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Specific Human Capital, Credible Commitment and Optimal Capital Structure

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In this paper, we show that although ex ante equityholders would like to adopt an optimal displacement and operating policy, they may not have incentives to implement such a policy ex post when the manager acquires firm-specific human capital and becomes indispensable to the firm's continued operation. An optimal mix of debt and equity can serve as a commitment device in disciplining the manager.

Key Words: Capital structure; Bankruptcy; Specific human capital; Credible commitment; Managerial incentive.
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1. INTRODUCTION

Employees of a firm often acquire (accumulate) firm-specific human capital during their tenure with the firm. Its implications have been extensively investigated in labor economics (e.g., Jovanovic, 1979; Felli and Harris, 1996), but not in financial economics. In this paper, we study an implication of firm-specific managerial human capital for the optimal choice of a firm's capital structure (i.e., debt-equity ratio).

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The question of optimal capital structure has puzzled economists for decades since the time of Modigliani and Miller's famous irrelevance theorem, which implies that capital structure is irrelevant in the absence of transaction costs, taxes and asymmetric information. Efforts have been made to relax the theorem's assumptions in order to explain the real-word trade-offs between debt, equity or other financial instruments (see Harris and Raviv (1991) for a comprehensive survey).

One branch of research, following the seminal work by Jensen and Meckling (1976), focuses on the agency costs of corporate finance. Agency costs arise from conflicts of interest between investors and managers and between shareholders and creditors. The use of debt limits firms' free cash flows that may enable managers to engage in empire building activities (Jensen, 1986; Stulz, 1990), or, by giving debtholders the option to force bankruptcy in the event of a poor performance, imposes a personal cost on managers if they do not exert adequate efforts or enhances efficiencies in firms' operating decisions (Grossman and Hart, 1982; Harris and Raviv, 1990; Chang, 1992). The use of debt also has its costs such as the costs associated with bankruptcy and excessive risk-taking. Optimal capital structure is chosen to trade off the benefits and the costs of debt.

There are two problems with these agency models. First, why use a costly mechanism of bankruptcy to discipline the manager when equityholders in principle have the power to simply fire the manager if the firm performs poorly? Second, what prevents equityholders from doing what debtholders can do? For example, why can't equityholders force the firm into bankruptcy when the firm's income or the dividend payout is low?

In this paper, we show that although ex ante equityholders would like to adopt an optimal displacement and operating policy, they may not have incentives to implement such a policy ex post when the manager acquires firm-specific human capital and becomes indispensable to the firm's continued operation. However, an optimal mix of debt and equity can serve as a commitment device in disciplining the manager.

More specifically, we consider a two period model. In the first period, the manager exerts an effort which stochastically determines the first-period income and the "quality" of the firm. In the second period, the firm has three operating choices: it may continue its business as usual; it can also be liquidated; or it can reorganize. The second-period income depends on the firm's quality and the operating choice. If the firm's quality is good, continuation is most efficient; and if the quality is poor, the firm should be reorganized. The manager dislikes displacement, liquidation or reorganization as he enjoys a private benefit from staying in power and running the business as usual.

The manager acquires some firm-specific human capital in the first period that is important to the firm's continued operation.[1] We assume that without the manager's cooperative participation, the firm can only be liquidated. Thus, in the case of bad quality, the manager, given the bargaining power derived from his specific human capital, may insist on continuation and threaten to quit if his demand is rejected. Because equityholders' payoff depends more on the upper tail of the firm's random income, they prefer continuation over liquidation, which typically yields a safer but lower return. When they are in control of the firm, they are likely to give in to the manager's demand for continuation to avoid liquidation. This explains why equityholders are often passive in intervening in management. If equityholders are always in control of the firm's operation, the manager would be able to continue the business as usual regardless of his work effort. This in turn weakens his incentives to work hard in the first period.

