The Economics of Corporate Bankruptcy Law

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Erklärung

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Chapter 1. Introduction and Overview

1.1 Introduction

The separation of economically profitable firms from those with only poor prospects plays a key role in an economy. As production factors are scarce, it may be socially optimal to liquidate a firm and sell all its assets so that they can be used elsewhere more efficiently. A problem arises, however, if the economic agents involved in a firm, namely, managers and investors, disagree on whether or not the firm should be liquidated, be it due to asymmetric information about future earnings or because of opposing interests in the firm. Financial distress can partly serve as such a separation device: if a firm's current earnings contain some information about future business, then a firm that is not able to meet current debt payment obligations will most likely perform weakly in the future as well. This is the rationale for debt collection law, which enforces creditors' control in case of default. Default reveals low performance, and creditors usually tend to liquidate the firm rather than to take the high risk of continuation.

It may be the case, however, that a firm experiences financial difficulties because, for example, of a unique earnings shock and is expected to be highly profitable in the future. Then, according to the above mechanism, the firm would be liquidated despite of its bright economic prospects. The reason, therefore, why many countries have a bankruptcy law, is to protect such firms from inefficient liquidation. The straightforward aim of the design of bankruptcy law is then to force liquidation whenever a bankrupt firm is unviable and to grant protection whenever it is economically promising.

Simple as it is, this goal faces two serious impediments. First, information indicating that a defaulting firm is highly promising may be private to the firm's manager. As the firm's liquidation implies that he loses his job, a conflict of interests arises: The manager will always pretend that the firm is economically viable in order to avoid liquidation, no matter what his

private information indicates. Hence, in order to achieve the desired separation of good from bad firms, the manager must be given incentives to reveal his information truthfully.

The second complication associated with the design of bankruptcy law is that mechanisms that reveal future earnings prospects of a bankrupt firm may not be without consequences at other stages. If, for example, the manager is treated too generous in the event of liquidation, he may not be willing to exert as much effort as socially optimal. On the other hand, if the prospect of financial distress is too adverse, the manager will take inefficient actions to avoid it: He may choose investment projects so as to minimize risk instead of maxmizing expected profit, or, if financial distress is already imminent, he may inefficiently take long-shot risks to preserve a small probability that it is finally averted[1].

This thesis seeks to review the existing literature on the economics of bankruptcy law and to present some alternative arguments that take into account these problems to a larger extent than earlier contributions used to do. Except for Chapter 4, which deals with bankruptcy law in India, it will often be referred to the U.S. bankruptcy code enacted in 1978 throughout this thesis. The U.S. bankruptcy code contains regulations for the liquidation process of a bankrupt firm, the so-called Chapter 7, and the possibility for financially distressed firms to receive protection from creditors seeking to seize the firm's assets, which is specified in Chapter 11 of the Code. This "bias" towards U.S. law is due to the fact that most academic contributions on the economics of bankruptcy law refer to the U.S. bankruptcy code; a second reason is that many deem it exemplary and propose reforms that make bankruptcy law in other countries more similar to U.S. bankruptcy law. Furthermore, bankruptcy law in many other countries already provides for the possibility of a bankrupt firm's reorganization as a going concern, although liquidation occurs more often and incumbent managers have less control

[1] This problem of asset substitution is what Jensen and Meckling (1976) refer to as agency costs of debt.

under European bankruptcy laws than in the U.S[2]. In contrast to Chapter 11, for example, U.K. law prohibits that a firm stays in business if its liquidation value is higher than its going-concern value[3]. Additionally, it is easier for creditors to come to a decision in European countries such as the U.K., Germany or France, because all creditors vote on a reorganization plan within a single class, and old equity is not allowed to vote on the plan. In Germany creditors are even entitled to replace the administrator appointed by the court[4]. Over all, however, the analysis carried out in the following chapters will be that general that it is sufficient to notice that all of the bankruptcy codes just mentioned include a mechanism for liquidation and one of reorganization as a going concern.

This thesis contains three contributions of mine to the academic discussion on the economics of bankruptcy law. All of them build on the same basic model, which will be set out in section 2.2. This basic model assumes that a firm's current performance is a signal for its future profitability, so that a defaulting firm is more likely to perform poorly in the future than an otherwise identical firm with the same financial structure and that is in a healthy financial condition. This structure of the model gives rise to the role of default as a separation device between good and bad firms: The second-best liquidation policy can be implemented by simple debt collection law, although the firm's manager always prefers to keep the firm in business and the creditors always wish to liquidate the firm.

In section 2.6 I consider the complication mentioned earlier, namely, the case where a firm's manager is better informed about the firm's future prospects than the investors. Providing the manager with sufficient incentives to use this additional information efficiently may, however, not be individually rational for investors, even if it would be socially profitable. In

[2] White (1996) compares the bankruptcy codes of the United States, Great Britain, France and Germany in detail.

[3] For a comparison between the U.S. and U.K. bankruptcy codes see Franks and Torous (1992). Franks and Nyborg (1996) present a model of the U.K. insolvency code where in some cases even this bias towards liquidation turns out not to be sufficient.

[4] Since 1999, Germany has a new bankruptcy code. For a description of it see, for example, Sinz and Hefermehl (2001). Perker (1994) compares the new code, which was at that time only at a planning stage, with U.K. insolvency law.

this case bankruptcy law can be designed so as to make use of a conflict of interest between the firm's shareholders and creditors, so that the second-best liquidation policy is implemented, although it does not ex post maximize the investors' aggregate payoffs. It will turn out that there are three classes of claims in equilibrium, namely, equity, senior short-term debt and junior long-term debt. Optimal bankruptcy law then allocates control to the senior creditors if the firm has performed especially badly, and a better performing, but still defaulting firm should be decided on jointly by shareholders and senior creditors.

A direct application of the basic model will be presented in section 3.4 where I argue that the possibility to design exchange offers in a way that coerces bondholders will be anticipated in advance and, in contrast to the results of other contributions, will not affect efficiency. In equilibrium, all of the three legal environments that are considered implement the second-best arrangement.

Finally, the basic model will be modified so as to incorporate the decisions of a politician, who derives benefits from being able to enforce over-employment in a firm. The consequences of Indian bankruptcy law, which awards the local governor control of a bankrupt firm, will be examined within this framework. It will turn out that a governor whose objective depends on his expected private benefits from control and the treasury's cash position will reward highly leveraged firms with subsidized loans, because high leverage implies a large probability of bankruptcy, in which case he gains control over the firm.

All of these contributions, as well as the basic model, are driven by an understanding of bankruptcy as a state where a social planner can implement a favourable allocation of payoffs and control that the firm and its investors would not have specified contractually. Hence, bankruptcy law can be used to mitigate certain agency problems associated with corporate finance and is more a source of an increase in efficiency than a source of inefficiency. In the remainder of this chapter the literature will be reviewed that is consistent with or discusses other points of view. Section 1.2 will present the discussion about which kind of costs

associated with financial or economic distress deserve the label "bankruptcy costs". This discussion evolved in the late 1970s as a response to a widespread confusion of the administrative or even opportunity costs of liquidating a firm with bankruptcy costs. In section 1.3 a line of research is reviewed that seeks to design bankruptcy law such that (i) the bankrupt firm's future be efficiently decided on, (ii) the manager of the pre-bankruptcy firm face a credible threat of punishment for the case of bankruptcy, and (iii) the allocation of payoffs respect the contractually specified priority of claims. Especially the goals (ii) and (iii) imply a certain bias towards protecting the creditors' interests. If bankruptcy is, however, a sufficiently adverse state for managers and shareholders, they may be induced to avoid bankruptcy at any cost. This argument lead to a discussion about whether a bankruptcy procedure should respect the originally contracted priority of claims, which will be summarized in section 1.4.

In Chapter 2, a point of view that is more according to ex ante considerations will be derived. The basic model and previous contributions dealing with a trade-off between ex-post and ex-ante effects will be presented within one framework. Chapter 3 will examine whether private, informal reorganization of debt may resolve financial distress more efficiently than costly court-supervised procedures. Chapter 4 deals with the special problems of bankruptcy in developing countries and presents some evidence from India on the political economy of corporate sickness. Some concluding remarks and suggestions for future research will be presented in Chapter 5.

1.2 The Irrelevance of Bankruptcy for Efficiency

An appropriate starting point for any analysis of the economics of bankruptcy law is the Modigliani-Miller theorem[5], which states that, in the absence of asymmetric information, a firm's financial policy is irrelevant for its value. Since bankruptcy is a mere consequence of the financial contracting decision, it should not have any impact on the valuation of the firm, apart

[5] see Modigliani and Miller (1958, 1963) and Stiglitz' (1974) extension.

from eventual court fees, the so-called direct cost of bankruptcy. What is so special about this seemingly trivial conclusion? The academic discussion of bankruptcy and bankruptcy costs used to be driven by the belief that the costs associated with a firm's liquidation like the disruption of the firm's ties with customers or the possibly inefficient way the sale of the firm's assets is organized, should be seen as "bankruptcy costs" and thus enter the account as costs of debt when the firm chooses its financial structure. Supporters of this view claimed that, in a Modigliani-Miller world, the optimal level of debt is determined by the trade-off between tax benefits and these "bankruptcy costs" (the so-called "tax shelter - bankruptcy cost" hypothesis).

All the more valuable is Haugen and Senbet's (1978) contribution, which established that these liquidation costs are irrelevant for the firm's choice of capital structure. In response to the literature mentioned in the above paragraph, they argue that the liquidation decision should depend only on the firm's economic viability and, hence, be made independently of the event of bankruptcy. After the publication of this irrelevance result, some contributions still attempted to show the relevance of bankruptcy costs. The approach was to somehow tie liquidation to the event of bankruptcy and thus justify the use of liquidation costs as bankruptcy costs. Titman (1984) argues that bondholders, in general, are biased towards liquidation, because their claim is fixed. Altman (1984) shows an empirical significance of "bankruptcy costs" for capital structure. Ten years after publishing their irrelevance result, however, Haugen and Senbet (1988) defended their point of view. They find that Altman's (1984) result is driven by a confusion of liquidation costs with bankruptcy costs. Furthermore, they doubt that Titman's (1984) claim is justifiable, because, for example, creditors who are persuaded that the liquidation of a firm would be more appropriate than keeping it in business can as well buy all of the shares and force liquidation, thereby increasing the shares' value.

Where the *direct* costs of bankruptcy, such as court fees and other litigation costs, are concerned, there is a broad acceptance of their very existence, but there is some discussion about their impact. Weiss (1990) presents some evidence that direct bancruptcy costs are, on

average, as low as 3.1 percent of the book value of debt and concludes that "these low direct costs (...) will have little or no impact on the pricing of claims prior to bankruptcy". On the other hand, one could argue that we do not observe significant bankruptcy costs, *because* they are avoided beforehand when financial contracts are written out. Welch (1997), for example, argues that banks are better "fighters" in litigations and, hence, will appeal a bankruptcy court's decision that does not award them seniority of claims. In order to avoid the (deadweight) costs of such a trial, banks usually receive explicitly senior claims at the outset.

What, then, can we conclude about the relevance of bankruptcy costs? The "tax shelter-bankruptcy cost" hypothesis, which used to be very fashionable some twenty years ago, has certainly lost its appeal since the interpretation of liquidation costs as indirect costs of bankruptcy had been rejected and the direct costs of bankruptcy had turned out to be *ex ante* negligible[6]. As a consequence of the analogy with the Modigliani-Miller theorem, the chief concern of the literature on the economics of bankruptcy law were information and incentive problems, in the presence of which this theorem is, generally speaking, not valid. Building on the results that have been obtained in other fields of economics where information and incentive problems are an issue, another source of bankruptcy costs has been derived mainly by scholars in the Law and Economics literature, namely, inefficiencies in the way actual bankruptcy law allocates control rights and payoffs among the various claimants of a bankrupt firm. This strand of literature aims at finding ways to improve bankruptcy law in this respect, and part of it will be reviewed in the following sections.

1.3 Bankruptcy Law and the Liquidation Decision

After it had been recognized that the social costs, externalities or opportunity costs that may arise when a firm is liquidated must not be confused with bankruptcy costs, decision-

[6] Miller (1977, p. 264) drew this conclusion in his famous statement that "the supposed trade-off between tax gains and bankruptcy costs looks suspiciously like the recipe for the fabled horse-and-rabbit-stew - one horse and one rabbit."

making in the bankrupt firm was identified as the major source of inefficiencies associated with bankruptcy. Hart (1995, pp. 156-185), who in a way summarizes the point of view that drove this line of research, lists the three goals a bankruptcy code should serve: First, the firm's future should be efficiently decided on; second, the manager should face a credible threat of being punished in the case of default, in order to induce him to manage the prebankruptcy firm with higher diligence; and finally, the relative priority of claims as specified in the original contracts should be preserved. In the remainder of this section we will review some proposals of how to accomplish the first goal, and in the next section we will discuss the last two goals, which are closely interrelated.

In contrast to the liquidation costs mentioned in the preceding section, which could as well arise in financially sound firms that should for some reason or other be shut down, the problem of who should decide whether to liquidate a firm or to keep it in business is special to firms in financial distress, for the following three reasons: First, financial distress implies that the debt-equity ratio has turned very high, so that the firm's shareholders, as represented by the management, are strongly biased towards the gamble of continuation, even if the total expected return on it is lower than the proceeds of an eventual piecemeal sale of the firm's assets, a motivation which holds especially for the case where these proceeds are not sufficient to satisfy the creditors' claims. Secondly, if investors are uncertain about the firm's quality, its performance today may contain some information on future profitability, so that the probability that the firm's assets can be used elsewhere more efficiently is higher if the firm is not able to meet its debt payment obligations. Hence, the liquidation decision is more likely to be an issue when a firm is financially distressed than when it generates high profits. Finally, there is a collective action problem among creditors. If a firm fails to meet its payment obligations, creditors are, under debt collection law, entitled to seize the firm's assets in order to satisfy their claims. If the firm's assets are worth less than its total liabilities, this leads inevitably to a

piecemeal liquidation of the firm, which is not the desired outcome in the case of a firm that is insolvent but economically viable.

Bankruptcy law in many countries has been designed so as to protect firms from such a race to seize its assets, a prominent example being Chapter 11 of the U.S. bankruptcy code of 1978. Under Chapter 11, the firm's liabilities are automatically stayed, so that the creditors' efforts to seize the firm's assets are coordinated. Then a bankruptcy court decides, together with the creditors, whether some reorganization plan should be applied or the firm should be shut down. While Chapter 11 is often defended mechanically, mainly by lawyers and practitioners, who reveal a substantial skepticism towards the efficacy of market forces[7], many scholars in the field of bankruptcy law have argued that such a court-supervised procedure does not perform too well in investigating whether a firm should be shut down or kept in business. Market approaches to deriving the firm's values in liquidation and continuation have been proposed and will be reviewed in the following. Apart from these reform proposals, however, the whole idea of a formal reorganization procedure has been challenged by some contributors.

Some scholars have proposed to replace bankruptcy law with the possibility for firms and its creditors to write out contracts about what to do in the case of financial distress. Setting aside the supposedly high costs of a formal procedure, Rasmussen (1998) argues that if creditors are not completely rational, they may fail to price the effects of different bankruptcy regimes, because bankruptcy is a rather remote event at the time the contracts are bargained on. Direct contracting over the bankruptcy rules may then increase the lender's attention on bankruptcy. On the other hand it is not clear that the costs of writing out such contracts in advance may not even be higher than those incurred by formal bankruptcy. Moreover, the existence of bankruptcy law can be justified by the fact that it still exists: According to

[7] For an assessment of this approach to bankruptcy see Baird (1998). In an earlier paper, Baird (1997) criticizes that advocates of this approach refer to certain values of Chapter 11 that "seem to boil down to no more than assertions that misery loves company and everyone should share the hurt."

Easterbrook (1990), bankruptcy law, as any legal institution, would have been forced to be removed were investors not convinced of its appeals. A similar point is made by Baird (1997) who shows that even in cases where investors are able to opt not to apply bankruptcy law at the outset, they do not.

A most radical critique of court-supervised reorganization is made in the study of Bradley and Rosenzweig (1992). They find that after the 1978 Bankruptcy Act had come into effect, filings became more frequent, the earnings potential of filing firms higher, and the market value of the claims against the firm reduced. From this they conclude that the social costs of bankruptcy have increased under the 1978 Act. They explain this inefficiency by the endogenization of bankruptcy: In their view, Chapter 11 is such an attractive option for a firm's manager that avoiding financial distress has a smaller weight in the corporate financing decision than before 1978. They therefore propose to abolish any form of court supervision of the reorganization process. Firms should try to raise new equity in the case of financial distress in order to meet the debt payment obligations. If this is not possible, the firm defaults, and the junior creditors become automatically the new shareholders, the old shareholders losing all claims in the firm.

Although provocative, this argument is not completely convincing. For example, Bradley and Rosenzweig (1992) do not explain why they believe the inefficiency they find in their empirical study stems from the increased endogeneity of the bankruptcy decision. In particular, it is not clear why investors should, at the outset, be willing to accept financial contracts that lead to an inefficiently high probability of bankruptcy. Furthermore, even if one accepts their reasoning in this point, they do not explain why a strict application of the Absolute Priority Rule (APR), which they praise as a central feature of their proposal, should solve this problem[8]. Finally, in their proposal, junior creditors that become new shareholders in the case

[8] The debate about the APR will be reviewed and commented on in the next section.

of default are subject to the very same incentive problems as the old shareholders, above all to the risk-shifting problem, albeit to a smaller extent.

While Bradley and Rosenzweig (1992) accept the benefits of protecting an insolvent firm from routine liquidation, questioning only their size as compared with the costs of such a protection, there is a contribution that even denies their very existence. Assuming that a firm's performance in the past contains some information about its economic viability in the future, Adler (1997) argues that it is possible to choose the ex-ante capital structure such that insolvency and economic viability are unlikely to occur at the same time. If this is the case, there is no point in protecting the firm from a creditors' race to seize its assets by means of the costly Chapter 11 procedure. As modern theories of capital structure identify many incentive problems associated with debt and equity, however, it is very unlikely that capital structure should be designed solely to achieve exactly this goal. Furthermore, as long as poor performance in the past does not imply economic inviability with certainty, there is still room to bring about an increase in social welfare by means of some bankruptcy law, as will be shown in Chapter 2.

For the remainder of this section, we shall assume that the fundamental dilemma that motivated Chapter 11, namely to come to an efficient decision about an insolvent firm's future and at the same time allocate the claims in the post-bankruptcy firm or the proceeds from an eventual liquidation efficiently, does exist and is significant. Selling the firm as an entity[9], maybe in an auction, as proposed by Baird (1986, 1993), and distributing the proceeds among the claimants obviously solves this problem[10,11]. It has been argued, however, that potential

[9] Cornelli and Felli (1997, 2000) argue that the revenue to such a sale is higher when only the firm's majority stake is auctioned off rather than the whole firm, because in equilibrium, the winning bid will be less than the firm's value after the sale.

[10] As for the problem of valuing secured claims in such an auction, Bebchuk and Fried (2001) propose to sell a nonrecourse claim, backed by the same asset as the initial claim, in a separate auction, the winner of which would have the right to collect the claim only after the end of the bankruptcy procedure. Postponing the resolution of the new claim in this manner is to reduce eventual liquidity problems, so that the post-bankruptcy firm can participate at the auction of the collateral if it preserves going-concern value.

[11] Hansen and Thomas (1998) argue that it might be attractive to use the advantages of an auction without abandoning the benefits of Chapter 11. They therefore propose to substitute

buyers are less informed about the true value of the reorganized firm than the old claimants are, and that they may even face liquidity constraints preventing them from buying the firm, as Shleifer and Vishny's (1992) analysis on distressed assets sales suggests. Recent evidence shows that these impediments may not be that strong. Hotchkiss and Mooradian (1998) do observe that acquirers of bankrupt companies are also highly leveraged, but find, over all, a positive effect of such acquisitions on the operating performance. They even report that targets in these acquisition perform, on average, better than independently reorganized firms in Chapter 11. Thorburn (2000) observes in the context of small Swedish firms that auctions are "surprisingly efficient".

Another proposed way to ensure a correct assessment of this problem is, therefore, to transform the bankrupt firm into a new, unindebted one, and to distribute its shares according to the claims in the prebankruptcy firm, that is to say, to replace the (unfeasible) real sale of the firm by a hypothetical one. Both procedures have two major advantages compared to the reference case, in which the liquidation decision is made without a reorganization: First, and most importantly, the firm's new owners, who are entitled to decide whether the firm should be liquidated or kept in business, are provided with incentives that induce them to make this decision efficiently. Secondly, as the new owners' interests are, where these incentives are concerned, aligned with each other, bargaining and litigation occurs only over the share of the fixed pie everyone receives, and not over the firm's future, thus saving some of the costs associated with bargaining and litigation.

Setting aside fundamental objections of this proposal, for example, that a purely equity-financed firm is not very likely to be run efficiently, there remains the question of how the shares of the postbankruptcy firm should be allocated among the prebankruptcy claimants. Clearly, the process of allocating the new firm among the old claimants should be quick and

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the mandatory Chapter 7 liquidation, which is imposed upon a bankrupt firm if the Chapter 11 process has not led to an agreement within reasonable time, by an auction.

should not encourage the claimants to undertake wasteful efforts to misrepresent the true value of the reorganized firm. Beyond this, some scholars in law and economics have suggested that a reorganization should mimick roughly the structure of claims the firm and the investors have bargained for at the very outset, the so-called "creditors' bargain", according to Jackson (1982). A rigorous justification for this requirement has, however, not been given[12]. In any case, the value of the pie to be distributed must be identified prior to the distribution. To find out the value of a reorganized firm and at the same time eliminate reasons for participants to complain or bargain and litigate is a difficult task. As an attempt to improve the idea of selling the firm as an entity, Roe (1983) proposes to estimate the reorganization value of a firm by selling only a small part of the shares of the new firm. This estimation is most probably more accurate than that of a bankruptcy judge, but some of the old claimants may still disagree, be it for strategical reasons or because of certain information asymmetries, or the sale price may even be manipulated by old claimants.

Addressing to these shortcomings of the "slice-of-common-stock sale", Bebchuk (1988, 2000) presents a mechanism that does not rely on valuations made by outsiders. In the proposed mechanism, every claimholder is awarded a call option which she can exercise by paying off all senior claimholders, and is short a call option with an exercise price equal to her claim. In order to convey the idea, consider one claimholder's individual decision of what to do with the option. If she thinks the firm is worth more than the sum of her and all senior claims, then either the claimholders junior to her agree, exercise their call options and pay off all claimholders senior to them, or they disagree and refuse to exercise their options, in which case the claimholder under consideration can, herself, exercise her option, which she believes is worth even more than her claim. If, on the other hand, she thinks the firm is worth less than the sum of

[12] Baird (1986) presumes that the firm and the investors will, at the outset, only agree upon a strategically efficient structure of claims and that this initial financial structure should, therefore, be restored in the reorganized firm. Bebchuk (2000) also claims to have efficiency arguments in favour of this principle, without going into detail.

her and all senior claims, the option she is short will most probably not be exercised, and she can either pay off all senior claimholders or, if she thinks the firm is worth less than the senior claims, choose simply not to exercise her option. In any case, no claimholder receives less than what she thinks her claim is worth.

The advantages of Bebchuk's option approach are evident: The residual claimants are identified and given the right to become the exclusive owners of the firm by paying off all senior claims, so that they can make an unbiased decision of whether to liquidate the firm or to keep it in business. Furthermore, there is no incentive for strategically misrepresenting the firm's value. There is neither room nor need for bargaining and litigation, thus saving the deadweight costs thereof. Problems of liquidity, however, may arise even when the options approach is used, namely, if the claimholders do not have sufficient access to funds to exercise their options and if an eventual secondary market for the options issued in the reorganization process underestimates the reorganized firm's value. As Bebchuk (2000) remarks, however, the option approach is nevertheless at least weakly better than an auction even if outsiders underestimate the firm's value: If claimholders have access to sufficient funds to exercise the option, the firm's old claimholders are better off than in an auction, and if they have to sell their options in the secondary market, the two approaches perform equally well. Furthermore, Adler and Ayres (2000) have made a first attempt to modify Bebchuk's mechanism so as to alleviate eventual problems of constrained liquidity among junior claimants.

Another critique may be that the APR implemented by the mechanism may not provide the management with appropriate incentives to diligently manage the post-bankruptcy firm. Whether this is indeed a problem will be discussed in the next section. Anyway, Bebchuk (2002) cites one of his own unpublished papers (Bebchuk, 1999), in which he generalizes his Options Approach so as to allow for deviations from APR.

The Options Approach to corporate reorganization has proved to be most influential in many subsequent proposals for bankruptcy reform such as Aghion et al. (1992), Hart (1995,

2001) or Hart et al. (1997). In the fourteen years since it entered the academic discussion, however, its impact on practice has remained remarkably low.

1.4 The APR Debate

Debt financing, in its initial sense, means that the debtor promises the creditor a fixed payment that has to be made irrespective of the returns to the debtor's entrepreneurial undertakings. In the case of limited liability, however, the debtor cannot be forced to repay debt out of his private wealth, so that creditors receive the lesser of the firm's value and their (fixed) claim. In other words, as long as the creditors are not satisfied, the firm's owners are not entitled to any payment stream from the firm. This principle is called the "Absolute Priority Rule" (APR). Another feature of the APR is that junior creditors receive nothing as long as senior creditors have not been paid in full.

In practice, there is strong evidence that the APR is systematically violated. Franks and Torous (1989) find that the priority of claims was violated in 21 of 27 the corporate reorganizations in their study. Weiss (1990) reports similar figures, namely, 29 of 37 cases. Where the size of the deviations from the APR is concerned, Franks and Torous (1994) calculate that, on average, shareholders of the 37 firms in their sample that filed for Chapter 11 received 2.28% more of the total value of the restructured firm's securities than they would have been entitled to according to the APR. Eberhart, Moore and Roenfeldt (1990) report average excess returns for shareholders of no less than 7.6% of the total value.

As these figures came into circulation, the academic discussion shifted away from the general issue of bankruptcy reorganization to the question of whether deviations from the APR should be tolerated. Although such an approach is certainly too narrow, and the issue of optimal bankruptcy law should be examined in a more general framework, it is not only for the sake of completeness that this strand of literature will be reviewed in the following, but it will also introduce some typical arguments that will prove useful in the general analysis.

The focus on APR violations may have been caused by scholars coming up with criticism of this practice without having any convincing arguments. Many of them seem to have had in mind some considerations about financing costs. They believed that creditors will anticipate APR violations and demand a higher interest rate at the outset[13]. What is missing in this calculation is the insight that the firm's shareholders, who are the beneficiaries of APR violations, will contribute more funds for a share in the firm in the IPO if they can expect a piece of the cake even in the case of default, and at the same time, a different financial structure may be chosen in the first place. A closer economic reasoning builds on Jensen's (1986) free cash flow hypothesis that debt payment obligations prevent managers from investing retained profits in projects with negative present value. This view ignores, however, that irrespective of APR violations, the management's investment decisions are especially closely monitored under Chapter 11[14]. In effect, there emerged a widespread, vaguely motivated belief that only those bankruptcy procedures that adhere to the APR can be efficient[15].

Where the reasons for deviations from the APR are concerned, there is now a broad agreement among scholars that they are caused mainly by the threat of shareholders to seek Chapter 11 protection. In a sequential bargaining model of the Chapter 11 process, Bebchuk and Chang (1992) identify two reasons for creditors to make concessions to shareholders, both of which are supposed to induce shareholders to agree to a quick exit from Chapter 11, namely, to let them participate in the efficiency gains from exiting Chapter 11 earlier rather than later, and

[13] cf. Hart (1995, p.160):"If [...] debt priority [...] can always be violated within bankruptcy, then people may be unwilling to lend to the company in the first place, since their claims will be unprotected" or Baird and Picker (1991, p. 317):"If Creditor can predict that it is likely to receive a small share in the event of a reorganization, it will demand a correspondingly high interest rate at the time of the initial loan. [...] Firm will default more often if it must pay a higher rate of interest to Creditor (assuming the debt level is fixed [...])".

[14] Reorganization plans need the approval of the creditors and the bankruptcy court. Moreover, management turnover in bankrupt firms is especially high. Gilson (1990) observes that Bank lenders frequently appoint new directors: In the firms he examined in his study, only 46% of incumbent directors and 43% of CEOs remained, and those who did not held fewer seats on other boards thereafter.

[15] Wruck (1990, p. 440), for example, complains about the likely acceptance of "a plan that results in a lower firm value, i.e., that is inefficient and violates priority", without, however, justifying the claim that a violation of the APR lowers a firm's value.

to compensate them for the option value of remaining in Chapter 11: Shareholders of a bankrupt firm can only gain from remaining in Chapter 11. The following comparative statics are derived: The amount equityholders receive is decreasing in the initial undercoverage of debt and increasing in the insolvent firm's volatility, the cost of remaining in Chapter 11, the rounds of bargaining before the firm is forced into Chapter 7 liquidation, the time period the incumbent management enjoys exclusivity of reorganization proposals, and the loss of a liquidation as compared to a successful reorganization. Solvent firms will file for Chapter 11 only if the firm's value is sufficiently close to the liabilities.

Some relationships of this kind have been tested empirically: In accordance with the results of Bebchuk and Chang (1992), Eberhart, Moore and Roenfeldt (1990) can verify a correlation between the delay in bankruptcy and the extent to which the APR is violated. Franks and Torous (1994) find that the extent of APR violation is increasing in the firm's size, which they explain with increasing complexity of bargaining in larger firms.

