduce the contracting costs of creating bundled assignability. This is most evident when the owner plans to sell the firm by way of a stock sale[7]. When an owner creates a legal entity, the firm's counterparties contract with an artificial person that maintains its identity when its owners change. As a result, an owner need not write complicated, contingent assignment provisions in each contract that specify the other contracts and assets to which the parties wish to be bundled, and make allowances for future additions and/or changes to the bundle. Instead, the owner need only set up a legal entity, and make each contract with the legal entity non-assignable *by the entity* when it is written. Because a sale of the stock in a legal entity is generally not considered an assignment of that entity's contracts, the owner can achieve free assignability of the bundle of contracts by selling her stock. At the same time, the counterparties are protected from individual assignment away from the bundle.[8]

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[7] Legal entities can also reduce the contracting costs of creating bundled assignability in an asset sale, whereby the owner sells her assets and assigns her contracts as a bundle to a new owner. We discuss this possibility in Section VII of the paper.

[8] The ability to avoid anti-assignment provisions in key contracts by structuring transactions as stock sales is well-known by legal practitioners. Our theory not only incorporates this phenomenon, but also explains why counterparties will allow an owner to use this "loophole". The key is that counterparties may derive

A second important benefit of legal entities is that entities are necessary to create asset partitioning[9]. 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"). Existing scholarship notes that asset partitioning can reduce creditor monitoring costs by focusing the value of creditor claims on a business they are most able to value accurately.

We show that asset partitioning via a legal entity also serves a different useful purpose when an owner chooses to hold multiple business units, and values the option to separate them at a later date. Partioning assets into separate entities ensures that the credit risk borne by a supplier is based solely on the value of the business he supplies, and not on the value of the owner's other businesses. As a result, when the owner sells one of her businesses apart from the others, the sale will not affect the value of the suppliers' claims, because the assets bonding those claims remain the same. Asset partitioning, then, limits the owner's incentive to separate her businesses opportunistically to divert value from her suppliers.

Our analysis emphasizes the role of both assets and liabilities as crucial drivers of the boundaries of the firm, in contrast to the exclusive emphasis on assets that has previously been the focus of the economics literature on the topic. 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 that result from mergers, asset sales, and bankruptcy.

This work is part of a growing theory of legal entities that is based on interactions between assets and liabilities. In other, related work, Edward Iacobucci and George Triantis argue 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[10]. Closer to our work, another explanation of entities, by Margaret Blair, focuses on "capital lock-

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sufficient protection from being tied to the other contracts in the bundle that they will allow for transferability as a bundle away from the original owner.

[9] See Henry Hansmann and Reinier Kraakman, *The Essential Role of Organizational Law* 110 Yale L.J. 387 (2000); Henry Hansmann and Reinier Kraakman, *Organizational Law as Asset Partitioning* 44 European Economic Review 807 (2000); Henry Hansmann, Reinier Kraakman, and Richard Squire, *Law and the Rise of the Firm* 119 Harvard L. Rev 1333 (2006)

[10] See Edward M. Iacobucci and Geroge G. Triantis, *Economic and Legal Boundaries of Firms*. 93 Virginia Law Review, 515 (2007).

in".[11] 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.

II.   Complementarity of Contracts

The contracts entered into by a single firm often exhibit a substantial degree of complementarity. That is, the value to the firm of any individual contract is increased by the rights that the firm has under other contracts it has entered into. The owner of a baseball team derives more value from her contract with a pitcher if she also has a contract with a catcher, and particularly a catcher that works well with that pitcher. Moreover, and central to our model, the owner of the firm can increase this complementarity by expending effort in (1) selecting contractual counterparties that are well matched to each other and (2) integrating the services of those counterparties with each other after securing them by contract. These investments in complementarity -- or the potential for them -- are important in determining the set of contracts held not just under common ownership, but by a given legal entity. That is, they help determine the boundary of the entity.[12]

The entrepreneur who assembles the contracts that constitute a firm will be the original owner of the firm. Once the firm's assets are assembled and integrated into the production process, however, the original entrepreneur's personal involvement in the firm may no longer be important -- indeed, others may be more skilled than she at managing the established firm -- and she may wish to sell the firm to realize, in liquid form, the fruits of her entrepreneurship. To sell the firm as a going concern, she must transfer the entire bundle of contracts. How the entrepreneur does this depends upon the nature of the her ownership. On the one hand, she may own the firm directly as a sole proprietorship in which she serves personally as the nexus of contracts -- that is, in which she is personally a party to all of the firm's contracts. In that case, the only way to sell the firm is through an asset sale, in which each of the firm's contracts is individually assigned to the purchaser, who becomes the new nexus for those contracts. On the other hand, the entrepreneur may own the firm indirectly by organizing it as a(n artificial)

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[11] See Margaret M. Blair, *Locking In Capital: What Corporate Law Achieved for Business Organizers in the Nineteenth Century*, 51 UCLA Law Review, 387 (2003)

[12] These efficiencies from holding complementary contracts may, but need not, involve asset specificity in the sense that the asset to which the firm has contractual rights is specialized or unique (Williamson, 1975, 1985; Klein, Crawford, and Alchian, 1978). Even if there are many catchers who can perform equally well, it may remain important for the team to have a continuing contract with at least one of them, if only to avoid the transaction costs of repeated recontracting in the spot market (which create, of course, asset specificity of a sort).

legal entity, such as a business corporation, of which she in turn is the owner. In that case, she can sell ownership of the firm simply by selling ownership of the entity. Since the entity itself remains the nominal nexus for the contracts, no assignment of the individual contracts need take place.

Organizing the firm as a legal entity, then, can reduce the transaction costs of selling the firm. In particular, if consent to transfer some of the firm's key contracts is required by its counterparties, these costs might be substantial. The counterparties might attempt to hold up the firm and extract some of the "going-concern" surplus that resulted from the entrepreneur's efforts in assembling and integrating the contracts at the outset.

But if the ability to sell the firm is important enough to the entrepreneur, why not simply acquire the consent of counterparties to assignment in advance? Our model explains why the firm's counterparties would resist individual assignability (or charge a prohibitively high price for that right), when they might consent to assignability as a bundle through a sale of the firm. In our model, individual assignability can lead to opportunistic behavior by the owner(s) of the firm toward the counterparties to the contracts. The incentive for opportunistic assignment of a contract held by a firm derives from the fact that the value of the contract to the counterparty -- who may be an employee, a supplier, a customer, a franchisee, a lender, or any other patron of the firm -- may itself depend upon the character of the other contracts held by the firm. Most simply, those other contracts are assets whose value helps bond the firm's creditworthiness for the liability assumed by the firm under the contract in question. The value of the contract to the counterparty may therefore decrease if the contract is assigned to another firm that holds a bundle of other contracts that is of lesser value. Thus it is important that a firm promise to keep a given bundle of contracts together within a single legal entity, where they will serve as a bond for each other, and not to separate them by assigning one without the others.

We illustrate these incentives below with a numerical example. First, however, we turn to the mechanisms available under law for regulating the transfer of rights and obligations under contracts.

III.   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)[13] to a third party without the

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[13] The term "assignment" is most precisely used to refer to a promissee's transfer, to a third party, of the rights to receive the promisor's performance. "Delegation" refers to a promisor's transfer to a third party of the obligation to render the performance due to the promisee. "Transfer" of a contract by party generally means simultaneous assignment of the party's rights and delegation of the party's duties {material deleted}. We will use the term "assignment," however, as is common in contracting, to refer to complete transfer of a contract. See Farnsworth (2004, Chapter 11).

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 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 -- whether as a consequence of a default rule of law or of 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.[14] 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.[15]

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. The model that follows shows the value of such an arrangement.

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[14] 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).

[15] 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).

As our example below 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.

IV.   A Numerical Example: The Credit Risk Transfer Problem

Our numerical example focuses on the owner's relationship with her input suppliers, and on the credit risk transfer problem that those suppliers confront. Most of the underlying logic applies as well to the non-verifiable quality problem. We focus on the credit risk transfer problem simply because it lends itself more intuitively to quantification. The key to both problems is that the expected quality of performance to the firm's contractual counterparties depends on the identity and quality of the firm's other counterparties. The owner has an incentive, if allowed to do so, to opportunistically transfer a given contract to a firm with lower quality counterparties, making a profit on the transfer. As a result, counterparties ask for protection by bundling themselves with the firm's other inputs, ensuring the quality of their performance as a result.

Consider the following numerical example. For concreteness, the example focuses on the fictional Patriot Beer Company, a maker of high-quality, micro-brewed beer.[16] The owner/entrepreneur who started the company developed a formula for making a smooth, rich-flavored beer. To produce it, she established contractual relationships with five key parties: a supplier of glass bottles, a supplier of hops and other ingredients, a manufacturer that produces the beer according to the company's specifications, a distributor to transport the beer to bars and restaurants, and a lease of office space for the company headquarters. In reality, of course, a beer maker will have many more contracts, and will own outright some of the assets used in production. We assume that all inputs are obtained by contract simply to illustrate clearly the novel aspects of our theory; we keep the number of contracts to five so that the math stays manageable. We will focus particularly on Patriot's contract with the bottle supply company to demonstrate the owner's incentives for assignability. In principle, however, the same incentives could affect any of Patriot's contractual partners, as long as they provide credit along with their supplies.

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[16] The fact pattern is based, very loosely, on Boston Beer, the maker of Sam Adams. Nearly half of the beer sold by the company is produced by third-party brewers through contractual relationships, and the company has contractual relationships for all its other inputs, as the example suggests. See the Boston Beer 10-K, 2009.

