Disentangling the loan premium: The value of bank lending

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Abstract

Schwert (2020) shows that firms borrowing from both banks and the corporate bond market pay a substantial premium on bank loans, raising questions about firms' bargaining power and banks' competition. In this paper, I show that a large portion of the bank loan premium can be explained as a payment to bank lenders for facilitating out-of-court restructurings. This suggests a value creation from bank lending activities. Using a sample of loans matched with bond quotes, I estimate a loan premium of around 95 bps. I examine the effect of a U.S. court ruling in 2014 that disrupted market expectations and disincentivized out-of-court restructurings. Following the ruling, more affected firms experience a dramatic decrease in the loan premium by 70-90 bps, due to fewer restructuring opportunities and diminished potential for avoiding bankruptcy costs. Additionally, I show that a minor portion of the premium compensates for the prepayment flexibility in the loan contracts.

JEL classification codes: G12, G21, G32

Keywords: bank loan, corporate bond, loan premium, renegotiation

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1 Introduction

Firms borrow from two primary instruments, private bank loans and public bonds. One would expect firms to optimize their debt funding sources and substitute one for the other, if there were large spread differences. But surprisingly as shown by Schwert (2020), banks seem to earn a substantial interest rate premium relative to the credit spread implied by the bond market after adjusting for seniority. The study documents a loan premium of 140-170 bps, which accounts for half of the all-in-drawn spread of loans. This raises questions about the nature of competition in the loan market and why firms are willing to borrow from banks when they have access to cheaper funding.

In this paper, I show that a substantial part of the loan premium can be explained by banks' willingness to renegotiate in distress. The premium arises from reduced bankruptcy costs if the firm can avoid costly court procedures and rehabilitate from financial distress. Firms are willing to allocate all or part of the saved bankruptcy costs to banks due to the implicit insurance embedded in the loan contract. As reported by e.g., Chodorow-Reich and Falato (2022), many loans breach financial covenants, which can lead to technical defaults. Lenders can choose to accelerate repayment, further restrict the loan contract, or simply forbear or reset the covenant with no further impact on the loan. Based on a stylized binomial tree model, I show that a forbearance (modeled as a one-period extension of the debt contract) during financial distress can translate to a sizable reduction in bankruptcy costs. To test the hypothesis that reduced bankruptcy costs are the main source of the loan premium, I first reproduce the loan premium by constructing a dataset consisting of new loan originations and the corresponding secondary bond market quotes on the same date. Following Schwert (2020), I employ reduced-form and structural models of credit risk to adjust for the seniority difference between loans and bonds. I find that bank lenders charge a higher interest rate of around 95 bps compared to the public bond market.[1] Empirically, I utilize an unanticipated shock from a U.S. court ruling and examine its impact on the loan premium. The ruling reshaped the market's perception of the future possibility of out-of-court restructurings (Kornejew, 2024). Through a difference-in-difference analysis, I find a 70-90 bps reduction in the loan premium for those firms that

[1] I find a loan premium of around 125-145 bps when restricting the sample to term loans only, as in Schwert (2020), which aligns well with the findings presented in the study.

are more affected by the court ruling. This supports the hypothesis that reduced bankruptcy costs caused by renegotiation flexibility in distress can account for a large fraction of the loan premium. In addition, I show that a small portion of the premium is compensation for the prepayment flexibility in the loan contracts. I employ a quantitative analysis based on the binomial tree model and estimate the prepayment risk at around 20-30 bps. This is consistent with the finding by Schwert (2020) that calculates the prepayment risk as a Bermudan receiver swaption. Furthermore, I confirm empirically that the prepayment risk is priced in the loan premium.

Using a sample of 10,851 syndicated loans to public firms from 1997 to 2022, I estimate the spread between loan prices and corporate bond prices using both reduced-form and structural models of credit risk. I then conduct a series of cross-sectional tests to examine the source of the loan-bond spread (loan premium). In the first set of tests, I investigate whether the loan premium is associated with the compensation for the prepayment flexibility of loan contracts. Roberts and Sufi (2009) and Roberts (2015) demonstrate that when renegotiating prices of loan contracts, borrowers often demand a lowering of interest rates, indicating that high-quality borrowers self-select to renegotiate prices. Based on a binomial tree model, I show that the prepayment compensation should be higher for firms that are more likely to exercise the prepayment option, i.e., those with a higher potential to have an improved credit quality. I test this model implication and find that a higher loan premium can predict a higher probability of the issuer's credit rating improvement and a larger improvement, confirming the positive correlation between the loan premium and the prepayment risk. This justifies the existence of prepayment risk being priced into the loan premium, as documented by Schwert (2020). My results also imply that loan fees alone cannot fully compensate lenders for bearing the prepayment risk since it is priced into the loan premium. As pointed out by Eckbo et al. (2022), more than 90% of loans have the right to prepay with a zero cancellation fee. On the other hand, Eckbo et al. (2022) present a theoretical analysis and argue that to avoid credit rationing, banks must be compensated for the prepayment risk with a (minimum) upfront fee, combined with a *lower* loan spread. Empirically, they confirm that the upfront fee is positively associated with prepayment risk. Most syndicated loans do include an upfront fee, but the amount is not disclosed to all syndicate participants or the public.[2] Lead arrangers receive the upfront fee and can decide whether to share it with other participants. Since all lenders are exposed to the prepayment risk, it is fair that the compensation be paid to all syndicated members in the form of interest rates, rather than fees which are prioritized to lead arrangers. Overall, through modeling the prepayment risk as an option underlying the borrower's credit risk and empirical testing, I find that the prepayment option accounts for a minor portion of the loan premium.