On the other hand, because debtholders' payoff relies more on the lower tail of the firm's income, they are more conservative with respect to taking risk than equityholders and hence may prefer a safer choice of liquidation over the riskier continuation. Thus, when the firm defaults on debt and debtholders take control, they may have incentives to force liquidation if the manager insists on continuation. Knowing this, the manager would give in and propose reorganization, which is the efficient outcome and, for the manager, better than liquidation. Moreover, the possibility of liquidation forced by debtholders gives the manager incentives to work hard ex ante to avoid default and bad quality. In other words, using debt can help to improve both ex ante work incentives and ex post operating efficiencies. However, too much debt would make debtholders' payoff increasingly rely on the upper tail of the firm's income and move debtholders' incentives to liquidate a bad quality firm closer to those of equityholders.

The paper is related to the work by Aghion and Bolton (1992), who are the first to adopt the control rights approach to capital structure. Employing the incomplete contract framework (Hart, 1995), they model a bilateral financing situation with one penniless entrepreneur and a wealthy investor and stress the control rights aspect of debt and equity. They provide conditions that give rise to either an equity contract or an debt contract. However, their model does not explain the co-existence of both debt and equity.

Dewatripont and Tirole (1994) show the co-existence of both debt and equity by also using the idea that the difference in equityholders' and debtholders' payoff functions determines the difference in their incentives to intervene in management. However, they only consider two ex post oper-

[1]Indeed, Berkovitch et al. (2000) note that the market values of equity and debt decrease if the manager is replaced and that the expected cash flow of firms that retain their managers exceeds that of firms that replace their managers.

ating possibilities, i.e., continuation and liquidation, and ignore the possibility of reorganization. In reality, reorganization is very common. Chapter 11 bankruptcy is specifically used to accommodate this possibility. Moreover, they do not explicitly consider the possibility that the manager may acquire firm-specific human capital that gives him substantial bargaining power over the ex post operating choice.

The implication of firm-specific managerial human capital for the optimal use of debt is also studied by Jaggia and Thakor (1994) and Hart and Moore (1994). Jaggia and Thakor (1994) identify a cost of debt finance in a situation where firm-specific human capital is costly to acquire. In our paper, specific human capital is acquired by the manager through work at no cost. Their idea is the following. A long-term wage contract is needed to provide incentives for the manager to invest in firm-specific human capital. High leverage increases the possibility of bankruptcy and hence of the early termination of the contract. As the manager rationally anticipates the contractual consequence of bankruptcy, leverage worsens his incentives for human capital investment. This cost provides a counterbalance to the tax shield benefit of debt and leads to an optimal capital structure. Hart and Moore (1994) consider a situation where an entrepreneur needs outside finance for his project but cannot commit not to withdraw his specific human capital from the project. In their model, the manager's specific human capital is given. This is similar to our assumption of costless acquisition of human capital. But their focus is on the optimal maturity structure of debt.

The rest of the paper is organized as follows. Section 2 presents the model. Section 3 shows the inefficiency of all-equity financing and discusses the role of debt in *ex post* operating decisions. Section 4 considers the role of debt in improving ex ante managerial incentives and discusses an empirical implication of the model. Section 5 concludes the paper by summarizing the analysis.

2. THE MODEL

Consider a firm that operates for two periods. In period 1, the manager exerts an effort $e \epsilon [\underline{e}, \overline{e}]$ to, for example, identify a project. This effort stochastically determines the firm's quality, denoted as q, which takes two values: 0 or 1. If $q = 1$, we say the effort is successful; if $q = 0$, the effort is a failure. Let $p(e) \in (0, 1)$ denote the probability that an effort e is successful. Thus $1 - p(e)$ is the probability that the effort fails. We assume $p(e)$ is twice differentiable and strictly increasing and strictly concave in e. At the end of the period, an income x_1 is realized and is stochastically dependent on q.

