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WORKING PAPER NO. 99-8

FINANCIAL CONTRACTS AND THE LEGAL TREATMENT
OF INFORMED INVESTORS

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FINANCIAL CONTRACTS AND THE LEGAL TREATMENT OF INFORMED INVESTORS

Abstract

We explore the economic rationale for *equitable subordination*, a legal doctrine that permits a firm's claimants to seek to subordinate an informed investor's financial claim in bankruptcy court. Fear of equitable subordination is often cited as a reason that banks in the U.S. are wary of taking an active management role in their borrowing firms. We show that an optimally designed menu of claims for a large investor will include features that resemble equitable subordination. Our model provides a partial rationale for a financial system in which powerful creditors do not generally hold blended debt and equity claims.

FINANCIAL CONTRACTS AND THE LEGAL TREATMENT OF INFORMED INVESTORS

1. Introduction

We explore the economic rationale for *equitable subordination*, a legal doctrine that permits a firm's claimants, such as bondholders, trade creditors, or even stockholders, to petition the bankruptcy court to subordinate a controlling investor's financial claim. Fear of equitable subordination is widely believed to be an important reason banks in the U.S. are wary of taking an active management role in their borrowing firms, especially firms in distress.[1] While some observers have viewed this as a weakness of the U.S. financial system, our paper argues that this legal regime allows firms to choose efficiently between alternative governance structures by selecting the type of claim held by potentially powerful investors. Equitable subordination permits the firm to choose between different legal rules governing the influential investor's fiduciary responsibilities along with the form of the investor's financial claim.

We follow the security design approach in asking whether equitable subordination might arise as part of an optimal contracting scheme.[2] In a stylized model of a powerful investor with substantial influence over the firm, we show that an optimally designed menu of claims will include features that resemble equitable subordination.

Our story is very simple. In our model, there are two types of contracts: rule-driven contracts

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[1]Indeed, practitioner discussions often include lists of dos and don'ts for bankers with loans outstanding to firms in financial difficulty, with an eye to avoiding subsequent claims for subordination of the bank's claim. See for example Bauch (1987), Johnson and Gaffney (1990), and Watson (1980). Such fears may also lie behind banks' documented unwillingness to take equity positions in distressed firms—particularly when there are other public bondholders (see James, 1995)—even when legal restrictions on equity stakes are not binding. See also Kroszner and Strahan (1999) for evidence that concerns about lender liability affect bankers' willingness to sit on the boards of directors of U.S. firms.

[2]See Thakor (1996), Allen and Winton (1995), and Shleifer and Vishny (1997) for surveys of the security design literature. Other papers that treat the bankruptcy procedure as an object of security design include Harris and Raviv (1995), Kalay and Zender (1997), Berkovitch and Israel (1999) and Berkovitch, Israel, and Zender (1998).

and discretionary contracts.[3] Rule-driven contracts limit, but do not eliminate, the powerful investor's discretion to choose among actions that affect the likelihood that the firm will face liquidation. Discretionary contracts explicitly allow the investor to choose any action unconstrained by contract.

We view equitable subordination as a mechanism that permits the firm to choose between two distinct legal rules, one for rule-driven contracts and one for discretionary contracts. The optimal legal rule for discretionary contracts maximizes the influential investor's incentive to monitor by making the investor's payoff in liquidation *state-contingent*. Specifically, the contract penalizes the investor by subordinating his claim when his actions lead to an inefficient liquidation. In our model, only a costly court investigation can enforce state-contingent payoffs, and these costs must be weighed against the efficiency gains from greater monitoring. At the outset, we emphasize that these investigation costs are a simple modeling device that represent a wider class of influence costs that arise if claimants are permitted to challenge existing contracts whenever things turn out poorly.

The optimal legal regime for rule-driven contracts concedes that ex post inefficient outcomes are an inevitable feature of inflexible rules. Even though the influential investor has some discretionary power—because contracts are coarse and only imperfectly binding—the legal framework recognizes that monitoring by the investor is less valuable with rule-driven contracts. Thus, the optimal rule-driven contracts are *noncontingent,* without the need for costly investigations. In effect, the doctrine of equitable subordination provides the informed investor that has a rule-driven contract with a safe harbor against subsequent claims by other investors who may have been harmed by actions that led to liquidation. This preserves the firm's and investor's ability to agree to rule-driven financial contracts in the first place.

Thus, our model provides a partial rationale for a financial system in which powerful creditors do not hold the types of blended debt and equity claims that would be predicted by elementary finance

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[3]Williamson (1988) distinguishes between debt and equity as two different corporate governance mechanisms, one rule-driven and one discretionary.

theory. Here, the investor's observable levers of control (open-ended discretion or explicit rules) are optimally associated with distinct liability rules. Open-ended discretion—which we associate with claims that have a substantial equity stake—imposes fiduciary responsibilities, while explicit rules absolve even powerful creditors with significant discretion from such responsibilities. Holding a mixed claim places a creditor in a grey area of the law, in which there is no truly safe harbor from fiduciary responsibilities. [4]

Our paper proceeds as follows. In Section 2, we discuss equitable subordination. In Section 3 we describe the model, and in Section 4 we discuss the relationship between our stylized model and real world contracts and legal institutions. Section 5 derives the optimal contract. Section 6 contains our main results, showing the correspondence between the contractual governance structure (discretionary versus rule-driven) and the legal structure (state-contingent versus noncontingent liquidation payoffs). In Section 7, we discuss some of the related literature and directions for future research.

2. Equitable Subordination

Equitable subordination—a doctrine first formally enunciated in the late 1930s—permits the court to subordinate the claims of corporate insiders to those of other claimants in bankruptcy proceedings. [5] The key problems for the courts have been to define first: (i) those conditions in which an investor may be held responsible for harm to other claimants, and then (ii) the types of actions that would justify

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[4]As stated by Chaitman (1984): "When a bank exposes itself to a finding that it improperly exercised control over a borrower corporation, it risks the subordination of its entire claim against the borrower. Factual determinations as to the dollar extent of injury to creditors caused by an overreaching bank are difficult, time-consuming, expensive, and probably speculative at best. Hence, when faced with a scenario of serious impropriety, a bankruptcy court is likely to react by subordinating the bank's entire claim."

[5]The original cases are *Taylor v. Standard Gas & Electric Co., 306 U.S. 307 (1939)* and *Pepper v. Litton, 308 U.S. 295, 310 (1939)*. The principle is codified in Section 510(c) of the Bankruptcy Code, but the code is intentionally vague about when courts should apply the doctrine, leaving the resolution of this question to the evolution of case law. Here, we don't give a full account of the history of equitable subordination, but, instead, we distill its main elements for modeling purposes. While we believe that our account gives a fair picture of the consensus view, we don't do justice to the differences of interpretation and emphasis to be found in judicial decisions and in the legal literature. Useful references about equitable subordination and lender liability include Watson (1980), Chaitman (1984), DeNatale and Abram (1985), Fischel (1989), Dickens (1987), Karg (1991), French (1995), and Koh (1998).

subordination.

Insiders, such as directors, managers, and dominant shareholders, have traditionally been held to a fiduciary standard, and courts have unanimously agreed that they may be held responsible for harms to other claimants. But powerful nonmanagement creditors have not traditionally been held to have a strict fiduciary relationship to other firm claimants.[6] Although their treatment is not as clear-cut, case law reveals a significant degree of continuity and uniformity.

An investor who "controls" the firm may be held responsible for harm to other claimants, although the prerequisites for being viewed as a controlling investor have evolved with the case law. Other than being an insider, there is no single characteristic sufficient to identify an investor as a controlling investor. Instead, courts typically look for multiple characteristics that constitute control.[7] However, the courts have consistently held that a creditor exercising its *contractual* rights—including "sharp practices" that place the creditor's interests before those of other claimants—will not be viewed as a controlling investor, so long as the contractual agreement flows from an "arm's length" relationship.[8] In this sense, the loan contract provides a safe harbor against any claim for equitable subordination, as

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[6]"A premise underlying commercial transactions between banks and their borrowers is that a creditor owes no special duty to its debtor. Moreover, one creditor owes the other creditors of the debtor no fiduciary or contractual duty. When the relationship is solely that of creditor-debtor, and the trustee or other creditor challenges the claim of a nonmanagement creditor, the party must prove substantial inequitable conduct." (Dickens, 1987).

[7]See Karg (1991, pp. 450-451): "Among the more weighty factors indicating control are: rights to a controlling interest in the debtor's stock, coupled with a use of those rights to coerce the debtor into acting to the detriment of other creditors; actual ownership of a controlling interest in the debtor's stock; a merger of identity between debtor and creditor; unreasonable, arbitrary, and unwarranted exercise of control; joint control of the debtor's bank accounts requiring the creditor's signature for all substantial checks; placing employees of the creditor as directors and officers of the debtor; participation of the creditor's employees in the day to day operation of the debtor; loan agreements with provisions that are not within industry standard and provide the creditor with control exceeding the industry norm; and coercing the debtor into executing security agreements after it becomes insolvent."

[8] "[The Bankruptcy] Code nowhere says that a creditor may not protect his investment in accordance with the security and loan agreements." (*In re Clark Pipe & Supply Co. Inc., 893 F.2d 693 (5th Cir. 1990)*). In this influential case the court reversed its original ruling; we refer to the two opinions as *In re Clark I and II*.

long as the creditor's actions can be seen as straightforward attempts to enforce contractual clauses.

