Bankruptcy Litigation and Debt Contracts

Nicola Gennaioli and Stefano Rossi*

IIES Stockholm University and Stockholm School of Economics

This version: March 2006

Abstract

We present a view of corporate bankruptcy as litigation where the primary role of bankruptcy law is to enforce debt contracts. We allow parties to write fully contingent debt contracts, and study how such contracts optimally react to bankruptcy law. Our central finding is that bankruptcy codes allowing courts to seize a greater share of the debtor's property foster the use of contracts including more sophisticated incentive mechanisms such as options and direct court intervention − as opposed to straight liquidation − to decide whether to liquidate or continue upon default. Our analysis yields several predictions on how debt contracts and debt structure vary with bankruptcy law and rationalizes the different resolutions of financial distress adopted in the U.S., the U.K. and Sweden as special cases. The key normative implication of our analysis is that optimal bankruptcy law should maximize the enforcement of private contracts, for example by improving legal protection of creditors against fraudulent conveyances and wrongful trading.

JEL classification: G33, K22.

Keywords: Litigation, Corporate bankruptcy, Foundations of contract theory.

---

*Stockholm University, E-mail: nicola@iies.su.se; and Stockholm School of Economics, E-mail: stefano.rossi@hhs.se. We thank Viral Acharya, Julian Franks and Andrei Shleifer for helpful comments. Samuel Lee provided excellent research assistance.

1 Introduction

Recent research in comparative corporate governance has shown that legal systems affect financial markets development by shaping the framework for the enforcement of private contracts (La Porta et al. 2006, Djankov et al. 2005). That is, rather than by merely specifying certain investors' rights, legal systems affect the development of financial markets by allowing entrepreneurs and investors to use better contractual arrangements. For example, it has been shown that better enforcement enables the parties to write more sophisticated private equity contracts (Lerner and Schoar 2005), and to include more covenants in debt contracts (Qian and Strahan 2004). In turn, better contract enforcement fosters financial markets development (Djankov et al. 2006).

Existing theories of financial contracting do not directly address how a country's legal enforcement mechanisms affect financing and welfare. In this paper, we aim to fill this gap by focusing on the enforcement role of bankruptcy codes. The traditional approach to bankruptcy is based on the incomplete contracts view (Hart 1995), and assumes that financial distress is too costly to contract upon or just unpredictable. Because conflicts among creditors may arise and renegotiation may break down (e.g. Bulow and Shoven 1978, Gertner and Scharfstein 1991), an optimal bankruptcy law must say how to restructure creditors' claims, i.e. "who gets what", and whether the firm should be liquidated or not, i.e. "what to do with the firm" (Hart 2000). According to this view, bankruptcy law should fill contractual gaps ex post rather than enforce what the parties have written ex ante.

We instead view bankruptcy as a legal process for the litigation and enforcement of debt contracts. We allow debt contracts to specify "who gets what" and "what to do with the firm" in case of default. We then study how, by shaping the enforcement of these contracts, bankruptcy law affects financing and welfare. Our model allows us to make three points. First, it delivers predictions on how debt contracts respond to enforcement that are consistent with empirical evidence, as well as novel predictions on how bankruptcy law should affect debt structure. Second, it includes the U.S., the U.K. and the Swedish approaches to the resolution of financial distress as special cases and rationalizes existing proposals for bankruptcy reform. Finally, its key normative implication is that bankruptcy law should facilitate private contracting by enhancing the enforcement ability of bankruptcy courts.

We assume that bankruptcy law affects the enforcement of debt contracts by shaping two key outcomes of litigation.[1] The first is the ability of bankruptcy courts to pledge the firm's cash flows to creditors. Bankruptcy law affects this outcome by dealing with a version of the well-known problem of managerial self dealing or tunneling (Shleifer and Vishny 1997), known in the context of bankruptcy as fraudulent conveyances or wrongful trading. For example, LoPucki (2005) describes how three Enron executives started building million-dollar homes in Texas with Enron money before the Enron bankruptcy filing. LoPucki then argues that the court's decision not to appoint a trustee in the Enron case allowed the executives to essentially get away with it, because in Texas "the law permits a debtor to fraudulently invest ill-gotten gains in a homestead to beat his or her creditor" (p.150), while a trustee would have been able to challenge those actions in court under a fraudulent transfer theory. By contrast, trustees are always appointed in U.K. Receivership, and creditor protection against fraudulent conveyances is stronger.[2] This example illustrates that bankruptcy codes deal very differently with fraudulent conveyances and are thus likely to affect how much creditors can expect to be repaid from the bankrupt firm.

The second outcome of litigation we consider is the quality of the bankruptcy courts' estimates of the firm's continuation value. Bankruptcy law affects this outcome by shaping courts' expertise, for example through the appointment of former bankruptcy practitioners as bankruptcy judges. Bankruptcy law also affects the quality of courts' information through disclosure rules, dispute resolution procedures, or by yielding judges more or less discretion. By shaping the bankruptcy courts' ability to efficiently liquidate or continue a financially distressed firm, bankruptcy law can in turn affect the parties' willingness to delegate such powers to courts by contract.

We model the first dimension of bankruptcy law as the fraction of a firm's cash flow that courts can pledge to creditors. We model the second dimension as the precision with which courts estimate the firm's continuation value. We then embody these enforcement constraints in a model of debt under uncertainty where an investment project can be liquid or not, and if it is not liquid, it can either be optimal to continue or to liquidate. We depart from the Hart and Moore (1998) setup by allowing the parties to write fully contingent debt contracts and ask how contracts respond to the two enforcement dimensions of bankruptcy law. In this setup, we show that under imperfect enforcement a "complete" contract mandating liquidation if and only if it is efficient may not be

[1] It has indeed been argued that bankruptcy can be seen as litigation and that direct litigation costs such as the fees paid to lawyers, accountants and experts decrease the advantages of debt financing (e.g. Kraus and Litzenberger 1973). Yet, the importance of such direct costs has received little empirical support (Warner 1977).

[2] Section 5 describes how the U.K., U.S. and Swedish bankruptcy codes protect creditors against fraudulent conveyances.

optimal because ex post there is a conflict between the entrepreneur and the investor over liquidation and imperfectly informed courts may solve such conflict the wrong way.

The key enforcement dimension in bankruptcy is the courts' ability to pledge the project's future cash flows to creditors. If such dimension of creditor protection is high, then the parties achieve the first best with a contract consisting of straight debt plus an option whereby in distress the investor decides to liquidate the project if and only if it is socially efficient to do so. The strike price of the option induces the first best liquidation policy by making the investor residual claimant to the gains from continuation. When creditor protection is intermediate, the parties achieve a second best outcome with a fully state contingent contract calling for a bankruptcy court to intervene ex post on the continuation/liquidation decision, even if courts make costly mistakes. The intuition is that in this case the strike price of the option (i.e. the share of the liquidation proceeds the investor must forsake) is too large for the investor to break even. If creditor protection is low, parties achieve a third best outcome under a straight-debt contract whereby the project is always liquidated upon default. Finally, if creditor protection is lowest the project is not financed.

These results show that bankruptcy law affects optimal contracting: bankruptcy codes fostering court's ability to seize the debtor's property allow parties to include more sophisticated incentive mechanisms in their debt contracts and attain higher welfare. We thus confirm the idea that the litigation framework affects contracting (Gennaioli 2005) and the evidence that better enforcement fosters the use of more sophisticated financial contracts (Lerner and Schoar 2005, Qian and Strahan 2004). Section 5 shows that our results can rationalize different resolutions of financial distress across countries, such as the use of options and strict contract enforcement in U.K. Receivership, the use of court supervision in U.S. Chapter 11, and the use of cash auctions in Sweden. That is, the resolution of financial distress under different bankruptcy codes may precisely depend on how much creditors can expect to recover from bankrupt firms under different codes.

Section 4 extends the model to the case where the entrepreneur borrows from many creditors. To begin, we establish that ex ante contracting can avoid the coordination costs of multiple creditors (e.g. Jackson 1986), as the debtor can replicate the single creditor outcome by suitably choosing the firm's debt structure. We then note that our setup easily accommodates heterogeneous claims such as secured and unsecured debt together.

We find that bankruptcy law affects contracting with multiple creditors by shaping debt structure, defined as the relative number and size of secured/unsecured claims. The entrepreneur can reduce the cost of using options by borrowing from a large secured option-holder and infinitely many unsecured creditors. This way, the option-holder pays the option's strike price to the dispersed unsecured creditors, who in turn find it hard to collectively bribe him into inefficient liquidation. Yet, there is also a cost of debt dispersion. In the spirit of Bris and Welch (2005), we find that pro-debtor bankruptcy litigation procedures aggravate the coordination failure in creditors' litigation strategies, thus calling for a more concentrated debt structure. As a result, our model predicts that better legal enforcement facilitates both issuance of unsecured claims and debt dispersion.

From a normative standpoint, our paper sheds some light on the theory of optimal bankruptcy. Starting from an incomplete contracts premise, the existing literature has stressed what we call the "contractual" dimensions of bankruptcy law rather than its "enforcement" dimensions as we do here. By deriving the division of creditor's claims and the disposition of the firm's assets in bankruptcy as part of an optimal debt contract, we are able to rationalize existing proposals for bankruptcy reform. Section 6 discusses how our model can rationalize the Aghion, Hart and Moore (1992) and Bebchuk (1988) proposals for using options in bankruptcy, the Bolton and Rosenthal (2002) idea of ex post third party intervention, and the use of cash auctions (Baird 1986, Jensen 1989).[3] In this respect, we find that "one size cannot fit all" (Hart 2000) because different resolutions of distress are optimal depending on the enforcement dimensions of the bankruptcy code.

The key normative implication of our theory is that bankruptcy law should facilitate private contracting by enhancing the enforcement ability of bankruptcy courts. To the extent that debt contracts flexibly respond to bankruptcy litigation, then our model illustrates the costs of bankruptcy rules that specify "who gets what" and "what to do with the firm" without taking the parties' contractual response into account. For example, "completing" ex post a straight debt contract by distributing options to creditors and shareholders may undermine financing altogether if straight debt was optimally chosen precisely to avoid litigation over more sophisticated contracts in front of ineffective bankruptcy courts. In this respect, our analysis supports the idea that bankruptcy laws should be set as default as opposed to mandatory rules, so as not to interfere with contractual freedom (Rasmussen 1992, Schwartz 1997). More broadly, we argue that bankruptcy reforms should primarily aim at maximizing courts' ability to pledge the debtor's income to creditors, for example by establishing strict and clear rules for the avoidance of fraudulent conveyances and maximizing mandated disclosure. Private contracts will then do all the rest.

[3] Other papers optimally derive bankruptcy procedures by solving an ex-ante contracting problem. Yet, unlike our paper, these papers do not focus on litigation and do not allow the parties to write fully contingent debt contracts. For example, see Berglof, Roland and von Thadden (2003), Cornelli and Felli (1997), Povel (1999), Berkovitch and Israel (1999), Bernhardt and Nosal (2004), Giammarino and Nosal (1994), Chen and Sundaresan (2003).

2 The Model

We describe the basic setup in Section 2.1 and legal enforcement in bankruptcy in Section 2.2.

2.1 The Basic Setup

We study a two-period positive net present value investment project that requires an initial outlay of $K > 0$ for the purchase of a physical asset. The project is run by a penniless entrepreneur. In period 1, with probability π the project is liquid and produces a cash flow $y_1 > 0$; with probability $1 - \pi$ the project is illiquid and its cash flow is 0. If the project was liquid in period 1, its period 2 cash flow is $\overline{y}_2$; if instead the project was illiquid, its period 2 cash flow is $\overline{y}_2$ with probability μ or $\underline{y}_2$ with probability $1 - \mu$. To simplify the algebra, we set $\mu = 1/2$.

Figure 1. States of Nature

ω	$\Pr(\omega)$	$y_1(\omega)$	$y_2(\omega)$
G	π	y_1	$\overline{y}_2$
U	$(1-\pi)/2$	0	$\overline{y}_2$
B	$(1-\pi)/2$	0	$\underline{y}_2$

The project can be in one of three states of nature, G ("good"), U ("unlucky") and B ("bad"), (Figure 1). At the end of period 1, before period 2 cash flows are generated, the physical asset can be liquidated, yielding L plus the first period cash flow. Both investment and liquidation are zero-one decisions (Section 4 allows for partial liquidation). We assume:

A.1: $y_1 > \overline{y}_2 > L > \underline{y}_2 > 0$.

Besides imposing $y_1 > \overline{y}_2$ (which only simplifies the exposition but does not entail a loss in generality), A.1. implies that in the first best the project should be liquidated if and only if second period profits are low; in G the project is both liquid and profitable, in U the project is illiquid but eventually profitable. Only in B is the project both illiquid and unprofitable so that it should be liquidated. We also assume:

A.2: $\pi(y_1 + \overline{y}_2) + (1 - \pi)L > K$.

A.2 implies that the net present value of the project is positive even if its assets are liquidated in U, when continuation is efficient. This assumption only simplifies the exposition of our findings on contract choice. Its implications will become clear after Proposition 1.

To finance the project, the entrepreneur E tries to borrow from a wealthy investor I under a financial contract ensuring that I breaks even. Conditional on break even, the contract minimizes ex post inefficiencies arising from under or over liquidation. To describe the set of feasible contracts, we must specify the enforcement constraints in our model.

2.2 Bankruptcy Litigation and Contract Enforcement

When E fails to repay, the contract is litigated in front of a bankruptcy court. We do not model how parties actually end up in court, nor how bankruptcy law shapes the interaction of litigants in court. We characterize the outcome of litigation under a bankruptcy code with two enforcement parameters and study how they affect debt contracts and welfare.[4]

The first enforcement dimension of bankruptcy codes we consider is the share $\alpha \in [0, 1]$ of the project's cash flows that bankruptcy courts can extract from the project and pledge to creditors. The remaining share $(1 - \alpha)$ goes to the entrepreneur.[5] Section 5.1 discusses how real-world bankruptcy codes affect the value of α, for example through the rules affecting the entrepreneur's ability to engage in fraudulent conveyances. When $\alpha = 0$, our model boils down to the Hart and Moore (1998) case of unverifiable cash flows. When $\alpha > 0$ instead, our model departs from Hart and Moore (1998) by allowing the parties to write fully state-contingent debt contracts. Crucially for our argument, this is true even in states of liquidity (i.e. non-strategic) default, when parties must decide whether to liquidate or continue the project.

