Too Able To Commit: Contract Renegotiation and Efficient Takeover

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Abstract

When bankruptcy costs are introduced to Zwiebel's 1996 model of dynamic capital structure, only lower-ability managers can use debt as a commitment to refrain from empire-building. Anticipated debt contract renegotiation between a higher-type manager and the creditor reduces the expected value of the firm. The shareholder will choose to intervene through takeover and replace the manager.

Key words: managerial entrenchment, credible commitment, debt contract, liquidation cost.

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1 Introduction

Self-interested managers are disciplined by the threats of takeover by shareholders and bankruptcy initiated by unpaid debtors. When manager type varies as well as manager actions, takeovers can also serve to remove incompetent managers. Zwiebel (1996) incorporates both these effects in his influential model of dynamic capital structure, setting out how managers of intermediate ability will issue debt which serves as a commitment to take on only projects generating positive returns.

Recent empirical evidence (Stromberg (2000) and Benmelech *et al.*, (2005)) has shown that there are significant costs to bankruptcy for debtors. These costs may include liquidation costs or arise from a manager's ongoing entrenchment. Introducing these costs to the two-period investment version of Zweibel's model means that renegotiation of the debt contract after a bad project is now in the interest of both the relatively high-ability manager and the debt holder. This contrasts with the original model where covenants written into the initial debt restricting future debt served the interest of the debt holder.

Since they cannot issue debt as a commitment device, higher ability managers will be made redundant by firm takeover in the first period. The higher the bankruptcy costs the lower is the ability cutoff for the manager who can credibly issue debt in the first period to commit to take on only a good project. In other words, managers whose type is above the ability threshold are "too able" to commit. These managers are immediately taken over by the shareholder so are unable to secure employment in either period. They are also "too able" to be employed as firm managers.

2 The model

The firm generates certain cash flows y from its present assets after each period in a two-period investment model. The firm's manager has the opportunity to make an investment in each period.[1] A bad investment project which doesn't require any financing but reduces firm cash flows by r is always available. With a common-known probability of t, which measures management ability, there is also a good investment opportunity in each period. This good project, if available, does not require financing and generates additional cash flows of r for the firm.

The manager obtains private benefits A from running the firm in each period and extra benefits of $B > 0$ whenever a new project is undertaken. The manager can only be replaced in the case of a takeover or a bankruptcy. Once the manager is replaced, the firm generates y cash flows under the new management team, which has no access to either type of project.

In each period: first the manager chooses a capital structure optimally to maximize his own total benefits; then a raider may attempt a takeover with a cost of e, replacing the manager; then the availability of a good project is learned; the investment decision is made by the manager; after that, returns are realized and any debt is repaid or bankruptcy occurs, in which case the manager

[1] As in Zwiebel, all participants are risk-neutral and the interest rate is zero. We have used Zwiebel's notation throughout.

is replaced. In the case of a bankruptcy, the creditor is required to pay a cost of l.

The raider intervention cost e plays a crucial role. If there is no such cost, so $E = \frac{e}{r}$ is zero, low-ability managers are taken over and high-ability managers take on both good or bad projects and are never taken over. That is, there is no role for debt as a disciplining device. In light of recent empirical evidence, it seems reasonable to also incorporate an intervention cost on the part of the creditor. The rest of this section presents the subgame perfect equilibrium to the two-period game for managers of different abilities in the presence of such a cost.[2]

As in part (i) of Zwiebel's Proposition 1, the firm will be taken over at the start of the first period for managers of a very low type $t < \underline{t} = \frac{1}{2} - \frac{e/r}{2}$. As in part (iii), managers of the highest type, $t > \overline{t} = \frac{1}{2} - \frac{e/r}{4}$, retain their jobs in all periods. Managers in the intermediate ability range, when $\underline{t} < t < \overline{t}$ would not be removed at the start of the second period since $y + tr - (1-t)\, r \geq y - e$ for any $t \in \left[\underline{t}, \overline{t}\right]$. Will firms with managers in this ability range be taken over at the start of the first period? It depends.

If the raider takes over the firm at the start of period 1, the firm's value is $2y - e$; if the raider does not instigate a takeover, the firm's expected value is $2\left(y + tr - (1-t)\, r\right)$ *unless* the manager can *credibly* commit to not taking on bad project in the first period. In the absence of any such credible commitment, the manager will be removed in the first period since $2y - e > 2\left(y + tr - (1-t)\, r\right)$ for all t in this range.

In Zwiebel (1996), a manager in this ability range can use debt as a commitment device to constrain his actions so that he only takes on good projects in the first period. Suppose that the manager issues debt D_1 with $y - r < D_1 \leq y$ at the beginning of the first period. Taking on a bad project in that period would cause the firm to go bankrupt before the second period investment is made, since $y - r < D_1$. The manager would rather forgo the private benefits of taking on a project in the first period to ensure he keeps his job and gains the private benefits of running the firm and taking on a new project in period 2. The raider no longer finds it optimal to instigate a takeover at the start of period 1 since the expected firm value with debt D_1 is $y + tr + [y + tr - (1-t)\, r]$, which is greater than the expected value from a takeover, $2y - e$, when $\underline{t} \leq t \leq \overline{t}$. This establishes result (ii) in Zwiebel's Proposition 1.

Suppose the manager issues debt D_1 with $y - r < D_1 \leq y$ in the first period and then proceeds with a bad project but there is a bankruptcy cost for the creditor, l. A subset of manager types can successfully negotiate with the creditor (typically the bank) and remain in place for the next period. Whether the debt contract can be renegotiated crucially depends on t and the relative intervention costs for a raider and a creditor.