For example, a firm may have contractually agreed to pay its bank directly from the liquidation of receivables, according to some fixed percentage. The bank may be fully aware of its borrower's impending failure, yet continue to press the firm to liquidate receivables to cover its own claim without fear of having its claim subordinated, even if the bank is aware that in pressing its own interests first the firm's other creditors will be harmed. Or a bank might refuse to renew a loan commitment. The underlying idea here does *not* concern whether the bank has gained substantial influence over the firm.[9] The bank may have intimate knowledge of the firm's affairs, and indeed, the firm may have no alternative source of funds at any reasonable cost, both of which give the bank tremendous influence over the firm. Instead, the courts have reasoned that the bank's right to refuse further funds at maturity is a *predictable* part of a contractual relationship into which the firm and the bank entered as equals.[10]

Note, though, that the courts have not granted creditors blanket immunity from being viewed as a controlling investor. Much of the case law concerns instances in which the creditor uses its power to press the borrower to take actions to improve the creditor's own position at others' expense, but not in strict pursuance of explicit contractual rights. Continuing the example above, the bank might use its influence to insist that the firm make *all* payments to the bank and withhold payments to other creditors as long as possible. In cases such as these, the courts have looked to the details of the relationship between the creditor and the borrower to determine whether the creditor's influence should be viewed as control.

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[9] "...there is generally no objection to a creditor using his bargaining position, including his ability to refuse to make further loans needed by the debtor, to improve the status of his existing claims." From the second circuit court's opinion *In re WT Grant Co*., 699 F.2d 599 (2nd Cir. 1983). Also, see the cases cited in Koh (1998, footnote 56).

[10] "[There was] no evidence that the loan documents were negotiated at anything other than arm's length or that they are atypical of loan documents used in similar asset-based financings." (*In re Clark, II*). Also see Judge Easterbrook's influential opinion in *Kham and Nate's Shoes No.2 v First Bank*, 908 F.2d 1351 (7th Cir. 1990).

In order for a contractual agreement to provide a creditor with a safe harbor from equitable subordination, the courts have required that the agreement was made at arm's length. The resolution of this difficult issue has traditionally taken into account a menu of factors, two of which seem particularly weighty. The first is whether the firm was insolvent at the time the contract was negotiated; if so, the court is less likely to view the contracts as an arm's length transaction.[11] For example, if the firm's inability to make a coupon payment or the breach of a number of covenants is evidence of firm insolvency, then the court will be more inclined to view the agreement as one in which the investor was in control.[12] A second factor taken into account by the courts is whether the terms of the contract are consistent with prevailing business practice. A finding that a contract gave the investor unusual rights of intervention, in exchange for the waiver of contractual clauses negotiated earlier, would predispose the court to view the investor as a controlling agent.

If the court establishes that a creditor is a controlling investor, a second hurdle must be passed before a claim for subordination of the creditor's claim can be effective. The action itself must be inequitable. This has two components: (i) the action undertaken must actually benefit the creditor at other claimants' expense; (ii) the action of the investor must constitute "egregious conduct."[13] Actions that would normally be undertaken by a creditor protecting its own security interest are not inequitable,

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[11]"Authority on equitable subordination has found undercapitalization to be evidence of inequitable conduct." (Long ,1993, p. 99). See, for example, *In re Clark Pipe, I and II* (as discussed in Karg, 1991) and *In re Multiponics, Inc* (as discussed in Watson, 1980).

[12]Discussing *In re Hydroponics*, 622 F.2d 709,717 (5th Cir.1980), Watson writes, "The test used in the Fifth Circuit is that a corporation is undercapitalized if 'reasonably prudent men with [a] general business background would deem the company undercapitalized.' Application of this test is facilitated by a two-part inquiry that asks what a skilled financial analyst would consider adequate capitalization under the attendant circumstances and whether the corporation could have obtained comparable loans from informed outside sources."(p.631).

[13] Long (1993, p. 106) cites two types of inequitable conduct that have given rise to the subordination of non-management creditors' claims: (i) misconduct or misrepresentation by a claimant upon which others relied to their damage; (ii) mismanagement of the bankrupt by the claimant to the detriment of other creditors.

even if the creditor's influence increases its own payoff at the expense of other creditors.

3. The Model

3.1 Agents

There are two risk neutral agents, one passive *claimholder*, F, and one dominant *investor*, I. The claimholder represents a range of claimants—trade creditors, customers, and perhaps even small stockholders—who have no direct control over the firm's investment decisions and who are unlikely to be well informed about the firm's affairs. The investor has the power to make all production decisions, except where constrained by contract.

Although we will discuss our dominant investor at length in section 4.2, it may be helpful to have a concrete interpretation in mind from the outset. In one interpretation, the claimholder represents the uninformed claimants of a firm near financial distress, and the controlling investor is the firm's bank (or a coalition of the firm's insiders and the firm's bank). This is a case in which there is little doubt that a firm's creditor may be very powerful, whether or not the creditor also holds voting stock or a seat on the firm's board of directors. It is a helpful shorthand to think of a single investor making decisions or choosing actions. But in the distressed firm interpretation, we have in mind a situation where the firm's managers make decisions under the influence of a powerful creditor or stockholder. Collapsing the manager and investor into a single agent amounts to assuming that it is the investor who has effective control.

The timing of the model is presented in Figure 1.

3.2 Production

At the beginning of the period, the two agents provide total funds of \$1. Without loss of generality, assume that all funds come from the investor, whose opportunity cost of funds is ρ. The expected gross payoff depends both on the state of the world, $s \in \{a,b\}$, and an action taken by the investor, $d \in \{\alpha,\beta\}$. Assume that each state occurs with equal probability.[14] Once the initial investment is made, the investor can also pay to receive some interim information about the underlying state of the world. After receiving this information, the investor may choose to *continue* the project ($d = \alpha$) or the investor may *liquidate* the project ($d = \beta$). The firm's expected value is V_s in state s if the investor chooses to continue and L_s in state s if the investor chooses to liquidate. The state of the world is revealed after the investor's action is taken.[15]

The term liquidation doesn't completely capture the kinds of actions we have in mind. Here, liquidation refers to actions that reduce the value of the firm as an ongoing productive organization and increase its value as a collection of fungible assets that can be transferred to various claimants. These actions would include the forced sale of assets that would normally be used to produce goods, or the requirement that the firm postpone the purchase of such assets and hold large hoards of cash or liquid inventories. (These are the types of actions that debt contracts often impose directly through covenants or indirectly through the debt repayment schedule.)

We assume that continuation yields a higher expected payoff in state a and that liquidation yields a higher expected payoff in state b, that is,

<u>Assumption 1</u>: $V_a > L_a$ and $V_b < L_b$. (1)

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[14]Our central results generalize to the case where $\theta \neq 1/2$, where θ is the probability of state a and $1-\theta$ is the probability of state b.

[15]As a technical matter, we assume that the investor's action generates a distribution of returns $G_s(r|d)$—with strictly positive density $g_s(r|d)$—where r has a support $[r_0,r_1]$ that is independent of the underlying state. Thus, the expected values if the firm continues or is liquidated are $V_s = \int r g_s(r|\alpha)dr$ and $L_s = \int r g_s(r|\beta)dr$. That all final payoffs are drawn from a common support means that no agent could infer either the underlying state or the action chosen directly from observing the project's final payoff. Having said this, our presentation is significantly simplified by focusing on expected payoffs, conditional on the underlying state and the action, rather than on realized payoffs. From now on, we use the terms payoffs and payments to refer to expected payoffs and expected payments.

3.3 Information structure

3.3.1 Information production by the investor. After funds have been committed and contracts signed—but before the state of the world has been realized—the investor can undertake expenditures to observe a noisy indicator of what the state will be. But greater accuracy comes at a higher cost, and there are diminishing returns to increasing accuracy.

Formally, the investor bears an initial cost $c(q) = cq^2/2$ and observes an indicator, $i \in \{a',b'\}$, where $p(s = a|i = a') = p(s = b|i = b') = (1+q)/2$; that is, the investor learns the state correctly with probability $(1+q)/2$ and incorrectly with probability $(1-q)/2$. Thus, q measures the accuracy of the indicator, with $q = 0$ corresponding to a completely uninformative indicator and $q = 1$ corresponding to a perfectly informative indicator.[16]

We assume that neither the expenditure on the indicator nor the indicator itself is verifiable, and, in turn, neither is contractible. In contrast, the underlying state can be verified by a court, but only at the end of the period. Further, verification is costly; it costs 2m for the court to ascertain the underlying state in a judicial process that involves accountants, lawyers, and perhaps even economists (charging by the hour).[17] For simplicity, we assume that each agent bears one-half of the court costs.

Finally, we assume that the realized gross payoff, from which all payments are made, is costlessly verifiable and contractible.

3.3.2 The investor's actions. With probability 1-p the investors' actions are costlessly verifiable and contractible, but with probability p, the action can't be verified at any cost. In this case, the investor can,

[16]Our central results carry over to the more general case where $c'(q) > 0$, $c''(q) > 0$, and $c'''(q) \geq 0$, and where $p(s = a) = p(i = a') = \theta$, $p(s=a|i=a') = q + (1-q)\theta$, and $p(s=b|i=b') = q + (1-q)(1-\theta)$. In this parameterization, the indicator is a weighted function of a perfectly informative indicator and a completely uninformative indicator; a more accurate indicator has a larger weight on its perfectly informative indicator component.

[17]Note that the court can observe the state, s, without error. Although it is reasonable to assume that the court might make mistakes, for our purposes it is essential only that there be some cost of relying on the court to verify the state of the world. Our specification is the simplest possible way of introducing such a cost.

for example, manipulate the books to make it seem as if either action was chosen.