In the second period, the firm may continue its current operation, undergo a major reorganization, or simply be liquidated. The second-period income x_2 depends both on the firm's quality q and on which of the three actions (continuation, reorganization or liquidation) is taken.

The first-period income x_1 and, if the firm continues its operation as usual, the second-period income x_2 are distributed according to a cumulative distribution function, $F_c(x|q)$, over $[0, \overline{x}]$. The corresponding density function is $f_c(x|q)$. We further assume that the manager acquires some firm-specific human capital at no cost in the first period that makes him indispensable to the firm's continued operation and, in the absence of the manager's cooperation, the firm has to be liquidated. Let $F_l(x|q)$ denote the cumulative distribution function of x_2 if the firm is liquidated. The corresponding density function is $f_l(x|q)$. If the firm is reorganized in the second period, it yields an uncertain income distributed according to a cumulative distribution function, $F_r(x|q)$, over $[0, \overline{x}]$. The corresponding density function is $f_r(x|q)$. All cumulative distribution functions are assumed to be twice differentiable and all corresponding density functions bell-shaped.

Let $V(q)$, $R(q)$ and $L(q)$ denote, respectively, the expected value of the second-period income x_2 for each value of q if the firm is continued, reorganized and liquidated. Naturally, we assume $V(1) > V(0)$, $R(1) > R(0)$, and $L(1) > L(0)$. In addition, we assume $V(q) > L(q)$ for $q \in \{0, 1\}$. In other words, continuation always yields, on average, a higher income than liquidation.

Moreover, we make the following assumption about the above cumulative distribution functions.

ASSUMPTION 1. *In the sense of first-order stochastic dominance, $F_c(x|1)$ strictly dominates $F_r(x|1)$ and $F_l(x|1)$; and $F_r(x|0)$ strictly dominates $F_c(x|0)$ and $F_l(x|0)$.*

This assumption implies that when the initial effort is successful, continuation is a more efficient operating choice than both reorganization and liquidation; and that when the initial effort is a failure, reorganization is more efficient than both continuation and liquidation.

The manager's disutility from an effort e is $C(e)$, where $C(\ )$ is twice differentiable, strictly increasing and strictly convex. In addition, the manager enjoys some private benefits W if he stays in power and continues to run the business as usual in the second period. He will lose a substantial portion of the benefits if a reorganization has to be carried out and all of the benefits if he is fired or the firm is liquidated. We use rW, where $r < 1$, to denote his private benefits in the event of reorganization.

As in any agency model, the manager as an agent for the firm's owners needs to be motivated to both make an adequate effort *ex ante* and adopt an optimal operating choice *ex post*. It is assumed as usual that the manager's effort is not observable; hence the incentive scheme cannot be directly based on it. In the spirit of the incomplete contract approach (Hart,1995), we assume that the quality q is not verifiable and hence cannot be contracted on. For simplicity, we assume that an income-based managerial compensation scheme is absent. It may be because firm income is subject to the manager's manipulation so that an income-based monetary compensation is not desirable, or it may be too costly to use such a measure to motivate the manager (Hart, 1995). We show how an appropriately-designed capital structure can act as an incentive device.

To avoid the complication of the issue of security design, we consider only standard equity (common stock) and standard short-term debt. A short-term debt in this model is a debt contract that entitles its holders to a fixed payment, D, at the end of period one for some initial amount of debt. The initial face value of the debt is irrelevant in this model. If $D > x_1$, the debtholders are granted control rights over the decision on the second-period operation. Otherwise, the equityholders, in principle, have the control rights. At the end of period one, the securityholders in control have the final say over whether the firm should continue its current operation, be reorganized or be liquidated. The value of the equity shares of the firm is equal to the market value of the firm minus the market value of the debt.

We consider a simple noncooperative extensive-form game for the ex post bargaining over the second period operation. The rule of the game is as follows. At the end of the first period, the manager first proposes an operation of his choice and, if accepted by the controlling securityholders, can carry it out in the second period. If the proposal is rejected, the firm is then liquidated. This game form is consistent with the normal procedure of Chapter 11 bankruptcy. That the manager can make a take-it-or-leave-it offer reflects his substantial bargaining power gained from his specific human capital.