In a Chapter 11 bargaining framework similar to Bebchuk and Chang's (1992), based, however, on ex-ante considerations, Bergman and Callen (1991) derive from a transfer of wealth from creditors to shareholders through a deviation from the APR an upper bound on the debt-equity ratio creditors are willing to accept at the very outset. This suggests that such a violation of APR will be anticipated when contracts are written out and hence has no effects on efficiency.

If a deviation from the APR is just a transfer of wealth, what, then, is the point of this whole discussion? Consider one of the sources of efficiency losses caused by financial distress identified in the beginning of the preceding section, namely, the problem that a distressed firm's shareholders, whose equity claims have turned close to worthless, may want the firm to take long-shot risks even if such a strategy reduces the firm's expected value. They have nothing to lose and only care about the upper tail of the probability distribution. If, however, they were to expect some payoff, even if the creditors' claims are not fully satisfied, this incentive to shift the

firm's assets inefficiently to high-risk projects declines. White (1989) and Eberhart and Senbet (1993, henceforth E-S) conclude that if it is known that the APR will be violated in the case of financial distress, this can reduce the agency cost of debt. Moreover, Bebchuk and Picker (1993) show that deviations from the APR lead to less managerial entrenchment and more beneficial investment in firm-specific human capital by managers. They point out that even in the case of strict adherence to the APR, manager-shareholders can secure themselves a positive payoff if the firm defaults, by choosing projects that can be run most efficiently only by themselves.

More recently, Mella-Barral (1999) has provided a different explanation for APR violations. He examines a dynamic model where it is socially optimal that default occurs exactly at that point in time when the proceeds from an asset sale are highest. This optimal timing of default may, however not be in the best interest of a firm's manager. He shows that the possibility of reorganization may mitigate this moral hazard problem. It turns out that highly leveraged firms will undertake many reorganizations and that, if such a firm is liquidated, creditors share the entire proceeds from liquidation. On the other hand, in the case of low leverage, there will not be any reorganization, and the APR will be violated if the firm is liquidated. The reason for the APR violation is that by means of this concession, creditors seek to induce the manager to default earlier, which is more efficient in this case.

There are, however, also some defenders of the APR, who are able to show inefficiencies associated with violations of absolute priority. Longhofer (1997) argues that APR violations create an inefficiency because, in a costly state verification setting, debtors have a higher incentive to strategically default if they receive a strictly positive payoff in the case of default. Hence, the states where state verification and the cost thereof occur are more frequent.

In sharp contrast to E-S's result, Bebchuk (2002) shows that deviations from the APR *increase* the incentives for managers to shift the firm's assets to high-risk projects. To be more

speceific, Bebchuk shows that the problem that a firm may choose a risky project even if it has a lower expected return than a completely safe one is more severe in the presence of APR violations. That is to say, there are some cases where a risky, inefficient project is preferred to the safe one in the presence of APR violations but not in their absence, whereas the opposite does not hold. This discrepancy between E-S and Bebchuk can be explained by the different aims of the analysis. In contrast to Bebchuk's motivation as just explained, E-S show that the effects of a marginal increase in risk increases a firm's stock value more in the absence of APR violations than in their presence. In some sense, E-S's analysis is incomplete, as under both regimes, a rational manager would choose a maximal level of risk. What drives Bebchuk's analysis, on the other hand, is the fact that the firm cannot default if the safe project is undertaken. Therefore, as Bebchuk himself remarks[16], in the case where default is possible even if the safe project is chosen, APR violations may be beneficial, as claimed by E-S.

Cornelli and Felli (1997) show that a bankruptcy procedure's compliance with the APR may have positive or negative effects on the creditors' incentives to invest in costly, but socially beneficial monitoring. Suppose a firm's value is stochastic and that in the bad state of nature this value is larger if at least one of the creditors monitors. If the most senior creditor's claims cannot be satisfied in the bad state even if monitoring occurs, adherence to the APR clearly implies that the senior creditor both bears the costs of and receives the returns to his monitoring activity, his incentives therefore being aligned with social value, which may not be the case if APR is violated. In the case, however, where the most senior creditor's claims are not satisfied in the bad state only if there is no monitoring, and if there is no default if monitoring occurs, he still bears the total costs of monitoring while receiving less than the total returns thereto. If APR is violated, the most senior creditor's payoff in the bad state without monitoring is reduced, so that he participates at the returns to monitoring to a larger extent.

[16] p. 456

Notice that speaking technically, the argument in the first case is similar to E-S's and that in the second case to Bebchuk's. The main difference is the interpretation of the results.

In summary, the literature on the APR reveals that it produces not only beneficial, but also some undesirable effects on incentives. As mentioned at the outset of this section, the question of whether a bankruptcy procedure should adhere to the APR or allow deviations from it requires an analysis of the whole procedure. Another important caveat to this discussion is that the answer to this question may depend on the kind of firm under consideration: While the manager's incentives may not be too closely aligned with the firm's equity value in a large, publicly held company, strict adherence to the APR may be extremely inefficient in the case of a closely held enterprise, as Baird and Rasmussen (2001) point out.

Chapter 2. The Ex-Ante Effects of Bankruptcy Law

2.1 Introduction

The main focus of the contributions reviewed in Chapter 1[17] is to design a bankruptcy procedure that leads to an efficient decision on a bankrupt firm's future. The ex-ante effects of these proposals are treated, at best, as caveats, and mainly argue that punishing the manager of a defaulting firm induces him to avoid default in the first place, and that maximizing the creditors' aggregate payoffs minimizes the capital costs and thus increases the set of profitable projects that receive funds at the outset. Both of these arguments are, however, incomplete: The first ignores the point that default may occur because of bad luck in running a risky project, which would induce a manager, who used to run the firm carefully and now anticipates receiving nothing if the firm defaults, to take excessive risks in order to avoid default once things start to become bad. The second argument rests on the implicit assumption that debt is the only financing instrument, and even under this assumption, a proper assessment of the costs and benefits of reducing the creditors' aggregate payoffs in the event of bankruptcy is missing.

During the past five years, the ex-ante effects of bankruptcy law have received increasing recognition. It is now well understood that bankruptcy law is an instrument that allows a social planner to intervene in the contracting game between entrepreneurs and investors in a beneficial way. This modern view of bankruptcy law is closely connected to the institutional-economic approach to corporate finance. We will now show how this view evolved from first attempts to analyze ex-ante effects of priority rules, which have been made more than twenty years ago.

It started with the attempt to show that, under the governing priority rules, the decision between liquidating a firm and keeping it in business may be made based on other than social

[17] The exception are the three models on the ex-ante effects of APR violations, namely, Eberhart and Senbet (1993), Bebchuk (2002) and Cornelli and Felli (1997).

efficiency considerations. First, Bulow and Shoven (1978) and White (1980) connect the bankruptcy decision with a variation of Myers' (1977) well-known debt overhang problem. They assume that the decision between liquidation and continuation is made by a coalition consisting of the firm's shareholders and the bank as the most important single lender. In the presence of fixed claimants outside the coalition, namely, bondholders, the coalition as residual claimants will decide in a socially efficient way only by mere fluke. Bulow and Shoven (1978) illustrate such inefficiencies for the case where bonds are pari passu to bank debt. White (1980) then extends their model to analyze other priority rules and to distinguish between ex-ante and ex-post efficiency. Ex-post efficiency refers to the decision between liquidation and continuation when the firm is short of cash and cannot be kept in business without additional funding. The concept of ex-ante efficiency provides a means to evaluate the decision of an already existing firm not experiencing financial problems of whether to make an additional, risky project. Neither of the priority rules she considers meets generally both criteria.

Although the very reflection on ex-ante efficiency is remarkable, the model has several drawbacks. First, the ex-ante analysis boils down to the ex-post setting, with the difference that what is called "liquidation" in the ex-post case is risky in the ex-ante case. From this observation, it is no surprise that the results for the two settings are very similar[18]. Secondly, recall the more recent contributions, in which the ex-ante effects of violation of versus adherence to the absolute priority rule are compared, and which have been reviewed in section 1.4 (namely, Eberhart and Senbet, 1993, Cornelli and Felli, 1997 and Bebchuk, 2002). The criticism made there applies as well to White's (1980) ex-ante considerations: Both the effects of bankruptcy law on financial structure and the interaction between priority rules and other features of bankruptcy law, such as the structure of bargaining between investors, are ignored. A more consistent approach is, therefore, to compare different bankruptcy laws or to derive

[18] In a later contribution, White (1983) labels possible inefficiencies in making the decision between liquidation and continuation as ex-ante costs and the transaction costs of the formal procedure as ex-post costs. Hence, the first drawback of the earlier paper is removed, but the second point to be made below still applies.

optimal bankruptcy law on the basis of the respective optimal financial structure, and the effects of this financial structure on the occurence of financial distress.

It turns out that this step paves the way for a completely different view of bankruptcy, namely, that bankruptcy is a state where control and payoffs can be allocated in a more efficient way than firms and investors would have chosen in the original contracts. Hence, bankruptcy law is a suitable policy instrument to ameliorate agency problems of corporate finance that occur ex ante, i.e., at early stages of the financing game[19]. In contrast, the traditional view was that financial distress occurs exogenously and creates inefficiencies that may be reduced by bankruptcy law.

Among the first to take the "modern" view were Berkovitch, Israel and Zender (1997, 1998; henceforth "B-I-Z"), who analyze an entrepreneur's incentives to make investments in firm-specific human capital. As they deploy a costly state verification (CSV) setting, the firm is completely financed with debt[20]. After an initial investment to set up the firm and the manager's investment in human capital, the manager and the investors receive an exact signal of the firm's performance, which is unverifiable by third parties. At this point, the firm may be liquidated, the proceeds of which are L instead of what has been reported by the signal. B-I-Z assume that L is not sufficient to cover the initial investment, so that the face value of debt F will be larger than L. Hence, if it is learned that the firm's cash flow is between L and F, the creditors are entitled to liquidate the firm although it is economically viable. On the other hand, the entrepreneur does not have any incentives to pay out more than L to the creditors. Hence, there is room for both parties to gain through bargaining. While such bargaining can resolve the conflict of sharing cash flow, it may distort the entrepreneur's decision of investment in human capital: If the entrepreneur has less than full bargaining power, he may receive only a fraction of the return to an additional unit of firm-specific investment while bearing the total cost

[19] Laux (1996, p. 71) remarks: "It should be noticed that bankruptcy is not *per se* adverse (except for the manager). What is 'bad' is only the occurence of a state of nature that is associated with low payoffs." [own translation]

[20] For the optimality of debt in CSV models see, for example, Gale and Hellwig (1985).

thereof. B-I-Z therefore propose a bankruptcy law that awards the manager full bargaining power in the event of financial distress.

The remedy derived by B-I-Z to cure the ex-ante incentive problem is straightforward, because the entrepreneur and the creditors are completely informed when the liquidation decision is due. Furthermore, ex-ante efficiency can be achieved at no cost regarding ex-post efficiency[21]. Adverse effects of the increase in the manager's bargaining power on the creditors' expected payoffs, which may lead to underinvestment at the outset, are ruled out by assumption[22]. It is more realistic to consider trade-offs between ex-ante and ex-post efficiency and to include the eventual social cost of providing the manager with monetary incentives in the analysis. In the remainder of this chapter, four models with these properties will be presented within one framework. We will start by briefly describing them[23].

The first model, which will be labeled the "basic model", illustrates the ability of debt to restrict a firm's free cash flow. The fundamental conflict of interest between the firm's manager and the investors is that the manager always prefers keeping the firm in business, because he enjoys some private, non-monetary benefits of control, while the investors would opt for continuation only if it maximizes the firm's cash flow. Maximizing the firm's social value, however, requires taking into account both the manager's private benefits and the firm's cash flow. This is the source for the trade-off between ex-ante and ex-post efficiency: If the firm's cash flow is higher if it is liquidated than if it is kept in business, but this difference is smaller than the monetary equivalent of the manager's benefit, choosing continuation enhances social value ex-post, but reduces cash flow, which may prevent the firm from being funded ex

[21] Their observation on page 551 of the 1998 paper that "unrestricted bargaining provides for ex post efficiency but distorts the entrepreneur's ex ante incentives" suggests that there is a trade-off between ex-post and ex-ante efficiency, but notice that any allocation of bargaining power leads to an ex-post efficient liquidation policy.

[22] They discuss this problem on pp. 460-461 of the 1998 paper.

[23] In the context of bank deposits, Birchler (2000) shows that there also may be a trade-off between ex-ante and ex-post efficiency: Potential depositors acquiring costly information on the bank's project may be ex-post efficient, because it prevents the bank from investing in a bad project, but ex-ante wasteful, because the depositors' monitoring costs are deadweight. Legal regulations requiring the existence of senior and junior depositors may improve welfare.

ante. As the manager is wealth-constrained and his private benefits are non-monetary, he cannot compensate the investors for pursuing a socially better liquidation policy. It will turn out that the second-best arrangement can be implemented by a mix of debt and equity contracts, where creditors are entitled to decide whether to liquidate the firm or to keep it in business whenever their claims are not satisfied in full. The creditors' right to force liquidation enables the manager and the investors to commit themselves to the second-best liquidation policy in advance when contracts are written out.

Unfortunately, reality is not as straightforward as our basic model. When additional information and incentive problems are considered, more complex bankruptcy provisions than simple debt collection law that is optimal in the basic model have to be designed. In the following, some extensions of the basic model will be briefly reviewed; they will be presented extensively in the following sections.

Giammarino and Nosal (1996, henceforth "G-N") highlight certain consequences of the debt-overhang problem. Long-term payment obligations may induce the manager of a firm to inefficiently divert resources from the firm to his private consumption. On the other hand, purely short-term contracts are counteracted by the manager's ability to transfer cash flow intertemporally. As a consequence, creditors endowed with strong control rights in bad states will be able to extract long-term cash flow from the entrepreneur by threatening to liquidate the firm. These increased long-term payment obligations, in turn, will induce the manager later to increase perk consumption. Hence, in a setting with pure debt collection law, debt contracts do not perform particularly well. An improvement is to contractually exclude the investors' right to seize the firm's assets, for example, by writing out equity contracts. G-N, however, show that bankruptcy law with a judge having some discretion is more efficient than such a contractual solution, even if bankruptcy law is required to meet certain standards such as the non-application if neither party wants it to be applied.

Considering an incentive problem similar to that leading to the debt overhang problem in G-N, Kalay and Zender (1997, henceforth K&Z) present a model of optimal security design with possible state-contingent changes of control. In the short run there are two possible states of nature arising randomly and affecting the productivity of managerial effort in the long run. This managerial effort can be contributed either by an entrepreneur, who sets up the firm at the outset and will, therefore, be called the "insider", or by someone else, an "outsider", who will be, however, less efficient than the insider. Whether the insider or an outsider contributes effort depends on the allocation of control in the respective state of nature. The first-best solution to such a problem is, clearly, to let the insider always contribute effort and award him the firm's total cash flow. In a second-best world where the firm's initial investment can be financed only by means of outside capital, the investors' demand of at least breaking even defines an upper bound on the monetary incentives that can possibly be provided to the insider. If the initial investment required is especially high as compared to the firm's future cash flow opportunities, it may be optimal to transfer control to the outsider in one or even both of the states of nature.

This is the result derived in their section II. If the required initial investment is low, control should always be with the insider. The optimal payout to the outsider is larger following a good state in the short run. They interpret this as standard debt contracts that are renegotiated once prospects are gloomy in order to improve the manager's incentives to invest effort, without triggering a change of control. Such renegotiation resembles of G-N's model. For intermediate levels of required initial investment it is optimal to transfer control to the outsider in one state. If the insider's comparative advantage in running the firm is similar accross states, the outsider should be awarded control in the bad state; and if the advantage is much higher in the good state than in the bad state, the outsider should control the firm in the good state. Optimal payout to the outsider is equal to total cash flow in the state where control is transferred, and defined by the break-even condition in the other state. The transfer of control in the bad state is then interpreted as bankruptcy and that in the good state as a warrant or

convertible being exercised. Finally, if the required initial investment is high, the outsider should be awarded control and cash flow in both states of nature.

As a contribution to the theory of bankruptcy law, the analysis K&Z carry out in their section III is more significant. They extend their model by introducing an additional decision, namely, whether to liquidate the firm or to keep it in business. They assume that liquidation is efficient if and only if the liquidation value is high and the state of nature bad. Information on the exact liquidation value is, however, revealed only to the manager, whereas the investor knows only the ex-ante probabilities of the possible liquidation values. K&Z then show that inducing a manager to pursue the socially optimal liquidation policy may be ex-ante beneficial, but so expensive that higher payouts are necessary in circumstances where large payouts distort managerial effort decisions. Hence, there is a trade-off between the efficiency of the liquidation decision and the extent of the debt-overhang problem.

Another model where a firm's manager has an informational advantage compared to the investors concerning the liquidation decision will called the "Managerial Incentives" model, which is my own contribution. Like in the basic model, the manager's decision between liquidation and continuation will be biased towards continuation, unless the investors provide him with incentives to act in their interest. While the provision of these incentives enhances ex-post efficiency, it reduces cash flow and may, therefore, reduce ex-ante inefficiency, because some socially profitable projects will not receive funds at the outset. Furthermore, in contrast to the basic model, contracts cannot be written out such that creditors are induced to pursue the second-best liquidation policy if there are only debt and equity contracts combined with simple debt collection law. It is possible, however, to design bankruptcy law so as to implement the second-best arrangement.

In contrast to the three models cited in the preceding paragraphs, Berkovitch and Israel (1999, henceforth "B-I") ignore the transfer of control towards creditors in bad states stipulated by debt contracts. They rather interpret bankruptcy as an event where some updating of

information is used to renegotiate existing contracts. Bankruptcy law may set up rules for such renegotiation so as to allocate bargaining power in a socially beneficial way. The trade-off between ex-ante and ex-post efficiency arises in the case where the manager is better informed on the firm's future prospects than the creditor is, because in this case, it may be ex-post efficient to bribe the manager to reveal his information, but ex-ante inefficient due to the reduction of cash flow by this bribe. For the reference case where investors are always as informed as the manager, they show that optimal bankruptcy law awards the manager full bargaining power once bargaining is initiated; B-I call this the "Creditor Mechanism", because only the creditor is allowed to commence bankruptcy proceedings in the first place. If the creditor gets informed only with some probability less than one, optimal bankruptcy law depends on whether the firm's manager learns whether the creditor is informed or not. If the manager learns the success of the creditor's monitoring efforts, which B-I presume to be the case in a bank-based economic system, the Creditor Mechanism is still optimal as long as banks are, on average, sufficiently successful in monitoring the firm. For the case where the creditor's monitoring results are his private information (a market-based system), both the creditor and the manager should be entitled to commence bankruptcy, where the manager is awarded full bargaining power if the creditor commences bankruptcy; and if the manager commences bankruptcy, the bankruptcy court rolls the dice between awarding the manager full bargaining power and giving the creditor a large amount of bargaining power. Table 2.1 summarizes the literature on the ex-ante effects of bankruptcy law[24].

The remainder of this chapter is organized as follows: In section 2.2 the basic model will be set out. The models of B-I, G-N and K&Z will be reviewed in sections 2.3 through 2.5. Section 2.6 presents the Managerial Incentives model. The chapter ends with some concluding remarks in section 2.7.

[24] Notice that some of the contributions mantioned in the table deal only with ex-ante problems, without highlighting possible trade-offs between ex-ante and ex-post efficiency. They are not extensions of the basic model and therefore not dealt with in the following.

Reference	Ex-Ante Problem	Ex-Post Problem
White (1980)	Debt overhang	Debt overhang
Giammarino / Nosal (1996)	Strategic default	Perk consumption (effort)
Kalay / Zender (1997, s. II)	Underinvestment	Managerial effort
Kalay / Zender (1997, s. III)	Excess continuation	Managerial effort
Berkovitch / Israel (1999)	Underinvestment	Allocation of bargaining power
"Basic Model"	Underinvestment	Free Cash Flow
"Managerial Incentives"	Underinvestment	Liquidation decision
Berkovitch / Israel / Zender (1997, 1998)	Investment in firm-specific human capital	-
Cornelli / Felli (1997)	Incentives for monitoring	-
Eberhart / Senbet (1993)	Incentives to take high risks	-
Bebchuk (2002)	Overinvestment in risky projects	-

Table 2.1: The Literature on Ex-Ante Effects of Bankruptcy Law.

2.2 The Basic Model

A. Assumptions

Consider an economy that consists of (i) entrepreneurs, who are able to identify investment opportunities and run a project, but lack any funds; and (ii) investors, who, in aggregate, dispose of adequate funds but lack any entrepreneurial ability. All individuals are assumed to be risk-neutral. Without loss of generality we may normalize an entrepreneur's payoff in alternative employment to zero.

The investment projects, henceforth also called 'firms', require an initial investment that is normalized to one, and yield some cash flow within a two-period time frame, where cash flow in period t is denoted by π_t, t = 1, 2. First-period cash flow is drawn from a distribution with a continuous cumulative distribution function F: $[\underline{\pi}_1, \overline{\pi}_1] \rightarrow [0,1]$. Second-period cash flow is equal to either $\overline{\pi}_2$ or zero, the probability of the high value, $p_2(\pi_1)$, being dependent on first-period cash flow, where the function $p_2(.)$ is continuous and increasing in π_1. An entrepreneur who runs a firm also enjoys a private, non-pecuniary benefit, the monetary equivalent of which is B in each period. The alternative to keeping the firm in business in the second period is to liquidate it by selling all the assets, the market value of which is L (> B). It is assumed that in the case of liquidation, the benefit B is not "produced". Furthermore, we assume that the investment is risky even if a pure liquidation policy is pursued, i.e., $L + \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) < 1$. In order to ensure that all the equilibria to be derived are well-defined, we assume that $p_2(\underline{\pi}_1) < (L-B)/\overline{\pi}_2$ and $p_2(\overline{\pi}_1) > L/\overline{\pi}_2$, that is to say, if first-period cash flow is minimal, the sum of expected second-period cash flow and the monetary equivalent of the manager's private benefits is smaller than the liquidation value, and if first-period cash flow is maximal, the expected second-period cash flow is larger than the liquidation value. Hence, liquidation maximizes social value ex post if first-period cash flow is minimal, and continuation maximizes expected second-period cash flow if first-period cash flow is maximal. Without loss of generality, let there be no discounting between the two periods. It is further assumed that the manager's participation is essential for the production in the first period.

It is useful to focus on those liquidation policies where there exists a level of first-period cash flow π_1' such that the firm is liquidated if and only if $\pi_1 < \pi_1'$. In other words, this "cut-off" level π_1' fully describes the liquidation policy. We will see that implementing such a

liquidation policy usually is associated with awarding a liquidation-biased player control if $\pi_1 < \pi_1'$ and a continuation-biased player otherwise.

Throughout the analysis, we will assume that there are two types of financial contracts available:

(i) Debt contracts, which prescribe either the repayment of a fixed amount R_1 at the end of period 1 (short-term debt) or the amount R_2 at the end of period 2 (long-term debt). If cash flow π_t in period t is not sufficient to cover R_t, the creditor receives the entire cash flow in period t and, if t = 1, he carries over his unsatisfied claims to the second period and is awarded full control over the firm, unless bankruptcy law stipulates otherwise.

(ii) Equity, under which at the end of each period, shareholders get, in aggregate, the ouput that remains after all creditors' claims have been satisfied. The share of the firm the manager owns will be denoted by ε.

Finally, it is assumed that the market for funds is perfectly competitive, so that an investor will accept any contract under which expected repayment covers at least the investment.

To sum up, the timing of actions is as follows:

(i) Financial contracts and a one-period employment contract with the manager, albeit with the possibility of renewal for the second period, are written out. If funds are granted, the manager invests one unit of cash and undertakes the project.

(ii) Nature draws randomly the level of first-period cash flow $\pi_1 \in [\underline{\pi}_1, \overline{\pi}_1]$.

(iii) π_1 is realized and paid out according to the financial contracts signed in stage (i).

(iv) Control may be transferred to creditors.

(v) The firm's manager or, if they have been awarded control at stage (iv), the creditors decide whether to liquidate the firm or to keep it in business.

(vi) If the firm is still in business, nature draws second-period cash flow randomly, which is then revealed publicly. Payments are made according to the contracts written out in stages (i) and (iv).

B. The First-Best Solution

We start deriving the first-best optimum, that is to say, the liquidation policy that maximizes social welfare. Analyzing the first-best optimum is equivalent to the case where the entrepreneur disposes of sufficient funds to finance the firm by himself. After the realization of π_1, liquidation maximizes social value if and only if the liquidation value L is larger than expected cash flow in the case where the firm is kept in business. Denote by π_1° the level of first-period cash flow where liquidation and continuation are equivalent, that is, π_1° satisfies

$$L = B + p_2(\pi_1^\circ)\,\overline{\pi}_2 . \qquad (2.1)$$

It follows from the assumptions that $p_2(\underline{\pi}_1)\,\overline{\pi}_2 < L\text{-}B = p_2(\pi_1^\circ)\,\overline{\pi}_2 < L < p_2(\overline{\pi}_1)\,\overline{\pi}_2$, so that $\underline{\pi}_1 < \pi_1^\circ < \overline{\pi}_1$. The first-best solution is hence characterized as follows:

Proposition 2.1: The first-best liquidation policy is to liquidate the firm if and only if $\pi_1 < \pi_1^\circ$. In the first-best optimum, a firm is financed if and only if

$$\int_{\underline{\pi}_1}^{\pi_1^\circ} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^\circ} L dF(\pi_1) + \int_{\pi_1^\circ}^{\overline{\pi}_1} [B + p_2(\pi_1)\,\overline{\pi}_2]\,dF(\pi_1) \geq 1. \qquad (2.2)$$

Under the assumptions we have made in subsection A, the first-best outcome is not attainable. The reason is that a part of the returns from the project on the left-hand side of (2.2), namely, $\int_{\pi_1^\circ}^{\overline{\pi}_1} B dF(\pi_1)$, is not in cash and cannot, therefore, be distributed among the investors. As the entrepreneur does not dispose of any financial wealth, he cannot compensate the investors for their entire investment outlay in the case of a marginal project, that is to say, if the left-hand side of (2.2) is sufficiently close to the right-hand side.

C. Debt Collection Law and Optimal Financial Structure

As we have argued in the preceding sub-section, the first-best arrangement is, in a second-best world where funds have to be raised from an outside investor, ex-post efficient, but ex-ante inefficient: In assessing whether a project is profitable, such an investor will neglect the manager's benefit B. Hence, the investor may refuse to finance a project even if it would be profitable in a first-best world. To derive the investors' participation constraint, suppose a liquidation policy is known to be applied such that for some particular level of short-term cash flow π_1', the firm is liquidated for every $\pi_1 < \pi_1'$ and kept in business otherwise. Then the firm's expected cash flow is

$$Y(\pi_1') = \int_{\underline{\pi_1}}^{\overline{\pi_1}} \pi_1 dF(\pi_1) + \int_{\underline{\pi_1}}^{\pi_1'} L dF(\pi_1) + \int_{\pi_1'}^{\overline{\pi_1}} p_2(\pi_1)\, \overline{\pi}_2\, dF(\pi_1). \qquad (2.3)$$

Hence, the investors will agree to finance the project if and only if they anticipate the liquidation policy π_1' to be such that

$$Y(\pi_1') \geq 1. \qquad (2.4)$$

$Y(.)$ has a unique maximum at π_1^D, which is yielded by differentiating (2.3) with respect to π_1':

$$L = p_2(\pi_1^D)\, \overline{\pi}_2 . \qquad (2.5)$$

For a rough sketch of $Y(.)$ see figure 2.1.

