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Managerial Entrenchment and the Choice of Debt Financing

Prepared by Amadou N. R. Sy¹

Authorized for distribution by Donald Mathieson

July 1999

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Abstract

The paper analyzes the choice between public and private debt by an entrenched manager. The model shows that when the firm's credit risk is low, management issues public bonds because of the value gains from increased flexibility rather than reduced restrictions and monitoring. In fact, management's expected private gains decrease as initial private debt restrictions are selectively relaxed. In contrast, when credit risk is high, management issues private debt because of the value gains and private benefits from renegotiating more stringent restrictions. When the maturity of private debt is shortened, however, privately and publicly placed bonds can be preferred to bank debt.

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I. INTRODUCTION

Recent developments in financial economics have studied the firm's choice between public and private debt. This paper analyzes how managerial entrenchment influences the type of debt firms issue. The debt contracts in consideration differ not only in their maturity structure but also in their covenant restrictions. The paper shows that, when credit risk is low, management prefers to issue public debt because of the associated value gains from increased flexibility rather than the private gains from reduced restrictions and monitoring. In fact, the prospect of increased managerial discretion does not provide sufficient incentives to choose public debt because management's expected net private gains decrease as initial private debt restrictions are selectively relaxed when credit risk decreases. In contrast, when credit risk is high, management prefers to issue private debt because of the value gains and the private benefits from renegotiating more stringent private debt restrictions. However, when the maturity of private debt is short, management can prefer long-term debt contracts, whether public or private, because of the private benefits from increased managerial discretion.

Entrenched managers have not only discretion on their firms' leverage choice, but also on their sources of debt financing. Most previous studies have focused on the first type of decision. For example, Stulz (1990) shows that managerial discretion has two costs: an overinvestment cost that arises because management invests too much in some circumstances and an underinvestment cost caused by management's lack of credibility when it claims it cannot fund positive net-present-value projects with internal resources. Since debt and equity issues decrease one cost of managerial discretion and increase the other, there is a unique solution for the firm's capital structure. In an empirical study, Berger et Al. (1997) find that leverage levels are lower when CEOs do not face pressure from either ownership and compensation incentives or active monitoring. The focus of this paper is on the second type of choice and investigate what type of debt entrenched managers issue, after the capital structure decision has already been taken.

One strand of the literature² suggests that entrenched managers avoid private debt because its tighter covenants and shorter maturities are more effective in constraining them. In contrast, another strand of the literature³ argues that these same characteristics can be value-reducing and provide less flexibility because they can prevent managers from investing in value-enhancing projects. In practice managers often refer to the tighter restrictions in private debt and the associated loss of flexibility, as a reason to issue public debt⁴.

²See for example Fama (1985), Jensen (1986), James (1987), Berlin and Loeys (1988), and Diamond (1991), Rajan and Winton (1995), Barclay and Smith (1995), Nakamura (1993), and Preece and Mullineaux (1994).

³See for example, Smith and Warner (1979), Barclay et Al. (1995), Sharpe (1990), Rajan (1992), and Houston and James (1996).

⁴In 1997 and 1998, the UK chemicals company, ICI, which was involved in a major restructuring program refinanced a \$8.5 billion loan from a syndicate of banks through the Yankee, Eurodollar, Eurosterling, MTN and commercial paper markets in addition to asset sales. These achievements were recognized by awards for both Borrower of the Year and Debt Programme of the Year from International Finance Review. ICI treasurer, Chris Vallance, stated that "part of his job was to make sure the ICI board had complete freedom of action" and that the firm "could not afford the

This paper extends Berlin and Mester (1992) to study how managerial discretion affects the source of debt financing when entrenched managers value both flexibility, that is increased investment in value-enhancing projects, as well as the private benefits from reduced restrictions and monitoring. The paper is similar in spirit to Diamond (1991) who analyzes debt maturity choice as a trade-off between a borrower's preference for short-term debt due to private information about the future credit rating and liquidity risk. Liquidity risk is the risk that a solvent but illiquid borrower is unable to obtain refinancing. It is also similar to Sharpe (1990) and Rajan (1992) who argue that a bank that is a sole creditor of a firm has information monopoly and has the ability to hold-up its borrower to demand a share of the surplus from a good project.

One major difference with this literature, however, is that debt contracts in this paper differ not only in their maturity structure, but also in their covenant restrictions. Consequently, three types of contracts are modeled: (1) a long-term public debt without monitoring and renegotiation, (2) a long-term private debt contract with monitoring and renegotiation, and (3) a short-term private debt contract with monitoring and renegotiation. These contracts share many characteristics with a public bond, a privately placed bond, and a bank debt respectively.

The agency costs, in this paper, are caused by managers who would like to invest in value-reducing projects because they draw private benefits from these projects. Shareholders are unable to discipline management through corporate governance and control mechanisms such as monitoring by the board, the threat of dismissal or takeover, and stock-compensation-based performance incentives⁵. The firm has assets-in-place and growth opportunities in the form of new projects. These new projects can be either more productive than old assets (value-enhancing projects) or less productive and yield less than their liquidation value (value-decreasing projects). Both existing assets and new projects require investment. Managers have no personal wealth and need to raise money for investment by issuing debt. This occurs initially, before the managers or investors realize the project's type. After the type is realized, it is optimal for the managers to invest all its money in the new project if it is value-enhancing and to allow the firm to be liquidated if the new project is value-decreasing, or if liquidation is impossible, to invest all the money in existing assets. Managers, however earn private benefits from new projects, and would like to invest in any new projects, even a value-decreasing project.

This paper considers debt covenants that restrict investment in new projects. These covenants restrict investment in value-decreasing projects, but, at the same time, reduce flexibility by restricting investment in value-increasing projects too. However, the lender might know whether the project is productive or not, and when covenants are breached, debt renegotiation may improve upon covenants by preventing some of the value loss caused when projects are value enhancing.

First, this paper shows that private debt imposes tighter restrictions than public debt since covenants are more stringent when renegotiation is possible. However, initial restrictions can be

stumbling block of obstructive loan documentation." see Euromoney (1998)

⁵See John and Senbet (1998) for a survey of the empirical and theoretical literature on the mechanisms of corporate governance.

selectively relaxed for both contracts when credit risk decreases. This result implies that when managers choose public debt rather than private debt, the additional private gains from reduced restrictions and monitoring will decrease with credit-risk. The main result of the paper confirms this intuition and shows that the manager of a firm with low credit risk prefers to issue public to private debt because of the value gains from increased flexibility rather than the private gains from reduced monitoring and restrictions. In addition, the model suggests that when private benefits are independent of the size of the investment in new projects, management's debt financing decision is not influenced by managerial discretion since managers can always retain their control rights, under both contracts, by complying to the covenant restrictions. The model's empirical predictions that managerial entrenchment influences the type of debt financing can be directly tested. Furthermore, empirical tests can verify the model's suggestion that the stock price of a low credit risk firm that has just issued public debt, rather than privately placed bonds, increases since the issue is motivated by the need for increased flexibility⁶.

The paper proceeds as follows. Section 2 presents the model and derives the optimal debt contracts while section 3 studies the choice of debt contract by an entrenched manager and derives the main results of the paper. Finally, section 4 concludes and presents avenues for future research.