All parties are assumed to be risk-neutral and the discount rate is 0.

3. THE ROLE OF DEBT IN EX POST OPERATING DECISIONS

Let us show first why an all-equity capital structure is ineffective in both disciplining the manager and implementing *ex post* efficient operation decisions.

If the firm has an all-equity financing mode, the equityholders would be better off if the manager implements a major reorganization when $q = 0$.

The manager, however, would like to propose continuation. Since liquidation yields a lower expected income than continuation, the equityholders would have to accept such a proposal and let the manager continue the business as usual. Knowing that the equityholders will back down, the manager has no incentive to propose reorganization. When $q = 1$, continuation is good both for the equityholders and the manager. Therefore, regardless of the initial effort, the manager can always stay in power by insisting on continuation, and hence has no incentive to exert any effort in the first period. This result is summarized in the following proposition.

PROPOSITION 1. *In the case of all-equity financing, the second-period operation is always continuation regardless of the outcome of the initial effort. The manager exerts the lowest effort , $\underline{e}$, in the first period.*

This proposition implies that the equityholders are not able to exercise effectively the control rights they are entitled to. They cannot credibly commit to liquidate the firm if the initial effort has failed. The qualitative result does not depend on the assumption that the manager has effectively all the interim bargaining power. As the manager can acquire some specific human capital, he gains some bargaining power from it. It is likely that the equityholders will concede. Given the fact that there are too large a number of small equityholders, it is reasonable to assume that cooperative bargaining with possible side payments is not possible between the two parties.

In the rest of the section, we show how incorporating debt can increase the probability of an efficient *ex post* operating decision.

Suppose at the start of period one an amount of debt is issued and it is due at the end of the period with a face value of D . The debtholders are entitled to a promised fixed payment D and are given control rights upon default, i.e., when $x_1 < D$. Upon default, the debtholders' payoff to continuation is

$$\begin{aligned} V_B(D, q, x_1) &\equiv \int_{x_1+x\geq D} D f_c(x|q)dx + \int_{x_1+x<D} (x_1 + x) f_c(x|q)dx \\ &= D - \int_0^{D-x_1} F_c(x|q)dx. \end{aligned} \tag{1}$$

Similarly, the debtholders' payoff to reorganization is

$$R_B(D, q, x_1) = D - \int_0^{D-x_1} F_r(x|q)dx; \tag{2}$$

and their payoff to liquidation is

$$L_B(D, q, x_1) = D - \int_0^{D-x_1} F_l(x|q)dx. \tag{3}$$

Because of the difference in payoff structure between equityholders and debtholders, they may have different preference over the second-period operating choices. Specifically, the debtholders' payoff relies more on the lower part of the income distribution; hence they may prefer liquidation to continuation even if the latter yields higher expected income. This is because, typically, liquidation is safer than continuation after a failed initial effort. In other words, while continuation has a fatter upper tail, it also has a fatter lower tail. To sharpen the result, we follow Dewatripont and Tirole (1994) to formalize the above intuition in the following assumption.

ASSUMPTION 2. *There exists an $\tilde{x} > 0$, such that $F_c(x|0) \geq F_l(x|0)$ for all $x \leq \tilde{x}$ and $F_c(x|0) < F_l(x|0)$ for all $x > \tilde{x}$.*

Because $V(0) > L(0)$ implies $\int_0^{\overline{x}} F_c(x|0)dx < \int_0^{\overline{x}} F_l(x|0)dx$, by the mean-value theorem, there exists an $\widehat{x} > \tilde{x}$, such that

$$\int_0^{\widehat{x}} [F_c(x|0) - F_l(x|0)]dx = 0. \tag{4}$$

Assumption 2 implies that, when the debtholders have control rights after the initial effort fails, they may prefer to liquidate the firm if the manager proposes continuation. The following proposition confirms this intuition.