Suppose that there are three important dates: 0, 1, and 2. At date 0, Patriot's owner conducts an extensive search and assembles the five contracts required to produce beer. At date 1, before any supplies are received or any production begins, the company can make interim adjustments, such as switching suppliers and assigning contracts. If the owner needs liquidity, she can cash out by selling the bundle of assembled contracts. After date 1 ends, suppliers provide their inputs and beer is produced and distributed. At date 2, the beer is sold and the firm realizes a single cash flow. At this point, the firm ceases production, pays off its obligations, and returns any amount left over to its owner(s)/shareholder(s) . The firm then dissolves.

To understand assignability of contracts, we must have some form of credit risk, as well as a potential assignee. Thus, we will assume that beer makers may fail and become unable to pay off their suppliers. Concretely, suppose that if any beer maker (including Patriot) succeeds it receives a cash flow of 100 at date 2, but if it fails it receives 0.

Beer makers differ in their probability of success. Because Patriot's owner conducted a thorough search and identified high quality supplies that are ideally designed to make best use of its premium formula for beer, it has a high probability of success. Suppose that success is certain (the probability of success is 1) as long as Patriot keeps the 5 original suppliers it found at date 0. If it chooses to replace one of its inputs with a different input, we suppose the probability of success falls from 1 to .95. This is meant to capture the fact that the original assembly of inputs is the most complementary, and the most well-suited to producing Patriot Beer. The bottle supplier, for example, might be physically located near the brewing plant, minimizing delivery costs. Or it might have the special skills to produce a bottle design that emphasizes the premium nature of the beer.

A second beer maker, Milwaukee's Worst (MW for short), is a fly-by-night company that uses cheap, standardized ingredients and a standard brewing formula, and consequently makes lower-quality beer. Because its owners did not exercise a great deal of care in assembling its supply relationships or monitoring their quality, MW has poor future prospects. Concretely, suppose its probability of success, using its current inputs, is only .5. Since MW does not attempt to produce a specialized product, we suppose MW can change any of its inputs without affecting its probability of success.

Contracts and Assignability

Patriot will sign long-term contracts with each of its five suppliers. These contracts provide that the relationship will remain in place from dates 0 to 2, so that the suppliers cannot terminate at date 1 without breaching their contract. This long-term commitment of suppliers is valuable to the owner, because she plans to make long-term investments in the firm that will use these particular suppliers. The long-term contracts,

then, protect the owner against an opportunistic threat that a supplier will withdraw his input after the owner makes her investments in the bundle. [17]

Suppose also that supply and demand in the market for supplies is such that each supplier (bottles, hops, etc.) requires an expected payment of 10 in exchange for supplying their inputs. To assure that the suppliers have a strong incentive to perform well (or, alternatively, because the firm does not have good access to other sources of financing), the suppliers will be paid only at date 2. This means that, prior to date 2, the suppliers are creditors of the firm.

Credit Risk

Given that the *expected* payment must equal 10, the supplier must ask for a payment larger than 10 to compensate for the risk of default if there is any chance that the beer company will fail. In particular, if the supplier expects to be paid by a beer maker that has probability of success p, then the supplier must contract for a repayment of $10/p$ at date 2.[18] Thus, if the supplier expects that Patriot will be responsible for repaying her, and that Patriot will use all of its original contracted inputs, then each supplier will demand exactly 10 in repayment at date 2, since success is certain. If, alternatively, the supplier contracts with a beer maker whose probability of success is known to be only .5, then the supplier will insist on a promise of repayment of $10/.5 = 20$ at date 2.

If Patriot kept all 5 contracts in place, then the value of the owner's equity in the firm would be the expected payment she would receive at date 2 if the firm succeeds and pays off all its suppliers. This would be $100-5*10 = 50$. If all five suppliers made sure their contracts were bundled together and individually non-assignable, this would be the outcome.

Now let's suppose that Patriot's contract with the bottle supplier is freely assignable. At first glance, it might appear that Patriot would have no incentive to assign any of its supply contracts, because this would mean that a less complementary replacement supplier must be found. This would reduce the probability of success from 1 to .95, hurting the owner and the remaining suppliers. Moreover, MW doesn't increase its probability of success by using Patriot's bottle supplier. This means that it is economically inefficient for Patriot to assign its bottle supply conract to MW: the result is to decrease Patriot's probability of success without improving MS's. As we will see,

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[17] In our companion piece we show that long-term contracts are optimal, because they solve a holdup problem with respect to the owner's investments in complementarities. We examine the role of such investments later in the paper.

[18] The supplier will be repaid in full with probability p and paid nothing with probability (1-p), since the cash flow in failure is zero. So if the supplier demands a repayment of 10/p, then her *expected* repayment will be p*(10/p) + (1-p)*0 = 10, which is her required expected payment.

however, Patriot does indeed have an incentive to assign contracts opportunistically notwithstanding this social inefficiency.

To see this, note first that a supplier who anticipated supplying to MW would ask for a higher repayment of 10/.5 = 20, reflecting the greater credit risk of supplying to a lower-quality firm. Now suppose, momentarily, that Patriot's bottle supplier and its other suppliers do not anticipate any risk that Patriot will assign their contract. Rather, they expect that they will all continue to deal only with Patriot, and thus expect that Patriot will succeed with certainty. Consequently, they all enter into contracts that call for payment to them, at date 2, of only 10. The difference between this low price, and the higher price of 20 that the bottle supplier would require to contract with MW, creates an incentive for Patriot to assign. If MW can become an assignee of Patriot's bottle supply contract, MW's expected return increases by the expected difference in payment for bottling. This difference is .5*(20-10) = 5. Thus, MW is willing to pay Patriot up to 5 at date 1[19] to acquire Patriot's bottle supply contract by way of assignment.[20]

It follows that Patriot's owner would benefit from assigning the bottle supply contract. If Patriot does not assign, the owner receives the expected payment of 50, as we calculated above. If she assigns, however, she receives the payment of 5 from MW for the assignment, plus the value of her equity in Patriot after she replaces the bottle contract with a new bottle supplier.[21] This new supplier will know that he is being repaid by a firm with probability .95 of succeeding, so he will demand 10/.95 in repayment at date 2. Thus, the owner's payoff is 5 + .95*(100 – 4*10 – 1*10/.95) = 52. While it is costly to Patriot's shareholders to replace a superior input with an inferior one, this loss is more than made up by the benefit received by opportunistically assigning the contracts.

This gain to Patriot's owners is not a real economic gain, however. Rather, it is merely a redistribution of value from Patriot's supplier/creditors to its owners by shifting credit risk to the suppliers. Owing to the assignment, the value of payment promised the bottle supplier falls from 10 to .5*10 = 5. The other 4 Patriot suppliers also lose, albeit a smaller amount: the value of each of their contracts falls from 10 to .95*10 = 9.5. In total, the 5 original Patriot suppliers lose 7 (the bottle supplier loses 5 while the other 4

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[19] We assume that Patriot is able to extract all the surplus from MW in bargaining, but this is not crucial to the results. Any division of bargaining power will work (as long as Patriot takes some of the surplus).

[20] All calculations involve some rounding error, since all values are rounded to 1 decimal place.

[21] Our owner payoffs in these examples assume that she takes any proceeds from assignment; thus, the assignment payoff is not available to pay the remaining suppliers in the event of default. This assumption is not crucial to our results--forcing the owner to hold the proceeds for the benefit of the other suppliers would affect the numbers only slightly. A large diversion of the cash flows away from the suppliers in this way might be considered a fraudulent conveyance, but given the financial health of the firm in our example, this small transfer is unlikely to qualify as such.

lose .5 each) and the Patriot owners gain 2. On net, the total losses (7) exceed the gains (2). The net loss of 5 is exactly the expected loss in reducing Patriot's probability of success from 1 to .95, which creates a net expected loss to society of .05(100) = 5.

In short, if Patriot's contract with the bottling company were assignable, but neither the bottling company nor Patriot's other suppliers were to adjust their contract price to reflect the consequences of assignment, then Patriot would have an incentive to assign the contract with the bottling company, inefficiently, to MW.

A benchmark result: Indifference to Assignability

The result just described would not constitute an equilibrium in our contracting game, however, for several reasons. First, if it were indeed in Patriot's interest to assign the bottle contact to MW, we would expect Patriot's suppliers to anticipate this potential assignment and, consequently, ask for higher repayments in their date 0 contracts. Second, we might also expect that Patriot and the bottle supplier, facing the threat of assignment ate date 1, might renegotiate at that date for a result that would make both parties better off. We need to take these other effects into account when we predict whether firms will make their contracts assignable or non-assignable,

1.   Costless Renegotiation.

To begin with, if a very specific set of conditions hold (in particular, if renegotiation is perfect and costless at date 1), the owner will be *exactly indifferent* between making his contracts assignable and making them non-assignable.   To understand why this is so, suppose the beer owner has an incentive to assign the bottle supply contract opportunistically at date 1, as we have shown above. Given that assignment destroys value overall, there should be scope for the owner and the bottle supplier to renegotiate to an outcome that makes both parties better off.[22]

To keep things relatively simple, suppose that when the owner and the supplier bargain, all of the surplus from bargaining goes to the supplier. (The argument in fact works with any division of bargaining power). Complete supplier bargaining power implies that, after the owner and supplier bargain and the owner agrees not to assign, the owner is made as well off as she would have been had the assignment actually occurred. Thus, if the bottle supplier's contract were assigned to MW, and that contract called for a payment to the bottler at date 2 of an amount F, then MW would be willing to pay Patriot $.5*(20-F)$ for the assignment, reflecting the expected savings to MW from using a bottling company that costs F instead of 20. The payoff to Patriot's owner if assignment occurred would therefore be $.5*(20 – F) + .95*(100 – 4*10 – 1*10/.95)$.