II. THE MODEL

A. The Projects

Consider a model⁷ with three dates: 0, 1 and 2. At the initial date, a risk-neutral manager is hired by shareholders of a firm which has assets in place at date 0 and growth opportunities that will arise in the form of new projects at date 1. In order to focus on the type of debt financing, assume that the shareholders have no funds to invest in the new projects and do not want to issue new shares. The optimal capital structure⁸ is therefore already set and the only financing decision is the type of debt an entrenched manager will choose. At date 0, management is allowed to borrow debt to fund a total amount of investment worth I in order to invest in the old assets as well as in the new projects. At date 1, management uses the borrowed funds to invest an amount Z in the old assets and $I - Z$ in the new projects. All payoffs are realized at date 2, and assets in place yield a known positive cash flow of $R(Z)$ net of payments to management while growth opportunities yield cash-flows worth $r(I - Z)$. For simplicity, assume that there is no discounting and that the return functions $R(\cdot)$ and $r(\cdot)$ are increasing and concave in their arguments. To simplify notation, normalize I , the total amount borrowed to be equal to 1, so that the net cash flows from investment, excluding management's private benefits, are $R(z) + r(1 - z) - 1$.

⁶In a related empirical study, Gilson and Warner (1998) study firms that reduced private debt by repaying bank loans with proceeds from junk bonds. They find that junk bonds enabled the firms to maintain their ability to grow rapidly and that alternative explanations for the paydowns, such as managers' desire to avoid bank monitoring, have little support.

⁷See Figure 1.

⁸See Stulz (1990) for an analysis of the use of financing policies to reduce the costs of managerial discretion.

At date 0, it is public information that the new projects that will arise at date 1 will be value-enhancing with probability p and value-decreasing with probability $1 - p$. Value-enhancing projects have positive NPV that is, $R(z) + r^g(1 - z) > 1$, and if chosen will produce cash flows greater than the liquidation value of the firm, that is $R(z) + r^g(1 - z) > 1 > L^g$ for all z . Furthermore, such new projects have a greater marginal return than old assets i.e. $|r_z^g(1 - z)| > R_z(z)$ for all z , that is an additional dollar invested in value-enhancing projects will yield more than a marginal dollar invested in old assets. In contrast, value-decreasing projects have negative NPV, $R(z) + r^b(1 - z) < 1$, and will yield returns that are worth less than the liquidation value of the firm regardless of any investment in the old assets, that is $R(z) + r^b(1 - z) < L^b < 1$, for all z . Old assets are marginally more productive than value-decreasing new projects or $|r_z^b(1 - z)| < R_z(z)$ for all z , that is an additional dollar invested in value-decreasing projects will yield less than one additional dollar invested in old assets. For ease of notation, suppress the less productive terms and rewrite $R(z) + r^b(1 - z) - 1$ as $R^b(z)$ and $R(z) + r^g(1 - z) - 1$ as $r^g(1 - z)$. With this new notation, investment in value-enhancing projects yield a payoff of $r^g(1 - z)$ and investment in value-reducing projects generates a payoff of $R^b(z)$.

B. Managerial Entrenchment

Management receives a fixed wage and has no stake in the corporation. However, it values investment more than shareholders because its perquisites increase with investment even when they have negative NPV projects. Management is entrenched and have discretion over its choice of debt financing and over the amount invested in the new projects. In other words, it is assumed that corporate governance and control mechanisms fail to reduce the level of management entrenchment⁹. The non-transferable private benefits that management receives, when $1 - z$ is invested in the new projects, are equal to $C(1 - z) > 0$ for all z , with C increasing and concave in its argument. Assume that the private benefits are high enough so that the lender cannot induce the manager to agree to liquidate the project. If there were no private benefits, then management would maximize the expected value of the firm which would consist solely of the NPV from the value-enhancing new projects and the cash-flows from the old assets $pr^g(1 - z)$. In order to reach this objective, management would invest all the borrowed funds in value-enhancing new projects, $z^g = 0$, and would let the firm be liquidated if the projects are value-decreasing. The expected value of the firm would then be $pr^g(1)$. However, in the presence of private benefits, management has an incentive to invest in value-decreasing projects. Management's objective is then to maximize the sum of the expected value of the firm and its private benefits.

C. Covenants

The following discussion of the timing and information structure of the game is illustrated in Figure 1. The market for loanable funds is competitive and the lender has a required face value of debt of \underline{d} that gives her a utility of reserve. At date 0, when the contract is signed, both the lender and the manager expect the new project to be value-enhancing with probability p and

⁹Berger et Al. (1997) study associations between managerial entrenchment and firms' capital structure. Their results generally suggests that entrenched CEOs seek to avoid debt.

value-decreasing with probability $1 - p$. In addition, the lender bears some fixed monitoring cost k which will permit her to know the type of the project at date 1. Before management makes its investment decision, it not only knows whether the project is value-enhancing or not, but also whether the lender will be informed or not. The monitoring technology is such that the lender become informed at date 1 with probability θ . The lender does not know what type of projects management has chosen with probability $1 - \theta$, and management's information remains private in this case. These states are the informed and uninformed states respectively.

In this setting, managerial discretion causes management to invest too much in new projects since it is possible that value-decreasing projects are chosen in spite of their negative NPV. The lender is aware of this cost of managerial discretion and includes restrictive covenants in the debt contract in order to limit investment in new projects.

In this paper, a debt covenant, \underline{z} , is a minimum verifiable investment in assets-in-place at date. A breach of covenant occurs when management's investment in old assets is less than the required minimum, $z < \underline{z}$ and there is no breach when management complies, $z \geq \underline{z}$. Assume that if the lender monitors, then she can also obtain information on whether there is a breach or not at no additional cost. At date 1, the firm is audited and management remains in place if there is no breach of covenant. In case of a breach, the lender can demand repayment and the control of the firm may be transferred to her. In this case, management loses its private benefits. Management can however avoid liquidation by seeking renegotiation.

Assume a simple model of renegotiation in which management can propose a new contract by making a take-it-or-leave-it offer to the lender at date 1, after it receives information on the type of the project, and after the investment decision has been made. The lender audits the firm and accepts or rejects the offer. If the lender accepts the offer, then the firm is permitted to continue its operations until date 2. If the lender rejects the offer, then the firm is liquidated. In this setting, management can avoid liquidation and consume its private benefits in two ways, either by choosing to comply and not breach the covenant or by making an acceptable offer to the lender.

The lender will grant a permanent waiver¹⁰ without further modification of the contract and allow management to remain in place if she knows that a value-enhancing project has been chosen. In contrast, she will accelerate the maturity of the debt and liquidate the firm if she is aware that a value-decreasing project has been accepted. In the uninformed state however, assume that the lender will reject any offer and liquidate the firm because the expected value loss is higher than the expected liquidation value of the firm even taking into account the value gains from value-enhancing projects, that is $pr^g(1 - z) + (1 - p)R^b(z) < pL^g + (1 - p)L^b$. Note, however, that when the debt contract includes covenant restrictions, the lender never liquidates in the uninformed state in equilibrium because management will always comply to avoid losing its private benefits.

