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On debt service and renegotiation when debt-holders are more strategic ☆

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ABSTRACT

The contingent claims analysis of firm financing often presents a debt renegotiation game with a passive bank that does not use its ability to force liquidation strategically, contrary to what is observed in practice. We consider two motives that may lead a bank to refuse to renegotiate: maintaining its reputation to preserve its future lending activity and deterring firms from overstating their debt service abatement when they renegotiate. We show that with public information and private debt only, the optimal probability of debt renegotiation is high when the firm's anticipated liquidation value is high. Under asymmetric information about liquidation value, the high liquidation value firm may be tempted to mimic the low liquidation value firm to reduce its debt service. To deter such mimicking, banks may sometimes refuse to renegotiate with firms having a low liquidation value.

1. Introduction

There are many contributions to contingent claims analysis that propose models for the financing of the firm, but they fail to fit important facts observed in financial markets. For example, neither the model of costless debt renegotiation of Anderson and Sundaresan (1996, AS) nor that of Mella-Barral and Perraudin (1997, MP) obtains inefficient liquidations, whereas early liquidations do occur in many

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markets.[1] Borrowers that rely exclusively on bank debt always avoid bankruptcy, because the passive bank always agrees to renegotiate (Anderson et al., 1996).[2]

Hackbarth et al. (2007, HHL) consider the mix of market and private debt in the firm's capital structure. Public debt provides tax-shield benefits exceeding those attainable with bank debt alone but introduces inefficient bankruptcies. The optimal debt structure thus equalizes the marginal bankruptcy cost with the marginal tax benefits, as reported in the trade-off literature (Leland, 1994). HHL's approach reconciles debt-structure theory with some but not all of the empirical facts, because banks liquidate firms in many markets or countries.

We introduce strategic bank behavior into the model developed by MP and HHL to explain the early liquidation of firms. Several reasons may motivate a bank to refuse to renegotiate. One reason is that it allows firms without access to public debt to increase their debt capacity: because bank debt is not easily renegotiable, both its value and the amount a firm can borrow are large. Hence, by developing a reputation of not always agreeing to renegotiate, the bank increases its attractiveness to firms without access to public debt. This is beneficial for the bank if the increased value of the bank's long-run lending activity is greater than the loss of the short-term additional debt service it can extract from firms. Another reason rests on the information known by the contractual parties. Indeed, the asymmetric information between the firm and the bank at the renegotiation date may induce some firms to overstate the concessions in debt service they ask of the bank. By forcing the liquidation of some firms asking for large abatements, the bank deters firms from requesting too large a reduction of their debt service.

In our framework, the bank plays a mixed strategy where it may liquidate a distressed firm with positive probability. We derive the values of the different claims on the firm depending on the bank's mixed strategy using an extended zero-coupon approach. Interestingly, the firm and the equity values (and the public debt value, if any) exhibit a jump at the renegotiation threshold, either downward (if the firm is liquidated) or upward (if the bank agrees to renegotiate the debt service). We first show, in the exogenous private debt framework of AS and MP, that the mixed strategy increases the value of the bank debt. Because the bank never renegotiates at equilibrium, inefficient bankruptcies can be observed.

However, as the level of debt is endogenous, the firm may react to the risk of liquidation by reducing its debt level. Hence, the bank may prefer to have the reputation of agreeing to renegotiate under certain circumstances. We show that the optimal probability of debt renegotiation depends on the firm's anticipated liquidation value or its Loss Given Default (LGD) in the bankruptcy state. High LGDs correspond to low debt values and the firm has no incentive to renegotiate because it would be forced into liquidation. The bank is consequently able to increase the debt capacity of high LGD firms. We show that developing such a reputation is an equilibrium strategy in the competition game between commercial banks on the loan market.

We then investigate the case of private and public debt and we show that the bank always renegotiates under public information. This result corresponds to the assumption of a passive bank as made by HHL. This is not always true under asymmetric information about the LGD value. At the date of debt emission, the bank and the firm do not know the LGD value, so both use its expected value. After the debt contract is signed, only the firm learns its private LGD. At the renegotiation stage, the bank may thus find it beneficial to use a self-selection mechanism to separate firms. We show that a liquidation probability strictly between zero and one for the bad-type (lower liquidation value) allows the bank to deter the good type from mimicking the bad type in order to obtain better renegotiation conditions.

The rest of the paper is organized as follows. In Section 2, we extend the MP contribution using the EBIT continuous-time model of Goldstein et al. (2001) to the case of a bank's mixed strategy, and show

[1] In AS, early liquidations sometimes occur because of the no-negativity constraint on the net cash flow to equity holders. In contrast, both MP and Anderson et al. (1996) do not impose this constraint and allow equity issuance to support debt service.

[2] See also Fan and Sundaresan (2000) for a model of strategic interactions between debt holders and equity holders that accommodates varying bargaining powers. Acharya et al. (2006) propose an analysis of the relationship between liquidity defaults and strategic defaults. Strategic default happens when firms decide to forgo debt payment even when they have the necessary funds.