That actions might be directly verified (with probability $1-p$) is a shorthand way to capture the idea that actions give rise to measurable outcomes; for example, decisions that increase the liquidity of the firm's assets can be measured by various accounting ratios such as the working-capital-to-asset ratio. To the extent that actions can be measured precisely, we may think of the action itself as verifiable (and contractible). Of course, the firms' accounts may be subject to manipulation, or, more generally, actions with very different long-term consequences may look identical on the firm's books in the short term. We make the polar assumption that actions are either completely verifiable or completely unverifiable mainly to keep things simple, but it is not hard to think of examples for which this is a close approximation. For example, a decline in demand in a particular market may reduce organizational slack and make accounting measures of performance both more exacting and more informative, when under normal conditions, the investor may be able to manipulate reported accounting measures of performance. In this case, $1-p$ would represent the probability of low demand.

3.4 Contracts

We present a formal description of the contractual choices before discussing the connections between our model contracts and real world debt and equity contracts in Section 4. But it may be helpful to keep in mind our preceding discussion of equitable subordination, in particular, the legal distinction between a controlling investor and a powerful investor exercising well-specified contractual rights. We distinguish between *rule-driven* and *discretionary* contracts to capture this legal distinction.

Contracts have two elements: *rules* and *payments*.

3.4.1 Rules versus discretion. A rule is a commitment by the investor to choose a particular action based on contractible information. In our simple world, there are two possible rules, $d(i) = \alpha$, and $d(i) = \beta$, and each corresponds to a particular rule-driven contract. The first tells the investor, "always choose α" ($d = \alpha$); the second tells the investor "always choose β" ($d = \beta$). We will refer to a contract that incorporates such a rule as a *d-contract*.[18]

A rule is enforceable only when the underlying action is verifiable, so the rule is enforceable with probability $1-p$. Recalling our earlier discussion about the creditor's ability to manipulate the books, we note that with probability p the rule isn't enforceable and often refer to p as a measure of *contractual coarseness.*

The alternative to a d-contract is an *e-contract*, which gives the decision-maker full discretion to choose the action.

3.4.2 A simple example. For concreteness, think of the following simple example. The underlying state of the world is either that the firm is a good firm and has NPV > 0 (s = a) or that it is a bad firm and has NPV < 0 (s = b). The investor has a choice of two possible actions: to permit the firm to make productive investments ($d = \alpha$) or force the firm to liquidate its core assets ($d = \beta$). The rule may take the form of requiring the firm to make a coupon payment to prove that it has made a positive NPV investment.

If the ability to generate interim cash flows is a relatively poor indicator of the firm's investment behavior, then contracts will be coarse. For example, cash flow may be raised by selling essential assets that raise revenues but ultimately increase the likelihood of default. This would be a case where the investor actually chose liquidation but appeared to choose continued investment. Alternatively, an investor might force a firm to close down relatively unprofitable operations, thereby reducing interim cash flows, but increasing the likelihood of ultimate success. This would be a case where the investor actually chose continued investment but appeared to choose liquidation. In cases where the relationship between interim cash flows and ultimate profitability are poorly understood or

[18]We rule out d-contracts that are equivalent to giving the investor full discretion, that is, a rule that tells the investor to "choose either α or β" ($d \in \{\alpha, \beta\}$).

unstable, the d-contract will leave the investor with substantial discretion (higher p).[19]

3.4.3 Payments. Payments under both the d-contract and e-contract are made out of end-of-period payoffs. Payments may be conditioned on the action chosen, and if the court conducts an investigation, they may also be conditioned on the state. From the outset, we make the following assumption:

Assumption 2: The court will never investigate if the project is continued.[20]

Since the state can't be verified without an investigation, the payments to the investor and claimant when the project is continued are independent of the state and can be denoted as D_I and D_F, respectively.

However, it *may* be profitable for the firm to secure funds with a contract in which the payoffs in liquidation are state-contingent. We will refer to such contracts as *state-contingent* contracts. It is convenient to write the agents' payoffs in liquidation as shares of the firm's liquidation value. Thus, the investor's and claimant's payments in liquidation states are $\phi_{Is}L_s$ and $\phi_{Fs}L_s$, respectively. If the contract calls for no investigation, liquidation payoffs can't be conditioned on the underlying state and $\phi_{ja} = \phi_{jb}$, j = I,F. In this case the contracts are *noncontingent*.

We assume:

Assumption 3: Payoffs are divided completely between the two claimants.

Assumption 4: Agents have limited liability.[21]

Together, these two assumptions imply that $\phi_{Is} + \phi_{Fs} = 1$, so we can think of ϕ_{Is} as a measure of the investor's *priority* in liquidation in state s.

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[19]Note, this discussion suggests that it may be reasonable to view p as an object of contractual design rather than an exogenous parameter. In addition, it is possible p might be state dependent. We leave both issues to future research.

[20]This policy of restricting investigations to liquidation states will be optimal as long as the costs of an investigation, 2m, are sufficiently high relative to $[V_a - L_a]$.

[21]In the present setting, limited liability is a more controversial assumption than it might seem at first. Subordination of a powerful investor's claim is not the only remedy available to other claimants. For example, if the powerful investor's actions were fraudulent, those claimants that were harmed might seek larger penalties than mere subordination of the investor's claim.

We assume that neither actions nor payments are renegotiable. It is not hard to see that there may be gains from renegotiation once information has been revealed to the investor, since both agents have a joint interest in avoiding costly investigations. However, since our claimant represents numerous agents with differing interests, multilateral negotiations in a private workout are likely to be very costly.

This completes our formal description of the model.

4. Discussion

In this section we interpret equitable subordination in terms of our contracting framework. We also discuss the relationship between our stylized contracts and real world contracts, as well as the relationship between our two-agent model and the more complicated world it represents.

4.1 The legal system and the doctrine of equitable subordination

4.1.1 State contingency and equitable subordination. We adopt a highly stylized and mechanistic view of the legal system and ignore many of the interesting strategic issues that arise in bankruptcy. There are two possible outcomes, continuation or liquidation, and the court's role is twofold: (i) to investigate and determine the state of the world if the investor chooses liquidation and the contract is state-contingent; (ii) to enforce contractual payments if the firm is liquidated. It is important to note that, in principle, either the d-contract or the e-contract may be state-contingent and, therefore, require a court investigation. Indeed, the main goal of this paper is to determine the conditions in which state-contingency is uniquely associated with the e-contract and noncontingency with the d-contract.

Following our discussion of Section 2, we model equitable subordination as a two-pronged doctrine. First, the doctrine defines a controlling investor. In our simplified model, an agent with discretionary control (an e-contract) is viewed by the courts as a controlling agent, and an agent with a rule-driven contract (a d-contract) is viewed as a noncontrolling agent, even though the court knows that contracts are coarse and that the investor actually has discretion to direct the firm's affairs with some probability.[22]

The second prong is the rule for deciding when subordination is warranted. In our interpretation, a controlling investor will have its claim subordinated when the court's investigation reveals that: (i) the investor benefited at other claimants' expense, and then only if (ii) the investor's action reduced the value of the firm (given the state). We refer to any action that meets this double standard as one that is *purely redistributive.* Purely redistributive actions are actions that not only benefit the investor at other claimants' expense, but which the investor could never justify on efficiency grounds. Such actions would never be permissible for an investor with fiduciary responsibilities.

In our setting, equitable subordination is a doctrine that has two features. First, it imposes state-contingent payments in default states on an investor that the court views as a controlling agent (one with an e-contract), with a penalty of subordination for a breach of fiduciary responsibilities. Second, it provides a safe-harbor for a noncontrolling investor (one with a d-contract), protecting the priority of the investor's claim even when the investor has chosen a purely redistributive action. Thus, we state the following definition:

Definition: The optimal contracting scheme involves *equitable subordination* if the following three conditions hold:

(1) optimal e-contracts are state-contingent;

(2) optimal d-contracts are noncontingent; and

(3) the e-contract subordinates the investor's claim when the firm is liquidated and the court finds that the underlying state was a, that is, $\phi_{Ia} < \phi_{Ib}$.

4.2 The informed investor

How should we interpret the informed investor? By treating the informed investor as a single

[22]There is no presumption that the court knows this probability for any particular case. We think of the creation of two different legal standards of liability as one means of allowing contracting parties to use this information optimally.

agent, we abstract completely from all issues concerning the division of control between other insiders and the informed investor.[23] Although our model could apply literally to the design of an optimal claim for a single dominant investor, we view it as an idealization of a situation in which the investor has substantial influence, for example, the case of a firm nearing financial distress with a single banking relationship or a startup firm guided by venture capitalists. With only minor changes, we can also interpret the dominant investor as a coalition between the investor and other firm insiders.[24]

If the informed investor is interpreted as a coalition that includes an informed manager, the information structure may also be an issue. In particular, it is often reasonable to assume that the manager may have distinct, even superior, information about the state of the world. Thus, our model of information production by the investor doesn't permit a well-informed manager to credibly communicate any useful information to the investor. This makes sense if the manager can't make credible statements about the state of the world, either because of a strong preference to continue projects or because the manager's own ability is at issue, that is, if the state of the world, s, refers to the quality of the firm's management.[25]

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[23]In this sense, our model resembles Admati and Pfleiderer's (1994) model of a venture capitalist, in which the investor is given unilateral control. Important contributions that examine optimal contract design in the presence of *contested* control among insider groups include Zender (1991), Aghion and Bolton (1992), Aghion and Tirole (1997), and Burkart, Gromb, and Panunzi (1997).

[24]In this case, we would take the view that the firm's surplus was divided between the investor and other claimants, with their shares depending on their relative bargaining power at the time the contract was signed. This is an inessential change in the formal contracting problem, in which we assume that the investor's participation constraint merely ensures him nonnegative expected profits.

A more interesting issue is whether maximization of firm value is the appropriate way to model the firm's objective function, given our assumption of a powerful investor. This issue is especially important when the investor is an intermediary or when the investor has a significant stake in more than one firm. This is an important issue for further research. For some empirical evidence that such issues may matter empirically see Weinstein and Yafeh's (1998) evidence that Japanese firms' investment decisions are consistent with a managerial objective function that weights the interest of the firm's main bank along with firm profits.

