Debt, bargaining, and credibility in firm–supplier relationships ☆

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ABSTRACT

We examine optimal leverage for a downstream firm relying on implicit (self-enforcing) contracts with a supplier. Performing a leveraged recapitalization prior to bargaining increases the firm's share of total surplus. However, the resulting debt overhang limits the range of credible bonuses, resulting in low input quality. Optimal financial structure trades off bargaining benefits of debt with inefficiency resulting from overhang. Consistent with empirical evidence, the model predicts that leverage increases with supplier bargaining power (e.g., unionization rates) and decreases with utilization of non-verifiable inputs (e.g., human capital).

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1. Introduction

Why are firms with high taxable incomes reluctant to lever-up despite apparent tax benefits? Bankruptcy costs offer a potential explanation. However, direct costs of bankruptcy are relatively small. In a seminal paper, Titman (1984) argues that financial distress may entail large *indirect* costs. His model shows that high leverage potentially reduces sales of long-lived goods since customers anticipating a bankruptcy liquidation expect higher costs of parts and servicing.

Although Titman's model offers a partial resolution of the capital structure puzzle, it is incomplete. First, many defaulting firms are reorganized rather than liquidated. Second, costs of distress are often quite large on the *supply* side. For example, United Airlines suffered losses of $700 million during the summer of 2001 due to pilot work stoppages.[2] Not coincidentally, United filed for Chapter 11 bankruptcy protection shortly thereafter. Third, Titman's model fails to explain why firms take on debt in the first place. Of course, one may appeal to tax benefits of debt outside his model. However, many firms assume high debt burdens despite having low taxable income. Again, commercial airlines provide a case in point. Finally, his model fails to explain the empirically observed positive relationship between leverage and worker unionization rates shown by Bronars and Deere (1991) and Matsa (2006).

This paper offers a unified model explaining why financial distress entails large indirect supply side costs, even if defaulting firms are costlessly reorganized rather

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² See Lowenstein (2002) for an account.

than liquidated; why firms with little or no taxable income assume high debt burdens; and why leverage is positively related to supplier bargaining power. The basic causal mechanisms are simple. We first show there is a bargaining benefit associated with creating debt overhang. To see this, consider a bargaining game with equally strong parties dividing eight slices of pie, with failure to reach agreement resulting in no pie for either. Each party receives four slices. Now suppose one party has the ability to sell two slices prior to bargaining over the remaining six slices. Under this strategy, the seller captures the value of five $(= 2 + \frac{1}{2} \times 6)$ slices. A similar argument shows that the sale of debt also creates a bargaining benefit provided that cooperation between the firm and its supplier increases the value of the lenders' claim. That is, there is a bargaining benefit to debt overhang in the sense of Myers (1977).

We next show that strategic debt overhang creates agency costs for firms relying upon (implicit) relational contracts for the provision of incentives. This is because relational contracts rely upon the bilateral surplus shared by the firm and the agent to reward the payment of discretionary bonuses and rebates. The sale of surplus to a lender reduces bilateral surplus and necessarily reduces the range of credible (self-enforcing) discretionary payments. This compression of bonuses reduces incentives, efficiency, and profits. In fact, benefits and costs of debt are shown to represent two sides of the same coin: optimal leverage entails a tradeoff between bargaining benefits of debt overhang and efficiency costs. Firms with high (ex ante) bargaining power are most concerned about preserving efficiency while those with low bargaining power are most concerned about extracting surplus. Thus, optimal leverage is decreasing in firm bargaining power.

To illustrate these effects, we consider a setting with repeated trade in which an agent (e.g., upstream firm or employee) privately observes his production costs.[3] We depart from the traditional screening model (e.g., Laffont and Tirole, 1993) by assuming the quality of the input supplied by the agent cannot be verified by a court, necessitating reliance upon relational contracts. Although tradeoffs between rent extraction and efficiency are a feature of traditional screening models with verifiable quality, the tradeoffs in our model differ fundamentally. The traditional screening model endows the principal with all bargaining power ex ante. Inefficiency then arises from the need to pay informational rents to low-cost agents. In our model, the principal does not necessarily have full bargaining power ex ante. Rather, she performs a leveraged recapitalization prior to bargaining in order to increase her share of total surplus given limited bargaining power. Inefficiency then arises from the fact that debt overhang compresses the set of credible bonuses. The key difference between our model and existing relational contracting models, e.g., MacLeod and Malcomson (1989) and Levin (2003), is that we analyze optimal leverage.

The tradeoffs described are most similar to those derived by Dasgupta and Sengupta (1993) in a model featuring static moral hazard and verifiable output.[4] Both models posit a bargaining benefit to debt. However, the costs arising from debt differ. As in Brander and Spencer (1989) and Dasgupta and Sengupta (1993) demonstrate a negative incentive effect arising from placing a principal and agent *junior* to a lender. In these models, incentives become muted because the agent's output accrues to the lender in the event of default. In our relational contracting model, the distorting effect of debt persists despite the principal and agent having a *senior* claim to joint output each period. Further, we show that even non-defaultable debt can diminish the power of incentives. This is because an overhang problem exists whenever cooperation between the principal and agent causes an otherwise defaultable bond to become risk-free.

Although the setting is different, the *cause* of the decline in cooperative behavior can be linked to the duopoly model of Maksimovic (1989). Both models incorporate debt into repeated games where failure to cooperate is punished by reversion to the worst possible subgame perfect equilibrium. In both models, debt inhibits cooperation if the lender captures some of the benefit from cooperation. The most important difference between the models can be found in the effect coming from debt. Our model illustrates that debt overhang limits a firm's ability to provide incentives to agents. Maksimovic shows that debt overhang limits the stability of collusion. A second important difference between the models is that Maksimovic predicts that zero debt is optimal, whereas our model can generate interior optimum leverage ratios in the absence of tax shield benefits to debt or direct bankruptcy costs.

We turn next to the empirical relevance of the model. A wide range of studies show the prevalence of implicit contracts. For example, Banerjee and Duflo (2000) present evidence that implicit contracts are frequently utilized in the customized software industry, with proxies for reputation (e.g., firm age) having significant predictive power in determining which party pays for overruns. Good-faith agreements are also pervasive in labor markets. Gillian, Hartzell, and Parrino (2005) find that less than half the firms in the "S&P" 500 had a comprehensive explicit employment agreement with their CEO. Relatedly, Hayes and Schaefer (2000) present evidence suggesting that implicit contracting explains a large portion of top executive pay. Implicit contracts are also used for rank-and-file compensation. For example, the up-or-out promotion system is a widely used implicit incentive contract for young associates in law firms (see Gilson and Mnookin, 1990). Similarly, investment banks, consulting firms, and advertising agencies provide incentives through discretionary bonus payments that are based upon subjective measures of performance.

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[3] The insights of the model carry over if one considers hidden actions rather than hidden information.

[4] Bronars and Deere (1991) derive a bargaining benefit from debt relying on exogenous costs of default. Perotti and Spier (1993) illustrate a bargaining benefit to issuing debt ex post, in wage renegotiations, which is costly to the firm ex ante as workers demand risk premiums.