Apart from the prepayment flexibility, a loan contract can also provide renegotiation flexibilities during financial distress, whereas the ability to renegotiate bonds is limited. I examine whether the loan premium originates from the renegotiation flexibility in financial distress. Theoretically, I find that the renegotiation premium arises from the reduced bankruptcy costs if the firm can renegotiate and avoid costly court procedures. To empirically test this hypothesis, I utilize an unanticipated shock in 2014 (Court of the Southern District of New York, 2014) that reshaped the market's perception of out-of-court restructurings. The ruling, named after Marblegate, has broadly interpreted the protections granted to creditors under the Trust Indenture Act (TIA) of 1939. It led to concerns that borrowers might find it more difficult to implement out-of-court restructurings without unanimous consent, even if the actions are permitted. Evidence provided by Kornejew (2024) shows that the ruling has exacerbated hold-out problems in out-of-court restructurings and forced more distressed firms into formal bankruptcy procedures. The surged filing rates are heavily driven by firms with an above-median level of bond holdings (referred to as *bond-intensive* firms). Using the Marblegate ruling shock, I conduct a difference-in-difference analysis to examine the ruling's impact on the loan premium. After the shock, banks should charge a lower premium on *bond-intensive* firms since there is a lower probability of entering out-of-court restructurings and avoiding bankruptcy costs. Empirically, I find a dramatic drop in the loan premium of *bond-intensive* borrowers after the ruling. This supports the hypothesis that a notable portion of the loan premium is comprised of the saved bankruptcy costs due to the renegotiation flexibility of bank lending. The results also suggest a value creation function of bank lending activities through a wealth transfer from bankruptcy costs to firms' stakeholders.

[2] Berg et al. (2016) utilize hand-collected SEC filings of syndicate loan contracts, and find that many loan contracts refer to a nonpublic fee letter without disclosing the upfront fee.

The results are further validated through a series of supplementary tests. Notably, when breaking down loans into different types, I find that the Marblegate effect is smaller for loans associated with institutional lenders and stronger for loans with only one lead arranger. These results further confirm the mechanism that the loan premium is driven by the possibility of renegotiation during financial distress.

Overall, I show that banks offer valuable flexibilities to firms beyond what the capital market can provide. First, banks create value by allowing for renegotiations during financial distress and receive a reward for the value they generate, accounting for a large portion of the loan premium. Second, banks allow for prepayment and renegotiation of existing debt according to changing conditions and should be compensated for the prepayment risk. I show that a minor portion of the loan premium is indeed compensation for the prepayment risk.

Other related literature

My paper contributes to the literature on banks' ability to create value for their borrowers. Banks provide valuable functions such as screening and monitoring (Leland and Pyle, 1977; Diamond, 1984; Ramakrishnan and Thakor, 1984; Fama, 1985), maturity and liquidity transformation, risk diversification (Diamond and Dybvig, 1983), which can mitigate financial frictions. Another set of empirical papers provide indirect evidence of the value of bank lending. James (1987) shows that the stock market reaction to new loan announcements is positive. Berger and Udell (1995) find borrowers with longer banking relationships pay lower interest rates and are less likely to pledge collateral. Bharath et al. (2011) also arrive at the conclusion that repeated borrowing from the same lender translates into a 10–17 bps lowering of loan spreads. Datta et al. (1999) find the existence of bank debt lowers the spreads for first public straight bond offers by about 68 bps. In particular, Hoshi et al. (1990) present evidence that relationship banking can reduce the costs of financial distress using data of Japanese firms. The saved costs stem from the inherent difficulty of renegotiating financial claims, particularly when there are many dispersed creditors. Gilson et al. (1990) also document the pattern that distressed firms that owe more of their debt to banks are more likely to succeed in out-of-court restructuring and avoid the presumably more costly Chapter 11 bankruptcy. In this paper, I provide empirical evidence showing that banks charge an interest rate premium for the saved distress costs. However, in the event of a shock that strongly increases the difficulty of renegotiation and restructuring, the premium vanishes.

This paper also speaks to the bank loan contract design. Gorton and Kahn (2000) argue that the initial loan rate is not set to price the risk of default, but rather to minimize subsequent costs associated with moral hazard and renegotiation. As originally discussed in Hart and Moore (1988), debt contracts are inherently incomplete. Roberts (2015) find that a typical bank loan is renegotiated five times throughout the loan life. The pricing, maturity, amount, and covenants are all significantly adjusted during each renegotiation. Denis and Wang (2014) find even in the absence of covenant violation, there are frequent renegotiations, primarily relaxing existing restrictions and resulting in economically large changes in existing limits. Furthermore, Chodorow-Reich and Falato (2022) examine whether lenders' financial health can transmit to borrowers through the covenant violation channel. My paper confirms the pattern that the initial loan rate is subject to future changes of condition, which is not simply a reflection of credit risk.

More broadly, this paper relates to the research on debt structure and debtors' rights of firms. There are several explanations for the decision on the choices between public debt and private debt, such as the probability of inefficient liquidations, control of moral hazard problems, and cost of disclosure of proprietary information (Diamond, 1984, 1991; Chemmanur and Fulghieri, 1994; Hackbarth et al., 2007; De Fiore and Uhlig, 2011). More recently, Becker and Ivashina (2014) empirically examine firms' debt choice between bank loans and public bonds, whereas Morellec et al. (2015) build a model of investment and financing decisions to study the choice between bonds and loans. This line of research focuses more on the quantity of new issues of debt but this paper focuses more on the prices of the two sources of debt. There is an essential difference between the bond credit and loan credit in that the loan credit is more concentrated with a few creditors based on a relationship but bond securities are issued in the capital market, where many dispersed investors can buy and sell small positions. The misaligned motivation between dispersed bondholders and relationship banks can be costly to firms. First, the dispersed creditors suffer from a collective action problem which can create a potential to hold out the debt and free-ride on others' concessions. Second, the debtor and its relationship lenders might take advantage of restructuring debt strategically (Gertner and

Scharfstein, 1991; Brudney, 1992; Kornejew, 2024). This paper provides indirect evidence on how the misaligned motivation due to dispersed creditors can destroy stakeholders' value.