If $\pi_1^D \geq \pi_1' > \pi_1^\circ$, a reduction in π_1' enhances social value ex post, but reduces the investor's payoff, which, in turn, will induce the investor to refuse funding if his payoff is reduced to below one, thus creating an ex-ante inefficiency. The second-best arrangement can be determined by maximizing social value subject to (2.4). If we define π_1^* such that $\pi_1^* \leq \pi_1^D$ and

$$Y(\pi_1^*) = 1, \qquad (2.6)$$

we can state the following proposition:

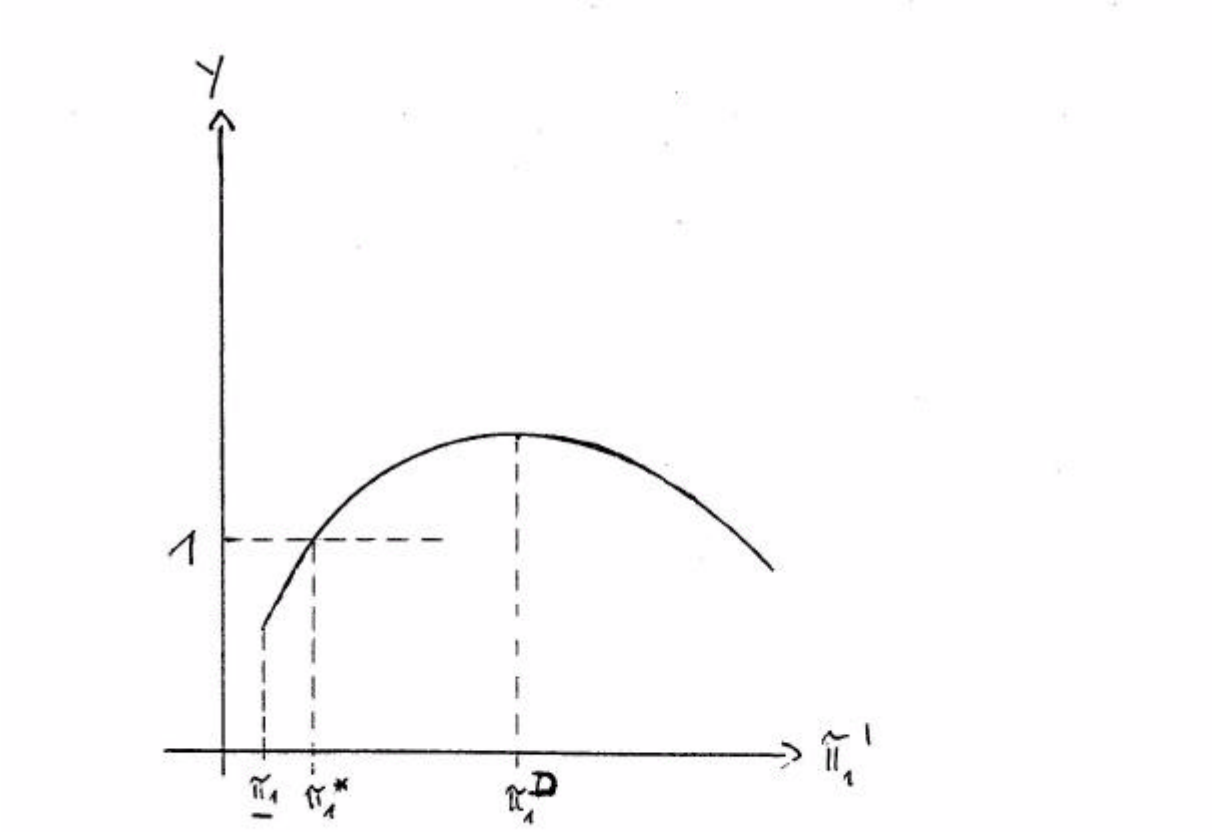

Figure 2.1. Investors' Aggregate Payoffs as a Function of the Firm's Liquidation Policy.

Proposition 2.2: The second-best liquidation policy is to liquidate an existing firm if and only if $\pi_1 < \max\{\pi_1^\circ, \pi_1^*\}$. A project will be financed if and only if $Y(\pi_1^D) \geq 1$. ■

We will now show how this liquidation policy can be implemented by means of debt and equity under pure debt collection law (which transfers corporate control to an unsatisfied creditor). Suppose, for simplicity, that there is only one class of debt and one class of equity. Let the entire debt be short-term. Furthermore, denote the aggregate funds provided by creditors by I_D. Then the aggregate funds provided by shareholders is $1 - I_D$.

It will be shown by proposition 2.3 that the manager and the investors can commit themselves to the second-best liquidation policy if contracts are written out in such a way that default occurs if and only if the firm should, according to the second-best solution, be liquidated.

Proposition 2.3: The second-best arrangement can be implemented by means of standard equity and short-term debt contracts, where debt contracts are such that unsatisfied creditors are given control over the firm. In equilibrium, contractual short-term debt payment is $R_1 = \max \{\pi_1^\circ, \pi_1^*\}$.

Proof: By assumption, the investors will agree to any contract that yields them, in aggregate, their aggregate investment outlay. Hence, the manager will offer them contracts so as to maximize social value subject to the subsequent choices these contracts may imply. If there are contracts that implement the second-best arrangement, they will be agreed on in equilibrium.

The outline for the proof is as follows: We will first prove that every set of contracts with $R_1 = \max \{\pi_1^\circ, \pi_1^*\}$ and $R_2 = 0$ implements second-best. Then it will be shown that in the absence of long-term debt any other choice of R_1 leads to either excess liquidation or excess continuation.

Whenever $R_1 - L_1 < \pi_1 < R_1$, the creditors, who control the firm in this case, prefer liquidation if and only if

$$R_1 \geq p_2(\pi_1)R_1 + [1 - p_2(\pi_1)]\,\pi_1 \qquad (2.7)$$

which is always satisfied. If even $\pi_1 \leq R_1 - L_1$, the creditors prefer liquidation; for

$$L + \pi_1 = p_2(\pi_1^D)\,\overline{\pi}_2 + \pi_1 > p_2(\pi_1)\,\overline{\pi}_2 + \pi_1 \geq p_2(\pi_1)R_1 + [1 - p_2(\pi_1)]\,\pi_1. \qquad (2.8)$$

Notice that the first inequation holds because $\pi_1 < R_1 \leq \pi_1^D$. In the case where $\pi_1 \geq R_1$, the manager remains in control and chooses to continue if and only if

$$B + \varepsilon\,[p_2(\pi_1)\,\overline{\pi}_2 + \pi_1 - R_1] \geq \varepsilon\,[L + \pi_1 - R_1]$$

or, equivalently,

$$B \geq \varepsilon\,[L - p_2(\pi_1)\,\overline{\pi}_2\,], \qquad (2.9)$$

which is satisfied for all $\pi_1 \geq \pi_1^\circ$, because $\varepsilon \in [0, 1]$.

It remains to show that the equilibrium choice of R_1 is unique. Obviously, an alternative R_1 different from $\max\{\pi_1^\circ, \pi_1^*\}$ may not be in the interval $[\max\{\pi_1^\circ, \pi_1^*\}, \pi_1^D]$ because, according to the above analysis, this would lead to liquidation if $\pi_1 < R_1$ and continuation otherwise.

Hence, we have to show that neither $R_1 < \max\{\pi_1^\circ, \pi_1^*\}$ nor $R_1 > \pi_1^D$ will yield the second-best result.

Suppose first that $R_1 < \max\{\pi_1^\circ, \pi_1^*\}$. Then, either $\pi_1^* > \pi_1^\circ$, so that for all $\pi_1 \in [\pi_1^\circ, \pi_1^*]$ the manager chooses continuation despite the fact that liquidation would be appropriate, or $\pi_1^* \leq \pi_1^\circ$, so that the second-best liquidation policy is pursued only if $\varepsilon = 1$. This, however, contradicts our assumption that $L + \int_{\underline{\pi}_1}^{\bar{\pi}_1} \pi_1 dF(\pi_1) < 1$, from which it follows that $R_1 > 1$ if $\varepsilon = 1$. Together with the definition of π_1^* in equation (2.6) and the fact that $\pi_1^* > \underline{\pi}_1$ (because of $p_2(\underline{\pi}_1) < (L-B)/\bar{\pi}_2$), it can be shown that investors will not break even on this contract.

On the other hand, if $R_1 > \pi_1^D$, then either $\pi_1^* < \pi_1^D$, and for all $\pi_1 \in [\max\{\pi_1^\circ, \pi_1^*\}, \pi_1^D]$ the creditor chooses liquidation despite continuation would be appropriate, or $\pi_1^* = \pi_1^D$, and it follows from (2.7) and (2.8) that there are some π_1 slightly larger than π_1^D such that the creditor in control chooses liquidation rather than continuation. ■

Given this optimal amount of short-term debt, equilibrium contracts can be derived by choosing I_D and ε such that

$$R_1 - \int_{R_1}^{\bar{\pi}_1} [1 - p_2(\pi_1)] (R_1 - \pi_1) dF(\pi_1) = I_D \quad \text{and} \tag{2.10}$$

$$(1-\varepsilon) \int_{R_1}^{\bar{\pi}_1} [1 - p_2(\pi_1)] (\pi_1 + \bar{\pi}_2 - R_1) dF(\pi_1) = 1 - I_D. \tag{2.11}$$

2.3 Monitoring in Different Economic Systems

A. Introduction and Basic Results

In the preceding section, we dealt with a model where capital structure was meaningful, because debt and equity had distinct roles to play: The level of debt payment obligations was chosen so as to bring about default whenever short-term performance is so low that the firm

should be liquidated. In the absence of further problems of information or incentives, we were able to show that a simple form of debt collection law is sufficient to implement the second-best liquidation policy.

We will now modify the basic model in two respects: First, we will eliminate cash flows in the first period. Hence, financial contracts and bankruptcy law cannot be written out contingent on π_1. If this is the case, debt loses its role of reducing free cash flow, so that financial structure becomes meaningless. Consequently, we will restrict our attention to long-term debt contracts. The second modification of the basic model is the simplifying assumption that the manager's private benefits contribute to social value even if the firm is liquidated, an assumption made by Berkovitch and Israel (1999, henceforth B-I). This simplifies the analysis, because it alignes social value with investors' aggregate payoffs: While in the basic model presented in section 2.2, the manager's private benefit B appeared only in the social value function but not in the investors' aggregate payoff, it is now part of both. They justify this assumption by assuming that, in the case of liquidation, another manager will be able to manage the firm's assets and, therefore, enjoy these private benefits. Fundamentally, whether it is appropriate to assume that the private benefits accrue even if the firm is liquidated depends on what kind of liquidation we refer to. The idea that a new manager will enjoy the benefits of the liquidated firm's assets is much in line with a sale of the firm as a going concern, whereas the assumption made in the basic model, that the benefits are not "produced" if the firm is liquidated is more related to a piecemeal sale of the firm's assets. The consequence of B-I's assumption of a going-concern sale of the firm is that maximization of social value is equivalent to maximization of expected cash flow. We will discuss the motivations of these different assumptions in section 2.7.

Furthermore, B-I assume that the manager is able to reveal his information costlessly and credibly. Such an assumption seems rather artificial and is uncommon in models of

asymmetric information, because the information revealed by the manager cannot be verified ex post. Unfortunately, the assumption is critical to the proofs of propositions 2.5, 2.6 and 2.8.

Finally, an additional assumption will be made that makes B-I's results remain valid in this framework, namely, that $L + \pi_1^D < 1$[25]. This assumption is fairly innocuous, as it only restricts attention to marginally profitable firms, for which bankruptcy law is more likely to be relevant.

In the following, the results obtained by B-I will be presented within our framework, together with sketches of the respective proofs. The first results follow from B-I's propositions 1 through 3 and establish the first-best liquidation policy and the insufficiency of debt financing without any bankruptcy law.

As can be seen easily from section 2.2, the first-best liquidation policy in the case where B enhances social value both in liquidation and in continuation, is to liquidate the firm if and only if $\pi_1 < \pi_1^D$, where π_1^D is defined by equation (2.5). If this liquidation policy is pursued, a project will be financed if and only if $Y(\pi_1^D) \geq 1$.

As B-I point out, the first-best level of efficiency cannot be obtained without any bankruptcy law. Because cash flow is generated only in the long-term, there can be no transfers of control contingent on short-term cash-flow. Hence, without any bankruptcy law, the firm's manager always decides whether to liquidate the firm or to keep it in business. If the face value of debt is R_2, he will choose liquidation if and only if

$$\max \{L + \pi_1 - R_2, 0\} > B + p_2(\pi_1)\max\{\pi_1 + \overline{\pi}_2 - R_2, 0\} + [1 - p_2(\pi_1)]\max\{\pi_1 - R_2, 0\}. \quad (2.12)$$

If $\pi_1 \in [\underline{\pi}_1, R_2 - L]$, (2.12) is equivalent to $0 > B + p_2(\pi_1)\max\{\pi_1 + \overline{\pi}_2 - R_2, 0\}$, which is never satisfied. For $\pi_1 > R_2 - L$, the left-hand side increases in π_1 by one, and the right-hand side increases in π_1 by at most one. Finally, if $\pi_1 = \overline{\pi}_1$, (2.12) boils down to $L > B + p_2(\overline{\pi}_1)\overline{\pi}_2$,

[25] This is necessary because in the B-I model the liquidation value is independent of the signal on second-period cash flow, which we denote as π_1, whereas in this model the firm's cash flow in liquidation is $L + \pi_1$. Hence, our assumption made in section 2.2 that $L + \underline{\pi}_1 < 1$ is not strict enough to bring about all the results of B-I.

which contradicts the assumption made in section 2.2 that $L < B + p_2(\overline{\pi}_1)\overline{\pi}_2$. We have seen that (2.12) is violated for all $\pi_1 \in [\underline{\pi}_1, R_2 - L]$ and for $\pi_1 = \overline{\pi}_1$, and that the difference between the right-hand side and the left-hand side of (2.12) is weakly decreasing in π_1. Hence, we can conclude that (2.12) is never satisfied and that the manager will never have an incentive to liquidate the firm, irrespective of R_2. Given this pure non-liquidation policy, a project can be financed if and only if $Y(\underline{\pi}_1) \geq 1$. Clearly, the set of projects that can be financed under the first-best liquidation policy strictly includes the set of projects that can be financed under the pure non-liquidation policy: in other words, there is under-investment if there is no bankruptcy law.

In the model of section 2.2, the kind of bankruptcy law that turned out to be optimal, namely, pure debt-collection law, was based on short-term payments to creditors. As there is no short-term cash flow in the present model, some other mechanism must be found to improve the dismal situation described in the previous paragraph. Obviously, the outcome that simple debt contracts without any bankruptcy law lead to excess continuation is a result of the powerful manager who is not constrained by any disciplining short-term payment obligations. This outcome is also renegotiation-proof because the manager is not interested in making any concessions. Hence, it may be an improvement to award the creditor the right to liquidate the firm if negotiations fail, because this endows the creditor with a credible threat and reduces the manager's power. B-I define such a mechanism, the so-called "creditor mechanism", and later prove that it leads, indeed, to the first-best outcome.

Definition 2.1: In the creditor mechanism, the creditor has the right to commence bankruptcy, whereafter the manager may make a take-it-or-leave-it offer to the creditor. If the creditor accepts the offer, it becomes the new debt contract, otherwise the firm is liquidated, and the proceeds are distributed according to the original contracts.

A mechanism that will prove useful in other settings is one that awards the manager more power than in the creditor mechanism but less than in the situation without bankruptcy.

The advantage of this so-called debtor mechanism is that it does not require the creditor to have any information on π_1.

Definition 2.2: In the debtor mechanism, the manager has the right to commence bankruptcy, whereafter the creditor may make a take-it-or-leave-it offer to the manager. If the manager accepts the offer, it becomes the new debt contract, otherwise the firm is kept in business, the original contracts remain valid, and the creditor has to pay a penalty Q.

The optimal level of the penalty will be derived later and depends on the ex-ante characteristics of the particular project. In their proposition 4, B-I show that under the assumptions we have made so far, the first-best level of efficiency can be obtained by means of the creditor mechanism:

Proposition 2.4: If creditors are always fully informed about the level of π_1, the creditor mechanism set out in definition 2.1 implements the first-best outcome.

Proof: If the creditor commences bankruptcy and the manager makes an offer, the creditor will receive $\min\{L + \pi_1, R_2\}$ if he rejects this offer. Hence, this is the minimal expected payoff the manager has to offer him if she wants to keep the firm in business.

We will now prove that the firm will stay in business whenever $\pi_1 \geq \pi_1^D$ and will be liquidated otherwise. If $\pi_1 \geq \pi_1^D$ and the creditor commences bankruptcy, the manager will offer him a new contract with an expected payoff of $\min\{L + \pi_1, R_2\}$ and keep the firm in business. If, on the other hand, the creditor does not commence bankruptcy and the original contracts remain valid, the manager will also choose continuation.

If $\pi_1 < \pi_1^D$, we have $R_2 > L + \pi_1$, because it was assumed that $L + \pi_1^D < 1$. The manager must offer the creditor at least an expected payoff of $L + \pi_1$ if she wants to avoid liquidation. Yet this is not possible even for a new contractual repayment of $\pi_1 + \overline{\pi}_2$, because for every $\pi_1 < \pi_1^D$, $L + \pi_1 = p_2(\pi_1^D)\overline{\pi}_2 + \pi_1 > p_2(\pi_1)\overline{\pi}_2 + \pi_1$, the expected cash flow from continuation. Hence, the creditor will commence bankruptcy and force liquidation.

Finally, notice that contracts can be written out in such a way that the creditor receives the firm's entire cash flow, so that he will finance a project if and only if $Y(\pi_1^D) \geq 1$. ■

Notice that, in contrast to section 2.2, the first-best outcome is feasible because the investors' aggregate payoffs and social value are aligned.

B. The Analysis

We have so far assumed that investors are endowed with the ability to perfectly monitor short-term cash flow π_1 at no cost. This is not a particularly realistic assumption, as a glance at the financial newspapers immediately reveals, where different analysts often come to completely contradictory conclusions about a firm's value. It seems more appealing to assume that information on such a signal for future performance may be noisy. Such noise can be incorporated by assuming that with a certain probability, r say, investors fail to acquire this signal. B-I then use the following observation to distinguish between different economic systems: In economies with a financial sector exhibiting mainly bank financing, debtors and creditors typically have a strong relationship and work closely together. In such an environment, a firm will most probably learn whether the bank has been succesful in monitoring its performance; B-I call this case "hard information". The opposite case, "soft information", prevails in economies where most financing is arm's-length, and a firm's management is poorly informed about the investors' monitoring results. Finally, the authors analyze the case where r, the probability that monitoring fails, is particularly high, which is a common feature of underdeveloped economies. In any case, the manager is assumed to be able to credibly report π_1. Before we turn to these cases, however, it will be shown that the debtor mechanism set out in definition 2.2 is the optimal regulation for the case where investors always fail to monitor the firm, that is to say, if r = 1. This result corresponds to B-I's proposition 5.

Proposition 2.5: The debtor mechanism presented in definition 2.2 is optimal for an economy where r = 1. The optimal penalty is $P^* = p_2(\pi_1^{**})\,\overline{\pi}_2 - (L-B)$, where $\pi_1^{**} \in (\pi_1^{\circ}, \pi_1^{D})$ is defined such that $Y(\pi_1^{**}) - BF(\pi_1^{**}) = 1$. A firm will be financed if and only if

$Y(\pi_1^{\circ}) - BF(\pi_1^{\circ}) \geq 1$.

Proof: The proof is as in B-I, with the following adjustments to our framework: π_1^{**} is defined such that the creditor's expected payoff from the strategy to pay the manager a compensation B whenever $\pi_1 < \pi_1^{**}$ is equal to his investment outlay,

$$\int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^{**}} (L-B)dF(\pi_1) + \int_{\pi_1^{**}}^{\overline{\pi}_1} p_2(\pi_1)\,\overline{\pi}_2\, dF(\pi_1) = 1, \qquad (2.13)$$

which is equivalent to $Y(\pi_1^{**}) - BF(\pi_1^{**}) = 1$. Furthermore, the penalty is chosen such that the creditor prefers compensating the manager in the amount B to making an unacceptable offer and paying the penalty if and only if $\pi_1 < \pi_1^{**}$. ■

The intuition is that the manager will commence bankruptcy, reveal π_1 and agree that the firm be liquidated only if she is compensated for the foregone private benefit B. There is, however, a tension between ex-post social value and the creditor's payoff: Compensating the manager enhances ex-post social value whenever $\pi_1 < \pi_1^{D}$, but may reduce the creditor's payoff. The task is, therefore, to maximize social value subject to the creditor's ex-ante participation constraint.

If r < 1 and information is soft, the argument is similar: If the creditor does not learn π_1, the manager can enjoy his private benefit B if she keeps the firm in business. On the other hand, if the creditor monitors successfully and he is allowed to commence bankruptcy, he can force liquidation without compensating the manager for his foregone benefit. Hence, the manager's expected private benefit from continuation is rB plus the expected share in the firm's cash flow she is entitled to according to the original contracts. Consequently, she can be induced to

commence bankruptcy only if the creditor's best reply is to offer her at least rB. Hence, the following proposition, which corresponds to B-I's proposition 6, is straightforward.

Proposition 2.6: The optimal code for the case of soft information with $r < 1$ is a randomized dual chapter code, where the creditor mechanism is used if the creditor commences bankruptcy and the creditor and debtor mechanisms are used with probabilities 1 - r and r, respectively, if the manager commences bankruptcy. The optimal penalty is $P^S = p_2(\pi_1^S)\overline{\pi}_2$ - (L-rB), where π_1^S is defined such that $Y(\pi_1^S) - rBF(\pi_1^S) = 1$. ■

The proof is omitted; it is as in B-I, with similar adjustments to those in our proposition 2.5.

If information is hard, that is to say, if the manager learns whether the creditor's monitoring has been successful, there is the following trade-off: Bankruptcy law can be designed so as to induce the creditor to make the manager reveal π_1. This increases ex-post efficiency but reduces ex-ante efficiency, because the creditor's expected payoff is reduced by the expected compensation to the manager. The alternative is the creditor mechanism that allows for costless liquidation if the creditor is informed, but does not restrict the manager if the creditor is uninformed. B-I show that for every level of B there is an r*(B) such that the first alternative is favourable if and only if $r > r^*(B)$. They call this case where monitoring failure is especially probable an "Underdeveloped System" and the case where $r \leq r^*(B)$ a "Bank-Based System".

Proposition 2.7: The creditor mechanism is the optimal bankruptcy code for a bank-based system. A firm can then be financed if and only if $rY(\underline{\pi}_1) + (1-r)Y(\pi_1^D) \geq 1$. ■

Proposition 2.8: The optimal code for an underdeveloped system is a deterministic dual chapter code where the creditor mechanism is applied if the creditor commences bankruptcy and the debtor mechanism if the manager does. The optimal penalty in the debtor mechanism is P* as defined in proposition 2.5. A firm can be financed if and only if $Y(\pi_1^\circ) - BF(\pi_1^\circ) \geq 1$. ■

Summarizing this section, B-I show that optimal bankruptcy law for a bank-based system contains only a creditor chapter, whereas in a market-based system randomization between a creditor chapter and a debtor chapter is optimal if the firm seeks bankruptcy protection. The way B-I set up the model, namely, ignoring the short-term bonding power of debt and completely focussing on bankruptcy as an event of renegotiation, requires, however, the objectionable assumption that the better informed party can costlessly and credibly reveal his superior information. Such an assumption is not needed when short-term default with a transfer of control towards creditors is possible, which makes such a setting with short-term contracts more appealing.

2.4 Reducing the Creditors' Bargaining Power through Bankruptcy Law

A. Assumptions

We now turn to Giammarino and Nosal's (1996, henceforth G-N) model, the basic intuition for which has been presented in the introduction of this chapter. Consider a version of the basic model where, for the sake of simplicity, there are only two possible outcomes in the short run: Cash flow in the first period is either $\pi_1 > 0$ or zero, where the probability of positive cash flow is q. G-N then include two strategic problems: First, the probability of high cash flow in the second period depends on an input of effort to be made at the beginning of the second period or, alternatively, on the manager's consumption of fringes, where high second-period cash flow is more probable the higher the manager's effort or the lower his perk consumption is. The manager's cost of the provision of one unit of effort or the opportunity cost of not consuming one unit of fringes is constant at k. This creates the well-known debt overhang problem. Let the input of effort be denoted by e, and the interval from which it can be chosen be $[e_{min}, e_{max}]$. Secondly, if short-term cash flow is high, the firm's manager may hide it instead of paying it out. He will invest this hidden cash flow in the firm's infrastructure, which will increase the probability that second-period cash flow will be high. Although this intertemporal

transfer of cash flow is assumed to be neutral to the firm's value if the input of effort is set on its first-best level[26], it exacerbates the debt overhang problem by forcing the investors to rely more on long-term payoffs, so that the choice of e will be less efficient if the manager undertakes this investment.

To be more specific about the way long-term cash flow depends on the manager's action, let the probability of high second-period cash flow if the investment in infrastructure is made be denoted by p_h and if it is not made by p_l, where these probabilities are functions $p_h(.)$ and $p_l(.)$ from $[e_{min}, e_{max}]$ to [0, 1] that are monotonically increasing and strictly concave in e and satisfy $p_h(e) > p_l(e)$ for every e. In order to guarantee the manager's participation, we assume that his private benefits from running the firm in each period are at least ce_{max}[27]. Let e*(.) denote the optimal choice of e given the firm's second-period payment obligations. Then the neutrality assumption for the intertemporal transfer of cash flow boils down to

$$\pi_1 + p_l(e^*(0))\,\overline{\pi}_2 = p_h(e^*(0))\,\overline{\pi}_2 . \qquad (2.14)$$

That is to say, in a firm without any payment obligations to investors and given the optimal input of effort in this case, cash flow is equal with and without the intertemporal transfer. Furthermore, G-N assume that the manager cannot be forced to work in the firm, so that he may extract some wealth from the investors by threatening to quit. Finally, G-N focus on firms whose expected short-term cash flow is, in principle, sufficient to cover the initial investment outlay, that is to say, $q\pi_1 \geq 1$. Thus, if the manager was able to commit himself not to hide any short-term cash flow, it would be possible to write out a short-term debt contract with face

[26] G-N obviously forgot to mention this assumption explicitly in the paper, but it is used in the proofs of their lemmas 2 and C1.

[27] Hence, the difference between these private benefits and ce corresponds to G-N's function "$v(\overline{e}-e)$".

value $1/q\pi_1$ and thereby eliminate the debt overhang problem. This arrangement is referred to by G-N as the first-best solution[28].

G-N analyze two kinds of contracts: Debt contracts specify a short-term payment obligation, with the creditor having the right to liquidate the firm if this obligation is not met. On the other hand, equity contracts specify a short-term payment obligation and a long-term payment that has to be done if the short-term obligation has not been met. Hence, default can arise only when there are debt contracts. If the firm defaults on a debt contract, the manager may bargain with the creditor in order to prevent him from liquidating the firm. On the other hand, there can be some negotiations even in the case of equity contracts, namely, if the manager threatens to quit.

Hence, depending on which kind of contract has been written out, either the manager (in the case of equity, by threatening to quit the firm) or the investor (in the case of debt contracts, by threatening to liquidate the firm) may be able to initiate bargaining. The respective individual will do so if and only if her payoff according to the bargaining outcome is higher than the expected payoff from honoring the contracts. In the case of debt contracts, clearly, the creditor will always initiate renegotiation, as a debt contract, by definition, does not specify any long-term payment.

Summing up, the course of action is as follows: First, contracts are negotiated. If an investor provides funds, the initial investment is undertaken, and short-run cash flow is revealed to the manager. If this short-run cash flow is strictly positive, the manager decides whether to hide it or to pay it out. Denote the outcome of this decision with $r \in \{l, h\}$. The investor learns r, and the initial contract may be renegotiated. Given the outcome of this

[28] G-N's model is even more explicit than it is presented here. For example, while we assume that the liquidation of the firm generates a fixed payoff of L, G-N explicitly model the firm's sale to an alternative, less efficient, manager. By this they allow for different liquidation values, depending on whether the manager hides short-term cash flow or not. We will see, however, that all their results hold without this assumption, and we therefore drop it to keep things simple.

renegotiation, the manager chooses e. Finally, long-term cash flow is revealed and distributed, where the probability of high long-term cash flow is $p_r(e)$.

B. The Results

Consider first the subgame starting with the manager choosing e. Let R denote the firm's second-period payment obligations after an eventual renegotiation of the initial contracts. Then the manager's problem is to

$$\max_e \{p_r(e)(\overline{\pi}_2 - R) - ke\}. \qquad (2.15)$$

The optimal choice e*(R) is given by the first-order condition

$$\partial p_r(e^*(R))/\partial e = k / (\overline{\pi}_2 - R). \qquad (2.16)$$

The strict concavity of $p_r(.)$ implies that both e*(.) and the firm's value in the equilibrium of this subgame are strictly decreasing in R.

The preceding stage of the game, namely, the renegotiation, depends on the assumed setting of the bargaining game. G-N point out that, depending on each player's bargaining power, the renegotiated R may come from a whole range of values. Instead of making some ad-hoc assumption, however, they leave the question of bargaining structure open and denote the outcome of the bargaining game by R_r, depending on whether short-term cash flow has been hidden or paid out. We will abuse their notation and let R_r denote the long-term payment obligations after the bargaining game, that is to say, R_r may be equal to the contractual payment obligation if there has been no renegotiation at all. In particular, in the case of equity contracts where the outcome of the bargaining game is a higher payment obligation than the contractual one, the manager chooses not to renegotiate the contract in the first place.

Given these outcomes, the manager chooses not to hide short-run cash flow if and only if the contract is incentive-compatible, that is,

$$\pi_1 - F_1 + p_l(e^*(0))\,\overline{\pi}_2 \geq p_h(e^*(R_h))(\overline{\pi}_2 - R_h), \qquad (2.17)$$

where F_1 is the contractual short-term payment obligation. Notice that R_h may depend on an eventual long-term payment obligation of an equity contract. By showing that condition (2.17) is satisfied in every equilibrium where the firm is able to raise funds, G-N show that the equilibrium contract is the one among the contracts satisfying (2.17) and the investor's participation constraint with the highest contractual short-term payment F_1. This result is a consequence of the fact that the higher the contractual short-term payment is, which will indeed be paid out, the less does the investor have to rely on long-term payoffs. Hence, higher, incentive-compatible contractual short-term payments are associated with less financial overhang.

One of G-N's two main results is that, without bankruptcy law, equity contracts weakly dominate debt. This is because every debt contract can be replicated by an equity contract with the same contractual short-term payment and the equity contract's long-term component being equal to R_l, but this does not hold the other way round: If the long-term component of an equity contract is smaller than the outcome of the bargaining game, equity will lead to a strictly lower long-run payment than a debt contract with the same contractual short-run payment.

Much of the inefficiency that arises in this model stems from the manager's inability to commit himself not to hide short-run cash flow and from the creditor's inability not to threaten liquidation if short-term payment obligations are not met, even though the manager may have behaved honestly. It is, therefore, straightforward to introduce an additional player that is not subject to any incentive problems, and that can make his actions contingent on information that is observable, but not verifiable, as is the case with the manager's choice of r. Such an additional player could be a bankruptcy judge who is endowed with some discretion.