The second enforcement dimension of bankruptcy litigation is the precision with which bankruptcy courts can assess the continuation value of the project. The issue of whether the physical asset should be liquidated or continued only arises when the firm is illiquid.[6] We assume that in a state of illiquidity courts correctly estimate the continuation value with probability $1 - \theta$. As a result, in state B (U) the court mistakenly believes that the entrepreneur is unlucky (bad) and that the project should be continued (liquidated) with probability $\theta \leq 1/2$. θ captures the court's overall imprecision in evaluating the project's future prospects.[7] Section 5.2 briefly discusses how bank-

[4] Gennaioli and Rossi (2006) introduce into the current framework a model of litigation in front of a limitedly competent and possibly biased bankruptcy court and study how different adjudication rules affect bankruptcy litigation and contracting costs as a result.

[5] Thus one could interpret bankruptcy law as affecting the size of non-dissipative private benefits (see Aghion and Bolton 1992).

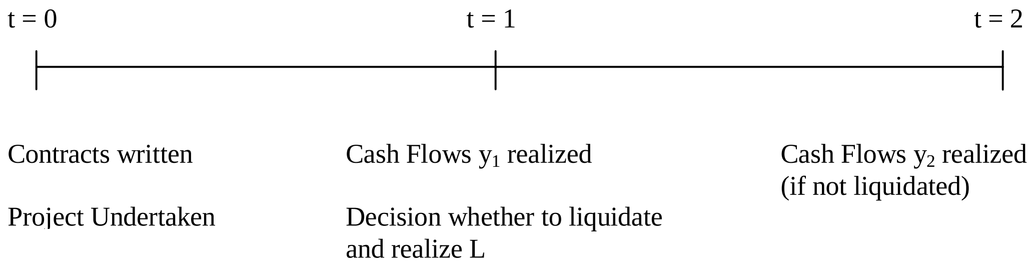
[6] Because in our model courts can always extract a share α of current cash flows, they can perfectly tell whether current profits are positive (in which case default is strategic) or zero (in which case it is not). The alternative assumption that courts cannot perfectly tell apart strategic and liquidity default would complicate the analysis without changing our main results.

[7] In line with Hart and Moore (1998) we assume that both E and I perfectly observe the state of nature. The

ruptcy codes can affect the quality of information produced by the litigation process, for example by regulating information disclosure.

In line with Hart and Moore (1998), we assume that physical assets are harder for the debtor to divert than other less tangible property. For simplicity, we take the liquidation value of the project's physical asset L as given and independent of bankruptcy law.[8] However, notice that creditors' value from liquidating the project is not independent of bankruptcy law. In state G, after an initial cash flow of y_1, such value is $\alpha y_1 + L$, which increases in α. Figure 2 summarizes the timing of the model.

Figure 2. Timeline



We consider financial contracts where the investor lends to the entrepreneur an amount $D \geq K$ in exchange for a repayment schedule. First period repayments can be made contingent on the state of nature. The liquidation decision (as well as the allocation of liquidation proceeds) can be made contingent both on the state of nature and on whether the debtor repaid or not in the first period. Finally, second period repayments can be made contingent on the state of nature, on first period repayment and on whether the project was liquidated or not. Thus, we allow the parties to specify in their debt contract two aspects that incomplete contracts scholars consider the key dimensions of a bankruptcy procedure (Hart 2000): how to allocate the project's cash flows (i.e. "who gets what") and whether to continue or liquidate (i.e. "what to do with the firm").

3 Bankruptcy and Debt Contracts

We now study how optimal contracts depend on α and θ, the two dimensions of contract enforcement in bankruptcy. To gain intuition on the logic of our model, we first study the case when the parties

assumption of symmetric information could be relaxed at the cost of complicating the analysis of renegotiation. Most of our results would go through under the weaker assumption that E is more informed than the judge.

[8] All our results hold as long as the liquidation value L is easier to pledge than cash flows.

do not renegotiate ex post. This analysis is summarized in Proposition 1. We then turn to the case of renegotiation and summarize the results in Proposition 2.

We first evaluate the ex post efficiency of different contracts by examining how they deal with the decision of whether to liquidate or continue. While in the Proofs of Propositions 1 and 2 we show that there may be a variety of contracts yielding the same level of ex post efficiency, here we focus on those contracts that maximize repayment to I, thus making break even more likely. We can then fully characterize contract choice: at any (α, θ) the parties choose, among the contracts achieving the highest ex post efficiency, those maximizing repayment ex ante.

3.1 Optimal Contract Terms when the Project is Liquid

Because courts perfectly determine if the initial cash flow is 0 or y_1 (i.e. whether the state is G or not), we can focus on G in isolation and find the optimal contract terms for this state. Optimal contract terms consist of first and second period repayments $d_1(G)$ and $d_2(G)$, as well as a liquidation policy such that the investor does not strategically default and the project is continued (i.e. $\lambda(G) = 0$). In line with Hart and Moore (1998), E's incentive to default on the promised repayment $d_1(G)$ is minimized by inefficiently liquidating the project upon default and by giving to I all liquidation proceeds $\alpha y_1 + L$.[9] As a result, I can get at most:

$$d_1(G) + d_2(G) \leq \alpha y_1 + \overline{y}_2 \tag{1}$$

In addition, $d_2(G) \leq \alpha \overline{y}_2$ and $d_1(G) \leq y_1$, because E cannot be induced to repay more than share α of period 2 cash flows and more than y_1 in period 1.[10] Under A.1, we have $d_2(G) = \alpha \overline{y}_2$, $d_1(G) = \alpha y_1 + (1 - \alpha)\overline{y}_2$. If $\alpha = 0$ repayment is the same as in the case of unverifiable cash flows (Hart and Moore 1998), where E only repays in period 1 and the threat of foreclosure cannot induce E to pay out more than the project's continuation value $\overline{y}_2$. If instead $\alpha = 1$, the threat of foreclosure is unnecessary: I obtains all present and future cash flows by having the bankruptcy court seize them after they realize. Thus, (1) shows a benefit of effective bankruptcy enforcement: a higher α increases the repayment E can promise to I. In spite of this finding, to understand the impact of bankruptcy codes on debt contracts, we must consider the states B and U when the

[9] Notice that E has no money to pledge to I besides the project's cash flow, because we study the case where I lends to E the sum $D = K$. In the appendix we prove that under no renegotiation it is always optimal to do so.

[10] We implicitly assumed that first period cash flows are entirely consumed by E before the second period. This assumption simplifies the analysis but it is not important for our results.

project is illiquid.

3.2 Optimal Contract Terms when the Project is Illiquid

Under perfect enforcement ($\alpha = 1$, $\theta = 0$) the first best can always be attained under a "complete contract" mandating liquidation only in state B and promising to I enough repayments so that he breaks even on average. Under this contract, the parties effectively ask the courts to intervene ex post to decide whether to liquidate the project (i.e. to verify if the state is U or B). However, if $\alpha < 1$ and $\theta > 0$, such contract is generally unable to achieve the first best because it generates a conflict of interest between the parties ex post. Indeed, if α is low I prefers to liquidate and get L while E prefers to continue and get $(1 - \alpha) y_2 (\omega)$. In this case, it can be costly to ask imperfectly informed courts what to do with the project because it may result in over- or under-liquidation. Can parties do better by using another contract?

If α is sufficiently high, it is not necessary to ask courts to intervene ex post to decide whether to liquidate the project, as in the "complete contract". In fact, if $\alpha\overline{y}_2 \geq L$ the parties can attain the first best by contractually allocating to I the decision of whether to liquidate or continue and all the ensuing cash flows. This way I is virtually residual claimant of the project and only liquidates in state B, when it is efficient to do so. Put differently, if $\alpha\overline{y}_2 \geq L$ the parties can attain the first best by "selling the firm to the investor". This contract exploits the fact that when $\alpha\overline{y}_2 \geq L$ the investor has the incentive to take the right decision with respect to liquidation.

A general way to implement the incentive mechanism above is to use *debt plus option* contracts. For example, when the project is illiquid, the contract can give I a call option (I-call) to buy the project, liquidate it and obtain L.[11] The strike price of the option is $S_{IC} = \max[0, L - \alpha\overline{y}_2]$. If the option is not exercised, I obtains a share α of continuation cash flows. This contract gives I the incentive to continue if and only if future cash flows are $\overline{y}_2$. If $\alpha \geq \alpha^* \equiv L/\overline{y}_2$, then I-call is equivalent to "selling the firm to the investor" because it yields the parties identical payoff and liquidation outcomes.[12] If instead $\alpha < \alpha^*$ the efficient liquidation policy is achieved under I-call but not under "selling the firm to the investor" because under the latter contract I would always liquidate. Intuitively, the strike price of the option ($S_{IC} > 0$) that I must pay to E to liquidate, avoids overliquidation in state U by equalizing I's continuation and liquidation payoffs in that

[11] Because transferring control of the project to the investor avoids the use of E's human capital, we view I's option of buying and liquidating as being equivalent.

[12] However, important legal issues make the two contracts profoundly different from an enforcement standpoint. For example, under "selling the firm to the investor" I is the sole shareholder and E owes I fiduciary duty.

state.

The I-call is not the only way to implement the first best liquidation policy. An alternative *debt plus option* contract gives the entrepreneur a put option to sell the project to I (i.e. to liquidate) for the strike price $S_{EP} = (1-\alpha)\underline{y}_2$. This strike price persuades E to liquidate the project in state B by equalizing his continuation ($(1-\alpha)\underline{y}_2$) and liquidation ($S_{EP}$) payoffs.

Our assumption that parties can contract about default delivers the result that by using options the parties can implement the first best liquidation policy, thus doing away with courts' mistakes. However, the parties' ability to write *debt plus option* contracts crucially hinges on α. When $\alpha < \alpha^*$, to provide incentives for efficient continuation the parties must allocate some liquidation proceeds to E, for example through a positive strike price. Because the strike price reduces I's payoff from liquidation, the use of options may conflict with break even.

In both *debt plus option* contracts the strike prices S_{IC} and S_{EP} summarize the ex ante cost of incentives because they represent the amount of the liquidation proceeds I must forsake to implement the optimal liquidation policy. Let $\widetilde{L} = L - \min[S_{IC}, S_{EP}]$ be the largest liquidation payout I can obtain under I-call or E-put.[13] Then, under these contracts, I lends at most:

$$\pi(\alpha y_1 + \overline{y}_2) + (1-\pi)(1/2)(\widetilde{L} + \alpha\overline{y}_2) \tag{2}$$

The first term in (2) represents the maximal ex ante repayment I can extract in state G; the second term is the maximal average repayment I can extract in U and B under our *debt plus option* contracts. If (2) is larger than K, then *debt plus option* ensures the first best and I breaks even. Intuitively, I's break even is more likely the larger is α, the bankruptcy courts' ability to seize the debtor's property. Importantly, the ex ante cost of options as measured by the strike price is inversely related to α. The lower α, the greater the conflict of interest between I and E over whether to liquidate, the steeper must be the incentives, and the larger the share of liquidation proceeds that must accrue to E (the smaller is $\widetilde{L}$).[14] Thus, options are less feasible at low levels of

[13] It is helpful to compare repayment under the two debt plus option contracts. They both yield the same to I in G and U. In B the investor call repays more if $(1-\alpha)\underline{y}_2 \geq \min[L, \alpha\overline{y}_2]$, i.e. if α is small. Because $\overline{y}_2 > \underline{y}_2$, as α goes down, I's bias for liquidation increases more than E's bias for continuation. As a result, at low levels of α providing incentives to I is relatively more costly.

[14] Notice that other option contracts can never dominate the two discussed here. For instance, if $\alpha < 1$, giving E a call to buy the project at the strike price $\alpha\overline{y}_2$ will always lead to continuation because E always prefers the latter outcome (yielding him at least $(1-\alpha)\underline{y}_2$) to liquidation (yielding him 0). Indeed, E's promise to pay $\alpha\overline{y}_2$ is not credible in state B. Even if in state U or B E can borrow from a third party, the E-call does not work for low α for two reasons. First, third party borrowing only helps if that party perfectly knows the continuation value of the project. This is unreasonable, especially because the main virtue of options is that they give incentive for ex post

α.

Notice that if α is sufficiently low *debt plus option* may not ensure break even. As a result, the parties may need to sacrifice ex post efficiency to be able to finance the project. As in Hart and Moore (1998), a simple way to go for the parties is to write a *straight debt* contract whereby the project is liquidated if E fails to repay $d_1(G)$ and all liquidation proceeds go to I. Since in this case the project is liquidated both in state B and U, I lends at most:

$$\pi(\alpha y_1 + \overline{y}_2) + (1-\pi)L \tag{3}$$

By comparing (2) and (3) one can see that if $\alpha < \alpha^*$ investor break even is easier to attain under *straight debt* than *debt plus option*, for two reasons. First, because $\alpha\overline{y}_2 < L$, even under efficient continuation I obtains less than under liquidation. Second, in this parameter range options are costly because, as opposed to *straight debt*, they allocate some liquidation proceeds to E. However, differently from *debt plus option*, *straight debt* imposes ex post inefficiencies because in state U the project is over-liquidated and the parties lose $(1-\pi)\left(\overline{y}_2 - L\right)/2$. Can the parties improve upon *straight debt* by asking the courts to intervene ex post on the decision of whether to liquidate the project?

