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THREE ESSAYS ON FINANCIAL DISTRESS AND CORPORATE CONTROL

Matthias Kahl

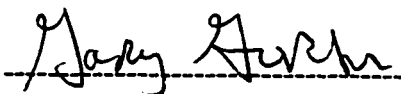
A DISSERTATION

in

Economics

Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of
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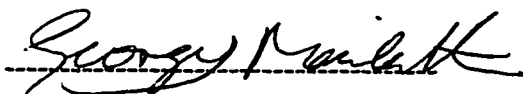
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A handwritten signature in cursive script, appearing to read "George Mailath", written over a horizontal dashed line.

Supervisor of Dissertation

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For my parents

Acknowledgments

During my time at Penn, I have benefited from the support and help of many persons.

It is my great pleasure to thank them here.

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ABSTRACT

THREE ESSAYS ON FINANCIAL DISTRESS AND CORPORATE CONTROL

Matthias Kahl

Gary Gorton and George J. Mailath

This dissertation analyzes several aspects of financial distress and corporate control. The first chapter argues that the central problem facing creditors during financial distress is to distinguish between economically viable firms and firms that should be liquidated. The incentives of creditors to generate information about a distressed firm's prospects and the effects of this information production on the firm's investment policy are explored. The resulting theory of dynamic liquidation can explain the long-term nature of financial distress solely as the result of socially valuable optimal dynamic learning strategies of creditors, without appealing to bargaining inefficiencies among many creditors or inefficiencies arising from the design of bankruptcy law. The paper discusses implications for the costs of financial distress and bankruptcy law and also contrasts the informational role of debt and dividend payments. The second chapter (co-authored by Gary Gorton) may explain the role that rich investors play in the acquisition of distressed firms. More generally, it contrasts the corporate governance roles of rich individuals and institutional investors (financial intermediaries), exploring the question of the identity of the principal in publicly-

owned corporations. Institutional investors are run by professional managers and hence, in contrast to a rich investor, face their own agency problems. We show that the rich investor may deploy his scarce agency cost-free capital to acquire blocks in firms only in situations in which agency conflicts are likely to be severe, for instance during financial distress. Institutional investors play a corporate governance role as permanent blockholders. We show that the identity of a firm's principal can change over time and differ across states. Moreover, identical firms with and without blockholders can coexist.

The third chapter describes the history of 110 financially distressed firms for twelve to sixteen years following the onset of financial distress. While liquidations are relatively rare, many firms are acquired within a few years after becoming financially distressed. The performance of the surviving firms improves over time, and the number of firms reporting negative operating income declines dramatically within a few years after the onset of financial distress.

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CHAPTER 1:

DYNAMIC LIQUIDATION, ADJUSTMENT OF CAPITAL STRUCTURE, AND THE COSTS OF FINANCIAL DISTRESS

1. Introduction

The central problem facing creditors during financial distress is to distinguish between economically viable firms and firms that are not viable and hence should be liquidated. This paper explores the incentives of creditors to actively generate information about a distressed firm's prospects before they make a liquidation decision. Unlike the existing literature, this paper investigates the effects of this information production on the firm's investment policy. The resulting theory of *dynamic* liquidation generates implications for the costs of financial distress and bankruptcy law. In particular, several stylized facts documenting the long-term nature of financial distress that have been interpreted by the previous literature as consequences of bargaining *inefficiencies* or a *suboptimal* design of bankruptcy law are explained solely as the result of the *socially valuable optimal learning strategies* of creditors who are uncertain about a firm's prospects.

The paper considers the situation after a firm has defaulted on its debt obligations. The firm is run by a manager who is privately informed about the prospects of the firm but will never liquidate the firm voluntarily. Creditors do not know whether the firm is economically viable or not. The traditional static view of liquidation (Bulow and Shoven (1978)) assumes that creditors have to make immediate liquidation decisions. Once they decide to continue, there is no subsequent liquidation opportunity and hence learning about the firm's prospects is irrelevant. In contrast to this view,

the interpretation of liquidation as a *dynamic* process recognizes that creditors do not have to make immediate, once-and-for-all liquidation decisions. Instead, they may postpone the liquidation decision and wait for more information about the firm's prospects. When creditors receive another liquidation opportunity later¹, they can make a better informed liquidation decision.

In such a dynamic environment, an efficient resolution of distress should have *two* goals. The first goal is to continue viable (efficient) firms and liquidate not viable ones. This requires *learning* about the financially distressed firm's economic viability. The second goal is to help a viable firm to recover as quickly as possible from its financial distress so that it can take advantage of its profitable investment opportunities ("*realize its growth opportunities*"). This paper makes the point that these two goals are in conflict, and this trade-off between learning (which allows optimal liquidation decisions) and the realization of growth opportunities influences the behavior of creditors and gives rise to a distinction between two strategies creditors can follow.

One strategy allows a quick and full recovery of the viable firm and enables it to realize its growth opportunities. However, this also means that creditors are not able to learn to distinguish between viable and not viable firms in time, and hence they make inefficient liquidation decisions. The other strategy allows creditors to learn more and hence make better liquidation decisions but prolongs the effects of distress on the viable firm's investment policy. This latter strategy which emphasizes learning I call

¹One way for creditors to keep an intervention opportunity is to ask for short-term debt repayments. If the firm fails to recover, it will reenter distress and hence creditors receive another opportunity to liquidate the firm.

a *controlled liquidation*. As will become clear, a firm that is the object of a controlled liquidation has to make high short-term payments, invests little, and is likely to perform poorly and to reenter distress.

A controlled liquidation can be the optimal strategy for the creditors, and this may explain the long-term consequences of financial distress. It is attractive to creditors because it preserves their opportunity to participate in a recovery of the firm and receive the full face value of their debt claims rather than only the liquidation value. At the same time, it preserves the opportunity of limiting the downside risk if assets lose value since the creditors learn enough to make an informed liquidation decision (in particular, they liquidate before a dramatic loss in asset values) when the firm fails to recover and reenters financial distress.

However, while a controlled liquidation leads to efficient liquidation decisions, it reduces the efficiency of the distressed firm's investment policy. An important idea in this paper is that there is a trade-off between optimal investment and optimal liquidation. Indicators of a firm's prospects are useful for the creditors' liquidation decision only if they are received *in the short-run*, i.e. *before* assets may have lost dramatically in value. Hence, creditors may choose to learn about the firm's viability by observing its ability to make a *short-term* payment. The firm's inability to make this payment reveals negative news about the firm's viability and may induce creditors to liquidate early enough to prevent a further, more dramatic loss in asset values.

The desire of creditors to generate information about the firm affects the firm's investment strategy, and the firm's investment strategy in turn affects the ability of

creditors to generate information about the firm. In particular, the firm's managers have an incentive to enhance their ability to make the short-term payment and hence avoid a liquidation by following a myopic investment strategy that preserves cash by forgoing long-term projects. Furthermore, the information content of the firm's inability to make the short-term payment is affected by management's investment strategy. While *short-term* results are informative about *long-term* profitability, the informativeness of short-term results depends on the strategy followed by the viable firm. Suppose that a not viable firm is not able to generate high enough short-term profits to make the payment but the viable firm is able to do this. If it is known that the viable firm focuses on making the short-term payment - perhaps by preserving cash and not investing in profitable long-run projects - and the creditors observe that a firm cannot make the payment, they can be very confident that the firm is not viable and hence should be liquidated. However, if the viable firm does not focus on making the short-term payment but instead concentrates on long-term projects, it is more difficult for the creditors to interpret the inability to make the short-term payment. Then, even a viable firm may generate poor short-term results because it may have invested the firm's resources in long-run projects. This inference problem is important as long as creditors cannot observe managerial project choice. To summarize, creditors can make more informed liquidation decisions if the viable firm forgoes long-term projects even if these are profitable.

In the model, creditors can affect management's ability and incentives to invest in profitable long-term projects by providing new funding, by the choice of managerial

compensation and by the level of short-term payments the firm is required to make. For simplicity, the model assumes that the creditors have all the bargaining power in the debt restructuring. Since the creditors effectively become the residual claimants of the firm's profits in the restructuring, they tend to make decisions that - given their information- maximize firm value. They immediately liquidate firms that have very poor recovery prospects. They allow firms with potentially very attractive growth opportunities (i.e., growth opportunities that are very attractive if the firm is viable) to quickly recover from distress and enable them to realize their growth opportunities. Creditors may engage in a controlled liquidation if there is sufficient uncertainty about a firm's recovery prospects and a correct liquidation decision is very important. The latter will be the case if the assets of a not viable firm can lose dramatically in value if such a firm continues its operations. The paper also analyzes how the timing of project cash flows affects the interaction between management and creditors.

The theory of dynamic liquidation has implications for the interpretation of certain stylized facts about financially distressed firms. In particular, financial distress is often a *long-term process* and has an impact on the capital structure, investment policies, and performance of many firms even *after* they emerge from debt restructurings. James (1995) finds that many firms increase their investment expenditures by only very little in the first two years after a restructuring. Hotchkiss (1995) shows that in each of the first five years after emerging from bankruptcy, roughly 40% of all firms have negative operating profits. According to Gilson (1995), 75% of firms that complete debt restructurings emerge with a leverage ratio that is higher than industry median

and most are still significantly more highly levered than before the onset of distress. Most strikingly, between 25% and 33% of all distressed firms reenter financial distress within a few years after completing a restructuring. These findings are puzzling to a theoretical literature that has viewed the liquidation decision as *static* (see for instance Bulow and Shoven (1978) and White (1989)). Some of these observations have been interpreted as the consequences of free-rider problems among creditors. Alternatively, Hotchkiss (1995) has suggested that US bankruptcy law allows entrenched management to continue the operations of not viable firms against their creditors' will which could explain poor postbankruptcy performance and the large number of repeated restructurings. This paper shows that all the observations about the long-term nature of financial distress mentioned above can be explained solely as results of creditors' *socially valuable optimal dynamic learning strategies* in the presence of substantial uncertainty about a firm's viability.

The paper relates two widely discussed inefficiencies that can occur during financial distress: investment distortions and inefficient liquidation decisions. It suggests that efficient liquidation decisions can be implemented although management is initially better informed about the firm's prospects than the creditors, but not willing to liquidate the firm and still in control of investment decisions. On the other hand, the firm will suffer from substantial inefficiencies during financial distress in form of inefficient investment decisions or inefficient liquidation decisions even when creditors have strong incentives to make decisions that maximize firm value and there are no other impediments to an efficient resolution of distress than managerial liquidation aversion and

creditors' uncertainty about the firm's prospects. While bankruptcy law can alleviate the costs of financial distress not analyzed in this paper (such as those arising from free-rider problems among many creditors) it is unlikely that it can substantially reduce the inefficiencies (costs incurred) during financial distress addressed in this paper. These inefficiencies seem to be a direct consequence of the separation of ownership and control and managerial liquidation aversion. As mentioned above, the theory of dynamic liquidation also provides an explanation for the poor performance of reorganized firms that does not implicate the enhanced bargaining power of management under Chapter 11, as Hotchkiss (1995) and other authors suggest. Finally, the model implies that the cancellation of all debt and an all-equity recapitalization of distressed firms as advocated by Roe (1983) will not eliminate all inefficiencies occurring during financial distress. These and other implications are discussed in more detail in section 4.

The empirical literature shows that the phenomena interpreted here as consequences of a controlled liquidation - low investment and poor performance after reorganizations and the large number of repeated restructurings - are concentrated among firms that emerge with high leverage from reorganizations (because creditors do not swap their debt claims into equity) while firms emerging with lower debt burden (because creditors accept equity stakes) often dramatically increase their capital expenditures and perform better (see James (1995)).

The correlation between capital structure and investment (which could be explained by, for instance, appealing to Myers' (1977) debt overhang argument) has interesting implications in the setting of this paper. The paper predicts that because a firm that

emerges with debt from a restructuring will never realize its growth opportunities, it will always be liquidated after a default on a short-term debt payment (since the inability to pay reveals that the firm is not viable), and will always have a first-best liquidation policy. In contrast, because a firm that emerges free of debt may realize its growth opportunities, a failure to make a short-term dividend payment may be ignored (since the inability to make a short-term dividend payment may be caused by the long-term investment), and then the firm will suffer from a suboptimal liquidation policy.

The literature often *assumes* that equityholders cannot liquidate (see Jensen (1986) and Stulz (1990)) or are less inclined to liquidate even if they have the opportunity to liquidate (see, among many other papers, Dewatripont and Tirole (1994)). While the assumption that shareholders cannot liquidate is appropriate in contexts in which free-rider problems among many shareholders are prevalent, it seems less attractive in the context of a typical debt restructuring. In particular, Gilson (1990) finds that banks that take equity stakes in financially distressed firms often become large blockholders who are actively involved in corporate governance. The assumption about the stronger inclination of debtholders to liquidate implicitly assumes that creditors cannot take equity in a debt restructuring. However, creditors do quite frequently take equity stakes in distressed firms (James (1995)). This paper does *not* assume that creditors cannot liquidate or are necessarily less inclined to liquidate when they become equityholders in the initial restructuring than when they remain debtholders. Still, *in equilibrium*, creditors *always* liquidate after a default on a short-term debt payment when they have remained debtholders while they may ignore the failure to pay a dividend (of the same

size as the short-term debt payment) when they have taken equity stakes in the firm and the firm emerges from restructuring free of debt.

The paper is related to Harris and Raviv (1990) who analyze the informational role of debt payments. In contrast to their paper, in this paper dividend payments can *in principle* replicate the informational role of debt. But *in equilibrium*, the default on a debt payment may be *worse news* than the omission of a dividend of the same size. This phenomenon arises because the investment strategies in firms with and without debt may differ.

In a recent paper, von Thadden (1995) presents a model in which there is a similar trade-off between long-run profits and information generation in the short-run. In contrast to von Thadden's (1995) paper which focuses on how long-term contracts and monitoring can overcome an inefficient bias towards short-term projects in a model of continuation investment, this paper is concerned with analyzing in detail under which circumstances inducing a short-term strategy is optimal for outside investors. Moreover, this paper aims to spell out implications for understanding and interpreting stylized facts observed during financial distress and for the debate about the costs and benefits of financial distress and bankruptcy law.

The remainder of the paper is structured as follows: In Section 2, the model is presented. In Section 3, I analyze the interaction between managerial investment decisions and the bank's liquidation policy for a given choice of capital structure, short-term payment, managerial compensation, and new financing. Sections 4 and 5 endogenize the bank's decisions in the debt restructuring and contain the main results. Section 6

concludes.

2. The Model

The following time line gives an overview of the model.

[insert Figure 1]²

2.1. Overview

At date 0, the firm is in financial distress because - for a reason outside the model - it cannot make its debt payments. Thus, its sole creditor ("the bank") gains control. The bank may immediately liquidate the firm or allow it to continue its operations. If the firm is allowed to continue, the bank may remain a debtholder and extend debt maturity. The bank may also forgive debt in exchange for an equity stake in the firm. Furthermore, the bank may affect the firm's investment behavior by providing new financing, by requiring a short-term payment, and by choosing managerial compensation. At date 1, the manager becomes privately informed about the state of the firm (firm quality). The manager is liquidation-averse and hence will never liquidate the firm himself, even if the firm should be liquidated. If the firm receives new financing from the bank, the manager has the choice of investing in a short-run or a long-run project. Neither the state of the firm nor the project choice is observed by anybody but the manager. The firm generates an interim (short-run) payoff at date 2, which is affected by the state

²All figures and tables can be found in the Appendix of the paper.

of the firm and the manager's project choice. If the interim payoff is high enough, the manager makes the short-term payment if the bank had required one. If the short-run payoff is not high enough, the manager cannot make the payment. In the latter case, the bank receives another liquidation opportunity after observing that the payment was not made. If the firm is continued at date 2, final payoffs are realized at date 3. They again are influenced by the state and the manager's project choice.

The following table summarizes the decisions the bank and the manager make at different points in time and indicates what information they possess when they make these decisions.

[insert Table 1]

In the remainder of this section, the assumptions of the model are spelled out in more detail. All notation is summarized in the table at the end of the model section.

2.2. States, Projects, and Payoffs

This subsection describes the payoff structure which is also illustrated by the graphs below. The state of the firm is realized at date 1. A high state (θ_H) means that the firm will produce high returns as explained below. A low state (θ_L) means that the firm is economically not viable and will produce low payoffs. Both interim (short-term) payoffs accruing at date 2 and final payoffs accruing at date 3 are generated from (not explicitly modeled) assets in place at date 0 and the manager's project choice.

(A1) If the manager does not invest in any project, assets in place at date 0 generate

an interim payoff of x_H and a final payoff of y_H in the high state; they generate an interim payoff of x_L with $0 < x_L < x_H$ and a final payoff of y_L with $0 < y_L < y_H$ in the low state.

(A2) The firm has no cash; hence, the manager cannot invest in a project unless he obtains new funding. The only source of new funding is the bank.³

(A3) If the manager obtains new financing, he can choose between a short-run and a long-run project. The short-run project is a zero NPV project; it costs I and has a payoff of I at date 2, both in the high and in the low state. In the low state, there is no long-run project. The long-run project that can be undertaken in the high state is a positive NPV project; it costs I and has the following payoffs: With probability δ , it has a payoff of I at date 2; with probability $1 - \delta$ it has a payoff of zero at date 2. In addition, it always has a payoff of $y_P > (1 - \delta)I$ at date 3.

One can interpret the long-run project in the high state as a costly restructuring of the firm's operations that consumes resources in the short-run but pays off in the long-run by improving the firm's competitive situation and business opportunities. The parameter y_P determines the firm's upside profit potential ("growth opportunities"). To simplify the analysis, I assume that the manager chooses the long-run project if he is indifferent between the short-run and the long-run project.

A crucial assumption is that the short-run payoff in the high state can be as low as

³Outside funding sources are not modeled to keep the analysis simple. Existing creditors usually have an important impact on the willingness of outside investors to provide new funding. If they refuse to scale down their debt claims, the firm may not be able to receive outside funding because of a debt overhang problem (see Myers (1977)).

the short-run payoff in the low state if the manager invests in the long-run project. For simplicity, this is formalized by:

$$(A4) \quad I = x_H - x_L.$$

Thus, with probability $1 - \delta$ the long-run investment causes the interim payoff to be x_H in the high state - which is the same as the interim payoff in the low state after investment in the short-run project, $x_L + I = x_H$. The following graphs illustrate the payoff structure.

[insert Figures 2a, 2b]

2.3. Liquidation Opportunities

If the bank liquidates the firm at date 0, it receives L_0 .⁴ I assume

$$(A5) \quad (1) \quad x_H + y_H > L_0; \quad (2) \quad x_L + y_L < L_0.$$

Because of (A5), continuation is value maximizing in the high state while liquidation is value maximizing in the low state (regardless of which - if any - project is chosen).

At date 2, there may be a second liquidation opportunity. The bank can always liquidate at date 2 *after* observing that the interim payment was not made.⁵ I assume that the bank receives the interim payoff (x_L or x_H) when the firm is liquidated (even if no interim payment was made), and in addition, L_I .

⁴If the bank runs the firm itself, the firm's value is also L_0 .

⁵If the bank becomes the firm's owner at date 0, it can also liquidate if the interim payment was made. This assumption is not important for the analysis but made because owners have the residual control rights over the firm.

(A6) The liquidation value at date 2 is $L_I + x_i$, $i \in \{L, H\}$, with $L_I + x_H < L_0$.

Since liquidation values deteriorate over time, immediate liquidation can be optimal. To make liquidation an interesting option at date 2, it is assumed that

(A7) $L_I > y_L$.⁶

While by (A7) liquidation at date 2 is value-maximizing in the low state, continuation is value maximizing in the high state because $y_H > L_I$. This follows directly from (A5) and (A6).

2.4. Information

I assume

(A8) Only the manager observes the state.

All other parameters - such as δ or y_P - are known also to the bank and the old equityholders.⁷ The prior probability of the high state is π . The bank could learn about the state by observing the interim payoff because the interim payoff is correlated with the state. However, I assume that

(A9) Interim payoffs are observable only by the manager.⁸

⁶The interim payoff does not appear in this inequality because the bank receives it both in a liquidation and in case of continuation.

⁷The firm may be in an industry with substantial growth opportunities. This is known to the bank. However, the bank does not know whether the firm is one of the viable firms in the industry (in which case it can be very profitable) or whether it is economically not viable.

⁸An interpretation of this assumption is that the manager can manipulate short-term earnings reports. However, this assumption is *not* crucial to the analysis. Even if short-term results would be observable by the bank, all results continue to hold as long as creditors have the right to intervene after poor short-term performance.

The manager may or may not make a debt or dividend payment after observing the interim payoff. In this model, the manager will make the payment if he can because he cannot “steal” cash and hence has no reason not to pay.⁹ The only way for the bank to learn about the state is by observing the firm’s ability to make the verifiable date 2 payment. Date 3 payoffs are also verifiable. I also assume

(A10) Only the manager observes which project he invests in.

This assumption is discussed in subsection 2.8.

2.5. Managerial Compensation

Managerial compensation is chosen at date 0. The manager is paid a fraction $\alpha \geq 0$ of the payoffs equity receives. If the bank takes an equity stake in the firm at date 0, it makes, as the new owner, a take-it-or-leave-it offer to the manager. If the bank remains a debtholder at date 0, it also makes a take-it-or-leave-it offer to the manager. In the Appendix (Lemma 7.1.) I show that the old equityholders are willing to grant the bank the right to choose compensation even when the bank remains a debtholder. The manager has limited liability so that his compensation must always be nonnegative. His individual rationality level is normalized to zero.

⁹I assume that the manager makes the payment if he is indifferent between making and not making the payment. This is for simplicity and does not affect any important result.

2.6. Debt and Equity

If the bank does not liquidate the firm at date 0, it can either remain a debtholder or take an equity stake in the firm in exchange for debt relief.¹⁰ For simplicity, I assume that the bank has all the bargaining power in the debt renegotiation and hence can take all the firm's equity. Then, it forgives all the debt and the firm emerges from restructuring without debt. When the bank remains a debtholder, it extends debt maturity. In particular, it asks for a short-term debt payment of D_I (due at date 2) and a long-term debt payment of D_F (due at date 3). If the bank takes all the equity, it requires a short-term dividend payment of D_I . The optimal choice of D_I will be discussed in sections 3, 4, and 5. I assume

(A11) The bank can liquidate at date 2 when it takes the firm's equity at date 0.

(A12) If the bank allows the firm to continue after a default at date 2, the bank receives all of the payoffs that do not go to the manager at date 3 while old equity receives nothing.

Implicitly it is assumed that if the bank remains a debtholder at date 0 and it wants to continue after a default at date 2, it can and will take all the equity in a second debt renegotiation. (A12) implies that for the same belief about firm quality the bank is *not* more inclined to liquidate at date 2 when it remains a debtholder at date 0 than when it becomes an equityholder at date 0 just because of the differences in the payoff

¹⁰Even in the US, a bank is allowed to take equity in a firm if this firm has defaulted on the bank's loan or is likely to do so. Moreover, banks do quite frequently take equity in distressed restructurings and typically hold it for an extended period of time (see James (1995)).

structures of debt and equity (since it can swap debt into equity after a second default). Hence, the bank's liquidation opportunities (by (A11)) and liquidation incentives (by (A12)) do *not* depend on whether the bank remained a debtholder or took equity in the initial restructuring.

The only important difference between debt and equity in this model is that debt gives the bank a limited claim on the firm's profits while equity gives it an unlimited claim. The total face value of debt, D , is

$$(A13) \quad x_H + y_H + I \leq D_I + D_F \equiv D < x_H + y_H + y_P + I.$$

2.7. Objective Functions

The bank is risk-neutral and cares about the sum of its interim and final payoffs net of managerial compensation (it is assumed that the interim payment is invested in a zero net present value project with payoff at date 3). The manager is interested in avoiding liquidation and in his long-run compensation. His utility function is $U = i B + \alpha y^T$, where B is a private benefit the manager receives when the firm is not liquidated, and i is an indicator function taking on the value 1 if the firm is not liquidated and 0 if the firm is liquidated. Furthermore, y^T is the payoff to equity (after the payment to debtholders if there is any) which may be a liquidation value or a date 3 payoff. I assume that the manager's liquidation aversion is so strong that he cannot be induced by a compensation plan to liquidate the firm himself. A sufficient condition for this is

$$(A14) \quad B > L_I + x_L.^{11}$$

2.8. Discussion

2.8.1. Financial and Economic Distress

There are several aspects of financial distress that have received attention in the literature. Many authors have stressed inefficiencies in bargaining in the presence of multiple creditors (see, e.g., Bulow and Shoven (1978) and Gertner and Scharfstein (1991)). By assuming that there is a single creditor, this paper abstracts from these bargaining inefficiencies during financial distress. There are several ways in which potential bargaining inefficiencies during financial distress can be alleviated. First, coercive exchange offers can alleviate the free-rider problem (see Gertner and Scharfstein (1991)). Second, the ownership concentration of the debt claims on financially distressed firms tends to become more concentrated shortly before and during financial distress. This is often brought about by the acquisition of substantial stakes by investors specializing in distressed securities. Rich individuals and their "vulture funds" play an important role in the market for corporate control of distressed firms (for empirical evidence, see Hotchkiss and Mooradian (1997); for a model that attempts to analyze the role rich investors can play during financial distress, see Gorton and Kahl (1997), which is Chapter 2 of this dissertation). Third, the provisions of Chapter 11 are in part designed to overcome free-rider and other bargaining problems, as argued in Gertner and Scharfstein (1991).

Indeed, there is some empirical evidence suggesting that the bargaining inefficiencies

¹¹A golden parachute will not induce the manager to report the low state. Such a golden parachute would need to compensate the manager for the private benefits of control, B . However, the promise of a golden parachute of size B for reporting the low state is not credible since the manager knows that the firm has not enough money to honor it (by (A14)).

induced by the presence of many creditors are overcome to an important extent. For instance, Alderson and Betker (1995) find that firms with high liquidation costs emerge from Chapter 11 with a relatively low leverage ratio. This could be interpreted as evidence that an adjustment of capital structure is provided when it is needed most.