2 Model

In this section, I present a model which is adapted from a standard binomial tree model of the short interest rate. The goal of the model is to provide a quantitative analysis of different options embedded in loan contracts. I start by introducing a basic model, which prices the 'bond-type' debt without renegotiation possibilities as a benchmark. Then, I introduce two options for renegotiation flexibilities: a repricing option and a restructuring option. The debt with these options is considered as 'loan-type'. Banks can thus charge a premium stemming from the additional flexibilities that the bond market cannot provide.

2.1 The value of a repricing option

Consider the binomial tree in Figure 1, the state variable λ is introduced to denote the short-term credit risk of a firm (the borrower). For simplicity, I assume a constant loss given default α throughout the debt duration. So, the credit spread is compensation for the expected credit loss, i.e., $\lambda = \alpha\rho$, where ρ is the short-term probability of default. Furthermore, I assume the risk-free rate is zero. This assumption is sufficient since in most of the loan contracts, the interest rate risk is fully hedged through a floating interest payment schedule. Therefore, the interest rate fluctuation is not priced in this debt instrument.[3]

There are two time periods for the debt, with $t = 0, 1, 2$. There are three possible outcomes with each iteration: the up-state, the down-state, and the default state. In the up-state, denoted by the superscript u, the firm's credit quality improves; In the down-state, denoted by the superscript d, the credit quality deteriorates. In both up- and down-states, the firm remains solvent and can continue operation in the next period. The probabilities of reaching these states are specified by q_t^u and q_t^d. The default state is when the firm is insolvent and therefore suffers from a bankruptcy cost, which has a probability of ρ_t. In each node, the Q-probabilities sum

[3]Assuming the risk-free rate as a non-zero constant will lead to the same conclusion.

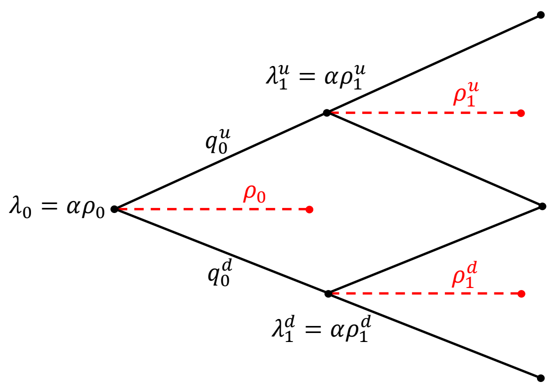

Figure 1: The two-period debt with a repricing option. The variable λ denotes the short-term credit risk of a firm. In the up-state with a probability of q_t^u, the firm's credit quality gets improved and in the down-state with a probability of q_t^d, the firm's credit quality deteriorates. The red-colored branches in between are the states where the firm is insolvent.

up to one,

$$q_t^u + q_t^d + \rho_t = 1. \tag{1}$$

I start by considering two-period coupon debt with the face value normalized to 1. The repayment schedule is that at time $t = 1$, the firm will repay the pre-specified margin, y, which is the total coupon due to the assumption of a zero riskless rate. At time $t = 2$, the firm will repay the interest and the principal $1 + y$. I further assume that when the firm defaults, it will be liquidated and the debt holder will recover a fraction $1 - \alpha$ of the face value. Now I solve for the yield of the debt, such that the current price of the debt equals the principal:

$$1 = y(1 - \rho_0) + (1 - \alpha)\rho_0 + (1 + y)[q_0^u(1 - \rho_1^u) + q_0^d(1 - \rho_1^d)] + (1 - \alpha)[q_0^u\rho_1^u + q_0^d\rho_1^d]. \tag{2}$$

Solving for Equation 2, the yield of the two-period coupon debt, denoted as y^*, is

$$y^* = \frac{\alpha\rho_0 + \alpha(q_0^u\rho_1^u + q_0^d\rho_1^d)}{(1 - \rho_0) + q_0^u(1 - \rho_1^u) + q_0^d(1 - \rho_1^d)}. \tag{3}$$

The resulting yield in Equation 3 has taken into account the overall credit risk in the next two periods, so I consider it as a fair yield of the two-period debt.

Next, I consider an option that allows for renegotiation on the future interest rate. Since the borrower can prepay the loan at a very low cost, it has the bargaining power to terminate the contract and initiate a new debt if the bank disagrees with the new price. To formalize that, I assume that when the firm remains solvent at time $t = 1$, it repays the fair yield y^*. If the firm's credit quality improves in the up-state, it will ask for a downward adjustment on the second-period interest, i.e., the borrower wants to pay a lower interest y_r at time $t = 2$. On the other hand, if the firm's credit deteriorates, it will retain the initial contract which is preferable. The self-selection feature is consistent with the findings in Roberts and Sufi (2009) and Roberts (2015).

Ex ante, anticipating the prepayment and repricing activities, banks will ask for compensation. To price the compensation, I first find the new yield requested by the borrower in the up-state, y_r. I define y_r as the fair yield of a one-period debt conditional on arriving at the up-state at time $t = 1$, which is equivalent to the firm terminating the old debt and initiating a new debt at $t = 1$. Apply the same strategy to make the new debt trade at par,

$$1 = (1 + y_r)(1 - \rho_1^u) + (1 - \alpha)\rho_1^u. \tag{4}$$

The requested new yield y_r^* is,

$$y_r^* = \frac{\alpha \rho_1^u}{1 - \rho_1^u}. \tag{5}$$

I show that y_r^* is always smaller than the initial yield y^* (see proof in Appendix). Intuitively, the new yield y_r^* only takes into account the states after the firm becomes better at time 1, while the initial yield y^* accounts for the credit risk of all possible states.