It turns out that the answer is yes. First, if courts are precise (i.e. if θ is low) then court intervention is better than *straight debt* from an ex post standpoint. Intuitively, precise courts give rise to lower overliquidation costs than *straight debt*. Second, court intervention verifying whether the state is U or B reduces, for a given α, the incentive cost of options. Intuitively, bankruptcy courts allow the parties to increase the share of liquidation proceeds accruing to I by reducing the need for endogenous information revelation. Formally, the parties may write a *contingent debt* contract whereby I is given a call option with a state contingent strike price, $S_{IC}(B) = 0$, and $S_{IC}(U) = L - \alpha\overline{y}_2$. If first-period cash flows are zero, the court intervenes by assessing the project's future prospects and thus enforcing the state contingent strike price. If $\theta = 0$, then in state B all liquidation proceeds go to I, who lends at most:

$$\pi(\alpha y_1 + \overline{y}_2) + (1-\pi)(1/2)(L + \alpha\overline{y}_2) \tag{4}$$

efficiency without using third party information. If third party information was perfect options would be useless in the first place. Second, even if the third party lender is perfectly informed, if $\alpha < \alpha^*$ the investor would bribe him not to lend to the entrepreneur, thus leading to over-liquidation.

By comparing (4) and (2), one sees that if $\alpha < \alpha^*$ *contingent debt* avoids the ex ante cost of incentives because it allocates all liquidation proceeds to I. As a result, *contingent debt* is more feasible than *debt plus option*. Hence, for intermediate α *contingent debt* may be feasible when *debt plus option* is not, implying that the use of direct court intervention can allow the parties to improve upon *straight debt* when *debt plus option* is unfeasible. However, when α is low also *contingent debt* becomes unfeasible and *straight debt* is the only way to finance the project. In fact, by inducing continuation in U *contingent debt* reduces repayment to I relative to *straight debt*. Interestingly, expression (4) also holds when the bankruptcy court's assessment of the project's continuation value is noisy (i.e. when $\theta > 0$).[15]

Direct court intervention is not costless, even from an ex post standpoint. If the quality of the information produced in bankruptcy litigation is low (i.e. $\theta > 0$), courts may enforce the wrong strike price. The resulting ex post loss is the cost of court intervention. In particular, the cost of *contingent debt* arises in U if courts enforce $S_{IC}(B) = 0$, inducing the over liquidation loss $(1-\pi)(1/2)\theta(\overline{y}_2 - L)$. Such expected ex post loss is smaller than that arising under *straight debt* but larger than that arising under *debt plus option*.

To sum up, the financial contracts considered differ as to how they trade off investor break even (ex ante efficiency) with efficient continuation (ex post efficiency). *Straight debt* maximizes the former at the expense of the latter; *debt plus option* maximizes the latter at the expense of the former; *contingent debt* is in between the previous two. Hence, *debt plus option* yields the first best, *contingent debt* the second best, *straight debt* the third best. Are there other contracts that differently solve this ex post vs. ex ante trade off? More importantly, how does bankruptcy litigation as identified by α and θ shape the efficiency of different contracts? We find:

Proposition 1 *There exist $\alpha_O \geq \alpha_C \geq \alpha_S$ such that the project is financed if and only if $\alpha \geq \alpha_S$. For $\alpha \geq \alpha_O$ the parties attain the first best under debt plus option. For $\alpha \in [\alpha_C, \alpha_O)$ the parties attain the second best under contingent debt. In this range social welfare decreases in θ. For $\alpha \in [\alpha_S, \alpha_C)$ the parties attain the third best under straight debt.*

Straight debt, *debt plus option* and *contingent debt* are the most efficient contracts for the parties to use. Crucially, bankruptcy law, as captured by the enforcement parameter α, shapes contracting by shaping the tradeoff between ex ante and ex post efficiency. If α is high ($\alpha \geq \alpha_O$), investor

[15] Here θ does not affect repayment because there is no bias towards continuation or liquidation. Under a pro-continuation bias, break even under *contingent debt* would require courts' bias not to be too large.

break even is easy to attain and the parties reach the first best by using *debt plus option.* If α is intermediate ($\alpha_C \leq \alpha < \alpha_O$) the cost of incentives undermines break even and the parties complement them with direct court intervention by using *contingent debt.* Such contract yields break even at the expense of ex post efficiency because courts' errors lead to over liquidation. If α is low ($\alpha_S \leq \alpha < \alpha_C$), break even is hard to attain and the parties sacrifice ex post efficiency by writing a *straight debt* contract.[16]

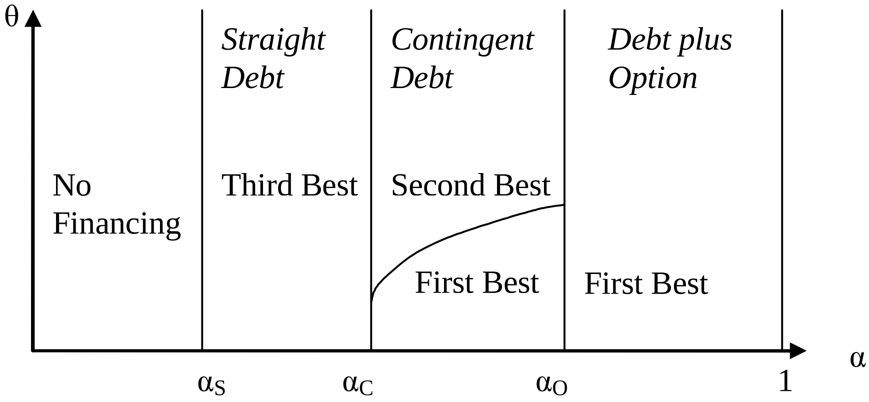
This result suggests that not only does bankruptcy litigation shape the form of financial contracts but also the parties' welfare. As α becomes smaller, ex post inefficiencies increase because parties must move away from *debt plus option* to *contingent debt* and eventually to *straight debt.* If α is very low, then no debt contract is feasible and the project is not financed. In addition, when *contingent debt* is used welfare decreases in θ because poorer informational quality in bankruptcy increases the likelihood of over-liquidation. An objection to our result is that if the parties were allowed to renegotiate inefficient contract terms ex post, then ex ante contracts would matter less than in Proposition 1. By allowing for ex post renegotiation we find:

Proposition 2 *If the investor has all the bargaining power in renegotiation, then for* $\alpha_C \leq \alpha < \alpha_O$ *there is a function* $\theta_R(\alpha)$ *increasing in* α *such that for* $\theta \leq \theta_R(\alpha)$ *the investor lends* $K + \theta(L - \alpha\overline{y}_2)$ *and parties attain the first best under contingent debt. For every* (α, θ) *outside this region, contract choice and welfare are the same as in Proposition* 1*.*

Proposition 2 shows that our main findings obtain even when we allow for renegotiation. Figure 3 summarizes the pattern of contract choice and welfare emerging from Proposition 2:

[16]Assumption A.2 matters here: it implies that if *straight debt* guarantees financing, E prefers to sign it rather than to do nothing. Yet, the main features of contract choice remain valid even if A.2 does not hold.

Figure 3. Contract Choice



In our model ex post renegotiation improves little over ex ante contracts because the ex ante constraints imposed by litigation also hold ex post when renegotiation occurs. Full bargaining power on the investor's part shows this intuition very clearly. Now *debt plus option* contracts are renegotiation proof not only because they yield ex post efficiency, but also because they already maximize repayment to I, which discourages him to strategically renegotiate ex post. But also *straight debt* is renegotiation-proof when optimal, because E does not have enough resources to bribe I to continue the project in U (this is more generally the case if $\alpha < \alpha^*$). Renegotiation only matters if $\alpha \in [\alpha_C, \alpha_O)$, when *contingent debt* is optimal. In this case, it is optimal for I to lend E the extra amount $\theta(L - \alpha\overline{y}_2)$ ex ante, which allows E to bribe I ex post so as to avoid the over liquidation cost of courts' imprecision. Yet, this contract is feasible only if the court is sufficiently precise (i.e. if $\theta \leq \theta_R(\alpha)$), otherwise I should lend so much as to undermine break even.

These results change little if the entrepreneur has all the bargaining power. We study this case in the appendix and find that, with respect to Proposition 2, this shift in bargaining power only affects the debt plus option contract where E is given a put option. Now E may strategically use his decision rights to reduce the payment to I ex post. This reduces the feasibility of the E-put and lowers the threshold above which *debt plus option* is feasible to $\widetilde{\alpha}_O \leq \alpha_O$. Yet, the main thrust of Proposition 1 is preserved.

Overall, these results indicate that debt contracts respond to contractual litigation under bankruptcy law. Bankruptcy laws enhancing courts' ability to grab the debtor's property allow the parties to attain the first best by using options. When courts' ability to grab the debtor's property is intermediate, options become too costly and the parties complement them with direct court intervention in the continuation/liquidation decision. In this parameter range, the quality of information produced in bankruptcy becomes a key determinant of ex post efficiency and welfare. When instead courts' ability to grab the debtor's property is low, then the parties use a simple *straight debt* contract that maximizes repayment to the investor at the cost of over-liquidating the project. Finally, if bankruptcy courts are very ineffective the parties refrain from contracting.

These results confirm the idea that litigation affects contracting (Gennaioli 2005) and rationalize the recent evidence in law and finance that better enforcement fosters the use of more sophisticated financial contracts (Lerner and Schoar 2005, Qian and Strahan 2004), and financial markets development (Djankov et al. 2005, La Porta et al. 2006). Section 5 shows that these results can also rationalize different approaches to bankruptcy across countries, such as the use of options and strict contract enforcement in U.K. Receivership, the use of court supervision in U.S. Chapter 11, and the use of cash auctions in Sweden. Section 6 discusses how our model can rationalize existing proposals bankruptcy reforms, and lays out our key normative implications.

4 Multiple Creditors

We now extend our model to the case where the entrepreneur borrows from multiple creditors. Our goal is twofold. First, we want to address the oft made point that the key role of bankruptcy law is to regulate conflicts among creditors (Jackson 1986) that could lead to inefficient runs on the assets of the company (e.g. Bulow and Shoven 1978). Second, we want to ask whether bankrupcy law affects the optimal debt structure by shaping the enforcement of debt contracts.

We introduce multiple creditors by assuming that the project's physical assets feature constant returns to scale and can be partially liquidated. That is, after liquidating a share $f < 1$ of the firm's assets, total output is fL plus the continuation value $(1 - f)y_2(\omega)$. This assumption allows for a multiplicity of secured creditors.

4.1 Contracts and Coordination Among Creditors

We address the issue of coordination among multiple creditors. In our model where the parties contract ex ante over the liquidation/continuation decision, the question is whether bankruptcy law can reduce the ex ante costs of contracting away ex post inefficient runs, for example due to the ex ante lack of coordination among multiple creditors. Suppose that the project is financed by a number $n > 1$ of creditors. Furthermore, assume that creditors do not renegotiate. Is it then possible, for any enforcement technology (α, θ), for the entrepreneur to replicate the single-creditor outcome by offering ex ante a set of debt contracts to n uncoordinated investors? We establish:

Proposition 3 *For any given (α, θ), the firm can always replicate the optimal one-creditor contract by issuing $n > 1$ identical claims, each of them of the same type as that the one-creditor would obtain, and with a face value equal to $(1/n)$th of the face value of the one-creditor's debt.*

The one creditor outcome can be replicated under $n > 1$ creditors by dividing, for any (α, θ), what formerly was a single claim into n identical claims. For example, if it is optimal for a single investor to lend under *debt plus option*, then each of the n investors is given a debt contract whose face value is $(1/n)$th of the single-creditor contract whereby either the entrepreneur or the investor is given the option to continue or liquidate $(1/n)$th of the project. The same logic can be applied to all other contracts. The intuition is straightforward: under constant returns to scale, the project can be divided into n identical but smaller projects, each financed by only one creditor. As a result, ex post inefficient runs on the project's assets are avoided, except when they are necessary for ex ante break even, i.e. when straight debt is optimal.

The lack of coordination among creditors is not a concern if parties can contract ex ante. In fact, Proposition 3 does not require any coordination among creditors. Optimal contracting is achieved because under competitive credit markets the entrepreneur internalizes the costs and benefits of different contracts, thus working as an effective coordination mechanism.[17] Proposition 3 does not say, however, whether the entrepreneur can actually do better than in the single-creditor case by suitably choosing the debt structure. Moreover, Proposition 3 takes (α, θ) as given, even though it is natural to expect that the number of creditors affects the outcome of bankruptcy litigation. In the next section we study optimal debt structure and ask to what extent it depends on litigation under the bankruptcy code.

4.2 Enforcement Costs of Different Debt Structures

We study the impact of bankruptcy codes on debt structure in two steps. Section 4.2.1 takes enforcement quality (α, θ) as given, while Section 4.2.2 endogeneizes (α, θ) as a function of debt structure.

[17] This implies that the replicability of the one creditor outcome under multiple creditors does not hinge on the assumption of constant returns either. For example, if the project's assets are complementary, E only needs to add a provision in each of the n debt plus option contracts whereby the entire project is liquidated when at least one option holder exercises. See the proof of Proposition 3 for details.

In our model debt structure is defined by the relative number and size of secured claims with respect to unsecured ones. In fact, a crucial difference between the single-creditor and the multiple creditors case is that now E can always finance part of the project by issuing unsecured debt. In the one-creditor case an unsecured claim guarantees financing only under very special conditions, e.g. $\alpha = 1$. We call "unsecured" any creditor that in no state of nature has the individual right to liquidate (a share of) the project's assets. Holders of *debt plus option*[18], *straight* or *contingent debt* are all regarded as secured. Fully unsecured claims – i.e. claims distributing 0 in liquidation – are only feasible if $\alpha > 0$.[19] The face value of a fully unsecured claim paying out only in G (when the project is liquid) is at most $\pi\alpha(y_1 + \overline{y}_2)$. Indeed, if an unsecured claim is repayed more than $\alpha(y_1 + \overline{y}_2)$, E selectively defaults on it and repays only the secured creditors.