Abstracting from multi-creditor bargaining issues, this paper emphasizes a different aspect of financial distress: Financial distress is an imperfect indicator of economic distress. The inability to make a debt payment indicates that the economic prospects of a firm may be so poor that liquidation is the best response. Indeed, debt payments may be chosen to indicate potential poor prospects of firms as going concerns and to give outsiders the opportunity to implement a liquidation against the will of entrenched insiders. This idea is formalized in Harris and Raviv (1990). This view implies an intimate link between financial and economic distress.

2.8.2. Information and Payoff Structure

The payoff structure in the model is highly stylized. The following features are crucial: The short-run payoff in the high state can be as low as (or lower than) the short-run payoff in the low state if the manager invests in the long-run project. Hence, the long-run project interferes with the bank's ability to distinguish between the high and the low state on the basis of short-run payoffs (here: the ability to make a short-term payment) alone. Moreover, the short-run project has a higher probability of generating a high short-run payoff than the long-run project. Hence, the bank is less able to distinguish the high and the low state if the manager in the high state chooses the long-run project

than if he chooses the short-run project. Third, the long-run project is more profitable than the short-run project, and hence not undertaking the long-run project is costly. Furthermore, the bank cannot observe the manager's project choice. If the bank could do this, it could always infer the state without error from the ability to make a short-term payment. Typically, investors can observe firm earnings reasonably well. However, it is often not clear what causes earnings to be, for instance, low. Finally, and more generally, the bank cannot perfectly infer the state by other means than observing the firm's ability to make a short-term payment. It seems reasonable to assume that management has private information about the firm; otherwise, there would be no problem for creditors in distinguishing between good and bad firms and hence their decision problem during financial distress would be trivial.

Assuming a zero NPV short-term project is not crucial but can be seen as a normalization and also allows a simplification of the calculations since the bank's payoffs in case the short-term project is undertaken and in the absence of investment are identical. Furthermore, it is not important that in the absence of the long-run project there is a one-to-one relationship between interim payoff and state. Again, this just simplifies the analysis. Finally, one could introduce a long-run project even in the low state. Then, one reason for the bank not to give new financing could be to prevent a discretionary negative NPV project in the low state. However, it is not clear what the manager could gain by investing in a negative NPV long-run project which may make it even harder to make a short-term payment. Moreover, there is already a negative NPV "project" in the low state: continuation.

2.8.3. The Modeling of Debt

Assumption (A13) will generate a correlation between post-restructuring capital structure and investment.¹² No result would be changed if one would instead explain this correlation by a debt overhang argument: The distressed firm cannot attract outside funding because of the firm's existing debt obligations. However, this would require an argument why the bank itself is not willing or able to provide the new financing. Hence, modeling the debt overhang problem would complicate the analysis without changing the results or generating new insights, and hence it is not done here. Because of its limited face value and the absence of an explicit advantage of debt, debt appears to be a weakly dominated choice. In section 5, I discuss some benefits banks obtain when they remain debtholders in a restructuring.

2.8.4. Managerial Liquidation Aversion

It seems plausible to assume that managerial liquidation aversion is strong since a manager is likely to lose his job in a liquidation. Then, he will lose his firm-specific human capital. Moreover, he may incur reputational costs in the labor market. For instance, Gilson (1989) finds that managers who lose their jobs in financially distressed firms almost never find senior management positions at any exchange-listed firm for at least three years. In this paper, managerial liquidation aversion is modeled in a simple way: the private benefits of control are so high that no compensation scheme

¹²A debt claim with a face value of at least $x_H + y_H + y_P + I$ (in particular, an infinite face value) would correspond to equity. However, typically, debt claims are limited, perhaps because the firm would otherwise have to be declared insolvent immediately.

can induce the manager to liquidate the firm. An assumption like this is often employed in the literature. For instance, Hart and Moore (1995) assume that a manager cannot be induced to give up his empire building tendencies by any compensation contract (see their paper on p.571). All what is needed here is that the agency conflict cannot be fully eliminated through compensation contracts. In the context of this paper, one could employ the following justification: In a more general model, the state of the world would be endogenous, i.e., the manager would have to make an effort to generate the high state. Hence, the low state would indicate the possibility that the manager did not make an effort. In such an environment, optimal compensation contracts would never fully insure the manager against the occurrence of the low state (in which the firm should be liquidated) since this would eliminate the manager's incentive to make an effort.

2.9. Summary of Notation

The following table summarizes the notation.

[insert Table 2]

3. The Trade-Off Between Optimal Investment And Optimal Liquidation

I solve the game by backwards induction. Thus, in this section, I analyze the managerial investment decision and the bank's liquidation decision for a *given* choice by the bank

of capital structure, managerial compensation, interim payment, and funding (i.e., we are at date 1). This section will illustrate the conflict between optimal investment and optimal liquidation. In sections 4 and 5, I will endogenize the bank's decisions at date 0.

In this section, the short-term payment can be interpreted either as debt payment or as dividend. For the interim payment to be informative, it must be chosen such that $x_H \geq D_I > x_L$ ¹³ if the bank gives no new funding and $x_H + I \geq D_I > x_L + I$ if the bank provides new financing. I will discuss this case first. Only if the manager receives funding from the bank, he can invest. In the low state, the manager can only invest in the short-run project. The manager's project choice in the high state depends on several factors. If the manager expects that a failure to make the short-term payment will be ignored, he is willing to invest in the long-run project. Then, he does not endanger his job and the private benefits he derives from it. If the manager expects that a failure to make the short-term payment will lead to a liquidation, he faces a nontrivial trade-off: if he invests in the long-run project, he may increase his long-run compensation if the firm is continued until date 3. But he also risks a liquidation.

The manager's strategy in the high state depends on the bank's reaction that he expects if a short-term payment is not made. (Only in the high state the manager has a nontrivial project choice. Hence, in the following, the word "the manager" refers to the manager in the high state unless stated otherwise.) This reaction depends on two

¹³If the debt due at date 2 was not higher than x_L , there would never be a default and thus short-term debt would not generate valuable information. If this debt level was higher than x_H , default would not be informative because all firms would default. The same is true for the dividend level.

factors: First, what is learned from a failure to pay? Second, given the information learned, will the bank liquidate? If the manager receives no funding or if he receives funding but it is the manager's strategy to undertake the short-run project, a failure to make the payment reveals the low state and hence always leads to the firm's liquidation. If it is the manager's strategy to undertake the long-run project, a failure to pay can be caused either by being in the low state or by being in the high state, investing in the long-run project, and generating the low short-run payoff. I denote by μ the posterior probability of the high state given that the payment was not made and given that the manager's equilibrium strategy is to invest in the long-run project. It can be calculated that $\mu = \frac{\pi(1-\delta)}{\pi(1-\delta)+(1-\pi)} = \frac{\pi(1-\delta)}{1-\pi\delta}$. When the bank believes the manager's strategy is to invest in the long-run project, the bank will liquidate after a failure to make the short-term payment if and only if $L_I > \mu(y_H + y_P) + (1 - \mu)y_L$, i.e. if and only if $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$. (I assume that if the bank is indifferent, it does not liquidate). I call the bank "liquidation-prone" if $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$. I call it "not liquidation-prone" otherwise.

Lemma 3.1. *Suppose $x_H \geq D_I > x_L$ and the firm receives no new financing or $x_H + I \geq D_I > x_L + I$ and the firm receives new financing. The bank's liquidation policy is first-best (i.e. induces liquidation in the low state and continuation in the high state) if and only if the manager does not receive funding or if he receives funding and his strategy is to undertake the short-run project in the high state.*

Proof: Suppose the manager receives funding and his strategy is to invest in the long-run project. If the bank is liquidation-prone, it excessively liquidates after a failure to

make the payment: the firm is sometimes liquidated even in the high state (the bank always liquidates after a failure to make the payment, i.e. if the interim payoff is $x_L + I = x_H$; this happens with probability $1 - \delta$ in the high state). If the bank is not liquidation-prone, there is not enough liquidation: a failure to make the payment is ignored, and hence the firm is continued even in the low state. However, the liquidation policy is first-best if the manager does not receive funding and hence cannot invest. Then, a failure to pay reveals that the firm is in the low state: The interim payoff is always x_H in the high state and x_L in the low state and hence the payment is made if and only if the firm is in the high state. The liquidation policy is also first-best if the bank provides new funding and the manager's strategy in the high state is to invest in the short-run project. Then, the interim payoff is always $x_H + I$ in the high state and $x_L + I = x_H$ in the low state, and hence the payment can be made only in the high state. ■

The reason behind this result is that the long-run project destroys the one-to-one relationship between the state and the ability to make the short-term payment. Thus, it is impossible to simultaneously realize growth opportunities and have a first-best liquidation policy. This reflects the idea that there is a real conflict between realizing long-run growth opportunities and generating information about the firm's viability in the short-run. The bank learns less about the firm's viability by observing its *short-term results* (here: its ability to make a short-term payment) if the firm is following a *long-term strategy*. This idea can also be illustrated as follows: Suppose an economically

viable firm can produce good short-term or good long-term results while a not viable firm will always generate poor short-term and poor long-term results. The viable firm may concentrate on generating good long-term results and in doing so sacrifice good short-term results (for instance, it may incur high investment outlays in the short-run). But then, short-term results do not distinguish well between the viable and the not viable firm.

Managerial compensation may be chosen so that the manager will invest in the long-run project even if there is some chance that the firm will be liquidated.¹⁴ Call α_H (α_H^D)¹⁵ the smallest share of payoffs to equity the manager must be promised at date 0 in an all-equity firm (in a firm in which the bank remains a debtholder and that hence emerges with debt) to induce him to invest in the high state even if he expects a liquidation after a failure to make a dividend payment (default). I will call compensation “low” if $\alpha < \alpha_H$ (α_H^D). I will call compensation “high” if $\alpha \geq \alpha_H$ (α_H^D). It can be calculated that $\alpha_H = \frac{B(1-\delta)}{y_P\delta + (1-\delta)(x_L + L_I) - (x_H + y_H)(1-\delta)}$.¹⁶ α_H increases in B : to overcome a stronger resistance towards liquidation, the manager must be granted a higher share of the payoffs equity receives. The share that must be promised to the manager decreases in the parameters that make the investment in the long-run project

¹⁴It can be easily checked that B can fulfill (A14) but still be low enough such that $\alpha_H < 1$. This is true because the investment decision is made *before* the state is realized but the manager would have to make the liquidation decision *after* the *low* state has been realized.

¹⁵We will see in section 5 that high managerial compensation will never be paid in a firm with debt. For this reason, I do not calculate α_H^D .

¹⁶If the manager invests and there is a liquidation after a failure to make the payment, his expected utility is:

$\alpha\{\pi[\delta(x_H + y_H + y_P) + (1-\delta)(x_L + L_I)] + (1-\pi)(x_L + L_I)\} + \pi\delta B$. If he does not invest, his expected utility is $\alpha\{\pi(x_H + y_H) + (1-\pi)(x_L + L_I)\} + \pi B$. α_H is the smallest α such that the first expression is at least as large as the second one. If $\alpha_H > 1$, compensation cannot induce the long-run project. I implicitly assume that the manager receives non-voting shares so that the bank, and not the manager, always has the right to make the liquidation decision when the bank becomes an equityholder.

more attractive to the manager for a *given* share of equity payoffs, in particular y_P and δ .

The following Proposition characterizes all the perfect Bayesian equilibria in the subgames induced by a particular capital structure, compensation, and funding choice and an *informative* interim payment.

Proposition 3.2. *Suppose the manager receives funding for the investment and $x_H + I \geq D_I > x_L + I$. If $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$, the perfect Bayesian equilibria are:*

(i) *if compensation is low ($\alpha < \alpha_H$ (α_H^D) in the firm that emerges without (with) debt from the restructuring): the manager invests in the short-run project; the bank liquidates if the short-term payment is not made;*

(ii) *if compensation is high ($\alpha \geq \alpha_H$ (α_H^D) in the firm without (with) debt): the manager invests in the long-run project; the bank liquidates if the short-term payment is not made.*

If $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$, the perfect Bayesian equilibria are:

(i) *if compensation is low: One equilibrium is for the manager to invest in the long-run project and the bank never to liquidate. Another equilibrium is for the manager to invest in the short-run project and the bank to liquidate if the short-term payment is not made;*

(ii) *if compensation is high: The manager invests in the long-run project; the bank never liquidates.*

Suppose the manager receives no funding. Then the unique perfect Bayesian equilibrium is: the manager does not invest; the bank liquidates if the short-term payment

is not made.

Proof: See the Appendix. ■

Thus, there may be multiple equilibria, and this multiplicity is inherent in the economics of the situation. If the bank interprets the failure to make the payment in a negative way, the bank will react with liquidation. Anticipating this, the manager does not invest in the long-run project which means that a default or failure to pay a dividend is indeed very bad news: it cannot stem from a short-term cash shortage due to the investment expenditures. But if the bank interprets the failure to make the payment in a less negative way, the bank will ignore it. Anticipating this, the manager invests in the long-run project which justifies that the bank ignores the failure to pay: it can now stem from a cash shortage caused by the long-run investment and does not necessarily indicate that the firm is not viable.

More importantly, nothing in the analysis so far suggests that there is a difference between the manager's behavior and the bank's liquidation policy in a firm that emerges from the restructuring with debt and the firm that emerges without debt. There is also no difference between the informational role of debt and dividend payments. This is not surprising because it was assumed that the bank's opportunities and incentives to liquidate do not depend on whether it took equity or remained a debtholder in the initial restructuring (by (A11) and (A12)). However, a difference in the liquidation policies of the all-equity firm and the firm with debt will emerge in section 5 when we consider the whole game.

Now let us consider what happens after an *uninformative* choice of the interim payment, i.e., $D_I \leq x_L$ or $D_I > x_H$ if the bank provides no new financing and $D_I \leq x_L + I$ or $D_I > x_H + I$ if the bank provides new financing. Now the bank's liquidation policy is not contingent on the firm's ability to make the short-term payment since the ability to make the payment contains no information. Clearly, the bank's liquidation policy cannot be first-best. If the bank liquidates at date 2, the firm is liquidated even in the high state; if the bank does not liquidate at date 2, the firm is continued even in the low state. The following Lemma characterizes all perfect Bayesian equilibria after an uninformative choice of the interim payment.

Lemma 3.3. *Suppose the manager receives funding for the investment. Suppose the dividend payment in a firm in which the bank takes all the equity is $D_I \leq x_L + I$ or $D_I > x_H + I$ and the interim debt payment in a firm in which the bank remains a debtholder is $D_I > x_H + I$. The perfect Bayesian equilibria are:*

(a) *The manager chooses the long-run project and the bank never liquidates if*

$$L_I \leq \pi(y_H + y_P) + (1 - \pi)y_L.$$

(b) *The manager chooses the short-run project and the bank liquidates after a failure to make the payment if $\alpha > 0$ and $\delta < 1$ and $L_I > \pi y_H + (1 - \pi)y_L$.*

(c) *The manager chooses the long-run project and the bank liquidates after a failure to make the payment if $\alpha = 0$ or $\delta = 1$ and*

$$L_I > \pi(y_H + y_P) + (1 - \pi)y_L.$$

If the bank remains a debtholder and the interim debt payment is $D_I \leq x_L + I$, the manager chooses the long-run project and the firm is never liquidated.

Suppose the manager does not receive funding for the investment and the interim dividend payment is $D_I \leq x_L$ or $D_I > x_H$ and the interim debt payment is $D_I > x_H$. Then the perfect Bayesian equilibria are:

(d) The manager does not invest and the bank liquidates if $L_I > \pi y_H + (1 - \pi)y_L$.

(e) The manager does not invest and the bank does not liquidate if $L_I \leq \pi y_H + (1 - \pi)y_L$.

If the bank remains a debtholder and the interim payment is $D_I \leq x_L$, the manager does not invest and the bank never liquidates at date 2.

Proof: See the Appendix. ■

4. Immediate Liquidation, Controlled Liquidation or Realization of Growth Opportunities?

In this section and the next, I will derive the main results of the paper. I now analyze the whole game, using the results from the analysis of the subgames in section 3. In this section, it will not be analyzed under which circumstances the bank remains a debtholder and under which circumstances it takes equity (this is done in section 5). The reader may assume that the bank takes equity when the manager invests in the long-run project, as is shown in section 5. It will help to establish:

Lemma 4.1. *Whenever the bank chooses an uninformative interim payment, it provides new financing, offers zero compensation, the manager invests in the long-run project, and there is no liquidation at date 2.*

Proof: See the Appendix. ■

Asking for an uninformative payment commits the bank to forgo any learning.¹⁷ The bank will then make its liquidation decision according to its prior belief about the firm's state, π . If this prior belief is so pessimistic that the bank will liquidate at date 2, the bank could do better by immediately liquidating since liquidation values deteriorate over time. Thus, asking for an uninformative payment can be optimal only if the bank is optimistic enough about the firm's recovery prospects so that, in the absence of new information, there will be no liquidation at date 2. But then, the bank will want the firm to invest in the long-run project, and hence it provides new financing. If there will be no liquidation, the manager invests in the long-run project. Finally, the only reason to offer a positive share of the equity value to the manager is to induce him to invest in the long-run project. If the manager does this even without participating in the profits, there is no need to grant him a share of the equity value.

4.1. Immediate Liquidation, Short-Run Project or Long-Run Project?

The next Proposition shows under which conditions the firm is immediately liquidated and when the viable firm invests in the long-run project (i.e., realizes its growth opportunities).

Proposition 4.2. *The bank immediately liquidates the firm if and only if π is small enough (i.e., for each combination of values for the other parameters, one can find a*

¹⁷Clearly, the bank can commit to a particular short-term *debt* payment. I assume that the bank can also credibly announce at date 0 which short-term *dividend* payment will be required at date 2.

value $\underline{\pi}$ such that the bank immediately liquidates the firm if and only if $\pi < \underline{\pi}$). The firm invests in the long-run project if and only if y_P is sufficiently large (i.e., for each combination of the values of the other parameters, one can find a \bar{y}_P such that the firm invests in the long-run project if and only if $y_P \geq \bar{y}_P$).

Proof: See the Appendix. ■

In this model, the bank has all the bargaining power in the debt renegotiation. This effectively makes it the residual claimant of the firm's profits and induces it to make decisions that maximize firm value. Clearly, if it is almost sure that the firm is in the low state, it does not matter much what would happen in the high state, in particular how attractive the investment opportunities are. Since liquidation values deteriorate over time, it is best to liquidate as early as possible.

In the interest of readability, the exact bounds on π (and also on y_P) are relegated to the proof of the Proposition in the Appendix. However, these bounds are very intuitive. If the initial liquidation value L_0 is higher, then immediate liquidation is the optimal choice for a broader range of recovery probabilities π , i.e. optimal even for relatively large π . If controlled liquidation is more attractive than the realization of growth opportunities and hence is the relevant alternative, immediate liquidation is optimal for a smaller range of recovery probabilities (only for very small π) if liquidation values lose less in value over time ($L_0 - L_I$ is lower) or a recovery leads to higher profits ($x_H + y_H$ is larger). On the other hand, if the realization of growth opportunities is more attractive than controlled liquidation and hence is the relevant alternative, immediate

liquidation is optimal for a smaller range of recovery probabilities (only for a very small π) if the profits that are generated by the project (y_P) are higher.

When are growth opportunities realized, that is, when does the firm invest in the long-run project? Clearly, if the investment opportunities are sufficiently attractive, the bank will provide the funds for the investment and give the manager an incentive to invest in the long-run project. The latter may be done by asking for an uninformative short-term payment (for instance, no short-term payment at all). This means that the bank will not liquidate and hence the manager is willing to choose the long-run project (see Lemma 4.1.). Alternatively, the manager can be offered a compensation package that is sufficiently sensitive to long-run performance ($\alpha \geq \alpha_H (\alpha_H^D)$) and hence induces the manager to choose the long-run project despite the chance that the firm may be liquidated if the short-term payoff is low. As can be seen from the bounds on y_P (see the proof of the Proposition in the Appendix), the firm invests in the long-run project for a larger range of y_{PS} (for instance, even if y_P is not very high) if liquidation values (L_0 or L_I) are lower.¹⁸

Finally, when does the bank choose a controlled liquidation, i.e., when does the bank allow the firm to continue and the firm does not invest or invests in the short-run project?

¹⁸On a more technical note, it should be noted that the multiplicity of equilibria in the subgames (in the not liquidation-prone region; see Proposition 3.2.) does not translate into a multiplicity of equilibria in the whole game (if capital structure is ignored; there will be multiple equilibria in the whole game once capital structure is considered; this, however, has nothing to do with the interaction of investment and liquidation strategies analyzed in section 3). For this it is crucial that the bank can guarantee that the manager chooses the long-term project (by asking for an uninformative short-term payment) and can also guarantee that the manager does not choose the long-run project (by withholding funds).

Proposition 4.3. Suppose $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$. Then, the firm continues its operations but does not invest in the long-run project if (1) $L_I \geq y_L + \frac{\pi y_P - \pi(1-\delta)(x_H - x_L)}{1-\pi}$ and (2) $L_I \geq \frac{L_0 - \pi(x_H + y_H) - (1-\pi)x_L}{1-\pi}$ hold. Suppose $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$. Then, the firm continues its operations but does not invest in the long-run project if and only if (1), (2), and (3) $y_H \geq \frac{(1-\alpha_H)\{\pi[\delta(x_H + I + y_P) + (1-\delta)(x_H + L_I)] + (1-\pi)(x_H + L_I)\} - I - \pi x_H - (1-\pi)(x_L + L_I)}{\pi[1 - (1-\alpha_H)\delta]}$ hold.

Proof: See the Appendix. ■

The bank can prevent the investment in the long-run project by not providing the necessary funds. The bank chooses a controlled liquidation¹⁹ if and only if the deterioration in liquidation values is not too strong and the benefits from learning about the firm's prospects outweigh the costs of not realizing the firm's growth opportunities. The latter will be the case if asset values can deteriorate dramatically and hence an optimal liquidation decision is important ($L_I - y_L$ is high) but growth opportunities are not particularly attractive (y_P is low). If the bank is liquidation-prone, learning may be more attractive than the realization of growth opportunities only if both asset values can deteriorate dramatically *and* excessive liquidation is very costly (y_H is large

¹⁹It might appear that the model suggests that a firm never recovers fully from distress and realizes its growth opportunities if it undergoes a controlled liquidation. However, what is meant is that a firm that undergoes a controlled liquidation forgoes profitable discretionary projects *while the creditors are learning about its prospects*. In a more general model, creditors would be willing to provide substantial new financing or would encourage outside investors to provide the financing by exchanging their debt claims into equity as soon as they become confident that the firm is viable. At this point of time, the firm would recover from distress and be able to take advantage of its investment opportunities. In the model, this is captured in a reduced form since the firm's profits under a controlled liquidation can be relatively high (y_H can be high) although there is no long-run investment. For simplicity, the model does not specify the investment projects that allow the continuation payoff (y_H) to be high even if the long-run project is not undertaken.

relative to L_I and δ is low).²⁰

4.2. Uncertain Recovery and Controlled Liquidation

The last subsection has shown that the bank chooses a controlled liquidation if it matters which liquidation decision the bank makes in case the firm fails to make the short-term payment. This subsection will illustrate that the bank may engage in a controlled liquidation (may allow the firm to continue but induce it not to choose the long-run project) if learning matters because there is *sufficient uncertainty* at the time of the initial debt restructuring about the state of the firm.

A controlled liquidation can be seen as a postponement of the initial liquidation decision. If the bank believes it is almost sure that the firm is in the low state (will not recover), an immediate liquidation is more attractive than a controlled liquidation. The advantage of a controlled liquidation over an immediate liquidation lies in the value of preserving the opportunity to receive more than the liquidation value in case the firm is in the high state. However, the value of this opportunity is very small if the firm is most likely in the low state. The advantage of immediate liquidation - avoiding a substantial loss in liquidation values if there will be no recovery - dominates.

If it is almost sure that the firm is in the high state and if the bank is not liquidation-prone²¹, providing new financing and inducing the realization of growth opportunities

²⁰If the bank is liquidation-prone, it can choose between two ways of realizing the firm's growth opportunities. If it offers high compensation and asks for an informative short-term payment, it will induce excessive liquidation (see section 3). In this case, the cost of realizing the growth opportunities is excessive liquidation. If the bank offers zero compensation and asks for an uninformative short-term payment, it will never (and hence not often enough) liquidate. In this case, the cost of realizing growth opportunities is the possibility of a dramatic loss in asset values if the firm fails to recover.

²¹If the bank is liquidation-prone, the cost of realizing the growth opportunities is still a suboptimal

is more attractive than a controlled liquidation. The advantage of a controlled liquidation over the realization of growth opportunities is that it preserves the opportunity of limiting the downside risk. The bank learns enough about the firm's prospects to make an efficient liquidation decision. In particular, it liquidates the firm before a more dramatic loss in asset values when the firm cannot make the short-term payment. However, the value of this opportunity is very small if the firm will recover with a very high probability. The advantage of realizing the growth opportunities - higher upside payoffs - dominates. Hence, if the bank is not liquidation-prone, a controlled liquidation is optimal for the bank if and only if the bank is uncertain enough about the firm's state and thus its recovery prospects.

The preceding discussion is summarized in:

Proposition 4.4. *Assume that $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$. The firm continues its operations but does not invest in the long-run project if and only if π is neither too high nor too low, i.e.*

$$\pi \in \left[\frac{L_0 - L_I - x_L}{x_H + y_H - x_L - L_I}, \frac{L_I - y_L}{y_P - (1 - \delta)I - y_L + L_I} \right].$$

Proof: See the Appendix. ■

Clearly, the upper and the lower bound on π that determine when controlled liquidation is optimal depend on the firm's growth opportunities and the potential deterioration

liquidation decision but this time in form of excessive liquidation in the *high* state. The advantage and the disadvantage of the realization of growth opportunities occur both in the high state. Then, the choice between the realization of growth opportunities and controlled liquidation is not driven by the prior probability of the high state.

in liquidation values. If liquidation values deteriorate substantially (so that $L_0 - L_I$ is high), the bank's prior belief about the high state must be relatively high (the bank must be relatively optimistic about the firm's recovery prospects) for controlled liquidation to be more profitable than immediate liquidation. Similarly, if the long-run project is very attractive, the bank must be relatively pessimistic about the firm's recovery prospects to prefer controlled liquidation over inducing investment. This can be easily seen from the bounds on π in the above Proposition.