G-N show that under the following bankruptcy rule, debt weakly dominates equity:

Definition 2.3: Let bankruptcy rule "B2" is defined as follows: If the firm is not able to meet its short-term payment obligations, the manager may file a petition to be protected from the creditor's attempts to seize the firm's assets. If r = h, the judge will dismiss the petition, and the

creditor may force liquidation. If r = l, the judge will cram down any offer made by the manager that guarantees the creditor a long-term payoff of at least $(1-pF_1) / (1-p)$. ■

The bankruptcy rule B2 is designed so as to let the creditor break even on average. As the objective function is to maximize the short-term component of the contract subject to incentive compatibility, consider the optimal debt contract in this sense. Then it can be shown that there is no incentive compatible equity contract with a larger contractual short-term payment:

Proposition 2.9: Under bankruptcy rule B2, debt weakly dominates equity.

Proof: Let $\overline{F}$ denote the largest incentive-compatible short-term face value, i.e.,

$$\overline{F} = \pi_1 + p_l(e^*(0))\,\overline{\pi}_2 - p_h(e^*(R_h))(\overline{\pi}_2 - R_h), \qquad (2.18)$$

as long as this $\overline{F}$ is at most 1/p. Then, by definition, either the short-term component of the optimal equity contract, F_1^*, is at most $\overline{F}$ or there is no equity contract the investors break even upon. The reason why F_1^* may be strictly smaller than $\overline{F}$ is that an equity contract with short-term component $\overline{F}$ may yield the investor more than his initial investment, a contradiction to the assumption of a competitive market for funds. Bankruptcy rule B2, however, reduces the investor's bargaining power always to such a level that he will break even whenever he will do so under the optimal equity contract. Hence, if $F_1^* < \overline{F}$, the investor exactly breaks even, but efficiency is higher, because under the debt contract short-term payments are higher, long-term payments lower and, therefore, e higher.

To complete the argument notice that if $F_1^* = \overline{F}$, debt and equity are equivalent, and if an equity contract with the short-term component $\overline{F}$ is not able to attract funds, the debt contract will not be able to either (for an explanation see G-N, p. 21). Combining, debt weakly dominates equity. Furthermore, notice that if $\overline{F}$ as defined in equation (2.18) exceeds 1/p, then the optimal debt contract will have a face value of 1/p, thus bringing about the first-best outcome. ■

While in G-N's model, liquidation of the firm is only a threat that influences the parties' relative bargaining powers and is never actually done in equilibrium, one can as well consider an economy where liquidation is, in some cases, welfare-enhancing. Kalay and Zender (1997, henceforth K&Z) show that, if the information of whether the firm should be liquidated or kept in business is distributed asymmetrically between the manager and the investor, there is a trade-off between providing the manager with incentives to make an efficient liquidation decision and resolving an ex-post effort problem that arises because of debt overhang. We will present this model briefly in the following section.

2.5 The Ex-Post Effects of the Liquidation Policy in Distress

We now extend the model presented in the preceding section by allowing for any form of contract, not just debt and equity, and make the important change that π_1 is not a cash flow but rather a signal that cannot be paid out. It only influences the efficiency of managerial effort in the second period.

An entrepreneur lacking any own funds seeks to finance a project that requires an initial investment I to be made at date 0 and generates a payoff $\pi_2 \in \{0, \overline{\pi}_2\}$ at date 2. At date 1, a signal $\pi_1 \in \{l, h\}$ is revealed to the public that will influence the probability of a high date-two payoff and assumes the value h with probability ρ. After π_1 has been observed, the firm may also be liquidated, in which case π_2 will not accrue, but rather a liquidation value $L \in \{L_1, L_2\}$, where $0 < L_1 < L_2 < \overline{\pi}_2$ and the probability that $L = L_2$, q, is common knowledge. The entrepreneur, however, has an informational advantage as compared to the investor, as he learns the exact liquidation value. It is assumed that liquidation is socially optimal if and only if $\pi_1 = l$ and $L = L_2$.

If the firm is kept in business, the manager decides on the level of effort e he makes in running the firm, where the probability of high π_2 is increasing in e. To be more precise, we

make the same assumptions on this probability as we made in the preceding section: There are two functions, $p_l(.)$ and $p_h(.)$, that are increasing, twice continuously differentiable, strictly concave in e, and satisfy the lower Inada condition. Furthermore, $p_l(0) = p_h(0) = 0$ and for every $e > 0$, $p_h(e) > p_l(e)$ and $p_h'(e) > p_l'(e)$. The cost of contributing one unit of effort is again constant at k.

There is a continuum of investors, each owning enough cash to finance the project alone. Contracts specify the amount of cash the investor receives for every level of π_1 and date-two cash flow. Following K&Z, we assume that the manager's liability is limited, so that the investor recieves nothing whenever date-two cash flow is zero. Furthermore, contracts may specify in advance whether the firm will be liquidated or kept in business for the case where $\pi_1 = l$. The alternative to contractually prescribe the liquidation policy is to let the manager make this decision.

As always, we assume that the market for funds is perfectly competitive, so that the investor will accept any contract he breaks even on.

We start the analysis by deriving the optimal contract among those *not* specifying a certain liquidation policy. As explained above, the investor receives nothing whenever date-two cash flow is zero. Furthermore, it is easy to see that assigning the investor the entire proceeds from liquidation whenever continuation is socially optimal induces the manager to choose continuation, the desired outcome in this case. That is to say, in equilibrium, the investor's payoff is L_1 if $L = L_1$ and the firm is liquidated, and L_2 if $L = L_2$, $\pi_1 = h$ and the firm is liquidated. There remain three cases: The case where $L = L_2$, $\pi_1 = l$ and the firm is liquidated, and the two cases where $L = L_2$, the firm is kept in business and $\pi_2 = \overline{\pi}_2$, which may be the case for $\pi_1 = l$ or $\pi_1 = h$. We will denote the contractual payout to the investor in these cases by R_L, R_l and R_h, respectively.

Given R_L, R_l and R_h and the realization of π_1, r, if the firm is kept in business, the manager will choose e so as to

$$\max_e p_r(e)(\overline{\pi}_2 - R_r) - ke, \qquad r = l, h \qquad (2.19, 2.20)$$

where the (unique) maximand is denoted $e_r^*(R_r)$, respectively. The first-order conditions are

$$p_r'(e_r^*(R_r)) = k / (\overline{\pi}_2 - R_r), \qquad r = l, h. \qquad (2.21, 2.22)$$

Notice that the properties of the functions $p_r(.)$ imply that for every R, $e_h^*(R) > e_l^*(R)$.

As to the liquidation decision, it is socially optimal that the manager liquidates the firm if and only if $\pi_1 = l$ and $L = L_2$. He will do so if

$$L_2 - R_L \geq p_l(e_l^*(R_l))(\overline{\pi}_2 - R_l) - ke_l^*(R_l), \qquad (2.23)$$

i.e., if the manager's payoff from liquidation is at least equal to his payoff from continuation. In equilibrium, (2.23) will hold with equality, because giving the manager more of the proceeds from liquidation than necessary to make him indifferent between liquidation and continuation reduces the investor's payoff and implies a need for higher payouts to the investors in states where they distort the managerial effort decision. We will refer to condition (2.23) in equation form as equation (2.24).

The investor will accept a contract if and only if it lets him break even, that is to say,

$$\rho p_h(e_h^*(R_h))R_h + (1-\rho)[qR_L + (1-q)p_l(e_l^*(R_l))R_l] = I. \qquad (2.25)$$

At the contracting stage, the manager seeks to maximize his expected payoff by choice of the contract's parameters, that is, to

$$\max_{R_L, R_l, R_h} \rho[p_h(e_h^*(R_h))(\overline{\pi}_2 - R_h) - ke_h^*(R_h)]$$

$$+ (1-\rho)\{q(L_2 - R_L) + (1-q)[p_l(e_l^*(R_l))(\overline{\pi}_2 - R_l) - ke_l^*(R_l)]\} \qquad (2.26)$$

subject to (2.21), (2.22), (2.24) and (2.25).

Assuming that a solution to (2.26) exists, the following properties of the optimal contract can be derived:

Proposition 2.10: The optimal contract not specifying a liquidation policy is given by (2.24), (2.25) and

$$p_l(e_l^*(R_l))p_l''(e_l^*(R_l))\frac{(\bar{\pi}_2 - R_l)^3}{R_l - q\bar{\pi}_2} = p_h(e_h^*(R_h))p_h''(e_h^*(R_h))\frac{(\bar{\pi}_2 - R_h)^3}{R_h}. \qquad (2.27)^{29}$$

Proof: Substituting (2.24) into (2.25) and the objective function leads to a simplified maximization problem with the following Lagrangian:

$$\mathcal{L} = \rho[p_h(e_h^*(R_h))(\bar{\pi}_2 - R_h) - ke_h^*(R_h)] + (1-\rho)[p_l(e_l^*(R_l))(\bar{\pi}_2 - R_l) - ke_l^*(R_l)]$$

$$+ \lambda\{\rho p_h(e_h^*(R_h))R_h + (1-\rho)[p_l(e_l^*(R_l))R_l + q(L_2 - p_l(e_l^*(R_l))\bar{\pi}_2)] - I\}. \qquad (2.28)$$

Noticing that $p_r'(e_r^*(R_r))\frac{de_r^*}{dR} = \frac{k^2}{(\bar{\pi}_2 - R_r)^3 p_r''(e_r^*(R_r))}$, r = l, h, the first-order conditions with respect to R_l and R_h imply (2.27). ■

The liquidation policy implemented by this optimal contract is socially optimal ex ante, but inducing the manager to pursue this policy is costly, so that there is a need for higher payouts to the investor when the firm is kept in business, thus further distorting the manager's effort decision. Inducing the manager to liquidate the firm if and only if it is socially optimal is especially wasteful if it is very unlikely that $L = L_1$, that is to say, if q is close to unity. In this case, an "uninformed" liquidation policy whenever $\pi_1 = l$ seems more attractive, because then the entire proceeds from liquidation can be allocated to the investor, thus reducing his payoff in states where the firm is kept in business and improving the efficiency of the manager's effort decision[30].

Suppose that q is approaching unity. As (2.27) can only be satisfied if $R_l > q\bar{\pi}_2$, R_l is approaching $\bar{\pi}_2$. This implies, in turn, that $p_l(e_l^*(R_l))\bar{\pi}_2 - ke_l^*(R_l)$ approaches zero. The social value in the limit is

[29] Notice that (2.27) corresponds to K&Z's equation (2).
[30] K&Z claim that for very low levels of q it is optimal to never liquidate the firm, without delivering a proof. At least the way this model is set up, clear-cut conclusions on this cannot be made.

$$\rho[p_h(e_h^*(R_h'))\,\bar{\pi}_2 - ke_h^*(R_h')] + (1-\rho)qL_2 - I, \quad (2.29)$$

where R_h' is chosen such that

$$\rho p_h(e_h^*(R_h'))R_h' + (1-\rho)qL_2 = I. \quad (2.30)$$

If, instead, a pure liquidation policy was pursued, the social value would be

$$\rho[p_h(e_h^*(R_h''))\,\bar{\pi}_2 - ke_h^*(R_h'')] + (1-\rho)[qL_2 + (1-q)L_1] - I, \quad (2.31)$$

where R_h'' is chosen such that

$$\rho p_h(e_h^*(R_h''))R_h'' + (1-\rho)[qL_2 + (1-q)L_1] = I. \quad (2.32)$$

As $p_h(e_h^*(R))R$ is decreasing in R and $p_h(e_h^*(R))\,\bar{\pi}_2 - ke_h^*(R)$ is increasing in R, it follows from (2.30) and (2.32) that $R_h'' > R_h'$ and that the terms both after "ρ" and after "(1-ρ)" are larger in (2.31) than in (2.29). Hence, for large q, a pure liquidation policy enhances social value, although it is inefficient in a first-best world.

Proposition 2.11: For values of q close to unity, it is optimal to prescribe that the firm be liquidated whenever $\pi_1 = l$. ■

As K&Z point out, the case where an uninformed liquidation policy is pursued corresponds to Chapter 7 of the U.S. bankruptcy code, and the case where the manager can decide whether to liquidate the firm or to keep it in business resembles Chapter 11 protection.

2.6 Bankruptcy Law and Financial Structure: The Impact of Managerial Incentives

A. Introduction

Running a firm basically requires two inputs, entrepreneurial ability and funds, the endowments of which usually are distributed heterogeneously within an economy: as a rule, managers are endowed with the former, and investors with the latter. Therefore, entrepreneurial undertakings need the participation of both of these groups. A distinctive feature of the relationship between the manager and the investors of a firm is, however, that their interests are, partly, opposed. The former seeks to maximize his private benefits from managing the firm,

whereas the latter are interested in the maximization of the value of payment streams resulting from their respective financial contracts. A central problem in this relationship, therefore, is to provide the manager with incentives to decide in the investors' interest. If the provision of such incentives, involves payments to the manager, however, the investors' payoffs will be lower, so that two kinds of inefficiencies can arise: first, the investors may prefer not to provide incentives even if their provision is socially optimal (ex-post inefficiency), and second, they may even choose not to invest in a socially profitable project in the first place (ex-ante inefficiency).

The minimization of these inefficiencies is the chief concern of this section. We focus on the decision of whether to liquidate a firm or to keep it in business. The opposed interests described above arise when the manager, in contrast to the investors, obtains full information on the firm's future profits, but the fact that he enjoys some private benefits from running the firm prevents him from liquidating the firm even if he learns that profits will be low. It will be shown that in order to resolve the problem between the manager and the investors, control must be suitably allocated between two general classes of investors with opposing payoff structures, namely, shareholders and creditors, and that second-best outcomes cannot be achieved with just one class of debt. We show that bankruptcy law can serve as an allocation device that induces the manager and the investors to write out financial contracts that yield a second-best arrangement.

The following bankruptcy law is shown to be optimal: Firms that perform sufficiently poorly should be filed under a creditor-in-possession procedure, which bears some resemblance to the provisions of Chapter 7 of U.S. law. For firms that do better, but are still in difficulties, a procedure that allocates some control to both creditors and shareholders should apply. In the latter case, managerial incentives are provided by a golden handshake, which the manager receives only if he "sacks" himself. Optimal contracts under this bankruptcy law turn out to exhibit two classes of debt, one of which is junior and never enjoys any power of

decision. As such junior debt is similar to (non-voting) bond debt, our theory provides a rationale for the existence thereof: the fixed claims resulting from these contracts reduce the shareholders' payoffs in such a way that they make informed continuation more attractive. On the other hand, we also need an upper bound on the senior creditor's claims, so that this reduction of the shareholders' payoffs must not be brought about by means of an increase in the senior creditor's claims.

The influence of a firm's financial structure on the decision between liquidation and continuation has been discussed extensively by Dewatripont and Tirole (1994). Their analysis, too, suggests that financial structure should be chosen so as to distribute the control over the firm among claimants in an appropriate way. The main difference between their paper and the approach followed here is that they model the two conflicts of interests by means of two different decision problems. In their setting, the prospect of receiving a private benefit is used as an incentive for the manager to make an earlier decision correctly. Hence, incentives can be provided at zero social cost, and ex-ante inefficiency cannot arise.

The problem that the optimal compensation scheme for the manager may be too costly for the investors plays a key role in Aghion, Dewatripont and Rey (1990). Their focus, however, is on the marginal project to be financed, that is, on maximizing the investors' aggregate payoff given a certain realization of short-term performance. In our model, the main emphasis is placed on the problem of inducing investors to choose an action that does not maximize their aggregate payoff, but improves social efficiency. The main point in Aghion et al. (1990) is that managers can be disciplined optimally by means of a mix of debt (the threat of liquidation) and voting equity (the threat of a takeover). Here, in contrast, the optimal provision of managerial incentives is quite simple, and the main strategic conflict is that between the various investors in the firm.

We start by setting out the model's assumptions. Then the first-best solution will be presented as a benchmark. Subsection D deals with the optimal provision of managerial

incentives, that is, it derives conditions when the investors should provide monetary incentives to the manager in order to minimize ex-post and ex-ante inefficiency. The problem dealt with and the results presented are very much in line with many contributions to the finance literature, the most closely related analysis being that of Aghion et al. (1990). A completely satisfactory implementation of the second-best outcome, however, has not been presented so far. This section's contribution to this line of work is that it recognizes that bankruptcy law can be a tool for such an implementation. In subsection E, we examine the problem that investors may not be willing to behave in such a way that yields the results derived in subsection D. A bankruptcy code that induces investors to write out contracts by means of which they can implicitly commit themselves to playing second-best strategies is proposed. This is the main result of our analysis. Whether some of the requirements of this bankruptcy code are strictly necessary is discussed in subsection F and the appendix, both of which may be skipped by readers with only minor interest in technical matters, but without losing any of the main insights. Subsection G presents some conclusions.

B. The Model

We make the same assumptions as in the basic model set out in section 2.2, with the following extension: In the course of running the firm in the first period, the entrepreneur acquires some information about the level of second-period cash flow. For the sake of simplicity, let this information be complete: Just before the decision of whether to keep the firm in business in the second period or to liquidate it must be made, the entrepreneur learns privately exactly what level of cash flow will be realized at the end of the second period. Hence, the entrepreneur is the only person in the economy who can make this decision correctly for certain.

Notice, however, that it is not necessarily in the manager's best interest to make the "correct" liquidation decision. It will turn out that he will liquidate the firm only if he receives

some monetary compensation for his foregone private benefits B. Hence, the investor in control has the choice of whether to compensate the manager or to make an uninformed liquidation decision. We therefore modify the timing presented in subsection A of section 2.2 in the following way:

(v)(a)The investor in control decides whether to delegate the liquidation decision to the manager. A new contract with the manager may be written out; the terms of this eventual contract are publicly observable. Nature draws the level of second-period cash flow randomly, which is revealed only to the manager. (b) The liquidation decision is made either by the manager or by the investor in control, according to the decision made at the beginning of (v).

(vi)If the firm is still in business, second-period cash flow is realized and revealed publicly. Otherwise, the liquidation value L is realized. Payments are made according to the contracts written out in stages (i), (iv) and (v).

As the manager has to be compensated for his foregone private benefits if he is to make an unbiased, i.e., cash-flow maximizing liquidation decision, the investor in control may need to negotiate a new contract with the manager whose terms are contingent on whether the firm remains in business or will be liquidated. It is assumed that this kind of negotiation involves some small cost c for the firm's owner, that is to say, the investor who possesses the control rights over the firm. Contracts other than those described above are not available.

C. First-Best

As a benchmark, we present the first-best solution, that is to say, every socially profitable project is financed, and the manager chooses continuation if and only if he learns that second-period cash flow will be high. Notice that the assumption that $L > B$ implies that liquidation is efficient whenever second-period cash flow is low (i.e., zero). A project is

socially profitable ex ante if and only if the expected social value covers at least the investment costs:

$$\int_{\underline{\pi}_1}^{\bar{\pi}_1} [\pi_1 + B + p_2(\pi_1)\,(\bar{\pi}_2 + B) + (1 - p_2(\pi_1))\,L]\, dF(\pi_1) \geq 1 \qquad (2.33)$$

Notice that a project's expected social value is the sum of expected cash flow and the manager's expected (net) private benefits.

The first-best outcome could be achieved, for example, if the entrepreneur disposed of sufficient funds to cover the initial investment by himself. It has been ruled out by assumption.

D. Optimal Provision of Managerial Incentives

In this section we focus on what would be the optimal strategies if the manager were to act purely in his self-interest, but the players were also able to coordinate their actions so as to maximize the social value of a project subject to the investors breaking even. An incentive problem now arises because the manager may not be willing to use the information about the level of second-period cash flow to make the optimal decision between liquidating the firm and keeping it in business. In the absence of any financial compensation, there is never an incentive for him to liquidate the firm, because this action would deprive him of his private benefit B. Hence, if this decision is to be made efficiently, the manager's payoff schedule has to be such that he weakly prefers liquidation if he learns that cash flow in the second period will be low, and continuation if cash flow will be high.

When dealing with such compensation schemes, however, we have to keep in mind that every dollar paid out to the manager reduces the investors' payoffs. Hence, if the investors' break-even constraint binds sufficiently tightly, they will try to provide these incentives most "efficiently", that is, given that the manager's payoff in alternative employment has been normalized to zero, he should receive some compensation if and only if it affects his incentives to liquidate the firm whenever it is appropriate. It is clear that no form of compensation in the

first period improves these incentives, cash flow therein being chosen by nature; nor does any compensation in the second period do so in the case of high cash flow, as in this case, he would make the "right" decision anyway. Thus, the cheapest way of inducing the manager to choose liquidation in the case of low second-period cash flow is to set his compensation in that period to B if he liquidates the firm, and to zero if he chooses continuation. The following lemma summarizes this fact:

Lemma. *The Optimal Employment Contract (the 'Golden Handshake')*

The cheapest way of providing the manager with the right incentives is a contract according to which the manager receives a payment of B if and only if he sacks himself and liquidates the firm at the start of the second period. This payment will be referred to as the "golden handshake". ■

Given that the manager's payoff in alternative employment is zero, such a contract clearly satisfies his participation constraint at all relevant stages of the game.

Even if the compensation scheme is designed most efficiently, however, the investors still may find it too expensive. Consider, in particular, the case where short-term cash flow π_1 turns out to be such that

$$L > p_2(\pi_1)\,\overline{\pi}_2 + (1 - p_2(\pi_1))\,(L - B) - c, \qquad (2.34)$$

that is, the case where the investors' aggregate payoff is strictly higher in case of uninformed liquidation than providing the manager with the golden handshake contract. If (2.34) holds, the investors will maximize their own aggregate payoffs if they liquidate the firm.

What we need, therefore, is a decision rule contingent on the level of short-term cash flow. After the revelation of π_1, there are three sensible actions an investor could possibly take: First, he can offer the golden handshake contract and thus take advantage of the manager's private information. Second, he can let the manager run the firm without providing him with incentives to use the said information. Finally, he can liquidate the firm uninformedly. On the right-hand side of (2.34) we have the investors' payoff if the golden handshake is offered. As

this is increasing in π_1, it is obvious that, whenever the golden handshake contract is favourable for a certain π_1', it is favourable for every $\pi_1 > \pi_1'$ as well. Hence, the said decision rule is sufficiently described by a level of first-period cash flow π_1' that indicates that the golden handshake contract is offered for every $\pi_1 \geq \pi_1'$ and the firm is liquidated uninformedly otherwise.

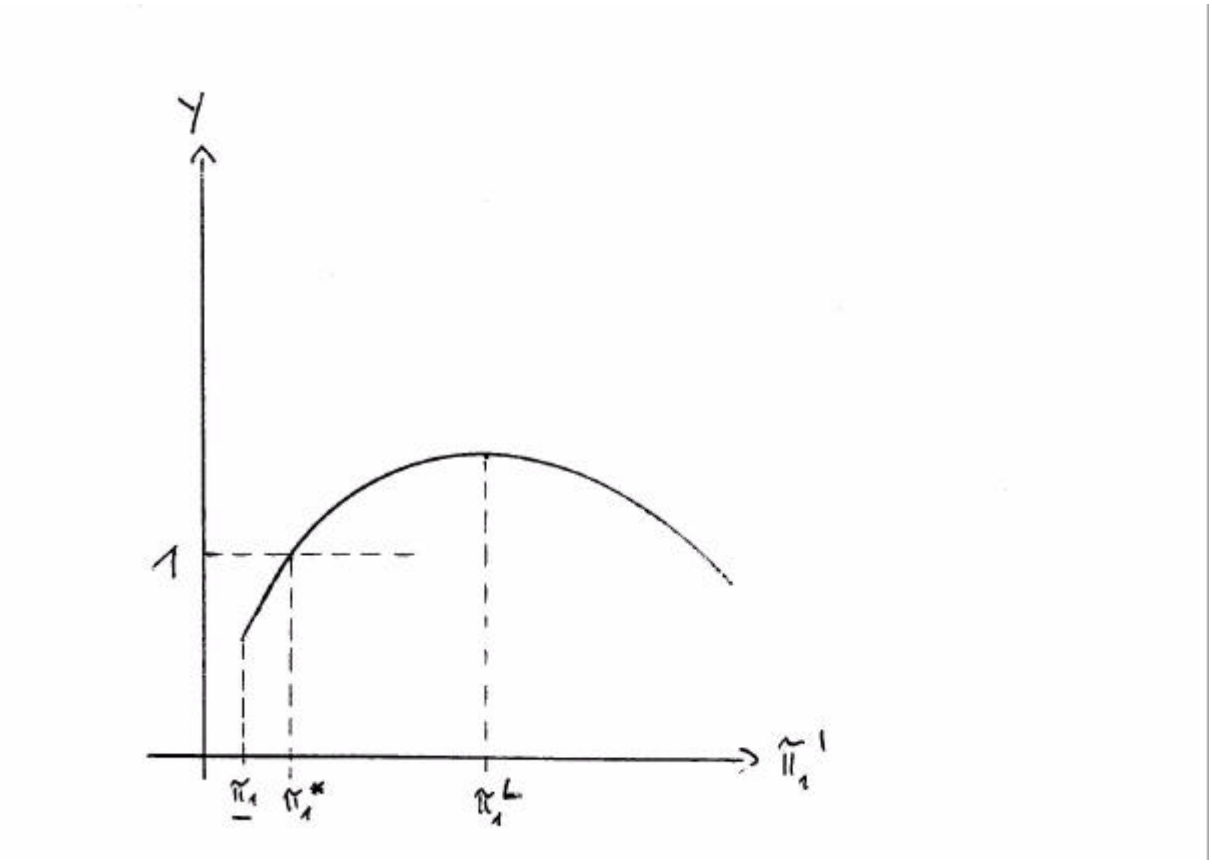

Figure 2.2. Investors' Aggregate Payoffs as a Function of the Firm's Liquidation Policy.

In order to analyse the consequences of using a particular value π_1', denote the investors' aggregate payoffs by $Y(\pi_1')$:

$$Y(\pi_1') = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1'} L dF(\pi_1) + \int_{\pi_1'}^{\overline{\pi}_1} [p_2(\pi_1)\ \overline{\pi}_2 + (1 - p_2(\pi_1))\ (L - B) - c] dF(\pi_1). \quad (2.35)$$

Additionally, denote the value of π_1 where the left-hand side of (2.34) is equal to its right-hand side by π_1^L. That is to say, if the investors observe a level of first-period cash flow π_1^L, they are

indifferent between the golden handshake and uninformed liquidation. Then Y(.) is increasing in π_1' for $\pi_1' < \pi_1^L$ and decreasing for $\pi_1' > \pi_1^L$ (see figure 2.2). Left to their own devices, the investors would therefore choose $\pi_1' = \pi_1^L$. Notice, however, that the firm's social value is strictly decreasing in π_1'. Is it, therefore, always efficient to offer the golden handshake contract? It maximizes social value once this decision node is reached; i.e., it is ex-post efficient, but it reduces the investors' aggregate payoff whenever realized cash flow $\pi_1 < \pi_1^L$. This reduction may be so severe that $Y(\pi_1') < 1$, i.e., investors do not break even. In this case, if it were common knowledge that the golden handshake would always be provided, an otherwise socially profitable project would not get financed in the first place: some ex-ante inefficiency arises. To achieve a second-best outcome, we therefore have to balance these effects. Define $\pi_1^* \leq \pi_1^L$ such that

$$Y(\pi_1^*) = 1. \qquad (2.36)$$

Then the second-best optimum arrangement is to provide the golden handshake contract whenever $\pi_1 \geq \pi_1^*$, and to liquidate the firm otherwise. Summing up, we have

Proposition 2.12. *The Second-Best Optimum*

a) If π_1^* is well-defined according to (2.36), it is second-best optimal to provide the golden handshake contract whenever $\pi_1 \geq \pi_1^*$, and to liquidate the firm otherwise. If $Y(\pi_1') > 1$ for every $\pi_1' < \pi_1^L$, the golden handshake contract should always be offered.

b) A project is financed if and only if $Y(\pi_1^L) \geq 1$. ■

An interpretation of proposition 2.12 is that, whenever π_1^* is well-defined according to (2.36), i.e., whenever

$$Y(\pi_1^L) \geq 1 \geq Y(\underline{\pi}_1), \qquad (2.37)$$

the firm is worth more than the initial investment. Since the market for funds is assumed to be competitive, the resulting "rent" accrues to the manager through a higher probability that he receives B in the second period. Condition (2.37) describes the set of projects where ex-ante

inefficiency is really an issue, and where this analysis is meaningful. Hence, the remaining discussion will be confined to the case where (2.37) holds.

E. Optimal Allocation of Control

Now that we have derived the socially optimal provision of managerial incentives, it is important to notice that if π_1^* is well-defined according to (2.36) and $\pi_1^* < \pi_1^L$, a single class of investors would not have any incentive to provide the golden handshake contract whenever $\pi_1 \in [\pi_1^*, \pi_1^L)$, despite the fact that proposition 2.12 tells us that it would be the second-best optimal arrangement in this interval. Hence, the goal is now to derive a way of implementing the second-best optimum given by proposition 2.12. The task of this subsection is, first, to present a set of allocations of control and payoffs that implements the second-best optimum and, then, to suggest an interpretation of this result in terms of actual institutions. In particular, it will be shown how optimal bankruptcy law can induce the contracting parties to write out optimal contracts in the case where only standard debt and equity contracts are available.