PROPOSITION 2. *If the initial effort fails and $x_1 < D < x_1 + \widehat{x}$, then the debtholders take control and the optimal operating choice is adopted in period two.*

Proof. If $q = 1$, continuation will be accepted by either type of securityholders because it strictly dominates the other two choices. Suppose $q = 0$. The debtholders take control upon default, i.e., when $D > x_1$. Their net gains from liquidation instead of continuation are

$$L_B(D, 0, x_1) - V_B(D, 0, x_1) = \int_0^{D-x_1} [F_c(x|0) - F_l(x|0)]dx. \tag{5}$$

Therefore, if $D - x_1 < \widehat{x}$, then $L_B(D, 0, x_1) > V_B(D, 0, x_1)$, and if $D - x_1 \geq \widehat{x}$, then $L_B(D, 0, x_1) \leq V_B(D, 0, x_1)$. This implies that when $D < x_1 + \widehat{x}$,

the debtholders prefer to liquidate the firm rather than let the manager continue. Knowing this, the manager should propose reorganization. This will be accepted by the debtholders because reorganization strictly dominates liquidation. ∎

Proposition 2 implies that debt can play a role in disciplining the manager. Low first-period income and bad quality of the firm resulting from a low effort may lead to liquidation if the manager proposes continuation. Because the manager enjoys some private benefits from reorganization, he will have to propose reorganization. Therefore, the use of debt improves *ex post* operating decisions.

4. THE ROLE OF DEBT IN IMPROVING EX ANTE INCENTIVES

From the last section, we know that if $q = 1$, continuation will be accepted by either type of securityholders because it strictly dominates the other two choices. In the absence of default, continuation will be proposed by the manager and accepted by the equityholders if $q = 0$. Upon default, however, the manager, in the case where $q = 0$ and $x_1 < D < x_1 + \widehat{x}$, has to propose reorganization. This is because the debtholders who will have control rights in the event of default will liquidate the firm if the manager proposes to continue.

The optimal capital structure should maximize the value of the firm taking into account the fact that upon default an optimal operating choice will be followed when $D < x_1 + \widehat{x}$. The value of the firm consists of (1) the first-period income, $V(q)$, (2) in the absence of default, second-period income $V(q)$, (3) in the case of default, $R(q)$ when $q = 0$ and $D < x_1 + \widehat{x}$, and $V(q)$ otherwise. Note that the condition $x_1 < D < x_1 + \widehat{x}$ is equivalent to $D - \widehat{x} < x_1 < D$. Thus, given the manager's effort level e and the debt level D, the expected value of the firm is

$$\begin{aligned} p(e)V(1) \;+\; & [1-p(e)]V(0) + p(e)V(1) \\ +\; & [1-p(e)] \int_{D-\widehat{x}}^{D} R(0) f_c(x|0)dx \\ +\; & [1-p(e)]V(0)[1 - \int_{D-\widehat{x}}^{D} f_c(x|0)dx]. \end{aligned} \tag{6}$$

After some manipulation, this becomes

$$2[p(e)V(1) \;+\; (1-p(e))V(0)] \tag{7}$$

$$+\; (1-p(e))[R(0) - V(0)][F_c(D|0) - F_c(D-\widehat{x}|0)]. \tag{8}$$

Given a debt level D, the manager's maximization problem is as follows:

$$\max_{\{e\}} \quad W(1 - r[1 - p(e)][F_c(D|0) - F_c(D - \widehat{x}|0)]) - C(e). \tag{9}$$

The first-order condition is

$$rW[F_c(D|0) - F_c(D - \widehat{x}|0)]p'(e) = C'(e). \tag{10}$$

Using the first-order approach, the optimal debt level is chosen to maximize (7) over D and e subject to (10).