The Proposition has an interesting empirical implication for the *distribution* of postrestructuring performance among firms emerging from a reorganization. It may explain why many firms continue to perform poorly after a debt restructuring. If the ex ante expectations about the recovery prospects for a firm emerging from a restructuring and undergoing a controlled liquidation are to some degree met ex post, one should expect to see that a substantial fraction of such firms do recover. However, one should also expect that a substantial fraction fail. Hotchkiss (1995) finds that in each of the first five years after emerging from bankruptcy, between 35% and 41% of firms have negative operating income while a substantial number outperform the industry median (between 26% and 33%).²²

²²The model suggests that this prediction about the distribution of postbankruptcy performance should hold for firms that are undergoing a controlled liquidation, and hence in particular for all highly levered firms (section 5 will show that all firms that emerge from the restructuring with debt undergo a controlled liquidation). While Hotchkiss' data refer to all firms, they are likely to be not too different from the distribution of postbankruptcy performance for highly levered firms since most firms emerging from a restructuring remain highly levered (see Gilson (1995)).

4.3. The Timing of Cash Flows

The last subsections have illustrated the conditions under which the bank prefers to induce the short-run project or to prevent investment. Suppose that the parameter values are such that immediate liquidation is not the bank's optimal choice. When the bank decides which type of project choice it wants to induce, it compares the benefits of the long-run project and the short-run project.²³ The bank's choice is driven by two characteristics of the projects. The first characteristic is the project's contribution to payoffs in the high state. The higher is the net present value $y_P - (1 - \delta)I$ of the long-run project, the more attractive it becomes relative to the zero net present value short-run project. The other characteristic of a project is the information value of its short-run payoffs, in particular, what the bank can learn from the firm's failure to make an informative short-term payment. The model is constructed in a way that the bank can always infer the state without error from the firm's inability to make the informative short-term payment if the manager's strategy is to choose the short-run project. However, this is not the case if the manager's strategy is to choose the long-run project. This subsection isolates the information value of the long-run project from its net present value. Hence, the parameter δ is varied while the net present value of the long-run project is held constant. The latter is achieved by setting $y_P = P + (1 - \delta)I$, where P is the constant net present value of the long-run project. Define $\bar{\delta}$ as the lowest value of δ that makes the bank liquidation-prone.²⁴ It will become clear below that

²³ Preventing investment yields the same payoffs for the bank as inducing the short-run project.

²⁴ $\bar{\delta}$ is the value of δ which makes the bank indifferent between liquidation and continuation after the firm fails to make an informative payment, given that the manager's strategy is to choose the long-run

δ has an important impact on whether the bank is liquidation-prone or not. Call the difference in the bank's profits from inducing the long-run project and its profits from inducing the short-run project or preventing investment $\Delta\Pi = \Pi^{LR} - \Pi^{SR}$.

Proposition 4.5. *Suppose δ is varied while the net present value of the long-run project P is held constant. As long as $\delta \leq \bar{\delta}$, $\Delta\Pi$ does not change with δ . If $\delta > \bar{\delta}$ and $(1 - \alpha_H)\{\pi[\delta(y_H + x_H + y_P + I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I \geq \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L)$, $\Delta\Pi$ is strictly increasing in δ . For δ close enough to 1, $\Delta\Pi > 0$.*

Proof: See the Appendix. ■

The parameter δ affects the posterior belief about firm quality after an informative payment is not made if the manager's equilibrium strategy is to choose the long-run project. $\mu = \frac{\pi(1-\delta)}{1-\pi\delta}$. Clearly, $\frac{\partial\mu}{\partial\delta} < 0$. In particular, if $\delta = 0$, the long-run project always leads to the same short-run payoff in the high state as the short-run project in the low state. Then, nothing is learned from the inability to make an informative short-run payment and $\mu = \pi$. On the other hand, if $\delta = 1$, then $\mu = 0$: If the long-run project cannot lead to a low short-run payoff in the high state, the inability to make a short-run payment reveals that the firm is in the low state, and hence the long-run project is as informative in the short-run about the firm's state as the short-run project.

Of course, δ does not affect the profits from the short-run project. As long as $\delta \leq \bar{\delta}$, the bank is not liquidation-prone, and an increase in δ has no effect on the attractiveness

project. It solves $\mu(y_H + y_P) + (1 - \mu)y_L = L_I$, where, of course, μ and y_P are functions of δ .

of the long-run project either (remember that we hold the NPV of the long-run project constant). A higher δ means that a failure to make an informative payment is less likely in the high state and hence is worse news. However, as long as $\delta \leq \bar{\delta}$, it is not bad enough news to lead to a liquidation, and hence the negative information does not lead to a change in behavior by the bank. Moreover, the probability with which the bank continues a firm although it is in the low state is not affected by δ and remains $1 - \pi$.

The bank is always at least as well off in the liquidation-prone region ($\delta > \bar{\delta}$) as in the not liquidation-prone region. If the bank is not liquidation-prone, there is no essential difference between asking for an informative and an uninformative payment if the manager's strategy is to undertake the long-run project. While the failure to make an informative payment generates some negative information about the firm's state, it is not bad enough news to justify a liquidation, and hence the optimal reaction to a failure to pay is the same as if the bank asked for an uninformative payment. If $\delta > \bar{\delta}$, the bank can ask for an uninformative payment and generate exactly the same profits it generates by inducing long-run investment in the not liquidation-prone region. However, it has an additional option: by asking for an informative payment, the bank can implement a liquidation policy that is contingent on the firm's ability to make the payment but still induce the firm to undertake the long-run project. If $\delta > \bar{\delta}$, the failure to make a payment is bad enough news to justify a liquidation even if the manager's strategy is to invest in the long-run project. Then, inducing long-run investment and asking for an informative payment leads to excessive liquidation (rather than excessive continuation). The probability with which the bank makes a suboptimal

liquidation decision (excessively liquidates) is $\pi(1 - \delta)$, and hence a higher δ leads to a lower probability of excessive liquidation, making the long-run project more attractive. Thus, in the liquidation-prone region the bank can choose between inducing the long-run project together with excessive continuation (by requiring an uninformative payment) or with excessive liquidation (by requiring an informative payment). If the bank prefers excessive liquidation over excessive continuation, its profits from inducing the long-run project are increasing in δ .

It is easy to confirm that in the absence of managerial compensation the bank would prefer excessive liquidation over excessive continuation if it is liquidation-prone. However, if the bank requires an informative payment and is liquidation-prone, the manager will not invest in the long-run project unless he receives a fraction of the firm's equity α_H . Offering performance-sensitive compensation is the only way to induce the manager to choose the long-run project when the bank asks for an informative payment and is liquidation-prone. While the ability to use managerial compensation allows the bank to sometimes induce efficient long-run investment that it could not induce otherwise, the necessity to motivate the manager by means of compensation is the only reason why the bank may follow a strategy that does not maximize firm value, given its information. In particular, the bank may induce the manager to forgo the long-run project even though the long-run project maximizes overall returns if a too large fraction of the payoffs have to be given to the manager in form of compensation. However, as δ goes to 1, α_H tends to zero, and the long-run project comes very close to implementing the first-best outcome that could be obtained if the bank knew the firm's

state or the manager was not liquidation-averse.

This subsection has illustrated that not only the net present value of the long-run project but also the timing of its payoffs matter for the bank's reaction to financial distress. In particular, the earlier a long-run project pays off (the higher δ), the more attractive can the long-run project be to the bank (if $\delta > \bar{\delta}$) because it leads less often to a suboptimal liquidation decision. If a long-run project always has a high interim payoff ($\delta = 1$), the long-run project dominates and achieves the first-best outcome: optimal investment and optimal liquidation.

On the other hand, the bank prefers the short-run project (controlled liquidation) over the long-run project if the probability with which the long-run project pays off in the short-run (δ) is low enough and hence the long-run project interferes to an important extent with the bank's ability to learn from short-run payoffs. The short-run project is particularly attractive if the probability with which there is a difference in the liquidation decision when the manager undertakes the long-run project as compared to the situation when he undertakes the short-run project is large enough. This probability is $1 - \pi$ in the not liquidation-prone region and $\pi(1 - \delta)$ in the liquidation-prone region.

4.4. Implications for the Costs and Benefits of Financial Distress

The paper has ambiguous implications concerning the costs and benefits of financial distress. On the one hand, the paper has a more optimistic view of the liquidation process than is prevalent in the existing literature. Creditors are able to implement efficient liquidation decisions even if liquidation-averse managers are initially better

informed about the firm's prospects and still control its investment decisions. The bank engages in a controlled liquidation if the benefits of such a strategy for firm value (an improved liquidation decision) outweigh its costs (suboptimal investment decisions). Hence, if the liquidation decision would have to be made immediately, firm value would be lower under the circumstances that make controlled liquidation optimal.

On the other hand, the analysis implies that some - potentially substantial - inefficiencies (or: costs incurred) during financial distress cannot be avoided. Financial distress will result in inefficient investment decisions or in inefficient liquidation decisions even when creditors have strong incentives to maximize firm value. This is true even if there are no other impediments to an efficient resolution of distress than creditors' lack of information and managerial liquidation aversion. The only situation in which all inefficiencies could be avoided is when creditors know whether the defaulting firm is economically viable or when managers implement the efficient liquidation decision themselves. Both scenarios seem unrealistic in a world with separation of ownership and control and liquidation-averse management.

It also should be noted that overall, financial distress is beneficial in the environment analyzed in this paper. In the absence of financial distress, the manager would remain in control of liquidation decisions at all times and hence there would never be a liquidation. Such an outcome can be also achieved by the creditor during financial distress if he allows the firm to realize its growth opportunities. However, an optimal liquidation decision may be more valuable than realizing the firm's growth opportunities, and such an optimal liquidation decision can only be implemented by the creditor when he obtains

control of the firm during financial distress.

Finally, the analysis suggests that the inefficiencies during financial distress will not be eliminated by an all-equity recapitalization of a distressed firm. The costs of financial distress emphasized in the literature often arise only because creditors do not have the incentive to maximize firm value. In particular, it is frequently argued that liquidation decisions are inefficient because of a conflict of interest between creditors and equity-holders or among senior and junior creditors. This was already pointed out by Bulow and Shoven (1978) who show that conflicts of interests between various claimants can lead to both excessive liquidation and excessive continuation. However, these inefficiencies could be completely overcome if the bankruptcy code required the cancellation of all debt and ordered an all-equity recapitalization of the distressed firm. This has indeed been suggested by Roe (1983). This paper shows that such a reform would not eliminate the inefficiencies that occur during financial distress since the inefficiencies analyzed here do not arise from conflicts of interest caused by an inadequate capital structure.

4.5. Implications for Bankruptcy Law

While bankruptcy law can reduce inefficiencies during financial distress that this paper has not addressed (for instance, those arising from free-rider problems among creditors), it is unlikely to have a substantial impact on the inefficiencies during financial distress that this paper focuses on (it may reduce these inefficiencies to some extent by requiring stringent disclosure to creditors). The analysis has another implication for bankruptcy

law. It suggests a new interpretation of the poor postbankruptcy performance observed for many firms. This phenomenon has been interpreted as an indicator that management's enhanced bargaining power under Chapter 11 allows inefficient firms to continue against their creditors' will (see Hotchkiss (1995)). This paper implies that poor post-bankruptcy performance may simply be a consequence of creditors' uncertainty about firms' recovery prospects which induces creditors to allow many firms to continue (see Proposition 4.4.). Naturally, a substantial number of these firms will do poorly and perhaps be (partially) liquidated in another incidence of financial distress. In addition, even viable firms may perform poorly because they may not be able to take advantage of their profitable investment projects.

4.6. Implications for the Debate on Workouts vs. Chapter 11

The view of financial distress as a dynamic process suggests that out of court debt restructurings, bankruptcies, and subsequent repeated reorganizations of the same firm should not be analyzed in isolation but seen as part of the same, long-term process. In particular, the analysis implies that a distressed firm's situation and prospects are different at different stages of this dynamic process (for instance, the firm is likely to have better prospects in a first restructuring than when it reenters distress since new negative information has been learned when the firm reenters distress). It seems likely that firms first attempt an out of court restructuring before they file for Chapter 11. If a Chapter 11 restructuring comes at a later point in the dynamic distress process, conclusions about the effects of the institutional framework of a Chapter 11 restructuring as compared to

an out of court restructuring have to be treated with caution. The different results of the two kinds of restructurings for firms' capital structure, investment, and performance may not be generated by the differences in the institutional settings of the two restructurings but by the firm's worse situation when it files for Chapter 11. Potentially misleading conclusions about the efficiency of Chapter 11 could even be obtained if the empirical work controlled for the distressed firm's financial situation, since, in principle, one should also control for the information learned from the history of the firm's distress. While this seems very difficult to implement, empirical work should at least take into account whether a distressed firm had a previous attempt to restructure its debt. Typically, this is not done; instead, debt restructurings of the same firm that are at least a year apart are analyzed as independent events (see, for instance, Gilson (1995)).

5. Capital Structure Adjustment, Investment, and Liquidation Policies

The empirical literature shows that the phenomena interpreted here as consequences of a controlled liquidation - low investment and poor performance after reorganizations and the large number of repeated restructurings - are concentrated among firms that emerge with high leverage from a reorganization (because creditors do not swap their debt claims into equity) while firms emerging with lower debt burden (because creditors accept equity stakes) often dramatically increase their capital expenditures and perform better. As already mentioned in the Introduction and Model sections, the correlation between post-restructuring capital structure and investment can be explained, for instance, by a debt overhang argument. The point of this section is *not* to give a new explanation

for such a correlation but to explore its consequences for liquidation policies and the informational role of debt and dividend payments - regardless of how one explains the correlation.

The following Lemma will help in the analysis:

Lemma 5.1. *The bank will never choose an uninformative interim payment when it remains a debtholder.*

Proof: See the Appendix. ■

If the bank provides no funding, an uninformative interim payment prevents the bank from implementing the first-best liquidation policy but has no benefit. If the bank provides new funding, an uninformative interim payment will induce the manager to invest in the long-run project (see Lemma 4.1.). But choosing equity is more profitable than remaining a debtholder if the manager chooses the long-run project. As a debtholder the bank does not benefit from the long-run project as much as it would as the firm's sole equityholder (by (A13)).

5.1. Post-Restructuring Capital Structure, Investment, and Liquidation Policies

Proposition 5.2. summarizes the results on the interaction of capital structure choice, compensation, and investment and liquidation strategies.

Proposition 5.2. *In all perfect Bayesian equilibria in which the firm emerges from the restructuring with debt the long-run project is not undertaken and there always is a*

liquidation after a default. The liquidation policy in a firm with debt is always first-best and $\alpha = 0$. There are perfect Bayesian equilibria in which the firm emerges from the restructuring as an all-equity firm and the long-run project is undertaken. In an all-equity firm in which the long-run project is undertaken, the liquidation policy is not first-best, an informative dividend is not required or the failure to pay such a dividend is ignored if the bank is not liquidation-prone, and managerial compensation may be high ($\alpha \geq \alpha_H$).

Proof: See the Appendix. ■

If the realization of growth opportunities is more valuable than an improved liquidation decision, the bank will induce the manager to invest in the long-run project, as seen in section 4. To benefit the most from the increased upside profit potential generated by the investment, the bank takes all the equity. However, the bank will prefer a controlled liquidation when learning about the firm's viability is more valuable than realizing its growth opportunities. When the manager does not invest in the long-run project, the firm's profit potential is limited, and it is optimal for the bank to retain a limited claim and remain a debtholder (so that the firm emerges with debt from the restructuring). This is because we assumed $D \geq x_H + y_H + I$. Since the bank remains a debtholder only if the manager does not invest in the long-run project (so that the inability to make the short-term payment reveals the low state), observing the firm's ability to make the short-term debt payment allows the bank to implement the first-best liquidation policy (see Lemma 3.1.). However, because in equilibrium the bank will take equity when

the manager chooses the long-run project, the inability to make a short-term dividend payment in an all-equity firm may not be informative enough about the firm's prospects to induce the bank to liquidate. Then, the bank will also not be able to implement the first-best liquidation policy (see Lemma 3.1.).

In this model, there are also perfect Bayesian equilibria in which the manager in a firm that emerges from the restructuring without debt does not invest in the long-run project. This is a consequence of the bank's indifference between remaining a debtholder and taking all the equity if the long-run project is not undertaken. In a more general model, there are good reasons why the bank would prefer to remain a debtholder in this situation. One such reason is the existence of regulatory costs associated with taking equity stakes in distressed firms. If there are any - even arbitrarily small - regulatory costs to holding equity, the equilibria in which an all-equity firm implements the first-best liquidation policy disappear. Taking equity stakes may attract regulators' attention, and risk-based capital standards require more capital reserves for risky claims such as equity. Furthermore, there are restrictions on the duration banks can hold on to equity stakes in distressed firms (see James (1995)). For simplicity, these regulatory costs are not explicitly modeled.²⁵

Regardless of how one explains the correlation between post-restructuring capital structure and investment, it has, in the context of the model, an interesting implication: The liquidation policies in firms that emerge with and without debt from restructuring may differ *in equilibrium* although the bank's ability and incentives to liquidate do not

²⁵In such a more general model, however, the bank may prefer to remain a debtholder even if the long-run project is undertaken if regulatory costs are sufficiently large.

in principle depend on whether it remained a debtholder or took equity in the initial restructuring (because of (A11) and (A12)). There are other papers in the literature in which there is a difference in the liquidation policies of owners and debtholders. Among others, Dewatripont and Tirole (1994) use the idea that the concave payoff structure of a debtholder and the convex payoff structure of an equityholder leads to a difference in the reaction of the debtholder and the equityholder to the *same* belief about firm quality. In contrast to that argument, in the model presented here the difference in liquidation policies is caused by the fact that a failure to make a short-term payment in a firm with debt may be *worse news* than the failure to make such a payment in a firm without debt. The reason for this is that the manager's project choice in both types of firms may differ.

5.2. The Informational Role of Debt and Dividends

The short-term payment plays an informational role: the ability to make this payment conveys information about the firm's prospects which is used in the liquidation decision by the bank. In contrast to Harris and Raviv (1990), the model makes the point that dividend payments can *in principle* replicate the informational role of debt payments. However, Proposition 5.2. shows that *in equilibrium* debt payments may contain more information than dividend payments of the same size. The default on a short-term debt payment is always very bad news and reveals the low state because the long-run project is never undertaken in a firm with debt. However, the failure to pay a short-term dividend may not be as bad news as a default. This is so because in equilibrium in a

firm without debt, the long-run project may be undertaken, and hence low short-term results do not reveal the low state.

5.3. Empirical Implications

The model is consistent with many empirical findings about financially distressed firms. The strategy of controlled liquidation can explain the long-term effects of financial distress that were described in the Introduction. Proposition 5.2. suggests that firms that emerge highly levered from debt restructurings invest less and perform worse than firms that emerge with lower leverage (because creditors exchanged debt into equity). Propositions 4.2. and 5.2. together suggest that creditors take equity in firms with substantial growth opportunities. These implications of the model are consistent with the following results of the empirical literature: James (1995) finds that “capital expenditures for firms in which banks take equity have increased by the end of the second year of restructuring over 100% relative to their pre-restructuring levels. In contrast, the average growth in capital expenditures for firms in which banks do not take equity is less than two percent.” Moreover, firms with substantially reduced debt burden also tend to perform better than firms that emerge still highly levered, and banks tend to take equity in firms with substantial growth opportunities as measured by the ratio of market to book value of the assets (see James (1995) and Brown, James, and Mooradian (1993)). The strategy of controlled liquidation also provides a rationale for the large number of firms that reenter financial distress within a few years after emerging from a reorganization. Indeed, learning about a firm’s viability would be without value to

creditors if they would not receive another liquidation opportunity if the firm fails to recover. Gilson (1995) and Hotchkiss (1995) find that between a quarter and a third of the firms in their samples reenter financial distress within a few years after emerging from the first debt restructuring (the median time in their studies is 2 and 3.8 years, respectively). High recidivism rates for firms in Chapter 11 have also been reported by Altman (1993) and LoPucki and Whitford (1993).

6. Conclusion

This paper has presented a theory of dynamic liquidation that recognizes the incentives for creditors to learn about a financially distressed firm's recovery prospects. It was argued that creditors may postpone their liquidation decision to learn more about the distressed firm's prospects and base a final liquidation decision on better information. Creditors can obtain more information about the firm's situation from observing short-term results if the manager of a viable firm follows a myopic investment strategy, preserving cash and forgoing some profitable long-term projects. Hence, there is a conflict between optimal investment and optimal liquidation decisions. If there is enough uncertainty about a distressed firm's prospects and making the correct liquidation decision is important, creditors may discourage long-term investment even if they are confident that management will not invest in unprofitable discretionary projects. Such a *controlled liquidation* preserves the opportunity to participate in a recovery of the firm while it also preserves the opportunity to learn enough about the firm's prospects to liquidate before a more dramatic loss in asset values if the firm fails to recover. The

strategy of controlled liquidation rationalizes the effects of financial distress on many firms' capital structures, investment policies, and performance even after they emerge from debt restructurings. Hence, the theory of dynamic liquidation can explain the long-term nature of financial distress solely as the result of the socially valuable dynamic learning strategies of creditors instead of appealing to bargaining inefficiencies or a suboptimal design of US bankruptcy law. The dynamic view of liquidation has implications for the costs of financial distress, bankruptcy law, and the comparison of private workouts and Chapter 11 bankruptcies.

It would be interesting to discriminate between the theory of dynamic liquidation and other potential explanations for the long-term nature of financial distress. Hotchkiss (1995) suggests that management entrenchment is responsible for the poor post-bankruptcy performance of many firms. Others, most recently Agarwal (1995), argue that free-rider problems among creditors cause leverage ratios to stay high after restructurings. However, free-rider problems can be and often are overcome by means of coercive exchange offers, the voting rights procedures of Chapter 11, and the concentration of debt in the hand of banks and vulture funds. It may be seen as an advantage of the theory of dynamic liquidation that it provides a unified explanation for many different indicators of the long-term nature of financial distress. However, it is left to future empirical work to evaluate the relative importance of the competing theories.

7. Appendix

7.1. Proofs

This subsection of the appendix contains all proofs not given in the main text. In addition, it provides a justification for the assumption that in a firm with debt the bank rather than the equityholders makes a take-it-or-leave-it compensation offer to the manager (Lemma 7.1.). I will start with the proof of Proposition 3.2.

Proof of Proposition 3.2.:

Suppose the firm receives new financing I . If $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$, the bank's best response to a failure to make the interim payment is liquidation even if the bank believes that the manager's strategy is to invest in the long-run project. If the manager gets only a low share $\alpha < \alpha_H (\alpha_H^D)$ of the equity value, he is not willing to choose the long-run project. But if he gets at least $\alpha_H (\alpha_H^D)$, his best response is to invest in the long-run project even if there is liquidation after a failure to make the short-term payment. If $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$, there are two equilibria for $\alpha < \alpha_H (\alpha_H^D)$: If the bank is expected to ignore a failure to make the payment, choosing the long-run project is the best response. And ignoring the failure to make the payment is the best response if the manager's strategy is to choose the long-run project. But if the bank is expected to liquidate after a failure to make the payment, choosing the short-run project is the best response. And the best response to a failure to make the payment if the manager is believed to invest in the short-run project is to liquidate. Clearly, if $\alpha \geq \alpha_H (\alpha_H^D)$, the manager chooses the long-run project and a failure to make the payment is ignored. Suppose the firm receives no new

financing. Then, the manager cannot invest, and a failure to make the payment reveals the low state. Hence, the bank liquidates after a failure to make the payment. ■

Proof of Lemma 3.3.:

Suppose the firm receives new financing I . If there is no liquidation at date 2, the manager's best response is to invest in the long-run project (if the manager receives $\alpha = 0$, he is indifferent between the long-run and the short-run projects and by assumption he invests in the long-run project). If the firm is liquidated at date 2, the manager's best response is to choose the short-run project if $\alpha > 0$ and $\delta < 1$ since the long-run investment reduces interim profits with positive probability but does not increase the liquidation value L_I . If $\delta = 1$, the long-run investment never reduces interim profits: if $\alpha = 0$, the manager does not care about interim profits. In both cases, the manager is indifferent between the two projects and by assumption chooses the long-run project. The bank's best response is to liquidate if the manager's strategy is to choose the long-run project if and only if $L_I > \pi(y_H + y_P) + (1 - \pi)y_L$. If the manager's strategy is to choose the short-run project, the bank's best response is to liquidate if and only if $L_I > \pi y_H + (1 - \pi)y_L$. (It was assumed that the bank continues if it is indifferent between continuation and liquidation).

It is now easy to see that the strategy combinations under (a), (b), and (c) in the Lemma specify all combinations of best responses for both the manager and the bank. If the bank requires a short-term debt payment $D_I \leq x_L$, the manager always makes the payment and hence the bank has no right to liquidate at date 2. The owner of

a firm with debt will not liquidate because all of the liquidation value and short-term payoff goes to the debtholder. Hence, if $D_I \leq x_L$, the firm is not liquidated at date 2 and hence the manager chooses the long-run project if he has funding.

Suppose the firm does not receive new financing. Then the manager cannot invest. The bank's best response is to liquidate at date 2 if and only if $L_I > \pi y_H + (1 - \pi)y_L$. It is easy to see that the strategy combinations under (d) and (e) in the Lemma are the only equilibria. Clearly, if the bank remains a debtholder and $D_I \leq x_L$, it cannot liquidate. ■

Proof of Lemma 4.1.:

The bank can always immediately liquidate and receive L_0 . Liquidation at date 0 is more profitable than liquidation at date 2 because $L_0 > L_I + \pi x_H + (1 - \pi)x_L$ by (A6). Hence, the bank will not ask for an uninformative payment if this strategy means that there will be a liquidation at date 2. Thus, the bank will fund the investment and induce the manager to choose the long-run project when it asks for an uninformative payment since this project has a positive NPV. The manager will choose the long-run project because there will be no liquidation. The bank will offer only $\alpha = 0$ because even then the manager will invest in the long-run project. ■

Proof of Proposition 4.2.:

First, I give a more precise statement of the Proposition.