[25]Other models that assume a strong managerial preference to invest include Stulz (1990) and Hart and Moore (1995). In a venture capital interpretation it is probably reasonable to think of managerial ability of the entrepreneur as highly uncertain and also to view the venture capitalist as no

4.3 Debt and equity

Our distinction between rule-driven and discretionary contracts captures one facet of the difference between debt and equity, one that corresponds to the legal distinction between pursuing predictable contractual remedies and exercising control. In contrast, given our assumption that the investor has substantial influence over the firm, we make no attempt to model the conditional transfer of ownership between equity and debt that has been emphasized in much of the incomplete contracting literature. In addition, the payoffs under our d- and e-contracts are not designed to mimic those of textbook debt and equity contracts. In fact, our optimal e-contract will give the investor conditional priority over the claimant, which is inconsistent with the payoff characteristics of a pure equity claim.[26] But the different standards for assigning liability for d- and e-contracts do produce default payoffs for creditors similar to those we observe in the real world.

It is easy to see how real world debt contracts, with contractual payments and covenant restrictions, may be viewed as rule-driven from the viewpoint of the insider, say a manager, who has agreed to meet the terms of the contract. But our model also assumes that the influential investor makes a (limited) commitment to enforce the terms of the contract, rather than exercise discretion. In what sense is this true of any real world debt contract, in which contractual clauses give the creditor the *right* to require the firm to make a loan payment or to satisfy its working capital requirement, but doesn't say that the investor *must* exercise these contractual rights?

In particular, how should we think about an agreement among a bank and the firm's insiders' to defer the bank's contractual right to impose an immediate default—which would lead to bankruptcy—hoping to keep the firm operating solely to transfer assets to the bank, rather than the firm's

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less informed than the entrepreneur about the entrepreneur's ability.

[26]We can view our investor as holding a mix of claims. An investor with a d-contract holds primarily debt, although he may also hold limited amounts of equity or larger amounts of nonvoting equity. An investor with an e-contract holds a mixture of debt and equity claims, but with a substantial equity component.

other creditors? One way to approach this question is to ask how the courts view contracts that are the outcome of negotiations between a borrower in current default of a debt contract and a creditor who is aware of this default.

Ultimately, the answer to this question hinges on whether the court interprets the renegotiated contractual agreement as a cloak for investor control of the firm or as an arm's length agreement. In light of our discussion in Section 2, evidence that the bank knowingly renegotiated a contract with an insolvent firm or that the renegotiated contract terms are atypical of loan documents would predispose the court to view the bank as a controlling investor. In the terminology of our model, the investor who waives a contractual right and insists upon some other course of action has made a discretionary choice and will be treated by the court as the holder of an e-contract.[27]

5. Equilibrium Contracts

We assume that the contract is designed to maximize firm value, contingent on the participation of the investor and the other claimants.

To begin, we restrict attention to the class of contracts in which the investor is induced to choose the *efficient decision rule*, $d(a') = \alpha$ and $d(b') = \beta$, whenever he is not bound by a contractual rule to do otherwise. So, when we speak of an α- or β-contract we (temporarily) mean a contract that imposes a rule that is verifiable with probability $1 - p$ and that yields an efficient decision rule when the contract is coarse (with probability p). In Section 6.3, we will expand our discussion to include contracts in which the investor follows a simple rule even when he has discretion to do otherwise. Note that the investor will never produce any information unless the action varies with the state of the world, because

[27]Admittedly, we are drawing a very sharp line in a situation where the real world seldom permits such precision. It is important to note that our model is not intended to show that powerful creditors would never renegotiate contracts. However, decisions that favor a powerful creditor at others' expense will not receive *automatic* legal protection against challenges by other claimants, if the decisions arise from contract negotiations with an insolvent borrower or a borrower in default. At the same time, a court's ex post findings that these decisions were reasonable, in the sense that an informed creditor might have renegotiated the contract with an eye to avoiding an inefficient default, at terms in accord with common industry practice, would protect the creditor against subordination of its claim.

information production is costly and the investor who follows a simple rule has no use for information.

5.1 First-best contracts

To fix ideas, it is useful to derive the optimal contract in a world where no contracting problems arise, that is, one in which information production by the investor is contractible and in which incentive compatibility constraints can be ignored. With risk-neutral agents, it is uncontroversial to view the first-best contract as one that maximizes the expected value of the firm,

$$\Pi(q) = \frac{1}{2}\left[\left(\frac{1+q}{2}\right)V_a + \left(\frac{1-q}{2}\right)V_b\right] + \frac{1}{2}\left[\left(\frac{1-q}{2}\right)L_a + \left(\frac{1+q}{2}\right)L_b\right] - \frac{cq^2}{2} - \rho\,. \qquad (2)$$

The first expression is the expected value of the firm when $i = a'$ and the second expression is the expected value of the firm when $i = b'$. Both expressions already assume that the investor chooses the efficient decision rule, $d(a') = \alpha$, $d(b') = \beta$, that is, the investor continues whenever he observes $i = a'$ and liquidates whenever he observes $i = b'$. In each case, the investor makes the correct decision with probability $(1+q)/2$ and the incorrect decision with probability $(1-q)/2$, since the indicator is noisy.

Maximizing (2) with respect to q, the first best level of q, q*, is determined by the first order condition,

$$(1/4)[(V_a - L_a) + (L_b - V_b)] - cq^* = 0. \qquad (3)$$

The expression in brackets—which is positive by the inequalities in (1)—measures the marginal benefit of monitoring: the higher contractual surplus from a more efficient liquidation policy. Examination of first order condition (3) makes transparent the net benefits of monitoring. The optimal monitoring level increases when the benefits from efficient liquidation are higher and decreases when monitoring costs rise quickly with q (that is, c is higher).

5.2 The general contracting problem

Next we show that the choice between state-contingent and noncontingent contracts depends upon a simple tradeoff. Contingent contracts provide stronger incentives for the investor to monitor to increase the accuracy of the indicator. But contracting agents must weigh the costs of the court's investigation against the increase in efficiency due to more monitoring.

We assume that the firm's financial structure is designed to maximize the firm's expected value subject to participation by the investor. Although it would be easy to modify the model to include *ex ante* bargaining among the various claimants with different degrees of market power, we assume that the claim for the influential investor is determined in a competitive market.[28]

With a little notation we can conveniently view all of our contracts as special cases of the solution to a single contracting problem. Think of a general contract in which each rule can be imposed with some probability and in which the borrower has discretion with the remaining probability. For each contract type $k \in \{\alpha, \beta, e\}$, denote these probabilities by $z_k \equiv [z_{k1}, z_{k2}, z_{k3}]$, where z_{k1} is the probability that rule $d = \alpha$ constrains the investor's behavior, z_{k2} is the probability that rule $d = \beta$ constrains the investor's behavior, and z_{k3} is the probability that the investor has discretion. Thus,

$$z_\alpha = [(1-p), 0, p],\ z_\beta = [0, (1-p), p], \text{ and }\ z_e = [0, 0, 1].$$

Note that $z_{k1} + z_{k2} + z_{k3} = 1$. For each contract type there are two potential variants—a state-contingent variant and a noncontingent variant. Let δ be an indicator function that equals 1 when a contract is state-contingent and equals 0 when the contract is noncontingent. Denoting a particular contract by $C_\delta(z_k)$, the optimal state-contingent contract solves the following problem,

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[28]Note, however, that the contracting problem may refer to the renegotiation of an existing contract.

$$\begin{aligned} \text{Max } \Pi^f(C_\delta(z_k)) \;=\; & z_{k1}\left[\frac{1}{2}(V_a - D_I) + \frac{1}{2}(V_b - D_I)\right] \\ & + z_{k2}\left[\frac{1}{2}(L_a(1-\phi_{Ia}) - \delta m) + \frac{1}{2}(L_b(1-\phi_{Ib}) - \delta m)\right] \\ & + z_{k3}\left\{\frac{1}{2}\left[\left(\frac{1+q}{2}\right)(V_a - D_I) + \left(\frac{1-q}{2}\right)(V_b - D_I)\right]\right. \\ & + \left.\frac{1}{2}\left[\left(\frac{1-q}{2}\right)(L_a(1-\phi_{Ia}) - \delta m) + \left(\frac{1+q}{2}\right)(L_b(1-\phi_{Ib}) - \delta m)\right]\right\}, \end{aligned} \tag{4}$$

subject to,

$$\begin{aligned} \Pi^I(C_\delta(z_k)) \;=\; & z_{k1}\left[\frac{1}{2}D_I + \frac{1}{2}D_I\right] \\ & + z_{k2}\left[\frac{1}{2}(\phi_{Ia}L_a - \delta m) + \frac{1}{2}(\phi_{Ib}L_b - \delta m)\right] \\ & + z_{k3}\left\{\frac{1}{2}\left[\left(\frac{1+q}{2}\right)D_I + \left(\frac{1-q}{2}\right)D_I\right]\right. \\ & + \left.\frac{1}{2}\left[\left(\frac{1-q}{2}\right)(\phi_{Ia}L_a - \delta m) + \left(\frac{1+q}{2}\right)(\phi_{Ib}L_b - \delta m)\right]\right\} \\ & - \frac{cq^2}{2} - \rho \;\geq\; 0, \end{aligned} \tag{5}$$

$$q \;=\; \operatorname{argmax} \;\; \Pi^I(C_\delta(z_k)), \tag{6}$$

$$D_I \;\geq\; \left(\frac{1+q}{2}\right)(\phi_{Ia}L_a - \delta m) + \left(\frac{1-q}{2}\right)(\phi_{Ib}L_b - \delta m), \tag{7}$$

$$D_I \;\leq\; \left(\frac{1-q}{2}\right)(\phi_{Ia}L_a - \delta m) + \left(\frac{1+q}{2}\right)(\phi_{Ib}L_b - \delta m), \tag{8}$$

$z_\alpha = [1-p, 0, p]$, $z_\beta = [0, 1-p, p]$,   and $z_e = [0, 0, 1]$, and (9)

$\delta = 1$. (10)

Subject to the investor's participation constraint (5), this contract maximizes the expected value of all other claims on the firm, as given in (4). Remember, in both expressions, the investor follows rule $d = \alpha$ with probability z_{k1}, rule $d = \beta$ with probability z_{k2}, and exercises discretion with probability z_{k3}. Condition (6) says that the investor chooses his level of monitoring to maximize his own expected profits, while conditions (7) and (8) are incentive compatibility conditions that ensure that $d(a') = \alpha$ and $d(b') = \beta$, respectively. In each case the investor chooses between continuation (the left-hand side of (7) or (8)) and liquidation (the right-hand side of (7) or (8)). Constraint (9) repeats our definition of z_k, k = α, β,e. In this program, $\delta = 1$, which means that the court conducts a costly investigation whenever the firm is liquidated. (Remember that, by assumption, we have ruled out state-contingency in states where the firm is not liquidated.)