Let π denote the level of second-period cash flow net of compensation payments to the manager, where π can assume the values $\{0, L - B, L, \overline{\pi}_2\}$, depending on the level of second-period cash flow and the decisions made at the beginning of the second period. The following definitions suggest how π should be allocated among the investors and who should exercise control over the firm in what circumstances.

Definition 2.4. *An Allocation Rule for Second-Period Payoffs*

Let there be three types of investors, namely, I_1, I_2 and I_3, and select some $D \in (0, L - B]$. Then, for this choice of D, I_1 receives $\min \{\pi, D\}$, I_2 receives $\min \{\max \{0, \pi - D\}, R_2\}$ with $R_2 \in [L - D - c, \overline{\pi}_2 - D - c)$, and I_3 is the residual claimant. ■

In other words, I_1 and I_2 are creditors, the face value of their debt contracts being D and R_2, respectively; and I_3 is the class of shareholders. For the remaining analysis, it will be

assumed that investors are completely homogeneous within their classes, and every class of investors will be treated as a single investor.

Definition 2.5. *An Allocation Rule for Corporate Control*

For $\pi_1 < \pi_1^*$, I_1 is in control. For $\pi_1 \geq \pi_1^*$, I_3 has control, but I_1 has a right of veto, that is, he is allowed to reject any contract I_3 reaches with the manager in stage (v.a). If I_1 exercises his veto, the firm is liquidated at the end of stage (v.b). ■

In principle, the investor who controls the firm can choose among three possible actions when the decision between liquidation and continuation is due: First, he can delegate this decision to the manager and offer him the optimal incentive contract, namely, the golden handshake contract [stage (v.a)]. If, on the other hand, he chooses to make an uninformed decision, he can either liquidate the firm or keep it in business without providing the golden handshake contract [stage (v.b)]. The investors' payoffs, corresponding to the relevant courses of action, and according to definitions 2.4 and 2.5, are summarized in table 1.

Decision	I_1	I_2	I_3
uninformed liquidation	D	L - D	0
uninformed continuation	$p_2(\pi_1)D$	$p_2(\pi_1)R_2$	$p_2(\pi_1)(\overline{\pi}_2 - D - R_2)$
golden handshake offered by I_1	D - c	$p_2(\pi_1)R_2 + (1-p_2(\pi_1))(L - B - D)$	$p_2(\pi_1)(\overline{\pi}_2 - D - R_2)$
golden handshake offered by I_3	D	$p_2(\pi_1)R_2 + (1-p_2(\pi_1))(L - B - D)$	$p_2(\pi_1)(\overline{\pi}_2 - D - R_2)$ - c

Table 2.2. Second-Period Decisions and Payoffs.

In order to show that the second-best arrangement described in proposition 2.12 is an equilibrium for every π_1 given the allocation rules defined above, we deal with the relevant domains of control in turn.

$\pi_1 < \pi_1^*$: Uninformed liquidation weakly dominates the other two options for I_1, the investor in control.

$\pi_1 \geq \pi_1^*$: If I_3, the investor in control, does not offer the golden handshake contract, I_1 anticipates that I_3 will choose continuation and therefore makes use of his veto right. Hence, in equilibrium, I_3 does offer the golden handshake contract and so delegates the liquidation decision to the manager.

Notice that if I_2's claims are defined by means of a debt contract (which is consistent with his payoff structure), a renegotiation among the investors in the case where $\pi_1 \geq \pi_1^*$ is not possible, although their aggregate expected payoff is lower than in the case of an uninformed liquidation. One could think of I_2 announcing his intention to waive part of his claims in case the firm is liquidated, thus giving the shareholders the incentive to liquidate, which is the collectively optimal action for the investors. But even if I_2 agrees to receive only a sure payment of $p_2(\pi_1)\, R_2 + (1 - p_2(\pi_1))\, (L - B - D - c)$, this announcement is not credible, since he still has legal claims R_2 in the firm, which he will enforce once π has been revealed. Hence, we have established

Proposition 2.13. *Optimal Allocation of Control and Payoffs*

If π_1^* is well defined according to (2.37), the allocation rules defined in definitions 2.4 and 2.5 induce the investors to behave in such a way as to attain the second-best optimum according to proposition 2.12. If there is no π_1^* satisfying (2.37), the second-best outcome is achieved by setting $\pi_1^* = \underline{\pi}_1$ and then applying definitions 2.4 and 2.5. ■

Clearly, the allocation devices set out in definitions 2.4 and 2.5 cannot be implemented completely by means of standard debt and equity contracts alone, as standard debt contracts do

not contain the veto right of I_1 in the case where $\pi_1 > \pi_1^*$. Additionally, it is not clear how I_1's claims on second-period cash flow can be limited to D. Some means must be found to grant veto power to I_1 and to induce the investors to reorganize the contracts appropriately.

In real life, we call a legal code that determines control rights in the reorganization of a financially distressed firm bankruptcy law. If a firm cannot meet its payment obligations, debt contracts usually assign creditors the right to sell the firm's assets and collect the proceeds up to the limit of their unsatisfied claims. Bankruptcy law sometimes calls a halt to this process and prevents the firm from being liquidated. In this case, although the old shareholders are still in control, creditors have a say in the firm's major decisions, and the investors' contractual payoffs may be renegotiated.

Proposition 2.13 states that a fixed claimant should be granted the right to decide whether to liquidate the firm or to keep it in business whenever $\pi_1 < \pi_1^*$. This is compatible with credit contracts if this claimant is an unsatisfied creditor of the previous period whose contractual claims are $R_1 > \pi_1^*$. In the case of $\pi_1 \geq \pi_1^*$, proposition 2.13 requires the residual claimant to be in control, but with the fixed claimant having a specific veto right. That the fixed claimant should have a say in the shareholders' decision is plausible only if her claims are not fully satisfied and bankruptcy law provides protection to the distressed firm. Then, if the shareholders and the manager are able to reach an incentive contract, it can be interpreted as a rehabilitation proposal. If $R_1 = \overline{\pi}_1$, the short-term creditor has the right of veto whenever $\pi_1 \geq \pi_1^*$.

The last obstacle to be cleared in order to reach the second-best outcome is to restrict D to at most L - B. In the above paragraph, we used the condition $R_1 = \overline{\pi}_1$ in order to justify the short-term creditor having a veto right whenever $\pi_1 \geq \pi_1^*$. Suppose, therefore, that the claims she carries over to the second period exceed L - B. Then she will strictly prefer liquidation to continuation, and she will use her veto right to force the firm into liquidation whenever she

possesses it ($\pi_1 \geq \pi_1^*$). Hence, if the unsatisfied claim $\bar{\pi}_1 - \pi_1^*$ exceeds L - B, the law has to force the investors to reorganize contracts such that $D \leq L - B$. Notice that this is empirically consistent with many reorganizations in which creditors write down some of their claims, even though the firm's assets would have been sufficient to cover their unsatisfied claims. Combining these arguments, we have

Proposition 2.14. *Optimal Bankruptcy Law*

a) A bankruptcy code that: (i) allocates control to the unsatisfied creditors if $\pi_1 < \pi_1^*$, (ii) gives them a veto right if $\pi_1 \geq \pi_1^*$, and (iii) sets an upper bound $\bar{D} \leq L - B$ on the unsatisfied creditors' claims carried over to the next period, induces the manager and the investors to write out contracts such that the second-best outcome is achieved.

b) Optimal contracts specify the creditors' contractual repayments $R_1 = \bar{\pi}_1$ and

$R_2 \in [L - \bar{D} - c, \bar{\pi}_2 - \bar{D} - c)$, respectively. ■

In order to obtain a more complete description of the optimal contracts in part (b), recall that the market for funds is assumed to be competitive. Hence, if the investments made by the short-term creditor, the long-term creditors and the shareholders are, respectively, V_1, V_2 and V_S, then in equilibrium

$$V_1 = \int_{\underline{\pi}_1}^{\bar{\pi}_1} \bar{\pi}_1 dF(\pi_1) - \int_{\underline{\pi}_1}^{\bar{\pi}_1 - \bar{D}} [\bar{\pi}_1 - \pi_1 - \bar{D}]dF(\pi_1),$$

$$V_2 = \int_{\underline{\pi}_1}^{\pi_1^L} (L - \min\{\bar{D}, \bar{\pi}_1 - \pi_1\})dF(\pi_1) + \int_{\pi_1^L}^{\bar{\pi}_1} [p_2(\pi_1)R_2 + (1-p_2(\pi_1))(L-B - \min\{\bar{D}, \bar{\pi}_1 - \pi_1\})]dF(\pi_1)$$

and

$V_S = 1 - V_1 - V_2$.

Notice that if $Y(\underline{\pi}_1) > 1$, this definition would contradict the assumption of perfect competition in the market for funds, as in this case, investors' total payoffs exceed their investment outlays. The analysis of such projects is beyond the scope of this paper, because ex-

ante inefficiency is not an issue for highly profitable projects where (2.37) does not hold. For such projects, it is possible to find other mechanisms to implement the second-best outcome.

The proof of proposition 2.14 is straightforward: The legal environment of part (a) together with the contracts described in part (b) implement the allocations required in proposition 2.13. Under this bankruptcy law, it is optimal for the manager and the investors to enter into the contracts given in part (b). Notice that the contractual repayments given in part (b), together with the condition that the market for funds be perfectly competitive and, hence, that investors break even on average, completely determine the investment of every class of investors. Hence, optimal bankruptcy law induces an optimal capital structure, by means of which ex-post and ex-ante inefficiencies are minimized.

F. Necessary Conditions

We now discuss whether there are weaker conditions for a set of allocations of payoffs and control to induce the second-best outcome than those set out in proposition 2.14. The following results will be derived: First, it will be shown that, whenever $\pi_1^L > \pi_1 \geq \pi_1^*$, joint decision-making, that is to say, contractual negotiations undertaken by the shareholders with a veto right for the "bank", is necessary. Second, it will be argued that there is no combination of debt and equity contracts such that the second-best outcome can be achieved with only two classes of investors. Finally, we will investigate in the appendix under what conditions the rather restrictive requirements $R_1 = \overline{\pi}_1$ and $\overline{D} + R_2 \geq L - c$ used in the previous section can be relaxed. The necessity of bankruptcy law to set the upper bound $\overline{D} \leq L - B$ will also be discussed there.

Suppose a level of cash flow π_1 has been realized in the first period. What contracts for the allocation of second-period cash flow then induce the investors to behave according to proposition 2.12? Let there be two investors who could possibly control the firm: one fixed claimant ("she") with claim D and one residual claimant ("he"). In order to allow for the

possibility of other fixed claimants junior to her, let total fixed claims be denoted by $R \geq D$. "Her" payoff is, in the case of liquidation, D if $D < L$ and L otherwise. If she provides the golden handshake contract, her payoff is $D - c$ if $D < L - B$, and $p_2(\pi_1)D + (1 - p_2(\pi_1))(L - B) - c$ otherwise. Hence, whenever $\pi_1 < \pi_1^L$, she strictly prefers liquidation, no matter which level of D is chosen. Since $\pi_1^L \geq \pi_1^*$, it follows that whenever the firm should be kept in business (that is, $\pi_1 \geq \pi_1^*$), the residual claimant should have the right to control the firm. Now consider the case where $\pi_1^L > \pi_1 \geq \pi_1^*$. If total fixed claims are R, the residual claimant prefers to offer the golden handshake contract to uninformed liquidation only if $R \geq L - B$. For suppose, on the contrary, that $R < L - B$. Then he prefers the golden handshake to uninformed liquidation if and only if

$$p_2(\pi_1)\,\overline{\pi}_2 + (1 - p_2(\pi_1))(L - B) - c - R \geq L - R, \qquad (2.38)$$

which, from (2.34) is equivalent to $\pi_1 \geq \pi_1^L$. If $R \geq L - B$, however, he prefers uninformed continuation to providing the golden handshake, as uninformed continuation avoids the cost of negotiation c. Consequently, if only standard debt and equity contracts are available, we need a joint decision of a fixed and a residual claimant in order to attain the second-best outcome.

If the residual claimant offers the golden handshake contract, it is her who bears the negotiation cost c. Hence, the fixed claimant is indifferent between uninformed liquidation and the golden handshake contract offered by the residual claimant if and only if her fixed claims are at most L - B. In this case, an appropriate rule for the joint decisionmaking is to let the fixed claimant have a right of veto after she observes whether or not the residual claimant has offered the golden handshake and to let the fixed claimant decide between liquidation and continuation if she does exercise her veto. If the golden handshake contract has been offered, there is no incentive to use this veto right, whereas in the opposite case, it is rational to expect the residual claimant to keep the firm in business, after which the veto right would be applied, a (credible) threat that induces the residual claimant to offer the golden handshake contract.

This argument also explains why $R > D$, which entails the presence of a second class of creditors, is a necessary condition for the attainment of the second-best outcome: For the fixed claimant to be indifferent between liquidation and the golden handshake contract offered by the shareholders, we need $D \leq L - B$. The shareholders' incentives require, however, that $R > L - B$ and thus that $R > D$.

G. Conclusions

The analysis presented in this section reveals that the need for monetary managerial incentives may lead to major coordination problems among investors. We have shown that if only standard debt and equity financial contracts are available, the second-best outcome can only be achieved by means of legal regulations concerning recontracting after default (that is to say, an upper boundary on the claims carried over by the creditor whose claims have been defaulted on) and the allocation of control. It turns out that these legal regulations bear some resemblence to the U.S. bankruptcy code: If a defaulting firm has performed very badly, the unsatisfied creditor should control the firm and will, in equilibrium, liquidate it. Shareholders of a firm that does somewhat better should, despite default on its payment obligations, remain in control, with the unsatisfied creditor enjoying a veto right as a disciplinary device. The former result is close to Chapter 7 of the U.S. bankruptcy code, whereas the latter has something in common with the provisions of Chapter 11.

The main result of this paper, that bankruptcy law can induce investors to decide differently than if they were to simply maximize their joint payoffs, may be extended to the case where it is not only the manager's private benefits of control that are included in the social value function, but not in the investors' objective functions, as here. There may also be other social costs of liquidation, such as shortages in the supply of the goods produced by the financially distressed firm, which are not taken into account by rational investors.

The reader will have noticed that much of the analysis is driven by the assumption that only standard debt and equity financial contracts are available. This assumption might be questioned; for if it is dropped, one can easily find an allocation of second-period payoffs such that only two classes of investors are required[31]. Two justifications for this assumption can, however, be given. First, even if a solution that lifts the restriction to debt and equity seems more straightforward than the one presented in section 5, since only two classes of investors are then needed, notice that, in order to be renegotiation proof, the resulting contractual claims have to be enforceable in court, which is a striking feature of debt contracts and still requires the presence of some legal regulation. Second, we do not claim to present a model of optimal security design. It proceeds from the assumption that, for some reason or other, only debt and equity contracts are available or optimal, but it recognizes that they are not free of disadvantages. Given this much, the legal environment should provide some regulations that reduce the social costs arising from these disadvantages. The argument made here should therefore be perceived more as a contribution to the theory of bankruptcy law than to that of optimal contracting. The task for future work, then, is to explain within a framework of optimal security design why, in reality, a seemingly strong regulatory mechanism is used to overcome the incentive problems associated with debt and equity instead of writing out more general contracts.

2.7 Conclusions

In this chapter, five models are presented that highlight the possible tensions between the achievement of ex-ante and ex-post efficiency. The basic model, presented in section 2.2,

[31] Consider, for example, two investors, say, X and Y. If $x(\pi)$ denotes X's payoff if total investors' payoffs are π, let $x(L-B) = L - B - \beta$, $x(L) = L$ and $x(\overline{\pi}_2) = L + \alpha$, where α and β are sufficiently small. Then X will always choose uninformed liquidation and Y will choose to provide the golden handshake, irrespective of π_1. Hence, we only have to write out the contract such that X is in control whenever $\pi_1 < \pi_1^*$ and Y is in control otherwise, and we are done.

shows that debt may restrict free cash flow in an ex-post beneficial way, and the optimal mix between debt and equity is also ex-ante efficient. Sections 2.3 and 2.6 demonstrate, however, that an ex-post relevant conflict between a firm's manager and the investors may have some ex-ante effects: Although being ex-post beneficial, providing the manager with monetary incentives to act in the investors' best interest may prove ex-ante inefficient, because it reduces the investors' expected payoff and may prevent the firm from being funded at the outset. This trade-off plays a particularly important role in propositions 2.5, 2.6 and 2.8. Section 2.6 introduces an additional layer of complexity by considering a heterogeneous group of investors. Although the second-best arrangement is not implementable if there is only one homogenous class of investors, conflicting interests among investors may result in the choice of an action that is collectively suboptimal for the investors as a group, but optimal both for the individual investor in control and with respect to the maximization of social value.

In section 2.4 an alternative trade-off between ex-post and ex-ante efficiency is considered: High contractual short-term payments to the investors and low contractual long-term payments reduce the manager's incentives to divert the firm's resources to his private consumption, but increase his incentives to transfer cash flow intertemporally and vice versa. Without bankruptcy law, the creditor can, in the case of default, always bargain for a substantial second-period payoff, by threatening to liquidate the firm, thus inducing the manager to choose an inefficiently high amount of perk consumption. Even though it may seem profitable to do so, the creditor cannot commit himself to a lower renegotiated long-term payoff. On the other hand, rule "B2" as set out in definition 2.3 restricts the creditor's bargaining power to an ex-post efficient level, while at the same time guaranteeing the creditor's break even.

Finally, the discussion carried out in section 2.5 demonstrates that the attempt to induce a firm's manager to pursue an efficient liquidation policy may distort his incentives to contribute effort in later periods. Hence, if it is very unlikely that the liquidation value is low, equilibrium contracts specify that the firm be liquidated whenever a bad short-term signal is observed even

though such a liquidation policy foregoes some information the manager possesses on whether the firm should be liquidate or kept in business.

Much of the structure in the basic and the managerial incentives models stems from the discrepancy between maximization of cash flow and of social value. This discrepancy is caused by the manager's private benefits from control, which add to social value but are not relevant where cash flow is concerned. One could now argue that these benefits are small in relation to the firm's total value. First, however, they may be large as compared to the manager's income, so that he will care about these benefits. If they are not respected, he may deem some outside option more attractive than devoting his working force to manage the firm. Furthermore, as remarked in the conclusions to section 2.6, there may arise some other social opportunity costs when a firm is liquidated that cannot be paid out to compensate the investors in control for not liquidating the firm, as shortages in the supply of the goods the distressed firm produces or the workers' human capital that may be lost if the firm is shut down. It is obviously easy to extend the respective models in this direction. Some details of the results may change, but the fundamental trade-offs between ex-post and ex-ante efficiency will remain.

In sum, this chapter demonstrates that if contracting alone cannot resolve agency problems to a satisfactory extent, the design of bankruptcy law and financial distress as the event when such law is applied may bring about substantial welfare improvements. This result is in sharp contrast to the traditional view on bankruptcy as an undesirable, exogenously induced event and may encourage some further research on the "modern" view.

Appendix to Section 2.6

We now discuss the necessity of the requirements $R_1 = \overline{\pi}_1$ and $\overline{D} \leq L - B$. Clearly, the former requirement assures that the short-term creditor has got the veto right whenever $\pi_1 \geq \pi_1^L$ and thus prevents the shareholders from choosing uninformed continuation. One could argue, however, that this can also be achieved by reducing total debt claims to at most

$L - B - c/[1-p_2(\pi_1)]$ for some $\pi_1 > \pi_1^L$, so that the negotiation costs are compensated and offering the golden handshake is more attractive for the shareholders. Let $R(\pi_1)$ denote total debt claims in the second period if first-period cash flow is π_1. R(.) is weakly decreasing:

$$R(\pi_1) = R_2 + \max\{\min\{\overline{D}, R_1 - \pi_1\}, 0\}. \quad (2.39)$$

More precisely, R(.) is strictly decreasing for $R_1 - \overline{D} < \pi_1 < R_1$, and constant otherwise. Then we can rewrite proposition 2.14 in the following way:

Proposition 2.15. *Optimal Bankruptcy Law Revisited*

A bankruptcy code that allocates control to the unsatisfied creditors if $\pi_1 < \pi_1^*$, gives them a veto right if $\pi_1 \geq \pi_1^*$, and sets an upper bound $\overline{D}$ to the unsatisfied creditors' claims carried over to the next period induces the manager and the investors to write out contracts such that second-best is achieved, if and only if $\overline{D}$ and the debt contracts' parameters R_1 and R_2 satisfy

$R_1 \geq \pi_1^L$,

$$L - B + R_2 \geq R(\pi_1) \geq L - [p_2(\pi_1)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1)] \text{ whenever } \pi_1^L > \pi_1 \geq \pi_1^* \quad (2.40)$$

and $R_1 > \pi_1$ or $R(\pi_1) < L - B - c/[1-p_2(\pi_1)]$ whenever $\pi_1 \geq \pi_1^L$. (2.41) ■

The first requirement, $R_1 \geq \pi_1^L$ ensures default and, therefore, the creditor's participation in the liquidation decision whenever $\pi_1 < \pi_1^L$. Condition (2.40) imposes two restrictions on the outstanding debt claims in the case where offering the golden handshake is individually, but not jointly rational: The first inequation restricts the short-term creditor's claims in the second period to at most L - B, the necessity of which has been derived in subsection F. The second inequation is necessary for the residual claimant to prefer offering the golden handshake to uninformed liquidation. Condition (2.41) requires that, whenever there is no default, that is to say, whenever the residual claimant can make the liquidation decision on his own, his expected payoff is sufficiently high as to induce him to offer the golden handshake.

Are there some $\overline{D}$ and R_2 such that we can choose $R_1 < \overline{\pi}_1$ and still satisfy these requirements? Consider some $\pi_1 \in [\pi_1^*, \pi_1^L)$ where $R(\pi_1) = L - [p_2(\pi_1)(\overline{\pi}_2 - L) - c] /[1 - p_2(\pi_1)]$,

that is to say, condition (2.40) is met with equality. Suppose further that $\pi_1 > R_1 - \overline{D}$, so that we are in the strictly decreasing part of R(.), its first derivative being -1. It is not obvious, however, whether the right-hand side of condition (2.40) increases by more or less than the left-hand side, R(.), when we reduce π_1. There are parameter values for both cases to happen. Define

$$\pi_1^m = \underset{\pi_1 \in [\pi_1^*, \pi_1^L]}{\arg\min} \{[p_2(\pi_1)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1)] - \pi_1\}. \quad (2.42)$$

If $R_1 - \overline{D} \leq \pi_1^m$, then condition (2.40) is equivalent to

$$R_2 \geq L - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)] - (R_1 - \pi_1^m). \quad (2.43)$$

Turning now to the case where $\pi_1 \geq \pi_1^L$, notice that for every π_1,

$c / [1 - p_2(\pi_1)] \leq c / [1 - p_2(\overline{\pi}_1)]$. Hence, whenever $R_1 < \overline{\pi}_1$, condition (2.41) is equivalent to

$$R_2 \leq L - B - c / [1 - p_2(\overline{\pi}_1)]. \quad (2.44)$$

Using (2.43) and (2.44), we can prove

Proposition 2.16: *When Non-Default Is Possible*

There are some $\overline{D}$ and R_2 such that $\pi_1^L \leq R_1 < \overline{\pi}_1$ is possible and (2.40) and (2.41) are satisfied at the same time, if and only if

$$L - B \geq \max \{L - R_1 + \pi_1^m - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)],$$

$$\min \{R_1 - \pi_1^*, B - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)] + c / [1 - p_2(\overline{\pi}_1)]\}\}. \quad (2.45)$$

Proof:

a) $$R_1 - \pi_1^* \leq B - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)] + c / [1 - p_2(\overline{\pi}_1)]. \quad (2.46)$$

if: Suppose condition (2.45) is satisfied. Then $R_2 = L - B - c / [1 - p_2(\overline{\pi}_1)]$ satisfies (2.40) and (2.41), without any regulation $\overline{D}$.

only if: Suppose condition (2.45) is violated. If

$L - B < L - R_1 + \pi_1^m - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)]$, we need, by means of (2.43) and (2.44), $R_2 \geq L - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)] - (R_1 - \pi_1^m) > L - B > R_2$, a contradiction. If

$L - B < R_1 - \pi_1^*$, we must restrict $\overline{D}$ to at most $L - B$, because otherwise, the short-term creditor's second-period claims are strictly larger than $L - B$ for some $\pi_1 \in [\pi_1^*, \pi_1^L)$. Hence,

$R(\pi_1) \leq R_2 + \max \{\min \{L - B, R_1 - \pi_1\}, 0\}$

$\leq 2(L - B) - c / [1 - p_2(\overline{\pi}_1)]$ [using (2.44)]

$< L - B + R_1 - \pi_1^* - c / [1 - p_2(\overline{\pi}_1)]$ [because (2.45) is violated]

$< L - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)]$, [using (2.46)]

which means that condition (2.40) is violated at least for $\pi_1 = \pi_1^* + \varepsilon$ for $\varepsilon > 0$ sufficiently small.

b) $R_1 - \pi_1^* > B - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)] + c / [1 - p_2(\overline{\pi}_1)]$. (2.47)

<u>if:</u> Suppose condition (2.45) is satisfied. Then $\overline{D} = L - B$ and $R_2 = L - B - c / [1 - p_2(\overline{\pi}_1)]$ satisfy the conditions in proposition 2.15.

<u>only if:</u> Suppose condition (2.45) is violated. Then either

$L - B < L - R_1 + \pi_1^m - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)]$, (2.48)

which implies that $L - [p_2(\pi_1^m)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^m)] > R_2 + R_1 - \pi_1^m \geq R(\pi_1^m)$, a violation of (2.40), or

$L - B < B - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)] + c / [1 - p_2(\overline{\pi}_1)] < R_1 - \pi_1^*$, (2.49)

or both. (2.49), however, implies that

$R(\pi_1) \leq R_2 + \max \{\min \{L - B, R_1 - \pi_1\}, 0\}$

$\leq 2(L - B) - c / [1 - p_2(\overline{\pi}_1)]$ [using (2.44)]

$< L - B + B - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)] + c / [1 - p_2(\overline{\pi}_1)] - c / [1 - p_2(\overline{\pi}_1)]$

$= L - [p_2(\pi_1^*)(\overline{\pi}_2 - L) - c] / [1 - p_2(\pi_1^*)]$,

which, by means of (2.44), implies that condition (2.40) is violated at least for $\pi_1 = \pi_1^* + \varepsilon$ for $\varepsilon > 0$ sufficiently small. ■

The proof of proposition 2.16 also provides some insights on the necessity of the regulation $\overline{D} \leq L - B$. If $L - B \geq R_1 - \pi_1^*$ and (2.45) holds, we do not need this regulation, because contracts will be written out as proposed in the "if"-section of part (a) of the proof. If, however, $L - B < R_1 - \pi_1^*$, we need the regulation for some π_1 close to π_1^*.

Corollary: *When a Regulation of the Debt Claims Carried Over is Necessary*

For a given R_1 that satisfies (2.45) or is equal to $\overline{\pi}_1$, the regulation $\overline{D} \leq L - B$ is necessary if and only if $L - B < R_1 - \pi_1^*$. ■

Chapter 3. Private Debt Workouts

3.1 Introduction

Firms in financial distress can often avoid the administrative costs of a formal bankruptcy procedure by negotiating privately with their creditors. Compared to raising new capital from outside sources, debt renegotiation has a higher probability of success and leaves a larger stake in the firm for old shareholders. This is because it is the existing creditors of distressed firms that face the threat of liquidation, in which case they will not be paid in full, as opposed to new investors, who will not make any investment upon which they do not expect to break even. Even within the realm of debt renegotiation, the results may still vary substantially, depending on which class of creditors is the target of such a restructuring. In what follows, we will distinguish among bank debt renegotiation and public debt restructuring, making a further distinction concerning the dispersion of bonds among a large amount of independent creditors and eventual coordination problems resulting from it. Furthermore, we will focus on the resolution of financial distress by purely financial means, such as debt restructuring or new capital infusions.

There are two aims of this chapter: First, it is supposed to deliver a rough overview of the existing literature on private debt workouts, without which a discussion of the resolution of financial distress would be incomplete. Secondly, it will be pointed out that the academic discussion of the legal regulations of exchange offers for public debt is unsatisfactory to the extent that it ignores possible ex-ante adjustments by firms to changes in these regulations. The analysis carried out in section 3.4 reveals that this may lead to unjustified conclusions.

Some contributors discuss an alternative way of resolving financial distress, namely, through the sale of part of the firm's assets. The main focus of this branch of the literature is to explain differences between such asset sales and those undertaken by healthy firms. It is found that distressed asset sales are much less favourable for shareholders. If healthy firms sell some

of their assets, we can expect these assets to be directed to their highest-value use. Shleifer and Vishny (1992), however, argue that the market for a distressed firm's assets may be less liquid than in the case of a healthy firm. A reason for this may be that potential buyers of a distressed firm's assets may also be in financial trouble and face a shortage of cash. Brown, James and Mooradian (1994) present evidence that suggests that asset sales of distressed companies are mainly to the creditors' advantage. If a sale of assets is undertaken within formal Chapter 11 bankruptcy, things may be different: Hotchkiss and Mooradian (1998) observe positive abnormal stock returns to both the target and the bidder around the announcement of a sale of an entire bankrupt company, as opposed to non-bankrupt mergers where no such effect on the bidder is observed. They add, however, that coordination problems among bondholders may deter acquisitions even in a Chapter 11 case.