Unsecured debt plays a crucial role in our model. Its coexistence with secured claims in a debt structure allows E to lower the ex ante costs of options and thus improve both ex post and ex ante efficiency. To see this, suppose that $\alpha \in [\alpha_C, \alpha^*)$. Proposition 1 showed that in this range, under a single creditor ex post efficiency is only attained by giving E some liquidation proceeds, which reduces repayment to I and thus debt capacity. If instead E borrows from two creditors, one secured holding *debt plus option* and another unsecured, the secured one can pay the call option's strike price $S_{IC} = L - \alpha\overline{y}_2$ to the unsecured one. The combination of these two contracts attains full ex post efficiency and allows E to borrow up to:

$$\pi(\alpha y_1 + \overline{y}_2) + (1 - \pi)(1/2)\left[\max(L, \alpha\overline{y}_2) + \alpha\overline{y}_2\right] \tag{5}$$

The comparison of (5) and (2) shows that borrowing from a secured and an unsecured creditor allows the entrepreneur to exploit the ex post benefit of *debt plus option* without paying its ex ante cost. Because the option holder can now pay the option's strike price to the unsecured creditor, total debt capacity is unaffected by incentive costs. In other words, mixing secured and unsecured claims allows the entrepreneur to separate liquidation rights and repayment,[20] which reduces the cost of incentives and facilitates break even. Yet, such separation of liquidation and repayment rights can be hard to achieve in practice. If $\alpha < \alpha^*$ creditors as a group lose from continuation.

[18] We call "secured" also a creditor holding a *debt plus option* contract with an entrepreneur put because, provided the entrepreneur exercises his option, the creditor liquidates the project.

[19] We introduce the notion of "fully unsecured" creditors because a creditor may have no rights to decide whether to liquidate or continue the project but still be entitled to some liquidation proceeds. We return to this issue below.

[20] This is the most important distinction between secured and unsecured claimants in our model. The former have the right to liquidate the project, the latter do not have such right even though they may be entitled to some liquidation proceeds.

Hence, if they collude against the debtor, the project is always liquidated in state U.

4.2.1 Renegotiation and the Benefit of Debt Dispersion

Can the debt structure, i.e. the relative number, size and type of secured claims, be designed so as to counter the impact of ex post collusions among creditors? In order to address this issue, we need to specify a process of coalition fomation among $n > 1$ creditors. We assume:

A.3: With n creditors, a coalition of $s \leq n$ of them forms with probability $P(s\,|n) = [n!/(n-s)!s!]\,/2^n$

Thus, coalitions among players form by random assignment. A.3 captures the intuitive notion that if n is larger it becomes harder to form an encompassing coalition of creditors. Renegotiation works as follows: after a coalition is formed, its members bargain over liquidation and unsecured creditors have all the bargaining power (this assumption only simplifies the analysis but is not important for our results). Under A.3, we find:

Proposition 4 *If $\alpha \geq \alpha_C$, E attains the first best by borrowing the amount $\pi(1-\alpha)\overline{y}_2 + (1-\pi)(1/2)(L - S_{IC} + \alpha\overline{y}_2)$ from a large secured creditor holding debt plus option with strike price $S_{IC} = (L - \alpha\underline{y}_2)$ and the amount $\pi(\alpha y_1 + \alpha\overline{y}_2) + (1-\pi)(S_{IC}/2)$ from infinitely many unsecured creditors. If $\alpha_S \leq \alpha < \alpha_C$, E cannot do better than by borrowing $\pi(1-\alpha)\overline{y}_2 + (1-\pi)L$ from a large secured creditors holding straight debt and the amount $\pi(\alpha y_1 + \alpha\overline{y}_2)$ from infinitely many unsecured creditors. If $\alpha < \alpha_S$ the project is not financed.*

If $\alpha \geq \alpha^*$, all creditors benefit from continuing the project when it is efficient to do so. Thus, the optimal debt structure is not renegotiated and attains the first best. If $\alpha < \alpha_C$ not only does every creditor find it optimal to always liquidate but it is also efficient to do so, because it is the only way to ensure break even. As a result, the secured creditor is given *straight debt* - which is not renegotiated.[21] If $\alpha < \alpha_S$ the project is not financed.[22]

The most interesting case arises if $\alpha^* > \alpha \geq \alpha_C$. Now E can attain the first best by issuing a debt structure that is similar to the two-creditors one from before except for the fact that now

[21] Under multiple creditors, we have allowed for partial liquidation. Thus, for $\alpha_S \leq \alpha < \alpha_C$ break even is also attained by a *straight debt* contract that in U and B liquidates a fraction $f < 1$ of the project. Intuitively, partial liquidation improves upon full liquidation if and only if over-liquidation is more costly than under-liquidation, i.e. if $L < (\overline{y}_2 + \underline{y}_2)/2$. See the appendix for the details.

[22] Other debt structures yield the same outcome for $\alpha \notin [\alpha_C, \alpha^*)$ as there need not be only one secured creditor nor many unsecured ones. In general, the set of possible debt structures is very large, as any liquidation policy can be attained under different packages of contracts (e.g. a liquidation pattern can be attained by arbitrarily dividing liquidation rights among different creditors). Yet, our goal here is to illustrate, by reference to some specific and intuitive debt structures, what E can at most achieve as a function of α.

the strike price S_{IC} is larger and unsecured debt is dispersed among infinitely many bondholders. Importantly, E grants to a single, large option holder all continuation proceeds (i.e. $\alpha\overline{y}_2$) and sets the largest strike price at which the option holder continues in U but liquidates in B. This debt structure is optimal for two reasons. First, by maximizing the option holder's incentive to continue in U, it makes it harder for any coalition of unsecured creditors to bribe the option holder into inefficient liquidation. Second, for given repayment to the option holder, dispersion of unsecured debt among infinitely many creditors minimizes the probability that any given coalition of them has enough resources to convince the option holder to liquidate.[23]

To gauge the benefit of debt dispersion, suppose that there are $n-1$ unsecured creditors. Then, because every creditor benefits from liquidation, in state B the project is always efficiently liquidated. In state U instead, a coalition of $m \leq n-1$ unsecured creditors successfully bribes the option holder to inefficiently liquidate if:

$$L - S_{IC} + \frac{m}{n-1} S_{IC} \geq \alpha\overline{y}_2 \quad \Leftrightarrow \quad m \geq \widetilde{m}(n) = (n-1)\, \frac{\alpha(\overline{y}_2 - \underline{y}_2)}{L - \alpha\underline{y}_2} \tag{6}$$

The left-hand side of (6) identifies the size of the smallest coalition of unsecured creditors m such that the coalitions' bribe to the option holder in state U, $(m/n)\, S_{IC}$, induces the option holder to inefficiently liquidate the project. As the right-hand side of (6) shows, the size of such smallest coalition increases with the number of unsecured creditors because when n is larger each unsecured creditor obtains a smaller fraction of the liquidation proceeds.

As a result, over-liquidation in state U happens with probability $\Pr(m \geq \widetilde{m}(n)\, | n-1)$, i.e. when a coalition with at least $\widetilde{m}(n)$ unsecured creditors forms. For $n \to +\infty$, this probability goes to zero as the only coalition inducing liquidation eventually becomes the grand coalition, which forms with zero probability.[24] Hence, by dispersing unsecured debt, E can bring to zero the cost of incentives and the parties no longer rely on the court's intervention.

This result indicates that borrowing from multiple creditors under the optimal debt structure reduces the ex ante costs of incentives by separating liquidation and repayment rights among different creditors. Such separation, attained by issuing secured and unsecured claims, is made

[23] This result may seem to contradict the idea that unsecured creditors favor continuation over liquidation. In our model, this effect does not hold because there are no violations of priority among creditors. It would instead hold if, for example under straight debt, continuation allows the secured creditors' priority to be violated. We return to the issue of violation of priorities at the end of section 4.2.2 below.

[24] The same benefit of debt dispersion (and the same optimal debt structure) also arises under the alternative assumption that each unsecured creditor individually decides whether to bribe the option holder or not. In this case, collective bribing fails because of holding out of dispersed creditors (Gertner and Sharfstein 1991).

robust to ex post collusion among creditors by concentrating liquidation rights on a large secured creditor and by dispersing unsecured debt. These results differ from existing studies on the optimal number of creditors (e.g. Bolton and Scharfstein 1996); cast in an incomplete contracts setup, such analysis focuses on secured creditors only and does not study the incentive benefit of separating liquidation and repayment rights in bankruptcy.[25] Moreover, while Bolton and Scharfstein show that debt dispersion beneficially increases creditors' barganing power, here dispersion of unsecured debt reduces creditors' power by preventing them from colluding against the debtor. Another strand of the literature focuses on multiple investors holding *different* claims, such as debt vs. equity (Dewatripont and Tirole 1994) and short-term debt vs. long-term debt (Berglof and von Thadden 1994). These papers take the basic financial contracts as given and study how to combine them in an optimal financial structure. Our paper instead derives at the same time the optimal contracts and the optimal financial structure.[26]

4.2.2 Uncoordinated Litigation and the Cost of Debt Dispersion

Proposition 4 stresses a benefit of debt dispersion, but it does not fully pin down debt structure as a function of bankruptcy law, because it does not explain how the latter affects the optimal number of creditors n. For instance, when the secured creditor is given *straight debt* (in $\alpha_S \leq \alpha < \alpha_C$), the number of unsecured claimants is indeterminate because no ex post renegotiation can ever occur.

However, borrowing from many creditors may be costly because their uncoordination might make them vulnerable to the debtor, eventually undermining break even. This is especially true in bankruptcy litigation, where creditors' dispersion can severely impart their overall litigation strategy by hindering, for example, their individual incentives to invest resources in gathering evidence, hiring lawyers, bringing motions to the court. As a result, by shaping the individual litigation costs of dispersed creditors, bankruptcy codes can affect the optimal number of creditors. In this exploratory section, we introduce some of these considerations in our model of contracting.

For simplicity, we only focus on how litigation among multiple creditors may affect α, the share of cash flows that creditors can grab. Concretely, assume that if creditor i engages in (unverifiable) legal effort x_i, he prevents the debtor from diverting a share x_i/n of each creditor's repayment.

[25] However, it is interesting to notice that in the case of asset complementarity, the Bolton and Scharfstein (1996) trade-off on the number of secured creditors arises also in our model, but only for $\alpha = 0$.

[26] In a costly-state-verification model Winton (1995) derives the optimal mix of secured and unsecured claims as a function of exogenous verification costs. In our model instead the ex ante and ex post costs of different claims are determined endogenously as a function of imperfect enforcement.

This assumption captures the nature of litigation as a public good: a creditor's successful attempt to monitor the debtor restrains the diversive activities of the latter at the benefit of all the creditors. To exert x_i (e.g. to produce evidence or to bring a motion to the court), creditor i spends a share $(1/2)\delta x_i^2$ of his own repayment.[27] Parameter $\delta \geq 0$ characterizes bankruptcy law. A bankruptcy law with higher δ specifies more pro-debtor litigation rules. For example, a bankruptcy code with high δ may place the burden of proof on the individual creditor, thus increasing the amount of resources he should expend to revoke the fraudulent conveyances and obtain repayment. Each creditor individually invests $x_i = 1/(\delta n)$.[28] As a result, all creditors obtain the same share of their due repayment, which also corresponds to the overall share of cash flows that the debtor is forced to disgorge:

$$\alpha(n, \delta) = \frac{2n - 1}{2\delta n^2} \tag{7}$$

Intuitively, the fraction of cash flows the debtor must disgorge decreases with the number of creditors, because a larger n worsens the moral hazard in team among creditors. Bris and Welch (2005) exploit this effect to study the optimal concentration of creditors. Interestingly, the severity of the moral hazard in teams problem depends on the pro-debtor bias of procedural rules δ. If bankruptcy law makes it very easy for each individual creditor to obtain repayment ($\delta = 0$), then the number of creditors becomes irrelevant. If instead bankruptcy litigation is more debtor friendly ($\delta > 0$), coordination of legal strategies is required for the debtor to repay. Now debt dispersion is costly because it reduces $\alpha(n, \delta)$.[29]

Expression $\alpha(n, \delta)$ can be integrated into our previous analysis. Now the enforcement stance of bankruptcy law is described by (δ, θ) and the earlier predictions obtained in the (α, θ) space can be formulated in the (δ, θ) space, with the main difference that our model yields predictions also on the number of creditors n. By inverting (7), one can define the function $n(\delta, \alpha)$, which indicates the number of creditors E can borrow from so as to disgorge a fraction α of cash flows under pro-debtor bias δ. The larger δ (i.e. the more pro-debtor is the bankruptcy code), the

[27] This amounts to assuming that creditors' expenditures are perfect substitutes in increasing the total share of pledgeable cash flows. This assumption makes sure that creditors' incentives do not depend on the value of their claims and is only made for simplicity.

[28] That is, each creditor solves $\max_{x_i}\ x_i/n - (1/2)\delta x_i^2$. For simplicity, we rule out the formation of coalitions that coordinate creditors' litigation efforts. The main thrust of the results would not change if such coalitions could form.

[29] The model could also be enriched to study the effect of violation of priority among creditors. By reducing the certainty of property rights over cash flows, such violation would presumably exhacerabate the public good nature of creditors' litigation strategies.

larger is the cost of creditors' uncoordination as reflected in a smaller α, and in turn the smaller is the maximum number of creditors consistent with financing. Thus, the pro-debtor stance of bankruptcy law increases the cost of creditors' multiplicity.