Given the requested new yield, the value of the repricing option, P_{ro}, at time 0 is

$$P_{ro} = q_0^u (y^* - y_r^*)(1 - \rho_1^u), \tag{6}$$

which is essentially the difference between the initial yield and the updated yield that the bank can receive at time 2, conditional on the firm arriving up-state at time 1 and remaining solvent at time 2. At first sight, the option value seems to increase in q_0^u, and decrease in ρ_1^u (or λ_1^u) since the multiplier $y^* - y_r^*$ is always positive. This is reasonable because when it is more likely to arrive at the up-state, it is more likely for the firm to exercise the option, so the option is more valuable when q_0^u is larger. Additionally, when the firm's credit quality gets a larger improvement (ρ_1^u becomes smaller), the option value also increases because the new yield will become even more attractive.

Mathematically, it is proven that $\frac{\partial P_{ro}}{\partial \lambda_1^u} < 0$, but the sign of $\frac{\partial P_{ro}}{\partial q_0^u}$ is undetermined. To examine the dynamics of the option value with q_0^u, I solve the first order condition $\frac{\partial P_{ro}}{\partial q_0^u} = 0$, and get the value of q_0^{u*} that corresponds to the maximum P_{ro},

$$q_0^{u*} = \frac{-(1-\rho)(2-\rho_1^d) + \sqrt{(1-\rho)(2-\rho)(2-\rho_1^d)(1-\rho_1^u)}}{\rho_1^d - \rho_1^u}. \tag{7}$$

By making very mild assumptions on the parameters, I approximate q_0^{u*} is in the range of 0.7 to 0.83 (see Appendix). So, the option value first increases with q_0^u, but peaks when q_0^u reaches a threshold of around 70% and starts to decrease afterwards. Intuitively, the option price increases in the probability q_0^u since it becomes more likely for the firm to exercise the option. At the same time, the yield y^* in the original contract decreases with q_0^u. When q_0^u reaches the threshold, the yield difference between the initial contract and the renewed contract will be very small, which makes the repricing option less attractive. That explains why the option price starts to decrease after the threshold. However, the threshold of 0.7 is much larger than the realistic value of q_0^u that is usually assumed to be around 0.5. So, I can assume that P_{ro} is increasing in q_0^u in most cases.

I also find the repricing option price increases with λ_0. Since q_0^u, y_r^*, λ_1^u are uncorrelated with λ_0, the option price is only dependent on λ_0 through y^*, $\frac{\partial P_{ro}}{\partial \lambda_0}$ will have the same sign as $\frac{\partial y^*}{\partial \lambda_0}$, which is positive.

To derive the price of the option as a function of the debt's coupon, I add the price of the repricing option to the left-hand-side of Equation 2:

$$1 + P_{ro} = y(1-\rho_0) + (1-\alpha)\rho_0 + (1+y)[q_0^u(1-\rho_1^u) + q_0^d(1-\rho_1^d)] + (1-\alpha)[q_0^u\rho_1^u + q_0^d\rho_1^d]. \tag{8}$$

Solving the equation for y, the solution is the yield that a bank should charge ex ante to account for the prepayment risk, denoted as y_{ro}, is

$$y_{ro} = y^* + \underbrace{\frac{P_{ro}}{(1-\rho_0) + q_0^u(1-\rho_1^u) + q_0^d(1-\rho_1^d)}}_{\text{Repricing option adjustment}}. \tag{9}$$

It turns out that the compensation term is very small compared to y^*. Based on a simple calibration using parameters of $\rho_0 = 4\%, \rho_1^u = 2.4\%, \rho_1^d = 6.7\%, \alpha = 50\%, q_0^u = 50\%, q_0^d = 46\%$, I find a fair yield y^* of 245 bps, with a repricing option adjustment term of only 25 bps. The tiny size can also be judged from the option price in Equation 6, the size of the option is mostly determined by the yield difference between y^* and y_r^*, which should be very small. So it is not surprising to see that the yield compensation for the repricing option only corresponds to a very small fraction of the fair yield of the loan.

The quantitative analysis provides insights into how the value of the repricing option changes with different parameters, and how large the compensation should be. More importantly, I view the prepayment flexibility as an exclusive feature of bank loans, which is not provided by bond market. However, it remains an empirical question whether the prepayment risk is charged in the form of interest rate and therefore contributes to the loan premium.

2.2 The value of distressed renegotiation

Under the same model setup, I now consider a one-period debt contract where banks are willing to extend the debt for one more period when the firm falls into financial distress. In practice, it can be considered as a waiver of a financial covenant which triggers the technical default, where banks have the right to terminate the loan (or credit line) immediately. In reality, a covenant violation often leads to a renegotiation instead, which relaxes the constraints because it is in the interest of banks to facilitate a renegotiation and restructuring plan for distressed firms. In contrast, it is more challenging for dispersed bondholders to reach a consent agreement on renegotiations and restructurings.