The optimal noncontingent contract is the solution to (4)-(9) and two more conditions,

$$\delta = 0, \qquad (10)'$$

and,

$$\phi_{ja} = \phi_{jb}, \quad j = I,F. \qquad (11)$$

The noncontingent contract avoids the costly court investigation but has the disadvantage of added constraint (11), which says that the priority of claims can't be conditioned on the state, s.

5.2.1 Parametric restrictions

Before deriving the optimal contracts and stating our main results we impose some parametric restrictions, primarily to simplify the presentation. First we make the parametric restriction that

Assumption 5: $L_b > L_a$, (12)

a necessary condition for noncontingent contracts to satisfy IC conditions (7) and (8) in our highly simplified setup.[29]

We also assume

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[29]This condition is mainly an artifact of the stark structure of our model, in which the investor's payoffs in continuation (D_I) are *completely* independent of the state. A weaker condition would hold if there were a verifiable component of the firm's revenues or if the investor sold other services to the firm—as do many banks—more profitably in state a than in state b.

<u>Assumption 6</u>: $[V_a - V_b] - L_a > 0$, (13)

which is both a necessary and sufficient condition for the first-best level of monitoring defined in equation (3) to be unattainable under any of our contracts.

Keeping in mind that the rule "always liquidate" ($d(i) = \beta$) is just a stylized way of modeling a contract with very stringent repayment and covenant conditions, we make parametric restrictions that ensure that such a contract is feasible, whether it is contingent or noncontingent, respectively:

<u>Assumption 7</u>: $L_b/2 > \rho + m$, and $[L_a + L_b]/2 > \rho$. (14)

Our final two parametric restrictions, along with Assumption 7, ensure interior solutions for all contracts, that is, that the contracts $(\phi_{Ia}, \phi_{Ib}) = (0,1)$ and $(\phi_{Ia}, \phi_{Ib}) = (1, 1)$ satisfy the incentive compatibility conditions (7) and (8) for *all* contracts k = α, β, e. (Note that weaker sufficient conditions guarantee interior solutions for individual contracts.)

<u>Assumption 8</u>:

$$\frac{1}{p^2}\frac{L_b}{2} - \left(\frac{1-p^2}{p^2}\right)(\rho + m) \leq \frac{c}{2}\left(\frac{L_b}{4c}\right)^2 + \rho + m \ , \qquad (15)$$

<u>Assumption 9</u>:

$$\frac{1}{p^2}\left(\frac{L_b+L_a}{2}\right) - \left(\frac{1-p^2}{p^2}\right)\rho \leq \frac{c}{2}\left(\frac{L_b-L_a}{4c}\right)^2 + \rho \ . \qquad (16)$$

The underlying economic interpretation of these restrictions is that the face value of the investor’s claim (D_I) derived from his participation constraint is neither: (i) so high that the investor would insist on keeping the firm afloat under all circumstances, even if he were given the full proceeds from liquidating the firm’s assets (Assumption 7); nor (ii) so low that he would always liquidate the firm (Assumptions 8 and 9). These conditions make sense in a world where the investor is a large investor, but only one among many claimants.

5.3 Optimal contracts

Proposition 1: ***Optimal state-contingent contracts***

Given Assumptions 1-8 the investor's optimal state-contingent claim is subordinated in state a and has priority in state b, that is,

$$\phi_{Ia} = 0, \ \ \phi_{Ib} = 1. \tag{17}$$

The investor's monitoring level, $q_1(z_k)$ is defined by,

$$z_{k3}\,(1/4)L_b - cq = 0, \quad k = \alpha,\beta,e. \tag{18}$$

In particular, for the e-contract,

$$(1/4)L_b - cq_1(z_e) = 0, \tag{19}$$

and for the two d-contracts,

$$p\,(1/4)L_b - cq_1(z_d) = 0, \quad d = \alpha,\,\beta\,.\ \blacksquare \tag{20}$$

The proof of Proposition 1 is straightforward and intuitive. Conditions (17) and (18) are derived immediately by maximizing the investor's expected profits, defined in (5), with respect to q, which yields the first order condition:

$$z_{k3}(1/4)[\phi_{Ib}L_b - \phi_{Ia}L_a] - cq = 0. \tag{21}$$

Note that the level of monitoring doesn't depend on z_{k1} or z_{k2} under any contract. These are the probabilities that the investor will be constrained by an enforceable rule and, thus, that monitoring will turn out to have been pointless. It is only the likelihood of discretionary decision-making that increases the investor's incentive to monitor.

Assumption 6 ensures that monitoring is below the first best level. But the investor can be motivated to increase monitoring by setting contract terms appropriately, that is, by rewarding the investor for correct liquidation decisions and penalizing him for incorrect liquidation decisions. The most powerful reward/penalty scheme is to give the investor a full priority claim in state b ($\phi_{Ib} = 1$) and a completely subordinated claim in state a ($\phi_{Ia} = 0$). Expression (18) follows when we substitute these values into first order condition (21).

Note that the level of monitoring is higher under the e-contract than under either of the d-contracts, since the e-contract is fully discretionary, while the investor exercises discretion with probability p under the d-contracts. Note also, from equation (18), that the level of monitoring is equal under the two d-contracts. This follows from the stark structure of our model, in which both d-contracts are verifiable with identical probability $1-p$; thus, the verifiability of the contract depends neither upon the prescribed action nor upon the underlying state.

We can now turn to the noncontingent contracts.

Proposition 2: ***Optimal noncontingent contracts***

Given Assumptions 1-7 and Assumption 9, the investor's optimal noncontingent claim has full priority, that is,

$$\phi_I = 1, \tag{22}$$

and the investor's monitoring level, $q_0(z_k)$, is defined by,

$$z_{k3}\,(1/4)[L_b - L_a] - cq = 0, \quad k = \alpha,\beta,e. \tag{23}$$

In particular, for the e-contract,

$$(1/4)[L_b - L_a] - cq_0(z_e) = 0, \tag{24}$$

and for the two d-contracts,

$$p\,(1/4)[L_b - L_a] - cq_0(z_d) = 0, \quad d = \alpha, \beta. \;\blacksquare \tag{25}$$

Note that the inability to condition the investor's priority on the state leads to a less powerful system of penalties and rewards for the investor and, thus, a lower level of monitoring, that is, $q_0(z_k) < q_1(z_k)$ for each k. This can be seen by comparing expressions (18) and (23). Expression (23) is derived using first order condition (21) and imposing the restriction that $\phi_{Ia} = \phi_{Ib}$. We see that full priority increases monitoring by the investor as much as possible, since $L_b > L_a$, by Assumption 5. Without state-contingency, the contract can't penalize the investor for making the wrong decision (liquidate in state a); it can only reward the investor for making the right decision (liquidate in state b). This reduces the incentive to monitor compared to the state-contingent contract.

6. Optimal legal regimes

6.1 The value of state contingency under e- versus d-contracts.

In this section we present our main result, that the optimal e-contract is state-contingent over a larger part of the parameter space than is the optimal d-contract. To show this, we examine the difference in surplus under a state-contingent contract and a noncontingent contract of type k,

$$\begin{aligned}\Delta_k^{10} &\equiv \Pi(C_1(z_k)) - \Pi(C_0(z_k)) \\ &= \left[z_{k3}\frac{1}{2}\gamma(q_1(z_k)) - \frac{cq_1(z_k)^2}{2} - (2z_{k2}+z_{k3})m \right] - \left[z_{k3}\frac{1}{2}\gamma(q_0(z_k)) - \frac{cq_0(z_k)^2}{2} \right],\ k=\alpha,\beta,e\ ,\end{aligned} \tag{26}$$

where the monitoring levels are defined by first order conditions (18) and (23), where,

$$\gamma(q) \equiv \left[\left(\frac{1+q}{2}\right)V_a + \left(\frac{1-q}{2}\right)V_b \right] + \left[\left(\frac{1-q}{2}\right)L_a + \left(\frac{1+q}{2}\right)L_b \right], \tag{27}$$

and $z_{e3} = 1$, $z_{\alpha3} = z_{\beta3} = p$, $z_{e2} = z_{\alpha2} = 0$, $z_{\beta2} = 1-p$.

Then, we have the following two propositions. Proposition 3 establishes that if the costs of a court investigation, 2m, are not too large, state-contingent contracts are preferred to noncontingent contracts when the liquidation value of the firm's assets in state a, that is, L_a, is low and that noncontingent contracts are preferred when L_a is high. Proposition 4 says that state-contingency is preferred over a larger part of the parameter space for the e-contract than for either of the d-contracts.