By shaping enforcement quality, bankruptcy law also affects financial contracts. In line with Proposition 3, if $\delta \leq 1/2\alpha^*$, then E can credibly commit to pledge at least a share α^* of cash flows to creditors by raising *debt plus option* from $n \leq n(\delta, \alpha^*)$ creditors, attaining the first best. If $\delta > 1/2\alpha_C$, E cannot do better than disgorge a share α_C of cash flows. Thus, E attains the third best by issuing *straight debt* to at most $n(\delta, \alpha_S)$ creditors. For $\delta > 1/2\alpha_S$ the project is not financed. The interesting case now arises for $\delta \in (1/2\alpha^*, 1/2\alpha_C]$ as the project could either be financed by *debt plus option* or *contingent debt*. As in Proposition 3, if E can set $n = \infty$, then court intervention in the form of *contingent debt* is never optimal. However, in this parameter range the creditors break even only if E issues at most $n(\delta, \alpha_C) - 1 < \infty$ unsecured claims. As a result, giving a call option to a large secured creditor as in Proposition 3 results in over-liquidation in U with probability $\Pr(m \geq \widetilde{m}(n(\delta, \alpha_C)))$, i.e. whenever the grand coalition of the unsecured forms (see (6) for reference). As a result, court intervention may still be optimal if courts' mistakes are small. For instance, for θ low enough the "complete contract" directly asking the bankruptcy court to decide whether to liquidate or continue may yield greater ex post efficiency than *debt plus option*. In this case, direct court intervention avoids that coalitions of creditors lead to overliquidation. In other words, when bankruptcy litigation makes debt dispersion costly, court intervention might be the only way to solve the conflict of interest between the debtor and the creditors and to separate liquidation and repayment rights, even if courts makes mistakes. Because $n(\delta, \alpha)$ decreases in δ, our model predicts that more pro-debtor bankruptcy codes reduce debt dispersion.

In sum, section 4.2 shows that viewing bankruptcy as litigation over an optimal debt contract allows us to study not only the form and efficiency of debt contracts but also the entire structure of debt financing, that is the relative type, quantity and number of different claims. When enforcement quality in bankruptcy is sufficiently good (α is high or δ is low) the entrepreneur borrows from a large secured creditor under debt plus option or contingent debt and from a set of dispersed unsecured creditors. This debt structure allows him to separate liquidation and repayment rights in bankruptcy. When instead the quality of enforcement in bankruptcy is low (α is low or δ is high), sophisticated debt structures do not work. In this case, liquidation and repayment cannot be separated and entrepreneurs borrow from fewer creditors, issue fewer unsecured claims and sthrenghten the liquidation rights of secured creditors.

More generally, our results indicate that the optimal debt structure trades off creditors' vs. debtor's power in litigation. That is, it trades off the risk that creditors collude against the debtor and overliquidate the project with the risk that the debtor takes advantage of uncoordinated creditors and does not repay them. Bankruptcy law in turn affects debt structure by shaping the relative likelihood of these two risks.

5 Bankruptcy Codes and Resolutions of Financial Distress in U.K., U.S. and Sweden

We stress the role of the "enforcement dimensions" of bankruptcy law. Here we provide some empirical foundations to our theory by describing how certain provisions of the U.K, the U.S. and the Swedish bankruptcy codes deal with these enforcement dimensions. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998, LLSV henceforth) examine the "contractual dimensions" of bankruptcy law.[30] We build on their work but, in line with our model, we focus explicitly on litigation procedures affecting courts' ability to seize the debtor's property.

Section 5.1 focuses on how bankruptcy laws deal with a version of the well-known problem of investor protection against self dealing or tunneling (Shleifer and Vishny 1997, La Porta, Lopez-de-Silanes and Shleifer 2005). Section 5.2 examines resolutions of financial distress under different codes.

5.1 Creditors' expropriation in bankruptcy

By diverting corporate wealth to themselves via self dealing with (usually connected) third parties, managers can eschew contractual repayment and precipitate their firms' financial distress before creditors find out. The extent to which the bankruptcy code protects creditors against such managerial behavior is therefore a crucial determinant of how much creditors can expect to recoup from the bankrupt firm (α in our model).[31]

[30] LLSV (1998) consider the absence of an automatic stay on the assets, the right for secured creditors to collateral in reorganizations, the need of creditors' consent for filing for reorganization, and the removal of the management pending the resolution of the reorganization procedure. LLSV also consider one remedial creditor right, namely the existence of a legal reserve requirement forcing firms to maintain a certain level of capital to avoid automatic liquidation. It protects creditors who have few other rights by forcing an automatic liquidation before all the capital is stolen by the insiders.

[31] Davydenko and Franks (2006) study bankruptcy in U.K., France and Germany and find that creditors' recovery rates increase with the extent of creditor protection, as measured by the LLSV index, in the three codes.

Managerial self dealings in the context of bankruptcy are known across different codes as fraudulent transactions, fraudulent conveyances, wrongful trading, and similar headings. It is important to stress that these transactions could be perfectly legal *per se*, but still seriously impart creditors' ability to recoup their contractual claims (e.g. LoPucki 2005). In this section, we show that the U.K., the U.S. and the Swedish bankruptcy codes differ with respect to how these dealings can be identified, where the burden of proof is placed and the remedies available to creditors.

The U.K. administrative receivership[32] is generally thought of as a superior code on the score of protecting creditors against fraudulent conveyances and wrongful trading. In insolvency, directors owe a duty of care to the company to protect with a primary regard the interests of its creditors rather than those of its shareholders. Such duty of care implies that all managerial dealings prior to entering bankruptcy may be reviewed as potentially fraudulent or wrongful, with a view to avoid them if that helps creditors recoup their contractual claims. No time limit is specified for such review. The duty of care can be enforced in the name of the company by a liquidator, administrator or administrative receiver, who is usually appointed in practice. Moreover, not only does the court protect creditors by avoiding fraudulent conveyances, it also deters them by empowering courts to impose on the directors personal liability to contribute to the assets of the company for the benefits of its creditors (§ 214 of the 1986 Insolvency Act). Directors can only get away with it if they proved they acted with "due diligence", but crucially the burden of proof is squarely placed on them.

By way of a contrast, the U.S. Bankruptcy code, known as Title 11 of the U.S. laws,[33] is much less concerned with the interests of creditors than the U.K. Code. To begin, unlike in the U.K., in bankruptcy directors still need to have primary regard to the interests of shareholders rather than the interests of creditors. Furthermore, in the U.S. there is a time limit to review potentially fraudulent transfers, which must not be undertaken more than one year before the date of the filing of the petition (§ 544). Unlike in the U.K., the burden of proof is placed on the trustee, who has also to meet the "preponderance of the evidence" test of actual intent to hinder, delay or defraud.[34]

[32] The discussion below is based on Lightman and Moss (2000), the leading authority on U.K. receivership.

[33] Title 11 of the code of the laws of the U.S., known as the U.S. bankruptcy code, includes eight evenly numbered Chapters. Chapters 1, 3 and 5 contain the general provisions of the code regarding case administration and determination of the estate for the purpose of the debtor and the creditors. The provisions of Chapters 1, 3 and 5 then apply to the other Chapters, including among others Chapter 7 concerning liquidation, and Chapter 11 concerning reorganizations.

[34] Importantly, a creditor who possessed fraudulent conveyance action under non-bankruptcy law lacks standing to bring same action under § 544(b), unless authorized by court after trustee fails to act, (see Nebraska State Bank v. Jones, 846 F.2d 477 (8th Cir. 1988)).

Importantly, although the court may in principle appoint a trustee to control the firm in the interest of creditors under Chapter 5, such appointment is almost never observed in practice. As a result, creditors have little protection against fraudulent conveyances because it is often the trustee alone who stands to bring action against the directors. Notice that courts fail to appoint a trustee even in cases when it is specifically mandated by the code. For example, § 1104 states that "the court shall order the appointment of a trustee for cause, including fraud, dishonesty, incompetence, or gross mismanagement of the affairs of the debtor by current management, either before or after the commencement of the case". However, not even in such famous bankruptcy cases of corporate fraud as Enron, Worldcom, Global Crossing and Adelphia was a trustee appointed by the court. (see LoPucki 2005 p.145-151 for a detailed account). Even when trustees are appointed, their role is still determined by the court and may thus conflict with the interest of the creditors (e.g. Weiss and Wruck 1998). These observations indicate that U.S. creditors' ability to recoup their claims is seriously impaired.

Finally, the Swedish code deals with fraudulent conveyances in a way that is similar to the U.S. code, by applying to these dealings the standard of bad faith (knew or ought to have known) and by placing the burden of proof on the trustee (e.g. Lennander 1983).

These observations are consistent with the view that the U.S. and the Swedish codes are much more debtor friendly than the U.K. Code (e.g. Skeel 2001) and that provide very few rights to creditors during bankruptcy: Djankov et al. (2006) document that the U.S. and Sweden score only 1 out of 4 in their creditor rights' index, as compared with the U.K. that scores the maximum of 4. In the context of our model, it is possible to rationalize the U.K. Receivership code as providing contracting parties with a very high α (close to 1), and the U.S. and Swedish code as providing contracting parties with a relatively low/intermediate α.

5.2 Resolutions of financial distress in the shadow of the bankruptcy code

Given how the U.K., the U.S. and the Swedish bankruptcy codes place different emphasis on enforcement, our model indicates that we should expect different contractual responses and resolutions of financial distress in these three countries.

As reviewed above, the U.K. Receivership Code puts a strong emphasis on pledging the firm's property to creditors (high α). Interestingly, the U.K. bankruptcy code leaves reorganizations under the complete contractual freedom of the parties (e.g. Franks and Sussman 2005b). Consistent with our model, creditors seek security by means of *floating charges* on the company's undertakings as a going concern. In turn, the secured creditor holding a floating charge, usually a bank, is given the exclusive contractual option (debenture) to appoint a receiver conditional on default. Such appointment takes the management of the company out of the hands of the directors and places it in the hands of the receiver, who then acts exclusively as agent of his debenture-holder appointer. The receiver may then either seek to liquidate piecemeal, or sell the firm as a going concern. In practice, more than 80% of receiverships end up in liquidation (Franks and Nyborg 1996).[35] As a result, the practice of debt contracts in the U.K. seems to support our result that under a bankruptcy code that focuses on seizing the debtors' property to meet creditors' contractual claims (high α), the parties optimally "privatize" corporate reorganizations by using the incentive properties of options, without resorting to the bankruptcy courts' intervention.

Unlike in the U.K., U.S. bankruptcy litigation relies strongly on court intervention and direct supervision. Especially in Chapter 11, U.S. bankruptcy courts have strong discretionary powers, for example to approve supra-priority finance if they are convinced that the company has a reasonable chance of survival, with a view to avoiding inefficient liquidations. The role of U.S. bankruptcy judges in Chapter 11 can be understood in terms of our model as the third-party intervention in resolving financial distress, which is precisely optimal when the code places a limited focus on upholding creditors' contractual claims (low/intermediate α).

To gauge the efficiency of court intervention, in particular of Chapter 11, our model indicates that a natural dimension to examine is the precision of the information available to courts to resolve financial distress $(1 - \theta)$. On the one hand, it has been noted that U.S. bankruptcy judges are particularly expert, because they are appointed by courts of appeal (§ 152 Title 28), often among bankruptcy practitioners, unlike in the U.K. where they come from the career judiciary (e.g. Posner 1996). Consistent with this view, our model suggests that the large reliance of U.S. debtholders on contractual covenants (e.g. Smith and Warner 1979) can be rationalized as the parties' attempt to write a contingent debt contract so as to exploit the strong expertise of U.S. bankruptcy courts and the high disclosure standards under U.S. law (e.g. La Porta et al. 2006).

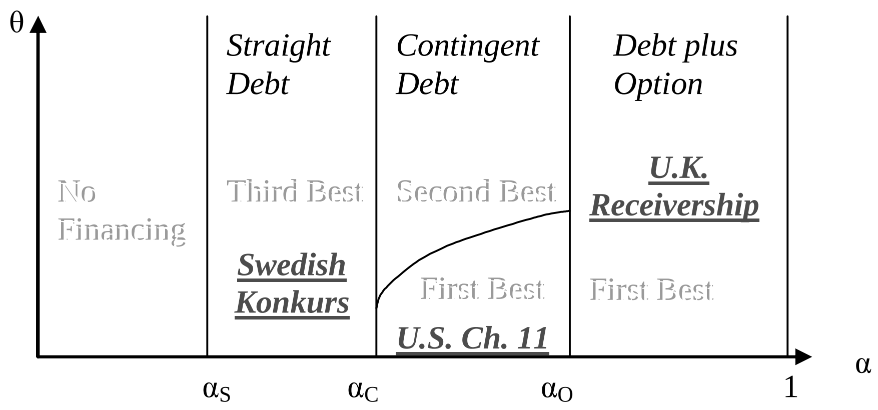
On the other hand, intervention by a third party needs not necessarily achieve the first best. In fact, it has been argued that recurring mistakes by too powerful judges may be very costly (e.g. Jensen 1989). Also, the U.S. bankrutpcy system may suffer from excessive litigation, as a result of the unpredictability of judges' decisions. Indeed, several studies have documented the large emphasis of the U.S. system on bankruptcy litigation, especially in reorganizations under Chapter

[35] We have no evidence on whether such liquidations are actually efficient.

11, e.g. Andrade and Kaplan (1998), Asquith, Gertner and Scharfstein (1994), and Gilson (1997). In contrast, Franks and Sussman (2005a) document that bankruptcy litigation is nearly absent in the U.K., consistent with the practice of U.K. bankruptcy courts to leave corporate reorganizations under the parties' complete contractual freedom (see Franks and Sussman (2005b)).

Finally, again consistently with our model, although the Swedish bankruptcy code has two chapters to deal with reorganizations ("Ackordslagen") or liquidations through cash auctions ("Konkurslagen"), parties overwhelmingly choose to liquidate insolvent firms and almost entirely disregard the possibility of reorganizining them (e.g. Strömberg 2000). This choice can be rationalized in light of our model as the optimal contractual response to the relative ineffectiveness of Swedish bankruptcy courts against fraudulent conveyances (low/intermediate α). Figure 4 summarizes the arguments above.

Figure 4. Bankruptcy Codes and the Optimal Resolution of Financial Distress



It is worth noting that our theory can rationalize existing practices to resolve financial distress as optimal responses to the bankruptcy code's enforcement provisions. However, there are reasons to doubt that real-world practices are necessarily optimal, even in a constrained or second best sense (i.e. for given α, θ). For example, bankruptcy law is often set as mandatory rather than default. As a result, legal scholars have argued that the mandated resolution of distress may significantly deviate from the parties preferred one (e.g. Rasmussen 1992, Schwartz 1997). The next section addresses these issues by providing a normative perspective on optimal bankruptcy law.