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[22] Strictly speaking, this is not always true, because the other suppliers also benefit from preventing assignment, and the owner and bottle supplier do not take this into account when they only bargain with each other. If all parties could bargain, though, we would expect assignment to be prevented. See Ayotte and Hansmann (2009) for a treatment of this issue when all suppliers bargain collectively with the owner.

2. **Renegotiation Anticipated**

Now suppose that the bottle supplier not only understands Patriot's incentive to assign the bottler's contract, but also anticipates the renegotiation that will occur at date 1 under the assignment threat. He knows that Patriot's owner is willing to accept a renegotiation under which the bottling contract will not be assigned, but the bottler will agree to a reduction in his date 2 contract price that makes Patriot's owner as well off as she would be if the assignment occurred. In this situation, the bottler, when entering into its initial contract with Patriot at Date 0, will insist on a higher contract price, $F > 10$, to make up for the expected reduction in that contract price in the course of renegotiation at Date 1.

To compute what this higher initial contracts price F would be, let us label as F' the lower contract price that will be agreed to in the renegotiation. If Patriot's owner is to be as well off after renegotiation as she would be if she assigned the bottler's contract, the following equation must hold:

$$.5*(20 - F) + .95*(100 - 4*10 - 1*10/.95) = 1*(100 - 40 - F')$$

The left hand side of this equality is the return to Patriot's owner with assignment. The right hand side is the owner's payoff after renegotiation to a new contract price. In the latter case, the probability of success is 1 because the original supplier remains in place, and the new promised repayment to the bottling company is now F'. If we simplify this equation, it becomes:

$$F' = .5F + 3$$

Now, let's return to date 0. Anticipating that she will be bargained down to a lower price under the threat of assignment at date 1, the supplier will insist that F will be set so that she will receive an expected payment of 10 *after renegotiation.* That is, F will be set at date 0 so that F' = 10 after renegotiation. Plugging F' = 10 into the above expression, we get F = 14. To recap, our bottle supplier would be equally willing to supply bottles for a repayment of 10 under a non-assignable contract, or a repayment of 14 under an assignable contract. Both give her an expected repayment of 10 when all is said and done.

Given all this, how does Patriot's owner feel about assignability? As it turns out, she is completely indifferent. In both cases, the firm will succeed for sure and produce the 100 cash flow. The other four suppliers will require repayments of 10 in both cases, since they anticipate that the original bottler will remain in place whether contracts are assignable or not. If contracts are assignable, the initial contracted-for payment to the bottler is higher (14), but this is largely irrelevant, because everyone knows that it will be bargained down to 10 at date 1 under the assignment threat. Under non-assignable contracts, the required payment is 10 at the outset, and never changes. The ultimate outcome is the same either way. All suppliers will be paid 10 at date 2, the company will succeed with certainty, and the owner's equity will be worth 50.

Why Does the Assignability Decision Matter?

The preceding section explains some of the consequences of individual assignability. In particular, it can cause the firm's suppliers to increase their required contract prices to account for the risk of assignment to a new counterparty with lower creditworthiness. At first blush, it might seem that this argument alone is enough to prove that individual assignability is a bad idea for the firm's owners. After all, when a firm must pay more to its suppliers, less is available for its shareholder owners.

The previous analysis demonstrates that this argument is incomplete, because it ignores the benefit the firm later receives when it chooses to assign opportunistically – namely, the ability to force the supplier to reduce his contract price in renegotiation. The increased contract price on the front end may be cancelled out by the benefit of assignment on the back end, making the firm indifferent between assignability and non-assignability.

Is assignability therefore irrelevant in the real world? We think not. In this section, we suggest three reasons why firms and their owners will prefer to make contracts non-assignable. It is important to emphasize that two of the three reasons (reasons 1 and 3) rely on the existence of complementarities within the bundle of contracts—the contracts must be worth more together than separated in order to generate value from bundling. Thus, our model explains why complementary contracts, in particular, should be bundled together.

3. **Reason 1: Imperfect Renegotiation**

There may be many reasons why renegotiation between the bottle supplier and the owner would be imperfect. For example, any attempt by Patriot to renegotiate the supplier's repayment to a lower amount under threat of assignment to a less creditworthy firm might be viewed by other businesspersons as devious, unethical behavior, damaging the owner's reputation so badly as to prevent her from acquiring supplies in the future. Alternatively, the two parties might not be fully informed of each other's threat points, and a bargaining outcome may be difficult to reach.

If, for such reasons, renegotiation is not possible, then the owner will have a strict preference to sign non-assignable contracts with her suppliers. To understand this, suppose that the bottle supply contract is assignable. Then the bottle supplier will expect that a promised payment of F at date 0 will be worth only .5F when the risky MW is responsible for paying. Thus, in order to guarantee an expected payment of 10, the bottle supplier will now insist that F = 20. Patriot's other suppliers will also ask for higher repayments of 10/.95 = 10.5 if they expect an assignment will take place, since they anticipate a lower value replacement bottle supplier at date 1 that will lower Patriot's probability of success.

After assignment, the entrepreneur will receive .5*(20 – F) = 0 from MW. Patriot's owner will replace the old bottle supply contract with a new supply contract at a price of 10/.95. Thus, the value of Patriot's owner's equity falls from 50 to .95*(100 – 5*10/.95) = 45. Even though assignment is an optimal strategy as of date 1, it hurts the

owner as of date 0 through higher prices on supply contracts. The effect of these higher prices outweighs the date 1 gains from assignment.

In this situation, the beer maker operates in a less efficient manner than it could, and the losses from this inefficiency are borne entirely by Patriot's owner. The inefficiency occurs precisely because the bottle supply contract is complementary in value with Patriot's other inputs. If Patriot's bottle supply contract were worth as much to MW as it is to Patriot, then MW would pay a higher price for the assignment. Alternatively, if a replacement bottler were as useful as the first bottler, assignment of the first bottler's contract would not change the firm's probability of success. In either case, assignment would no longer produce an inefficient outcome. Because, instead, the inputs are complementary in our example, Patriot's owner has an incentive to enter into nonassignable contracts with the firm's suppliers to prevent this loss in complementarity.

4. **Reason 2: Wasteful Effort to Find an Assignee**

Another reason the owner might prefer non-assignability is to commit herself not to waste resources finding a potential assignee. Suppose, as before, that renegotiation is costless, but finding an assignee like MW wastes resources that could have been used in production. Concretely, suppose that the owner can choose to search for an assignee like MW, but the search effort costs 3 to Patriot in direct costs and forgone opportunities. If the owner has an assignable contract with the bottling company, it is in the owner's interest to spend the search cost, because a credible threat of assignment is necessary for the owner to be able to extract the concessions from the bottling company in renegotiation. If no search is incurred, the supplier will not agree to any concessions, because assignment is not a credible threat. In this case, the owner's equity would be worth only $1*(100 - 4*10 - 1*14) = 46$, with the bottler demanding an initial contract price of 14[23]. If, alternatively, she spends the 3 in search cost and finds MW, she can bargain the bottler down, in renegotiation, from a payment of 14 to 10. This is worth 4 to the owner, so any search cost below 4 will be in the owner's best interests to expend after date 0. If she expends the search costs, and then extracts the concessions, her equity will be worth $1*(100 - 5*10 - 3) = 47 > 46$. So it will be worthwhile for her to search.

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[23] Note our assumption that the bottler will ask for 14 in this scenario. To demonstrate that any outcome is an equilibrium, we must show that the suppliers set their contract prices rationally, anticipating that the owner will behave rationally under those contract prices. In this example, we seek to show that assignability can lead to an inefficient equilibrium with value-destroying search, and a threat of assignment that leads to renegotiation. If the bottle supplier anticipates this, he sets his contract price at 14. The numerical example shows that the owner does indeed have an incentive to search and assign given the bottler's contract price of 14, since her payoff is larger when she does (47 > 46). This implies, in turn, that the choice of 14 as a contract price is consistent with equilibrium play by the bottler because he will receive an expected payoff of 10.

But before date 0, the owner would like to tie her hands and prevent this wasteful search from taking place. She can do this by making her contracts non-assignable. By doing so, she eliminates her incentive to waste resources in finding an assignee like MW, because it does the owner no good: the bottle supplier can always refuse an assignment given the contract terms. Anticipating that there will be no risk of assignment, the bottle supplier will then be willing to supply at the lower price of 10. Thus the owner ultimately benefits -- through a lower cost of inputs – by protecting the supplier from (threats of) assignment. As before, the owner's equity is then worth 50 > 47. This means that non-assignable contracts are preferable for Patriot's owner.

5. **Reason 3: Valuable Investments in Complementarities by the Owner**

A third reason why non-assignability provisions may be preferred is that they enhance the owner's incentive to make investments in complementarities -- that is, investments that make the various inputs more valuable as a bundle. In our example so far, we have assumed that the bottling company has inherent characteristics that make it more valuable than any other bottling company when combined with the rest of Patriot's inputs (i.e., the replacement bottling company reduces the probability of success from 1 to .95). While this may be an accurate representation of some situations, in other cases the complementarities between inputs is the result of costly investments made by the firm *after* the inputs are acquired.

To give a concrete example, suppose that Patriot's owner uses a real-time inventory system that keeps the bottling company up to date on the required quantities of bottles for the upcoming month. While the investment could be used with another bottler, the time spent installing the software at the current bottler's headquarters and training the employees at the current bottler to use and respond appropriately to the information would be specific to that bottler, increasing the complementarity between Patriot and the bottling company. If a replacement bottling company were found, that effort and expense would need to be replicated with the replacement's employees. This makes the initial bottler more valuable than a replacement once this costly investment is made. At the same time, if the bottling contract were transferred to MW and MW does not – as we assume -- use this inventory management system, the investment would be of little use to them.