Proposition 3: Fix z_k. For

$$m < m^+(z_k) \equiv \psi(z_k)\frac{L_b}{4c}\frac{1}{4}\left[(V_a - V_b) - \frac{L_b}{2}\right], \quad \text{where } \psi(z_k) \equiv \left[\frac{z_{k3}^2}{2z_{k2}+z_{k3}}\right],$$

there exists $L_a(z_k) \in \{0, L_b\}$ such that:

$$\Delta_k^{10} \geq 0 \Leftrightarrow L_a \geq L_a(z_k)\ , \quad k=\alpha,\beta,e. \ \blacksquare \tag{28}$$

Proof: In the appendix.

Proposition 4: Let $m(z_k)$, $k=\alpha,\beta,e$, be defined as the largest m such that $\Delta_k^{10} \geq 0$, i.e.,

$$m(z_k) \equiv \psi(z_k)\frac{L_a}{4c}\frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right], \quad \text{where } \psi(z_k) \equiv \left[\frac{z_{k3}^2}{2z_{k2}+z_{k3}}\right],$$

and let $L_a(z_k)$, $k=\alpha,\beta,e$, be defined as in Proposition 3. Then,

(i) $m(z_e) > m(z_\alpha) > m(z_\beta)$, and

(ii) $L_a(z_e) < L_a(z_\alpha) < L_a(z_\beta)$. ■

Proof: In the appendix.

Propositions 3 and 4 are illustrated in Figure 2. It shows that for each contract there will typically exist some range of values of L_a near 0, where the optimal contract, whether a d-contract or an e-contract, will be noncontingent. As L_a varies, so does the value of state contingency in promoting stronger incentives to monitor by making the investor's payoffs in liquidation more sensitive to actual outcomes. This is because when L_a is very low ($L_a < L_a(z_e)$), the monitoring levels under state-contingent and noncontingent contracts are nearly equal—see expressions (18) and (23)—and it is unlikely that the efficiency gains from higher monitoring will outweigh the court costs. Similarly, when L_a is high ($L_a > L_a(z_\alpha)$), state-contingent contracts will typically dominate. This is because monitoring approaches zero under the noncontingent contract as the investor's liquidation payoffs are nearly identical in states a and b—see expression (23). However, in an intermediate range, ($L \in [L_a(z_e), L_a(z_\alpha)]$) the optimal e-contract is contingent while the optimal d-contract is noncontingent. The size of this intermediate range decreases with p. As shown by the diagonally hatched area in Figure 2, the e-contract is optimally state-contingent for more values of L_a than either of the two d-contracts.

The intuition behind Proposition 4 is simple. The value of monitoring by the investor is greater when he has more discretion; rule-driven contracts permit less discretion, so monitoring is less important. Since the value of state-contingent liquidation payments is to increase monitoring by the investor, e-contracts, which give the investor more discretion, are more likely to be more profitable if they include costly state-contingency. Since rule-driven contracts are discretionary only because they are coarse (with probability p), they are more likely to be more profitable if they avoid the costs of state-contingency.

6.2 Equitable subordination as an efficient contracting scheme

We've presented pairwise comparisons between state-contingent and noncontingent contracts of each type. Although we sharpen our results further in the next section when we consider the globally optimal choice amongst all contracts, we view Proposition 4 as our main support for the doctrine of equitable subordination as an efficient contracting scheme. Consider the intermediate region in Figure 2, where the optimal e-contract is state-contingent and the optimal d-contract is noncontingent. In this region, when the contracting agents make their contractual choice they also elect a legal rule governing the investor's fiduciary responsibilities. The court is a mechanism for enforcing state-contingent liquidation payments, but only if the investor holds an e-contract, that is, only if the investor is in control in the eyes of the court. In this case, when the court's investigation concludes that the investor's actions were purely redistributive, the investor's claim is subordinated.

But a costly investigation to determine whether the investor's claim should be subordinated is efficient only when the optimal contract gives the powerful investor substantial discretion and when the costs of the court's investigation are sufficiently low. In the intermediate region, the court also acts as a mechanism that enforces the investor's priority in bankruptcy under all circumstances, as long as the investor holds a d-contract. Choosing a d-contract effectively precommits all agents to operate within a legal regime that permits purely redistributive actions without penalty. When investigation costs are high and when the benefits of discretionary decision-making are relatively low, the investor will have a priority claim, and the priority of this claim can't be challenged by other claimants.

While the extra costs of more extensive court investigations are not a negligible matter, we view these court costs as a stand-in for a broader class of influence costs that arise when claimants are permitted to challenge the validity of existing contracts whenever they are harmed. If we take a more expansive view of what we have modeled as court costs, the benefits of using courts instead of direct contracts among multiple claimants become clearer. Think of potential claims for subordination as coming from a whole range of suppliers of products and funds. The d-contract of our model is a precommitment mechanism that permits the firm to *commit* to a system of bilateral contracts that grants the influential investor protection against future claims for subordination. That is, we can think of the contract between the firm and its investor as a means of enforcing commitments between the firm and its many other claimants.[30]

6.3 Further comparative statics

The preceding propositions have involved pairwise comparisons between state-contingent and noncontingent variants of otherwise identical contracts. This is enough to establish a case for equitable subordination as part of an optimal contracting scheme. But pairwise comparisons don't permit full optimization among contractual alternatives. In fact, we can go farther and establish the following result:

Proposition 5: In equilibrium, only e-contracts will ever be state-contingent. A d-contract will always be noncontingent whenever it is the optimal contract.

Thus, our simple model generates a legal regime that enforces the investor's priority claim, even if the investor engaged in purely redistributive actions, as long as the investor holds a d-contract. While our model shows that optimal e-contracts *may* be state-contingent—so it is efficient to have a legal regime that permits powerful investors to hold claims that impose a fiduciary standard—noncontingent e-contracts may also appear in equilibrium.[31]

We leave the proof and most of our discussion of Proposition 5 to the Appendix, but the basic intuition can be conveyed succinctly. A state-contingent d-contract that achieves an efficient liquidation policy may dominate the e-contract when contracts are not too coarse, but only if a *perfectly* enforceable rule would dominate unfettered flexibility (see Lemmas 1 and 2 in the Appendix). The coarse state-

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[30]See Fischel (1989) and Koh (1998) for opposing views of the economic costs and benefits of insisting on the primacy of written contracts in bankruptcy proceedings.

[31]This will occur when there are substantial benefits from efficient decision-making, but the costs of the court investigation are very high.

contingent d-contracts are compromises that seek to impose a rule as often as possible, yet seek efficient liquidation whenever the investor has discretion. But if we extend our possible contracts to include *simple d-contracts*—which induce the investor to choose the same inflexible rule when he has discretion as when the rule is verifiable—we can effectively achieve a perfectly enforceable rule. Further, the incentive compatibility conditions for inducing rule-driven behavior are lenient: (i) a fully subordinated d-contract would always induce the investor to choose $d = \alpha$; (ii) a sufficiently small face value ($D_I \approx 0$), in tandem with a priority claim, would always induce the investor to choose $d = \beta$. Thus, whenever the state-contingent d-contracts of Proposition 1 dominate the e-contract, they are themselves dominated by a simple d-contract.[32]

7. Conclusion and Directions for Further Work

In this paper we explore the economic rationale for *equitable subordination*, a legal doctrine that permits a firm's claimants to petition the bankruptcy court to subordinate an informed investor's financial claim. We adopt the security design approach and ask whether equitable subordination might arise as part of an optimal contracting scheme, taking the view that the bankruptcy process itself is part of the security design problem. In our stylized model with a single powerful investor with substantial influence over the firm, an optimally designed claim will include features that resemble equitable subordination.

Equitable subordination permits the firm to choose between different legal rules governing the dominant investor's fiduciary responsibilities along with the form of the investor's claim. When monitoring is very valuable and flexibility is very important compared to the costs of permitting other claimants to challenge the priority of the dominant investor's claim, and when contracts are necessarily coarse, dominant investors will have open-ended rights of intervention and will bear fiduciary responsibilities. When monitoring and flexibility are less valuable, when contracts are relatively precise,

[32]Note, this does not imply that simple d-contracts always dominate the noncontingent d-contracts in Proposition 2.

and when the costs of allowing claimants to challenge existing contracts are large, dominant investors will be constrained by explicit rules and will receive a safe harbor against challenges to their priority.

Our model provides a partial rationale for a legal system that promotes specialization in the holding of debt claims by powerful creditors. This rationale complements previous work by Bergloff and von Thadden (1994) and Dewatripont and Tirole (1994), who explain such specialization as a mechanism for imposing hard budget constraints on management, and Berlin, John and Saunders (1996), who view a specialized lender as best equipped to promote coordination among claimants when a firm is in financial distress. One limitation of our model is that it cannot account for influential investors who hold pure equity claims, since our investor with an e-contract has a priority claim as long as the courts do not find a breach of fiduciary responsibilities. This feature may be related to a second limitation of our model—that it abstracts completely from the interesting issue of contested control among distinct insider groups. This issue has been emphasized in much of the recent literature, for example, articles by Aghion and Bolton (1992), Aghion and Tirole (1997), and Burkart, Gromb, and Panunzi (1997). A more complete model would consider both the optimal assignment of control between insider groups and the management of conflict among claimants.

Figure 1. Timing

Investor provides funds = $1.

Investor and claimholder sign contract. There are four possible choices: state-contingent d-contract; noncontingent d-contract; state-contingent e-contract; noncontingent e-contract.

Investor decides whether to pay and receive an indicator $i \in \{a', b'\}$ about the underlying state of the economy.