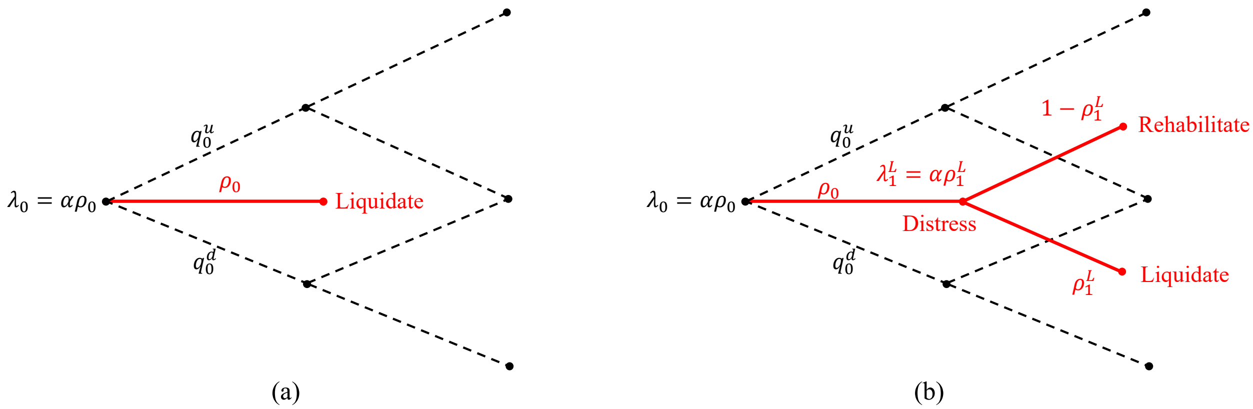

Figure 2: The one-period debt (panel a) and the debt with an extension in distress (panel b). The variable λ denotes the short-term credit risk of a firm. The highlighted branch denotes the distressed state when the firm is insolvent or triggers technical default. I assume in panel b, the bank agrees to extend the debt for one more period, as a result, the credit risk is restored to λ_1^L and firm can avoid liquidation at time 1. At time 2, if the firm rehabilitates, the bank will receive the principal; but if the borrower remains insolvent, it will be liquidated and suffer from bankruptcy costs.

2.2.1 Benchmark debt

I start by considering a benchmark debt contract without renegotiation probability. This corresponds to the situation that the borrower will only borrow from the corporate bond market (which is not realistic). The debt price will reflect the true default risk of the firm. The left panel in Figure 2 depicts the one-period debt. In the following modeling, it is not necessary to distinguish the up-state and down-state since the focus is only on the default state. I assume the bond with face value normalized to 1 will get repayment of $1+y$ in solvent states at time 1, with a probability of $1-\rho_0$. Otherwise, if the borrower becomes insolvent with a probability of ρ_0, it is forced to liquidate and the bondholder will recover $1-\alpha$ of the face value. So, the fair yield of the bond, denoted as y^{**}, is the solution of

$$1 = (1-\rho_0)(1+y) + \rho_0(1-\alpha), \tag{10}$$

which is,

$$y^{**} = \frac{\alpha\rho_0}{1-\rho_0}. \tag{11}$$

The resulting yield reflects compensation for the expected loss given default to bondholders.

2.2.2 Pure bank debt

Next, I consider if the firm only borrows from relationship banks. This is prevalent particularly among small firms without access to the corporate bond market. I consider a one-period debt contract from banks where the bank lenders are willing to renegotiate with the borrower in distress states, as depicted in the right panel of Figure 2. Instead of forcing the borrower to file for bankruptcy and liquidate assets when the firm is insolvent at time 1 (the maturity), the bank agrees to extend the debt for one more period.[4] I further assume that the firm's credit quality is restored to $\lambda_1^L = \alpha\rho_1^L$ due to the renegotiation. Accordingly, the firm can rehabilitate from the distress with a probability of $1 - \rho_1^L$ in the next period. In this case, the bank debt will recover the face value. However, when the firm deteriorates again with a probability of ρ_1^L, it will be liquidated at time 2. The bank can only recover $1 - \alpha$ of the face value due to liquidation costs.

A fair price of the instrument with the above payoff structure can be reflected by the following equation:

$$1 = (1 - \rho_0)(1 + y) + \rho_0[\rho_1^L(1 - \alpha) + (1 - \rho_1^L)]. \tag{12}$$

The equation describes the debt, with the face value normalized to 1, will receive the repayment of face value and coupon $1 + y$ if the borrower is solvent at time 1. However, if the borrower becomes insolvent, it is allowed to delay repayment until time 2. If the borrower rehabilitates at time 2, the debt holder receives the face value; otherwise the borrower is liquidated and the debt holder receives $1 - \alpha$ of the face value. The solution of Equation 12, denoted as y^{**}_{reduce}, is given by

$$y^{**}_{\text{reduce}} = \frac{\alpha\rho_0\rho_1^L}{1 - \rho_0}. \tag{13}$$

It captures the fact that the credit risk of the borrower has been effectively decreased given the extension of debt. However, it does not mean that the borrower should only pay this reduced interest rate, which is conditional on the renegotiation. Without the renegotiation, the bank

[4]The assumption of extending the debt only represents one feasible outcome of the renegotiation. One could also model scenarios involving debt written-down or exchange offers. They would provide similar insights that bank lending can mitigate bankruptcy costs through renegotiation flexibilities.

lender can charge an interest rate of y^{**} in Equation 11 that the bondholder charges. It is natural to think that with the renegotiation, the bank should charge a higher rate.

To find the fair rate of a bank loan with the renegotiation option, I first show that banks should charge at least the same amount of y^{**}. Banks suffer from an interest rate loss if firms pay a reduced rate y^{**}_{reduce},

$$P_{\text{loss}} = (y^{**} - y^{**}_{\text{reduce}})(1 - \rho_0). \tag{14}$$

So, the loss P_{loss} should be added to the left-hand side of Equation 12, which leads back to Equation 10 that reflects the firm's credit risk without renegotiation.