Suppose $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$. The bank immediately liquidates the firm if and only if

$$\pi < \min\left\{\frac{L_0 - (x_L + L_I)}{x_H + y_H - (x_L + L_I)}, \frac{L_0 - (x_H + L_I)(1 - \alpha_H) + I}{(1 - \alpha_H)\{\delta(y_P + y_H + x_H - (x_H + L_I))\}}\right\},$$

$\frac{L_0 - (x_L + y_L)}{\delta(y_P + y_H + x_H) + (1 - \delta)(x_L + y_P + y_H) - (x_L + y_L)}$. The firm invests in the long-run project if and

only if

$$y_P \geq \frac{L_0 + I - (1 - \alpha_H)\{\pi[\delta(x_H + y_H + I) + (1 - \delta)(x_H + L_I)] + (1 - \pi)(x_H + L_I)\}}{(1 - \alpha_H)\pi\delta} \text{ and}$$

$$y_P \geq \frac{\pi(x_H + y_H) + (1 - \pi)(x_L + L_I) - (1 - \alpha_H)\{\pi[\delta(x_H + y_H + I) + (1 - \delta)(x_H + L_I)] + (1 - \pi)(x_H + L_I)\} + I}{(1 - \alpha_H)\pi\delta} \text{ or}$$

$$y_P \geq \frac{L_0 - \pi(x_H + y_H) + \pi(1 - \delta)I - (1 - \pi)(x_L + y_L)}{\pi} \text{ and}$$

$$y_P \geq \frac{(1 - \pi)(L_I - y_L) + \pi(1 - \delta)I}{\pi}. \text{ Suppose } \mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}. \text{ The bank immediately liquidates}$$

the firm if and only if

$$\pi < \frac{L_0 - (x_L + y_L)}{\delta(y_P + y_H + x_H) + (1 - \delta)(x_L + y_P + y_H) - (x_L + y_L)} \text{ and } \pi < \frac{L_0 - (x_L + L_I)}{x_H + y_H - (x_L + L_I)}. \text{ The firm invests}$$

in the long-run project if and only if

$$y_P \geq \frac{L_0 - \pi(x_H + y_H) + \pi(1 - \delta)I - (1 - \pi)(x_L + y_L)}{\pi} \text{ and } y_P \geq \frac{(1 - \pi)(L_I - y_L) + \pi(1 - \delta)I}{\pi}.$$

Proof:

I will calculate all perfect Bayesian equilibria of the game. For completeness, I will also solve for capital structure. While this is not needed for Proposition 4.2., it will be relevant for Proposition 5.2.. The bounds given in Proposition 4.2. can be directly calculated from the list of equilibria.

Let us start out with the following observation: There is no equilibrium in which the bank remains a debtholder but the manager receives funding and chooses the long-run project. This is a direct consequence of (A13). Taking all the equity allows the bank

²⁶As seen in section 3, α_H is a function of y_P . Substituting in for α_H , one can easily obtain the appropriate bound for y_P .

²⁷See last footnote.

to receive all the firm's profits while this is - if there is long-run investment - not true if the bank remains a debtholder. It is convenient to note that one can restrict attention to a face value of debt of $D = x_H + y_H + I$. $D > x_H + y_H + I$ is not optimal if the manager's strategy is to choose the long-run project because taking all the equity is more profitable. But if the manager's strategy is to choose the short-run project or he receives no funding, a face value of $D = x_H + y_H + I$ generates the same returns for the bank as any higher face value since payoffs will not exceed $x_H + y_H + I$. We have to consider the option of an uninformative payment only if the manager invests in the long-run project, the bank does not liquidate at date 2, and $\alpha = 0$ (see Lemma 4.1.), in which case the bank will take all the equity by the previous observation: if the manager's strategy is to choose the long-run project, it is more profitable for the bank to take equity than to remain a debtholder.

Now let us list all equilibria. Suppose $\mu < \frac{L_I - y_L}{y_H + y_P - y_L}$. Immediate liquidation is an equilibrium if and only if

$$(1) L_0 > \pi(y_H + x_H) + (1 - \pi)(x_L + L_I) \text{ and at the same time}$$

$$(2) L_0 > (1 - \alpha_H)\{\pi[\delta(y_H + x_H + y_P + I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I \text{ and at the same time}$$

$$(3) L_0 > \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L) \text{ hold.}$$

Choosing $(D, \alpha)^{28}$, $\alpha < \alpha_H^D$ with $x_H + I \geq D_I > x_L + I$ and with funding or with $x_H \geq D_I > x_L$ and without funding or $(E, 0)$ with $x_H + I \geq D_I > x_L + I$ and with funding or with $x_H \geq D_I > x_L$ and without funding is an equilibrium in which the

²⁸ D stands for debt, E for equity. I will often write $(E, 0)$ instead of $(E, \alpha = 0)$.

manager does not invest in the long-run project and there is a liquidation after a failure to pay if and only if (1) does *not* hold and at the same time

$$(4) \pi(y_H + x_H) + (1 - \pi)(x_L + L_I) \geq (1 - \alpha_H)\{\pi[\delta(y_H + x_H + y_P + I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I \text{ holds and at the same time}$$

$$(5) \pi(y_H + x_H) + (1 - \pi)(x_L + L_I) \geq \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L) \text{ holds.}$$

Choosing $(E, \alpha = \alpha_H)$ with $x_H + I \geq D_I > x_L + I$ and with funding is an equilibrium in which the manager invests in the long-run project and there is liquidation after a failure to pay a dividend if and only if (2) does *not* hold and at the same time (4) does *not* hold or holds as an equality and

$$(6) (1 - \alpha_H)\{\pi[\delta(y_H + x_H + y_P + I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I \geq \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L) \text{ holds.}$$

Finally, choosing $(E, 0)$ with $D_I \leq x_L + I$ or $D_I > x_H + I$ and with funding is an equilibrium in which the manager chooses the long-run project and there is no liquidation at date 2 if and only if (3) does *not* hold and at the same time (5) does *not* hold or holds as an equality and at the same time (6) does *not* hold or holds as an equality.

Now suppose $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$. Immediate liquidation is an equilibrium if and only if both (1) and (3) hold.

$(E, 0)$ with $x_H + I \geq D_I > x_L + I$ and with funding is an equilibrium in which the manager invests in the long-run project and there is no liquidation after a failure to pay a dividend if and only if (3) does *not* hold and at the same time (5) does *not* hold or

holds with equality.

$(E, 0)$ with $D_I \leq x_L + I$ or $D_I > x_H + I$ and with funding is an equilibrium in which the manager chooses the long-run project and there is no liquidation at date 2 if and only if (3) does *not* hold and at the same time (5) does *not* hold or holds as equality.

(D, α) with $\alpha < \alpha_H^D$ and $x_H + I \geq D_I > x_L + I$ and funding or with $x_H \geq D_I > x_L$ and without funding and $(E, 0)$ with $x_H + I \geq D_I > x_L + I$ and funding or with $x_H \geq D_I > x_L$ and without funding are equilibria in which the manager does not invest in the long-run project and the firm is liquidated after a default or a failure to pay a dividend if and only if (1) does *not* hold and at the same time (5) holds.

The conditions under which immediate liquidation and inducing the manager to choose the long-run project are optimal can be easily calculated from this list of all equilibria. ■

Proof of Proposition 4.3.: The conditions under which it is optimal for the bank to continue the firm but the firm does not choose the long-run project can be easily calculated from the list of all equilibria in the proof of Proposition 4.2.. ■

Proof of Proposition 4.4.:

Inducing no investment or the short-run project yields an expected payoff of $\pi(y_H + x_H) + (1 - \pi)(x_L + L_I)$ for the bank and hence is preferred over immediate liquidation if and only if $\pi(y_H + x_H) + (1 - \pi)(x_L + L_I) \geq L_0$. Inducing no investment or the

short-run project is more profitable than inducing the long-run project if and only if $\pi(y_H + x_H) + (1 - \pi)(x_L + L_I) \geq \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L)$. The relevant range of π can be calculated from the two inequalities. ■

Proof of Proposition 4.5.: Suppose $\delta \leq \bar{\delta}$. Then the bank is not liquidation-prone.

Hence, $\Delta\Pi = \pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L) - \pi(x_H + y_H) - (1 - \pi)(x_L + L_I)$.

Substituting in $y_P = P + (1 - \delta)I$, one obtains $\Delta\Pi = \pi(P + y_H + x_H) + (1 - \pi)(x_L + y_L) - \pi(x_H + y_H) - (1 - \pi)(x_L + L_I)$. This does not depend on δ . Now suppose that

$\delta > \bar{\delta}$. Then the bank is liquidation-prone. Hence, $\Delta\Pi = \max\{(1 - \alpha_H)(\pi[\delta(y_H + x_H + y_P + I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)) - I,$

$\pi[y_P + y_H + x_H - (1 - \delta)I] + (1 - \pi)(x_L + y_L)\} - \pi(x_H + y_H) - (1 - \pi)(x_L + L_I)$.

Substituting in $y_P = P + (1 - \delta)I$, one obtains

$\Delta\Pi = \max\{(1 - \alpha_H)(\pi[\delta(y_H + x_H + P + (2 - \delta)I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)) - I,$

$\pi(P + y_H + x_H) + (1 - \pi)(x_L + y_L)\} - \pi(x_H + y_H) - (1 - \pi)(x_L + L_I)$. If

$(1 - \alpha_H)\{\pi[\delta(y_H + x_H + P + (2 - \delta)I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I$

$> \pi(P + y_H + x_H) + (1 - \pi)(x_L + y_L)$, then $\frac{\partial \Delta\Pi}{\partial \delta} > 0$ (notice $\frac{\partial \alpha_H}{\partial \delta} < 0$). Finally, as $\delta \rightarrow 1$,

$(1 - \alpha_H)\{\pi[\delta(y_H + x_H + P + (2 - \delta)I) + (1 - \delta)(x_L + L_I + I)] + (1 - \pi)(x_L + L_I + I)\} - I$

$\rightarrow \pi[y_H + x_H + P] + (1 - \pi)(x_L + L_I) > \pi(x_H + y_H) + (1 - \pi)(x_L + L_I)$. ■

Proof of Lemma 5.1:

The bank will ask for an uninformative payment only if there will be no liquidation

at date 2 and there will be long-run investment (see Lemma 4.1.). But then, taking all the equity is more profitable than remaining a debtholder because of (A13). ■

Proof of Proposition 5.2.:

If the manager receives funding and his strategy is to choose the long-run project, the bank's best response is to take equity. This is more profitable than any debt claim because of (A13). If the manager's strategy is not to choose the long-run project, the bank is indifferent between equity and a debt claim because of (A13). Hence, in equilibrium, a firm that emerges with debt (because the bank retains a debt claim) will never choose the long-run project. By Lemma 3.1., it will have a first-best liquidation policy. There will always be liquidation after a default because the default reveals the low state if the manager receives no funding or his strategy is to invest in the short-run project. Managerial compensation will be low ($\alpha < \alpha_H^D$) - otherwise the manager chooses the long-run project and retaining a debt claim is not a best response. A firm that emerges free of debt (because the bank takes all the equity) may invest in the long-run project: taking all the equity is optimal if the manager receives funding and his strategy is to invest in the long-run project. Then, by Lemma 3.1., such a firm's liquidation policy is suboptimal. A failure to pay a dividend will not lead to liquidation if $\mu \geq \frac{L_I - y_L}{y_H + y_P - y_L}$: Then, the bank's best response to a failure to pay a dividend if the manager's strategy is to choose the long-run project is to continue (see section 3). The proof of Proposition 4.2. lists all equilibria. From this list it is apparent that there are equilibria in which the firm emerges free of debt and invests in the long-run project

and the bank requires an uninformative dividend payment. It also shows that there are equilibria in which the firm emerges free of debt and $\alpha = \alpha_H$. ■

7.2. An additional lemma

Lemma 7.1. *The equityholders are willing to let the bank set managerial compensation when the bank remains a debtholder.*

Proof:

In a firm with debt, equityholders always have an incentive to induce the manager to undertake the long-run project by setting compensation at α_H^D . If the manager undertakes the long-run project, the equityholders receive a strictly positive expected payoff because profits may be higher than the face value of the debt (by (A13)); if he does not invest in the long-run project, they receive a payoff of zero for sure (by A13)). But choosing all the equity and offering $\alpha = 0$ is more profitable for the bank than choosing debt in a firm in which the manager's strategy is to undertake the long-run project because of (A13). If the bank takes all the equity, then old equity receives a payoff of zero for sure. The old equityholders are not worse off if they grant the bank the right to set managerial compensation if the bank remains a debtholder than if they do not grant the bank this right: in the latter case, the bank takes all the equity, and the old equityholders receive nothing. ■

7.3. Figures and Tables

Figure 1: Time Line

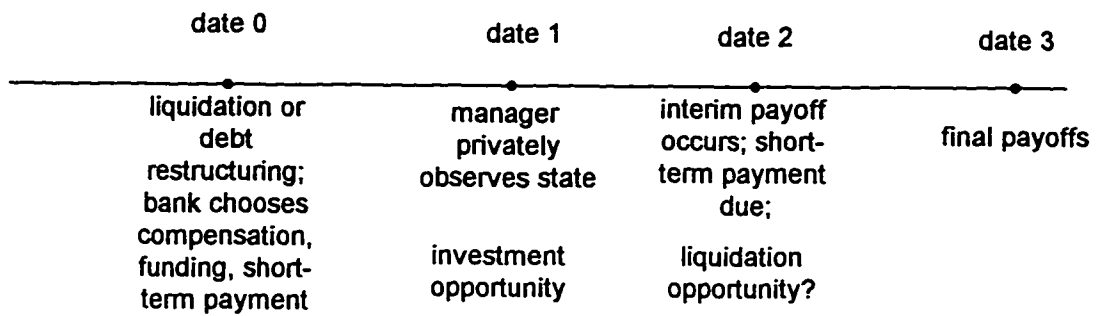


Table 1: Decisions

Date	Player	Decision	Information
0	Bank	Liquidation	prior belief about state
0	Bank	Funding	prior belief
0	Bank	Compensation	prior belief
0	Bank	Debt or Equity	prior belief
0	Bank	SR payment	prior belief
1	Manager	Project Choice	knows state
2	Bank	Liquidation	sees payment, but not state and pro- ject choice

Figure 2a: Payoff Structure Without Investment

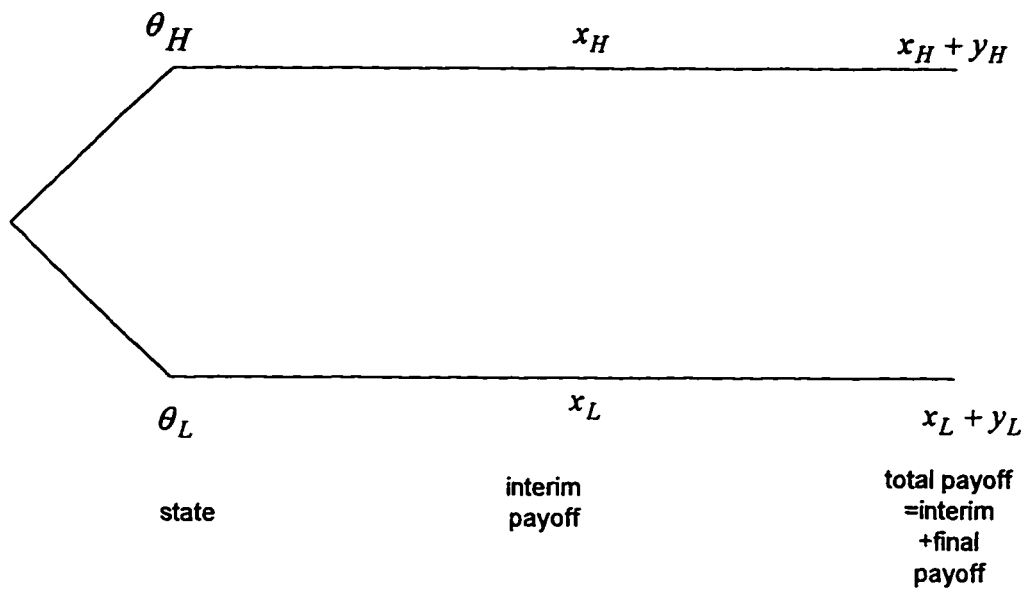


Figure 2b: Payoff Structure With Investment Projects

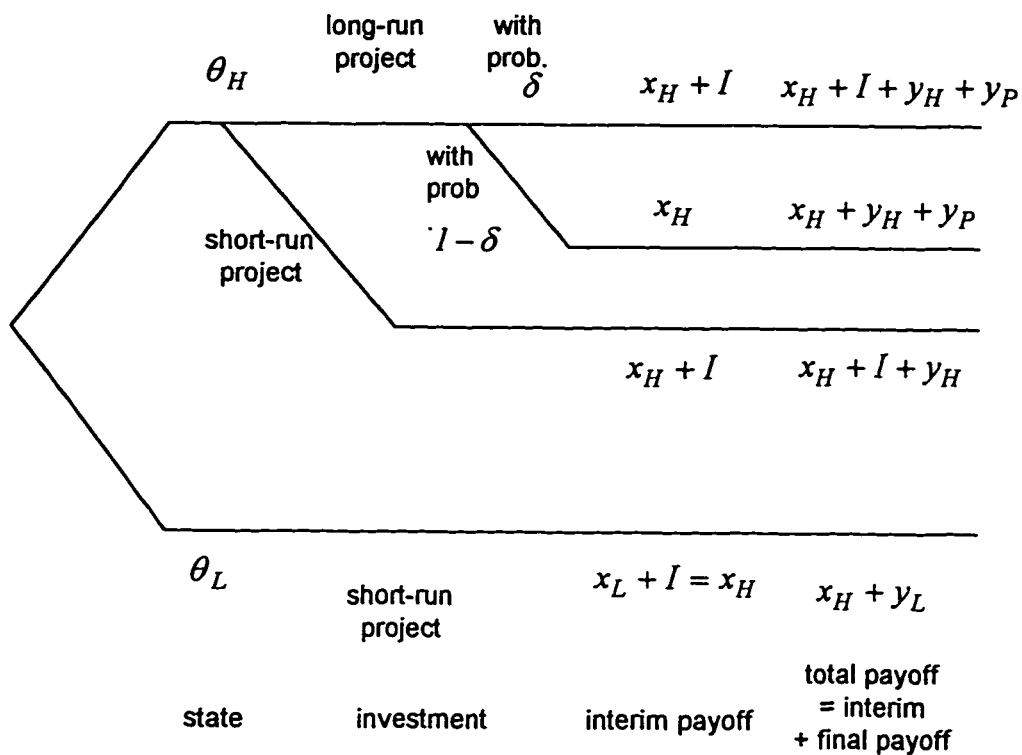


Table 2: Notation

L_0 : liquidation value at date 0
 L_I : liquidation value at date 2 (in addition to interim payoff)
 D_I : debt or dividend due at date 2
 D_F : debt due at date 3
 $D = D_I + D_F$: total face value of debt
 x_L : low interim payoff
 x_H : high interim payoff
 y_L : low final payoff
 y_H : high final payoff
 y_P : final payoff of the investment project
 $I = x_H - x_L$: cost of investment project
 y^T : total payoff to equity
 θ_H : high state
 θ_L : low state
 π : prior probability of high state
 δ : probability that high interim payoff occurs in high state if project was undertaken
 α : fraction of the payoff to equity that the manager receives
 α_H : fraction of the payoff to equity in an all-equity firm that induces the manager to invest even if there is liquidation after a dividend omission
 α_H^D : fraction of the payoff to equity in a firm with debt that induces the manager to invest even if there is liquidation after a default
 μ : probability of high state given that the informative interim payment is not made and the manager's equilibrium strategy is to invest in the long-run project
 B : the manager's private benefit if firm not liquidated

CHAPTER 2:

**RICH INVESTORS, INSTITUTIONAL INVESTORS, AND
CORPORATE CONTROL**

(Joint with Gary Gorton)

I. Introduction

Berle and Means (1932) argued that corporate finance largely concerns a fundamental conflict between the scale of modern technology and concentrations of wealth in the investor population. The scale of modern technology makes corporations so large that they cannot all be owned, and hence controlled, by single families or rich individuals. In other words, the ownership of corporate assets is dispersed because the wealth of rich individuals or wealthy families is scarce. The insight of Berle and Means has been formalized in the theoretical paradigm of the principal-agent problem in which the “principal” is the outside owner and the agent is the firm’s manager. Realistically, however, the identity of the principal in this model is somewhat problematical. Does it correspond to the board of directors? To a large blockholder who represents a number of small investors? If a rich person owned the firm, but did not operate the firm, is that person a “principal”? In this paper we explore the question of the identity of the principal in publicly-owned corporations. We examine the equilibrium in the capital market and show how identical firms can have different types of principals initially. The identity of the principal can subsequently change in different states of the world. Agency problems emanating from the separation of ownership and control can be mitigated by the state-contingent allocation of rich people’s wealth.

It has been recognized that large block shareholders may alleviate the agency problems caused by the separation of ownership and control. Large shareholders have an incentive and the ability to monitor managers (see Shleifer and Vishny (1986)). While the literature does typically not distinguish between different types of large shareholders, we argue that the *identity* of large shareholders is important for understanding their role in corporate governance. In

particular, we contrast the corporate governance roles of rich investors (wealthy individuals or small groups of wealthy individuals) and of intermediaries that pool the resources of many small investors and are run by professional managers themselves. We argue that such intermediaries, which we call “institutional investors,” face their own agency problems. As a result, rich investors are better at producing information about the optimal restructuring policies because they provide *agency-cost free capital* (i.e., they do not suffer from agency problems). The scarcity of this agency-cost free capital is a crucial factor in determining the corporate governance role of rich investors and institutional investors. It also explains the coexistence of firms with and without rich shareholders. Put more theoretically, we argue that the number and identity of the principals is crucial in determining the extent to which the inefficiencies stemming from the principal-agent conflict can be alleviated.

Institutional investors have come to dominate the shareholdings of US firms. Institutional investors (including public pension funds such as Calpers, corporate pension funds, mutual funds, insurance companies, and bank trusts) held in mid-1995 \$10.2 trillion in assets and ca. 50% of US equity securities and over 57% of the shares of the largest 1000 US corporations (see Brancato (1997)). In many firms, individual institutional investors hold substantial positions. Still, rich individuals play an important role in corporate control, too. Investors such as Leon Black, Charles Bluhdorn, Carl Icahn, Irwin L. Jacobs, Carl Lindner, David Murdock, and Victor Posner dominated the hostile takeover market of the 1980s. More recently, some of these individuals and other rich investors have been active in the market for distressed securities (see Hotchkiss and Mooradian (1997)), sometimes forming hedge funds with a small number of rich investors such as Leon Black’s Apollo fund.

Anecdotal evidence suggests that in contrast to institutional investors rich investors are particularly active in the market for corporate control: they acquire blocks in firms mainly in certain states of the world in which agency conflicts in a firm are likely to be of particular importance. Two of these special situations are the conflicts associated with the existence of free cash flow with managers unwilling to pay out excess cash in mature industries (Jensen (1986)) and financial distress during which managers are likely to resist major asset sales or liquidation. There is some evidence that at least some of these individual investors play a special role in corporate control changes. Holderness and Sheehan (1985) find that the abnormal returns associated with the acquisition of a stake of a company's stock by six of the most well-known and active "raiders" (Charles Bluhdorn, Carl Icahn, Irwin L. Jacobs, Carl Lindner, David Murdock, Victor Posner) are significantly higher than those associated with the acquisition of stakes by other investors.

We analyze the following situation: Firms are run by self-interested managers. Some firms receive bad news about their profitability in the absence of a restructuring. Restructuring refers to any change in managerial strategy including asset sales, divestitures, change of business lines, etc. Although restructuring is value-maximizing for some of these firms, incumbent management never voluntarily implements a restructuring, perhaps to preserve pet projects or due to concerns about its reputation in the labor market. Only a blockholder can force a restructuring. There are two types of potential blockholders: a rich investor and institutional investors. Both have an incentive to investigate which firms would improve their performance if they were restructured. We assume that the rich investor is more effective at producing this information than the manager of the institutional investor who manages other people's money. Importantly, the rich investor's wealth is insufficient to investigate and acquire

blocks in all firms that receive bad news. There are two ways the wealth of the rich investor can be allocated. He could randomly buy blocks of the stock in firms *before* news about their profitability arrives. In this case, the rich investors acquires a block before the realization of the state and hence holds a block in all states, even in those in which agency conflicts may not be important. This strategy means that agency-cost free capital is not allocated to the firms with the greatest need of being investigated and potentially restructured; it might be more efficient to acquire blocks only in states of the world in which agency conflicts are of particular importance. Such a state-contingent allocation of his wealth would allow the rich investor to deploy his agency-cost free capital where it is most productive, and hence earn a higher rate of return.

There are, however, costs to acquiring a large position in a firm in only certain states of the world, i.e. *after* there is a strong indication that agency problems are severe. In particular, the price at which such a position can be acquired may reflect to some extent the expectation that an investigation and potentially a restructuring by a blockholder will occur and hence firm value will rise. This will reduce the rich investor's incentives to investigate the firm and implement efficient restructuring policies and make it less attractive for him to contingently deploy his wealth. In the extreme case, the Grossman-Hart (1980) paradox arises and *all* the expected surplus from the monitoring activity is appropriated by existing investors, and hence nobody has an incentive to acquire a stake and monitor management. Moreover, the rich investor may be able only to buy a block of limited size which reduces his effectiveness in implementing a restructuring and increasing firm value.

We show that the rich investor will invest his wealth in a state-contingent manner, exclusively acquiring blocks in firms that received bad news, if the probability of receiving such

bad news is sufficiently low for a typical firm. Hence, under these circumstances, the rich investor will specialize in acquiring a controlling block in certain states of the world only. This result can explain the positive correlation of restructuring activity with preceding corporate control changes, including the prominent role played by rich investors in the hostile takeover market or the corporate control market for financially distressed firms (in which they often take debt stakes anticipating a later conversion of the debt into equity in a reorganization). This correlation would be puzzling if institutional investors would be as effective at monitoring or information production as rich investors. Then, institutional investors as blockholders in all states of the world should be able to provide a monitoring of management that cannot be improved upon, and there would be no role for state-contingent corporate control changes.