Non-assignability can enhance the owner's incentive to make such investments in complementarity. Returning again to our numerical example, suppose that Patriot's owner, between dates 0 and 1, can choose whether or not to invest 2 in the training of the bottler's employees to use the inventory software.[24] If the investment is made and

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[24] As is common in the literature on the theory of the firm, this investment must be *non-contractible*; if the suppliers could somehow require the owner to make this investment and specify its terms completely in a contract, then assignability/non-assignability would not be important. In most cases, it is realistic to assume that there are non-contractible components of this decision (how hard the owner works to implement the software, time spent training employees, etc).

the bottle supplier is kept in place, the probability of success is 1, as before. If the investment is not made, then the probability of success will be .95, whether the supplier is replaced or not. In other words, the investment is required to make the bottle supplier complementary with the rest of the firm; if the investment is not made, then all bottlers are identical.

If contracts are non-assignable, the owner has the incentive to make the investment. It costs 2, but boosts the owner's payoff (net of the cost of the investment) by 2.5, for a net gain of .5: the owner's equity would increase from $.95*(100 – 5*10) = 47.5$ to $1*(100 – 5*10) - 2 = 48$.[25]

If contracts are assignable, however, the owner faces a different decision. Suppose that suppliers set their contract prices anticipating that the owner will not invest and will assign the bottle supplier; as we will see, these beliefs will be confirmed by the owner's behavior. (Recall that if the investment is not made, then there are no efficiency gains to be split in keeping the bottle supplier; thus, there are no gains from renegotiation. For simplicity, then, we'll proceed assuming that the assignment actually takes place when it is not inefficient).

Anticipating no investment, the other suppliers will demand $10/.95 = 10.5$. The bottle supplier will expect assignment to MW, and insist on $F = 10/.5 = 20$.

Given these supply costs, now consider the owner's incentive to invest and/or assign the bottle supplier. If the owner invests, but chooses not to assign, she will receive $1*(100 – 4*(10/.95) – 10/.5) - 2 = 35.9$. If the owner invests and chooses to assign, the bottle supplier will renegotiate to prevent the assignment. But recall we assume that the supplier has all the bargaining power. Thus, the owner's outcome in bargaining is the same as if she in fact assigned. Thus, the owner will receive $0 + .95*(100 – 5*(10/.95)) - 2 = 43$. As a result, if the owner invests, she prefers to assign the supply contract rather than keep it.

Now suppose the owner chooses not to make the investment. Her payoff if she does not invest and does not assign is $.95*(100 – 4*10/.95 – 1*10/.5) = 36$. If she doesn't invest and assigns, she receives $0 + .95*(100 – 5*10/.95) = 45$. Since 45 is the highest possible payoff for the owner of the 4 possible choices when contracts are assignable, she will choose not to invest and to assign. Looking back to date 0, however, the owner knows that non-assignable contracts give her an incentive to make the investment, and hence produce a higher payoff of 48 (as we saw above). Thus, given a choice about how to arrange the bundle at the outset, she will choose to sign non-assignable contracts with her suppliers.

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[25] Note here that, in contrast to the last example, suppliers demand 10. The suppliers must have a contract price that gives them an expected repayment of 10, given the owner's optimal behavior that will follow. Under non-assignable contracts, the owner chooses to invest, hence the contract price of 10 is consistent with equilibrium play.

This result follows because the owner's investment is subject to a *hold-up problem*, a familiar driving force in the economic theory of the firm. In bargaining with the supplier to prevent assignment, the owner loses the value she created. Notice, in this regard, that the investment adds no value to the owner's payoff when contracts are assignable: whether the investment is made or not, the expected cash flow to the owner from the firm is 45. The reason is that the owner's payoff in renegotiation with the supplier is based on what she *would have received if an assignment occurred*. Since the investment has no value when the contract is assigned, it has no bearing on the owner's ultimate payoff.

If the owner chose to invest, all of the benefits of the investment would be captured by the supplier in bargaining. In effect, the supplier reasons, "the value of the investment depends on my participation in the firm. I know that the owner needs me to realize this value, so I'm not going to concede as much in bargaining when the owner threatens to assign my contract." Looking backward to date 0, however, the owner anticipates this renegotiation outcome and decides not to make the investment.

The extent to which the hold-up problem occurs here, we should note, depends on how much bargaining power the owner has in renegotiation. If the owner had all the bargaining power, then the holdup problem would not occur, because the owner would capture 100% of the value of her investment. Thus, the owner would be as likely to make the investment under assignable contracts as under non-assignable contracts and the irrelevance result above would obtain. As the supplier's bargaining power increases, however, the hold-up problem becomes more severe. The numbers above illustrate, for simplicity, the extreme case in which the supplier has all of the bargaining power, and consequently no investment would ever occur, because the owner would expect to lose 100% of the value of the investment.

What about Residual Liability?

In the analysis so far, we have assumed away the ability of a counterparty to pursue the original assigning party (Patriot's owner) for compensation if the assignee (MW) defaults. With the potential for *residual liability* included, the owner might not face the same problem of opportunistic assignment. After all, the opportunism problem occurs because the creditworthiness of the assignor and the assignee differ. If the assignor could guarantee to his contracting counterparties that he will remain liable for the obligations under the contract even after assignment, the counterparty might face substantially less credit risk after an assignment occurs. As a result, the opportunistic motives behind individual assignability, and hence the value of bundled assignability, might disappear.

While residual liability may reduce opportunism in some cases, it is not a complete solution the owner's problem. First, residual liability is, at most, a solution to the credit risk transfer problem. It will not solve the non-verifiable quality problem. A customer who contracts with a firm who sells high quality goods might find that an assignee with lower quality inputs produces lower quality output. To the extent that this

difference in quality is difficult to specify in a contract in a way that a court can verify, residual liability will not provide a remedy.

Second, residual liability provides some protection to a counterparty, but it is unlikely to provide the same protection against credit risk as a direct claim against a going concern. If our owner sold the firm by assigning her contracts for money (whether as a bundle, or individually in some form), the counterparties would have claims against the proceeds of the sale in the hands of the owner.[26] The owner would have strong incentives to dilute the value of these residual claims against the pool of money, and would have many options to do so. She could simply spend the proceeds directly. She could also invest the proceeds in a high risk venture, or pledge the proceeds to a creditor as security for a loan, spending the proceeds of the loan. These risks of claim dilution are sources of risk for any creditor of a going-concern, of course, but they are more severe when the underlying assets are easily fungible, like a pool of money. Suppliers to a going-concern are also better able to monitor the activity of the firms they supply than would a creditor with a contingent residual liability claim.

Third, and perhaps most importantly, recall that the reason our owner values free assignability in the first place is her demand for *liquidity.* That is, the owner values the ability to cash out by selling her interests for a price and spending the proceeds as she pleases. Empirical evidence from the finance literature shows that liquidity can be quite valuable to the owners of firms. Studies have documented that markets apply significant liquidity discounts to assets that are not freely salable. Restricted stock in public companies, for example, trades at discounts of up to 30% relative to their equivalent, salable shares. [27] If this liquidity demand by the owner were not important, free assignability coupled with residual liability might provide a solution. In fact, another solution might work just as well: the owner could write personal, non-assignable contracts with all of her counterparties and promise not to assign them, even as a bundle. If the owner anticipated no need for liquidity, this would also eliminate opportunism. It would not provide the owner with liquidity, however.

Residual liability, at least if it is to be effective in shielding counterparties from credit risk transfer, will also necessarily restrict the owner's liquidity. To provide an effective guarantee to the counterparty in a freely assignable contract, as we have seen, the owner would need to promise not only that she remain residually liable on the

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[26] They might also try to establish successor liability claims against the other assignees of contracts, but this is unlikely to resolve the opportunism problem we describe here. Successor liability is more likely to be found when the buyer is effectively a continuation of the seller's business as a going concern in a different legal entity.   In our model, the opportunism problem is already one in which the owner has an incentive to break up a firm opportunistically; thus, successor liability is unlikely to protect a counterparty against opportunistic individual transfers of contracts.

[27] W. Silber, Discounts on restricted stock: The impact of illiquidity on stock prices. *Financial Analysts Journal* **47** (1991), pp. 60–64.

contract, but that she also make a credible promise to retain enough assets to make good on the counterparty's claim in states of the world when the assignee cannot. But this means she would have limited ability to use the proceeds from the sale until the assigned contracts expire, which might be years in the future.[28]

is In short, there is a necessary trade-off between the effectiveness of residual liability and liquidity for the owner. As a result, owners will likely value the ability to transfer contracts in a way that does not give rise to residual liability. Bundled assignability can provide the owner with the best of both worlds in a way that individual assignability with residual liability cannot; she can assure her counterparties by bundling with other inputs, and satisfy her liquidity needs by freely selling her interests in the firm.

V.   How Big Should a Bundle Be? Toward a Theory of Subsidiaries and Divisions

The previous sections examined situations in which the owner prefers to sign non-assignable contracts with all of her suppliers, thus bundling them together. This guarantees that the owner must obtain permission from her suppliers to transfer any individual contract away from the bundle. Though this bundling limits the flexibility of the owner, we showed that it can ultimately benefit the owner: the assurance against opportunistic assignment that it provides to suppliers leads them to contract at more favorable rates to the owner. It also encourages the owner to make investments in the firm that are socially valuable. Both effects ultimately increase the value of the owner's equity.

When an owner has multiple lines of business, additional questions arise. Should a firm bundle all of its contracts together to ensure the distinct business lines cannot be separated from each other? Or, should the contracts be held as a group of distinct, separable bundles? The following two subsections give some intuition for the benefits and costs of the *separability* decision.