¹⁰The breach of a debt covenant, other than payment of interest is called a technical default. In practice, lenders choose from a wide array of measures to respond to technical default. Smith (1993) documents that these actions range from granting a permanent waiver without further modification of the contract to accelerating the maturity of the debt and forcing the borrower to obtain financing elsewhere.

Debt covenants, in this paper, restrict investment in value-decreasing projects but at the same time restrict investment in value-enhancing projects too. However, when covenants are breached, debt renegotiation may improve upon covenants by preventing some of the value loss caused by these covenants when projects are value-enhancing¹¹.

In this setting, a debt contract is of the form (d, z) and specifies the face value to be repaid at date 2 as well as the covenant restriction z . If the lender could write contracts contingent on the project's type but could not liquidate selectively, then the first-best contract would make management invest all the debt proceeds in new projects if they are value-enhancing ($z^g = 0$), and invest all the borrowed funds in old assets if new projects are value-decreasing ($z^b = 1$). Since such type of contracts are not feasible, the analysis is restricted to second-best contracts.

Next, assume that management has the choice between three types of debt contracts that differ in their maturity and covenant structure. First, consider a long-term debt contract with covenants but no renegotiation. Such a contract shares many similarities with a publicly placed bond. In fact, publicly sold bonds, even though they incorporate covenants in their indenture, are seldom renegotiated because the great number of bondholders makes the costs of an agreement between bondholders prohibitive¹². Second, analyze a long-term debt contract which allows for renegotiation when its covenants are breached. Such a contract has many of the characteristics of privately placed debt. Such contracts tend to be long-term and while most public issues have few restrictive covenants, privately placed bonds often impose significant restrictions on borrowers¹³. Furthermore, empirical evidence in Smith (1993) has shown that a breach of covenant is more likely in private than public debt issues. Finally, consider a short-term debt contract with renegotiation at maturity which can be seen as a bank debt contract. In practice, bank debt has the most stringent covenants in addition to shorter maturities and banks have the option to accelerate debt maturity thereby forcing contract renegotiation. The next sections derive the optimal debt contracts.

III. THE DEBT CONTRACTS

A. Publicly Placed Bonds

Bondholders do not monitor and their auditing and monitoring costs are assumed to be zero. The public bond contract, (z^*, d^*) specifies a loan rate d^* as well as a minimum investment in old assets z^* . Renegotiation outside of bankruptcy is impossible and a breach of covenant

¹¹This result is standard in the literature and is justification for the existence of covenant restrictions in debt contract. See Berlin and Mester (1992), Jensen and Meckling (1976), Stulz and Johnson, and Smith and Warner (1979).

¹²The Trust Indenture Act of 1939 limits the discretion that may be allocated to the trustee in a public debt issue. It is thus costly to renegotiate covenants in public debt agreements outside the bankruptcy process.

¹³See M. Carey et al. (1993) for a comprehensive study of the private placement market. Their sample shows that covenants of public issues are rarely negotiated whereas at least half of all private placements are renegotiated at least once.

restrictions would be detected by the audit at date 1. Consequently, management loses its private benefits if it does not comply. Hence the covenant constraint is binding. The incentive compatible decision of management is then to invest the minimum amount required in the old assets, $z^g = z^b = z^*$. Management will not invest more than required in the assets-in-place because they are less productive than value-enhancing projects. Similarly, management has no incentive to invest more than what is required in value-decreasing projects and always complies to avoid liquidation. Management will then maximize the expected value of the firm and of its private benefits $pr^g(1 - z^g) + C(1 - z^g) - d + (1 - p)C(1 - z^b)$ subject to its incentive compatible constraint, $z^g = z^b = z^*$ and to the bondholders' participation constraint $pd + (1 - p)R^b(z^b) \geq \underline{d}$.

The first order conditions (FOC) of this maximization problem are such that :

$$-pr^g(1 - z^*) + (1 - p)R_z^b(z^*) - C_z(1 - z^*) = 0 \quad (1)$$

The first term of the first-order conditions is negative and shows that covenant restrictions create a value loss by forcing management to invest in assets-in-place rather than value-enhancing projects. However, forcing management to invest in the old assets rather than in value-decreasing new projects reduces the value loss as shown by the second term of the first-order conditions which is positive. The last term is negative and shows the loss in marginal private benefits caused by covenant restrictions. By limiting investment in new projects, covenant restrictions reduce management's private benefits. At the optimum, the expected increase in marginal value losses is equal to the expected decrease in marginal value gains in addition to management's marginal private benefits, where expectations depend on public information, p . Denote π^* the expected total value of the firm and of the private benefits when management chooses to issue public debt:

$$\pi^* \equiv pr^g(1 - z^*) + (1 - p)R^b(z^*) + C(1 - z^*) - \underline{d} \quad (2)$$

In contrast to public debt, private debt contracts such as privately placed bonds allow for renegotiation. The next section takes a closer look at a long-term debt contract when renegotiation is possible.

B. Long-Term Private Debt

The long-term private debt contract, (d^n, z^n) specifies the covenant restriction, z^n , and the face value of the debt, d^n , that has to be repaid at date 2. At date 1, management can either comply or breach the covenant restriction and make an offer (d'_j, z'_j) , $j = g, b$. Two situations can occur in the first of which the lender is informed with probability θ and rejects any offer from management if the new project is value-decreasing. Alternatively, she can accept an offer if the new project is value-enhancing. In the second case, the lender is uninformed with probability $1 - \theta$ and, by assumption, rejects any offer from management.

Informed Lender

When management knows that the lender will be informed, her incentive compatible investment decisions are as follows.

Value-increasing Projects: Intuitively, if management decides to comply when new projects are value-enhancing, she is not going to invest more in the old assets than what is required by the lender. The reason is that she always prefers to invest in the new projects because they are more productive than assets in place and in addition pay private benefits. The solution of management's optimization program is a corner solution and is such that $z^g = z^n$. At date 2, investment generates cash flows of $r^g (1 - z^g)$, management gets private benefits worth $C (1 - z^g)$ and the lender receives the face value d^n . If management does not comply, it makes an offer worth (z'_g, d'_g) where it requests a waiver in order to invest more in the new project than initially agreed, $z'_g < z^n$ and pay the same face value. In fact, management will offer to invest all the proceeds of the debt issue in the new projects, $z'_g = 0$. This new contract, $(0, d^n)$, will be accepted¹⁴ by the lender since the maximum she can gain if she rejects the offer is L^g . At date 2, investment generates cash flows worth $r^g (1)$, management receives the private benefits $C (1)$ and the lender gets the face value d^n .

Value-decreasing New Projects: If management complies when new projects are value-decreasing, she will choose a level of investment in the old assets equal to what the lender requires, z^n , for the same reasons as before. In this case, the lender cannot force liquidation because the covenant has not been breached. Even though at date 2 the lender will own all the revenues produced by the firm, the manager will still receive its private benefits worth $C (1 - z^n)$. In contrast, if management does not comply and the lender is informed, she will force liquidation and earn L^b . Hence, management will never breach the covenant when the lender is informed because it will lose the private benefits, $C (1 - z^b)$. Management's investment decision is then to comply, $z^b = z^n$. At date 2, management receives the private benefits, $C (1 - z^n)$ and the lender gets $R^b (z^n)$.