6 Implications for the Theory of Optimal Bankruptcy

Traditional incomplete contracts theories (Hart 1995) stress that an optimal bankruptcy law should complete debt contracts by determining upon default such "contractual" dimensions as the distribution of the debtor's cash flows, i.e. "who gets what," and whether the project is continued or not, i.e. "what to do with the firm" (Hart 2000). In contrast, in our analysis the parties fully anticipate in debt contracts the possibility of default and optimally specify "who gets what" and "what to do with the firm" as a function of the "enforcement" dimensions of bankruptcy law (α, θ). Despite this difference, our analysis can shed light on incomplete contract theories of optimal bankruptcy because, if ex ante contracting is costly, we show how the "contractual" dimensions of bankruptcy law should be optimally set as a function of the "enforcement" dimensions of bankruptcy law. We start by discussing the single creditor model, which already conveys the main messages of our analysis. Then, to see how our analysis compares with the incomplete contracts view, suppose that parties do not foresee states U and B, and therefore optimally write a *straight debt* contract whereby the firm is liquidated upon default and the investor obtains all liquidation proceeds L.

In this context, our finding that when $\alpha \geq \alpha_O$ *debt plus option* is optimal implies that an optimal way to complete *straight debt* ex post is to use options. In this sense, our result can rationalize the optimality of the bankruptcy procedure proposed in Aghion, Hart and Moore (1992, AHM henceforth). The basic idea of AHM, which also uses options, goes as follows. First, when a firm goes bankrupt, all of the firm's debts are cancelled, and all claims are converted into equity. Then, in line with Bebchuk (1988), former claim-holders are either allocated equity in the new company (in the case of senior creditors) or given an option to buy equity (in the case of junior creditors or shareholders), according to the amount or priority of their claims. Then, cash and non-cash bids are solicited for all or part of the new firm. After the options have expired the new shareholders vote on whether to select one of the cash bids or to maintain the company as a going concern, either under existing management or under some alternative management team. The firm then exits from bankruptcy.

In the context of our model, this scheme amounts to: 1) transferring control of the project to I, and 2) giving E (i.e. the only shareholder) a call option to buy back the project from I. By exercising the option, E avoids liquidation and continues the project. Because in AHM the strike price of the option makes sure that upon exercise I is repaid in full with respect to the original (incomplete) debt contract, it seems reasonable to assume that the call option given to E has a strike price of L.[36]

The way this scheme works depends on whether E is given the right to exercise the option by making a cash or a non-cash payment. In the former case, E can raise up to $\alpha\overline{y}_2$ from capital markets in state U. As a result, the AHM scheme yields full efficiency for $\alpha\overline{y}_2 > L$ and over-liquidation otherwise. If instead E is allowed to exercise the option by making a non-cash payment (i.e. by issuing shares), then the AHM scheme yields always over-continuation because E will always claim that the state is U and promise to pay out L out of second period cash flows $\overline{y}_2$. By always continuing, E obtains at least $(1-\alpha)\, y_2(\omega) > 0$ as opposed to 0 under liquidation.

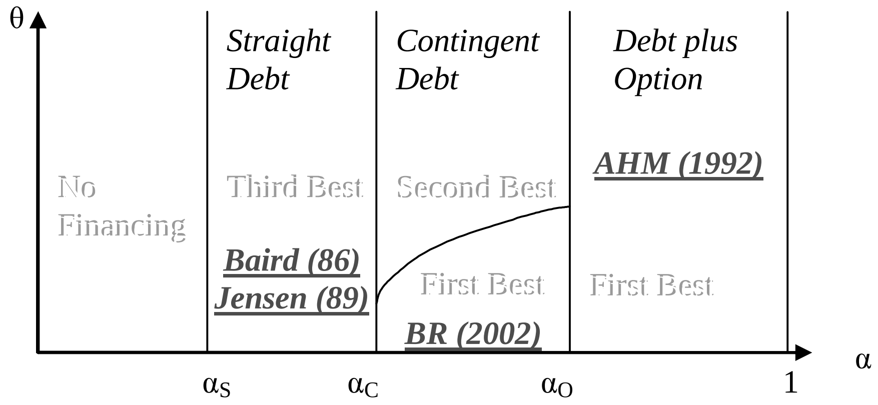
In line with our findings in Section 3, this discussion suggests that for $\alpha \geq \alpha_O$ the AHM procedure as discussed above is dominated by one giving a call option to the investor or a put to the entrepreneur. In fact, for $\alpha \geq \alpha_O$ unlike AHM both I-call and E-put guarantee the first best. In the context of a *straight debt* contract, our optimal I-call and E-put amount to violating absolute priority of I with respect to liquidation proceeds. The intuition is that to give incentives for efficient continuation some liquidation proceeds must be allocated to E through the option's strike price (we return to this issue below). More generally, irrespective of the type of options used, if $\alpha < \alpha_O$ our analysis indicates that the ex ante cost of options is larger than their ex post benefit and options no longer guarantee break even. As a result, an alternative way of completing *straight debt* should be devised.

In particular, if α is intermediate, we find that the bankruptcy court should actively intervene to determine "what to do with the firm", even if courts make costly mistakes. Bolton and Rosenthal (2002, BR henceforth) argue that a key role of bankruptcy laws is to adapt debt contracts ex post by making them contingent on a state of nature that was unforeseen ex ante. By contrast, our model rationalizes direct court intervention in liquidation/continuation as a way to avoid the ex ante cost of incentives, not to remedy ex ante unforeseeability.

Finally, when enforcement in bankruptcy is weak (i.e. for low values of α), our model suggests that the optimal bankruptcy procedure should always liquidate the project upon default and distribute the proceeds to the investor. This procedure is reminiscent of the proposals of Baird (1986) and Jensen (1989) that cash auctions should be the primary avenues to efficient resolution of financial distress. In fact, the efficient resolution of distress should use options or court intervention if and only if bankruptcy courts can enforce them properly. Figure 5 summarizes the analysis above.

[36] However, our discussion does not depend on the level of the strike price. Also, mapping the AHM proposal into our model does not depend on whether there is only one or many creditors.

Figure 5. Bankruptcy Reform Proposals



The analysis of financing under multiple creditors shares many similarities with the one creditor case, but it also provides a rationale for violating the priority of secured creditors in favor of unsecured ones (and not shareholders, as in the case with one creditor). With many creditors, the optimal bankruptcy procedure should give to a secured creditor the option to liquidate the project by paying to the dispersed unsecured an amount S_{IC} of liquidation proceeds, thus violating absolute priority. In the spirit of Proposition 4, such bankruptcy law attains the first best for $\alpha \geq \alpha_C$. Notice that here violation of priorities in liquidation are not desirable because they induce equal treatment of creditors as commonly argued. In our model there is no benefit of equal treatment, as only break even on average matters. Violations of secured creditors' priority may instead be beneficial because they remove the pro-liquidation bias of secured creditors, thus leading to efficient continuation.[37]

Our analysis thus indicates that the contractual dimensions of bankruptcy law should optimally adjust to its enforcement dimensions. By examining different proposals for setting "who gets what" and "what to do with the firm", we show that it is unlikely that "one size fits all" (Hart 2000) because the rules shaping bankruptcy litigation ultimately determine the efficient resolution of financial distress.

[37] Violation of priority is optimal only if in exchange for the violation the secured creditor obtains the full rights to decide over liquidation/continuation. This result casts doubt on the view that bankruptcy should facilitate ex post renegotiation (e.g. Jackson 1986) because here renegotiation among creditors induces excessive liquidation (see Proposition 4 for details).

This observation leads to the main implication of our analysis for the theory of optimal bankruptcy, namely that the bankruptcy law should facilitate private contracting by enhancing the ability of bankruptcy courts to grab the debtor's property and the quality of information available to them. This implication follows from two considerations. First, the resolution of financial distress is first-best efficient only if bankruptcy courts' enforcement ability is high, but not otherwise. Second, the facts that in the real world default and litigation are so widespread and that parties write covenants in debt contracts constraining management in states of low earnings (Smith and Warner 1979) question the assumption that default is unpredictable or too costly to contract about.

If parties can contract about default, then our model illustrates the costs of mandatory bankruptcy rules setting "who gets what" and "what to do with the firm" without taking into account the parties' contractual response to the underlying enforcement technology. For instance, if enforcement is so weak that the only contract sustaining financing is *straight debt*, then using options or court intervention instead of straight liquidation is likely to undermine financing altogether.[38] It follows that bankruptcy rules dealing with "who gets what" and "what to do with the firm" should be set as default rules as opposed to mandatory so as to allow the parties to contractually opt out of them (Rasmussen 1992, Schwartz 1997).

More fundamentally, viewing bankruptcy as litigation over a debt contract suggests that the search for an optimal bankruptcy law should be centered around finding the legal rules and procedures maximizing the enforcement of debt contracts. In particular, we have found that bankruptcy law should maximize investors' ability to challenge in court the debtors' diversive activities. When bankruptcy courts perfectly seize the debtor's property ex post, we have shown that ex ante contracting does all the rest.

7 Conclusions

We have presented a view of bankruptcy as litigation over debt contracts. We find that debt contracts optimally react to enforcement in bankruptcy. Greater courts' ability to seize the debtor's property reduces the costs of using sophisticated contractual incentives such as options and direct court intervention to govern the continuation/liquidation decision. Accordingly, also debt structure (the relative proportion of dispersed and unsecured claims) optimally adjusts to bankruptcy

[38] Also proposals mandating automatic conversion of debt into equity upon default may run counter the investors' original will of lending under debt.

law. Our model sheds light on several empirical findings in law and finance showing that better enforcement facilitates private contracting (Lerner and Schoar 2005; Qian and Strahan 2004) and financial markets development (e.g. La Porta et al. 2006). We also rationalize the different approaches to resolution of financial distress in U.K., U.S. and Sweden as special cases. From a normative standpoint, we find that optimal bankruptcy law should facilitate private contracting by improving the legal protection of creditors against fraudulent conveyances and wrongful trading.

Of course, our paper is only a first step towards a theory of bankruptcy as litigation. For example, in our model courts' mistakes in assessing the project's future prospects are pure noise. It has been argued however that real life bankruptcy courts can be biased systematically towards continuation or liquidation (e.g. Franks and Torous 1993). Recently, Bris, Welch and Zhu (2006) show that the extent of violations of absolute priority varies systematically across bankruptcy courts. Clearly, incorporating bankruptcy judges and their biases into our model is an exciting topic for future research. Moreover, future research should aim at understanding how the specific legal rules governing bankruptcy litigation affect the quality of contract enforcement, and how such rules should optimally be designed.

Finally, we have only considered how bankruptcy litigation affects debt contracts. However, the indirect costs of bankruptcy law that we study are also likely to affect the use of other financial securities such as equity. As a result, our perspective on bankruptcy may also help explain features of capital structure decisions across countries, as documented for example by Rajan and Zingales (1995) and Acharya, John and Sundaram (2004), by pointing out one crucial feature of bankruptcy law, namely the enforcement ability of bankruptcy courts, and its potential impact on financing decisions of firms.

8 Proofs

Debt Contracts. We consider the following contracts. I advances $D \geq K$ to E, who agree to a first and second period state contingent repayment $d_1(\omega)$, $d_2(\omega)$, $\omega = G, U, B$ and to a liquidation policy $\lambda(\omega)$. Feasibility requires $d_1(\omega) \leq \alpha y_1(\omega) + \lambda(\omega)L$, $d_2(\omega) \leq \alpha y_2(\omega)$, $\lambda(\omega) \in \{0,1\}$. First period repayment can also be contingent on liquidation. The contract also specifies a first and second period repayment and liquidation policies $d_1^D(\omega_3)$, $d_2^D(\omega_3)$ $\lambda^D(\omega)$ that are enforced if E defaults. The parties can also delegate the liquidation decision to themselves by writing into the contract a control allocation $i(\omega) \in \{0,1\}$. If $i = 1$, I decides whether to liquidate; if $i = 0$, E does. By allocating the liquidation/decision to themselves, the parties may improve ex post efficiency by using their superior information, because bankruptcy courts may erroneously enforce a state contingent liquidation policy $\lambda(\omega)$.

Proof of Proposition 1. The general expression for the contracting problem solved by E and I is cumbersome, but its logic is simple. Suppose that I advances $D = K$. Consider state G first. Because courts can perfectly determine if $\omega = G$, $\lambda(G)$ is perfectly enforced. To avoid ex post inefficiencies, the parties set $\lambda(G) = 0$. The incentive compatible repayments $d_1(G), d_2(G)$ satisfy:

$$y_1 - d_1(G) + \overline{y}_2 - d_2(G) \geq y_1 + \lambda^D(G)L - d_1^D(G) + \left[1 - \lambda^D(G)\right]\overline{y}_2 - d_2^D(G)$$

Subject to the feasibility constraints $d_1(G) \leq y_1, d_2(G) \leq \alpha\overline{y}_2$, $d_1^D(G) \leq \alpha y_1 + \lambda^D(G)L$, $d_2^D(G) \leq \left[1 - \lambda^D(G)\right]\alpha\overline{y}_2$. E's income in case of default is minimized at $\lambda^D(G) = 1$, $d_1^D(G) = L + \alpha y_1$. This yields (1). Because $\overline{y}_2 > L$, $\lambda(G) = 0$, $\lambda^D(G) = 1$ is optimal at every (α, θ) and maximizes ex ante and ex post efficiency. Looking at G in isolation was indeed correct. What about B and U? As hinted in section 3.1, there is a tradeoff between ex ante and ex post efficiency. We look for optimal contracts as follows. First, at each (α, θ), we find the maximal repayment I can attain under different arrangements on the liquidation/continuation decision. Then, at each (α, θ) the parties choose the most efficient arrangement among those that guarantee that I breaks even.