The remainder of this chapter will be organized as follows: In section 3.2, the literature on financial restructurings that ignores creditor coordination problems will be reviewed. In section 3.3, we then turn to such coordination problems. We will first set out the model usually employed in this line of research, then present the results that have been derived so far in the literature, and finally comment critically on some features of the model and the conclusions that are conventionally drawn from it. In the fourth section, the standard model will be extended to include the choice of financial structure at the outset. It will turn out that, without introducing additional information or incentive problems, bondholder coercion resulting from a lack of coordination among bondholders has no effect on efficiency. Section 3.5 will contain some concluding remarks.

3.2 Renegotiation with Coordinated Creditors

Among the theoretical contributions on private debt workouts with coordinated creditors two main directions have been pursued. One of them examines the role of such informal reorganization as opposed to the formal bankruptcy procedure, and the other seeks to

explain the composition of securities offered in a workout. We will deal with these in turn. The section will be concluded by some related results obtained by empirical studies.

The simultaneous existence of a sophisticated formal mechanism to restructure debt and the practice of renegotiating debt contracts privately raises the question of whether both are actually necessary. Advocates of private workouts stress that much less fees for lawyers have to be paid in out-of-court reorganizations[32]. One can therefore ask why firms do not always restructure their debt privately, as opposed to going through the costly litigation invoked in Chapter 11 proceedings, as often happens in practice. Gilson (1997) shows that transaction costs are much higher in private workouts, and therefore less debt is reduced than in Chapter 11 cases. One source for these transaction costs is the fact that private workouts are subject to much stronger regulations than Chapter 11 renegotiations. These regulations are often justified with the need for protecting junior creditors, who are typically less informed and coordinated than senior claimants. As Bigus (2000) shows, they may also face a coalition of the firm's management and senior creditors trying to extract wealth from them by pursuing an investment policy with inefficiently low risk. Furthermore, recall that one of the main justifications for the existence of bankruptcy law identified in Chapter 1 of this thesis is to avoid a race among creditors to a distressed firm's asset, namely, by means of the automatic stay provision.

Apart from these obvious explanations for choosing reorganization under court supervision, there have been some theoretical contributions that helped understand eventual trade-offs between and the complementarity of formal and informal reorganization. Brown (1989), for example, shows that, in private workouts, creditors unanimously accept the reorganization proposal leading to the same outcome that would have been obtained under Chapter 11. Hence, in Brown's model, Chapter 11 is a means by which the social planner can

[32] Gilson (1991) estimates these fees to be only 10% of the fees typically incurred in Chapter 11.

influence the renegotiation outcome, without the mechanism ever being chosen in equilibrium, and hence without incurring its attendant costs.

Although appealing, Brown's (1989) model of perfect information is not able to explain why firms do file for Chapter 11 protection in reality. Other contributors therefore consider the case where the distressed firm's manager has an informational advantage over the creditors concerning the relative value of the firm as a going concern as compared to its liquidation value. It turns out that within such a framework, either form of reorganization may be chosen, depending on the model's parameters.

Giammarino (1989) argues that if a distressed firm's manager is better informed than the creditors about the liquidation value of the firm's assets he can anticipate the outcome that eventually occurs in Chapter 11 more exactly than them. He shows that whether the manager sometimes chooses Chapter 11 depends on whether the value of the firm's assets in the good state is high or low as compared to outstanding debt, and on whether the value of the firm's assets in the bad state is high or low as compared to deadweight costs of the bankruptcy process. While in the case of a high value, informal renegotiation will be successful under certain conditions, there are always equilibria in which firms end up in costly formal bankruptcy if the firm's value is low in both states. In a way, therefore, Giammarino's analysis may be seen as an endogenization of the popular interpretation of bankruptcy as costly state verification[33].

Berkovitch and Israel (1998) assume that some information relevant for the firm's value as a going concern is distributed asymmetrically between the firm's owner-manager and the creditors. They highlight the manager's decision about whether to pay back loans, file for Chapter 11 or renegotiate debt contracts informally. It turns out that the manager seeks protection by Chapter 11 more often when the model's parameters are in a certain range that is best described by the firm being in a mature industry, where firms tend to have over-investment

[33] This point is made by Detragiache (1995, p. 349)

incentives. In this case, if Chapter 11 did not exist, the firm's debt might not be reorganized at all, giving rise to the well-known agency problems associated with over-leverage. The manager of a firm in a growth industry will choose one of the two remaining options, depending on the firm's going-concern value. Furthermore, average managerial quality is higher among firms that choose Chapter 11 rather than a private workout. One empirical implication of their analysis is, therefore, that a defaulting firm will experience an increase in its share price upon the announcement of a workout and a decrease upon the announcement of a Chapter 11 filing, which is consistent with the results obtained by Gilson et al. (1990).

While Giammarino (1989) and Berkovitch and Israel (1998) show that the simultaneous existence of informal reorganization and formal bankruptcy may induce firms of different quality to reveal their quality by taking different actions, Brown, James and Mooradian (1993) and Detragiache (1995) examine the information content of some details of the reorganization offer made by a distressed firm. Brown et al. (1993) present a model of asymmetric information on a distressed firm's going-concern value, which is assumed to be completely revealed only to the firm's manager, the shareholders and private (i.e., bank) lenders, whereas the bondholders' information on this value is incomplete. They show that if the going-concern value is low, the manager will offer equity to badly-informed bondholders. Equity claims offered to private lenders, on the other hand, are a signal for a high value. Consistent with this prediction, they find that abnormal returns around restructurings that offer equity to banks and senior debt to bondholders are significantly positive, and significantly negative if equity is offered to bondholders and senior debt to banks.

Detragiache (1995), on the other hand, shows that private workouts in which creditors receive a certain mix of cash and equity completely resolve the problem of asymmetric information about a distressed firm's going-concern value. This result is also consistent with the evidence reported by Brown et al. (1993). In equilibrium, all reorganizations are informal. Notice, however, that this is the case only as long as bankruptcy law adheres to the APR. If

shareholders can expect to receive a positive payoff in the event of bankruptcy, the firm may decide to file for bankruptcy.

Additionally to these theoretical contributions, many empirical studies have been undertaken seeking to explain a financially distressed company's choice between a private workout and Chapter 11. Jensen's (1989) conjecture that firms with high going-concern values are more likely to be restructured privately rather than in Chapter 11 is verified by Gilson et al. (1990). Jensen concludes that this is an advantage of high leverage, because highly leveraged firms experience financial distress at an earlier stage when operational restructuring is more likely to be successful.

As to the composition of private reorganization plans, renegotiations with banks do not seem to be too successful in resolving financial distress. Asquith, Gertner and Scharfstein (1994) report that bank concessions do not significantly reduce the probability of a subsequent bankruptcy, whereas all firms that neither restructured public debt nor sold a substantial part of their assets went bankrupt. James (1995) shows in a theoretical model that banks are reluctant to make unilateral concessions and underpins this result with an empirical study.

Given this central role of public debt in private workouts, a smooth mechanism to reorganize bonds seems desirable. The following section will, however, show that public debt renegotiations may be subject to severe problems of collective action.

3.3 Coordination Problems in Bond Renegotiations

In the case where bonds are held by a large number of dispersed investors, public debt restructurings may incorporate severe collective action problems and coordination failures. Consider, for example, a financially distressed but economically viable firm seeking some debt relief from its creditors. Suppose that this debt relief is necessary for the firm to stay in business, and that the firm's value as a going concern is higher than its liquidation value, which is assumed to be smaller than total outstanding debt. Then the creditors as a group are better off

if the firm's debt burden is sufficiently reduced. If a single creditor is convinced, however, that this reduction of debt takes place and is sufficient for the firm to stay in business irrespective of her own eventual concession, she will free ride on the remaining creditors' debt forgiveness and insist on her original contract. Such a free rider problem is certainly more severe the lower the probability is that a single creditor's decision of whether to make concessions is pivotal for the success of the whole debt restructuring. Notice that the free rider problem does not exist if creditors can vote on whether to reduce the claim of *every* creditor, as it is the case in many bankruptcy proceedings.

In the following, we will assume that bond workouts exclusevely take the form of exchange offers, whereby some new securities, which may or may not have the same priority and/or face value as the old bonds, are offered in exchange for the old bonds. This is consistent with the practice in the United States, because the Trust Indenture Act of 1939, in effect, prohibits a voting on an entire debt restructuring plan outside of formal bankruptcy[34]. Hence, bond workouts usually take the form of exchange offers.

Exchange offers may be accompanied by two kinds of collective action problem, the hold-out and the hold-in problems. The hold-out problem arises if a security is offered which is junior or pari passu to the old bonds. Then, the free rider problem described at the outset of this section applies: Suppose the firm is known to be in a position to undertake an investment project with a positive net present value if the debt restructuring succeds and the bondholders as a group are better off if they all tender. Then, for every bondholder, tendering is weakly dominated by rejecting the offer. Hence, in equilibrium, every bondholder will reject the offer. The hold-out problem is therefore often used to explain why an exchange offer fails[35].

[34] More specifically, according to the Trust Indenture Act, no creditor's claim may be affected by any vote of other bondholders, neither concerning its timing nor its amount.
[35] Detragiache and Garella (1996) show that a version of the hold-out problem, where creditors differ in what they expect to receive in bankruptcy, can be mitigated by means of mechanism design.

The hold-in problem has the opposite effect: If the security offered in a workout is senior to the old bonds, the target bondholders will accept the offer even if they, as a group, would be worse off than in the case where everyone rejected the offer. This problem arises because of the threat that dissenting bondholders may end up with subordinated debt, which may turn out to be even worthless if the firm defaults. Hence, this case is often referred to as "bondholder coercion". The hold-in problem arises even if the original bonds have a covenant that prohibits the issue of senior debt. In this case, tender offers are designed such that bondholders vote simultaneously about whether to remove the covenant[36] and, contingent on the removal of the covenant, about whether to accept the tender offer. Clearly, if these decisions are tied together, the coercive nature of the tender offer extends also to the vote about an eventual removal of the covenant, the so-called "exit consent"[37].

After a short review of the literature in law and economics on this topic, the standard model, introduced by Gertner and Scharfstein (1991, henceforth G-S), will be set up, and some well-known results will be presented. After that, some critical comments will be made and extensions of the model suggested.

The coordination problems associated with bond workouts were discussed first in the literature in law and economics. Roe (1987) argues that the voting prohibition clause in the Trust Indenture Act should be repealed, because it creates the holdout problem, which prevents renegotiation proposals that would have been approved under a majority vote regime from being undertaken, thus resulting in the costly bankruptcy of an economically healthy firm. Furthermore, he points out that this regulation is anachronistic: It was once installed because of fears that insider shareholders would buy the majority of a bond issue, vote in favour of a

[36] A vote on the removal of a covenant is not prohibited by the Trust Indenture Act.
[37] Kahan and Tuckman (1993) examine the coercive character of attempts to remove covenants that do not aim at obtaining debt relief and find that coercion is possible even if the votes are not tied to a subsequent tender offer: Firms usually offer a so-called "consent payment" as a reward for consenting bondholders, so that dissenters do not receive this payment and lose the protective covenant nevertheless, as long as the required majority of the remaining bondholders votes in favour of the solicitation.

reduction of principal and interest payments, and so transfer wealth from an uninformed and unexperienced minority of bondholders to themselves. Roe argues that the assumption that bondholders are not able to understand exchange offers is untenable, and that the voting prohibition cannot really protect bondholders, not only because a Chapter 11 filing is an alternative option where voting is allowed, but also because the firm can design the offer so as to make use of the hold-in problem, as indicated above.

Coffee and Klein (1991) focus on this hold-in problem and the possibility that wealth is transferred from bondholders to shareholders by means of "coercive" exchange offers. While they acknowledge this practice as a means of achieving some debt relief in an environment where the holdout problem would prevent the resolution of financial distress, they are, on the other hand, aware of the fact that the possibility of bondholder coercion may have some drawbacks, mentioning the lack of fairness and some strategic uncertainty[38]. The impact on efficiency of neither of them is, however, immediately obvious. Consequently, the main point of the whole article is that bondholder coercion is "hard to judge, but easy to correct"[39], referring to a reform proposal made in the article, which, as Coffee and Klein argue, is at least as good as the present legal environment without being exposed to the concerns that are often raised against the current practice of exchange offers.

Coffee and Klein propose the following alternative to the current legal setting: As they argue, a covenant waiver, which let bondholders vote about whether to remove a covenant prohibiting the issue of senior debt, and where, in contrast to an exit consent, a bondholders' vote is *not* tied to his decision whether to accept or reject a subsequent exchange offer, mitigates the holdout problem, but is prohibited by the Trust Indenture Act. They therefore present a way of changing legal code in order to enable firms to use this mechanism. What they do not realize, however, is that the use of covenant waivers enables the firm to solve the

[38] p. 1250
[39] p. 1271

holdout problem without coercing bondholders, but does not prevent bondholder coercion. Hence, rational managers who maximize shareholder value will, after an eventual removal of the protective covenant, coerce bondholders to transfer wealth from bondholders to shareholders if possible.

Notwithstanding the validity of many points made in the contributions cited above, they lack of rigorous economic analysis. What will be done in the following is, therefore, to compare the level of efficiency under the different legal regimes proposed in this context. The seminal work on this topic is Gertner and Scharfstein's (1991), who argue that efficiency can be enhanced by allowing bondholders to vote and prohibiting coercive exchange offers. Their analysis mainly builds on the role of debt as to discipline management, according to Jensen's (1986) "free cash flow" hypothesis.

A. The Model

The analysis considers a firm, which is run by a manager who acts purely in the shareholders' best interest, within a two-period framework, where at the end of period 1, the firm has a cash position of Y, and outstanding bank debt B and public debt D. Bank debt is held by a single creditor, whereas public debt is held by a large number of uncoordinated bondholders. More specifically, we assume that each bondholder holds one unit of public debt, which is assumed to be very small as compared to D. Bank debt and a fraction q of public debt are due at the end of period 1 ("short-term"), so that total payment obligations at the end of period 1 amount to B + qD. At the beginning of period 2, the firm may undertake an investment project which requires an investment I and generates a random output X that is distributed according to the cumulative distribution function F(.). If the firm is unable or unwilling to undertake the project, the firm is liquidated, and the available cash is distributed among the creditors. It is assumed that cash is not sufficient to cover total debt (as G-S put it, the firm is in financial distress) and that bank debt and public debt are equally senior. Hence, if the firm is

liquidated, the bank receives L_B:=YB/(B+D), and bondholders receive, in aggregate, L_D:=YD/(B+D). As equity receives nothing if the firm is liquidated and the manager acts so as to maximize the shareholders' payoffs, the manager will undertake the investment project whenever it is possible, irrespective of its profitability.

The firm can invest I only if its cash, net of short-term payment obligations, is sufficient to cover I, or after debt has been successfully restructured. If the firm does invest, then total payment obligations are either (1-q)D, or the new value of debt after a restructuring at the end of period 1, respectively. If cash at the end of period 2 is insufficient to meet these payment obligations, it is either distributed among the bondholders according to their claims, or the allocation follows a certain order of priority that may have been agreed on in the renegotiation process at the end of period 1. Finally, we assume that there is no discounting between the periods, so that the risk-free rate of interest is zero.

B. Established Results

In order to capture how bondholder coercion is possible, suppose cash is sufficient to cover short-term debt payments and the investment outlay, that is, $Y \geq I + B + qD$. If the firm invests without renegotiating debt, its equity has an expected worth of

$$EV = \int_{D-Y+I+B}^{\infty} (X + Y - I - B - D)dF(X), \qquad (3.1)$$

namely, the expected value of second-period cash flow, X, plus the remaining cash from the first period, Y - I - B - qD, minus long-term debt payment (1-q)D, as long as the algebraic sum thereof is non-negative.

Consider now an exchange offer where new bonds that are senior to the old ones are offered. Let the new claims be purely long-term[40] and let the face value thereof be D_n. If all

[40] In their proposition 3 and the discussion following it, G-S argue that it is irrelevant for the transfer of wealth whether the security offered in the exchange is long-term or short-term.

other bondholders tender, a single bondholder is indifferent between tendering and holding out if and only if

$$q + (1-q)[1-F(D_n-Y+I+B)] = \{ \int_0^{D_n-Y+I+B} (X + Y - I - B)dF(X) + D_n [1-F(D_n-Y+I+B)]\} / D. \quad (3.2)$$

The bondholder's expected payoff from holding out, on the left-hand side of (3.2), is the sum of the short-term part of public debt, q, which is paid out for sure, and the expected repayment of the long-term part, namely, 1-q times the probability that some cash will remain in the second period after the new bonds have been paid out. On the right-hand side of (3.2) we have a tendering bondholder's expected payoff. If all bondholders tender their claims, the expected value of the firm's equity is now

$$EV_n = \int_{D_n-Y+I+B}^{\infty} (X + Y - I - B - D_n)dF(X). \quad (3.3)$$

Rearranging (3.2) yields

$$(D - D_n) [1 - F(D_n-Y+I+B)] = \int_0^{D_n-Y+I+B} (X + Y - I - B - qD)dF(X), \quad (3.4)$$

and, since $Y \geq I + B + qD$, $D > D_n$. Hence, there is a (positive) transfer of wealth from bondholders to shareholders in the amount of $EV_n - EV$.

This may serve as a starting point for the discussion of the analysis pursued by G-S. Their focus is, however, not on the size of this wealth transfer, but rather on investment behaviour, and on the effects of certain legal regulations thereon. More specifically, they compare investment behaviour under three different legal regimes: Under the first, there are no contractual restrictions on issuing senior debt. Under the second regime, there is a bond covenant that prohibits a senior debt issue, but a so-called exit consent is possible, that is, the firm can let bondholders vote on whether or not to remove the covenant, where a bondholder's subsequent decision of participating in the exchange is contingent on his vote on removal. In other words, a bondholder can vote either to simultaneously remove the covenant and

subsequently tender his claims, or to stick to the covenant and reject the exchange offer. Note that this decision is strategically equivalent to the bondholders' decision in the case where there is no covenant in the first place. The third legal regime is one where there is a covenant prohibiting a senior debt issue, and exit consents are banned, that is to say, it is not possible to tie the vote on the covenant to a bondholder's decision of participation in any exchange that should arise subsequently.

For the first two regimes, the analysis carried out in the beginning of this subsection is valid. G-S establish the result that it is profitable for the firm to tender all of its debt also for the case where $Y < I + B + qD$. Hence, as long as $Y \geq I + B$, the firm may try to seek some reduction of public debt. If the new bonds' face value can be set arbitrarily high, and the entire public debt is targeted in the exchange, a potential holdout who expects every other bondholder to participate in the exchange receives q, whereas accepting the tender would, in the limiting case, result in an expected payoff of $(\overline{X} + Y - I - B) / D$, where $\overline{X}$ denotes expected second-period output. Hence, the entire short-term payment obligations stemming from public debt can be removed if and only if $\overline{X} - I \geq B + qD - Y$[41]. If this is not possible, the firm may approach the bank for some debt relief. The bank will anticipate that, without concessions on its part, the firm will not be able to undertake the investment, in which case the firm would be liquidated and the bank would receive L_B. Hence, the bank will agree to receive only L_B in the short run, thereby enabling the firm to restructure also its public debt as long as the maximal payoff to a tendering bondholder, $(\overline{X} + Y - I - L_B) / D$, is at least as large as a holdout's payoff if the face value of the new bonds offered in exchange is chosen arbitrarily high, namely, q. This latter condition is equivalent to

$$\overline{X} - I \geq qD - L_D. \qquad (3.5)$$[42]

[41] G-S, inequality (7).
[42] G-S, inequality (9).

In the third legal regime, tying the vote on the covenant to the bondholder's decision of participation in an exchange is not allowed. Hence, a bondholder voting on a covenant waiver will anticipate a subsequent (coercive) exchange offer once the covenant is removed. Bondholders then will never agree to remove the covenant if investment is possible without a public debt restructuring. On the other hand, if bondholders know that without a reduction in short-term public debt, the firm would not be able to invest and, therefore, would be liquidated, the bondholders will waive the covenant if the subsequent exchange offer leaves them at least with the payoff they would receive in liquidation, namely, L_D. Consequently, if a reduction of bank debt alone is not sufficient for the firm to be able to invest, bondholders will waive the covenant if and only if the expected value of public debt after the restructuring of bank debt and after the exchange of public debt, namely, $\overline{X} + Y - I - L_B$, is at least as large as the bondholders' payoff in liquidation, L_D. On the other hand, we know that the exchange offer will be succesful only if $\overline{X} + Y - I - L_B \geq qD$. Combining the two conditions, the bondholders will vote to waive the covenant if and only if

$$\overline{X} - I \geq \max \{qD - L_D, 0\}. \qquad (3.6)^{43}$$

Summing up, inequalities (3.5) and (3.6) are the respective conditions for the investment project to be undertaken with and without the availability of exit consents. G-S point out that investment under the third legal regime, where exit consents are banned, is weakly more efficient than under the first two regimes, because some negative NPV projects that are undertaken in the presence of exit consents are omitted when exit consents are banned.

Mooradian (1994) extends the G-S model by introducing asymmetric information between the firm's manager and creditors about the investment project's quality, which can be either good or bad. The probability distribution of X for the good project is assumed to first-order stochastically dominate that for the bad project, where the expectation of X for the good

[43] G-S, inequality (10).

project is larger than I, and that for the bad project is smaller than I. Mooradian shows that bad firms in financial distress will mimic the good ones in order to obtain some debt relief, whereafter the project can be undertaken. If, however, there is a reorganization procedure similar to Chapter 11 as an alternative to private restructuring, bad firms will, under certain conditions, choose this alternative process, whereas good firms will stick to private restructuring. Hence, Chapter 11 induces good and bad firms to separate and thus enhances efficiency. Notice that separation is obtained irrespective of the level of coordination among bondholders[44].

In a recent empirical study, Lie, Lie and McConnell (2001) also find that debt-reducing exchange offers contain some information, but they argue that this information carries adverse news. They observe a negative stock price reaction to those offers and conjecture that the offer is a signal that the extent of financial distress is higher than originally expected: The probability for a subsequent Chapter 11 filing is 25% among the firms making such an offer, compared to a mere 6% for otherwise identical firms that forego this option.

C. Critical Comments

The established theory on bondholder coercion in exchange offers has not gone unchallenged. In what follows, I will comment on G-S's conclusions concerning the effects of bondholder coercion on efficiency and on the size of the transfer of wealth from bondholders to shareholders.

A quite peculiar feature of G-S's analysis is that it starts at some exogenous level of outstanding debt. In other words, there is an implicit assumption that the firm's ex ante choice of financial structure is independent of the legal environment governing the subsequent debt renegotiation game. This seems quite arbitrary; for it is not evident why firms should adjust some decisions to the changing legal environment and others not. In the next section, an

[44] Mooradian (1994), section VI.

extension of G-S's model will, therefore, be presented which explicitly examines the contracting stage. It will turn out that firms will include the respective legal setting in their financing decision in such a way that the second-best arrangement is implemented under every regulation considered by G-S, which is the main result of this chapter.

Apart from the possible consequences of bondholder coercion, doubts have been raised as to whether there actually is any form of coercion in tender offers. Schwartz (1993) claims that bondholders will accept only those offers that allocate the firm's value according to the priority that would have ruled in bankruptcy. He denies in particular the possibility of successful coercive offers. More specifically, he considers three types of exchange offers: (i) "Successful" offers, which allocate the firm's value according to the priority that would have ruled in bankruptcy and which are conditioned on unanimous consent; (ii) "Greedy" offers, which pay out to creditors less than a "successful" offer but at least the amount they would have received in bankruptcy and which allows for some bondholders to reject; and (iii) "Coercive" offers, which pay out to creditors less than the amount they would have received in bankruptcy. He argues that only "successful" offers will always be accepted, because, due to the required unanimous consent, no creditor can free ride on the debt forgiveness of other creditors, because every creditor is pivotal for the vote. "Greedy" offers, according to Schwartz, will sometimes be rejected, because unanimous consent is not required and some creditors may judge themselves not pivotal for the acceptance, but they will sometimes be accepted, because the equilibrium where everyone rejects is not perfect. Finally, as Schwartz argues, "coercive" offers will always fail, because the equilibrium where creditors accept a "coercive" offer is not Pareto-optimal among the Nash equilibria.

There are two kinds of doubt to be raised on Schwartz's argument. First, his classification of workout offers seems quite arbitrary. For example, it is not clear why firms should allow for holdouts in a greedy offer and take the risk that the offer be rejected. As greedy offers are defined such that, upon acceptance, all creditors receive at least what they

would get in bankruptcy, requiring unanimous consent resolves the holdout problem for the same reason as it does in the context of "successful" offers[45]. Secondly, the analysis undertaken by Schwartz is somewhat confusing, because he does not treat the different kinds of offers within a single framework. Where his claim is concerned that "coercive" offers fail, the analysis is even inconsistent: He argues that "greedy" offers are accepted with positive probability because equilibria where every bondholder rejects are not perfect, but suggests a non-perfect equilibrium when he claims that "coercive" offers fail.

I agree that the extent to which bondholders can be coerced may be less than G-S's analysis suggests, but for different reasons: The debtor cannot commit credibly to not making another (coercive) exchange offer right after the first one has been completed. Hence, accepting even the first one may not be a subgame perfect equilibrium strategy.

There is also a line of argumentation that denies the very existence of coordination problems. Bab (1991) interprets the fact that failure rates for tender offers exceed fifty percent as evidence that coordination among bondholders enables them to turn down (possibly unfavourable) offers. Furthermore, it is widely believed that individuals own a mere 5-10 percent of junk bonds, the market being dominated by large institutions, a fact which contradicts the assumption that bonds are dispersed among a large number of small creditors. For these and other, legally motivated reasons, Bab concludes that courts should not interfere with the practice of tender offers in private debt restructurings. Notice, however, that Bab's observation that bonds are usually not widely dispersed among a large number of creditors does not imply that there are no coordination problems at all: Noe and Wang (2000) show that, by strategically sequencing one-to-one negotiations with one or more creditors, a firm can "play off" creditors against one another and thereby extract ex-post rents.

[45] Schwartz denies that by arguing that creditors will anticipate the firm to make a "successful" offer once the "greedy" offer is rejected and, therefore, reject the "greedy" offer.

It has been argued repeatedly that vulture investors, who typically buy large blocks of public debt, may help coordinate bondholders of a distressed company. Indeed, Hotchkiss and Mooradian (1997) find significantly positive abnormal stock returns around purchases of public debt by vulture investors. They explain this with the fact that in most cases where vulture investors enter the scene, they subsequently seek to gain control over the firm, thus disciplining managers of distressed companies. Notice, however, that they may also remain passive in order to use their blocking power to reach private deals with the firm, thereby extracting wealth from other bondholders[46].

Finally, the participation of banks may improve the success of an exchange offer. If simultaneously to the exchange offer commercial banks promise to make concessions on their loans, the reduction of public debt outstanding is larger, the proportion of senior debt offered to bondholders smaller, and the probability of success higher. These results are reported by James (1996), who concludes that commercial bank participation may help resolve information and holdout problems. Even the participation of investment banks, which are not among the firm's lenders, in an exchange offer may mitigate the hold-out problem. Mooradian and Ryan (2000) show that in these cases more junior securities can be offered. Hence, investment banks are, to some extent, a substitute for bondholder coercion, where the fees paid to the investment bank may be offset by an efficiency gain which can be obtained, for example, within a model of firm-specific investments by the manager and which accrues if bondholders accept equity shares in exchange for their bonds, thereby alleviating the debt overhang problem.

3.4 Does Bondholder Coercion Reduce Efficiency?

This section takes up a point made in subsection C of the preceding section, namely, that G-S compare different regulations for public debt restructurings under the assumption that the

[46] Hotchkiss and Mooradian (1997) label this kind of vulture investors as "bondmailers"; see also Coffee and Klein (1991, p. 1223).

firm's financial structure is exogenous. It is immediately evident that, without this assumption, investors will anticipate an eventual coercion of bondholders and the associated transfer of wealth from bondholders to shareholders, so that bondholders will contribute less, and shareholders more, funds for their respective securities than under a legal regime that prohibits coercive exchange offers. A transfer of wealth is not, however, the only consequence of bondholder coercion; G-S claim that it leads to inefficient investment. It will be useful for the motivation of the additional assumptions introduced in this section if we examine the particular incentive problem that leads to this result.

In the G-S model, investment occurs if and only if the firm disposes of a sufficient amount of free cash flow at the end of period 1 to finance the investment outlay in period 2. As the manager is assumed to act on behalf of the shareholders, who may receive a substantial return if long-term cash flow is high but nothing if the firm is liquidated and, hence, do not bear any of the costs of investment in period 2, efficiency considerations do not play a role when he makes the investment decision. Hence, we have a version of Jensen's (1986) free cash flow problem, a widely accepted remedy for which is debt as a disciplining device for managers. Indeed, the level of short-term output relative to short-term debt is crucial to the firm's investment behaviour: If, for example, $(1-q)D > I$ and $Y \in [I + B + qD, B + D]$, there is no restriction on investment, and, the alternative being liquidation, which renders equity worthless, investment will be undertaken. If, on the other hand, $Y < I + B + qD$, the creditors must make some concessions if investment is to be feasible. They may refuse if the investment project is judged to be unprofitable. The creditors' decision of whether to make such concessions may, however, involve two kinds of inefficiency: The concessions may be rejected, even although the investment project has a positive net present value, or they may be granted, despite a negative NPV.