However, while rich investors are most effective at producing information about the optimal restructuring policies, our model provides a role for institutional investors, too. Because the agency-cost free wealth of rich investors is scarce, not all firms can be monitored by them in all states of the world, and not even in those states where restructuring is potentially attractive. As a consequence, for some firms improved restructuring decisions are instead implemented by the blockholdings of institutional investors. Because their wealth is not a scarce resource, there is no need for them to acquire positions only in certain states of the world. Instead, they serve as permanent blockholders and implement a restructuring if the firm receives bad news and they learn from their investigation that a restructuring would increase firm value.

We also provide a rationale for the coexistence of identical firms with different types of ownership structures or principals. Initially, some firms can have their equity held directly by dispersed small investors while other firms have their equity held by an institutional investor.

Having an institutional blockholder improves the restructuring policies of firms. With liquid security markets, the firms initially held by dispersed small investors may be sold to the rich investor if they receive bad news. The rich investor can investigate widely-held firms that receive bad news and become a blockholder in those firms that look promising for a restructuring. Hence, firms with widely dispersed ownership in most states of the world may benefit from a particularly effective restructuring policy because it is the rich investor rather than institutional investors that decide on a restructuring in the states in which a restructuring is potentially value increasing. On the other hand, these firms may suffer from a particularly inefficient restructuring policy, leaving incumbent management to decide on a restructuring. This will be the case if the rich investor spends his limited wealth on investigating and acquiring blocks in other firms. We predict an increase in ownership concentration of widely dispersed firms if news indicates that agency conflicts are severe. The blockholders in this case are likely to be rich individuals or their hedge funds rather than institutional investors with widely dispersed ownership. This seems to be consistent with the activity of rich investors in the takeover market and the market for distressed securities as described above.

Besides the references mentioned above, our paper is related to a number of other papers. Aghion and Bolton (1992) provide a model of state-contingent corporate control. However, in their model, poor performance leads to control by debtholders while good performance leaves control in the hand of inside equity holders (see also Dewatripont and Tirole (1994)). Aghion and Bolton's model is one of a closely held firm, and debt holders are assumed to face no agency conflicts themselves. Moreover, a crucial feature of our model is the ability of the rich investor to assemble the block by buying shares in the market.

Diamond (1984) shows that a large investor can be synthetically created by many small investors who can form a coalition (a financial intermediary). In his setting, however, diversification of the intermediary's portfolio combined with a debt contract held by the small investors allows perfect monitoring of the intermediary by its depositors. In contrast, we assume that such synthetic large investors cannot perfectly replicate a single rich individual.

Kahn and Winton (1996) also analyze the role of blockholders in monitoring. They are analyzing the potential conflict between gathering information for two purposes: to trade on this information or to implement a restructuring. Maug (1995) focuses on the effects of insider trading regulation on the incentives to monitor. Finally, Admati, Pfleiderer, and Zechner (1994) analyze the trade-off between risk-sharing and optimal monitoring and the resulting asset allocation of a rich investor and many small investors. None of these papers distinguishes between institutional investors and rich individuals.

Sometimes it is argued that liquid markets - while they allow efficient risk-sharing - are detrimental for monitoring management because widely dispersed ownership structures give nobody an incentive to monitor management (see Bhidé (1993)). In contrast to this view, our paper suggests that liquid markets may be helpful in monitoring management because they allow scarce monitoring resources (in our case, agency-cost free capital) to be deployed where they are needed most.¹

The remainder of the paper is structured as follows: In section II, we present the model. Section III analyzes the model by backwards induction. Section IV provides an example of a

¹ Holmstrom and Tirole (1993) also suggest that liquid markets can improve monitoring of managers. However, in their paper, liquid markets allow more informative incentive contracts for management.

particular price formation mechanism for shares traded in the interim period. Section V concludes.

II. The Model

We begin with an overview of the model and then provide the details of the model. Finally, this section provides a discussion of the important assumptions of the model.

A. Overview

There are three dates in the model economy: 0, 1, and 2. All agents are risk neutral and utility of consumption is defined over date 2 payoffs.

At the beginning of the model, a continuum of identical entrepreneurs with total measure 1 seek to finance their projects. The representative firm is run by a manager and finances its project exclusively with equity. There are two types of potential investors. There is a continuum of small investors and there is a single rich investor (that is, an investor with measurable wealth). It takes many small investors to finance the project of any one firm, but the rich investor has enough wealth to finance a strictly positive measure of firms.² Small investors can invest as individuals or they can pool their wealth into funds, which we shall call *institutional investors*.³ An institutional investor is an intermediary which is overseen by a manager. Investors need not invest at date 0; they can wait until date 1 and purchase shares in the secondary market (though in equilibrium firms will be financed at date 0).

² By “rich” investor we mean to include hedge funds. Hedge funds are funds with no more than 100, typically very rich investors. An example is Leon Black’s Apollo fund that was mentioned in the Introduction.

³ Alternatively, such a fund could be called a financial intermediary.

At date 0, the rich investor first decides whether to acquire any shares (or wait until date 1). This decision is publicly observable. Next, the entrepreneur of each firm chooses a funding source: he auctions off his firm's shares to individual small investors, institutional investors or the rich investor. After obtaining funds, the entrepreneur hires a manager who invests in the project.

At date 1 a public signal arrives concerning each firm: there is either good news or bad news about the firm's final date 2 payoff. Bad news means that the date 2 payoff will be low unless the firm is restructured. "Restructuring" means taking actions that might improve the firm's date 2 payoff. It may or may not be optimal to restructure the operations of a firm that has received bad news. This depends on the likelihood that the restructuring will be successful. There are two problems in restructuring. First, managers never voluntarily restructure their firms. Only blockholders can force a restructuring. Second, assessing the desirability of restructuring requires expending resources to produce information about the likelihood of the success of a restructuring. Institutional investors or the rich investor may find it profitable to produce information about the future prospects of the firm if it is restructured.

In producing information about the likelihood of restructuring success of firms that have received bad news, there is an important difference between an institutional investor and the rich investor. There is an agency problem with the institutional investor since it is run by a manager. This is taken to mean that the chance of learning the restructuring success likelihood is lower for the institutional investor than for the rich investor (since the rich investor, by definition, faces no agency problem). Following any information production about restructuring success, trading in shares occurs. In the stock market institutional investors and the rich

investor may acquire a block of a firm's shares in order to implement a restructuring. Restructuring outcomes are affected by the degree to which the firm's ownership is concentrated.

At date 2 firms with blockholders desiring to restructure are restructured followed by the realization of final payoffs. Figure 1 provides the sequence of events.

[insert Figure 3]⁴

B. Detailed Assumptions

Entrepreneurs each have a business idea but need to obtain financing (in the amount I). Moreover, they each need a professional manager to run the firm (though this is not explicitly modeled). While managers run the firm after date 0, entrepreneurs make the initial decision about the source of financing. That is, while firms are financed exclusively with equity, the equity can be issued directly to small individual investors or placed as blocks with institutional investors or a rich investor. All firms are identical *ex ante*. For the economy as a whole, we assume that the amount of available resources for investment from the small investors exceeds the funding requirements of the firms.

Payoffs on the project occur at date 2. Payoffs depend on whether the firm receives good news or bad news at date 1 and on whether the firm is restructured (if it received bad news). The news is publicly observable. The probability of receiving bad news at date 1 is δ (with

⁴ All figures and tables can be found in the appendix.

probability $1 - \delta$ good news is received).⁵ A firm which receives bad news will be called “distressed.” Date 2 payoffs are as follows:

(A1) Project Payoffs. Firms that received good news at date 1 receive R at date 2 for sure. It is never optimal to restructure these good firms. Distressed firms will have a date 2 payoff of L_2 if they are not restructured. If a distressed firm is restructured, its date 2 payoff is $H(\beta) > 0$ with probability p and zero with probability $1 - p$, where β is the fraction of the firm’s equity owned by the blockholder.

To simplify the analysis, we assume that a firm has at most one blockholder.⁶ A blockholder is necessary to implement restructuring because of:

(A2) Entrenched Management. Managers never voluntarily restructure their firms.

We assume that a firm can only be restructured if a single investor owns at least a fraction γ of the firm.

The prospects of a distressed firm when it is restructured are captured by the parameter p . This probability is not known by any agent at date 0. We assume:

⁵ In the following, probabilities such as δ are treated both as a probability for an event to happen to an individual firm and the fraction of firms at date 1 that actually experience this event. Of course, with a continuum of firms, there are technical problems with an appeal to a law of large numbers. For a discussion of these problems and solutions to them, see Judd (1985) and Feldman and Gilles (1985).

⁶ For a very interesting analysis of the benefits of partial blockholding and coalitions among several blockholders, see Zwiebel (1995).

(A3) Restructuring Success Likelihood. It is common knowledge that p is uniformly distributed on $[0, 1]$.

Note that restructuring may increase the expected firm value, but it may also lower it below what the current managerial strategy can achieve. Thus not all firms that receive bad news will do poorly under the strategy of incumbent management. A new controlling blockholder may implement a strategy that turns out not to be as profitable as the current managerial strategy. Hence, restructuring increases value for some distressed firms but not for all distressed firms.

As will be discussed below, institutional investors and the rich investor may attempt to learn p and hence the desirability of a restructuring. If they do not generate new information about the firm's prospects, they will not restructure the firm:

(A4) Value of Information Production. Given the prior belief about p , no restructuring is the best response: $0.5H(1) < L_2$.

At date 1 shares of all firms may be traded. We assume that the disadvantage of issuing shares only to small investors directly (i.e., obtaining *nonintermediated finance*) is that the small investors cannot coordinate (due to free-rider problems) to implement a restructuring. Small investors, however, can pool their funds, to create an *institutional investor*.

At date 0 the rich investor or an institutional investor can acquire a block of a firm's equity (i.e., fraction of the outstanding equity), but for simplicity we do not endogenize the

size of the block an investor can acquire at date 1; instead we assume that either a fraction λ can be purchased or no block at all. Attempting to buy more than fraction λ of the firm's shares is assumed to be suboptimal since this would reveal the rich investor's private information concerning the restructuring success likelihood. We also assume that $1 > \lambda > \gamma$. Blocks of stock are important because restructuring outcomes are affected by the concentration of ownership at date 2; outcomes are increasing in the blockholder's ownership fraction. In particular, a larger block gives the investor more incentives and more power to force the firm to make more efficient decisions.

(A5) Effects of Block Size. $\partial H / \partial \beta > 0$ and $L_2 < H(\lambda) < H(1) \equiv H < R$.

The rich investor has sufficient resources to purchase blocks of stock, but small investors individually cannot buy blocks. Small investors, however, can attempt to synthetically create a rich investor by forming a fund or institutional investor. Each institutional investor is run by a manager (who is not explicitly modeled). This leads to an agency conflict within the institutional investor. For simplicity we do not model the manager's effort choice, i.e., the standard principal-agent conflict, explicitly. Instead, we assume that as a result of the principal-agent conflict, the manager is worse at producing information about a firm's prospects than the rich investor:

(A6) Agency Costs in Institutional Investors. If the manager of an institutional investor investigates a distressed firm's prospects, he learns p with probability π_L . If the rich investor investigates the prospects of a firm, he learns p with probability $\pi > \pi_L$.

Investigation of distressed firms is costly. It costs c to investigate measure 1 of firms.

The fraction of all firms that the rich investor can investigate is limited by his wealth. In particular, the rich investor has to spend c per measure 1 of firms he investigates. We assume

(A7) Agency-Cost Free Capital is Scarce. $W < \delta c$.

(A7) says that the rich investor's wealth is insufficient to allow the investigation of all distressed firms. Since the rich investor will not be able to investigate all the distressed firms, he will not be able to buy blocks in all of them at date 1 should it turn out that none of the firms had institutional blockholders at date 0. In equilibrium the number of firms without institutional blockholders at date 0 is endogenous and we ask whether all of the rich investor's wealth is spent on buying date 1 blocks. (A7) is stronger than we need. In Proposition 3, we give a weaker condition.

We assume that small investors are competitive whether they act as individuals or form funds (institutional investors).⁷ Hence, at date 0 shares are priced such that individual small investors and institutional investors make zero profits. However, if the rich investor supplies

funds by himself, he can extract the difference between the equity value of the firm that obtains funds from him and the equity value of a firm that obtains funds from an institutional investor.

We assume that there is only one round of trading at date 1. It is impossible to sell some shares and then acquire other shares at date 1. This assumption makes the distinction between taking a position at date 0 and taking a position at date 1 meaningful. It ensures that buying shares at date 0 and then selling shares of firms receiving good news in order to acquire shares of firms receiving bad news is not a dominant strategy for the rich investor. Hence, there is a cost to taking a position at date 0.

Table 1 summarizes the notation.

[insert Table 1]⁸

C. Discussion of Assumptions

The model focuses on two important differences between the rich investor and the synthetic rich investors created by the small investors, which we have called “institutional investors.” First, because of the scarcity of rich people, the rich investor can act as a monopolist. If the rich investor buys blocks of shares at date 0, he can extract surplus for his potential future restructuring services. If he buys a block at date 1, he may be able to extract surplus at that date as well. In contrast, small investors and their institutional investors are competitive. The

⁷ The model does not determine the size of the institutional investors. However, we assume that if small investors form funds, then there are many such institutional investors that are competing with each other.

⁸ All tables and figures can be found in the Appendix.

second difference concerns the agency problem assumed to plague the synthetic rich investor, but not the rich investor. This makes the institutional investor less effective in restructuring.

The model assumes that agency problems in firms, problems which can be potentially alleviated by restructuring, are not always present to the same degree. Rather, there are certain states of the world where these problems are more severe. In the model these states of the world correspond to states in which bad news arrives, states which we have called “distress.” Clearly, if the costs of agency problems in firms were constant across all states of the world, then there would be no issue of state contingent allocation of the rich investors “agency cost free capital.”

At date 2, the firm may be restructured. Restructuring may come in form of asset sales, a divestiture of a business line, a change in business strategy, etc. We assume that incumbent managers are averse to restructuring. One rationale for this is that these managers want to preserve projects that provide private benefits to them (“pet projects”) which may also help to entrench themselves (see Shleifer and Vishny (1989)). Alternatively, managers may be concerned about the inferences that the labor market draws from the restructuring decisions: because firms in a truly bad shape are more likely to need a restructuring, implementing a restructuring may convey negative news about the current situation of the firm. Incumbent management can be held responsible for the troubled situation of the firm by the outside labor market (for a career concern model formalizing this idea in the context of an aversion to divest see Boot (1992)). Indeed, Weisbach (1994) finds that while incumbent managers are averse to divestitures, new management often implements such divestitures. Clearly we have to assume that contracts cannot fully alleviate managerial restructuring aversion.

III. Analysis

The rich investor can acquire block positions in firms at date 0 or date 1. Small investors cannot acquire blocks individually, but may choose to form institutional investors which can acquire blocks. Either directly or via their funds small investors must also choose when to acquire positions in firm shares. Small investors and the rich investor choose their strategies to maximize their respective utilities, taking the strategy of the other as given and taking the price of distressed firms' stock at date 1 as given. The equilibrium strategies of the small and the rich investor will depend on the price formation mechanism for the date 1 stock price, a subject we have not mentioned until now. The reason for this omission is that in this section, we analyze the equilibrium strategies of the rich investor and the small investors while not restricting ourselves to a particular price formation mechanism for shares traded at date 1. In Section IV we complete the determination of the equilibrium by specifying the details of a price formation mechanism.

There are two reasons for delaying the specification of a particular price formation mechanism. First, most of our results do not depend on a particular price formation mechanism. While the one institutional setting for price formation that we study in Section IV (liquidity trading) is perhaps the leading example of price formation in the literature, there are other ways to model price formation, for instance in a bargaining process. In general, our results do not depend on the specifics of the price formation mechanism. Second, the model becomes much more complicated and notationally burdensome when we introduce the details of a specific price formation mechanism, and we do not want to cloud our basic points by this.

Until Section IV we make one assumption on the price of date 1 shares of distressed firms, p_B . We assume that $p_B \geq L_2$.

This assumption seems natural and should be the result of any reasonable price formation mechanism. A blockholder will buy shares at date 1 to implement a restructuring of the firm only if the expected value of the firm under a restructuring is no less than the value of the firm under the current managerial strategy, L_2 . Hence, the value of the firm is at least L_2 , and nobody would sell shares at a price below L_2 . We will see that the assumption holds in the equilibrium in our price formation mechanism presented in Section IV.

We solve the model by backwards induction. First, we analyze the restructuring policies of date 0 blockholders, then the restructuring policies of the rich investor if he buys blocks in the date 1 stock market. Next we characterize the conditions under which the rich investor will invest his wealth at date 1 and the conditions under which he invests it at date 0. Finally, we will analyze the whole game, incorporating the firms' choices of financing source.

A. Restructuring by Date 0 Blockholders

First, we analyze the conditions under which the firm will be restructured if a blockholder has become informed about the distressed firm's prospects. We begin with the restructuring decision of blockholders that acquired a block at date 0. This can either be the rich investor or an institutional investor. We will assume for now that date 0 blockholders acquire 100% stakes in firms. This will be verified below.

By (A4), any blockholder who does not become informed about the firm's prospects chooses not to restructure the firm.

Lemma 1: If a date 0 blockholder learns p , he restructures if and only if $pH(l) \equiv pH \geq L_2$ or,

$$\text{equivalently, } p \geq \frac{L_2}{H} \equiv p^+.$$

Note that this is the socially optimal restructuring decision because the date 0 blockholder becomes the firm's residual claimant in the restructuring (actually, he becomes its sole owner).

Now we verify that date 0 blockholders acquire 100% stakes:

Lemma 2: A date 0 blockholder will acquire 100% blocks.

Proof: Because small investors and their funds are competitive date 0 blocks will be acquired by them at a price that corresponds to the value of the firm that has an institutional investor as a date 0 blockholder. Hence, the entrepreneur receives all the surplus generated by an improved restructuring policy. Thus, he chooses the size of the block that a blockholder acquires at date 0 such that the restructuring policy is implemented that maximizes firm value. By (A5), this is the case if the blockholder holds 100% of the firm. Alternatively, suppose that the rich investor decides to acquire a block at date 0. Since the rich investor receives all the surplus generated by an improved restructuring policy, he decides to hold a 100% block. QED

The institutional investor's restructuring decisions are not in general first-best because he may not learn p . In addition, the institutional investor is not as efficient as the rich investor in

learning p because of the agency problem. The rich investor learns p with probability π while the institutional investor learns p with probability π_L ($\pi > \pi_L$). Because small investors are competitive, the rich investor is able to appropriate all the surplus generated by the improvement in restructuring decisions brought about by his lack of agency problems.

Lemma 3: The rich investor's profit from investing all his wealth at date 0 is

$$\frac{W}{(1-\delta)R + \delta[(1-\pi_L)L_2 + \pi_L \int_0^{p^*} L_2 dp + \pi_L \int_{p^*}^1 pH(1) dp - c]} \delta(\pi - \pi_L) \int_{p^*}^1 (pH - L_2) dp.$$

Proof: Because small investors are competitive, to calculate the rich investor's profits per firm he acquires at date 0, we only need to calculate the difference between the value of the firm with the rich investor as date 0 blockholder and the value of the firm with an institutional

investor as date 0 blockholder. This difference in firm value is $(\pi - \pi_L) \delta \int_{p^*}^1 (pH(1) - L_2) dp$.

This is the amount the rich investor earns per firm he acquires at date 0. Given his wealth, he

can acquire a measure of $\frac{W}{(1-\delta)R + \delta[(1-\pi_L)L_2 + \pi_L \int_0^{p^*} L_2 dp + \pi_L \int_{p^*}^1 pH(1) dp - c]}$

firms. QED

B. The Rich Investor's Behavior at Date 1 If He Does Not Become A Date 0 Blockholder

Above, the rich investor did not invest at date 1, but instead spent all his money on date 0 blocks of stock. In that case, firms that obtain funds from many small investors at date 0 are never restructured, regardless of p . The reason is simple: the rich investor will never buy a block of a distressed firm at date 1. Lemma 4 below shows that institutional investors never acquire blocks at date 1. The resulting noncontingent restructuring policy is clearly a less efficient outcome than the restructuring policy that would be implemented with a date 0 blockholder. Now we consider the case where the rich investor only buys blocks of shares of distressed firms at date 1. If the rich investor acquires a block of shares of a distressed firm, this firm can be restructured. If the rich investor does not know p , he anticipates that he will not restructure, by (A4), and hence he does not acquire a block in this firm. If he expends resources to learn p , he may acquire a block of shares in a distressed firm if he learns p .

The following two Lemmas simplify the analysis:

Lemma 4: Institutional investors do not acquire blocks at date 1.

Proof: As seen above, blocks are acquired at date 1 only if p is learned. Since institutional investors are competitive, they can acquire blocks at date 1 only at a price that generates zero expected profits for them. This means that they cannot recoup their investigation costs if they decide to investigate a firm's prospects. Hence, no institutional investor investigates firms at date 1, and hence no blocks are acquired at date 1 by institutional investors. QED

Lemma 5: No date 0 blockholder sells shares of a firm that he investigates at date 1.

Proof: Selling shares of a distressed firm at date 1 could only be profitable if there was private information on the side of the seller, i.e., the seller learned that p was low and then sold the shares to an investor who did not have this information. However, a firm that is sold at date 1 by a date 0 blockholder will be known to be worth L_2 unless somebody acquires a block in it at date 1. By the previous lemma, institutional investors do not acquire blocks at date 1. Moreover, the rich investor will not acquire a block at date 1 without learning p . Hence, nobody acquires a block at date 1 without learning p and thus a distressed firm sold at date 1 is known to be worth L_2 . As a consequence, it will be acquired at a price of L_2 . Thus, selling distressed shares at date 1 is not profitable. QED

Assuming the rich investor learns p , when will he choose to enter the date 1 stock market and buy a block of size λ ? The rich investor must choose a measure of distressed firms to investigate, μ , and among those firms for which the rich investor learns p , he must decide which firms to buy a block of size λ . That is, knowing p , the rich investor must choose a cut-off value for p , say \bar{p} such that he buys a block if $p \geq \bar{p}$. The rich investor's problem is to choose μ and \bar{p} to maximize:

$$\mu \left(\pi \int_{\bar{p}}^1 (pH(\lambda) - p_B) \lambda dp - c \right) \text{ subject to: } W = \mu c + p_B \lambda \mu \pi (1 - \bar{p}).$$

The budget constraint says that the rich investor's wealth is exhausted by investigation costs and the costs of buying blocks of stock. If the rich investor investigates measure μ of the distressed firms, the cost is μc . Of this measure, he learns the quality for only a subset, measure π of those investigated. Of these he only purchases blocks of those with $p \geq \bar{p}$, i.e., measure $1 - \bar{p}$. He pays $p_B \lambda$ since he buys a fraction λ and the entire equity value is p_B . Eliminating μ using the budget constraint, the rich investor's problem is to choose \bar{p} to maximize:

$$\left(\frac{W}{\pi(1-\bar{p})p_B\lambda + c} \right) \left(\pi \int_{\bar{p}}^1 (pH(\lambda) - p_B) dp - c \right).$$

The first term in brackets is the measure of distressed firms that the rich investor (with wealth W) can investigate if his policy is to buy a block of size λ if and only if $p \geq \bar{p}$. Obviously, this is increasing if he buys a smaller set of firms, i.e., \bar{p} is higher. Within the sample of firms receiving bad news that the rich investor investigates, he does not learn the realization of p with probability $1 - \pi$ (i.e., for this fraction of the distressed firms he learns nothing). Then he does not buy blocks in these firms because he would not restructure them (by (A4)) and because, by assumption, $p_B \geq L_2$. The second term in brackets describes the payoff when the rich investor learns the realization of p (this occurs with probability π) and then pays p_B to buy blocks of size λ if $p \geq \bar{p}$. The cut-off \bar{p} determines the quality of the distressed firms that the rich investor will buy.

Note that the rich investor's objective function depends on p_B which, in turn, depends on \bar{p} . The reason is that any reasonable price formation mechanism will take account of the quality of the distressed firms that the rich investor is buying and this, in turn, will affect the rich investor's choice of \bar{p} . This interaction is deferred until Section IV. Let \tilde{p} be the optimal choice of \bar{p} .⁹ The cut-off firm quality \tilde{p} depends on c , π , $H(\lambda)$, and λ . Note that it does not depend on δ or π_L since these do not appear in the objective function (and would not affect the price). Proposition 1 characterizes the rich investor's trading and restructuring policy, \tilde{p} , at date 1 if the measure of firms obtaining nonintermediated finance (without a date 0 blockholder) is large enough to ensure that the rich investor cannot investigate and potentially acquire all firms with a low interim payoff.¹⁰

Proposition 1: The rich investor buys a fraction λ of a distressed firm and restructures the firm if and only if he learns that $p \geq \tilde{p}(c, \pi, H(\lambda), \lambda)$ where:

$$\tilde{p} \geq \frac{p_B(c, \pi, H(\lambda), \lambda)}{H(\lambda)} \text{ and } \tilde{p} > p^+ \text{ if } \lambda < 1 \text{ or } p_B > L_2.$$

The rich investor investigates the fraction $\frac{1}{\delta} \left(\frac{W}{\pi(1-\tilde{p})p_B\lambda + c} \right)$ of all distressed firms.

Proof: Without specifying a particular price formation mechanism, we cannot give an explicit

solution for \tilde{p} . However, a necessary condition for the optimal solution is that $\tilde{p} \geq \frac{p_B}{H(\lambda)}$: if

⁹ We assume that \tilde{p} is unique.