PROPOSITION 3. *There exists a unique D^* that solves the value maximization problem, and D^* maximizes $F_c(D|0) - F_c(D - \widehat{x}|0)$.*

Proof. Define $Q(D) \equiv r[F_c(D|0) - F_c(D - \widehat{x}|0)]$. Equation (10) becomes $WQp'(e) = C'(e)$. By the implicit function theorem, there exists a unique differentiable function $e(Q)$ such that

$$WQp'[e(Q)] = C'[e(Q)]. \tag{11}$$

Differentiating (11) with respect to Q, we have

$$e'(Q)[C''(e) - WQp''(e)] = Wp'(e). \tag{12}$$

Since $C''(e) > 0$, $p''(e) < 0$, $p'(e) > 0$, we have $e'(Q) > 0$. Define $\overline{Q} \equiv \max_D Q(D)$. We show $\{e(\overline{Q}), \overline{Q}\}$ is the solution to the value maximization problem:

$$\begin{aligned} \max_Q \Pi(Q) \equiv 2\{p[e(Q)]V(1) \ &+ \ (1 - p[e(Q)])V(0)\} \\ &+ \ (1 - p[e(Q)])[R(0) - V(0)]Q. \end{aligned} \tag{13}$$

After differentiating $\Pi(Q)$ with respect to Q and with some manipulation, we have

$$\begin{aligned} d\Pi(Q)/dQ \ &= \ p'e'(2V(1) - 2V(0) - Q[R(0) - V(0)]) + (1 - p)[R(0) - V(0)] \\ &> \ p'e'(2V(1) - 2V(0) - Q[R(0) - V(0)]) \\ &> \ p'e'[2V(1) - V(0) - R(0)] \\ &> \ 0. \end{aligned} \tag{14}$$

$\Pi(Q)$ is maximized at $\overline{Q}$. Since $f_c(x|0)$ is bell-shaped, there exists a unique debt level D^* that maximizes $Q(D)$. The corresponding effort level is $e^* \equiv e(Q(D^*))$. ∎

The intuition of the proposition is simple. The optimal debt is chosen to maximize the probability that the debtholders will both take control in the case of $q = 0$ and have preference for liquidation over continuation. This not only enhances the *ex post* efficiencies in the second-period operation but also improves the manager's *ex ante* incentive to work hard. Although debtholders may not be as passive as equityholders in disciplining the manager, debt level should not maximize the likelihood of debtholders' control over the second-period operation. They have to have incentives to liquidate the firm after a failed effort if the manager proposes to continue. Although raising debt level can increase the probability of debtholders' control, it also increases the probability of debtholders' passivity. This is because when $D > x_1 + \widehat{x}$, debtholders lose incentive for liquidation. Higher debt implies that debtholders' payoff relies more on the upper tail of the stochastic returns. This property imposes a limit on the optimal debt level. Given the level of debt, the value of equity is then determined.

With a slight modification to the model, we can derive a comparative static result. Let us assume the random income from liquidation to be $x = sy$, where $s \in (0, 1]$ and y is a random variable that has a cumulative distribution function $F_l(y|q)$. Hence the cumulative distribution function for x is $G_l(x|q) = F_l(\frac{x}{s}|q)$. Corresponding to Assumption 2, we assume that there exists an $\tilde{x}$ such that $F_c(x|0) \geq G_l(x|0)$ for all $x \leq \tilde{x}$ and $F_c(x|0) < G_l(x|0)$ for all $x > \tilde{x}$. This implies that there exists an $\widehat{x} > \tilde{x}$ such that

$$\int_0^{\widehat{x}} [F_c(x|0) - F_l(\frac{x}{s}|0)]dx = 0. \tag{15}$$

The parameter s is an indicator of the firm's liquidation value. When s decreases, then, stochastically speaking, the liquidation value will decrease. For the debtholders to have preference for liquidation over continuation when they have control, the optimal level of debt D^* should decrease so that the debtholders' payoff relies more on the lower tail of the income. Otherwise, if D is too high, the liquidation value may be too low to compensate the debtholders; hence they would rather let the manager continue current operation. In other words, *the firm's leverage is positively correlated with the firm's liquidation value.* This intuition is formally stated in the following proposition.