An analysis of multiple lines of business raises some related questions involving *asset partitioning*. Which assets should bond which claims? Should the suppliers to one line of business have a claim on the assets of another line of business, and vice versa, when the lines of business are held under common control? Or should suppliers have claims only to the cash flows of the business they supply? In this section, we address

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[28] One could imagine trying to devise clever ways to get around this. For example, the owner might agree to hold the cash proceeds from the assignment for the benefit of the bottle supplier, and borrow against them to satisfy her liquidity needs. Presumably, the owner would also need to find a way to guarantee that this personal borrowing could not be senior in priority to the residual liability claim of the supplier, or else the bonding value of residual liability would be lost. If this were feasible (which is not at all certain), an outside lender might be willing to lend against this pool of cash with a junior claim to the residual claims of suppliers. But in reality, problems of incomplete information about the value of these residual claims would likely render this solution ineffective as a means of providing liquidity to the owner.

these questions in turn. We start with an environment in which asset partitioning is irrelevant (both businesses have no chance of failure), to understand the benefits of separability. We then add a risk of failure to one of the businesses, which leads into an analysis of separability in conjunction with asset partitioning.

The Benefits of Separability: Investments with Value Outside the Bundle

To explore these questions, consider a different type of investment. Suppose that at date 0, Patriot Beer's entrepreneur can start a second company, called Moontory, that produces premium whiskey. Like Patriot, Moontory will also consist of a bundle of five supply contracts.

Patriot's owner thinks there may be complementarities in joining the companies under common ownership. For example, she may believe that, because liquor stores and bars that purchase beer generally purchase whiskey too, there may be economies in advertising, ordering, or distribution by having the two products coordinated under common ownership. On the other hand, it might turn out that this strategy will be ineffective. The owner might learn later that the customers that Patriot and Moontory appeal to different clientele, and the profitability of both products would suffer if they were subject to common management rather than being separately owned and controlled. Suppose the knowledge about efficient ownership becomes apparent only after the original integration decision, at date 1: with probability .5 it may be efficient for Patriot and Moontory to be under common ownership, and with probability .5, Moontory should be independent.

Now suppose that our owner has the ability to make an investment in Moontory after creating it at date 0, but before knowing whether or not it is best kept under common ownership with Patriot at date 1. The investment might be a costly advertising campaign that increases knowledge of the brand and consumer demand for Moontory. As such, the investment will add value to Moontory irrespective of who owns it. But the investment will add the most value to Moontory if it is given the efficient ownership structure.

To make all this concrete, suppose that -- just as with Patriot -- five supply contracts are required to produce Moontory whiskey, each of the five suppliers requires an expected payment of 10, and the five original contracts yield a high cash flow with certainty if kept bundled together. If the advertising campaign is undertaken, and Moontory is under efficient ownership (whether owned in common with Patriot or independently), the high cash flow rises from 100 to 120. If not efficiently owned, the high cash flow rises from 100 to 110.

Suppose the investment costs 18. Note that the investment in advertising has a social value of 20 (it raises the final cash flow of the most efficient owner from 100 to 120) so long as Moontory will be owned efficiently at date 1. Thus, the investment is potentially profitable, producing a return of 20 – 18 = 2. The owner would like to set up

an entity structure that gives her the right incentives to make the investment and capture the rewards.

From the earlier analysis above, we can understand why the five Patriot contracts should be tied together: this prevents the threat of opportunistic assignment to low quality firms like MW. Committing to protect supplier/creditors from this opportunism can in turn can make the owner better off, for the three reasons we analyzed above (imperfect renegotiation, wasteful effort, and valuable investments in complementarities.) For similar reasons, the five Moontory contracts should be tied to each other, as a low quality whiskey maker might be willing to acquire one of the Moontory contracts. An important question remains, however: should the entrepreneur own Patriot and Moontory as two separable bundles of contracts at date 0, or should the ten contracts be tied together in a single bundle?

In this example, because neither firm experiences any credit risk, we can show that Moontory and Patriot should in fact be owned as two bundles of five contracts each that can be freely separated from each other. That is, it is efficient and in the interest of Patriot's owner to ensure that she can transfer ownership of Moontory away from Patriot, without requiring permission from any of the ten suppliers, if it is efficient for Moontory to be a stand-alone firm at date 1.

To see this, suppose first that the projects are held, as of date 0, in two separable bundles by the owner. In other words, the owner can transfer the Moontory contracts, as a bundle, to a new owner without the consent of any of the suppliers. Since all suppliers bear no credit risk (the firms will succeed with certainty whether the investment is made or not), they will all be willing to contract for a price of 10. At date 1, if Moontory is best owned as a stand-alone firm, the owner should be able to sell her interest in Moontory for its full value[29]. This value would be $1*(120 – 5*10) = 70$ if the advertising investment is made. If the investment is not made, then the value would be $1*(100 – 5*10) = 50$. If Moontory is best owned jointly with Patriot, then the entrepreneur would realize 70 by keeping Moontory if the investment is made, and 50 if it is not made. Adding in the value of her interest in Patriot (50), and netting the cost of the investment, the entrepreneur's stake would be worth $50 + 70 – 18 = 102$ if the investment is made, and $50 + 50 – 0 = 100$ if it is not. In short, if our owner makes the initial investment of 18 in Moontory, she is certain to receive a return of 10 from that investment, whether it subsequently turns out to be efficient for her to maintain ownership of Moontory or to sell Moontory as a stand-alone firm. Thus, if Moontory and Patriot are held in separable bundles, the owner has the incentive to make the investment, and her stake will be worth 102.

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[29] This assumption seems reasonable, as a buyer need not have any specific qualities in order to buy and hold Moontory. The buyer would only need to have enough cash to make the purchase. Since there should be many such buyers, the seller should receive all the surplus from the transaction.

If the ten contracts are owned together in a single bundle, however, there is potential for a holdup by the suppliers of Moontory when the owner tries to transfer the Moontory contracts. If Moontory is most efficient as a stand-alone, the owner would need to assign the bundle of five contracts to a new owner. For this, she would need consent from the suppliers. As before, let's focus on the negotiation between the Moontory bottle supplier and Patriot's owner, supposing for simplicity that the other suppliers would willingly consent to having their contracts assigned[30]. If the supplier has the bargaining power with respect to the owner, he is in an advantageous position. The supplier knows that without his consent, the sale of Moontory will not take place – in which case Patriot's owner would not realize the value of the advertising investment, and would have a stake worth only 50 + 50 – 18 = 82. Knowing this, the supplier will consent to the transfer, but only if Patriot's owner pays the supplier an additional 20. This would leave the owner with a stake that is worth, after the investment cost and the transfer payment, 70 + 50 – 18 – 20 = 82.

Anticipating that this value extraction by the Moontory bottle supplier will occur at date 1, the owner would not make the advertising investment. For if she makes the investment, her stake will be worth 82 if Moontory is efficient as a stand-alone, and 102 if it is more efficiently owned in combination with Patriot (in which case no supplier consent is required to realize the value of the investment, and thus no payment need be made to the bottler). This means that, in expected value, her stake is worth .5(102) + .5(82) = 92. If, alternatively, she chooses not to make the investment, her stake is worth 50 + 50 - 0 = 100. As before, the holdup problem leads the owner to forgo a profitable investment because too much of the surplus ends up in the hands of her suppliers. It follows that the owner has an incentive to ensure that the bundles are freely separable, so that if necessary she can sell one of the bundles and realize the maximum equity value of 102.

A comparison to our earlier analysis may be useful. When we analyzed Patriot and its bottle supplier above, the supplier was subject to an increase in credit risk if its contract were assigned to MW. This, in turn, reduced the incentive of the owner to make investments that increased the value of the bottle supplier *when kept in the original bundle*. Thus, tying the bottle supplier's contract to the bundle encouraged investment in complementarities with that bundle.

In the Moontory/Patriot example, by contrast, suppliers to Moontory and Patriot bear the same credit risk (here, no risk at all), whether they are in two separate bundles or a single bundle; either way, the two individual projects will succeed for sure. If Moontory's suppliers would be exposed to a higher likelihood of default when separated from Patriot, this might distort the incentives of Patriot's owner to assign. As we showed (when we analyzed the inventory investment in Patriot), this in turn can weaken the

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[30] Clearly, this would not be in the suppliers' best interest; they would try to extract some of the surplus from the transfer as well. This would only exacerbate the holdup problem we demonstrate here, so we put the other suppliers aside to keep things simple.

owner's incentives to make investments in Moontory that are complementary with Patriot.

I the numerical example at hand, however, there is no potential credit risk transfer problem, so there is no risk of opportunism by the owner that can ultimately destroy value. Thus, there is no cost to allowing free transferability of Moontory *as a bundle* away from Patriot, while there is a potential benefit. This shows that bundling contracts together can reduce the incentive of the owner to make investments that increase the value of contracts *when separated.*

Having thus illustrated the benefits of separating two lines of business into distinct bundles of contracts, we now expand the example to consider the *costs* of separability.

The Costs of Separability

The previous example showed that, under the parameter values we have assumed, the owner should retain the option to separate Moontory from Patriot without the permission of suppliers. This gives the owner an incentive to make investments in an economic entity when that entity may be worth more under the control of a new owner.

In the previous example, both Moontory and Patriot are sure to succeed, and each business will be able to pay its own suppliers with certainty. This implies that the effect of Moontory claims on Patriot's suppliers, and vice versa, is irrelevant. If one of the businesses' cash flows might be needed to pay the claims of the other business's creditors, then the decision becomes more complicated. To illustrate, we modify the previous example as follows: We assume that Patriot will succeed for sure, but that Moontory is risky and might fail. Concretely, we assume that Moontory's initial probability of success is only .6; with probability .4 it will fail and produce a cash flow of 0.