Investor chooses his action: to continue the project, $d=\alpha$; or to liquidate, $d=\beta$.

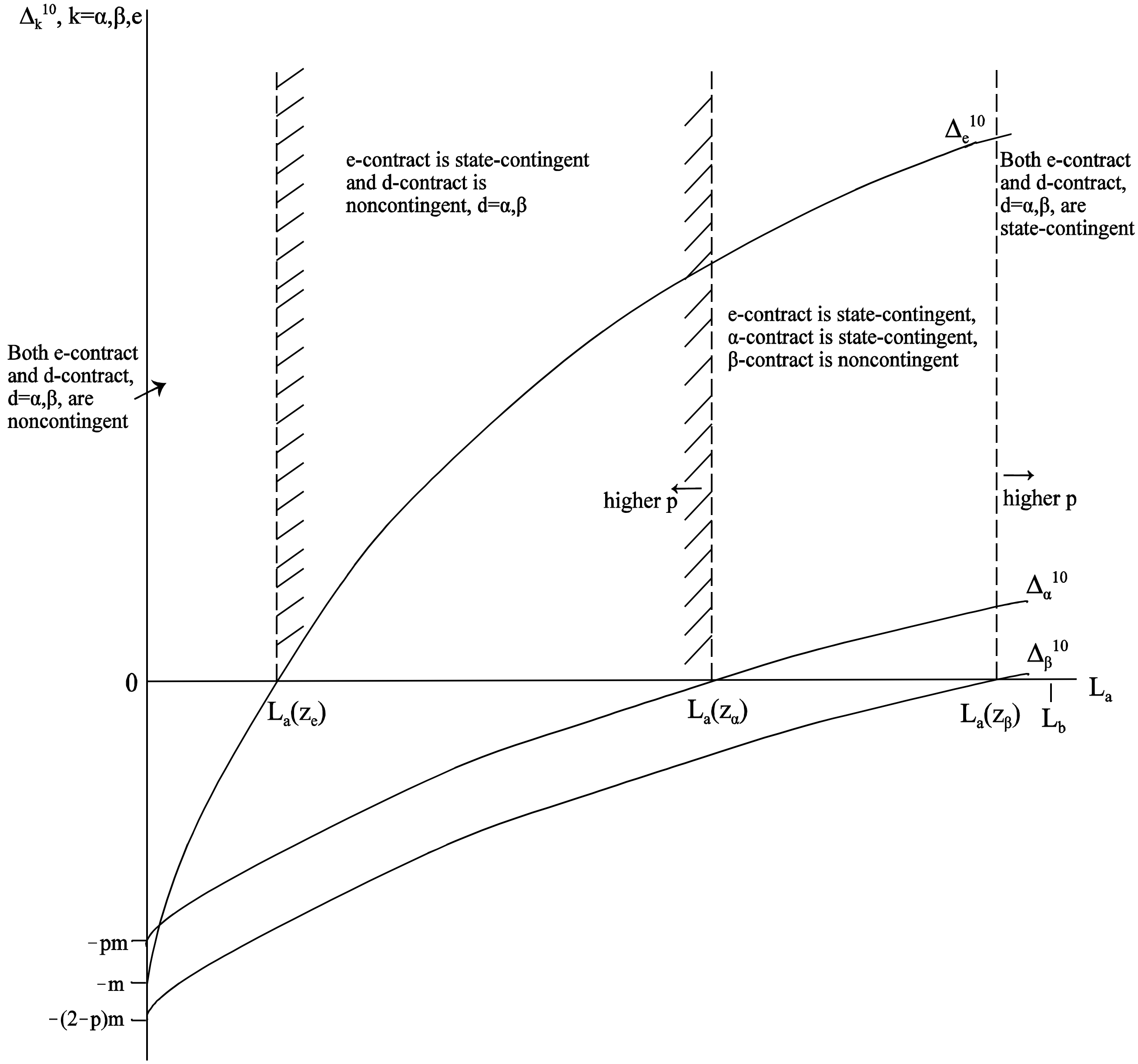
If the investor chooses $d=\alpha$, then the firm's expected value is V_s in state $s \in (a,b)$

If the investor chooses $d=\beta$, then the firm's expected value is L_s in state $s \in (a,b)$

The state of the world is revealed.

Court determines state of the world if investor chose to liquidate and contract was state-contingent.

Figure 2. Regions of the parameter space where e- and d- contracts are state-contingent and noncontingent



Appendix.

Proof of Proposition 3

See Figure 2. Simplifying equation (25) in the text yields:

$$\Delta_k^{10} \equiv \frac{1}{4} z_{k3}[q_1(z_k) - q_0(z_k)][(V_a - L_a) + (L_b - V_b)] - \left(\frac{cq_1(z_k)^2}{2} - \frac{cq_0(z_k)^2}{2} \right) - (2z_{k2} + z_{k3})m$$

$$= [q_1(z_k) - q_0(z_k)]\left[\frac{1}{4} z_{k3}[(V_a - L_a) + (L_b - V_b)] - \frac{c}{2}[q_1(z_k) + q_0(z_k)]\right] - (2z_{k2} + z_{k3})m \text{ ,(A1)}$$

where $z_{\beta 2} = p$, $z_{e2} = 0$, $z_{\alpha 2} = 0$; $z_{e3} = 1$, $z_{k3} = p < 1$, $k = \alpha,\beta$. Using equations (18) and (23), $q_1(z_k) = z_{k3} L_b/4c$ and $q_0(z_k) = z_{k3}(L_b - L_a)/4c$. Substituting these into equation (A1) and simplifying yields:

$$\Delta_k^{10} = z_{k3}^2 \frac{L_a}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right] - (2z_{k2} + z_{k3})m. \tag{A2}$$

By Assumption 6, that is, whenever the optimal level of monitoring under the equity contract is less than first best, the term in square brackets in equation (A2) is positive. Now,

$$\frac{d\Delta_k^{10}}{dL_a} = z_{k3}^2 \frac{1}{16c}\left(V_a - V_b - L_a\right) > 0 \text{ by Assumption 6,}$$

and $L_a \in \{0, L_b\}$ by Assumption 5. Thus, for any $m < \psi(z_{k3}) \frac{L_b}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_b}{2}\right]$, there exists a $L_a(z_k) \in \{0, L_b\}$ such that $\Delta_k^{10} \geq 0 \Leftrightarrow L_a \geq L_a(z_k)$. QED

Proof of Proposition 4

(i) Fix L_a.

$$m(z_k) \equiv \psi(z_k) \frac{L_a}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right], \quad \text{where } \psi(z_k) \equiv \left[\frac{z_{k3}^2}{2z_{k2} + z_{k3}}\right].$$

Thus, $$m(z_e) = \frac{L_a}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right], \tag{A3}$$

$$m(z_\alpha) = p \frac{L_a}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right], \tag{A4}$$

$$m(z_\beta) = \frac{p^2}{2-p} \frac{L_a}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a}{2}\right]. \tag{A5}$$

Therefore, $m(z_e) > m(z_\alpha) > m(z_\beta)$, since $0 < p < 1$.

(ii) Fix $m < m(z_\beta)$. Define $L_a(z_k)$ as the smallest L_a such that $\Delta_k^{10} > 0$. Then, by equation (A2), $L_a(z_k)$ is defined implicitly by

$$\frac{L_a(z_k)}{4c} \frac{1}{4}\left[(V_a - V_b) - \frac{L_a(z_k)}{2}\right] = \frac{m}{\psi(z_k)} \text{ where } \psi(z_k) = \frac{z_{k3}^2}{2z_{k2}+z_{k3}}. \tag{A6}$$

The right-hand side of (A6), $m/\psi(z_k)$, equals m for k=e, equals m/p for k=α, and equals $(2-p)m/p^2$ when k=β. Therefore, $m/\psi(z_e) < m/\psi(z_\alpha) < m/\psi(z_\beta)$, since $0 < p < 1$.

The derivative of the left-hand side of (A6) with respect to L_a is

$$\frac{1}{16c}\left[V_a - V_b - L_a(z_k)\right] > 0 \text{ by Assumption 6}. \tag{A7}$$

So the left-hand side of (A6) is increasing in L_a.

Thus, $L_a(z_e) < L_a(z_\alpha) < L_a(z_\beta)$. QED

Proof and discussion of Proposition 5

Denote the difference between joint profits under the state-contingent e-contract and joint profits under the state-contingent α-contract by:

$$\Delta_{e\alpha}^1 \equiv \Pi(C_1(z_e)) - \Pi(C_1(z_\alpha)) = \left[\frac{1}{2}\gamma(q_1(z_e)) - \frac{cq_1(z_e)^2}{2} - m - \rho\right]$$

$$- \left[(1-p)\frac{1}{2}\left(V_a + V_b\right) + p\frac{1}{2}\left(\gamma(q_1(z_\alpha)) - 2m\right) - \frac{cq_1(z_\alpha)^2}{2} - \rho\right]. \tag{A8}$$

Extend the contracting space to allow fully verifiable rules, that is, rules such that contracts are not coarse, so that $p = 0$. Then we can define the range of parameters for which state-contingent α-contracts might appear in equilibrium.