Uninformed Lender

When the lender does not know whether projects are value-enhancing or decreasing, she will reject any offer and force liquidation. In this case, management always comply to avoid losing its private benefits, $z^b = z^g = z^n$. Given the situations studied above¹⁵, management maximizes the expected value of the firm and of its private benefits $p[\theta (r^g (1) + C (1) - d^n) + (1 - \theta) (r^g (1 - z^n) + C (1 - z^n) - d^n)] + (1 - p) C (1 - z^n)$

subject to the incentive compatible constraints studied above and to the private bondholders' participation constraint $pd^n + (1 - p) [R^b (z^n)] - k \geq \underline{d}$. The first order conditions are:

¹⁴It is assumed that the private lender will not use its information monopoly. See Rajan (1992) for a study of how private debt can be restrictive because of the higher bargaining power of private lenders.

¹⁵When the lender is informed, a separating equilibrium exists where management breaches the covenant and make an offer when the new project is value-enhancing while it decides to comply when the project is value-decreasing. On the other hand, only pooling equilibria are feasible when the lender is uninformed. See the Appendix for a detailed proof.

$$-p(1-\theta)r_z^g(1-z^n) + (1-p)R_z^b(z^n) - (1-\theta p)C_z(1-z^n) = 0 \quad (3)$$

The form of the FOC is the same as before but expectations now depend on the probability of the lender being informed, θ and on the prior beliefs, p . The first term on the RHS is negative because the marginal revenue from the old assets is smaller than the marginal gains from value-enhancing new projects. The second term is positive because the old assets yield always marginally more than value-decreasing projects. Finally, the last term is negative because restrictive covenants reduce management's private benefits. The optimal contract is such that the marginal revenues from restricting investment in value-decreasing projects are equal to the marginal loss from the reduced investment in value-enhancing projects in addition to the marginal loss of private benefits. Finally, denote π^n the borrower's expected profit from private debt. The following obtains:

$$\begin{aligned} \pi^n \equiv & p[\theta(r^g(1) + C(1)) + (1-\theta)(r^g(1-z^n) + C(1-z^n))] \\ & + (1-p)[R^b(z^n) + C(1-z^n)] - k - \underline{d} \end{aligned} \quad (4)$$

Covenant restrictions are renegotiated only when they are breached since the lender is contractually prevented from forcing liquidation if the borrower respects them. In contrast, a short-term private debt contract, by allowing the lender to demand repayment at maturity based on any information, contractible or not, can force the manager to renegotiate. The next section studies a short-term private debt contract which is comparable to a bank short-term debt.

C. Short-Term Private Debt

The short-term debt contract has a specified loan rate d^s to be repaid at date 1. Because the firm has no cash flows at date 1, the lender can demand repayment or roll over the debt at maturity. If the lender demands repayment, then management offers to pay d'' at date 2. In this case, based on her beliefs, the lender either accepts the offer or rejects the offer and liquidate the firm. As before, the investment decision is made before the renegotiation starts and the monitoring technology is such that the lender knows whether projects are value-enhancing or value-decreasing with probability θ at date 1.

When the lender knows the type of the new project, she demands repayment to management if the new project is value-decreasing and rejects any offer thereby forcing liquidation since by assumption, the resulting liquidation value of the firm is greater than any revenues it can produce. In this case the lender gets a payoff of L^b and management does not receive any private benefits. The lender rolls over the debt of the firm if new projects are value-enhancing because investment will generate a cash-flow of $r^g(1-z_g^s)$ which is more than the liquidation value of the firm, L^g , by assumption. In this case, the incentive compatible decision of management is to invest everything in the value-enhancing new projects and nothing in the assets in place ($z_g'' = 0$). The lender will then receive a payoff equal to d^s at $t = 2$, investment

will yield cash flows worth $r^g(1)$ and management will receive the private benefits $C(1)$.

When she is uninformed, the lender rejects any offer and liquidates the firm. In this case, the lender's expected payoff is $pL^g + (1-p)L^b$ and management receives no private benefits. At date 0, the lender will require a loan rate for the short term debt contract such that, $p[\theta d^s + (1-\theta)L^g] + (1-p)L^b = \underline{d} + k$. The borrower's expected benefit from the short-term debt contract, π^s is such that:

$$\pi^s = p\theta(r^g(1) + C(1)) + (1-p)L^b + p(1-\theta)L^g - k - \underline{d}. \quad (5)$$

The previous analysis has highlighted the result that, on the one hand, debt contracts are value-enhancing because they allow monitoring and impose constraints on management. However, on the other hand, debt contracts are value-reducing because they prevent management to invest in value-enhancing projects. In other words, they create a loss of flexibility. The next sections study how the differences in contractual restrictions and maturity between debt contracts affect the choice of an entrenched manager's debt financing.

IV. THE CHOICE OF DEBT CONTRACT

First, consider management's choice between long-term private debt and public debt. Comparing the first order conditions for the publicly and privately placed debt contracts yields the following result.

Result 1

The private debt contract has more stringent covenant restrictions than the public debt contract, $z^n > z^*$. Initial restrictions are, however, selectively relaxed when the firm's credit risk decrease, $\frac{dz^*}{dp} < 0$, $\frac{dz^n}{dp} < 0$.

Proof: see Appendix.

More stringent covenants will reduce the value loss associated with investment in value-decreasing projects. However, debt renegotiation may improve upon covenants by preventing some of the value loss caused by these covenants when new projects are value-enhancing. As the probability of value-enhancing projects increase, the lender will selectively relax the initial restrictions and increase the flexibility of the debt contract.

Denote $\pi_1 \equiv \pi^n - \pi^*$ the difference between the expected total value of the firm and the private benefits associated with each contract:

$$\pi_1 = p[\theta r^g(1) + (1-\theta)r^g(1-z^n) - r^g(1-z^*)] + (1-p)[R^b(z^n) - R^b(z^*)]$$

$$+p\theta [C(1) - C(1 - z^n)] + [C(1 - z^n) - C(1 - z^*)] - k \quad (6)$$

The second term on the RHS of the equation is positive and represents the value gains from the increased restriction to invest in value-decreasing projects. The sign of the first term is ambiguous as it represents the expected value gain or loss when management invests in value-enhancing projects. There will be a value gain when the lender is informed since the manager can renegotiate the covenant restriction and invest as much as possible in value-enhancing projects. However, when the lender is uninformed, management prefers to comply and avoid losing its private benefits through liquidation. In this case, since private debt has more stringent covenants ($z^n > z^*$), there will be a value loss associated with the reduced investment in value-enhancing new projects, or in other words, a loss of flexibility. It is straightforward to realize that private debt monitoring is costly for the borrower and that the better the monitoring technology, the greater the value gains will be, $\frac{d\pi_1}{d\theta} > 0$, because of the greater value gains from private debt when the lender is informed.

Finally, the sign of the last term is ambiguous and represents management's gain or loss of private benefits. Private debt renegotiation in the informed state will enable management to earn more private benefits, but more stringent covenant restrictions result in a higher loss of private benefits. It is important to notice that this term disappears if private benefits are independent of the size of the investment in new projects. In fact, this result states that if private benefits are constant, then management's debt financing decision is not influenced by managerial discretion since it can always retain its control rights under both contracts by complying to the covenant restrictions. In this model, the main difference between public and private debt relates to monitoring and to the more stringent restrictions private debt imposes and the associated value of renegotiating them. There will be no additional private gains from renegotiation for a management team who values control but not size since its private gains remain constant regardless of the amount invested in new projects. This result suggests that compensation policy can play an important role in the choice of debt financing.