1. Separability Without Asset Partitioning: The Credit Risk Transfer Problem Revisited

Let's suppose for the moment that, if two businesses like Patriot and Moontory are held under common ownership, their creditors will have claims on the entire pool of commonly-owned assets. In other words, we will assume that the two firms' assets are not partitioned, so that the claims of their creditors are not kept separate.

If the owner ultimately sells Moontory to a new owner and keeps ownership of Patriot, however, we will continue to assume no residual liability. Moontory's creditors will no longer be able to reach Patriot's assets after being sold away from Patriot, and vice-versa.[31]

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[31] As in our example with Patriot and the bottle supplier, we do not consider residual liability explicitly in our numerical solutions. For the reasons we discuss in Section IV (E) above, to the extent that Patriot's

Suppose, as before, that the investment increases the cash flow by 20 under efficient ownership and 10 otherwise, but that the investment only pays off if Moontory succeeds. This means that, even if efficient ownership will be achieved, the expected value of the investment is now only .6*20 = 12. Suppose that the investment costs 10. This implies that the investment is profitable, offering a net return of 12 -10 = 2.

Now let's consider the owner's incentives for separating Moontory from Patriot at date 1, after making the investment. If the owner chooses to sell Moontory to a new owner, she will receive a price of .6*(100 + V – 5F), where V is the value of the investment, conditional on the success of Moontory (i.e., V is either 10 or 20, depending on whether Moontory is more or less efficient as a stand-alone), and F is the payment promised to a Moontory supplier. The overall price is the expected value of Moontory's equity to a buyer, which the owner of Patriot should be able to capture in a sale of that business.[32] Adding this price to the value of the entrepreneur's stake in Patriot (which is worth 1*(100 – 5*10) = 50), the entrepreneur's combined equity in the two businesses is worth 50 + .6*(100 + V – 5F) = 110 + .6V – 3F.

If she does not sell Moontory, then the value of her ownership interest is the combined value of the cash flows from the two firms, less the combined value of the claims. Patriot's creditors, given the certainty of its cash flows, will demand a contract price of 10. Thus, the value of the owner's equity is 100 + .6(100 + V) – 50 – 5F = 110 + .6V – 5F.

Comparing the owner's payoffs from separating and not separating Moontory, for a given V and F, we can see that the owner will have a bias toward transferring Moontory. In doing so, the owner separates Patriot's cash flows from the claims of Moontory's suppliers—and this increases the value of the owner's equity. Comparing the expressions above, we can see that the amount of this increase in value is 2F. This is exactly the amount that the five Moontory suppliers lose in expected value when they are separated from Patriot, and thus lose the ability to reach Patriot's assets. Each supplier would be paid F with certainty if bundled with Patriot; as a stand-alone, however, each supplier is paid only when Moontory succeeds. Thus, each supplier receives only an expected payment of .6F. So each supplier loses .4F in expectation, making the total loss to the 5 creditors equal to 5*.4F = 2F – which is precisely the amount that the entrepreneur gains.

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owner values liquidity (the ability to cash out her interest in Moontory and/or Patriot and spend it as she pleases), she is likely to resist a solution that provides protection to Moontory's creditors by way of a promise to hold the proceeds of the sale of the businesses to pay a claim by Moontory's suppliers that may arise later if Moontory fails.

[32] This assumes that the buyer has no other assets to which the suppliers could attach, which would increase the value of the suppliers claims. It is exactly this type of buyer who would be willing to pay the most for Moontory, so it seems a sensible assumption.

With this in mind, we can see that the owner might have an incentive to sell Moontory, even if the investment in Moontory is more valuable when Moontory is owned in common with Patriot. The owner gains 2F by separating Moontory from Patriot. As long as this gain exceeds the loss from using the Moontory investment inefficiently (in this case, .6*(20 -10) = 6), the owner finds it worthwhile to sell Moontory, whether it is most efficiently owned by Patriot or not. Note that F will never be less than 10 in our example, so the owner will always prefer to sell Moontory, irrespective of whether it is more or less valuable as a stand-alone firm.[33]

Taking a step backward, the owner will anticipate that the value of the investment will not be maximized, given her bias toward selling Moontory. As a result, the investment, from the owner's perspective, is worth 20 when Moontory is most efficient as a stand-alone, but only 10 when it is best owned by Patriot. This means the expected value of the investment to the owner, given the way the owner expects to use it, is only ½*.6*20 + ½*.6*10 = 9. Since we assumed the investment costs 10, the owner will choose not to invest at the outset, and a profitable opportunity is lost.

The lesson from this example is very similar to the lesson offered by the earlier example of Patriot and its bottling company. The ability to shift credit risk to suppliers can lead to underinvestment in complementarities. Here, there is a 50% chance that the investment in Moontory will be complementary with Patriot. The distorted incentives to sell Patriot caused by the credit risk transfer problem lead to underinvestment in complementarities. In the next section, we explain how asset partitioning may be able to solve this problem of distorted investments.

2.   **Separability With Asset Partitioning: Efficient Separation Decisions**

Now, let's suppose that the owner can and does choose to hold Patriot and Moontory so that their assets are partitioned: Patriot's suppliers will have a claim only to the cash flows of Patriot, and Moontory's suppliers will have a claim only to the cash flows of Moontory. (As we will discuss shortly, separate legal entities will, in general, be necessary to do this.) The owner will, however, hold the equity in both firms.

In partitioning the assets and liabilities of the two lines of business in this way, the owner can remove her incentive to transfer Moontory opportunistically. That, in turn, increases her incentive to invest. To see this, suppose the owner makes the investment. If she keeps Moontory, the value of her equity in the two entities would be the value of Patriot equity plus the value of Moontory equity: (100 – 5*10) + .6*(100 + V – 5F) = 110 + .6V – 5F. Notice that this payoff function is the same as the owner's payoff if Moontory is sold to another owner. This means that the owner will make the decision about whether or not to sell Moontory based on the allocation that generates the highest V. If

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[33] To convey this intuition, we are assuming that the owner and Moontory's suppliers do not renegotiate to an efficient outcome; as we have seen, renegotiation can result in a holdup of the owner by the suppliers, which can similarly reduce the value of the investment to the owner.

Moontory is most efficient as a stand-alone, the owner has an incentive to sell it; if not, she has an incentive to keep it.

Again stepping backward to the owner's investment decision, she anticipates that the investment's value will be maximized, given her incentive to transfer Moontory efficiently at date 1. Thus, the investment has an expected value of .6*20 = 12 to the owner. Given that the investment costs 10, it is in her interest to make the investment. More generally, the owner will choose to invest in this example whenever the investment cost is less than 12. This means that the owner will invest efficiently: she has the incentive to invest if and only if the investment is profitable. The owner ultimately captures the net value of the investment. This means it is in her interest to set up Patriot and Moontory so that the assets (contractual claims) and obligations associated with one line of business are not only bundled separately from those associated with the other line of business, but partitioned off from each other as well.

3. Non-separability, With and Without Asset-Partitioning: Holdup with No Corresponding Benefit

In this numerical example, we have shown that separability with asset partitioning gives the owner the incentive to invest efficiently—that is, she will invest if and only if the investment is profitable. Using the same numerical example, it is easy to see that non-separability, with or without asset partitioning, will not produce efficient investment decisions. Under non-separability, the consent of Moontory's suppliers would be needed to separate Moontory and Patriot. This would give rise to the now-familiar holdup problem that reduces the owner's incentive to make investments that are valuable outside the bundle.

Although separability combined with asset partitioning is the best of the four options in this particular numerical example, the result is specific to the particular type of investment we have considered: one that pays off only when the project succeeds. This type of investment never benefits a supplier, because it pays off only when the suppliers would have been paid in full anyway.

It is not generally true, for any type of investment an owner might make, that any two businesses should be both separable and partitioned to generate the best possible investment incentives for owners. We now turn to one last example, to illustrate why the opposite set of characteristics -- non-separability without asset partitioning -- may be the best possible strategy for a different type of investment (one that increases the probability of success, and hence benefits the suppliers). This will establish a trade-off between a strategy of separability and asset partitioning (which resembles two distinct subsidiary entities) and non-separability without asset partitioning (which resembles two divisions within the same legal entity) when two businesses are held initially under common ownership.

4. Bonding versus Holdup

To sharpen understanding of the reasons why the owner might want to ensure that Patriot's and Moontory's creditors have claims on a common pool of assets, let's

change slightly the way the advertising campaign works. Suppose that the entrepreneur's investment in the advertising campaign for Moontory increases, not (as we assumed above) the final cash flow, but rather the probability that Moontory will succeed. If the advertising investment is made, and Moontory is not under efficient ownership, the probability of success rises from .6 to .7. If the investment is made and ownership of Moontory is efficient, the company's probability of success rises from .6 to .8. In all cases, Moontory returns a cash flow of 100 if it succeeds and 0 if it fails.

Because it will help our intuition later, we denote by the parameter q the probability that Moontory is most efficient as a separately owned business. (So far, we have assumed that q = ½.) We denote the investment cost, in turn, by the parameter x. Thus, the investment is socially efficient as long as x ≤ 20, because the expected value of the net return from the investment, when Moontory is owned efficiently, is (.8 - .6)*100 – x = 20 – x.