Second, I show that the bank can charge an additional rate because the renegotiation has led to a wealth transfer from deadweight bankruptcy costs to the borrower's stakeholders. The expected saved bankruptcy cost is equal to $\alpha\rho_0 - \alpha\rho_0\rho_1^L$, obtained by comparing the two scenarios depicted in Figure 2.[5] I further assume that banks charge a fraction k of the saved bankruptcy cost for providing the renegotiation option (as a reward). So, the value of the distressed renegotiation is,

$$P_{\text{reward}} = k(\alpha\rho_0 - \alpha\rho_0\rho_1^L). \tag{15}$$

Adding this back to the left-hand side of Equation 10, the resulting yield becomes,[6]

$$y^{**}_{\text{loan}} = \frac{\alpha\rho_0}{1-\rho_0} + \frac{k\alpha\rho_0(1-\rho_1^L)}{1-\rho_0} = y^{**} + \underbrace{k(1-\rho_1^L)y^{**}}_{\text{Reward adjustment}}. \tag{16}$$

Comparing the spread of a senior bank loan (only borrowing from banks) with the spread of a senior bond (only borrowing from the bond market), the yield premium of the loan over the bond is simply the reward adjustment term in Equation 16. The premium increases in k, when the bank has greater bargaining power and asks for a larger reward. It also increases in the current credit risk λ_0 and the loss given default of the borrower α. This means the expected saved bankruptcy cost is larger when the loss given default is larger or when the firm is more likely to fall into distress. I also find the premium increases in the rehabilitation probability $1 - \rho_1^L$ after the renegotiation.

[5]The value of saved bankruptcy costs is also equal to the loss in Equation 14.

[6]This is equivalent to add both P_{loss} and P_{reward} to the left-hand side of Equation 12.

2.2.3 Mixed borrowing

Next, I consider that the firm borrows from both the relationship banks and the corporate bond market, where the bank loan is senior to the corporate bond. I assume both the loan and the bond are one-period coupon debt with the face value summing up to 1, where the bond's face value is F_{bond} and the loan's face value is $1 - F_{\text{bond}}$. The mixed debt assumption can better describe the data sample in the following empirical analysis, which compares the loans and bonds issued by the same firm.

It is assumed that banks will initiate renegotiations with both the firm and bondholders to extend the debt for one more period if the borrower is insolvent at time 1. If the bondholders disagree with the extension and force the firm to liquidate, the remaining assets after paying the bankruptcy costs will be first distributed to the banks and then distributed to bondholders. This means the bonds have a larger loss given default than α (and therefore, they need to be compensated more). On the other hand, if bondholders accept the renegotiation and extend the debt for one more period, there is a probability of $1 - \rho_1^L$ that the firm can rehabilitate, and the bondholders can also avoid the large loss. Accepting the renegotiation can make the bondholders better off because it reduces loss given default, especially when the bankruptcy cost is large. However, there exists the hold-out problem that a minority of the bondholders do not agree with the extension and ask for an immediate repayment. They can free ride other agreeing creditors and get full repayment. As a result, in a pure bond financing scenario, the renegotiation cannot be implemented by the agreeing bondholders that anticipate the hold-out problem. The participation of bank lenders can mitigate the hold-out problem. As long as the bank lenders and the majority of bondholders reach a consensus, the extension will happen. In a worst-case scenario, the hold-out bondholders can free ride and get full repayment at time 1, but the renegotiation is implemented by the majority of debt holders.[7] If the bargaining power of the majority debt holders is large enough, the hold-out bondholders might be 'forced' to accept the renegotiation. In any case, bank lending can shift the scenario from direct liquidation (depicted in the left panel of Figure 2) to a renegotiation scenario (shown in the right panel of Figure 2). That means there is a wealth transfer from the expected bankruptcy costs to the firm as a result of bank lending activities. Since the total face value of debt is 1, the amount

[7] The amount of bond holdings by the hold-out bondholders can be ignored.

of the saved bankruptcy cost is still $\alpha\rho_0 - \alpha\rho_0\rho_1^L$, which is equal to the saved bankruptcy cost when the firm only borrows from the bank.

When pricing the debt, I consider a synthetic loan and a synthetic bond with the same seniority, i.e., the payoff is pro rata distributed. This is done to align with the empirical analysis, where the loan-bond premium is calculated by subtracting a bond-implied senior debt spread from the actual loan spread.

To price the (synthetic) loan, I follow the two-step procedure where the bank is first compensated with the cost of offering an extension in terms of the lost interest payment and then rewarded with part of the saved bankruptcy cost. Implementing the first step will not make a difference from the pure bank debt scenario, and it only leads back to the pricing of the benchmark debt as described in Equation 10. If the bank debt always matures at time 1 (i.e., no renegotiation or prepayment), the bank should charge the yield, which satisfies the equation:

$$1 - F_{\text{bond}} = (1-\rho_0)(1+y)(1-F_{\text{bond}}) + \rho_0(1-\alpha)(1-F_{\text{bond}}). \tag{17}$$

However, the bank is rewarded P_{reward} in Equation 15, (i.e., bank's share of the saved bankruptcy costs). Add it to the left-hand side of Equation 17:

$$1 - F_{\text{bond}} + P_{\text{reward}} = (1-\rho_0)(1+y)(1-F_{\text{bond}}) + \rho_0(1-\alpha)(1-F_{\text{bond}}), \tag{18}$$

which is equivalent to

$$1 + \frac{P_{\text{reward}}}{1-F_{\text{bond}}} = (1-\rho_0)(1+y) + \rho_0(1-\alpha). \tag{19}$$

The solution of the equation, denoted as $y^{**}_{\text{loan, mix}}$, is equal to,

$$y^{**}_{\text{loan, mix}} = y^{**} + \underbrace{\frac{k(1-\rho_1^L)y^{**}}{1-F_{\text{bond}}}}_{\text{Reward adjustment}}. \tag{20}$$

When F_{bond} is zero, the loan yield is the same as the value y^{**}_{loan} in Equation 16 where there is only debt financing from banks. The larger F_{bond}, the larger is also $y^{**}_{\text{loan, mix}}$, because P_{reward} is distributed to a smaller principal.

Then I show that the yield of the (synthetic) bond should be between y^{**}_{reduce} and y^{**}. The lower boundary, y^{**}_{reduce}, is the yield required to compensate bondholders for credit risk taking into account the cost of accepting a postponement of repayment if the borrower is in distress at time 1. However, if bondholders can threaten credibly to not accept the renegotiation offer, they could charge a high yield of y^{**}. Therefore, the bond yield has an upper boundary of y^{**}.