The effect of an increase of the ex-ante probability of value-enhancing projects, p on the choice between private and public debt can be obtained by differentiation:

$$\begin{aligned} \frac{d\pi_1}{dp} = & \theta [r^g(1) - r^g(1 - z^n)] + [r^g(1 - z^n) - r^g(1 - z^*)] \\ & - [R^b(z^n) - R^b(z^*)] + \theta [C(1) - C(1 - z^n)] \end{aligned} \quad (7)$$

Recall that the lender selectively relaxes the covenant restrictions when the probability of new value-enhancing projects increase since the optimal covenant restrictions z^n and z^* decrease when p increases. This property can help to show that:

Result 2

When credit risk is low, management prefers public debt to private debt because of the value gains from increased flexibility rather than the private gains from reduced monitoring and restrictions.

When credit risk is high, management prefers private debt to public debt because of the value gains and the private benefits from renegotiating more stringent covenant.

Proof: see Appendix.

When the probability of value-enhancing projects increase, initial covenants are relaxed and both the value gains from renegotiation $[r^g (1) - r^g (1 - z^n)]$ and the costs from more stringent covenant restrictions $[r^g (1 - z^n) - r^g (1 - z^*)]$ are reduced. For firms with investment grade ratings, the value gains from private debt will be negligible and public debt will be preferred. Interestingly, the effect of an increase of p on management's private benefits is similar. In fact, as covenant restrictions are relaxed when p increases, both the gains of private benefits from renegotiation and the private losses associated with more stringent private debt restrictions decrease. They disappear when p is so high that both contracts prescribe no restrictions, $z = 0$. In this case, $\frac{d\pi_1}{dp}$ is equal to zero and public debt is preferred to private debt because of the private monitoring costs, $\pi_1 = -k$.

This result suggests, that when p is high, reduced restrictions and monitoring is less relevant in the manager's choice of public debt since the private benefits are small and decrease when private debt restrictions are relaxed. In contrast, increased flexibility, that is the ability to increase investment in value-enhancing projects because of the less stringent restrictions becomes more significant in the choice of public debt. When p is low, the initial restrictions are increased until $z = 1$. Management will then prefer private debt because the expected value gains and the private gains from renegotiating very stringent covenant restrictions are high. When the maturity of private debt is short, the results obtained above change. The rest of the paper first compares the short-term debt contract with the private long-term debt contract and then with the public long-term debt contract.

In a private long-term debt contract, there is no renegotiation as long as the covenant restrictions are not breached whereas the lender of the short-term debt contract can force renegotiation at the maturity of the debt contract. The difference between the expected total value of the firm and the private benefits when management chooses a short-term private debt rather than a long-term private debt, $\pi_2 = \pi^s - \pi^n$ is such that:

$$\begin{aligned} \pi_2 = & p(1 - \theta) [L^g - r^g (1 - z^n)] + (1 - p) [L^b - R^b (z^n)] \\ & - (1 - p\theta) C (1 - z^n) \end{aligned} \quad (8)$$

The first term is negative and represents the expected costs from the liquidation of the firm when the manager invests in value-enhancing projects. The second term is positive and represents the expected benefits of liquidating the firm when management invests in value-decreasing projects. Finally, the last term is negative and represents the expected loss of private benefits. If management chooses short-term rather than long-term debt, it loses private benefits worth $p(1 - \theta) C(1 - z^n)$ when the lender is uninformed and it has invested in value-enhancing projects. It also loses private benefits worth $(1 - p) C(1 - z^n)$ in all states when it invests in value-decreasing projects. These losses of private benefits occur because, under a long-term debt contract, management always avoids liquidation and the associated loss of private benefits by complying in the uninformed state. When private benefits are ignored, the short-term debt contract is preferred to the long-term debt contract¹⁶, ($\pi_2 > 0$). However, if they are considered, then long-term borrowing can be preferred to the short-term debt contract, ($\pi_2 < 0$), because by complying, the manager can avoid losing them¹⁷.

The effect of an increase in the probability of value-enhancing projects on the total value of the firm and of private benefits is such that:

$$\frac{d\pi_2}{dp} = (1 - \theta) [L^g - r^g (1 - z^n)] + [R^b(z^n) - L^b] + \theta C(1 - z^n) \quad (9)$$

The sign of this expression is ambiguous. The first two terms are negative while the last term is positive and the results obtained earlier do not hold anymore. The effect of private benefits, $\theta C(1 - z^n)$, is positive and increases with p . In contrast with the earlier case, this result states that, although it reduces the attractiveness of the short-term debt contract, the loss of private benefits is reduced when credit risk is low (high p). The intuition is as follows: the increase in the loss of private benefits associated with the loss of flexibility as p increases, $-(1 - \theta) C(1 - z^n)$, is more than compensated by the reduction in the loss of private benefits associated with investment in value-decreasing projects in all states, $C(1 - z^n)$.

Finally, the long-term debt contract with no renegotiation is compared to the short-term debt contract. The difference between the expected benefits to the manager of borrowing short-term rather than signing a long-term debt contract with no renegotiation, $\pi_3 = \pi^s - \pi^*$ is such that:

¹⁶Rewrite equation (7) as $[L(p) - \phi(p)] + p\theta [r^g(1 - z^n) - L^g] > 0$;

where $L(p) \equiv pL^g + (1 - p)L^b$ and $\phi(p) \equiv pr^g(1 - z^n) + (1 - p)R^b(z^n)$.

¹⁷Similarly, Diamond (1991) analyzes debt maturity choice as a trade-off between a borrower's preference for short-term debt due to private information about the future credit rating and liquidity risk. Liquidity risk is the risk that a solvent but illiquid borrower is unable to obtain refinancing. Therefore there is a conflict region due to excessive liquidation by short-term lenders. In this model, the higher θ , the probability of the lender being informed, the lower the conflict region.

$$\begin{aligned} \pi_3 = & p [\theta r^g (1) + (1 - \theta) L^g - r^g (1 - z^*)] + (1 - p) [L^b - R^b (z^*)] \\ & + p\theta C (1) - C (1 - z^*) - k \end{aligned} \quad (10)$$

The second term is positive and represents the value gains from the liquidation of the firm when the manager has invested in value-decreasing projects. The sign of the first and the last terms are ambiguous. The first-term represents the expected value gain or loss when the manager invests in value-enhancing new projects, where expectations depend on the probability of the lender being informed, θ as well as p , the probability of value-enhancing projects. The last represents the manager's gains or losses of private benefits. Note that as before, better monitoring technology increases the value gains from a short-term bank debt, $\frac{d\pi_3}{d\theta} > 0$. Furthermore, when the private benefits are constant, that is the manager values control but not size, this expression is equal to $-(1 - p\theta) C$ and is similar to the loss of private benefits for a manager who chooses short-term debt rather than private long-term debt. In other terms, when the manager values control but not size the net loss of private benefits from a short-term debt is the same, whether public or private (long-term) debt is chosen.