¹⁰ The measure of firms without a date 0 blockholder is endogenous and will be determined below in subsection D.

this was not the case, the rich investor could increase his profits by not buying the firms with $\tilde{p} < \frac{p_B}{H(\lambda)}$ on which he loses money. By assumption, $p_B \geq L_2$ and by (A5), $H(\lambda) < H$ if $\lambda < 1$. Hence, $\tilde{p} > p^+$ if $\lambda < 1$ or $p_B > L_2$. Given that the rich investor buys if and only if he learns that $p \geq \tilde{p}$, he can investigate a measure $\frac{W}{\pi(1-\tilde{p})p_B\lambda+c} \equiv \tilde{\mu}$ of all distressed firms. QED

The rich investor's activity at date 1 improves the efficiency of the restructuring decisions. In the absence of the rich investor no firm that obtained nonintermediated finance at date 0 would be restructured. The rich investor's activity in the date 1 stock market means that some of these firms that should be restructured (from the social planner's perspective) are indeed restructured, alleviating the problem of insufficient restructuring. However, Proposition 1 also shows an inefficiency in the restructuring policies of firms that obtain nonintermediated finance.

Recall that the socially optimal restructuring policy is to restructure firms with quality $p \geq p^+$. But, according to the proposition, $\tilde{p} > p^+$ if $\lambda < 1$ or $p_B > L_2$, and hence the rich investor when becoming active at date 1, unlike a date 0 blockholder, may not restructure all firms that should be restructured from a social planner's perspective even if he knows the realization of p . This result is due to several inefficiencies in the restructuring policies of the rich investor at date 1. In order to separate them, suppose for a moment that the rich investor's wealth is not limited. The first inefficiency is that the rich investor may not have the ability to acquire all the stock of a distressed firm. He can only buy a fraction λ . To isolate

this inefficiency, assume $p_B = L_2$. Then the rich investor will buy distressed firms only if

$$pH(\lambda) \geq L_2, \text{ or equivalently, only if } p \geq \frac{L_2}{H(\lambda)}. \text{ Now, if } \lambda < 1, \frac{L_2}{H(\lambda)} > \frac{L_2}{H} \equiv p^+.$$

The second inefficiency is that the rich investor may have to buy shares at a price higher than their value in the absence of a restructuring, sharing the surplus from his restructuring activity with existing equityholders (i.e., $p_B > L_2$). This may be the case because sellers of shares and the rich investor split the surplus generated by the rich investor's restructuring activity in bargaining or because the price reflects the possibility that the rich investor will buy a block and restructure the firm. In Section IV, we formalize the latter idea. This second inefficiency can be seen best if one abstracts from the first inefficiency by assuming $\lambda = 1$ and hence $H(\lambda) = H(1) \equiv H$. Suppose $p_B > L_2$. Then, the rich investor will buy shares in a distressed firm only if $p \geq \frac{p_B}{H} > \frac{L_2}{H} \equiv p^+$. In the extreme, the rich investor cannot cover the investigation cost because he has to give up all the surplus generated by his restructuring activity. This is the Grossman and Hart (1980) free rider problem. Even without the extreme version of the problem, an inefficiency is induced by having to share the surplus.

The third inefficiency in the restructuring policies of firms obtaining nonintermediated finance stems directly from the rich investor's limited wealth. He cannot investigate all firms receiving bad news. This leads to a lack of restructuring of those firms which are not investigated by the rich investor, but which have $p \geq p^+$.¹¹ Despite these inefficiencies in the restructuring policies of firms that obtain nonintermediated finance, their restructuring policies

¹¹ If there are sufficiently few firms obtaining nonintermediated finance, this source of inefficiency is absent. The number of firms obtaining nonintermediated finance is endogenous and determined below in subsection D.

may be more efficient than the restructuring policies of firms that obtain intermediated finance if the rich investor is active in the date 1 stock market. But under which circumstances will the rich investor be active in the date 1 stock market? This question is addressed in the next subsection.

C. The Rich Investor's Choice: Blockholding at Date 0 or Date 1?

How will the rich investor allocate his wealth: acquiring blocks at date 0 or date 1?

Proposition 2 gives the answer to this question.

Proposition 2: Suppose a large enough measure of firms choose nonintermediated finance at date 0 so that the rich investor could feasibly invest all his wealth at date 1 in distressed firms that had obtained nonintermediated finance at date 0. Then the rich investor chooses to invest all his wealth at date 1 if and only if:

(*)

$$\left(\frac{W}{\pi(1-\tilde{p})p_B\lambda + c} \right) \left(\pi \int_{\tilde{p}}^1 (pH(\lambda) - p_B)\lambda dp - c \right) \geq \kappa(\pi - \pi_L)\delta \int_{\tilde{p}^*}^1 (pH(1) - L_2)dp,$$

$$\text{where } \kappa = \frac{W}{(1-\delta)R + \delta[(1-\pi_L)L_2 + \pi_L \int_0^{\tilde{p}^*} L_2 dp + \pi_L \int_{\tilde{p}^*}^1 pH(\lambda) dp - c]}.$$

If he cannot spend all his wealth at date 1, he invests as much of his wealth as possible at date 1 and the remainder in date 0 blocks iff (*) holds.

Proof: The rich investor's profits from investing all his wealth at date 0 are

$\kappa(\pi - \pi_L)\delta \int_{p^*}^1 (pH(1) - L_2)dp$, as was calculated in Lemma 3. Alternatively, the rich investor

can invest all his wealth to acquire blocks in distressed firms at date 1. Then, his profits

are $\left(\frac{W}{\pi(1 - \bar{p})p_B\lambda + c} \right) \left(\pi \int_{\bar{p}}^1 (pH(\lambda) - p_B)\lambda dp - c \right)$, with \bar{p} defined in Proposition 1.

Clearly, both the profits from investing at date 0 and from investing at date 1 are linear functions of the wealth invested in each alternative. Hence, the rich investor will invest as much as possible of his wealth in the date 1 stock market if and only if condition (*) holds (assuming that he breaks an indifference in favor of the date 1 stock market). Notice that if the rich investor invests all his wealth at date 0, no firm will choose nonintermediated finance and all firms will want to obtain funds from the rich investor rather than an institutional investor at date 0. Hence, if the rich investor wants to invest all his wealth at date 0, he is always able to do so. QED

While condition (*) is very simple, it formalizes several insights which are discussed in the form of Corollaries.

Corollary 1: The rich investor chooses to invest all his wealth in the date 1 stock market if and only if $\delta \leq \bar{\delta}$.

Proof: First, recall that $\frac{\partial \bar{p}}{\partial \delta} = \frac{\partial \bar{p}}{\partial \pi_L} = 0$ since δ and π_L do not appear in the rich investor's objective function. Since the cut-off firm quality \bar{p} does not depend on δ and it is public information which firms become distressed, $\frac{\partial p_B}{\partial \delta} = 0$. Hence, the left hand side of (*) does not depend on δ . The right hand side of (*) is a strictly increasing function of δ because

$$\frac{\partial \kappa}{\partial \delta} = \frac{\{R - [(1 - \pi_L)L_2 + \pi_L \int_0^{\bar{p}} L_2 dp + \pi_L \int_{\bar{p}}^1 p H dp]\} W}{\{(1 - \delta)R + \delta[(1 - \pi_L)L_2 + \pi_L \int_0^{\bar{p}} L_2 dp + \pi_L \int_{\bar{p}}^1 p H dp]\}^2} \quad \text{which is strictly positive}$$

because of $H < R$ in (A5). Hence, the difference between the right hand side and the left hand side is a strictly increasing function of δ . For $\delta = 0$, this difference is negative. Hence, by the Mean Value Theorem, there exists a critical value $\bar{\delta}$ where (*) holds with equality, and where for $\delta < \bar{\delta}$, (*) holds while for $\delta > \bar{\delta}$, it does not hold. Of course, if $\bar{\delta} > 1$, investing at date 0 is never optimal. QED

Corollary 1 formalizes a basic point. If the rich investor buys a position at date 0, he is wasting his agency-cost free capital because he is investing in circumstances where the agency conflict is not severe. An agency conflict arises only if bad news arrives at date 1 and hence there may be a need for restructuring (which the incumbent manager would like to avoid). Hence, if there is a sufficiently large chance that the firm will receive good news at date 1 and hence not need restructuring, the rich investor is better off deploying his wealth at date 1, contingent on news that the agency conflict matters: here, contingent on bad news arriving. Clearly, the scarcity of the rich investor's wealth is important for this result. Because the rich

investor cannot investigate all firms receiving bad news and then acquire blocks in all the attractive firms that he investigated, investing a marginal dollar at date 0 implies that he has to forgo the attractive return in the date 1 stock market. He can earn this return because in this economy the rich investor is able to improve efficiency of restructuring policies since only he can offer agency-cost free capital.

Alternatively, the rich investor can acquire equity blocks at date 0. If institutional investors (intermediated blockholders) suffer from very severe agency problems and the rich investor is sufficiently better at producing information (i.e., π_L is very low compared to π), then he may invest at date 0 because he does not have to share the surplus from his monitoring and restructuring activity with other investors and can acquire a larger block at date 0. Hence,

Corollary 2: The rich investor chooses to invest all his wealth at date 0 if and only if:

$$\pi_L < \pi - \frac{\left(\frac{W}{\pi(1-\bar{p})p_B\lambda + c} \right) \left(\pi \int_{\bar{p}}^1 (pH(\lambda) - p_B)\lambda dp - c \right)}{\kappa \delta \int_{p^*}^1 (pH - L_2) dp} = \bar{\pi}_L.$$

Proof: The left hand side of condition (*) does not depend on π_L . The right hand side of condition (*) is a strictly decreasing function of π_L . Recall that $\frac{\partial \bar{p}}{\partial \pi_L} = \frac{\partial p_B}{\partial \pi_L} = 0$. Hence, there exists a cut-off value for π_L , call it $\bar{\pi}_L$, that makes condition (*) hold with equality. Clearly, if this cutoff value is below zero, investing at date 0 is never optimal. QED

D. The Firms' Date 0 Financing Choice

In the last subsection, we isolated the determinants of the rich investor's decision about the allocation of his wealth between dates 0 and 1. Of course, the rich investor's investment choice and the firms' financing policies are related. In particular, if the rich investor is not active in the date 1 stock market, then a policy of issuing shares to many small investors is a strictly dominated source of financing. However, if the rich investor is active in the date 1 stock market, the restructuring policy implemented in a firm that obtains nonintermediated finance (issuing shares only to small investors) may become sufficiently efficient to induce firms to obtain nonintermediated finance. Notice that the rich investor decides whether to invest at date 0 or date 1 *before* the firms choose their financing sources. Hence, his investment decision is driven only by condition (*), and the firms adjust to his decision. The following Proposition characterizes the unique equilibrium in the perhaps most interesting parameter region. It shows that intermediated and nonintermediated finance can coexist although all firms are identical.

Proposition 3: Suppose condition (*) holds. If the rich investor's wealth is scarce such that

$$W < \delta[c + \pi(l - \bar{p})\lambda p_B] \text{ and if}$$

$$(l - \frac{\tilde{\mu}}{\delta})L_2 + \frac{\tilde{\mu}}{\delta}\{(l - \pi)L_2 + \pi[\int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^l [\lambda p_B + (l - \lambda)pH(\lambda)]dp]\}$$

$$< \pi_L[\int_0^{p^*} L_2 dp + \int_{p^*}^l pH dp] + (l - \pi_L)L_2$$

$$< (l - \pi)L_2 + \pi\{\int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^l [\lambda p_B + (l - \lambda)pH(\lambda)]dp\},$$

then at date 0 a measure $l > x^* > \frac{W}{\pi(1-\bar{p})p_B\lambda + c} = \frac{\tilde{\mu}}{\delta}$ of firms issue shares only to individual small investors and a measure $l - x^*$ of firms issue shares at date 0 to an institutional investor.

Proof: The entrepreneur can sell all the equity of the firm to an institutional investor for

$E = (1-\delta)R - I + \delta\{\pi_L[\int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^l p H dp] + (1-\pi_L)L_2\}$ (this is the amount that an institutional investor is willing to pay for 100% of the firm given competition among the institutional investors: each of them just breaks even). Next we calculate the amount for which the entrepreneur could sell the equity to many small investors, provided that the rich investor invests all his wealth in the date 1 stock market. The shares are priced, given the equilibrium restructuring behavior of the rich investor, so that individual small investors at date 0 make zero profits. Hence,

$$\begin{aligned} (\#)E &= (1-\delta)R - I + \delta\left\{\left(1 - \frac{\tilde{\mu}}{\delta x}\right)L_2 + \frac{\tilde{\mu}}{\delta x}\left\{(1-\pi)L_2\right.\right. \\ &\left. + \pi\left[\int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^l [\lambda p_B + (1-\lambda)pH(\lambda)] dp\right]\right\}\}. \end{aligned}$$

(Notice that a if the rich investor investigates a distressed firm and learns $p \geq \bar{p}$, he buys a fraction λ of this firm. Hence, the small investors will receive a payoff equal to the date 1 price of shares with probability λ and the continuation value of the firm, $pH(\lambda)$ with probability $1-\lambda$; remember that $\tilde{\mu}$ denotes the measure of firms that the rich investor investigates, given that he behaves optimally). The expression (#) is strictly decreasing in x if

$x\delta > \tilde{\mu}$. Therefore, if

$$(1-\delta)R - I + \delta\left\{\left(1 - \frac{\tilde{\mu}}{\delta x}\right)L_2 + \frac{\tilde{\mu}}{\delta x}\left\{(1-\pi)L_2 + \pi\left[\int_0^{\tilde{p}} L_2 dp + \int_{\tilde{p}}^1 [\lambda p_B + (1-\lambda)pH(\lambda)] dp\right]\right\}\right\}$$

$$> (1-\delta)R - I + \delta\left\{\pi_L\left[\int_0^{\tilde{p}^*} L_2 dp + \int_{\tilde{p}^*}^1 pH dp\right] + (1-\pi_L)L_2\right\}$$

for $x = \frac{\tilde{\mu}}{\delta}$ (so that the rich investor investigates all distressed firms) but this inequality is reversed for $x = 1$, then there exists $x = x^*$ for the left hand side of the above expression equals the right hand side. Hence, for $x = x^*$, the equity value of a firm that obtains unintermediated finance is equal to the equity value of a firm obtaining finance from an institutional investor. Thus, if a measure x^* of all firms issue shares to individual small investors and a measure $1 - x^*$ issue shares only to one institutional investor each, all firms are indifferent between intermediated and nonintermediated finance and no firm has an incentive to deviate. The upper bound on the rich investor's wealth ensures that he cannot investigate all distressed firms and follow his strategy of buying if and only if he learns that $p \geq \tilde{p}$. If that was the case, all firms would prefer to issue shares only to small investors at date 0. The rich investor is willing to invest all his wealth in the date 1 stock market since (*) holds. QED

The proposition shows that firms with and without a date 0 blockholder can coexist even though all firms are identical. The situation is portrayed in figure 1.

[insert Figure 3]¹²

¹² Figure 3 can be found in the appendix.

Note that the efficiency of the restructuring decisions made by an institutional investor does not depend on the fraction of firms obtaining nonintermediated finance (i.e., issuing shares to many small investors). Hence, in Figure 1, the equity value for firms obtaining funds from institutional investors is a horizontal line. However, the efficiency of the restructuring policies in firms that obtain nonintermediated finance decreases in the fraction of firms that obtain nonintermediated finance. In particular, the larger the fraction of firms obtaining nonintermediated finance, the more likely it is that an individual firm's shares will not be investigated by the rich investor after the firm has received bad news. This is because the rich investor's wealth is limited. If for a small fraction of firms obtaining nonintermediated finance the restructuring policy is more efficient for firms obtaining nonintermediated finance, but the restructuring policy is more efficient for firms that obtain funds from institutional investors if all firms would obtain nonintermediated finance, both forms of finance coexist. The fraction of firms that obtain nonintermediated finance adjusts such that all firms are indifferent between obtaining funds from an institutional investor and from individual small investors.

Coexistence of intermediated and nonintermediated finance - in the debt market - has been shown in models with heterogeneous firms. In particular, Chemmanur and Fulghieri (1994) and Bolton and Freixas (1996) develop models in which firms that are more likely to become distressed obtain loans from financial intermediaries while the other firms issue bonds to many small investors at lower cost. In contrast to that literature, we obtain coexistence of financial intermediaries and securities markets although all firms are *identical*. In the equilibrium described in Proposition 3, the rich investor deploys his agency-cost free capital in the date 1 stock market. Hence, information production is more efficient for firms issuing shares to many small investors at date 0 if these firms are investigated by the rich investor at date 1.

However, institutional investors hold a larger block and do not have to share the surplus from their restructuring activity with other investors, and their funds are not as limited as the rich investor's wealth. Hence, they make the better decisions once they become informed about the firm's quality.

If a firm was certain that the rich investor would investigate it once it received bad news, it would strictly prefer obtaining funds from individual small investors over obtaining funds from institutional investors. The indifference of firms between intermediated and nonintermediated finance arises because *ex ante* a firm that obtains funds from individual small investors takes into account the likelihood of receiving bad news, but also of not being investigated by the rich investor in that event. That there is a chance of receiving bad news and then not being investigated by the rich investor is a consequence of the rich investor's wealth being a scarce resource.

If the restructuring policy implemented by the rich investor is sufficiently better than that implemented by an institutional investor, then all firms obtain unintermediated finance at date 0, i.e. no firm has a date 0 blockholder. This can be the case if the agency conflict within the institutional investor is sufficiently severe and hence firms prefer to rely on the restructuring policy of the rich investor at date 1 even if the chance that he will investigate a particular firm is low because all firms obtain unintermediated finance. On the other hand, it may be the case that all firms prefer to have a blockholder at date 0. This can occur if the inefficiencies in the restructuring policy implemented by the rich investor at date 1 (see section III.B) are particularly severe. Then no firm wants to rely on the restructuring policy of the rich investor at date 1 even if it is guaranteed that the rich investor will investigate all firms that obtain unintermediated finance because so few firms do so. These insights are summarized in Proposition 4.

Proposition 4: If

$$(1 - \frac{\tilde{\mu}}{\delta})L_2 + \frac{\tilde{\mu}}{\delta} \{ (1 - \pi)L_2 + \pi \{ \int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^1 [\lambda p_B + (1 - \lambda)pH(\lambda)] dp \} \} >$$

$$\pi_L \{ \int_0^{p^*} L_2 dp + \int_{p^*}^1 pH dp \} + (1 - \pi_L)L_2,$$

then no firm issues shares at date 0 to an institutional investor. If

$$\pi_L \{ \int_0^{p^*} L_2 dp + \int_{p^*}^1 pH dp \} + (1 - \pi_L)L_2 >$$

$$(1 - \pi)L_2 + \pi \{ \int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^1 [\lambda p_B + (1 - \lambda)pH(\lambda)] dp \},$$

all firms have a date 0 blockholder.

Proof:

If

$$(1 - \frac{\tilde{\mu}}{\delta})L_2 + \frac{\tilde{\mu}}{\delta} \{ (1 - \pi)L_2 + \pi \{ \int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^1 [\lambda p_B + (1 - \lambda)pH(\lambda)] dp \} \} >$$

$$\pi_L \{ \int_0^{p^*} L_2 dp + \int_{p^*}^1 pH dp \} + (1 - \pi_L)L_2,$$

then the equity value of firms that issue shares only to small investors at date 0 is higher than the equity value of firms that have an institutional date 0 blockholder even if all firms issue shares only to small investors so that the probability that a particular firm is investigated by the rich investor at date 1 is low.

If

$$\pi_L \{ \int_0^{p^*} L_2 dp + \int_{p^*}^1 pH dp \} + (1 - \pi_L)L_2 >$$

$$(1 - \pi)L_2 + \pi \{ \int_0^{\bar{p}} L_2 dp + \int_{\bar{p}}^1 [\lambda p_B + (1 - \lambda)pH(\lambda)] dp \},$$

then the equity value of a firm that issues shares only to small investors is below the equity value of a firm with an institutional

date 0 blockholder even if the probability of an investigation by the rich investor at date 1 is 1.

Hence, all firms prefer to have a date 0 blockholder. QED

Clearly, if the rich investor is not active in the date 1 stock market, firms that obtain nonintermediated finance are never restructured. Then, obtaining nonintermediated finance is always less efficient in terms of restructuring decisions and strictly dominated by obtaining finance from a date 0 blockholder, even an institutional investor. This is formalized in:

Proposition 5: Suppose condition (*) does not hold. Then, no firm issues shares to many small investors.

Proof: If condition (*) does not hold, then the rich investor invests all his wealth at date 0. Hence, firms obtaining funds from individual small investors will never be restructured. The equity value of a firm (or the price at which the entrepreneur can sell a firm) that obtains funds from individual small investors is $E_S = (1 - \delta)R + \delta L_2 - I$. The equity value of a firm that obtains funds from a institutional investor is given by:

$$E_I = (1 - \delta)R - I + \delta \{ \pi_L [\int_0^{p^*} L_2 dp + \int_{p^*}^1 p H dp] + (1 - \pi_L) L_2 \}.$$

Clearly, E_S is strictly smaller than E_I . QED

IV. Price Formation for Date 1 Shares

To complete the solution for the equilibrium, we need to analyze how the price, p_B , is formed in the date 1 stock market. This section presents an example of a mechanism for the

formation of the price of date 1 shares of firms which received bad news (referred to hereafter as “date 1 shares”). All assumptions made in section II continue to hold. The model is fairly standard, building on the work by Kyle and Vila (1991). First, we extend the model of Section II to a general equilibrium model. Then, we solve for the price of date 1 shares.

A. The Extended Model

As above, the economy has entrepreneurs/firms, small investors, and a single rich investor. All agents are risk neutral. All investors have funds, no projects, but have a storage technology. For simplicity the interest rate in the economy is zero. At date 0 a small investor may store his wealth or invest in a firm’s project, either directly or via becoming a shareholder of an institutional investor. Each small investor’s wealth w is small relative to the size of a entrepreneur’s project, I : a positive measure of small investors who invest all their wealth is needed to finance a project.

We now specify that small investors will either be early consumers who derive utility from consumption at date 1 or late consumers who derive utility from consumption at date 2. All other agents derive utility from consumption at date 2. More specifically, there is a double continuum of small investors in the space $[0, I]^2$, with measure 1 and each with wealth w . The wealth can be invested or stored for future consumption. At date 0 small investors do not know whether their preferences are for consumption at date 1 or date 2. Just prior to date 1, small investors learn their preferences. With probability λ a small investor will derive utility only from consumption at date 1, i.e., early consumption. With probability $1 - \lambda$ a small investor will derive utility only from consumption at date 2, i.e., late consumption. Early consumers will sell any securities they hold at date 1. If they have invested in a fund run by an

institutional investor, then they withdraw their funds at date 1 if they are early consumers.¹³ With probability $1 - \pi$ late consumers receive another endowment at date 1. This endowment is nonstorable. For simplicity, we assume this endowment is just enough to purchase a fraction λ of the firms.¹⁴

Assuming that each small investor has the same portfolio, the above scenario is one in which fraction λ of each firm's shares will be offered for sale at date 1.

Recall that for the economy as a whole, we assume that the amount of available resources for investment from the small investors exceeds the funding requirements of the firms. When early consumers withdraw from the institutional investor, there is only a $1 - \pi$ chance that the late consumers will have a new endowment to invest in the fund. If late consumers do not invest more in the fund, then the early consumers can be paid off by attracting new shareholders from the small agents who are storing their endowment but are indifferent between storage and investments in a fund. Finally, we assume that institutional investors stand ready to buy back existing shares, or issue new shares, at date 1.

At date 1 the stock market opens. Agents trading in the stock market submit market orders to a competitive market maker who sets the price (for each firm's equity in total) after observing the amount of buy and sell orders, but not the identity of traders. The market maker sets the price so that expected profits are zero.

¹³ At date 1 when consumer preferences for consumption are realized we assume that this becomes public information. We are not interested in the possibility of panics at the institutional investors' funds. See Diamond and Dybvig (1983).

¹⁴ Otherwise, there could be excess demand which would affect the price and hence severely complicate the calculation of the price.

There are potentially three kinds of traders in the stock market: early consumers who must sell any shares they hold to finance consumption at date 1; late consumers, who receive additional endowment with probability $1 - \pi$, must buy shares since this new endowment is nonstorable; and finally, the rich investor who may buy shares. We assume that investors who are indifferent between trading and not trading do not trade.

B. Discussion of the Assumptions

The assumptions are clearly intended to be a simple way of generating uninformed “liquidity” buying and selling at date 1. Early consumers will sell measure λ of each firm’s shares. There are two types of potential buyers. Late consumers may arrive to buy shares. Or, the rich investor may arrive to buy shares. Since the rich investor cannot investigate every distressed firm, and the late consumers do not always receive an endowment, there is a chance that no buy orders arrive. If the rich investor does investigate, he learns the firm’s prospects but does not buy the shares of low quality firms. Again, there are no buy orders and the price is set to L_2 . However, when the rich investor investigates, the chance he learns anything is perfectly negatively correlated with the late consumers’ chance of receiving additional endowment at date 1. This assumption is purely to reduce the number of prices that we need to compute to exactly one price, p_B .

C. Price Formation in the Date 1 Stock Market

To determine the rich investor’s optimal trading strategy, we must determine the price at which he can buy date 1 shares. The price is set by the competitive market maker and is a function of the rich investor’s equilibrium trading strategy, i.e., the quality of firms which the

rich investor will buy, $p \geq \bar{p}$, once he has investigated a measure of the distressed firms. Of course, if (*) (see Proposition 2) does not hold, the rich investor becomes a date 0 blockholder and the market maker sets a price of L_2 .

Proposition 6: Suppose condition (*) holds. The equilibrium in the market for date 1 shares of distressed firms is characterized by:

$$(1) p_B = \frac{\pi(1-\bar{p})\frac{\tilde{\mu}}{\delta x^*}}{\pi(1-\bar{p})\frac{\tilde{\mu}}{\delta x^*} + 1 - \pi} \int_{\bar{p}}^1 p H(\lambda) \frac{1}{1-\bar{p}} dp + \left(1 - \frac{\pi(1-\bar{p})\frac{\tilde{\mu}}{\delta x^*}}{\pi(1-\bar{p})\frac{\tilde{\mu}}{\delta x^*} + 1 - \pi}\right) L_2;$$

$$(2) \frac{\pi p_B \lambda}{\pi(1-\bar{p})p_B \lambda + c} (\pi \int_{\bar{p}}^1 (p H(\lambda) - p_B) dp - c) - \pi \bar{p} H(\lambda) + \pi p_B(\bar{p}) = 0,$$

where $\tilde{\mu} = \frac{W}{\pi(1-\bar{p})p_B \lambda + c}$ and x^* is the measure of firms issuing shares to many small

investors in equilibrium (see Proposition 3).