The key feature of this example is that an investment that lowers the risk of failure is particularly valuable to the supplier/creditors, because it increases the chance that they will be fully repaid. Moreover, the extent to which the owner and the suppliers benefit from this investment depends on the bundling and separability decisions. We now compare two cases: separability with asset partitioning, and non-separability without asset partitioning. Using the same intuition as above, we can show that in this example, the other two possibilities (non-separability with asset partitioning and separability without asset partitioning) will never be optimal structures for the owner. [34]

a.   Separability with Asset Partitioning

In this example, if Moontory and Patriot are separable and partitioned, the owner has weaker incentives to invest. First, recall that our result above demonstrates that, once partitioned into isolated pools of assets, the owner has the incentive to decide the ownership of Moontory and Patriot efficiently at date 1. This means that the full value of the investment (the increase in success probability from .6 to .8, which is worth 20 in expected value) will always be realized under separability with asset partitioning. If – given that she will subsequently choose the efficient ownership structure -- she invests, her equity in the two entities will be worth

$$1*(100 – 5*10) + .8*(100 – 5F).$$

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[34] It is easy to see that non-separability with asset partitioning will never be preferred to separability with asset partitioning: once assets are partitioned, there is no opportunistic credit risk transfer problem. Non-separability merely introduces a holdup problem when Moontory is efficiently owned separately from Patriot, with no corresponding benefit. With respect to the fourth case, separability without asset partitioning, it can be shown that in this example, Patriot's owner will have the incentive to sell Moontory, irrespective of whether it is more efficiently owned by Patriot. As in the previous case, the owner does not realize the full value of her investment. This, in turn, implies that separability with asset partitioning is also superior to separability without asset partitioning.

If she does not invest, her equity in the two entities is worth

$$1*(100 – 5*10) + .6*(100 – 5F).$$

(The supplier's contract price F will take the value 10/.8 = 12.5 if the suppliers anticipate investment, and 10/.6 = 16.7 if they anticipate that investment is not in the owner's interest.) The difference between these two expressions is the owner's benefit from investment: $.2*(100 – 5F) = 20 - F$. Thus, the owner will not choose to invest unless $x \leq 20 - F$.

Recall that investment is socially efficient for any $x \leq 20$, so asset partitioning creates underinvestment in this example. The degree of underinvestment is increasing in the suppliers' claim F, but is not dependent on q. The underinvestment follows because the suppliers capture some of the investment's value. By investing, the owner increases the value of the suppliers' claims by the increased probability of success, multiplied by the amount they are promised: $.2*(5F) = F$. Because the owner does not internalize this benefit conferred on the suppliers, but bears all its costs, it reduces her incentive to make the investment.[35]

b.   Non-Separability Without Asset Partitioning

If Moontory is bundled together with Patriot and guaranteed a claim to Patriot's cash flows, the owner's calculus is as follows. If she makes the investment, the value of her equity in the combined firm will be the combined cash flow of Moontory and Patriot, less the combined value of the claims and the cost of the investment. If Moontory is most valuable when owned together with Patriot, this value is

$$(1*100 + .8*100 – 5*10 – 5 *10) - x = 80 - x.$$

If Moontory is most valuable as a stand-alone, however, she must obtain the consent of Moontory's suppliers to transfer the contracts to a new owner. As we have seen, this gives the suppliers hold-up power to extract, in bargaining, the additional value of separating Moontory from Patriot. If we suppose the suppliers extract the entire surplus in bargaining, the owner's payoff would be the same as it would be if she did not separate Moontory; in this case, Moontory would only succeed with probability .7. Thus, the owner's equity value, after renegotiation, is

$$(1*100 + .7*100 – 5*10 – 5*10) - x = 70 - x.$$

The first of these results will be obtained with probability 1-q (the probability that Moontory is most efficiently owned together with Patriot) and the second with probability q. Thus, if the entrepreneur invests, the expected value of her equity, net of the investment cost, is

$$(1-q)*(80 – x) + q*(70 - x) = 80 – 10*q - x.$$

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[35] This underinvestment result is simply a classic example of the debt overhang problem, as originally formulated by Myers (1977) [add cite].

If the owner does not invest at all, the value of her equity would instead be

$$100 + .6*100 – 5*10 – 5*10 = 60.$$

Comparing these latter two owner payoffs, investment will be in the interest of the owner whenever $80 – 10*q - x \geq 60$, or, $x \leq 20 – 10q$. If $q = 0$, meaning that Patriot is always efficiently owned together with Moontory, then the owner will invest whenever $x \leq 20$, which means that the owner will make the investment decision that is socially efficient. This is sensible, because there is no potential holdup problem if the owner never finds it efficient to separate Patriot and Moontory. As q rises, however, the holdup problem appears with greater frequency, and the owner's incentive to underinvest increases. Note, however, that the owner's investment decision under no asset partitioning is independent of F, the value of the supplier claims.

VI.   Predictions and Implications of Our Theory

Pursuing some of the implications of our informal model a bit more, we can develop some predictions about entity structure and assignability of contracts.

With respect to assignability, our theory suggests that individual contracts that are subject to a non-verifiable quality problem or a credit risk transfer problem are likely to contain restrictions that limit individual assignability. More often than not, contracts are assembled in an original bundle because owners believe they are complementary. Investments that owners make in a firm are likely to be investments that make the bundle worth more when kept together, rather than investments that are more valuable when contracts are split up.

Nevertheless, our Patriot/Moontory example demonstrates the possibility that it is optimal to make some contracts freely assignable if there is sufficient chance that the contracts may be worth more in the hands of a new owner, and if investments by the owners can increase the value of the firm outside its current bundle. While the numerical example focused on transferability of one bundle of contracts away from another, the intuition can also apply to a single contract that might be more valuable in the hands of a different firm.

Our numerical example suggests that assignability should be more severely restricted when there is a greater likelihood of a credit risk transfer problem. Opportunistic assignment takes place between low risk assignors and high risk assignees. Thus, we should expect stricter limits on assignability when the firm is considered high quality and safe. Assignment should also be more tightly restricted when the counterparty is more exposed to credit risk. An individual contract that involves prepayment by the firm, or a contract that can be terminated on short notice in the event of non-payment, exposes the counterparty to less credit risk and less risk of opportunism and should have weaker restrictions on assignability; a longer term contract, in which the counterparty has greater credit risk exposure to the firm, should have tighter restrictions.

Furthermore, free assignability is more likely to be restricted when the potential pool of risky assignees is particularly large. We might expect to see tighter restrictions on assignability when the underlying asset is standard and can be used by many potential assignees. Thus, we might expect to see tighter restrictions on assignability for leases of standardized office space than for supply contracts of highly specialized components.

At the same time, we should expect contracts that are non-assignable on an individual basis to allow for the possibility of bundled assignability. This should be particularly true when the owners have higher demands for liquidity. A founder that is personally tied to his business and has no desire to sell it should be less likely to negotiate for the right to transfer the bundle away without permission. Serial entrepreneurs, who value the opportunity to sell a business and move on to other ventures, should be sure to contract for bundled assignability. Bundled assignability should also be more likely when the value of the bundle is less dependent on its owner. Smaller firms whose values are more heavily dependent on the presence of owner/managers, for example, might restrict assignability even as a bundle. In these situations, we should expect *change in control* provisions that require consent when the business is transferred away from its current owners.

Finally, our theory generates some predictions about how two businesses should be held under common control. When owners want to preserve the option to separate the business at a later date, they will want to ensure that the businesses are held in distinct, separable bundles, rather than one large bundle. This prevents holdup of any specific investments made by the owners that may be valuable outside the bundle.

We have also shown that, conditional on making the bundles separable, asset partitioning is also valuable. This ensures that the value of a counterparty's claims is based only on the value of the business he supplies, whether his business is transferred or not. This, in turn, gives the owner better incentives with respect to the decision of whether to separate the businesses or hold them together. When these incentives are more closely aligned with efficiency, the owner has better incentives to invest in the businesses at the outset.

Finally, we showed that it is not always optimal to separate two businesses into separable, partitioned entities, even if they may prove later to be more valuable when separated. Pooling the contracts of the two businesses (non-separability without asset partitioning) is more likely to be an optimal strategy when the owner's investments can have a large effect on the creditworthiness of a business, when the firm's counterparties have a larger stake in that business, and when it is more likely that the businesses will prove to be worth more together than separated. It may be sensible to use the assets of a safe business as bonding assets for the claims of the creditors of a riskier business. This gives the owner better incentives to make valuable investments in the risky entity. The cost of this strategy is the potential holdup in states of the world where the businesses prove to be efficiently separated; thus, non-separable, non-partitioned firms (i.e. divisions) rather than separable, partitioned firms (i.e. subsidiaries) should be

observed more when it is less likely that the businesses will prove to be worth more apart than together.

VII. Why are Legal Entities Valuable in Our Theory?

Our economic theory shows that bundled assignability is a useful solution to the tension caused by an owner's need for liquidity and counterparties' demand for protection against opportunism. Moreover, bundled assignability gives owners incentive to assemble contracts that are complementary in value and to make investments that add to these complementarities. We have also shown that asset partitioning can be useful in preserving an owner's incentive to hold together or separate businesses efficiently. In this section, we explain why legal entities can make it easier for contracting parties to create these benefits. In short, legal entities may not be necessary to create bundled assignability, but in most realistic cases, they are likely to be helpful and less costly than any alternative. To create asset partitioning, as prior work has discussed, a legal entity is necessary in most realistic cases. Because the connection between legal entities and asset partitioning is well-developed in prior work, we focus on the first benefit of entities here.

Legal entities and bundled assignability

To understand why legal entities can be useful in creating bundled assignability, consider how parties might create bundled assignability when they can use a legal entity. If the owner planned to cash out by way of a stock sale, she could do this with a very simple contracting structure. She 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. Because courts generally do not consider a sale of stock to be an assignment of the firm's contracts, the entrepreneur would have liquidity, because she could sell her stock in the corporation for cash. This would transfer the firm's contracts, as a bundle, to its new owner. Counterparties could not prevent the stock sale, so they would not be able to hold up the entrepreneur and extract any of the value of the owner's investments in bargaining. At the same time, the entrepreneur could not opportunistically transfer one of the contracts apart from the rest without permission, because the parties are all tied to the same legal entity.