The effect of the borrower's type on the ex-ante profit from borrowing short-term rather than long-term is

$$\frac{d\pi_3}{dp} = [\theta r^g (1) + (1 - \theta) L^g - r^g (1 - z^*)] - [L^b - R^b (z^*)] + \theta C (1) \quad (11)$$

The sign of this expression is ambiguous. However, since the initial covenant is relaxed when the probability of value-enhancing projects increase, the first two terms become negative when p is large. In contrast, the effect of private benefits, $\theta C (1)$, is positive and invariant to changes in credit risk, p . If private benefits are large enough, the expression given by $\frac{d\pi_3}{dp}$ can be positive. As earlier, the loss of private benefits reduces the attractiveness of short-term debt, but such a loss is reduced when credit risk is low.

V. CONCLUSIONS

This paper extends the literature on the choice between private and public debt. It studies the debt issuance decision of an entrenched manager when debt contracts have different maturities and covenant restrictions. Its main findings show that although managers gain private benefits when they issue public debt because of reduced monitoring and constraints, such control rents decrease with credit risk because initial covenant restrictions are selectively relaxed by private borrowers. This implies that, when credit risk is low, managers issue public debt because of the increased flexibility this type of financing provides rather than the benefits from increased managerial discretion. Flexibility is defined here, as the increased ability to invest in value-enhancing projects. In addition, the model shows that when private benefits are independent from the size of investment, that is when the managers value control but not size, private benefits are irrelevant in the choice between public and private debt. This result suggests that compensation policy can play a role in giving incentives to managers to choose a debt financing policy which

is in the best interest of shareholders. Finally, the paper shows that excessive liquidation and the associated loss of private benefits can lead the managers to choose public debt rather than short-term private debt.

One interesting extension of the model would be to consider the choice of a mix of private and public debt. In practice, firms issue both types of debt and an analysis of such a choice, as in Diamond (1991) and Hart and Moore (1995), could lead to capital structure models that take into account most contractual features of debt. Finally, the model's empirical predictions that managerial entrenchment influences the type of debt financing could be tested and lead to a better understanding of the association between managerial entrenchment and capital structure.

PROOF OF RESULT 1

First, it is shown that the long-term debt with renegotiation has more stringent covenant restrictions than the long-term debt with no renegotiation, $z^n > z^*$.

Denote the first order conditions for the long-term debt contract with no renegotiation $V^*(z)$ so that at the optimum, they can be rewritten as $V^*(z^*) = 0$. Similarly, denote the first order conditions for the long-term debt with renegotiation $V^n(z)$ so that $V^n(z^n) = 0$ at the optimum. By concavity, V^* and V^n are both downward sloping functions that intersect the horizontal axis at z^* and z^n , respectively.

Furthermore $V^n(z) > V^*(z)$ since

$$V^n(z) - V^*(z) = -\theta p [-r_z^g(1-z) - C_z(1-z)] > 0, \forall z.$$

It follows that $z^n > z^*$ should hold.

Second, it is shown that the initial covenants are relaxed when the ex-ante probability of a value-enhancing project, p , increases, $\frac{dz^n}{dp} > 0$ and $\frac{dz^*}{dp} > 0$. Total differentiation of the first order conditions, $V^*(z^*) = 0$ yields:

$$\frac{dz^*}{dp} = \frac{r_z^g(1-z^*) + R_z^b(z^*)}{pr_{zz}^g(1-z^*) + (1-p)R_{zz}^b(z^*) + C_{zz}(1-z^*)}$$

Since the numerator is positive and the denominator is negative by concavity of the revenue and private benefits functions, $\frac{dz^*}{dp} < 0$. Using the same approach, it is straightforward to show that $\frac{dz^n}{dp} < 0$ holds. \square

PROOF OF RESULT 2

It is shown that, if π_1 is quasiconcave for all values of p where both $0 < z^n(p) < 1$ and $0 < z^*(p) < 1$, then there exists some $p' \in [p^a, p^d]$ such that:

- (i) $\frac{d\pi_1}{dp} > 0$ for $0 < p < p'$
- (ii) $\frac{d\pi_1}{dp} < 0$ for $p' < p < p^d$
- (iii) $\frac{d\pi_1}{dp} = 0$ for $p^d \leq p \leq 1$

The idea of the proof is to study the solutions at very high and low levels of p , where the contracts yield corner solutions¹⁸.

Lemma 1

If for some value of p , $0 < z^n(p) < 1$ and $0 < z^*(p) < 1$, then there exist p^a, p^b, p^c, p^d , for which the following hold:

- (i) $\frac{d\pi_1}{dp} > 0, 0 < p < p^a,$
- (ii) $\frac{d\pi_1}{dp} < 0, p^c < p < p^d,$
- (iii) $\frac{d\pi_1}{dp} = 0, p^d \leq p \leq 1,$ and
- (iv) $\frac{d^2\pi_1}{dp^2} \leq 0, p < p^b.$

Proof:

First note that $\pi_1(z^n(p), p)$ is a continuous function of p and define p^a as $\inf \{p : z^* < 1\}$, p^b as $\inf \{p : z^n < 1 \text{ and } z^* < 1\}$, p^c as $\sup \{p : z^n > 0 \text{ and } z^* > 0\}$ and finally p^d as $\sup \{p : z^n > 0\}$. For $p \in (p^b, p^b)$, z^n and z^* are interior solutions. Second, note that $\frac{d\pi_1}{dp}$ takes the following values:

For $p \geq p^c$, $z^* = 0$ and

$$\begin{aligned} \frac{d\pi_1(p)}{dp} = & -(1 - \theta) [r^g(1) - r^g(1 - z^n)] - [R^b(z^n) - R^b(0)] \\ & + \theta [C(1) - C(1 - z^n)] \end{aligned}$$

¹⁸See Berlin and Mester (1992) for a similar approach.

Note that if private benefits are ignored, then the last term vanishes and $\frac{d\pi_1(p)}{dp} < 0$ since the first two terms are negative. Note also that the effect of private benefits, $\theta [C(1) - C(1 - z^n)]$ is positive and depends on the more stringent covenant restrictions of the long-term debt contract with renegotiation z^n .

This effect, however, is decreasing with p because $\theta C_z (1 - z^n) \frac{dz^n}{dp} < 0$ while the effects of increased flexibility is increasing since $- [(1 - \theta) r_z^g (1 - z^n) + R_z^b (z^n)] \frac{dz^n}{dp} > 0$.

Furthermore, if p increases further, $p^d \leq p \leq 1$, then both contracts prescribe no covenant restrictions, $z^n = z^* = 0$. In this case, no renegotiation will occur and $\pi_1 = -k$, and $\frac{d\pi_1(p)}{dp} = 0$. Assume that $\frac{d\pi_1(p)}{dp}$ is quasiconcave over the interval $p^d \leq p \leq 1$.

For $p \leq p^a$, $z^n = z^* = 1$,

$$\frac{d\pi_1(p)}{dp} = \theta [r^g(1) - r^g(0)] + \theta [C(1) - C(0)] - k$$

which is positive and nonincreasing.