Proof: Equation (1) describes the price that yields zero expected profits for the marketmaker. Observing a buy order for a fraction λ of shares, the marketmaker knows that this buy order could come from either late consumers or the rich investor. Late consumers receive an additional endowment with probability $1 - \pi$. The rich investor becomes informed with probability π . He investigates a fraction $\frac{\tilde{\mu}}{\delta x^*}$ of all distressed firms and, if he learns p , acquires a block if and only if $p \geq \bar{p}$. Hence, the conditional probability that the buy order comes from

the large investor is, using Bayes' Rule, $\frac{\pi(1-\tilde{p})\frac{\tilde{\mu}}{\delta x^*}}{\pi(1-\tilde{p})\frac{\tilde{\mu}}{\delta x^*}+1-\pi}$. If the buy order comes from

the rich investor, the firm's expected value, given that the rich investor will restructure, is

$\int_{\tilde{p}}^1 p H(\lambda) \frac{1}{1-\tilde{p}} dp$. On the other hand, if the buy order comes from the late consumers, there

will be no restructuring and hence the firm is worth L_2 . Equation (2) stems from the first-order condition of the rich investor's problem (see section III.B)¹⁵. QED

Clearly, $p_B \geq L_2$, which we assumed would be a feature of the equilibrium price in Section III above. It is also apparent that $p_B > L_2$ if $\pi > 0$ and hence there is some chance that the informed rich investor is a stock purchaser at date 1. This formalizes the idea that it is costly to acquire a position after bad news has arrived, news which indicates the need for restructuring. In this liquidity trading model, the price of date 1 shares partially reveals the value generation by the rich investor's monitoring activity. In contrast to Grossman and Hart (1980), the rich investor still has an incentive to monitor because he keeps some of the surplus generated by his monitoring activity because of the presence of liquidity traders. This is essentially the point made by Kyle and Vila (1991).

We have given only one example of price formation. There are other possible scenarios in which the date 1 share price is set such that the rich investor retains some incentive to monitor but his incentive to monitor is reduced as compared to the case in which he does not have to share the surplus generated by his monitoring activity. One example would be a bar-

¹⁵ Here it is assumed that the rich investor's problem is a quasiconcave program.

gaining environment in which the rich investor and existing date 1 shareholders would split this surplus. The specifics of the price formation mechanism determine the extent to which the rich investor is able to benefit from his monitoring activity and hence his incentives to monitor. The main point is that the results of this paper do not depend on the specifics of the price formation mechanism as long as the Grossman and Hart (1980) paradox is not fully present.

V. Conclusion

In this paper, we have contrasted the roles rich investors and institutional investors play in corporate governance. Small individual investors can overcome free-rider problems by pooling their resources and forming an institutional investor that can become a blockholder in firms and force value-increasing restructurings against the will of self-interested managers. However, as an institution, such an institutional investor suffers from its own agency problem because it is run by professional managers. This agency problem within the institutional investor makes it less efficient at information production and implementing restructuring policies than rich investors who provide agency-cost free capital.

Because the agency-cost free capital is a scarce resource in the economy, rich investors may want to allocate it in a state-contingent way, acquiring blocks only in situations in which agency conflicts are particularly important. This gives a rationale for the prominent role rich investors play in the hostile takeover market and the market for corporate control of financially distressed firms. Because the wealth of rich investors is not sufficient to acquire blocks in all firms, there is also a role for institutional investors in corporate governance. Our model suggests that they monitor management in all states of the world as permanent blockholders. Finally, the model can also explain the coexistence of firms with and without large sharehold-

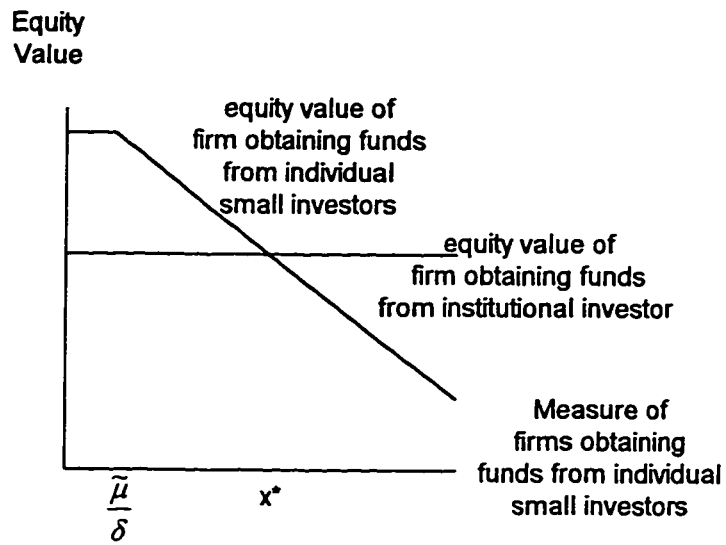
ers. Liquid securities markets allow rich investors to monitor firms that are initially without a large shareholder in those states in which monitoring is needed most. Liquid markets help in monitoring management because they allow the agency-cost free capital of rich investors to be deployed where it is most productive in monitoring management.

VI. Appendix

Table 3: Notation
Frequently Used Symbols

Symbol	Meaning
R	date 2 payoff of firm with high interim payoff
δ	probability of bad news and measure of firms that receive bad news
L_2	value of firm that receives bad news under current managerial strategy
P	probability that date 2 payoff is H if firm restructured after it receives bad news
λ	fraction of firm's equity that can be acquired at date 1
$H(\lambda)$	highest date 2 payoff of firm with low interim payoff after restructuring
γ	minimal fraction of firm investor must control to force restructuring
π_L	probability with which manager of institutional investor learns p if he investigates
π	probability with which rich investor learns p if he investigates
p_B	Price of date 1 shares of firm with low interim payoff
W	the rich investor's wealth

Figure 3: Coexistence of Firms With and Without Date 0 Blockholder



CHAPTER 3:

**LONG-RUN PERFORMANCE AND CORPORATE CONTROL
EVENTS IN FINANCIALLY DISTRESSED FIRMS:
AN EMPIRICAL INVESTIGATION**

I. INTRODUCTION

Of crucial importance for an economy's efficiency is a mechanism that ensures that scarce resources are put to their most valuable use. In particular, this requires a mechanism that ensures the reallocation of resources from inefficient to efficient firms. Financial distress plays an important part in this reallocation of resources because it serves as a selection mechanism for firms, perhaps leading to the liquidation of inefficient firms. The importance of financial distress as a mechanism to achieve an efficient reallocation of scarce resources is documented by the prominence of bankruptcy reform in the debate about Eastern European economic reform. In the US, increases in leverage ratios, the use of high yield debt financing, and leveraged buyouts have led to an increase in the number of firms entering financial distress. This has revived the debate about the merits of Chapter 11, the US reorganization law. Some authors, for instance Bradley and Rosenzweig (1992), have charged that Chapter 11 entrenches incumbent management and allows it to continue inefficient firms for too long. Others have defended the positive role of Chapter 11 in allowing financially distressed firms that are economically viable to be rehabilitated.

Unfortunately, relatively little empirical evidence is brought to bear on this debate. A notable exception is Hotchkiss (1995) who documents that many firms that emerge from Chapter 11 continue to perform poorly, and that postbankruptcy performance is positively correlated with management turnover. Hotchkiss suggests that this evidence supports the view that Chapter 11 leads to the excessive continuation of not

viable firms. This paper attempts to contribute to this debate by describing and analyzing the long-run performance, liquidations, and control events among financially distressed firms in the US. It can be viewed as a first step in a research project that could allow more informed inferences about the efficiency of the financial distress process in the US.

The potential for inefficient liquidation decisions during financial distress arises because financial distress is an imperfect indicator of economic viability. While some financially distressed firms are not viable and hence, from an efficiency point of view, should be liquidated (their assets are worth more outside the firm than inside the firm), there are also economically viable firms that become financially distressed. Hence, two kinds of errors can be made: excessive continuation of not viable firms or excessive liquidation of viable firms. Supporters of Chapter 11 argue that the reorganization procedure reduces the likelihood of excessive liquidation of economically viable firms. Opponents argue that it has led to an unacceptable increase in the likelihood of the excessive continuation of not viable firms.

Hotchkiss (1995) examines the performance of firms that emerge from Chapter 11 as public companies. She finds that in each of the first five years after emerging from Chapter 11 roughly 40% of firms have negative operating profits and at least two thirds underperform the industry median firm. This poor performance is interpreted as an indicator that not viable firms are continued although they should have been liquidated. Moreover, postbankruptcy performance is significantly positively correlated

with management turnover.¹ However, the finding of poor postbankruptcy performance is also consistent with a different view of the process of financial distress (see Kahl (1996)). If creditors are uncertain about a firm's viability they may allow it to continue in order to learn about the firm's viability from its short-run performance. In such a setting, poor performance after restructurings does not necessarily imply that too many firms were continued; instead, it may be a consequence of creditors' uncertainty about the firm's viability and can be interpreted as consistent with an efficient resolution of financial distress. This view of financial distress as a dynamic learning process implies that several debt restructurings of the same firm should be analyzed as part of the same dynamic process of financial distress. Moreover, because learning takes time, this approach suggests to analyze the *long-run* performance of financially distressed firms. Last not least, this view implies that reactions to poor performance may even in an efficient setting take some time. However, if financial distress is an efficient process, it should lead, after additional negative evidence (in form of continued poor performance) about a firm's viability has been learned, to a reaction to this poor performance.

The debate about the merits of Chapter 11 has emphasized one kind of reaction to poor performance that should take place in an efficient setting: liquidation, which

¹ The results reported in Hotchkiss (1995) are somewhat different from the results reported in Hotchkiss and Mooradian (1997). In particular, as Hotchkiss and Mooradian (1997) note, the post-bankruptcy performance in Hotchkiss and Mooradian (1997) is somewhat better than in Hotchkiss (1995), and there is no significant positive correlation between management turnover and performance. Hotchkiss and Mooradian (1997) attribute the differences to the different sample selection procedures.

means the sale of *all* assets of a firm, potentially to several different buyers. However, there are several different ways in which a firm's assets can be brought to a higher value use. Somewhat similar to a liquidation (and in a sense a special case of it) is an *acquisition* in which *all* of the firm's assets are sold to the *same* buyer. Alternatively, there could be a partial liquidation in form of *asset sales* or divestitures. Firm performance can be improved even in the absence of asset reallocation via a change in organizational structure or management turnover.

While the empirical literature has found that management turnover is very high during financial distress (for instance Gilson (1989)) and asset sales (Brown, James, and Mooradian (1995)) and the granting of equity stakes to creditors (James (1995)) are common responses to poor performance, some authors have suggested that acquisitions of financially distressed firms are rare (see for instance Gilson (1997)). The only papers I am aware of that found significant acquisition activity for financially distressed firms are Hotchkiss and Mooradian (1997) and Gilson (1990). Hotchkiss and Mooradian (1997) show that vulture investors are quite active in acquiring controlling stakes in financially distressed firms. Their activity is correlated with an improved subsequent performance even under incumbent management.

This paper attempts to contribute to the empirical literature by analyzing the *long-run* performance, liquidations, and several corporate control events for 110 financially distressed firms. The only existing study which I am aware of that looks to some degree at the long-run history of financially distressed firms is Hotchkiss (1995) who

analyzes the performance of firms in the first five years after they emerge from Chapter 11. In contrast to Hotchkiss (1995), the firms are followed here from the onset of financial distress on and the study is not restricted to firms that emerge from Chapter 11. This different sampling may be responsible for the very different empirical results concerning performance obtained in Hotchkiss (1995) and here which are described and discussed below. Moreover, the firms are followed through between 12 and 16 years after the onset of financial distress. Finally, the paper describes liquidations and several categories of corporate control events occurring after the onset of financial distress. The corporate control events described in this paper are equity stakes of creditors and acquisitions. Here, the systematic description of acquisition activities involving the financially distressed firms may be of most interest because it leads to a dramatically different impression of the extent of acquisition activities than some of the current literature suggests.

While acquisitions (in which a buyer acquires all of a firm's assets) do not - in contrast to liquidations (in which different assets may be sold to different buyers) - necessarily lead to an end of the firm as a going concern (with all its assets), it seems that they are a potentially important way to bring about asset reallocation away from inefficient firms. Indeed, casual evidence suggests that in a number of cases the acquirers of a financially distressed firms sold large parts of the firm within a short amount of time. Moreover, even if the assets of the acquired firm are kept together after the acquisition, a potentially important asset reallocation may have taken place: the assets

may have synergies with the acquiring firm's original assets and may benefit also from new financial synergies (the internal capital market of the acquiring firm).

This paper follows 110 firms that became financially distressed between 1979 and 1983. The main findings can be summarized as follows: First, there is a very large number of corporate control events and liquidations, and only less than 10% of firms are not involved in any of them. Only very few firms survive as independent entities. Acquisitions are extremely common: if one includes the acquisition of minority stakes that are large enough to change control, more than 50% of firms in the sample for which there was sufficient information were acquired within 5 years after the onset of financial distress (mostly outside of Chapter 11). Liquidations are much less common than acquisitions. Hence, the focus on liquidation as a measure of asset reallocation in financially distressed firms may be misplaced and underestimate the true extent of asset reallocation as a consequence of poor performance dramatically.

Moreover, the results concerning the firms' performance differ from Hotchkiss' (1995) findings. The performance of the sample firms reaches a low in the year these firms become distressed (with more than half reporting negative operating income) but improves quickly and substantially after that. Overall, the number of firms with negative operating profits declines dramatically and is arguably very small 5 years after the onset of financial distress (7 firms as compared to 58 in the year the firms become distressed). The fraction of firms underperforming industry median decreases

from 80.4% in the year of the onset of financial distress to exactly 50% in year 4 after the onset of financial distress.

This evidence is not inconsistent with the view that financial distress is a dynamic process during which only firms that improve their performance in a reasonable amount of time seem to have a good chance at surviving as a going concern and independent entity. The evaluation of the efficiency of this process, however, is beyond the scope of this paper and has to await further research, as discussed briefly in the conclusion.

The remainder of the paper is structured as follows. In section II, I describe my sample selection procedure and some characteristics of the sample firms in the year that they became financially distressed. In section III, I describe all corporate control events in which these firms were involved. Section IV describes their performance. Section V concludes.

II. SAMPLE SELECTION

This study analyzes the performance, liquidations, and several corporate control events of 110 firms that enter financial distress between 1979 and 1983. The firms are followed until they lose their independence in a merger or acquisition or they are liquidated. Firms that survive as independent entities are followed until 1995. To be included in the sample, firms must fulfill several criteria. First, they must have, accord-

ing to *Compustat*, an interest coverage ratio² of below 1 in at least one year between 1980 and 1983.³ I restrict myself to firms that have total assets of at least \$10 million at the time that they have the low interest coverage ratio. Slightly over 800 firms fulfill this criterion. Most of these firms had negative operating profits in the critical year(s). The interest coverage ratio is calculated from *Compustat* by dividing operating performance *before* interest expense, income taxes, depreciation and amortization (EBITDA) by interest expense. An interest coverage ratio below one does not mean that a firm will necessarily become financially distressed, that is, have difficulties in making debt payments or complying with the covenants in its debt contracts since debt payments can be made from other sources than operating income. However, a low interest coverage ratio seems to be a necessary condition for financial distress.

Second, the *Wall Street Journal* must indicate that the firm might⁴ have attempted to restructure its debt, defaulted, or filed for Chapter 11 between 1980 and 1983. The *Wall Street Journal* was searched by hand for all articles covering the firms that pass the interest coverage filter. Following Gilson (1990), a debt restructuring is defined as an exchange of financial claims that a firm makes to avoid defaulting on its debt or filing for bankruptcy (including implicit exchanges such as maturity extensions). A default, a debt restructuring that avoids a default, or a Chapter 11 filing indicate that

² Asquith, Gertner, and Scharfstein (1994) discuss advantages of the interest coverage filter over other indicators of financial distress used in the literature, in particular stock prices.

³ The years in *Compustat* are not calendar years but financial years and hence do not cover exactly the same time period for different firms.

⁴ The *Wall Street Journal* does not have detailed information on many of these firms so that it was not always clear whether a firm qualified or not. If there was uncertainty, I did not exclude the firm

the potential financial difficulties indicated by a low interest coverage ratio are indeed severe enough to make the firm financially distressed - that is, cause it to violate covenants in its debt contracts or miss a debt payment in the absence of a debt restructuring. Because all firms in the sample must have a low interest coverage ratio, all debt restructurings are indeed *distressed* restructurings rather than nondistressed refinancings.

For all firms that have survived the sample selection procedure described so far, the *Dow Jones News Retrieval* service is used to verify that the firm indeed defaults or has a distressed restructuring or files for Chapter 11 between 1980 and 1983. The information in *Dow Jones News Retrieval* service is much more detailed than in the *Wall Street Journal* because it contains a dramatically larger number of news articles and press releases.

I exclude two firms from the Philippines due to the different institutional environment during financial distress (for instance, one firm participates in the debt moratorium declared by the Philippine government). More importantly, all firms for which it is known that they entered financial distress earlier than 1979 are excluded. Most of these 10 firms were in bankruptcy before 1979 (one, Boston&Maine, was in bankruptcy since 1970). These firms are excluded because this study intends to cover the history of firms starting from their first instance of financial distress. However, I leave those 6 firms that began to be financially distressed in 1979 in the sample. The final

but instead checked the more detailed information in the *Dow Jones News Retrieval* service to make a decision (see below).

sample consists of 110 firms. From the *Dow Jones News Retrieval* service, the year of the onset of financial distress was established. This is the first year in which there was a default, a debt restructuring to avoid a default, or a Chapter 11 filing. All events are measured in years relative to the onset of financial distress.

Six of the firms (5.5%) became financially distressed in 1979, twelve (10.9%) in 1980, and 14 (12.7%) in 1981. However, the bulk of the firms became distressed in 1982 (47 firms or 42.7%) and 1983 (31 firms or 28.2%). Table 4 depicts some characteristics of the sample firms *at the onset of financial distress* (which, as discussed above, differs across firms).

TABLE 4: SAMPLE DESCRIPTION AT ONSET OF FINANCIAL DISTRESS⁵

Characteristic	
Median (mean) book value of assets	\$71.79 (379.87) million
Median (mean) net sales	\$ 81.69 (470.96) million
Median (mean) Interest Coverage Ratio	-0.169 (-0.393)
Median (mean) Operating Income/Total Assets	-0.013 (-0.036)
Median (mean) Operating Income/Net Sales	-0.013 (-0.025)

With a median book value of assets of \$71.785 (the mean is \$379.87 million), the firms are comparable to Gilson's (1990) sample, substantially smaller than James' (1995) firms (median: \$135.95), and substantially larger than Hotchkiss' (1995) firms (median: \$21.1 million). The median and mean hide substantial heterogeneity across

⁵ The summary statistics are calculated from the 102 firms for which data were available from *Compustat* at the year of the onset of financial distress. For 8 firms, there were no data available.

firms. As Table 4b shows, more than 10% of firms have a book value of assets less than \$20 million while almost 10% have more than \$1 billion in assets.

TABLE 4b: TOTAL ASSETS AT ONSET OF FINANCIAL DISTRESS

Total assets (\$million)	Percentage of Firms
smaller than 20	11.8
between 20 and 50	31.4
between 50 and 100	13.7
between 100 and 500	30.4
between 500 and 1000	3.9
larger than 1000	8.8

Median net sales are \$81.69 million (mean: \$470.96 million). Over 13% have sales of less than \$20 million while over 12% have sales of more than \$1 billion. More details about the distribution of net sales can be found in Table 4c.

TABLE 4c: NET SALES AT ONSET OF FINANCIAL DISTRESS

Net Sales (\$million)	Percentage of Firms
smaller than 10	3.9
between 10 and 20	9.8
between 20 and 50	18.6
between 50 and 100	22.5
between 100 and 500	27.5
between 500 and 1000	4.9
larger than 1000	12.7

Sample firms are distressed to a varying extent. The median firm has negative operating income so that its interest coverage ratio is negative (-0.17). As can be verified

from section IV, almost one third of the firms have an operating margin (operating performance over net sales) of -5% or worse; almost a quarter between 0% and -5%; the median operating margin is -0.013.

Finally, Table 5 describes the industry distribution of the sample firms (in 2digit Standard Industrial Classification or SIC codes) in the year they became financially distressed. While the sample firms stem from 33 different industry groups, close to one half of all firms (49 firms or 44.5%) come from only five industries: 14 (12.7%) are engaged in oil and gas extraction (12 of these in crude petroleum and natural gas), 10 firms (9.1%) are from the industrial, commercial machinery and computer equipment industries, 9 firms (8.2%) are in the primary metals industries, the same number is active in transportation by air, and 7 firms (6.4%) are wholesale retailers of durable goods.

TABLE 5: INDUSTRY CLASSIFICATION

Industry Classification	Number of Firms
Oil and Gas Extraction	14
Food and Kindred Products	3
Textile Mill Products	3
Chemicals&Allied Products	4
Primary Metals Industries	9
Indl, Commercial Machinery, Computer Equip- ment	10
Electr., Other Electr. Equipm., Ex Comp	3
Transportation Equipment	5
Misc Manufacturing Industries	3
Transportation by Air	9
Durable Goods-Wholesale	7
Nondurable Goods-Wholesale	4
Real Estate	4
Business Services	5
Other	27

III. CORPORATE CONTROL EVENTS AND LIQUIDATIONS

In this section, I describe the corporate control events and liquidations that took place in the sample firms. The corporate control events I focus on include minority or majority equity stakes taken by creditors, non-majority controlling stakes (as explained below), the acquisition of a majority stake, and a full acquisition of the firm.

The information concerning these corporate control events covers the years from the onset of financial distress until 1995 or as long as the firm survived as an independent entity. This information is collected from the *Dow Jones News Retrieval* service and *Lexis/Nexis*. For most firms I searched all articles in which the firm was mentioned first in the *Dow Jones News Retrieval* service. For some firms with a very large number of articles (some firms are mentioned in more than one thousand articles on the *Dow Jones News Retrieval* service alone) keyword searches were conducted to identify the control events. In any case, if there was not sufficient information available from the *Dow Jones News Retrieval* service, I searched on *Lexis/Nexis*⁶. Events were included only if it was certain that the event had taken place; if there remained uncertainty (for instance, whether a reorganization plan that contained a control event such as an acquisition was indeed executed) the event was not included.

For 13 firms there was insufficient information concerning control events. They are categorized in the following under the rubric of “uncertain”. It seems most likely that

⁶ Lexis/Nexis includes a large number of different libraries. Most informative for my purposes were the libraries called *Busfin* and, to a lesser extent, the *Bankruptcy Data Source*.

a large fraction of these firms were actually liquidated or acquired which would explain why they cease to be mentioned in any of the data sources. Indeed, for some there was mention of a reorganization plan that required a liquidation of the firm. However, because it could not be ascertained that the reorganization plan was indeed carried out, the firms were classified as “uncertain”. Overall, the lack of information about these firms probably leads to an underestimation of liquidation and acquisition events in the sample.

Most of the events that are searched for are self-explanatory. The following categories may need some explanation. If it could not be determined whether creditors received the majority of shares in a debt restructuring, the event is called a “creditor equity stake” without specifying whether it was a minority or majority stake. One category is called “essential liquidation”. This refers to a liquidation of almost all the assets of the firm. Often such firms were continued without any operating business (at least for a while). One reason is that many financially distressed firms accumulate a large amount of net operating loss carryforwards (NOLs). Roughly speaking, if these firms remain independent and satisfy a “continuation of business” test (for details see Gilson (1997)), they retain these NOLs which then are in many cases by far their most valuable asset. For these firms it makes sense to continue in business even without operating while looking to acquire firms with the potential for high earnings that can be shielded from income taxes through the NOLs. However, from the perspective of asset reallocation of financially distressed firms, almost all of their productive assets

are sold (liquidated); hence I refer to such an event as “essential liquidation”. Finally, control of a firm can be gained even without acquiring at least 50% of the voting shares. Often, small shareholders do not vote their votes so that a stake of 40% or even, under certain circumstances, of 30% gives effective control to an investor. Following Hotchkiss and Mooradian (1997) I include these events in my analysis. If a stake of larger than 30% but less than 50% is acquired and at the same time the investor assumes control of the board of directors (his representatives gain a majority of the board seats) or assumes the CEO position, I count this event as an acquisition of a controlling minority stake. Finally, the category “essentially acquired” refers to situations in which a single investor or firm acquires almost all of the assets of a firm.

Table 6 summarizes the control events and liquidations and their timing relative to the onset of financial distress. The figure below Table 6 represents the same information in a different form. The events are categorized into three broad groups: creditors’ equity stakes, acquisitions (including controlling minority stakes and “essential acquisition”, see above), and liquidations (including “essential liquidation”, see above). These categories of events are split up in finer categories below. In the following, all years are measured relative to the year of the onset of financial distress. For instance, year - 1 is the year before the onset of financial distress; year 0 is the year of the onset of financial distress; year 1 is the year after the onset of financial distress, etc..