1) First consider contracts maximizing ex post efficiency by exploting the parties' information on $y_2(\omega)$. **1.1)** E sets liquidation ($i(B) = i(U) = 0$). Call d_L the amount of liquidation proceeds going to I. The transfers such that I sets $\lambda(B) = 1$, $\lambda(U) = 0$ satisfy constraints $L - d_L \geq \underline{y}_2 - d_2(B)$ in B and $\overline{y}_2 - d_2(U) \geq L - d_L$ in U, as E must obtain more by liquidating today than he expects to get tomorrow from continuing in B, while the oppostite should hold in U. By relabeling $S_{EP} \equiv L - d_L$ this contract is equivalent to the entrepreneur put as described in section 3.1. Since $d_2(\omega) \leq \alpha y_2(\omega)$

and $d_L \leq L$, I's payoff is maximized at $d_2(B) = \alpha \underline{y}_2$, $d_2(U) = \alpha \overline{y}_2$ and $d_L = L - (1-\alpha)\underline{y}_2$. This debt contract with an entrepreneur put (EP henceforth) repays I at most (2) where $\widetilde{L} \equiv L - S_{EP}$. **1.2)** I sets liquidation ($i(B) = i(U) = 1$). The transfers such that I sets $\lambda(B) = 1$, $\lambda(U) = 0$ satisfy constraints $d_L \geq d_2(B)$ in B and $d_2(U) \geq d_L$ in U. Call $L - d_L \equiv S_{IC}$. Then, this contract is equivalent to the investor call described in section 3.1 with strike price S_{IC}. I's payoff is maximized at $d_2(B) = \alpha \underline{y}_2$, $d_2(U) = \alpha \overline{y}_2$ and $d_L \equiv L - S_{IC} = L - \max[L - \alpha \overline{y}_2, 0]$. This debt contract with an investor call (IC henceforth) repays I at most (2) where $\widetilde{L} \equiv L - S_{IC}$. For $\alpha \geq \alpha^*$ this contract is equivalent to an investor put with strike price $\alpha \overline{y}_2$. **1.3)** Like in 1.1) E sets liquidation ($i(B) = i(U) = 0$), but $d_L(\omega)$ is state contingent, where $d_L(U)$ and $d_L(B)$ are enforced by courts, with error if $\theta > 0$. Contingent liquidation transfers give E the incentive to do different things in different states, otherwise nothing changes with respect to 1.1). It is optimal to set $d_L(B) = L - (1-\alpha)\overline{y}_2$, $d_L(U) = L$ to maximize repayment. Yet, notice that this contract is never optimal, because by setting $d_L(U) = L - (1-\alpha)\overline{y}_2$, one could improve it both ex post and ex ante. **1.4)** Like in 1.2), I sets liquidation ($i(B) = i(U) = 1$), and the contract specifies $d_L(U)$ and $d_L(B)$. This contract is equivalent to the contingent debt contract described in section 3.1, where $L - d_L(\omega) \equiv S_{IC}(\omega)$. Contingent liquidation transfers must give I the incentive to do different things in different states, otherwise nothing changes with respect to 1.2). It is optimal to set $S_{IC}(B) = 0$, $S_{IC}(\omega) = \max[L - \alpha \overline{y}_2, 0]$ because they maximize repayment. Under *contingent debt* (CD henceforth) I obtains at most (4) and ex post losses yield an over-liquidation cost of $(1-\pi)(1/2)\theta(\overline{y}_2 - L)$. Figure A1 summarizes the properties of options:

Figure A1. Properties of Options

Option	Default Decision	Strike Price	Repayment	F.B. Liq.?
I-Call	Continue	$\max[0, L - \alpha \overline{y}_2]$	$\alpha \overline{y}_2 + \min[\alpha \overline{y}_2, L]$	Yes
E-Put	Continue	$(1-\alpha)\underline{y}_2$	$\alpha \overline{y}_2 + L - (1-\alpha)\underline{y}_2$	Yes
E-Call	Liquidate	$\alpha \overline{y}_2$	$\alpha\left(\overline{y}_2 + \underline{y}_2\right)$	No
I-Put	Liquidate	$\alpha \overline{y}_2$	$\underline{y}_2$	No

2) We now study contracts where the bankruptcy court directly takes the liquidation decision ($\lambda(B) = 0, \lambda(U) = 1$). I gets L under liquidation, $\alpha y_2(\omega)$ under continuation. The average ex post loss under this contract is $(1-\pi)(1/2)\theta(\overline{y}_2 - \underline{y}_2)$ and maximal repayment to I is

$$\pi(\overline{y}_2 + \alpha y_1) + (1/2)(1-\pi)\left[L + \alpha\theta\underline{y}_2 + (1-\theta)\,\alpha\overline{y}_2\right] \tag{8}$$

To anticipate another result on contract choice, notice that *CD* dominates this contract in terms of ex post and ex ante efficiency. The intuition is that *CD* at least uses some of the investor's superior information, thus avoiding under-liquidation losses. Hence, this contract is never chosen.

3) We now study contracts where the parties mandate a non-contingent liquidation/continuation policy. **3.1)** Parties write $\lambda(B) = \lambda(U) = 1$, $d_L = L$. This is *straight debt* (*SD* henceforth) with ex post losses $(1-\pi)(1/2)(\overline{y}_2 - L)$ and maximal repayment (3). **3.2)** Parties write $\lambda(B) = \lambda(U) = 0$, $d_2(\omega) = \alpha y_2(\omega)$. Ex post losses are $(1-\pi)(1/2)(L - \underline{y}_2)$ and repayment to I is at most $\pi(\overline{y}_2 + \alpha y_1) + (1/2)(1-\pi)(\alpha\underline{y}_2 + \alpha\overline{y}_2)$. To anticipate another result, notice that *EP* dominates this contract in terms of ex post and ex ante efficiency. Hence, this contract is never chosen.

Note: there is no gain for I to lend $D > K$. For any extra dollar lent, I gets back at most a fraction $\alpha \leq 1$ of it in G and no more than $D - K$ in any other state. As a result, increasing the size of the loan only undermines break even without bringing any benefit. We will see that ex post renegotiation between I and E gives rise to a benefit of $D > K$.

Optimal Contracts as a Function of (α, θ). The above analysis reveals the following properties of optimal contracts in our model. In terms of ex post efficiency, for $\theta > 0$ the ranking among the contracts we did not yet rule out is: *IC*$\sim$*EP* $\succ$ *CD* $\succ$ *SD* $\succ$ *no contract* (if $\theta = 0$ and/or $\alpha \geq \alpha^*$, then *CD* ranks the same as *IC*). In terms of ex ante efficiency (break even), for $\alpha < 1$ there are two regimes: i) if $\alpha \geq \alpha^* = L/\overline{y}_2$ then *IC* $\sim$ *CD* $\succ$ *EP*, *SD* is last if $\alpha \geq \widetilde{\alpha} = (L + \underline{y}_2)/(\overline{y}_2 + \underline{y}_2)$ and third otherwise; ii) if $\alpha < \alpha^*$ then *SD* $\succ$ *CD* $\succ$ *IC*, *EP* is last if $\alpha \geq \widehat{\alpha} = (L - \underline{y}_2)/(\overline{y}_2 - \underline{y}_2)$ and third otherwise. For $\alpha = 1$, all contracts are feasible and *IC*, *EP* or *CD* is chosen (but also a E call with $S_{EC} = \overline{y}_2$ may be chosen). In general, there exist α_{IC}, α_{EP}, α_{SD}, α_{CD} which represent the feasibility thresholds for *IC*, *EP*, *SD* and *CD*, respectively. A contract is only feasible whenever α is non smaller than the corresponding threshold. Then, there are two cases: i) $\alpha_{SD} > \alpha^*$ (i.e. at α^* *SD* is infeasible), then define $\alpha_O \equiv \min[\alpha_{IC}, \alpha_{EP}]$, $\alpha_C = \alpha_O$, $\alpha_S = \alpha_O$. In this case, *SD* is never optimal because when it is feasible it is dominated ex post by *IC* and *EP*, which are also feasible; ii) $\alpha_{SD} < \alpha^*$ (i.e. at α^* *SD* is feasible), then define $\alpha_O \equiv \min[\alpha_{IC}, \alpha_{EP}]$, $\alpha_C = \alpha_{CD}$, $\alpha_S = \alpha_{SD}$. In this case, if *SD* is feasible, it is also optimal provided the other contracts are infeasible (i.e. if

$\alpha_S \leq \alpha < \alpha_C$); if *CD* is feasible, it is also optimal provided *IC* and *EP* are not feasible (i.e. if $\alpha_C \leq \alpha < \alpha_O$). *IC* and/or *EP* are optimal whenever feasible (i.e. if $\alpha_O \leq \alpha$) because they yield the first best. ■

Proof of Proposition 2. With ex post renegotiation, I may benefit from lending $D = K + t$, $t > 0$ to E. Notice that setting $t > 0$ is never optimal under *debt plus option* (i.e. *EP* and *IC*). Because I recoups on average only a fraction of t, setting $t > 0$ only undermines break even (especially if E has all the bargaining power). That is, it is profitable for the parties to set $t > 0$ only if this reduces ex post inefficiencies. Because *EP* and *IC* yield full ex post efficiency, setting $t > 0$ and letting the parties renegotiate can only be optimal under *CD* and *SD*. We study the model under two alternative assumptions on bargaining power, when I has full bargaining power and when E has full bargaining power.

I) I has all the bargaining power. In state G, incentive compatibility implies $d_1(G) + d_2(G) \leq \alpha(y_1 + t) + \overline{y}_2$, i.e. $d_1(G) = \alpha(y_1 + t) + (1 - \alpha)\overline{y}_2$, $d_2(G) = \alpha\overline{y}_2$. Notice that in this case ex post renegotiation does not affect *EP* and *IC*. When $t = 0$ repayment in G is the same as in the no-renegotiation case. Moreover, because *EP* and *IC* are designed to maximize I's payoff, when I has all the bargaining power they are renegotiation proof also in B and U. When about *CD* and *SD*? i) *CD*. With probability θ, this contract induces over liquidation in U. The goal here is to find a $t > 0$ allowing E to bribe I in U to continue the project before the court's intervention. When $\alpha < \alpha^*$ (this is the relevant case, otherwise *IC* and/or *EP*, $t = 0$ attain the first best) I's average payoff in U is $\alpha\overline{y}_2 + \theta(L - \alpha\overline{y}_2)$. If $t^* = \theta(L - \alpha\overline{y}_2)$, E can bribe I to continue in U. This contract yields the first best if feasible, i.e. when:

$$t^* \equiv \theta(L - \alpha\overline{y}_2) \leq \left[\pi(\overline{y}_2 + \alpha y_1) + (1/2)(1 - \pi)(L + \alpha\overline{y}_2) - K\right]/(1 - \alpha\pi) \tag{9}$$

The numerator of the right hand side of (9) is a measure of slackness of I's break even constraint under *contingent debt* if $t = 0$. The denominator says in how many states of nature such slackness should be "spent" to finance the upfron payment t from I to E. The logic of (9) is that only if t^* is sufficiently small, *CD* can achieve the first best when (under rengotiation) I advances $K + t^*$ to E. Condition (9) defines a function $\theta_R(\alpha)$ such that break even is atained iff $\theta \leq \theta_R(\alpha)$. For $\theta > \theta_R(\alpha)$ the parties use *CD* with $t = 0$. Notice that it is optimal to set t at the lowest level t^* (which yields no surplus to I despite the fact he has all the bargaining power) because it maximizes the chances of break even. It is also easy to show that in U and B it is optimal to leave t "in

E's hands" without using it to increase contractual repayment because it reduces the amount of resources E needs to bribe I in renegotiation. ii) *SD*. Here we should have $t = L - \alpha\overline{y}_2$ (again the minimum amount such that E can bribe I). This contract yields the first best if:

$$\pi(\overline{y}_2 + \alpha y_1) + (1 - \pi)\alpha\overline{y}_2 - (1 - \alpha)(L - \alpha\overline{y}_2) \geq K$$

Hence, I obtains less than under IC and cannot be feasible when IC is not. If *straight debt* is optimal, $t = 0$ and over liquidation cannot be renegotiated away. However, for α sufficiently large, *SD* with $t = L - \alpha\overline{y}_2$ can be as good as *debt plus option*.

Optimal Contracts as a Function of (α, θ). The main difference with respect to Proposition 1 is that for $\alpha_S \leq \alpha < \alpha_C$ there exists an increasing function $\theta_R(\alpha)$ such that, for $\theta \leq \theta_R(\alpha)$ *CD* plus $t^* = \theta(L - \alpha\overline{y}_2)$ yields the first best. Otherwise, nothing changes. Additionally, for large α (but still $\alpha < \alpha^*$) several contracts can yield the first best (e.g. *SD* with $t = L - \alpha\overline{y}_2$ or, equivalently, *IC* with $S_{IC} = 0$ and $t = L - \alpha\overline{y}_2$).