Seen from this point of view, bondholder coercion has two consequences: First, it transfers wealth from bondholders to shareholders. Second, it may force bondholders to agree

to a reduction in the payments due to them which they would reject were they able to coordinate their actions. In other words, bondholder coercion increases free cash flow as compared to the case where creditors are coordinated, and thus reduces the disciplining power of debt. Hence, as entrepreneurs generally bear the entire agency costs of financing, one would expect them to anticipate the possibility of bondholder coercion and choose a financial structure with higher short-term debt payment obligations than in absence of this possibility. It will later be shown that this is exactly the case. Moreover, the resulting equilibria under different legal settings are all equivalent in terms of social welfare.

Turning to the model's structure, we stress at the outset that some additional assumptions are needed. First notice that a simple way to remove a large amount of inefficiency from the G-S model would be not to issue any bonds. Hence, a desirable feature of the model should be to explain why bonds are nevertheless issued. Furthermore, all remaining inefficiency can be resolved by setting up an all-equity firm, as G-S assume that the manager acts completely in the shareholders' interest. Following the basic model of section 2.2, it will therefore be assumed that the manager enjoys some private benefit M if and only if he undertakes the follow-up investment. Finally, short-term cash flow and the profitability of the follow-up investment are completely independent in G-S's model. In this case, it is hard to justify any particular level of short-term debt with the free cash flow hypothesis, for it is not evident why management should be restricted in its investment decision when short-term cash flow is low and not when it is high. Hence, as in the basic model of section 2.2, it will be assumed that high levels of short-term cash flow imply an ex-ante highly profitable investment project. In the following paragraphs, the additional assumptions will be presented in detail.

Suppose that short-term cash flow Y is distributed on the interval $[0, Y_{max}]$ according to the cumulative distribution function G(.). Furthermore, let Y be also a one-to-one signal for the manager's competence which, in turn, influences the funds the manager needs at the beginning of period 2 to undertake a given investment project. More specifically, let the investment outlay

for the follow-up investment to be made after short-term cash flow has accrued (i.e., at the end of period 1) I = I(Y), where I(.) is once continuously differentiable and strictly decreasing in Y. As in G-S, cash flow in period 2 will be denoted by X, its expectation by $\overline{X}$, the level of bank debt, which is entirely short-term, by B, and the level of bond debt, the proportion q of which is short-term, by D.

In addition to these kinds of debt, the firm may issue equity shares. The proceeds from issuing these various securities is used to cover an initial investment outlay, which is due before period one and will be normalized to Z. Once this initial investment has been undertaken, the manager, who does not own any funds at the beginning, seeks to maximize the sum of his expected private benefits from making the follow-up investment at the end of period one, the monetary equivalent for which will be denoted by M, and, if shareholders own less than one hundred percent of the firm's equity, the value of the shares he owns. Investors are assumed to act competitively and therefore will accept any contract under which they will break even.

The analysis will be organized as follows: First, for every Y, B, D and q, G-S's results concerning the renegotiation game will be recapitulated. Then the results of section 2.2, where similar assumptions have been made, will be used to derive the second-best liquidation policy. Finally, by means of these steps, the equilibria will be derived recursively.

G-S derive the following outcomes of the renegotiation game: If there are no contractual restrictions on issuing senior debt, or if exit consents are possible, the firm will invest if and only if

$$Y - I(Y) \geq B + qD \text{ or } \overline{X} - I(Y) \geq qD\left[1 - \frac{Y}{q(B+D)}\right]. \qquad (3.7)$$

The first inequality reflects the case where short-term cash flow is sufficient to cover short-term payment obligations and the investment outlay, and the second one is the condition for

reorganization to be successful. If exit consents are banned and covenant waivers are used instead, this condition is modified to read: Investment occurs if and only if

$$Y - I(Y) \geq B + qD \text{ or } \overline{X} - I(Y) \geq \max\{qD\left[1 - \frac{Y}{q(B+D)}\right], 0\}. \quad (3.8)$$

Finally, if tender offers are abolished altogether and bondholders vote on a renegotiation plan, the firm invests if and only if

$$Y - I(Y) \geq B + qD \text{ or } \overline{X} - I(Y) \geq 0. \quad (3.9)$$

Turning to the socially (second-best) optimal liquidation policy, there may be a trade-off between maximization of cash flow and of social wealth, because the latter includes the non-monetary benefits M. This trade-off arises if the first-best liquidation policy, which would be chosen by a wealthy manager-owner financing the firm without any external funds, yields an expected cash flow of less than one. For a detailed analysis, see section 2.2, where a similar model with different notation[47] is examined. Expressed in G-S's notation, proposition 2.1 implies that the first-best liquidation policy is to liquidate the firm if and only if

$$\overline{X} + M - I(Y) < 0, \quad (3.10)$$

that is, if and only if the sum of expected long-term cash flow and the monetary equivalent of the private benefits is less than the required investment. Let Y° satisfy $\overline{X} + M - I(Y^\circ) = 0$.

On the other hand, cash flow is maximized by a liquidation policy where the firm is liquidated if and only if

$$\overline{X} - I(Y) < 0. \quad (3.11)$$

Let Y^D satisfy $\overline{X} - I(Y^D) = 0$. Furthermore, let Y^B denote the level of short-term cash flow such that total expected cash flow is exactly Z if a liquidation policy is pursued under which liquidation if and only if short-term cash flow is smaller than Y^B and such that $Y^B \leq Y^D$. That is to say, Y^B satisfies

[47] I have chosen the notation that G-S use in order to facilitate the comparison between the results.

$$\int_0^{Y_{max}} Y dG(Y) + \int_{Y^B}^{Y_{max}} [\overline{X} - I(Y)] dG(Y) = Z. \qquad (3.12)$$

Then, if (3.12) is well-defined, proposition 2.2 implies that the second-best liquidation policy is to liquidate the firm if and only if

$$Y < \max\{Y^B, Y^\circ\}. \qquad (3.13)$$

Let Y^* satisfy $Y = \max\{Y^B, Y^\circ\}$.

Having presented the second-best liquidation policy, the choices of B, D and q will now be derived that implement this arrangement under the various legal regimes considered by G-S. The aim is to choose B, D and q such that the respective condition for liquidation, namely, (3.7), (3.8) or (3.9), is satisfied if and only if $Y < Y^*$. Notice that under neither regime do trivial choices such as $B = D = 0$ or $B = Y_{max}$ implement second-best; for the manager of an all-equity firm will choose the "first-best" liquidation policy, which will fail to attract external funds whenever $Y^* > Y^\circ$, and a firm that will always have to renegotiate with his only creditor will be liquidated so as to maximize expected cash flow, neglecting private benefits.

Consider first the case where there are no contractual restrictions on issuing senior debt, or where exit consents are possible. The second inequality of (3.7) is equivalent to $Y \geq Y^*$ if and only if

$$q(B + D) = Y^*. \qquad (3.14)$$

If (3.14) holds, the first inequality of (3.7) is satisfied for all $Y \geq Y^*$, implying that free cash flow is never sufficient to finance investment if the firm should not invest. On the other hand, it is evident that any other choice of B, D and q leads to either over-or underinvestment. Hence, in equilibrium, contracts will be written out such that (3.14) holds.

Consider now the case where covenant waivers are proposed. If $Y < Y^D$, the left-hand side of the second inequality in condition (3.8) is smaller than zero. The right-hand side is always at least zero. Hence, renegotiation will fail whenever $Y < Y^D$. The second-best

liquidation policy will be pursued whenever the firm has sufficient free cash flow to finance the investment if and only if $Y \geq Y^*$. In equilibrium, contracts will therefore satisfy

$$B + qD = Y^* - I(Y^*). \qquad (3.15)$$

Notice that this condition is both sufficient and necessary whenever $Y^* < Y^D$. In the special case where $Y^* = Y^D$, any set of contracts satisfying

$$B + qD \geq Y^* - I(Y^*) \qquad (3.16)$$

implements the second-best arrangement.

Finally, for the case where tender offers are abolished altogether and bondholders vote on a renegotiation plan, the same set of contracts as in the previous case is optimal. Again, a renegotiation will fail whenever $Y < Y^D$, so that (3.15) specifies the unique equilibrium set of contracts for $Y^* < Y^D$, and (3.16) for $Y^* = Y^D$.

To complete the analysis, notice that, if (3.12) is well-defined, the amount of funds creditors are, in aggregate, willing to contribute, $Z^D + Z^B$, is given by their expected payoffs under the respective legal regime and for the particular equilibrium selected from the set of all equilibria. Shareholders will then contribute $Z - Z^D - Z^B$ and demand, in aggregate, a share in the firm's equity that is worth exactly this amount. We can sum up the analysis by stating

Proposition 3.1: The legal regimes where (i) there is no restriction on bondholder coercion, (ii) covenant waivers are used, and (iii) bondholders vote on a reorganization proposal are all equivalent with respect to social welfare and implement, in equilibrium, the second-best liquidation policy. ■

3.5 Conclusions

When distressed firms have the possibility of filing for Chapter 11 protection, private debt workouts seem to be an efficient way to mitigate agency problems associated with over-leverage. As argued in section 3.2, Chapter 11 is not only a means for a social planner to implement a certain renegotiation outcome outside of bankruptcy; it is also able to resolve

information problems. Furthermore, the composition of the proposed reorganization plan may also contain some information.

A potential impediment to private workouts may arise through attempts made by creditors who hold no more than a small fraction of debt, such as bondholders, to free-ride by refusing to make any concessions, hoping that a sufficient number of the remaining creditors will be willing to write off some of their claims. This hold-out problem can be mitigated by means of suitable design of an exchange offer. This practice, however, savours of coercion, which raises issues of fairness and even of efficiency. In contrast to this widely held opinion, I make the point in section 3.4 that, without additional information or incentive problems, possible inefficiencies that are identified when a firm's financial structure is exogenously given may be anticipated at the outset. If this is the case, then for every legal regime, contracts can be written out such that the renegotiation game implements the second-best arrangement. It is left as a topic for future research to establish whether this irrelevance holds also in settings with a higher degree of strategic complexity.

Chapter 4. Bankruptcy Law in a Developing Economy: The Case of India

4.1 Introduction

The reason why many countries have a bankruptcy law, which calls a halt to the creditors' attempts to seize the firm's assets, is to protect economically profitable firms in financial distress from inefficient liquidation. Such a law typically allocates control in a way different from the original contracts and requires the participation of a bankruptcy court that is endowed with some discretion. When bankruptcy law is applied, there is often a long period of bargaining and litigation, and its success depends crucially on how the bankruptcy court handles this discretion. While the application of such bankruptcy law is the subject of controversy even in countries where legal enforcement is highly efficient, one can certainly imagine that the resulting incentives may be counterproductive if a country is not able to provide appropriate and efficient institutions to implement the law[48], as it is often the case in developing or transition economies.

Among the most common obstacles to the efficient resolution of financial distress in developing economies, as well as in transition economies, are: an ideological bias in legislation towards keeping inefficient firms alive, low economic and managerial skills among managers and bankruptcy judges, and self-interested governmental executives who are insufficiently monitored by the public and heavily influenced by lobbyists[49]. The effect of the first obstacle is that many bankruptcy laws in developing countries do not provide any mechanisms to reach a competent decision of whether a firm in financial distress is economically profitable or should rather be liquidated. Bankruptcy law often seems to be

[48] For the special problems of legal design in developing countries see, for example, de Soto (2000), who argues that the failure of the installation of property rights and, hence, of capitalism in developing countries is mainly the result of mistakes made in drawing up legislation.

[49] Why this holds especially for developing countries can be explained, for example, by the low level of education and, hence, political awareness (Bardhan and Mookherjee, 2000).

written in such a way that the decision-makers are left unaware of the possibility to choose between liquidation and continuation. Due to poor economic and managerial skills, even economically profitable firms in financial distress fail to be restructured efficiently, so that the extent of financial distress throughout the economy rises continuously. Finally, developing countries often exhibit a low level of democratic monitoring, so that decisions concerning bankrupt firms are rarely made so as to maximize social wealth.

In this chapter we will examine the effects of this last problem. We will first present a short survey of the literature on the political economy of state capture and governance in general and of bankruptcy decisions in particular. The remainder of the chapter will then be devoted to the example of India. In particular, we will first describe Indian bankruptcy law and other characteristics of the legal environment there (section 4.3). There follows a formulation of a simple model of bargaining between politicians and firms, from which some hypotheses will be derived and empirically tested in section 4.5. Section 4.6 concludes and proposes some policy measures[50].

4.2 Bankruptcy in a Political-Economic Perspective

The political economy of bankruptcy is, of course, only a special case of the extensive literature on interaction between politicians and firms in general. In their seminal paper, Shleifer and Vishny (1994) summarize the various incentives for a politician to seek control over a firm and, starting from there, develop a model of bargaining between politicians and firms. In their analysis they focus on a votes-seeking politician's bias towards encouraging firms to have excess employment, and on the possibility of side-payments through bribes. More specifically, a politician's utility is a function of the level of employment in a firm, the treasury's cash position, and his own wealth. Managers, being interested in their own financial

[50] Notice that parts of the sections 4.3 through 4.6 are taken from Falk and Wohlschlegel (2002).

stakes in the firm, have incentives opposed to the politician's and, therefore, are willing to pay bribes to convince the politician to not exercise the right to assume control in some eventualities.

The setting considered by Shleifer and Vishny (1994) applies, in some respects, quite well to the political economy of bankruptcy. Politicians often are strongly biased towards bailing out financially distressed firms, because they thereby seek to avoid a decline in popularity caused by the layoffs of workers associated with the bankruptcy of a large firm. Replacing the benevolent social planner from the analysis carried out in chapter 2 by a self-interested politician allows us to deal with two major problems with which bankruptcy practice in developing countries is associated, namely, corruption and soft budget constraints. We shall first explain these problems briefly.

To start with, notice that corruption is not necessarily inefficient. The bribe a firm is willing to pay to a politician reflects the willingness to pay for a certain favour, and if the politician allocates his favours to the firms paying the highest bribes, corruption may be more efficient than other criteria that could be possibly applied by politicians. Whether corruption is efficient or not depends on whether the favour a firm's manager seeks from a politician is supposed to increase the firm's value or rather the manager's private benefits at the shareholders' expense[51]. In the case of the manager of a financially distressed firm, whose fianancial stake in the firm, if any, has become close to worthless, so that his dominant incentive is to secure his well-paid job for as long a time as possible, corruption hardly seems to be a suitable mechanism to achieve a socially efficient outcome.

More specifically, the following ways of corruption have been treated in formal models: In Lambert-Mogiliansky et al. (2000), which will be briefly presented at the end of this section, a firm's manager bribes the politician in exchange for a bailout in the case of financial

[51] As Boycko et al. (1995, p. 53) put it, "even if corruption addresses the problem of split control rights, it does not produce efficient ownership (...), and so cash flow and control rights are not aligned."

distress. This reduces the firm's value whenever the firm should have been liquidated. In the model presented in section 4.4, the politician rewards firms that choose his preferred financial structure with subsidized loans. Here the inefficiency stems from the fact that the politician's preferences concerning the financial structure are not completely aligned with the firm's value.

The second problem, which is known as the "soft-budget-constraint problem" and has been pioneered by Kornai (1980), may prevail even in the context of a politician seeking to maximize social wealth. If it is known in advance that the ex post optimal strategy for a politician is to bail out a bankrupt firm because, for example, its previous investments are sunk, the firm's management, facing no real threat of bankruptcy, takes this "soft budget constraint" into account when making decisions at earlier stages. This line of argument has been introduced by Dewatripont and Maskin (1995), who show that this commitment problem also exists for private investors deciding whether to provide additional funds to a firm in which they have a financial stake, and point out that soft budget constraints may evolve endogenously. Dewatripont and Roland (2000) then conclude that hardening budget constraints is not a direct choice of action, because the mere announcement thereof is clearly subject to the very same commitment problem that causes the soft budget constraint. Hardening budget constraints rather requires a set of measures changing the payoff structure in such a way that the threat of liquidation or non-investment becomes credible.

What measures should be taken to harden budget constraints depends on the source of the soft budget constraints. In the setting of Dewatripont and Maskin (1995) investors provide further funding even for bad projects, because their initial investments are sunk. Budget constraints can, therefore, be hardened by a decentralization of the market for funds, so that the investors providing funds in the second period are not identical to the initial investors. This may, however, lead to a bias towards short-term results in the evaluation of investment, thus creating a trade-off, which can explain the endogenous emergence of soft budget constraints

even in highly developed economies and of bank-based financial systems like Germany or Japan.

Things are obviously different if soft budget constraints are politically motivated. In part, the budget constraints of firms can be hardened by privatising them, by removing monopolies, and by hardening the banks' budget constraints through privatisation and regulation[52]. What still remains, however, is the possibility of a bailout by the politician. Güth (2000) points out that the resolution of such dynamic commitment problems usually requires the development of institutions that enforce commitments. In the case of a politician who cannot commit credibly not to bail out a bankrupt firm it is hard to imagine such an institution. Güth (2000) presents an example where budget constraints have been hardened by different means: In East Germany, many loss-making former state-owned enterprises have been liquidated or heavily scaled down, because the politicians who decided not to bail them out were different from those who once established and used to own them. The new government did not feel responsible for what had been done under socialism, or, speaking formally, their payoff structure was different from that of the incumbent politicians, who had not been able to commit themselves not to bail out those firms, an outcome that is similar to that of the decentralization model of Dewatripont and Maskin (1995) mentioned above.

Before we turn to our analysis of the Indian case, we shall briefly mention another prominent example where the interaction between politicians and firms has been examined in the context of bankruptcy law, namely, Russia. Russian bankruptcy law exhibits a rather weak focus on liquidation, which is caused both by the way the law is written and by the way it is handled. Especially large firms, which cause a particularly strong economic drag if they are run inefficiently, enjoy extensive protection from liquidation: The so-called "Town-Forming Organizations" provision, which applies to firms with an especially strong influence on employment in a certain locality, further extends the already strong influence of the local

[52] See Dewatripont and Roland (2000) and Roland (2000).

government on the bankruptcy process and allows restructuring to be extended for up to ten years. The local government's influence on the bankruptcy process in this case will certainly not facilitate quick liquidation of inefficient firms. Another provision that allocates control to agents having incentives not to act so as to maximize the firm's (social) value is the rule that even creditors with only small unsatisfied claims can initiate the bankruptcy process. A widespread strategy in the practice of bankruptcy in Russia is, therefore, to voluntarily default on very small claims, so that managers or other insiders who are also secured creditors can strip the firm of its most desirable assets[53].

A rigorous analysis of the political economy of corporate bankruptcy in Russia has been carried out by Lambert-Mogiliansky et al. (2000). They argue that managers use cash flow diverted from the firm to pay bribes to politicians who protect them from being dismissed during the bankruptcy procedure. Additionally, politicians are able to expropriate private investors by buying the bankrupt firm at a very low price, so that virtually only the government's claims, which are senior to the private ones, are satisfied. In equilibrium, the firm's management and the local politician collude at the private investors' expense. The authors' empirical analysis supports this argument.

The Indian bankruptcy code, the so-called "Sick Industrial Companies Act" (SICA), suffers, in part, from similar drawbacks. As we will see in section 4.3, the most striking feature of SICA is that a ’sick’ firm is hardly ever liquidated – and when it is, then only after a considerable time period has passed. In such a situation default certainly loses its role of disciplining the management. It is often the case that sick enterprises receive additional loans at subsidized interest rates as a ‘reward’ for becoming sick. Together with other regulations that make a voluntary exit nearly impossible, this encourages the choice of high-risk investments once the firm's prospects begin to worsen. Threats of liquidation that lack credibility not only

[53] See Kratzke (2000).

create wrong incentives, but a low rate of sick firms being liquidated results in an additional misallocation of resources that are an economic drag on a developing country.

Furthermore, the decision made by the authority that supervises the bankruptcy process defined by SICA, the so-called Board for Industrial and Financial Reconstruction (BIFR), is not only biased towards continuation, but also occurs very late in the bankruptcy process. If a restructuring process is to be successful, there is a need for earlier decisions.

Finally, there is a political-economic implication of SICA: As a sick firm is supervised by a government-controlled new management, the local government can more easily enforce its favoured business strategy compared to other privately owned companies. It is this implication on which we focus in the remainder of this chapter. We will argue that governors have strong incentives to increase a firm’s probability of becoming sick by rewarding high debt-equity ratios with subsidized loans, because higher leverage increases the probability of financial distress.

The approach presented below sharply differs from existing studies on corporate sickness in India in that it recognizes that SICA provides some incentives for politicians to pursue their own interests rather than seeking a socially optimal outcome. Contributions that consider any incentive effects of SICA are few: Goswami (1996) highlights the problems that too few sick units are liquidated, so that debt contracts do not contain any credible threat, and that sick units are detected too late. As Anant and Goswami (1995) stress, this lack of credibility even enables firms to use bankruptcy as a threat to extract fresh finance from the old creditors, a variation of Kornai's (1980) soft budget constraint problem. Pursell (1990) points out that SICA is, in fact, an exit barrier and leads to lower output prices and additional firms getting into difficulties, firms that would have been healthy in the absence of SICA. It incurs a welfare loss that is equivalent to that of a price subsidy. Apart from these studies there are only contributions that bemoan the rising number of sick units and praise SICA for helping those firms rather than blaming it for providing incentives that lead to corporate sickness.

The remainder of this chapter is organized as follows: After setting out the legal environment in India in further detail, we will present a simple model of bargaining between the governor and a firm's manager, thereby deriving equilibrium leverage and the optimal provision of subsidized loans. This will be followed by a presentation of the results of the econometric estimations in Falk and Wohlschlegel (2002) where the main hypotheses derived from the theoretical model are tested. The empirical analysis carried out there is based on firm-level data of some 2000 Indian manufacturing firms.

4.3 The Legal Environment in India

The Sick Industrial Companies (Special Provisions) Act was enacted in 1987 and applies to any public or private company whose accumulated losses exceed its net worth, and that has been registered for at least five years, employs at least 50 workers, and does not belong to the small scale or ancillary sector. Such a firm must register with the authority that supervises the application of SICA, namely, the Board for Industrial and Financial Reconstruction (BIFR), whereafter the bankruptcy procedure defined by SICA is initiated. In the remainder of this section, it will be shown that this procedure has two major drawbacks, namely, that it is too time-consuming and that liquidation of a sick company almost never occurs. These drawbacks will be dealt with in turn. A motivation of the theoretical model of section 4.4 based on these properties of the procedure follows.

The first delay of the procedure may occur as early as at the stage of registration with the BIFR, which does not have to be done before 60 days after the sickness criteria defined by SICA have been met. The BIFR then determines within another 60 days whether the firm is indeed sick. If some financial assistance is needed to keep the firm in business, a so-called Operating Agency has got another 90 days to work out a rehabilitation scheme of measures by means of which a turnaround is intended to be achieved. If the Operating Agency does not show up with a plan within 90 days, the company must set up its own rehabilitation scheme. All

claims against the firm are automatically stayed, not only while the rehabilitation plan is written out, but for some additional time that is determined by the BIFR and may extend to up to seven years. Once a plan is proposed, the revision of the plan may also take a long time, as unanimous consent of all shareholders and creditors is required. A look at the statistics of the BIFR[54] reveals that long delays are indeed widespread: Of the 3296 cases registered with the BIFR between 1987 and 2000, 1192 are still pending.

The problem that sick firms are rarely liquidated is closely connected to the delay problem: During the fourteen years since SICA's entry into force, a decision has been reached in 1416 cases. In 824 of these cases, the BIFR recommended liquidation of the firm. This figure looks like strong evidence for a high probability of liquidation, but the contrary is true: If we add the pending cases to the group of firms not recommended for liquidation, we identify a much lower propensity of the BIFR to recommend liquidation. Furthermore, to recommend liquidation does not necessarily entail a binding commitment. Mathur (1993) reports delays in liquidation of more than 20 years for one third of the firms in his sample of 1859 Indian firms. More than sixty per cent of these firms experienced a delay of at least 10 years.

Turning to the reasons for the reluctance to liquidate sick companies, their bright future prospects is certainly not a possible explanation: Less than nine per cent of the firms registered with the BIFR between 1987 and 2000 have managed their way out of sickness with the assistance of the BIFR. In those cases where liquidation was recommended but has not been executed, even the BIFR is obviously aware that they are hopeless cases.

A better understanding of the reasons for keeping most sick firms in business may be obtained if we disaggregate the information on sickness with respect to industries[55]. The industries most frequently affected by sickness are Textile & Leather, Food & Beverages and Basic Metal & Metal Products. A look at Indian employment data reveals that these are just the

[54] See Falk and Wohlschlegel (2002), table 1.
[55] ibd., table 2.

industries employing the largest number of workers. Notice, however, that this does not prove the popular conjecture that excessive wage demands were the major cause of sickness. This would be true only if especially labour-intensive industries exhibited a tendency toward sickness, which is the case only for Textile & Leather, as measured by the ratio of total workers employed to the value of output. Basic Metal & Metal Products, on the other hand, is characterized by a rather low labour-intensity. Hence, we must try to explain the obvious link between sickness and employment differently.

A strong and numerous working force can certainly exert a large amount of political pressure. More than the votes of the workers that would be directly affected by a closure of their firm are at stake when a politician has to decide whether to let a sick company be liquidated or to bail it out. Once a politician has earned a reputation of not deciding in the workers' interest, which is often perceived as the 'public interest', it is not very likely that he will be supported by the working-class. This is all the more true if workers are highly politicized, which can be measured by the degree of unionization. It turns out that the highest number of union members per 1000 employees is found in the Machinery, the Food & Beverages, the Textile & Leather, the Non-metallic Mineral Products and the Chemical industries, three of which belong to the five industries with the largest number of sick firms[56]. One could argue that this relationship between sickness and unionization is triggered by above-average wages demanded by the unions. Figures on average annual earnings per employee do not, however, support this conjecture. Earnings are high in Transport Equipment, where unionization is low, and earnings are low in Food & Beverages, where unionization is high.

We can therefore conclude that the descriptive statistics support the conjecture that industries with higher employment figures and higher unionization are more prone to sickness. A possible explanation is that weak politicians seek the support of a highly politicized working-class and therefore are reluctant to send a sick firm into liquidation. If politicians

[56] ibd., table 3.

perceive strong and widespread union pressure as the 'public interest', then SICA provides them with all necessary means to avoid unpopular decisions.

4.4 A Simple Bargaining Model on Industrial Sickness in India

A. Assumptions

Consider an economy with three kinds of agents: (i) managers, who are endowed with entrepreneurial abilities, but not with funds, (ii) private investors, who are endowed with funds, and (iii) a governor who disposes of public funds and acts so as to maximize the sum of these funds and certain private benefits.

Firms are such that after an initial investment of one, output is generated within two periods, where first-period output is drawn randomly from the interval $[\underline{\pi}_1, \overline{\pi}_1]$ according to the cdf F(.), and second-period output is equal to either $\overline{\pi}_2$ or zero, the probability of the high value, $p(\pi_1)$, being dependent on first-period output, where p(.) is continuous and increasing in π_1. The amount of funds contributed by private investors will be denoted by I_p Without loss of generality, we assume that there is no discounting between the two periods. It is further assumed that hiring a manager is essential for the production in the first period.

We assume that two kinds of contracts are possible, namely, (short-term) debt and equity. If total debt payment obligations cannot be met after the first period, the firm is declared sick, the management is dismissed, the governor achieves control over the firm, and second-period output is non-stochastic and equal to $S < \overline{\pi}_2$. If all creditors are satisfied, the firm stays in business as before. Neither the investors nor the manager are allowed to liquidate the firm before the end of the second period. It is assumed that the equilibrium contracts derived in the next subsection are available with more than 50% of the equity owned by private investors, so that we can confine the analysis to private firms.

The assumptions on second-period output can be interpreted as follows: Private investors and the governor do not know the extent to which the manager is capable to run the firm. If there are two possible types of manager, good and bad, the distribution of short-term output of a firm run by a good manager first-order stochastically dominating that of a bad manager's firm, and if having a good manager implies high second-period output and vice versa, then π_1 is a statistic for the manager's type, and $p(\pi_1)$ is the conditional probability of high second-period output when first-period output is observed to be π_1. On the other hand, if the incumbent management is dismissed after the first period, it is replaced by a new, government-controlled manager, whose entrepreneurial abilities are publicly known but strictly lower than those of a good manager. The lower efficiency of a state-controlled firm can be justified along the lines argued in Shleifer and Vishny (1994): Politicians with some control over a firm tend to force over-employment in order to collect the union's votes in the next election. This is also consistent with the stylized facts of our sample presented in section 4.3.

Our assumptions concerning sickness imply that the probability that otherwise identical firms become sick is completely determined by leverage.

The manager and the governor enjoy private benefits B_M and B_G, respectively, from controlling the firm in the second period. The manager's private benefits stem from the high reputation associated with a leading position in a large company as well as the possibility of diverting some of the firm's resources towards the consumption of fringe benefits. The governor enjoys the fact that a sick unit is more or less under his control, so that he can implement his own conceptions of running the firm more easily, and that he earns a reputation of "rescuing" jobs by preventing a sick unit from being liquidated. Concerning the levels of those benefits, we assume that $B_G > B_M$: The amount of money the manager has to be awarded in order to be willing to abandon his private benefit from control is smaller than the amount the governor would spend in order to achieve control, as this latter amount is taken from the treasury and does not affect the governor's consumption budget.