Finally for all p such that $p^a < p \leq p^b$, $z^n = 1$ and z^* has an interior solution, and

$$\frac{d\pi_1(p)}{dp} = \theta r^g(1) + (1 - \theta) r^g(0) - r^g(1 - z^*) - [R^b(1) - R^b(z^*)] + \theta [C(1) - C(0)]$$

Differentiating this expression with respect to p gives:

$$\frac{d^2\pi_1(p)}{dp^2} = [r_z^g(1 - z^*) + R_z^b(z^*)] \frac{dz^*}{dp}$$

which is negative. Thus, π_1 is concave for all $p \leq p^b$.

Lemma 2

By Lemma 1, both $\pi_1(p)$ and $\frac{d\pi_1(p)}{dp}$ are positive at p^a and $\pi_1(p)$ is negative at p^d while $\frac{d\pi_1(p)}{dp}$ is equal to zero at p^d . Quasiconcavity on the interval $[p^b, p^d]$ guarantees that $\frac{d\pi_1(p)}{dp}$ cannot be equal to zero for more than one p on this interval.

Lemma 1 and 2 complete the proof. \square

THE LONG TERM PRIVATE DEBT CONTRACT

Fully Informed Lender

See Figure 2. Consider the manager's choice when the project is value-decreasing. If the manager chooses to comply, she invests z^n in the old assets. If she does not comply, she makes an offer (d', z') to the lender. In this case, the lender, if she accepts, receives a payoff equal to $R^b(z')$ compared to L^b if she rejects. So the lender rejects the offer since $R^b(z') < L^b$. Given that the lender will reject her offer, the manager decides to comply because she can earn the private benefits $C(1 - z^n)$ rather than a payoff of zero if she makes an offer. So there is a unique equilibrium involving the following strategies:

{Manager complies when the project is value-decreasing ; Lender rejects}.

Next, consider the manager's choice when the project is value-enhancing. If the manager makes an offer (z', d') , then the lender gets L^g if she rejects the offer. If she accepts the offer she gets d' . So the lender accepts the offer if $d' \geq L^g$.

Suppose the lender accepts the offer. In this case, the manager will comply if $r^g(1 - z^n) + C(1 - z^n) - d^n > r^g(1 - z') + C(1 - z') - d'$.

So if $r^g(1 - z^n) + C(1 - z^n) - d^n < r^g(1 - z') + C(1 - z') - d'$ and $d' > L^g$, then the firm makes the offer (z', d') which the lender accepts. In this case, the manager would receive $r^g(1 - z') - d' + C(1 - z')$ and the lender will get d' .

Assume that if the lender receives an offer to grant a waiver but still receive the face value of the debt, she will accept such an offer. In this case, the manager's best offer is $z' = 0$ and $d' = d^n$. So if she knows that the lender will accept her offer, then the manager will indeed want to make an offer. The manager will make that offer if her payoff is higher than the payoff she gets if she complies i.e.

$$r^g(1) + C(1) - d^n > r^g(1 - z^n) + C(1 - z^n) - d^n]$$

and the lender will accept. Therefore, one Nash equilibrium involves:

{Manager chooses $z = 0$ when the project is value-enhancing; Manager makes an offer $(d', z') = (d^n, 0)$ when the project is value-enhancing; Lender accepts offer}.

Suppose now that the lender rejects the offer, that is $d' < L^g$. In this case, the manager loses her control rents and earns a zero payoff if she does not comply. Therefore, she decides to comply since $[r^g(1 - z^n) + C(1 - z^n) - d^n] > 0$. So if the lender rejects the manager's offer, the manager complies. There is another Nash equilibrium where

{Manager complies when the project is value-enhancing ; Lender rejects offer}.

However in this case, the lender's node is never reached. Whenever the lender's node is reached, it is optimal for the lender to accept the offer. So, the unique sequential equilibrium is:

{Manager chooses $z = 0$ when the project is value-enhancing; Manager offers $(d', z') = (d^n, 0)$ when the project is value-enhancing; Lender accepts offer}.

Uninformed Lender

Pooling Equilibrium

See Figure 3. If the managers do not comply, let z_b , be their offer when the project is value decreasing and z_g when it is value-enhancing. First check the existence of a pooling equilibrium. Both managers make the same offer (d', z') and when her information set is reached, the lender assigns a probability q to a value-enhancing project and $1 - q$ to a value-decreasing project. If the lender accepts, then the maximum she can receive is

$$(1 - q) R^b(z') + qr^g(1 - z') \quad (*)$$

If she rejects the offer, the lender receives

$$(1 - q) L^b + qL^g.$$

So if

$$(1 - q) R^b(z') + qr^g(1 - z') < (1 - q) L^b + qL^g$$

the lender will reject the manager's offer. Suppose the lender's belief q is such that she rejects the offer, then the best response for the managers of both firms is to comply since $C(1 - z^n) > 0$ and $(R(z^n) + r^g(1 - z^n) - d^n) + C(1 - z^n) > 0$. In this case, the lender's information set is never reached and Bayes' rule need not to be applied. There is a continuum of sequential equilibria:

{Manager complies when the project is value-decreasing, Manager complies when the project is value-enhancing, Lender rejects offer, q satisfies $(*)$ }

Separating Equilibrium

See Figure 3. This section checks for the existence of a separating equilibrium. Assume that the manager makes an offer (d'_b, z'_b) when the project is value-decreasing and (d'_g, z'_g) when the project is value-enhancing. Suppose that if the lender is indifferent between liquidating and not liquidating, she will choose not to liquidate. So, if the lender receives the offer (d'_g, z'_g) ,

she would place a probability 1 that the project is value-enhancing and would accept the offer as long as $d'_g \geq L^g$. The best action the manager can take when the project is value-enhancing is to offer a new contract $z'_g = 0$ and $d'_g = L^g$ since it would maximize her payoff giving her $r^g(1) - L^g + C(1)$. In contrast, if the lender receives the offer (d'_b, z'_b) , she would place a probability 1 that the project is value-decreasing and would reject any offer since, $L^b > R(z'_b) + r^b(1 - z'_b)$. The manager would then comply if the project is value-decreasing since she would get a payoff of zero if she makes an offer rather than $C(1 - z^n) > 0$. So, there can be no separating equilibrium. \square

Figure 1. The Model

<u>Information</u>	<u>Date</u>	<u>Action</u>
The manager and the lender have prior beliefs p about the type of the firm	0	Contract (d, z) is signed Lender invests k in monitoring apparatus
Borrower receives signal about the type of the firm and knows whether the lender will be informed or not	1	Borrower invests z in old assets and $1-z$ in new project Borrower may offer a new contract (z', d') if renegotiation is possible
Lender learns borrower's type with probability θ		Lender may accept and waive the covenant or refuse and liquidate the firm
All uncertainty is resolved	2	Payoffs are realized