PROPOSITION 4. *The optimal debt level D^* increases with s.*

Proof. By the definition of $\widehat{x}$, we have $\int_0^{\widehat{x}}[F_c(x|0) - F_l(\frac{x}{s}|0)]dx = 0$. After differentiation with respect to s, we have

$$[F_c(\widehat{x}|0) - F_l(\frac{\widehat{x}}{s}|0)]\frac{\partial \widehat{x}}{\partial s} = -\int_0^{\widehat{x}/s} x f_l(x|0)dx. \tag{16}$$

Since $F_c(\widehat{x}|0) - F_l(\frac{\widehat{x}}{s}|0) < 0$, we have $\partial\widehat{x}/\partial s > 0$. From Proposition 3, we know that the optimal debt level D^* maximizes $F_c(D|0) - F_c(D - \widehat{x}|0)$. The first-order condition is $f_c(D|0) = f_c(D - \widehat{x}|0)$. Differentiating it with respect to $\widehat{x}$, we have $[f_c'(D^* - \widehat{x}|0) - f_c'(D^*|0)]\partial D^*/\partial\widehat{x} = f_c'(D^* - \widehat{x}|0)$. Since $f_c(x|0)$ is bell-shaped, $f_c'(D^* - \widehat{x}|0) > 0$ and $f_c'(D^*|0) < 0$. Thus we have $\partial D^*/\partial\widehat{x} > 0$. This implies $dD^*/ds = \partial D^*/\partial\widehat{x} \cdot \partial\widehat{x}/\partial s > 0$. This completes the proof. ∎

Williamson (1988) and Harris and Raviv (1990) obtain a result similar to the above proposition. The implication that leverage is positively correlated with the liquidation value has in part been confirmed by empirical works (Harris and Raviv, 1991). The liquidation value is inversely related to bankruptcy costs. Thus, Proposition 4 also implies that *leverage is negatively correlated with bankruptcy costs*. This implication resembles Harris and Raviv's result (1990) that leverage increase with the decrease in the investigation cost during the bankruptcy procedure, which is the bankruptcy cost in their paper. However, the mechanism that gives rise to their result is different from ours.

5. CONCLUSION

In a two period model, we show how an optimal combination of debt and equity may not only provide incentives for the self-interested manager to exert efforts ex ante but also achieve ex post efficiencies in the firm's operating decision. In the model, the manager obtains private benefits from staying in power and running the business as usual and hence dislikes outcomes such as displacement or bankruptcy. Appropriate incentives can be provided when the manager is convinced that he could lose his job or the firm could go bankrupt if he does not exert adequate efforts. The manager acquires firm-specific human capital in the first period that is important to the firm's future operation. Thus it is not in the owners' interest to replace the manager ex post. Therefore, the only situation which the manager wants to avoid is when the firm's performance is so bad that it may go bankrupt.

Because of the difference in their payoff structures, equityholders are more passive than debtholders in the sense that the former lack incentives to liquidate the firm when the manager insists on continuation after a bad

performance, whereas the latter may want to do so. In other words, equityholders cannot commit *ex ante* to an optimal displacement and bankruptcy policy due to their convex payoff function and the manager's having firm-specific human capital.

Therefore, it is not that equityholders *cannot* in principle do exactly what the debtholders do in the event of bad performance by the manager, but that ex post they *do not* have incentives to *do so*. We show how some debt finance can be used as a commitment device. Too much debt, however, would weaken debtholders' credibility to commit to liquidate a poorly performing firm instead of letting it continue. Once the optimal debt level is chosen, equity then provides the remaining financing.

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