The market for funds is assumed to be perfectly competitive so that private investors will accept any set of contracts under which they break even. Beyond this, determining a firm's leverage is a bargaining game between the firm's management and the governor, where the manager's preferred level of leverage is lower than the governor's. We assume that the governor enjoys full bargaining power, his outside option being not to provide any subsidized loans. Where the manager's outside option is concerned, we have to distinguish two cases: If a firm cannot be financed by private funds alone, the manager's threat point is zero, and in equilibrium the governor dictates the terms of the firm's contracts so as to maximize the sum of the monetary equivalent for his expected private benefits and the treasury's cash position. If, on the other hand, purely private financing is available, the manager's threat point is his expected utility from the equilibrium set of contracts for the case where there are only private investors.

We start the analysis by setting out the relevant parameters of the bargaining game between the manager and the governor.

B. The Manager's Outside Option

As mentioned in the previous subsection, the manager's outside option depends on whether or not the firm can be financed only by means of private funds. Recall from section 2.2 that if a firm is financed only by private investors, that is, if $I_p = 1$, total expected cash flow depends on the amount of the short-term debt payment obligations. If these payment obligations are equal to some π_1', total expected net cash flow is equal to

$$V_P(\pi_1') = \int_{\underline{\pi_1}}^{\overline{\pi_1}} \pi_1 dF(\pi_1) + \int_{\underline{\pi_1}}^{\pi_1'} S dF(\pi_1) + \int_{\pi_1'}^{\overline{\pi_1}} p(\pi_1)\, \overline{\pi}_2\, dF(\pi_1) - 1. \qquad (4.1)$$

The first three expressions on the right-hand side of (4.1) are expected short-term output, long-term output in the case where the firm defaults and is declared sick, and expected long-term output in the case where the firm meets its payment obligation, respectively. Set against these expected revenues are expected costs, namely, expected compensation to private

investors equal to their investment outlay. Maximization of (4.1) leads to π_1^P, the first-order condition being

$$p(\pi_1^P) = S / \bar{\pi}_2 . \tag{4.2}$$

Hence, purely private financing is available if and only if

$$V_P(\pi_1^P) \geq 0. \tag{4.3}$$

The manager, as the residual claimant of the firm's cash flow, assigns every possible level of short-term debt π_1' an expected utility which is the sum of this expected residual claim and his expected benefits of control:

$$V_M(\pi_1') = V_P(\pi_1') + \int_{\pi_1'}^{\bar{\pi}_1} B_M dF(\pi_1). \tag{4.4}$$

What is the manager's threat point if (4.3) holds? If $V_P(\pi_1^P) = 0$, private financing is possible only if total short-term debt is equal to π_1^P, because π_1^P maximizes $V_P(.)$. For firms where (4.3) holds with strict inequality, however, the manager can increase his expected benefits from control by reducing leverage as long as the private investors, in average, break even. That means, the manager maximizes (4.4) subject to $V_P(\pi_1') \geq 0$ by choice of π_1'. Let the solution to this problem be π_1^M. If $V_P(\pi_1^M) > 0$, we have an interior solution which satisfies the first-order condition

$$p(\pi_1^M) = (S - B_M) / \bar{\pi}_2 . \tag{4.5}$$

Summing up, for projects where (4.3) is violated, the manager's threat point is equal to $U_M = 0$. If (4.3) holds, then $U_M = V_M(\pi_1^M)$.

C. The Governor's Problem

The governor's preferences concerning leverage include two effects: First, an increase in leverage increases the probability of default and, hence, the governor's expected benefit from control. On the other hand, leverage affects the firm's value: If leverage is low, the firm's

shareholders might decide that the management should stay in office even if a restructuring process was more efficient; whereas a highly leveraged firm might become sick even if short-term output indicates that the incumbent management will most likely perform well in the long run. Suppose a firm's short-term debt payment obligations are equal to π_1'. Then the governor's expected payoff can be written as

$$V_G(\pi_1') = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1'} (S + B_G) dF(\pi_1) + \int_{\pi_1'}^{\overline{\pi}_1} p(\pi_1)\, \overline{\pi}_2\, dF(\pi_1) - 1 - C_M. \qquad (4.6)$$

The right-and side is the sum of expected output and the governor's expected benefit from controlling a sick firm, B_G, minus expected costs, which consist of expected payment to the private investors which is equal to their investment outlay I_p, the governor's investment outlay, $(1 - I_p)$, and an eventual compensation to the manager, C_M. The governor's problem is then to maximize (4.6) subject to

$$C_M = \max \{0, U_M - \int_{\pi_1'}^{\overline{\pi}_1} B_M dF(\pi_1)\}, \qquad (4.7)$$

where U_M is the manager's threat point derived in the previous paragraph, and the governor's participation constraint,

$$V_G(\pi_1') \geq U_G, \qquad (4.8)$$

where U_G is the governor's expected payoff in the case where the firm is financed purely by private investors: U_G is zero if (4.3) is violated, and $\int_{\underline{\pi}_1}^{\pi_1^M} B_G dF(\pi_1)$ if (4.3) holds.

D. Equilibrium Leverage

If (4.3) is violated, that is to say, if it is not possible to finance the firm only by means of private sources, the constraints to the governor's problem set out in the previous paragraph are $C_M = 0$ and $V_G(\pi_1') \geq 0$, respectively. The first-order condition to this problem is

$$p(\pi_1^G) = (S + B_G) / \bar{\pi}_2 . \qquad (4.9)$$

Hence, if $V_G(\pi_1^G) \geq 0$, equilibrium short-term debt is π_1^G.

Suppose now that (4.3) holds. The constraints to the governor's problem in this case are $C_M = V_M(\pi_1^M) - \int_{\pi_1'}^{\bar{\pi}_1} B_M dF(\pi_1)$ and $V_G(\pi_1') \geq \int_{\underline{\pi}_1}^{\pi_1^M} B_G dF(\pi_1)$, respectively. By replacing for C_M in the objective function, we get

$$V_G(\pi_1') = \int_{\pi_1^M}^{\pi_1'} (S - p(\pi_1)\bar{\pi}_2 + B_G - B_M) dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^M} B_G dF(\pi_1). \qquad (4.10)$$

The first-order condition for optimal leverage π_1^*, hence, is

$$p(\pi_1^*) = (S + B_G - B_M) / \bar{\pi}_2 . \qquad (4.11)$$

Notice that π_1^* satisfies the governor's participation constraint, because there are at least some $\pi_1' \geq \pi_1^M$ such that the first integral on the right-hand side of (4.10) is positive, and, by definition, $V_G(\pi_1^*) \geq V_G(\pi_1')$ for every π_1'.

Combining our results, equilibrium leverage is π_1^G if (4.3) is violated, and π_1^* if (4.3) holds. Hence, for fixed probability distributions of short-term profits F(.), we have derived the following comparative statics:

Proposition 4.1. The optimal amount of short-term debt and, therefore, the optimal probability of becoming sick is increasing in S and B_G and decreasing in $\bar{\pi}_2$ and, if (4.3) holds, in B_M.

E. The Extent of Government Financing

So far, we have derived only the total amount of short-term debt in equilibrium. What remains to be analyzed is the structure of the firm's debt portfolio. It is natural to assume that the governor will seek to implement the optimal leverage with a minimal amount of own funds: Given that the governor has a certain budget for subsidized loans, his aim is to be involved in as many firms as possible. The relevant question is therefore: What is the maximal amount I_P a

private investor would invest in a firm that is leveraged according to the bargaining equilibrium derived above?

Consider first the case where (4.3) is violated. The equilibrium leverage is π_1^G. Expected cash flow and therefore the maximal amount private investors are willing to invest is

$$I_P = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^G} S dF(\pi_1) + \int_{\pi_1^G}^{\overline{\pi}_1} p(\pi_1)\ \overline{\pi}_2\, dF(\pi_1) \qquad (4.12)$$

If, on the other hand, (4.3) is satisfied, optimal leverage is π_1^*. If we assume that the manager's compensation emerging in the bargaining equilibrium is paid out of the firm's cash flow, the maximal private investment is

$$I_P = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^*} S dF(\pi_1) + \int_{\pi_1^*}^{\overline{\pi}_1} p(\pi_1)\ \overline{\pi}_2\, dF(\pi_1) - \int_{\pi_1^M}^{\pi_1^*} B_M dF(\pi_1). \qquad (4.13)$$

With the first derivatives of I_p, we can show

Proposition 4.2. The optimal share of subsidized debt in total investment is increasing in S and B_G and decreasing in $\overline{\pi}_2$.

Proof: If (4.3) is violated, then, according to (4.12),

$$I_P = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^G} S dF(\pi_1) + \int_{\pi_1^G}^{\overline{\pi}_1} p(\pi_1)\ \overline{\pi}_2\, dF(\pi_1).$$

Given F(.), $dI_p/dS = -B_G f(\pi_1^G) d\pi_1^G/dS < 0$, $dI_p/d\overline{\pi}_2 > 0$, and

$dI_p/dB_G = -[F(\pi_1^G) - F(\underline{\pi}_1)] - B_G f(\pi_1^G) d\pi_1^G/dB_G < 0$.

If (4.3) holds, then, according to (4.13),

$$I_P = \int_{\underline{\pi}_1}^{\overline{\pi}_1} \pi_1 dF(\pi_1) + \int_{\underline{\pi}_1}^{\pi_1^*} S dF(\pi_1) + \int_{\pi_1^*}^{\overline{\pi}_1} p(\pi_1)\ \overline{\pi}_2\, dF(\pi_1) - \int_{\pi_1^M}^{\pi_1^*} B_M dF(\pi_1).$$

Given F(.), $dI_p/dS = -B_G f(\pi_1^*) d\pi_1^*/dS < 0$, $dI_p/d\overline{\pi}_2 = -B_G f(\pi_1^*) d\pi_1^*/d\overline{\pi}_2 > 0$, and

$dI_p/dB_G = -[F(\pi_1^*) - F(\underline{\pi}_1)] - B_G f(\pi_1^*) d\pi_1^*/dB_G < 0$. ■

4.5 Testing the Model

A. Empirical Specification

Falk and Wohlschlegel (2002) test the model outlined above with firm level data from PROWESS, a highly comprehensive database of the Indian corporate sector constructed by the Centre for Monitoring the Indian Economy (CMIE). The companies in PROWESS account for more than 70 percent of the economic activity in the organized industrial sector in India and are representative where measures such as gross value added, gross fixed asset formation and value of output are concerned. From this an eight-year (unbalanced) panel of 2596 privately held Indian manufacturing firms for the period 1992-1999 has been compiled. The variables reported in the database include variables from balance sheet and income-expenditure accounts, as well as some additional information such as industry affiliation, type of ownership, location and year of incorporation. The database has, however, a serious limitation: The only variable dealing with employment is a company's annual wage-bill. Hence, employment figures can be obtained only approximately, namely, by dividing a company's total wage-bill by average sectoral wages available from the Annual Survey of Industries.

The two propositions from the theoretical model are tested seperately. Proposition 1, which states some comparative statics of the optimal probability of a firm to fall sick, is tested by means of a panel probit model, where a '1' is assigned to the observation if the sickness criteria are met, and a zero otherwise. The appropriate model for a test of Proposition 2, where the optimal share of subsidized debt in total debt is derived, is a panel tobit model, since the provision of loans from governmental bodies or development finance institutions is censored at zero. In both approaches the endogenous variable is regressed against ex ante firm characteristics in order to capture the model’s sequential structure.

The main assumption on which the theoretical analysis rests is that politicians reward highly leveraged firms with subsidized loans. Hence, a first step is to verify the validity of this

assumption by checking whether the provision of governmental loans is indeed correlated with leverage, as measured by the share of total borrowings in total liabilities, realized in the previous period. This latter variable will be denoted by LEVERAGE. On the other hand, as a politician's utility depends on the treasury position and, hence, on the financial success of his investments, he will prefer firms that are purely financially distressed, but economically viable. A measure of economic viability will be MEANPROF, which denotes mean profitability, i.e. mean R.o.A. (earnings before interest, tax and depreciation, divided by total assets), throughout the last three years. If the key idea of the model is correct, both LEVERAGE and MEANPROF should enter the government loans equation with a positive sign.

Both propositions of the theoretical model suggest that the private benefits a politician enjoys from controlling a sick firm play an important role, because he can implement his own conceptions of running the firm more easily if it is sick, and he earns a reputation of rescuing jobs by preventing a sick unit from being liquidated. In section 4.3 evidence has been presented that the number of sick firms in an industry is related to employment and unionization in this industry. It is, therefore, plausible to conjecture that the popularity of a politician who bails out a sick firm is higher if this firm employs many workers. Hence, the politician's benefits from control B_G are proxied by EMPLOYMENT, the one year lagged number of employees scaled by total borrowings[57]. Propositions 1 and 2 lead us to expect positive signs on EMPLOYMENT in both estimation equations.

Second, a firm's 'value in sickness', S, contributes to the opportunity costs of reducing the firm's probability of falling sick. Hence, the theoretical model predicts that, in equilibrium, S is positively correlated with this probability. We assume that the inefficient government-controlled management will forego most of the firm's growth opportunities. In the empirical

[57] Dividing by total borrowing is compelling since the endogenous variable of the tobit model is scaled by total borrowings, too. Otherwise a negative relation between mere employment and the share of subsidized loans in total loans could result just because large firms with many workers as a rule dispose of higher balances.

estimation S is therefore captured by the firm's SICKNESS VALUE, measured as the share of net fixed assets in total assets.

Third, it is likewise evident that a healthy firm's future prospects, captured in the theoretical model by $\overline{\pi}_2$, contribute to the opportunity costs of increasing the firm's probability of falling sick. Therefore the manager, as the firm's residual claimant, will be more reluctant to increase leverage of his firm the higher $\overline{\pi}_2$ is. From this the theoretical model yields the result that good future prospects will reduce both the probability of sickness and the share of subsidized loans in total investment. We reason that (unobservable) future output is proxied best by a firm's future growth potential, which, in turn, will be captured by observed growth rates in the most recent past. In the empirical exercise the relevant regressor is AVERAGE GROWTH, the average period-to-period growth rate of sales from the last three years.

In the government loans equation three further indicators of good future growth potential are included, namely, INTANGIBLE ASSETS, the share of intangible assets in total assets, a dummy on R&D-activity, and MARKET DEBT, the share of market debt in total debt. The last indicator is useful because Indian banks are generally less profit-oriented than bondholders, so that the ability to convince the latter of the firm's quality indicates a high quality indeed. In line with the theoretical results, we expect negative coefficients on all of these. An intuitive explanation for this is that good risks will take advantage of their outside option and refuse excessive government financing accordingly.

Finally, a manager enjoys some private benefits B_M from leading the firm, through high reputation or the consumption of fringe benefits. He will therefore prefer a low probability of sickness, in which case he will lose his benefit, to a high one. This aversion towards sickness is higher, the larger his benefits from control are. Hence, proposition 1 states that the probability that a firm falls sick is decreasing in B_M. It is now widely accepted in the finance literature that the positive side-effects of managing a firm are increasing in the firm's size. The 'large firm' dummy can therefore be expected to enter the regression of the sickness equation

with a negative sign. Size is measured by the official criteria that define monopolies and small-scale industries, respectively: if a company's gross fixed assets exceed one billion Rs., or, alternatively, if it reaches a market share of at least 25 percent and employs gross fixed assets worth one million or more, it is considered as being large.[58] A small company is defined as such if its gross fixed assets do not exceed six million Rs. (before 1997), or 30 million Rs. (from 1997 on), respectively.

The sickness equation is completed by the inclusion of some variables not predicted by the theoretical model. MEANPROF and RISK, i.e. firm-specific standard deviations of R.o.A. within the last three years, can be expected to describe a firm's economic performance rather well. They are included in the regression to reflect economic distress as a possible cause of sickness. Furthermore, industry affiliation and a location dummy enter both regressions as heterogeneity controls, where the location dummy ('Backward-Dummy') is set to one if the headquarter of the respective firm is located in a backward area. The reason for this is to check for the effects of preferential treatment of certain industries or firms located in backward areas.

B. Estimation Results

The estimation of the government loan equation is summarized in table 4.1. The basic assumptions of the theoretical model are verified: Politicians provide firms with subsidized government loans if they are highly leveraged but economically viable.

The hypotheses stated in proposition 2 are, however, not unambiguously confirmed. EMPLOYMENT affects the share of government loans in a firm's total borrowings significantly negatively, instead of positively, as proposition 2 suggests. Furthermore, among the industries identified in section 4.3 as especially endowed with politically aware workers, namely, Machinery, Food & Beverages, Textile & Leather and Non-metallic Mineral Products, only the

[58] For the empirical exercise the relevant market comprises all firms within the same 3-digit industry class.

last enjoys, other things being equal, a significantly higher share of subsidized loans in total loans than the reference industry, Rubber & Plastic. A possible explanation could be that

Table 4.1: Determinants of subsidized loans: results from the panel tobit model [a)]

		predicted sign	Coef.	Std. Err.	z-value	Marg. signif. level
Model Assumptions:						
LEVERAGE(t-1)		(+)	0.040	0.006	6.25	0.000
MEANPROF		(+)	0.094	0.030	3.12	0.002
Testable Hypotheses						
B_G:	EMPLOYMENT(t-1)	(+)	-0.050	0.011	-4.61	0.000
S:	SICKNESS VALUE(t-1)	(+)	0.389	0.018	22.14	0.000
$\overline{\pi}_2$:	AVERAGE GROWTH	(-)	0.002	0.004	0.51	0.614
INTANGIBLE ASSETS (t-1)			0.213	0.091	2.33	0.020
Dummy for R&D-activity (t-1)			-0.002	0.005	-0.32	0.749
MARKET DEBT (t-1)			-0.216	0.015	-14.45	0.000
Dummy for large firms[b)]			0.015	0.007	2.31	0.021
Dummy for small firms[b)]			-0.148	0.017	-8.61	0.000
Industry Dummies	Food & Beverages		-0.074	0.021	-3.49	0.000
	Textile & Leather		0.020	0.020	0.99	0.322
	Wood & Paper		0.008	0.023	0.35	0.725
	Chemicals		-0.022	0.020	-1.12	0.262
	Non-met. Mineral products		0.053	0.022	2.40	0.016
	Basic metal & Metal prod.		0.011	0.021	0.51	0.609
	Machinery & Mach. tools		-0.038	0.021	-1.83	0.067
	Electronics		-0.027	0.024	-1.10	0.270
	Transport Equipment		0.001	0.021	0.05	0.963
	Miscellaneous		-0.044	0.036	-1.23	0.219
Backward-Dummy			0.042	0.010	4.30	0.000
Year Dummies	1992		0.089	0.011	7.89	0.000
	1993		0.081	0.007	11.59	0.000
	1994		0.077	0.006	11.97	0.000
	1995		0.057	0.006	9.53	0.000
	1996		0.046	0.006	8.08	0.000
	1997		0.031	0.005	5.76	0.000
	1998		0.016	0.005	3.13	0.002
constant			0.046	0.021	2.15	0.031

Source: CMIE; own calculations

[a)] Number of firms: 2528; Number of obs.: 10399; 1836 left-censored observations; Wald-Teststatistic: $\chi^2(28) = 1618.34$; LogLikelihood: 1075.37

[b)] Reference group: medium-sized firms. Size is measured by the criteria for SSI and MRTP firms. Small firms: gfa < Rs. 6 million until 1996 and gfa< Rs. 30 million since 1997. Large firms: gfa > Rs. 1 billion *or* gfa > Rs. 1 million *and* market share of at least 25 %.

employment figures are not especially suitable for estimating B_G. It may rather be the case that the reputation of having rescued any firm is important for the politician, irrespectively of how many workers this firm employs. Policy variables in a narrower sense which vary across states and are independent of employment figures may improve the results, but it is hard to think of any such variable.

The coefficient of SICKNESS VALUE, which is intended to be a proxy for a firm's value in sickness, enters the equation with a positive sign, as predicted by proposition 2. The variables representing future growth opportunities show mixed results: The impact of AVERAGE GROWTH is not significantly different from zero, as is the R & D dummy. The coefficient of the third indicator for future growth opportunities mentioned in subsection A, MARKET DEBT, however, has the expected sign.

The preferential treatment of firms located in backward areas is confirmed by the positive sign of the backward dummy, whereas small firms have lost their once preferred status, which results in a negative sign of the dummy for small firms.

Results for the panel probit model where the probability of a firm to fall sick is regressed against ex-ante firm characteristics are found in table 4.2. Column 2 lists classical marginal effects, i.e. percentage point increases/decreases in the probability of falling sick caused by infinitesimally small changes of some regressor. For discrete covariates this measure does not make much sense, but we are rather interested in the change in outcome probability when the dummy switches from zero to one. These effects are given in the last column.

As in the estimation of proposition 2, the coefficient for EMPLOYMENT has a negative sign, where a positive sign has been expected. The only industry among the highly unionized ones that exhibits both higher shares of subsidized loans and a higher sickness probability than the reference industry is the Non-metallic Mineral Products sector. Textile & Leather performs as expected at least where the sickness probability is concerned: The coefficient has a significantly positive sign.

The remaining hypotheses of the theoretical model are, however, strongly supported by the empirical results. The positive coefficient of SICKNESS VALUE shows the impact of a firm's value when it is run under governmental control. On the other hand, if a manager enjoys high benefits from control, it is more difficult for a politician to induce him to increase the

Table 4.2: Determinants of sickness: results from the panel probit model[a)]

		predicted sign	Marg. Eff. (classic)	Std. Err.	z-value	Marg. Eff. (Dummy)
Testable Hypotheses						
B_G:	EMPLOYMENT(t-1)	(+)	-0.012	0.008	-1.433	
S:	SICKNESS VALUE (t-1)	(+)	0.109	0.027	4.022	
$\overline{\pi}_2$:	AVERAGE GROWTH	(-)	-0.012	0.005	-2.263	
B_M:	Dummy for large firms[b)]	(-)	-0.058	0.015	-3.941	-0.050
Dummy for small firms[b)]			-0.038	0.016	-2.302	-0.036
RISK			0.413	0.095	4.351	
MEANPROF			-0.740	0.149	-4.966	
Industry	Food & Beverages		0.022	0.019	1.174	0.021
Dummies	Textile & Leather		0.023	0.016	1.437	0.022
	Wood & Paper		0.001	0.022	0.036	0.001
	Chemicals		-0.006	0.017	-0.350	-0.005
	Non-met. Mineral products		0.056	0.021	2.719	0.063
	Basic metal & Metal products		0.052	0.017	3.016	0.058
	Machinery & Machine tools		0.000	0.018	0.015	0.000
	Electronics		0.012	0.020	0.596	0.011
	Transport Equipment		0.008	0.022	0.356	0.007
	Miscellaneous		-0.062	0.059	-1.050	-0.036
Backward-Dummy			0.023	0.011	2.098	0.025
Year	1992		-0.005	0.015	-0.353	-0.006
Dummies	1993		-0.007	0.009	-0.741	-0.008
	1994		-0.026	0.009	-2.752	-0.027
	1995		-0.034	0.010	-3.485	-0.035
	1996		-0.044	0.011	-4.084	-0.042
	1997		-0.019	0.008	-2.528	-0.021
	1998		-0.012	0.007	-1.875	-0.014
Constant			-0.149	0.030	-4.964	

Source: CMIE; own calculations

[a)] Number of firms: 2546; Number of observations.: 10449; Wald-Teststatistic: $\chi^2(25) = 615.92$; LogLikelihood: -2051.76

[b)] Reference-group: medium-sized firms. Size is measured by the criteria for SSI and MRTP firms. Small firms: gfa < Rs. 6 million until 1996 and gfa< Rs. 30 million since 1997. Large firms: gfa > Rs. 1 billion *or* gfa > Rs. 1 million *and* market share of at least 25 %.

sickness probability. More specifically, if a firm is large, and therefore its control especially valuable for a manager, the probability of becoming sick is five percentage points lower than that of medium-sized firms. Marginal increases in AVERAGE GROWTH reduce the sickness probability by 1.2 percentage points, thus showing the importance of future growth opportunities as opportunity costs of sickness. Furthermore, and as to be expected, economic distress proves to be a major cause for financial distress. Firms with unstable and low profits are more likely to become sick, where a marginal increase in RISK increases the sickness probability by more than 40 percentage points, and a marginal increase in MEANPROF reduces it by as much as 74 percentage points.

Turning to the variables that identify industries receiving preferential treatment, firms in backward areas face a significantly higher sickness probability than the reference group. This fact has been criticized by Goswami (1996) and is caused by excessive promotion of their very establishment and other legal advantages, thus inducing entrepreneurs to establish such firms without any economic justification. On the other hand, the negative sign of the coefficient for the dummy for small firms may have a technical reason, namely, a softer official definition of sickness for small firms[59]. Hence, many small firms which we identify as sound will in fact be sick according to the special sickness definition being effective for the SSI sector.

4.6 Conclusions

In the main part of this chapter, we examined the political economy of bankruptcy in India by focussing on a fundamental disagreement between politicians and managers concerning firms' financial policies: As a politician achieves some control over sick firms, he seeks to increase the probability that a firm becomes sick, and, therefore, highly leveraged firms are

[59] Any small-scale unit is declared sick if erosion of 50% or more of its peak net worth during the immediately preceding four financial years has taken place, and if in addition there is a delay in payment of principal or interest in respect of any of its creditors for a period exceeding two and a half years.

more valuable for him, whereas the incumbent managers prefer the higher level of control they enjoy when a firm is healthy, and therefore favour a lower leverage. Our argument rests on the basic hypothesis that politicians induce managers to choose a high leverage by rewarding them with subsidized loans. Data from the panel of 2596 Indian firms that we deployed in our analysis supports this hypothesis.

Both the theoretical model and the empirical estimations lead to the conclusion that firms with brighter prospects if they remain healthy and lower values in sickness exhibit a lower probability of becoming sick and a lower share of subsidized loans in total loans. More difficult to estimate are the variables capturing the private benefits of the politician and the manager from controlling the firm. The theoretical model predicts a positive correlation of the former with the firm's probability to become sick and share of subsidized loans in total loans and a negative correlation of the latter with the sickness probability. An attempt to approximate the politician's private benefits of control by some variables based on employment turned out to be useless to verify this prediction. What can be said in favour of the prediction associated with the manager's private benefit is that large firms exhibit a significantly lower probability of becoming sick than medium-sized firms. It is now undisputed in the finance literature that there is a strong correlation between a firm's size and the manager's private benefits from controlling the firm. To find some suitable proxies for a politician's private benefits of control as well as to achieve a deeper understanding of the bargaining between politicians and firms in India thus remain as challenging tasks for future research.

Our study's implications for bankruptcy reform are straightforward: As in many developing and transition economies, the influence of local politicians on Indian firms softens the firms' budget constraints and induces their managers to make socially suboptimal decisions. The first measure of a reform should, therefore, be to establish an *independent* bankruptcy court in order to cut the politicians' influence. The rules governing this court's decisions should be designed in such a way that the probability that a sick firm is liquidated substantially increases

and the time span within which this is done sharply decreases. Once the threat of liquidation becomes credible, encouraging a firm to be over-indebted becomes unattractive for a politician. In a first attempt in this direction, Hart et al. (1998) present a proposal for bankruptcy reform tailor-made for emerging markets that gives bankruptcy judges a minimum of discretion where the valuation and the future of a bankrupt firm is concerned. As Senbet (1998) points out, however, even their proposal exhibits some judicial discretion over the allocation of property and control rights in the reorganized firm. Furthermore, their proposal requires creditors to be highly liquid (for what they call the "insider auction") or the existence of a secondary market (for the "outside auction"), neither of which are very common features of developing countries.

Our results suggest, on the other hand, that a bankruptcy reform alone would be insufficient to increase efficiency of Indian firms to a satisfactory extent. Obviously counter-productive regulations such as the preferential treatment of small-scale industries or firms located in backward areas certainly have to be removed. Additionally, one can hardly expect funds to be allocated efficiently as long as the objective of state-owned banks is "loan maximization" instead of profit maximization.

Chapter 5. Conclusions and Outlook

The basic theme of this thesis was to examine ex-post and ex-ante effects of what happens with a firm when it gets into financial distress. It turned out that there are some tensions between certain incentive problems governing the decisions in a firm before and after becoming distressed. If, for example, an ex-post efficient arrangement is implemented, it may be the case that some decisions at earlier stages are made less efficient.

Furthermore, the second-best solution according to such a trade-off may not be implementable by contracting, because parties cannot commit themselves to this second-best strategy. It is in such settings where a role of bankruptcy becomes apparent that goes beyond the adverse overtone that used to adhere to bankruptcy in the earlier literature, according to which the aim of bankruptcy law is simply to minimize the inevitable costs associated with financial distress. Bankruptcy may rather be an event where a social planner interferes in the allocation of a firm's payoffs and of the control over the firm. Starting with a basic model set out in section 2.2, it has been shown in many examples throughout this thesis how such an interference can remove the said commitment problem.

I presented an application of this principle to the field of optimal design of bankruptcy law, where some remarkable contributions already had been made, and reviewed some of them. Where other problems related with financial distress are concerned, however, most scholars still do not seem aware of this view. The whole discussion about legal regulations of bond workouts is an example, as well as the topic of bankruptcy law in developing countries, where the so-called soft budget problem, according to which politicians are not able to commit themselves not to bail out unviable firms in financial distress, is especially pervasive. I proposed the application of the basic model of section 2.2 to both of these topics and showed that the results may be in sharp contrast to the conventional wisdom.

Revealing as they are, however, all the models presented in Chapter 2 are highly stylized and as such, may not be too useful in helping write out an optimal bankruptcy code in detail. All practical suggestions made so far are based on the "traditional" view set out in Chapter 1 of this thesis. Hence, it remains as a challenging task for future research to incorporate some of the insights gained in the more "modern" contributions in the proposal for a bankruptcy code.

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