Lemma 1:

(i) If a completely verifiable rule $d = \alpha$ is inefficient compared to full discretion, the state-contingent e-contract always has higher expected profits than the state-contingent α-contract, that is,

$$\Delta^1_{e\alpha}(p=0) = \left[\frac{1}{2}\gamma(q_1(z_e)) - \frac{cq_1(z_e)^2}{2} - m\right] - \frac{1}{2}\left[V_a + V_b\right] > 0 \Leftrightarrow \Delta^1_{e\alpha}(p) > 0 \text{ for all } p \neq 1. \qquad \text{(A9)}$$

(ii) If $\Delta^1_{e\alpha}(p=0) < 0$, then either $\Delta^1_{e\alpha} \leq 0$ for all $p \in [0,1]$ or there exists $p^+ \in (0,1)$ such that

$$\Delta^1_{e\alpha}(p) \geq 0 \Leftrightarrow p \geq p^+. \quad \blacksquare \qquad \text{(A10)}$$

Proof:

(i) First note from equation (A9) that $\Delta_{e\alpha}^1$ (p=1) = 0, and by assumption, $\Delta_{e\alpha}^1$ (p=0) > 0. Next note that

$$\frac{\partial^2 \Delta^1_{e\alpha}}{dp^2} = -\frac{L_b}{8c}\left(V_a - V_b - L_a + \frac{L_b}{2}\right) < 0 \text{ by Assumption 6.}$$

Since $\Delta_{e\alpha}^1 \geq 0$ at end points $p = 0$ and $p = 1$ and $\Delta_{e\alpha}^1$ is a concave function of p, it must be the case that $\Delta_{e\alpha}^1 \geq 0$ for all $p \in [0,1]$.

(ii) Now assume that $\Delta_{e\alpha}^1(p=0) < 0$. Since $\Delta_{e\alpha}^1 = 0$ at $p = 1$ and $\Delta_{e\alpha}^1$ is a concave function of p, it must be the case that either $\Delta_{e\alpha}^1 \leq 0$ for all $p \in [0,1]$, or that there exists a $p^+ \in (0,1)$ such that $\Delta_{e\alpha}^1 \geq 0 \Leftrightarrow p \geq p^+$. QED

The intuition is clear. First, consider a perfectly coarse α-contract (i.e., $p = 1$). This contract is identical to the e-contract, because the investor has full discretion in both cases. Here, the two state-contingent contracts must yield equal profits. As the degree of contractual coarseness decreases (as p decreases), the investor with an α-contract is increasingly rule driven. This increases the likelihood of continuation—because under the α-contract, the rule says to continue—and the investor reduces his level of monitoring because monitoring becomes less valuable as the investor has less discretion. Thus, there are two possibilities: (i) If the rule itself is inefficient compared to full discretion ($\Delta_{eA}^{1}(p=0) > 0$), both effects work in the same direction, and the state-contingent α-contract is strictly less profitable. The rule is inefficient when court costs are low (m low), when monitoring is costly (c high), and when the returns from efficient liquidation in state b are large ($L_b - V_b$ high); (ii) If the rule is efficient, there are two counteracting effects. As contracts become less coarse, the rule constrains the investor more often and increases the profitability of the α-contract. But as the rule becomes more enforceable, the investor monitors less because he has less discretion. Once the rule becomes sufficiently enforceable, this second effect becomes negligible compared to the first-order gain in efficiency from more rule-driven behavior.

We have an analogous result for the β-contract. Denote the difference in profits between the state-contingent e-contract and the state-contingent β-contract by

$$\Delta_{e\beta}^{1} \equiv \Pi(C_1(z_e)) - \Pi(C_1(z_\beta)) = \left[\frac{1}{2}\gamma(q_1(z_e)) - \frac{cq_1(z_e)^2}{2} - m - \rho\right]$$

$$- \left[(1-p)\frac{1}{2}\left(L_a + L_b - 4m\right) + p\frac{1}{2}\left(\gamma(q_1(z_\beta)) - 2m\right) - \frac{cq_1(z_\beta)^2}{2} - \rho\right]. \qquad \text{(A11)}$$

We have the following result:

Lemma 2:

(i) If a completely verifiable rule d = β is inefficient compared to full discretion, the state-contingent e-contract always has higher expected profits than the state-contingent β-contract, that is,

$$\Delta_{e\beta}^{1}(p=0) = \left[\frac{1}{2}\gamma(q_1(z_e)) - \frac{cq_1(z_e)^2}{2} - m\right] - \frac{1}{2}\left[L_a + L_b - 4m\right] > 0 \Leftrightarrow \Delta_{e\beta}^{1}(p) > 0 \text{ for all } p \neq 1 \text{(A12)}$$

(ii) If $\Delta^1_{e\beta}(p=0) < 0$, then either $\Delta^1_{e\beta} \leq 0$ for all $p \in [0,1]$ or there exists $p^{++} \in (0,1)$ such that

$$\Delta^1_{e\beta}(p) \geq 0 \Leftrightarrow p \geq p^{++}. \quad \blacksquare \tag{A13}$$

Proof:

(i) First note from equation (A11) that $\Delta_{e\beta}{}^1(p=1) = 0$, and by assumption, $\Delta_{e\beta}{}^1(p=0) > 0$. Next note that

$$\frac{\partial^2 \Delta^1_{e\beta}}{dp^2} = -\frac{L_b}{8c}\left(V_a - V_b - L_a + \frac{L_b}{2}\right) < 0 \text{ by Assumption 6.}$$

Since $\Delta_{e\beta}{}^1 \geq 0$ at end points $p = 0$ and $p = 1$ and $\Delta_{e\beta}{}^1$ is a concave function of p, it must be the case that $\Delta_{e\beta}{}^1 \geq 0$ for all $p \in [0,1]$.

(ii) Now assume that $\Delta_{e\beta}{}^1 (p=0) < 0$. Since $\Delta_{e\beta}{}^1 = 0$ at $p = 1$ and $\Delta_{e\beta}{}^1$ is a concave function of p, it must be the case that either $\Delta_{e\beta}{}^1 \leq 0$ for all $p \in [0,1]$, or that there exists a $p^{++} \in (0,1)$ such that $\Delta_{e\beta}{}^1 \geq 0 \Leftrightarrow p \geq p^{++}$. QED

The intuition is similar to that for the α-contract, but since the β-contract always enforces the simple rule "liquidate" with probability $1-p$, expected court costs are also larger than under the e-contract. This extra source of inefficiency compared to the α-contract implies that the state-contingent β-contract is more often dominated by the state-contingent equity contract than is the state-contingent α-contract.

We can now finish our proof of Proposition 5—and rule out state-contingent d-contracts altogether—by introducing rule-driven contracts with payoffs designed to induce an investor with discretion to choose a simple rule all of the time, either $d(a') = d(b') = \alpha$ or $d(a') = d(b') = \beta$. We call these *simple α-contracts* and *simple β-contracts*, respectively.

Lemma 3:

If $\Delta^1_{ed}(p=0) < 0$, $d = \alpha,\beta$, then a noncontingent, simple d-contract yields higher expected profits than the corresponding state-contingent d-contract. ■

Proof:

The joint profits under a state-contingent d-contract are

$$\Pi_k^1 = z_{k1}\left[\frac{1}{2}(V_a+V_b)\right] + z_{k2}\left[\frac{1}{2}(L_a+L_b) - 2m\right] + z_{k3}\left[\frac{1}{2}\gamma(q_1(z_k)) - m\right] - \frac{cq_1(z_k)^2}{2} - \rho \ , \quad k=\alpha,\beta, \tag{A14}$$

where the monitoring level $q_1(z_k)$ is defined by first order condition (18) and $\gamma(q_1(z_k))$ is defined in equation (27) in the text.

The second derivative of equation (A14) with respect to p is:

$$\frac{\partial^2\Pi_k^1}{\partial p^2} = \frac{L_b}{8c}\left(V_a - V_b - L_a + \frac{L_b}{2}\right) > 0, \quad \text{by Assumption 6}, \quad k=\alpha,\beta. \tag{A15}$$

Thus, the joint profits of a state-contingent d-contract is a convex function of p.

Also, by assumption $\Delta^1_{ed}(p=0) < 0$, and therefore, the joint profits of the simple state-contingent d-contract exceed the joint profits of the state-contingent e-contract, i.e., $\Pi_k^1(p=0) > \Pi_e^1$, $k=\alpha,\beta$. But the joint profits of the state-contingent equity contract equal the joint profits of the fully discretionary state-contingent d-contract, i.e., $\Pi_e^1 = \Pi_k^1(p=1)$, $k=\alpha,\beta$. Thus, $\Pi_k^1(p=0) > \Pi_k^1(p=1)$, $k=\alpha,\beta$, and as we've shown, this function is convex in p. Thus, $\Pi_k^1(p=0) > \Pi_k^1(p)$, $\forall\ p \neq 0$, $k=\alpha,\beta$. Since the joint profits of the state-contingent d-contract equal the joint profits of the noncontingent d-contract at p=0, i.e., $\Pi_k^1(p=0) = \Pi_k^0(p=0)$, $k=\alpha,\beta$, this implies $\Pi_k^0(p=0) > \Pi_k^1(p)$, $\forall\ p \neq 0$, $k=\alpha,\beta$. Finally, since the joint profits under the simple d-contract equals $\Pi_k^0(p=0)$, $k=\alpha,\beta$, it follows that the joint profits under the simple d-contract > $\Pi_k^1(p)$, $\forall\ p \neq 0$, $k=\alpha,\beta$. QED

Together, Lemmas 1-3 imply Proposition 5. To see this, note that by Lemmas 1 and 2, state-contingent α- and β-contracts can yield higher expected joint profits than state-contingent e-contracts only if a perfectly enforceable rule yields higher expected joint profits than a completely discretionary state-contingent contract, i.e., $\Delta^1_{ed}(p=0) < 0$, d=α,β. But if this is the case, by Lemma 3, the simple noncontingent d-contract yields higher expected joint profits than a state-contingent d-contract. Thus, whenever a d-contract is the optimal contract, it will be noncontingent. We can always achieve incentive compatibility (without further concern for corner conditions) under the simple d-contracts if we permit lump sum transfers. In this case the simple α-contract is implemented by setting $\phi_{Ia} = \phi_{Ib} = 0$ and the simple β-contract is implemented by setting $D_I = 0$.

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