Proposition 1 *For all* $t \in \left[\underline{t}, \overline{t}\right]$, *when* $l \leq \frac{e}{2}$, *the manager can issue debt of* D_1 *where* $D_1 \in$

[2] A two-period investment model allows us to illustrate the key result of the non-monotonic relationship between manager type and takeover in a relatively simple setting. The model and central result generalize to the three period model in Zwiebel (1996). One additional result in a three-period model is that some relatively high-ability agents unable to avoid takeover in a two-period setting can issue two-period debt at the start of the first period to credibly commit to not take on a bad project in the first period. This narrows the range of the relatively high-ability managers who are taken over at the start of the game.

$(y-r, y)$ *at the start of the first period as a credible commitment not to take a bad project in this period.*

When $l \leq e/2$, the debt holder prefers to incur the bankruptcy cost, and have access to the cash flow y generated in the second period. The incentives of the manager and the debt holder are no longer aligned at the end of the first period after a bad project. Anticipating this deterministic bankruptcy decision by the creditor after a bad project, the rational manager avoids taking on a bad project during period 1 since he prefers to keep running the firm.[3] Neither takeover nor bankruptcy would happen in this case. Since the manager can commit not to take on a bad project in the first period, it is not optimal for the raider to intervene before the first period investment. This manager can *strategically* issue debt as a credible commitment device.

Proposition 2 *For all $t \in \left[\underline{t}, \bar{t}\right]$, when $l \geq e$, the raider will take over the firm before the first period, since the debt is no longer a credible commitment. In this case, there is no optimal capital structure.*

The bankruptcy cost is high enough that the creditor will not want to declare bankruptcy even if the manager invests in a bad project in the first period. The manager would hence take on any project in period 1. For t in this intermediate range, anticipating that debt will not serve as a disciplining device, the raider takes over the firm before the first period investment. The debt contract is no longer an optimal commitment device for any type of entrenched manager.

Proposition 3 *When $e/2 < l < e$, the debt contract is robust to renegotiation for only a subset of managers in the intermediate ability range, $t \in \left[\underline{t}, \bar{t}\right]$. Only managers of type $t \in \left[\underline{t}, \left(\frac{1}{2} - \frac{l/r}{2}\right)\right]$ can avoid takeover at the start of the first period by issuing debt. Managers with $t \in \left[\left(\frac{1}{2} - \frac{l/r}{2}\right), \bar{t}\right]$ – relatively high-ability managers – cannot commit not to take a bad project in the first period and thus will be removed by the raider before the first period investment is made; however, relatively low-ability managers with $t \in \left[\underline{t}, \left(\frac{1}{2} - \frac{l/r}{2}\right)\right]$ will not be taken over.*

Proof. Let $e/2 < l < e$ and $t \in \left[\underline{t}, \bar{t}\right]$. The difference in creditor payoff from liquidating after a bad project in period 1 and the payoff from leaving the manager in place for period 2 is: $\Delta M \equiv \{(y-r) + [y-l]\} - \{(y-r) + [y + tr - (1-t)\, r]\}$

When $\Delta M \geq 0$, i.e., when $t \in \left[\underline{t}, \left(\frac{1}{2} - \frac{l/r}{2}\right)\right]$, it is optimal for the creditor to liquidate the firm after the manager takes a bad project in period 1. Thus the manager will not invest in a bad project in period 1. Issuing debt of D_1 with $D_1 \in (y-r, y)$ at the start of the first period is a *credible* commitment to avoid a bad project in period 1 for these managers.

When $\Delta M < 0$, i.e., when $t \in \left[\left(\frac{1}{2} - \frac{l/r}{2}\right), \bar{t}\right]$, the creditor prefers to let the manager continue operating the firm in period 2 after the manager has undertaken a bad project. Since there is no prospect of bankruptcy, the manager is not deterred from taking on a bad project in period

[3] The total benefit for the manager if he continues are $2A + (1+t)\, B$, always greater than the $A + B$ he gains if he is replaced before period 2.

1. Anticipating this, the raider will intervene and remove the manager before he can make any investment.

QED. ■

In Zwiebel's model, the probability that a firm is taken over is decreasing with t, the ability of the manager. With bankruptcy costs l where $e/2 < l < e$, this monotonicity disappears: When the manager's ability is very low ($t < \underline{t}$), the firm is taken over; when the manager's ability is $t \in \left[\underline{t}, \left(\frac{1}{2} - \frac{l/r}{2}\right)\right]$, the firm is protected from takeover; when the manager's ability is $t \in \left[\left(\frac{1}{2} - \frac{l/r}{2}\right), \bar{t}\right]$, the firm is again taken over; and when $t > \bar{t}$, there is no takeover.

3 Conclusion

This letter introduces bankruptcy costs for an intervening creditor – evidence for which has been empirically documented – to a variant of Zwiebel's 1996 model. Under certain conditions, the interests of the creditor and manager are best served by debt contract renegotiation at the expense of the shareholder. When bankruptcy costs lie within a certain range, creditors no longer find it optimal to include a covenant restricting future debt into the initial debt contracts. In this case, managers of relatively high ability are unable to use debt as a commitment to invest only in socially efficient investment opportunities. This leads the shareholder to instigate a takeover when the firm is managed by a relatively high type but leave a lower-ability manager in place.

References

[1] Benmelech, E., M. J. Garmaise and T. J. Moskowitz, 2005, Do Liquidation values affect financial contracts? Evidence from commercial loan contracts and zoning regulation, *Quarterly Journal of Economics* 120(3), 1121-1154.

[2] Stromberg, P., 2000, Conflicts of interests and market illiquidity in bankruptcy auctions: Theory and Tests, *Journal of Finance* 55(6), 2641-2692.

[3] Zwiebel, J., 1996, Dynamic capital structure under managerial entrenchment, *American Economic Review* 86(5), 1197-1215.