II) E has all the bargaining power. Besides reducing ex post inefficiency, renegotiation may allow E reduce repayment. In G, incentive compatibility is $d_1(G) + d_2(G) \leq \alpha(y_1 + t) + \max[L, \alpha\overline{y}_2]$, attained with $\lambda^D(G) = 1$, $d_1^D(G) = L + \alpha(y_1 + t)$ if $\alpha < \alpha^*$ and at $\lambda^D(G) = 0$, $d_1^D(G) = \alpha(y_1 + t)$, $d_2^D(G) = \alpha\overline{y}_2$ if $\alpha \geq \alpha^*$. Intuitively, this is less than (1). Let us now look at B and U, considering different contracts. i) *EP*. In B, incentive compatibility implies $t + L - d_L \geq t + L - d_2(B)$ and thus $d_L = d_2(B) = \alpha\underline{y}_2$. Thus, E can always bribe I in U, which implies $\overline{y}_2 - d_2(U) \geq \overline{y}_2 - d_L$, or $d_2(U) = \alpha\underline{y}_2$. Thus, if E has full bargaining power, *EP* is less feasible than before, as I in B and U only gets $\alpha\underline{y}_2$ on average. ii) *IC*. Under this contract I has the right to liquidate/continue the project, so, even if E has full bargaining power, renegotiation does not alter I's incentives. As a result, *IC* is unaffected by renegotiation. iii) *CD*. The same can be said of *CD*, where I has still the right to liquidate/continue the project. The only difference now is that by setting $t^* = \theta(L - \alpha\overline{y}_2)$, in U over liquidation is renegotiated away. Thus, if $\theta \leq \theta_R(\alpha)$ this contract yields the first best. Notice that the shift in bargaing power from I to E does not alter renegotiation under *CD* because t is set at the smallest level making renegotiation possible. iv) *SD*. Also under *SD* nothing changes as $t = L - \alpha\overline{y}_2$ is infeasible when *SD* is optimal. It is only feasible when *IC* is also feasible. Optimal Contracts. The only difference between the case where E has full bargaing power with respect to the case where I has full bargaining power is that in the former case renegotiation undermines *EP*, which is now less feasible at any α. ■

Proof of Proposition 3. With $n > 1$ creditors, at $t = 0$ E offers a menu of n. The project has nondecreasing returns, i.e by liquidating share $1/n$ of its assets yields $(1/n)L$ in liquidation and $y_2(1-1/n)$ in continuation value, where $y_2(1-k/n) - y_2(1-(k-1)/n) \geq y_2(1-(k-1)/n) - y_2(1-(k-2)/n)$, $\forall k \geq 0$, where $y_2(0) = 0$. E can replicate the single creditor outcome in G by setting, for each creditor, repayments $d_1(G) = (\alpha y_1 + (1-\alpha)\overline{y}_2)/n$, $d_2(G) = \alpha \overline{y}_2/n$ and by granting him $(L+\alpha y_1)/n$ upon default. E defaults on $k \leq n$ creditors if $y_2(1) - y_2(1-k/n) < (k/n)(y_2(1) - y_2(0))$ the assumption of nondecreasing returns implies that this condition is never satisfied. Thus, $k = 0$ and the one creditor outcome is attained in G. The same outcome would also be replicated under decreasing return by specifying that the project's physical assets should be fully liquidated upon default. What about states U and B? It is immediate to see that, at any α the debt structure of Proposition 3 attains the same outcome of the single creditor case. In particular, in equilibrium (where no liquidation occurs in U), the incentive properties of options and contingent debt also hold under the new contract. ■

Proof of Proposition 4. For $\alpha < \alpha_S$ the project cannot be financed under multiple creditors. The presence of multiple creditors cannot increase total repayment in G above $\alpha y_1 + \overline{y}_2$ (the same would be true also in the presence of multiple secured creditors, even if default on a single one of them is punished by fully liquidating the asset). Since $\alpha_S < \alpha^*$, in U and B investors can at most obtain L. Since for $\alpha < \alpha_S$ *straight debt* is infeasible, then financing does not occur under any debt structure. For $\alpha_S \leq \alpha \leq \alpha_C$, only *straight debt* ensures feasibility under a single creditor. By analogy, under multiple creditors break even requires that the asset is liquidated in bot U and B. Thus, E cannot do better than under a single creditor *straight debt.* In U and B the optimal straight debt contracts may allow for liquidation of only fraction $f < 1$, where $\pi(\overline{y}_2 + \alpha y_1) + (1/2)(1-\pi)\left[fL + (1-f)\alpha(\underline{y}_2 + \overline{y}_2)\right] = K$. However, setting $f < 1$ is only efficient for E to do if $L < (\overline{y}_2 + \underline{y}_2)/2$, otherwise the gain in welfare in U is more than compensated by the loss in B. Thus, if $L \geq (\overline{y}_2 + \underline{y}_2)/2$, $f = 1$ is optimal. For $\alpha \geq \alpha_C$, the debt structure of Proposition 4 yields the first best for the following reasons. First, it does not induce over continuation in B because the strike price $L - \alpha \underline{y}_2$ implies that the option holder weakly prefers continuation to liquidation in that state. In B there is no renegotiation because all creditors prefer liquidation over continuation. To see what happens in U, suppose that there are $n-1$ unsecured creditors. Then, as indicated in the text, a coalition with $\widetilde{m}(n) = n\frac{\alpha(\overline{y}_2 - \underline{y}_2)}{L - \alpha \underline{y}_2} = nv \leq n-1$ unsecured bribes the option holder to liquidate. Thus, with n creditors, liquidation in U occurs with probability $\Pr(m \geq \widetilde{m}(n)\,|n-1) = \sum_{s=nv}^{n-1}\left[(n-1)!/(n-1-s)!s!\right]/2^{n-1}$. For $n \to +\infty$, this probability tends to $\lim_{n\to\infty} \left[(n-1)!/(n-1-nv)!nv!\right]/2^{n-1}$, which is equal, by Stirling's approximation $\ln n! \approx n\ln n - n$, to $\lim_{n\to\infty} \exp\left\{(n-1)\ln(n-1) - (n(1-v)-1)\ln(n(1-v)-1) - nv\ln nv - 1\right\}/2^{n-1}$. The numerator of the limit tends to $\exp(-1)$, the denominator to $+\infty$. As a result, for $n \to +\infty$, $\Pr(m \geq \widetilde{m}(n)\,|n-1) \to 0$ and the first best is attained. ■

References

Acharya, Viral V., Rangarajan K. Sundaram, and Kose John, 2004. On the capital structure implications of bankruptcy codes. Mimeo, London Business School and New York University.

Aghion, Philippe, and Patrick Bolton, 1992. An incomplete contracts approach to financial contracting. *Review of Economic Studies* 59, 473-494.

Aghion, Philippe, Oliver Hart, and John Moore, 1992. The economics of bankruptcy reform. *Journal of Law, Economics and Organization* 8, 523-546.

Andrade, Gregor, and Steven N. Kaplan, 1998. How costly is financial (not economic) distress? Evidence from highly leveraged transactions that become distressed. *Journal of Finance* 53, 1443-1493.

Asquith, Paul, Robert Gertner, and David Scharfstein, 1994. Anatomy of financial distress: An examination of junk-bond issuers. *Quarterly Journal of Economics* 109, 625-658.

Baird, Douglas, 1986. The uneasy case for corporate reorganizations. *Journal of Legal Studies* 15, 127-147.

Bebchuk, Lucien Arye, 1988. A new approach to corporate reorganizations. *Harvard Law Review* 101, 775-804.

Berglof, Erik, Gérard Roland and Ernst-Ludwig von Thadden, 2003. Optimal debt design and the role of bankruptcy. Mimeo, University of California at Berkeley.

Berglof, Erik, and Ernst-Ludwig von Thadden, 1994. Short-term versus long-term interests: Capital structure with multiple investors. *Quarterly Journal of Economics* 109, 1055-1084.

Berkovitch, Elazar, and Ronen Israel, 1999. Optimal bankruptcy laws across different economic systems. *Review of Financial Studies* 12, 347-377.

Bernhardt, Dan, and Ed Nosal, 2004. Near-sighted justice. *Journal of Finance* 59, 2655-2684.

Bolton, Patrick, and Howard Rosenthal, 2002. Political intervention in debt contracts. *Journal of Political Economy* 110, 1103-1134.

Bolton, Patrick, and David S. Scharfstein, 1996. Optimal debt structure and the number of creditors. *Journal of Political Economy* 104, 1-25.

Bris, Arturo, and Ivo Welch, 2005. The optimal concentration of creditors. *Journal of Finance* 60, 2193-2212.

Bris, Arturo, Ivo Welch, and Ning Zhu 2006. The costs of bankruptcy. *Journal of Finance* 61, forthcoming.

Bulow, Jeremy I., and John B. Shoven, 1978. The bankruptcy decision. *Bell Journal of Economics* 9, 437-456.

Chen, Nan, and Suresh N. Sundaresan, 2003. Decisions under bankruptcy and their implications for recontracting debt. Mimeo, Columbia University.

Coase, Ronald, 1960. The problem of social cost. *Journal of Law and Economics* 3, 1-44.

Cornelli, Francesca, and Leonardo Felli, 1997. Ex-ante efficiency of bankruptcy procedures. *European Economic Review* 41, 475-485.

Davydenko, Sergei, and Julian R. Franks 2006. Do bankruptcy codes matter? A study of defaults in France, Germany and the UK. Mimeo, London Business School.

Dewatripont, Mathias, and Jean Tirole, 1994. A theory of debt and equity: Diversity of securities and manager-shareholder congruence. *Quarterly Journal of Economics* 109, 1027-1054.

Dewatripont, Mathias, and Jean Tirole, 1999. Advocates. *Journal of Political Economy* 107, 1-39.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2005. The law and economics of self dealing. Mimeo, Harvard University.

Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer, 2006. Private credit in 129 countries. *Journal of Financial Economics*, forthcoming.

Franks, Julian, R., and Kjell G. Nyborg, 1996. Control rights, debt structure and the loss of private benefits: The case of the U.K. insolvency code. *Review of Financial Studies* 9, 1165-1210.

Franks, Julian, R., and Oren Sussman, 2005a. Financial distress and bank restructuring of small to medium size U.K. companies. *Review of Finance* 9, 65-96.

Franks, Julian, R., and Oren Sussman, 2005b. Financial innovations and corporate insolvency. *Journal of Financial Intermediation* 14, 283-317.

Franks, Julian R., and Walter N. Torous, 1993. A comparison of the U.K. and U.S. bankruptcy codes. *Continental Bank Journal of Applied Corporate Finance 6*, 95-103.

Gennaioli, Nicola, 2005. Contracting in the shadow of the law. Mimeo, Harvard University.

Gennaioli, Nicola, and Stefano Rossi, 2005. Judicial discretion in corporate bankruptcy. Mimeo, IIES and Stockholm School of Economics.

Gertner, Robert, and David Scharfstein, 1991. A theory of workouts and the effects of reorganization law. *Journal of Finance* 46, 1189-1222.

Giammarino, Ronald, and Ed Nosal, 1994. The efficiency of judicial discretion in bankruptcy law. Mimeo, University of British Columbia.

Gilson, Stuart C., 1997. Transactions costs and capital structure choice: Evidence from financially distressed firms. *Journal of Finance* 52, 161-196.

Hart, Oliver, 1995. *Firms, contracts and financial structure.* Oxford: Clarendon Press.

Hart, Oliver, 2000. *Different approaches to bankruptcy*, in Governance, Equity and Global Markets, Proceedings of the Annual Bank Conference on Development Economics in Europe. Paris: La Documentation Francaise.

Hart, Oliver, and John Moore, 1998. Default and renegotiation: A dynamic model of debt. *Quarterly Journal of Economics* 114, 1-41.

Jackson, Thomas H., 1986. *The logic and limits to bankruptcy.* Boston: Little, Brown and Company.

Jensen, Michael C., 1989. Active investors, LBOs and privatization of bankruptcy. *Journal of Applied Corporate Finance* 2, 35-44.

Kraus, Alan, and Robert H. Litzenberger, 1973. A state-preference model of optimal financial leverage, *Journal of Finance* 28, 911-922.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2006. What works in securities laws? *Journal of Finance* 61, 1-32.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998. Law and finance. *Journal of Political Economy* 101, 678-709.

Lennander, Gertrud, 1983. Avoidance of preferences and fraudulent transfers under Swedish Bankruptcy Law. Acta Universitatis Stockholmiensis, Stockholm University.

Lerner, Josh, and Antoinette Schoar, 2005. Does legal enforcement affect financial transactions? The contractual channel in private equity. *Quarterly Journal of Economics* 120, 223-246

Lightman, Sir Gavin J., and Gabriel Moss, 2000. *The law of receivers and administrators of companies*. London: Sweet & Maxwell.

LoPucki, Lynn M., 2005. *Courting failure: How competition for big cases is corrupting the bankruptcy courts*. Ann Arbor MI: University of Michigan Press.

Modigliani, Franco, and Merton H. Miller, 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review* 48, 261-297.

Posner, Richard A., 1996. *Law and legal theory in England and America*. Oxford: Clarendon Press.

Povel, Paul, 1999. Optimal "soft" or "tough" bankruptcy procedures. *Journal of Law, Economics and Organization* 15, 659-684.

Qian, Jun and Philip E. Strahan, 2004. How law and institutions shape financial contracts: the case of bank loans. Mimeo, Boston College.

Rasmussen, Robert K., 1992. Debtor's choice: A menu approach to corporate bankruptcy, *Texas Law Review* 71, 51-122.

Schwartz, Alan, 1997. Contracting about bankruptcy. *Journal of Law, Economics, and Organizations* 13, 127-146.

Shleifer, Andrei, and Robert W. Vishny, 1997. A survey of corporate governance. *Journal of Finance* 52, 737-783.

Skeel, David A. Jr., 2001. *Debt's dominion: A history of bankruptcy law in America*. Princeton NJ: Princeton University Press.

Smith, Clifford W., Jr., and Jerold B. Warner, 1979. On financial contracting: An analysis of bond covenants. *Journal of Financial Economics* 7, 117-161.

Strömberg, Per, 2000. Conflicts of interests and market illiquidity in bankruptcy auctions: Theory and tests. *Journal of Finance* 55, 2641-2691.

Warner, Jerold B., 1977. Bankruptcy costs: Some evidence. *Journal of Finance* 32, 337-347.

Weiss, Lawrence A., 1990. Bankruptcy resolution: direct costs and violation of priority of claims. *Journal of Financial Economics* 27, 285-314.

Weiss, Lawrence A., and Karen H. Wruck, 1998. Information problems, conflicts of interests, and asset stripping: Chapter 11's failure in the case of Eastern Airlines. *Journal of Financial Economics* 48, 55-97.

Winton, Andrew, 1995. Costly state verification and multiple investors: the role of seniority. *Review of Financial Studies* 8, 91-123.