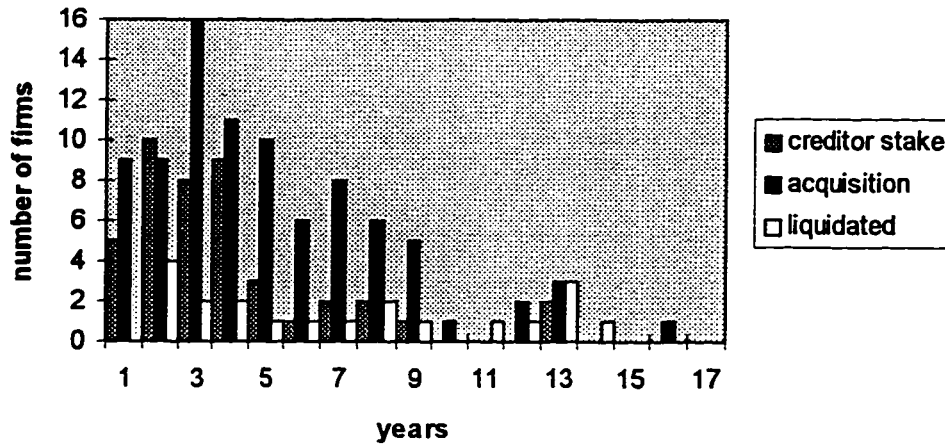
TABLE 6: CONTROL EVENTS AND LIQUIDATIONS⁷

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Sum
Event																		
Creditor equity stake	5	10	8	9	3	1	2	2	1	0	0	0	2	0	0	0	0	43
acquisitions	9	9	16	11	10	6	8	6	5	1	0	2	3	0	0	1	0	87
liquidation	0	4	2	2	1	1	1	2	1	0	1	1	3	1	0	0	0	20
Sum	14	23	26	22	14	8	11	10	7	1	1	3	8	1	0	1	0	150

The sample firms were involved in 150 of these events (of course, a single firm can have several events). More importantly, as we will see below, only 9 firms were not involved in any of these events (abstracting from the 13 firms in the category “uncertain”). There were 43 instances in which creditors took an equity stake in the firm. 20 firms were liquidated. There were 87 acquisitions (17 of which involved minority controlling stakes) among sample firms.

⁷ Table 6 is an aggregated version of Table 7 below. Creditor equity stakes include creditor minority or majority stakes, both in and outside of Chapter 11. Acquisitions include the acquisition of a controlling minority stake, acquisitions of stakes larger than 50% but less than 100%, and acquisitions of 100% of the firm’s share, both in and outside of Chapter 11. Finally, liquidations can also be in and outside of Chapter 11. Essential acquisitions and liquidations (see the discussion above) are counted under acquisitions and liquidations, respectively. An even finer disaggregation is given in Table 9 where events are described in cumulative form (see the discussion below).

Figure 4: Corporate Control Events And Liquidations



As can be seen from either Table 6 or Figure 4, most events happened within a few years after the onset of financial distress. Within 3 years of the onset of financial distress, 85 events (56.7%) have occurred; within 5 years, 105 (71.3%), within 8 years 133 (88.7%). Indeed, there is almost no event after year 8 with the exception of year 12. Creditors take equity stakes within a few years after the onset of financial distress: 32 of the 43 (74.4%) instances in which this occurs happen within 3 years of the onset of financial distress. Half of the events of the respective category have occurred within 2 years (creditor equity stakes), 3 years (acquisitions), and 5 years (liquidation), respectively. Liquidations seem to be somewhat less concentrated in the early years after the onset of financial distress than the other two categories of events. Table 7 below shows the timing of the events in more detail by disaggregating the categories in which the events are classified.

TABLE 7: CONTROL EVENTS IN MORE DETAIL

Event	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
creditor minority outs. Ch. 11		4	7	3	4													18
creditor stake outs. Ch. 11			1		1													2
creditor majority outs. Ch. 11				1	1	1												3
creditor minority in Ch. 11		1		1	1	1			1					1				7
creditor stake in Ch. 11			1	1														2
creditor majority in Ch. 11			1	2	2	1		2	2					1				11
minority controlling stake outs. Ch. 11		3	3	1		1		1	1		1		1					12
minority controlling stake in Ch. 11				1					1	2				1				5
acquired >50% outs. Ch. 11		5	3	4	3	4	2		1	1			1	1				25
acquired >50% in Ch. 11		1		3	3		1											8
taken private outs. Ch. 11				1			1											2
taken private in Ch. 11				1						1								2
100% acquired outs. Ch. 11		1	1	2	4	1	6	3	1					1			1	21
100% acquired in ch. 11		1	4	3	1	1												10
essentially acquired in Ch. 11		1					1											2
liquidated outs. Ch. 11		1		1														2
liquidated									1									1
liquidated in Ch. 11		2	1					1				1	3					8
essentially liquidated outs. Ch. 11								1			1			1				3
essentially liquidated in Ch. 11		1	1	1	1	1	1											6
		14	23	26	22	14	8	11	10	7	1	1	3	8	1		1	150

The table indicates that the majority of the control events take place outside of Chapter 11: 88 of the events (58.7%) occur outside Chapter 11 and 61 (40.7%) in Chapter 11 (for one event it could not be ascertained whether it occurred during a Chapter 11 procedure). Acquisitions happen more frequently outside of Chapter 11:

60 (69.0%) occurred outside of Chapter 11 while 27 (31.0%) were part of a Chapter 11 proceeding. On the other hand, liquidations occurred much more often (14 times; 70%) in Chapter 11 than outside of Chapter 11. Creditors took equity stakes in 23 instances outside of Chapter 11 and in 20 instances inside of Chapter 11. However, the majority of creditor stakes acquired in Chapter 11 involved majority stakes while creditors acquired only in 3 cases outside of Chapter 11 a majority stake in the financially distressed firm.

Table 8 and the figure below it summarize the control events and liquidations in a different way. It is motivated by the idea that the different control events analyzed here show a loss of the firm's control over its assets to a differing degree. A minority stake given to the creditors is the weakest loss of control over the firm's assets. If creditors are dispersed, corporate governance may not be much affected, and hence the control over the firm's assets not affected. Gilson (1990) documents that if creditors take stakes they often become involved in corporate governance but to a varying degree. Creditor majority stakes make a shift of control to some (institutional) creditors more likely. An acquisition leads to a change in control over the firm's assets. Finally, the strongest form of a redeployment of the distressed firm's assets is a liquidation. While an acquisition leaves the possibility for the firm to continue as a going concern - albeit with new ownership structure - a liquidation ends the firm's existence as a going concern (in the sense that a firm is a particular combination of assets).

Table 8 and the figure below it summarize what happens to the sample firms year by year, measured from the onset of financial distress. Following the discussed hierarchy of control events, only the strongest one is reported. For instance, if a firm first concedes a minority stake to its creditors in year 2, then a majority stake in year 3, then someone acquires a nonmajority controlling block in year 5, then someone acquires the firm fully in year 7, and then the firm is liquidated in year 10, the firm would be counted as nothing has happened in year 0 and 1, creditor minority in year 2, creditor majority in years 3 and 4, minority controlling stake in years 5 and 6, fully acquired in years 7,8, and 9, and liquidated in years 10 to the last available year. The category “year does not exist” refers to the fact that for firms that experience the onset of financial distress after 1979 there are not 16 years after the onset of financial distress that can be analyzed until 1995. For instance, a firm that became financially distressed in 1983 has only 12 years after the onset of financial distress (recall that the firms are followed until 1995).

Only very few firms (9) survive as independent entities until 1995 without conceding an equity stake to their creditors, being acquired, or liquidated. The vast majority of firms experience a control event which is most frequently an acquisition. Within the first two years after the onset of financial distress, 24 (24.7%) of the 97 firms with sufficient information had been acquired (including controlling minority stakes), 7 (7.2%) had been liquidated, and 15 (15.5%) conceded an equity stake to their creditors. Hence, within two years after the onset of financial distress almost half of the

firms experienced one of the control events that this study focuses on. Within four years after the onset of financial distress, almost half of the firms had been acquired (including minority controlling stakes) and an additional 7.2% had been liquidated. Only 28.9% of these firms had experienced no control event. More than 50% of sample firms for which there was sufficient information had been acquired within 5 years after the onset of financial distress. By year six after the onset of distress, 57.7% had been acquired and only 17.5% had experience no control event.

Hence, most of the control activity involving the sample firms happened within 4 to 5 years after the onset of financial distress. Acquisitions were most common; within five years after the onset of financial distress, more than half of all firms had been acquired. On the other hand, liquidations were relatively rare. Table 8 and Figure 5 summarize this information.

TABLE 8: STATUS OF FIRMS THROUGHOUT TIME⁸

Strongest Event	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
No event	86	70	50	38	28	23	17	13	11	11	11	11	9	8	3	2	2
Creditor equity stake	3	9	15	18	18	16	15	15	12	11	10	9	9	6	1	0	0
acquisition	7	13	24	33	43	50	56	58	61	63	63	63	62	43	17	11	2
liquidation	0	4	7	7	7	7	8	10	11	11	12	13	16	14	6	3	1
unclear year does not exist	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	0	0	0	0	0	0	0	0	0	0	0	0	0	31	78	92	104

⁸ Table 8 is an aggregated version of Table 9. See also the previous footnote.

Figure 5: Status of Firms Throughout Time

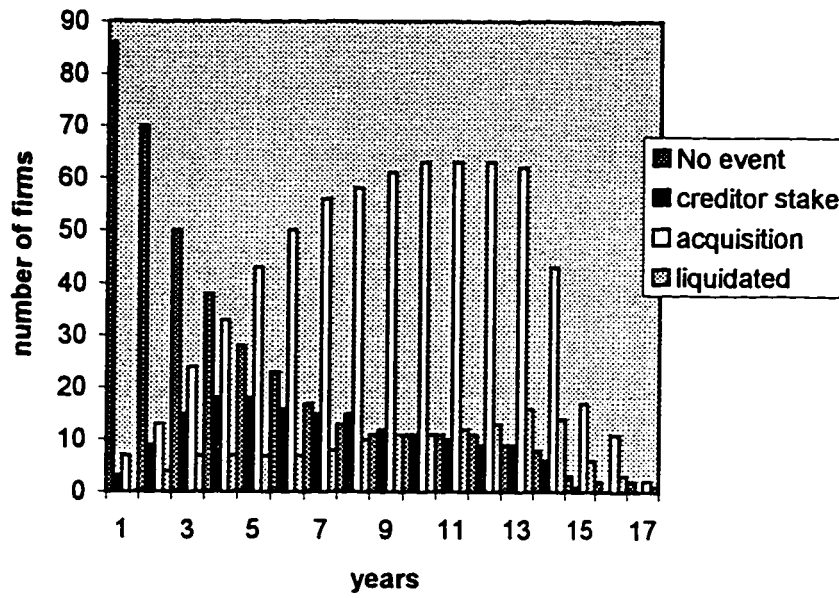


Table 9 provides more detail on the nature of the control events by disaggregating the categories of Table 8.

TABLE 9: CONTROL EVENTS IN MORE DETAIL

Strongest Event	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
no event	86	70	50	38	28	23	17	13	11	11	11	11	9	8	3	2	2
creditor minority stake outs. Ch.11	2	6	8	8	8	7	5	5	5	5	5	5	5	4			
creditor minority stake in Ch.11	1	1	1	2	2	2	2	2	1	1	1	1					
creditor stake outs. Ch.11		1	1	2	2	2	2	2	1	1	1	1	1				
creditor majority stake in Ch.11				1	1								1	1	1		
creditor majority stake outs. Ch.11				1	2	3	2	2	2	1							
creditor majority stake in Ch.11		1	3	3	3	3	4	4	4	4	3	2	2	1			
minority controlling stake outs. Ch.11	2	5	3	1	2	2	3	2	1	2	2	3	3	1			
minority controlling stake in Ch.11				1	1	1	1	2	4	4	4	4	3	3	1	1	
acquired >50% outs. Ch.11	4	4	6	8	11	11	10	10	11	11	11	11	10	7	4	1	
acquired >50% in Ch.11	1	1	3	5	5	6	6	7	7	7	7	5	5	4	1	1	
100% acquired outs. Ch.11		1	2	5	10	12	17	18	18	19	19	20	21	16	4	3	1
100% acquired in Ch.11		1	6	8	9	9	9	9	9	9	9	9	9	6	3	2	
taken private									1	1	1	1	1				
taken private outs. Ch.11			1	1	1	1	1	1	1	1	1	1	1	1	1	1	
taken private in Ch.11			1	1	1	1	1	1	1	1	1	1	1				
essentially liquidated outs. Ch.11								1	1	1	2	2	2	3	2	2	1
essentially liquidated in Ch.11		1	3	3	3	3	4	5	5	5	5	5	5	4	1		
liquidated									1	1	1	1	1	1			
liquidated outs. Ch.11		1	1	1	1	1	1	1	1	1	1	1	1				
liquidated in Ch.11		2	3	3	3	3	3	3	3	3	3	4	7	6	3	1	
most assets acquired by one firm ch.11				1	1	2	2	2	2	2	2	2	2	1			
essentially acquired in receivership (Can)						1	1	1	1	1	1	1	1				
taken private outs. Ch.11 in MBO						1	1	1	1	1	1	1	1	1	1	1	
essentially acquired in Ch.11		1	2	2	2	3	4	4	4	4	4	4	4	2	2	1	1
year does not exist														31	78	92	104
unclear	13	13	13	13	13	13	13	13	13	13	13	13	13	8	5	2	1

IV. PERFORMANCE

A. Absolute Performance (Not Industry-Adjusted)

In this section, the performance of the sample firms is described in detail. Only accounting measures of performance are used. All data are calculated from *Compustat* which reports data from 1976 to 1995. There are many missing data points due to three reasons. First, many firms are acquired or liquidated (see section III) and hence have no data for the years after that event. Second, because the sample firms become financially distressed between 1979 and 1983, not all firms have data for the years before -3 (the third year before the onset of financial distress) or after year 12 available. Third, *Compustat* also does not always report the performance of firms that are still in business and have not been acquired even for the years between 1976 and 1995. This is because some of these firms were delisted from stock exchanges or did not file financial statements with the SEC. The main source of missing observations, however, is the acquisition and liquidation activity described in section III rather than missing data on *Compustat*.

The performance is measured by the operating income *before* interest, taxes, depreciation and amortization (EBITDA). Performance is reported as an operating margin: in particular, operating performance as a fraction of net sales. Table 10 and the figure below it describe the evolution of the *median* operating margin relative to net sales. Median operating margins deteriorate each year before the onset of financial distress

until median operating performance becomes negative in the year of the onset of financial distress. This is the worst year in terms of median operating performance and at the same time the only year during which the median firm suffers operating losses. The median performance recovers within four years to a level comparable to three years before the onset of financial distress but it deteriorates somewhat after the eighth year following the onset of financial distress.

TABLE 10 : MEDIAN OPERATING SALES MARGINS

Year	Median Operating Performance/ Net Sales	Number of Observations
-7	0.114	22
-6	0.097	61
-5	0.09	74
-4	0.085	88
-3	0.069	103
-2	0.058	107
-1	0.031	107
0	-0.013	102
1	0.007	90
2	0.041	75
3	0.039	67
4	0.057	54
5	0.065	44
6	0.064	39
7	0.060	38
8	0.065	35
9	0.045	32
10	0.059	30
11	0.041	27
12	0.039	24
13	0.056	19
14	0.048	8
15	0.078	5
16	0.086	3

Figure 6: Median Operating Sales Margin

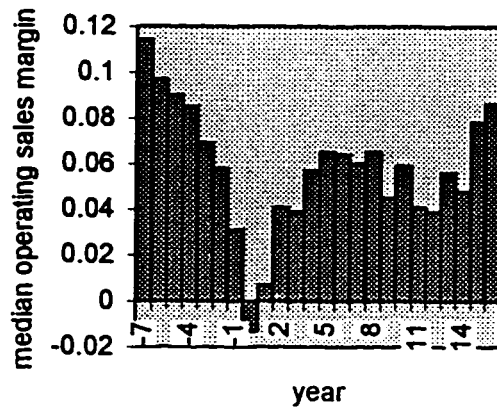


Table 11 and the figure below it describe the evolution of the fraction and the number of firms with negative operating performance. The number of firms for which performance data are available declines as more firms disappear because they are acquired or liquidated.

Starting five years before the onset of financial distress, the fraction of firms that experience operating losses increases until it reaches its peak (56.9%) in the year of the onset of financial distress. Hence, as already the median performance indicated, the year of the onset of financial distress is actually the worst year for the financially distressed firms' performance. After the onset of financial distress, the fraction of firms with operating losses declines very quickly and dramatically; within four years is reduced to roughly 20% but does not change much after that. There is a subsequent sudden increase of firms experiencing operating losses in year 12 and less dramatically

in year 14. However, at that point the number of firms that are still active (and have data available on *Compustat*) is already very small.

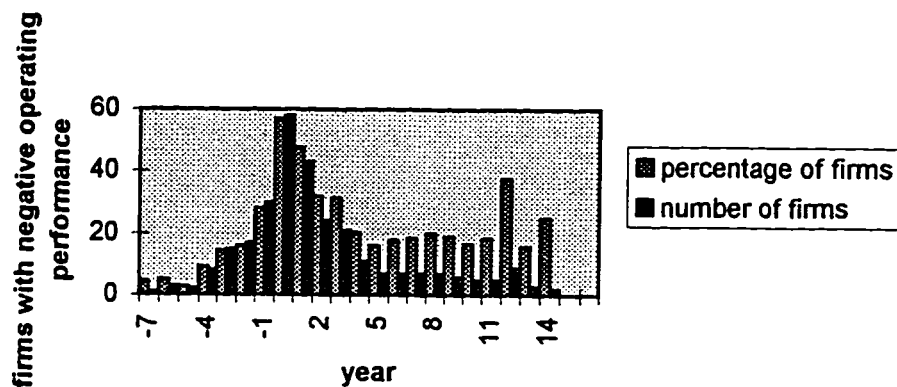
TABLE 11: NUMBER AND PERCENTAGE OF FIRMS WITH OPERATING LOSSES

Year	Number of Surviving Firms with Operating Losses	Percentage of Surviving Firms with Operating Losses
-7	1	4.6
-6	3	4.9
-5	2	2.7
-4	8	9.1
-3	15	14.6
-2	17	15.9
-1	30	28
0	58	56.9
1	43	47.5
2	24	32.0
3	21	31.3
4	11	20.4
5	7	15.9
6	7	17.9
7	7	18.4
8	7	20.0
9	6	18.8
10	5	16.7
11	5	18.5
12	9	37.5
13	3	15.8
14	2	25.0
15	0	0
16	0	0

Interestingly, the number of firms experiencing negative operating performance declines dramatically. It reaches its peak in the year in which the firms become financially distressed (58). However, already two years later, this number is cut by more

than half; in no year after the fourth after the onset of financial distress there are more than 10 firms experiencing operating losses. The dramatic and quick decline of the number of firms that report losses is due to both an improvement in the distribution of performance among the surviving firms (as shown by the fraction of firms reporting losses) and the reduction in firms that survive without being acquired or liquidated. Figure 7 summarizes this information in a different form.

Figure 7: Percentage and Number of Firms with Operating Losses



One possible interpretation of the performance data described so far is that after the onset of financial distress, poor performers leave the sample due to acquisitions and liquidations while the firms that survive as independent entities are the better performing ones. This results in a number of firms that continue to have operating losses that seems to be almost negligible from year 5 after the onset of financial distress on.

The performance results reported here are not consistent with the data reported in Hotchkiss (1995). In particular, Hotchkiss finds no significant improvement of performance in the first five years after emerging from Chapter 11. The difference in the findings may have to do with the different samples of the two studies. While Hotchkiss analyzes the performance of firms that emerge from Chapter 11 as public firms this study is not restricted to firms that enter and emerge from Chapter 11. Indeed, there are only 15 firms in this sample that emerge from Chapter 11 without being acquired or liquidated. Only 8 of these firms survive as independent entities for more than 3 years.⁹

Finally, Table 12 summarizes the operating margins of the sample firms in more detail. The number of firms experiencing losses larger than 10% of their net sales is relatively high in the first two years after the onset of financial distress (16 and 15, respectively). However, this number never reaches more than 7 after the second year after the onset of financial distress and never reaches more than 4 after the fifth year of financial distress. Hence, this number becomes arguably negligible.

⁹ Hotchkiss (1995) also reports that ca. 75% of the firms in her sample do not emerge as public companies from Chapter 11 but are taken private, liquidated, or acquired. Their performance is not analyzed in her study.

TABLE 12: OPERATING SALES MARGINS OVER TIME

Year	smaller than -0.5	between -0.1 and -0.5	between -0.05 and -0.1	between 0 and -0.05	between 0 and 0.05	between 0.05 and 0.1	larger than 0.1
-7	0	1	0	0	4	3	14
-6	0	0	3	0	8	22	28
-5	1	0	0	1	12	29	31
-4	0	1	2	5	18	27	35
-3	2	4	4	5	19	42	27
-2	1	5	1	10	30	37	23
-1	2	4	5	19	40	14	23
0	2	14	17	25	23	11	10
1	2	13	10	18	22	11	14
2	2	4	6	12	19	15	17
3	3	2	3	13	17	12	17
4	1	6	2	2	10	22	11
5	1	3	1	2	10	18	9
6	1	1	3	2	9	10	13
7	1	3	1	2	8	12	11
8	0	2	1	4	7	14	7
9	1	3	1	1	12	7	7
10	1	1	1	2	8	8	9
11	1	1	1	2	9	4	9
12	1	3	1	4	4	5	6
13	2	1	0	0	6	5	5
14	1	0	0	1	2	3	1
15	0	0	0	0	1	3	1
16	0	0	0	0	0	3	0

B. Industry-Adjusted Performance

While the previous subsection described the absolute performance of the sample firms, this subsection describes their industry-adjusted performance. Industry-adjusted performance was calculated as follows: First, the median operating margin (operating income/net sales) of all firms on *Compustat* with the same 4-digit SIC code was cal-

culated for a each year for each firm in the sample. Then this number was subtracted from the absolute operating margin. Table 13 illustrates the evolution of the median industry-adjusted operating margin of the sample firms.

TABLE 13 : MEDIAN INDUSTRY-ADJUSTED OPERATING SALES MARGINS

Year	Median Industry-Adjusted Operating Performance/ Net Sales	Number of Observations
-7	0.001	22
-6	-0.004	61
-5	0.000	74
-4	-0.0131	88
-3	-0.0171	103
-2	-0.0291	107
-1	-0.051	107
0	-0.087	102
1	-0.061	90
2	-0.037	75
3	-0.013	67
4	-0.006	54
5	-0.010	44
6	-0.011	39
7	-0.003	38
8	-0.012	35
9	-0.027	32
10	-0.019	30
11	-0.022	27
12	-0.061	24
13	-0.047	19
14	-0.036	8
15	0.001	5
16	0.015	3

Starting five years before the onset of financial distress, median industry-adjusted performance deteriorates until it reaches its low in the year of the onset of financial distress. Then it improves steadily until the fourth year after the onset of financial dis-

tress when the median industry adjusted performance is very close to zero (-0.006). However, in some years after the eighth year of financial distress the median industry-adjusted operating sales margin is substantially lower than zero. In those years, however, there are already very few surviving firms.

Finally, Table 14 shows the number and percentage of surviving firms that underperform the industry median.

TABLE 14: NUMBER/ PERCENTAGE OF FIRMS UNDERPERFORMING INDUSTRY MEDIAN

Year	Number of Firms Underperforming Industry Median	Percentage of Surviving Firms Underperforming Industry Median
-7	10	44.5
-6	36	59.0
-5	36	48.6
-4	51	58.0
-3	68	66.0
-2	75	70.1
-1	80	74.8
0	82	80.4
1	66	73.3
2	51	68.0
3	41	61.2
4	27	50.0
5	25	56.8
6	21	53.8
7	20	52.6
8	20	57.1
9	21	65.6
10	18	60.0
11	16	59.3
12	18	75.0
13	11	57.9
14	6	75.0
15	2	40.0
16	1	33.3

The fraction of firms underperforming industry median increases in the five years before the onset of financial distress until it reaches its high at over 80% during the year of the onset of financial distress. Then it steadily declines to exactly 50% in the fourth year after the onset of financial distress. From then on it is never higher than 60%, except again for some years after the eighth year of financial distress when there is already a small number of surviving firms. The number of firms underperforming their industry median declines dramatically from 82 in the year of the onset of financial distress, reaching 41 in year 3, 27 in year 4, and 21 in year six. After that this number is never higher but it is still 18 in year 12.

V. CONCLUSION

This paper has analyzed the long-run history of 110 firms that became financially distressed between 1979 and 1983. The firms are involved in a large number of control events. In particular, many of them are acquired: more than 50% of all sample firms for which there was sufficient information had been acquired within 5 years after the onset of financial distress. Liquidations were much less common than acquisitions, and most acquisitions occurred outside Chapter 11. Very few firms survived as independent entities over the long-run.

The performance of the firms reached a low in the year they became financially distressed, with more than half of them reporting negative operating income. However, the fraction of firms reporting negative operating income declines relatively fast to 20%. The number of firms that report negative operating income becomes very small within only a few years after the onset of financial distress because of the improvement in the performance of the surviving firms and the large number of firms that are acquired or liquidated.

Overall, the evidence presented here is not inconsistent with a dynamic process of financial distress in which firms that continue to perform poorly are acquired or, less often, liquidated while firms that improve their performance have a better chance of surviving as independent entities.

This paper provides a first step towards understanding the extent and form of asset reallocation among financially distressed firms by simply describing the extent and timing of acquisitions among these firms. The evidence presented here raises the question to what extent this acquisition activity can be viewed as an important form of asset reallocation away from financially distressed firms. This question is beyond the scope of this paper and can only be answered through further research. I hope to address this question in future research on the same sample of firms. One question of particular interest is what happens to the acquired firm's assets after the acquisition. Are the assets typically split up and a relevant fraction sold to third parties? Or are they more often kept together and organized as an independent entity such as a sub-

subsidiary? The identity of the acquirer will have an important effect on the answer to this question. Is the acquirer typically a firm in a similar industry allowing substantial synergies between the assets of the acquiring and the acquired firm? Is the acquirer a conglomerate that may generate financial synergies? Or is the acquirer an investment firm without specific expertise in the business lines of the acquired firm, perhaps specializing in splitting up firms and selling the pieces to different buyers? In this case, acquisitions could indeed be interpreted as a perhaps cost-effective way of liquidating distressed firms. Then, an active corporate control market for distressed firms could serve as a substitute for liquidations during bankruptcy that may not occur often enough, perhaps due to features of Chapter 11.¹⁰ If the corporate control market is indeed an effective means of reallocating assets away from financially distressed firms, the provisions of Chapter 11 may play a less important role than the intense debate about Chapter 11 suggests.

Moreover, acquisitions play an important role also for firms outside of financial distress. It would be helpful to establish a control sample of similar but not distressed firms and compare the control events in these firms to the ones in the distressed sample described here.

¹⁰ Hotchkiss and Mooradian (1997) suggest that an active corporate control market for financially distressed firms may discipline management and alleviate problems caused by management entrenchment.

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