To conclude, for a firm with a mixed debt structure, bank lenders can charge a premium over a synthetic bond with the same seniority. The premium arises from the saved bankruptcy costs for the firm, and the premium has a minimum value of,

$$y_{\text{min premium}} = y^{**}_{\text{loan, mix}} - y^{**} = \frac{k(1-\rho_1^L)y^{**}}{1-F_{\text{bond}}}. \tag{21}$$

When F_{bond} increases, the minimum premium increases. This is because the saved amount of bankruptcy cost remains unchanged while the face value of bank loans decreases. Intuitively, the positive correlation between the loan premium and the bond intensity indicates that the renegotiation guaranteed by the bank is on the whole debt position, but not only on the bank's own position. When there are more bonds outstanding, banks need more compensation for the entire guarantee. On the other hand, if the renegotiation does not happen, the effective credit risk will be y^{**} and the premium should be zero (the transition from the left panel to the right panel in Figure 2 does not happen). In the empirical analysis, I test the model implications utilizing an exogenous shock that leads to a sharp decrease in the expected restructuring probability for *bond-intensive* firms. Prior to the shock, the model suggests that the loan premium should be positively correlated with the bond holding intensity. After the shock, the model predicts that the premium for the *bond-intensive* firms should vanish since they are the most affected by the shock and become less likely to implement the out-of-court restructurings.

The magnitude of the premium: The median level of bond-holding over book assets is close to 25%, and the median of the ratio of market asset value to book asset value is 100%, in the data sample used in this paper. Therefore, I estimate the parameter F_{bond}, which denotes the ratio of bond-financing to total debt-financing, to be roughly 0.5. If the bank's reward fraction k approaches 1, and assuming a 50% rehabilitation probability, the magnitude of the minimum loan premium can be as large as y^{**}.

2.3 Summary of model predictions

To summarize, I first model a two-period benchmark debt contract, which only accounts for credit risk. Based on the benchmark debt, I consider a repricing option because the borrower can prepay the loan at a very low cost. The model implies that the bank should charge a small yield premium to compensate for the prepayment risk. The premium increases when:

- there is a higher probability that the firm's credit quality improves;
- the expected improvement in the firm's credit quality is larger.

Next, I analyze a one-period debt under various financing scenarios: purely bond-financing, purely loan-financing, or a mix of bond- and loan-financing. I show that banks' willingness to extend the debt in distress can lead to a wealth transfer from unnecessary bankruptcy costs to firms' stakeholders. As a result, banks charge a sizeable yield premium arising from the saved bankruptcy costs as a reward, which increases when:

- there is a higher probability that the firm rehabilitates from distress;
- the bank has greater bargaining power;
- the amount of bond-financing is larger.

Importantly, the premium only exists when the renegotiation is offered by the bank. In other words, if the renegotiation is unlikely to occur due to e.g., a sudden shock, the premium should vanish.

3 Data

In this section, I describe the primary data sources and the sample creation for the empirical analysis. To reproduce the loan premium in Schwert (2020), I start with loan originations from DealScan and merge them with bond quotes from Refinitiv Eikon. I use both reduced-form and structural models of credit risk to calculate the price difference between bank loans and corporate bonds. The required capital structure data is sourced from Compustat and S&P Capital IQ. The stock returns used to calculate market capitalization and equity volatility are obtained from CRSP.

Loan origination: I retrieve the loan origination data from DealScan, which contains historical information on loan pricing, contract details and terms of syndicated loans. Before matching the loans with company information, I apply the following filters to loan issues: 1) The borrower country is the U.S. and the loan tranche currency is USD; 2) Exclude loans to financial firms (SIC 6000-6999), and quasi-public firms (SIC above 8999); 3) The loan type belongs to 'Term Loan', 'Revolver/Term Loan' and 'Revolver > 1Y'; 4) Exclude the sponsored loans and those with purpose of 'Commercial paper backup', 'Debtor-in-possession', 'Exit financing', 'Leveraged Buyout', 'Management Buyout', 'Sponsored Buyout'; 5) The loan seniority is senior; 6) The loan's margin interest rate is relative to LIBOR.

I use the linking table provided by Chava and Roberts (2008) to map the loan originations to the Compustat database. I also search for the loan issuers' permanent IDs (reported by DealScan) in Refinitiv Eikon and then obtain their CUSIPs to supplement the linking.

Firm characteristics: The firm characteristics are mainly obtained from Compustat and Capital IQ. From the Compustat quarterly table, I retrieve the book asset, total liability, book equity, total long-term debt, total revenue, operating income, net property, plant and equipment. To apply the structural model of credit risk, I also retrieve detailed capital structure information from Capital IQ, including total bank debt, outstanding balance for capital leases, and total undrawn credit.

Bond origination and bond price: From Mergent FISD, I collect the bonds issued by the firms in the loan dataset. After merging the bond issues with the loan originations, I apply the following filters: 1) the country domicile is the U.S. and the bond is denominated in USD; 2) the bond is not perpetual, and the maturity difference between the bond and loan does not exceed two years; 3) the bond is issued before the loan origination. Next, I search for the daily quotes of yield to maturity of the matched bonds in Refinitiv Eikon. I extract the daily quotes of matched bonds 10 calendar days before the corresponding loan is issued, and take the average of these quotes as the bond yield. Then, I merge the bond quotes back to the loan dataset. Finally, I compress the dataset by selecting only the matched bond with the closest maturity to the loan.