Another means of tying contracts via an entity is to use bundled assignment clauses that use the entity to define the bundle. These clauses are slightly more complicated, but would allow for the entrepreneur to cash out by way of an asset sale instead of a stock sale.[36] To do this, the entrepreneur could set up a corporation and

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[36] Allowing for a future asset sale, instead of a stock sale, might be useful for several reasons. First, tax liability for the buyer and the seller will differ in an asset sale and a stock sale. Second, the buyer might prefer to avoid any hidden liabilities that would attach to the assets in a stock sale but not in an asset sale.

take ownership of its stock, as before. The corporation would sign contracts with its counterparties that would prevent individual assignment, but permit assignment to a party that acquires all (or substantially all) of the contracts and assets of the corporation. If all of the counterparty contracts take this form, the entrepreneur would also have bundled assignability.

Now, let's consider how the entrepreneur might try to achieve the same benefits without using a legal entity. One way is for the entrepreneur to sign personal contracts that are non-assignable, but that enumerate, in each contract, the other components of the bundle with which the counterparty wishes to be tied, allowing for assignment to occur only with the defined bundle. If this is feasible, it would be a reliable way of creating bundled assignability. For a business of any measurable complexity, however, this would be extremely costly and unreliable. To take one example, Boeing uses 700 different suppliers to create one of its airplanes[37]. 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.

Alternatively, bundled assignability might be achievable without an entity by way of a general description of the bundle. The entrepreneur might sign personal, individually non-assignable contracts, but allow for bundled assignability in the event of a sale of "the Patriot Beer assets", for example. This would not require a precise description, in each contract, of the other contracts that constitute the bundle. This solution might prove complicated, however, in the event that the entrepreneur wishes to separate Patriot from another business she owns, or her personal assets, if identification of "the Patriot Beer assets" is not easily verifiable. As we have seen, when an owner transfers contracts, she has the incentive to opportunistically separate a bundle in a way that shifts credit risk to her suppliers. She might seek to exclude some contracts from her definition of the "Patriot Beer" bundle. This risk would be greater to the extent that the owner runs multiple businesses that use assets and contractual rights in common. If the same distributor contract is used to distribute both Patriot Beer and Moontory whiskey, would the distribution contract be a Patriot Beer asset that is included in the sale? When key employees provide services to both firms, which employees will move with Moontory in the event of a sale? The answer might not be easily identifiable. Moreover, the risk of an ambiguously-defined bundle runs two ways: the Patriot

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Finally, to the extent that a court might deviate and consider a sale of stock to be an assignment, the more complicated contractual language used to define the bundle in an asset sale might give the entrepreneur more certainty in being able to avoid holdup.

[37] See Jim DeStefani, *A Look at Boeing's Outsourcing Strategy.* 132 Manufacturing Engineering 65, (Mar 2004).

suppliers might argue that the definition of the bundle being sold is under-inclusive. They might use this ambiguity opportunistically to hold up the owner and extract more value in the sale. As we have seen, these opportunism problems can lead to underinvestment in the business.

In comparison, a bundle that references the entity creates substantially less ambiguity. The counterparty who is concerned about opportunism need only prove that there are assets owned and/or 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 an asset not being transferred is not owned by the entity being sold, or 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.

A related way of defining a bundle, without an entity, that would avoid this ambiguity problem is to create a central "node" that would be common to all contracts. For example, the owner might create a Patriot Beer trademark, and specify in each contract that it can be assigned only if all contracts similarly tied to the trademark are also assigned. Since the identification of the contract to a bundle is clear, the opportunism problem of identifying the bundle would disappear. Similar to a legal entity, it would rely on the incentive of future contracting parties to tie themselves to the bundle, to protect themselves from opportunism by the entrepreneur.

This approach is the closest to a legal entity, but it has an important disadvantage. While this procedure might be effective for bundling contracts, it is less effective for tying contracts to the proceeds of the bundle that were generated before the transfer takes place. As we have seen, one of the benefits of bundling to a contractual counterparty is that, by virtue of being tied to other contracts of complementary value, the counterparty is more likely to receive its promised payments.

With a legal entity, the cash flows produced by the complementary bundle of contracts (along with any other assets the entity acquires before the transfer takes place) would become property of the legal entity and thus a component of the bundle that would be transferred, along with its existing contractual rights. A bundle that uses the legal entity would tie the contracts not only to each other, but also to these assets that are generated by the complementarity of the contracts.[38][39]

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[38] The asset partitioning features of entities also helps tie the future cash flows generated by the bundle of contracts to the counterparties when the firm is transferred by way of a stock sale. If the owner wanted to sell the firm by assigning the bundle of contracts to a new owner in the absence of an entity, the counterparties might want assurance that the assignee of the bundle did not have a substantial amount of pre-existing debts that could attach to the future cash flows generated by the bundle, and thus dilute the value of the counterparty claims. If they tried to protect themselves from transfers of this kind contractually (by requiring consent to a transfer), it could give rise to the same holdup problems we see in our numerical example. Because the legal entity makes the counterparties senior to the personal creditors of any assignee, the counterparties' claim to the firm's cash flow is less dependent on the identity of its owner, allowing for counterparties to consent to free transferability of the contracts (as a bundle).

Even if it were possible to somehow earmark the proceeds of the contracts to a particular bundle, the entrepreneur would have significantly less incentive to tie her future business assets to the trademark for the benefit of her existing contractual counterparties. With a new contractual right, the entrepreneur might have a stronger incentive to tie the new contract to the rest of the bundle, because protecting the counterparty in this way would give the entrepreneur better terms on the new contract. But with respect to a pure asset (like cash), tying the asset to the bundle of contracts would convey little benefit to the entrepreneur; it would merely reduce her flexibility.

Other Reasons for Restricting Assignability

In our numerical example, 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.[40]

It is perhaps the most important reason, however, and it seems to help explain the law's presumptions as to whether various corporate transactions constitute assignments of the firm's contracts.

Assignments in Bankruptcy

Under bankruptcy law, most contracts that are otherwise nonassignable by their explicit terms are held to be assignable in bankruptcy. Our model helps illustrate why

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[39] As with all theories of legal entities, the existence of the entity alone does not guarantee that the owners will hold assets sufficient to satisfy the entity's claims. The entrepreneur could take the cash flow and pay it out as a dividend to herself. But some features of entity law (in particular, the law of fraudulent conveyance) prevents behavior of this type that is intended to "hinder, delay or defraud" creditors, or that puts the entity in a financially shaky condition after the transfer. To some extent, this "seals" assets within the entity for the benefit of creditors. Parties can also write more sophisticated contracts than the ones we consider here that use the entity to protect the counterparty (for example, including covenants that limit dividends paid by the entity, or conditions these payments on the entity's net worth).

[40] 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.

this is so. In the model, the owner of the firm has the strongest incentive for value-destroying opportunistic assignment when there is complementarity between contracts—that is, when the firm's contracts are worth more together than separated. This value-destroying assignment threat is particularly severe when the assigning firm is more creditworthy than the potential assignee, as the potential assignment payoff to the assigning firm is greater when this difference in creditworthiness is greater.

At the same time, we saw in the Moontory example that free separability of contracts can sometimes be valuable and create the best possible incentives for investment. This is most likely to be true when investments can have more value outside the bundle than inside, and when separating assets is less likely to expose suppliers to an increase in credit risk. Bankruptcy might be seen as a particular state of the world in which both of these conditions are likely to be true. Firms in bankruptcy are more likely than firms in the general population to be worth more broken up than kept intact (i.e., the firm in bankruptcy is less likely to have positive "going-concern value"). Furthermore, firms in bankruptcy are usually the most severely financially distressed. The chance that a supplier to a firm in bankruptcy will suffer an *increase* in credit risk in being assigned to another firm is much less than would be the case if the potential assignor were financially healthy.

In this sense, bankruptcy might be conceived as a way of achieving *conditional assignability*: in states of the world that are more likely to involve assignment of the value-destroying, opportunistic kind, the anti-assignment provisions normally included in contracts are respected. In bankruptcy states, where opportunism is reduced and assignment is more likely to be efficient, the law overrides contractual terms to prevent the holdup of an efficient assignment by the firm's counterparties.[41] Moreover, the opportunism problem is limited by the bankruptcy judge, who is charged with permitting assignments only if there is "adequate assurance of future performance."[42]

Some exceptions in the bankruptcy code to free assignability help prove the rule. For example, the Bankruptcy Code does not permit loan contracts to be assumed, and hence they cannot be assigned. For free assignability to be efficient according to our theory, there must be some possibility of an investment that increases the value of the asset side of the contract, making it more valuable in the hands of an assignee. The asset side of a loan contract is simply the cash borrowed under that contract. It is hard to imagine any investment a firm could make that would increase the value of a loan

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[41] We should be careful to note here that our theory cannot rationalize the entirety of bankruptcy's treatment of executory contracts under Section 365. In particular, our model does not explain why the bankruptcy code makes this contingent assignability in bankruptcy states a mandatory rule, as it is under the law, as opposed to a default rule that parties could contract around.

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

contract to an assignee of that contract. Hence, there is little benefit to be seen in allowing free assignability of such a contract.

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 that which we model. The threat is that the original licensee will assign the license to another firm that will make broader or different 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.

Other Corporate Transactions

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. Nonetheless, a broader view of the considerations illustrated by the model shows that opportunism can also take the form of placing in the same bundle two or more previously unrelated contracts. Thus, merging a highly profitable firm with one that runs a substantial risk of failure can increase the credit risk faced by the counterparties of the more securely solvent firm. It is understandable, then, that the rule that a merger does not constitute a violation of a nonassignment clause is less absolute than the rule that a sale of some or all of the stock in a corporation doesn't constitute an assignment.

Conversely, while 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.

VIII.   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.