Figure 2. Long-Term Debt with Renegotiation: Fully Informed Lender

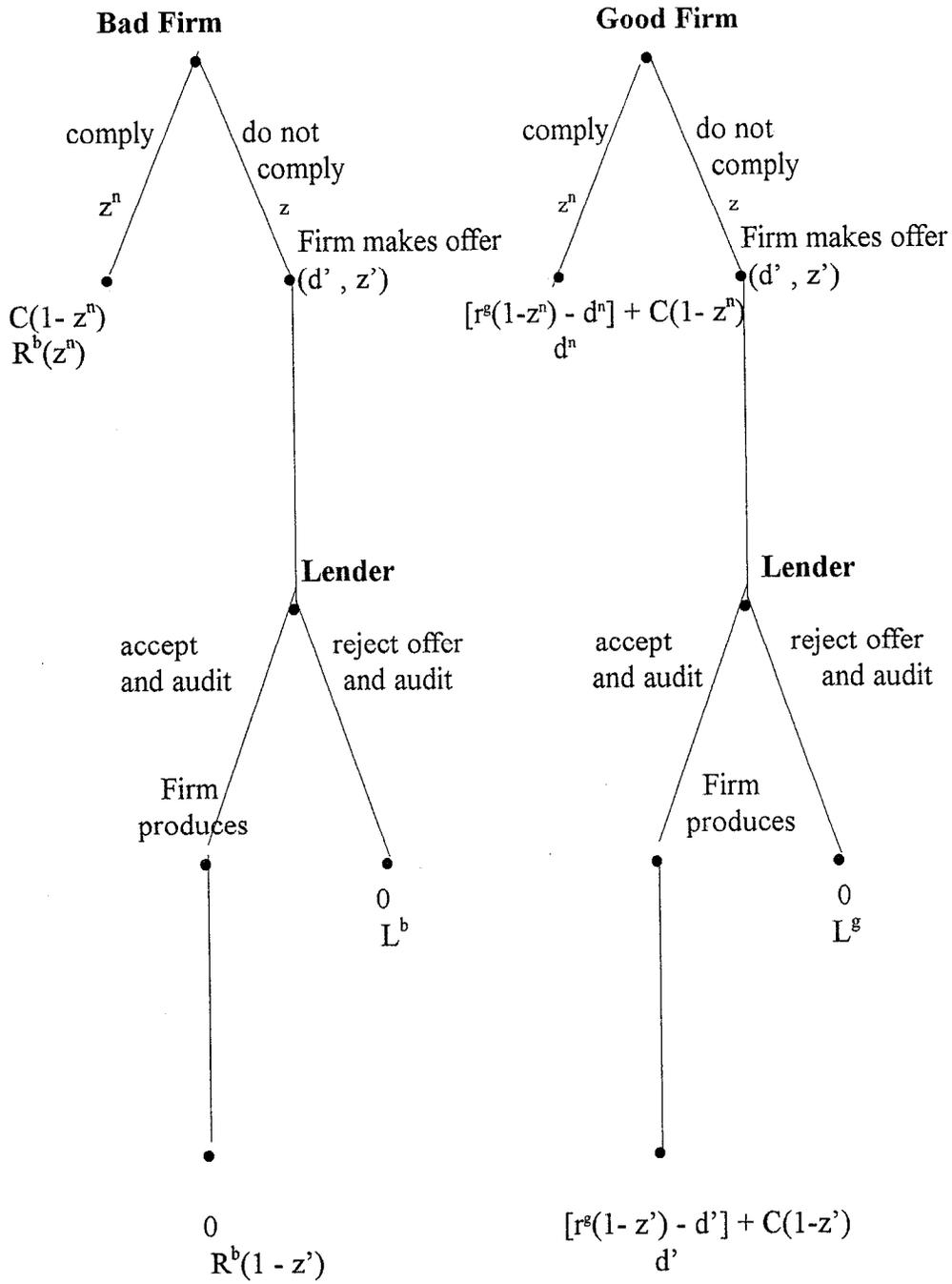
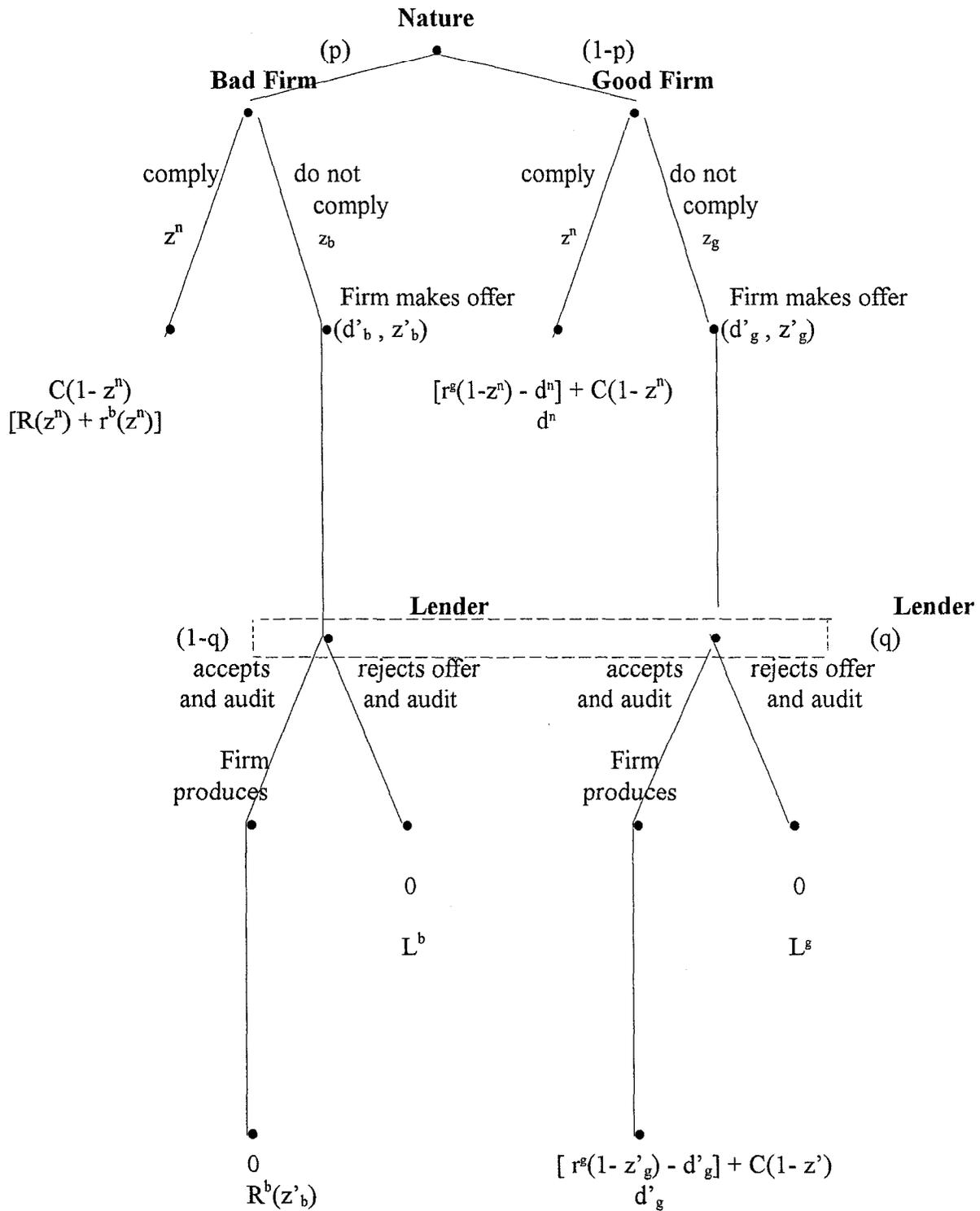


Figure 3. Long-Term Debt with Renegotiation: Uninformed Lender



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