Bond holding: When testing the distressed renegotiation option, I need to obtain the outstanding bond holdings of the firm at the time a loan is originated. I still use the Mergent FISD database to collect all relevant bond information, but unlike the previous filters, I do not restrict bond maturity. After matching the loan origination and bond issues, I only apply two filters: 1) the bond is denominated in USD, and the country domicile is the U.S.; 2) the bond is issued before the loan origination. Once I find all matched bonds originated by the loan issuer, I identify whether the bond is still active with a non-zero outstanding amount. I search for each bond's status and the status effective date through Refinitiv Eikon. If the bond has matured or been called with an outstanding amount of zero, it is dropped from the bond holding count. For matched bonds from the same issuer issued on the same date, I double check whether these bonds share the same issue amount, coupon rate, and other elements. I drop the replicated bonds as they are likely the same bonds issued under different rules or conditions, such as under the 144A rule or private placements.

Other data sources: I retrieve the LIBOR swap curve from Bloomberg to construct the maturity-matched risk-free rates. For a given date and rates, I apply cubic spline interpolation to extract the rate with the same maturity as the debt in question. I retrieve the daily stock price from CRSP to calculate the market capitalization. The daily stock return is also used to compute the equity volatility, the trailing stock return, and the subsequent stock return. Historical S&P long-term issuer ratings are collected from Capital IQ and Refinitiv Eikon and translated into numerical scores as shown in Appendix, Table AI.

3.1 Sample creation

I compute the loan premium by subtracting the seniority-adjusted bond spread (bond-implied loan spread) from the actual loan spread. To measure the bond-implied loan spread, I first employ the reduced-form model of credit risk by Duffie and Singleton (1999). Following the data processing as described above, I obtain a sample of loans matched with bond spreads from the same firm on the same date. The Duffie and Singleton (1999) model indicates that the yield spread should reflect the compensation for the expected loss given default of an instrument. Assuming the cross-default provisions are in place, the probability of default for bonds and loans issued by the same firm on the same date should be identical. Consequently, the model predicts that:

$$YS^{reduce}_{loan} = \frac{\alpha_{loan}}{\alpha_{bond}} YS_{bond}, \tag{22}$$

where YS_{bond} is the yield spread of the matched bond, α_{loan} and α_{bond} denote the loss given default of loans and bonds, respectively. Here, YS^{reduce}_{loan} denotes the bond-implied loan spread. Schwert (2020) uses a loan-bond matched sample from 1997 to 2017 and finds that the expected loss given default of senior unsecured bonds is, on average, four times higher than that for loans. Therefore, the Duffie and Singleton (1999) model predicts that the bond-implied loan spread YS^{reduce}_{loan} is simply one-fourth of the bond spread, expressed as:

$$YS^{reduce}_{loan} = \frac{1}{4} YS_{bond}. \tag{23}$$

In this paper, I extend the sample period which covers loan originations from 1997 to 2022. For the period after 2017, I assume the relative recovery rates for bonds and loans remain unchanged. This might lead to inaccurate estimations of the bond-implied loan spread, especially for the period after 2019. However, it will not affect the subsequent estimations using structural models.

I then compute the bond-implied loan spread by applying the recovery-adjusted Merton (1974) model as illustrated in Schwert (2020). Assume the firm's asset value follows a geometric Brownian motion,

$$d \ln V_t = \left(r - \frac{1}{2}\sigma^2\right) dt + \sigma dW^Q_t. \tag{24}$$

The firm has two classes of zero-coupon debt, the senior loan with face value K_S and the junior bond with face value K_J, both maturing at time T. Following Glover (2016), I assume a fraction α of the asset value is lost in the event of default, where α is proxied by $0.45 - 0.2Lev_{book}$ and Lev_{book} denotes the book leverage. The value of the senior debt, denoted as D_S, is given by:

$$\begin{aligned} D_S &= (1-\alpha)(1-\Phi(d_{1,S}))V + K_S e^{-rT}\Phi(d_{2,S}), \\ \text{with } d_{1,S} &= \frac{\ln\left(\frac{V}{\min(K_S/(1-\alpha), K_S+K_J)}\right) + (r+\frac{1}{2}\sigma^2)T}{\sigma\sqrt{T}}, \quad d_{2,S} = d_{1,S} - \sigma\sqrt{T}. \end{aligned} \tag{25}$$

The value of the junior debt, denoted as D_J, is given by:

$$D_J = (1-\alpha)\Big[V(\Phi(d_{1,S}) - \Phi(d_1)) - K_S e^{-rT}(\Phi(d_{2,S}) - \Phi(d_2))\Big] + K_J e^{-rT}\Phi(d_2),$$
$$\text{with } d_1 = \frac{\ln(\frac{V}{K_S+K_J}) + (r+\frac{1}{2}\sigma^2)T}{\sigma\sqrt{T}}, \quad d_2 = d_1 - \sigma\sqrt{T}. \tag{26}$$

The yields of senior and junior debt, denoted as y_S and y_J, are

$$y_S = \frac{1}{T}\ln\frac{K_S}{D_S}, \quad \text{and } y_J = \frac{1}{T}\ln\frac{K_J}{D_J}. \tag{27}$$

Given the model, the calculation procedure is as follows:

- First, find the junior debt price D_J given the yield of bonds y_J, using Equation 27.
- Then, insert the parameters $K_S,\ K_J,\ V,\ T,\ r,\ D_J$ into Equation 26 and back out the asset volatility σ.
- Next, pass all the parameters to Equation 25 to get the price of the senior debt.
- Finally, compute the yield spread of the senior debt, which is the bond-implied loan spread.

I utilize detailed debt structure information from Capital IQ, where the senior debt amount K_S is defined as the sum of bank debt, capital lease, and undrawn credit. The amount of junior debt K_J is calculated as the total amount of book debt less the senior debt. The detailed definitions and data sources for other related parameters are summarized in Table 1.

3.2 Summary statistics

Using the Merton model and the reduced-form model, I derive two series of bond-implied loan spreads. The variable of interest, loan premium, is then computed as the actual loan spread less the bond-implied loan spread. The resulting loan premium and other loan or firm characteristics are summarized in Table 2, and the detailed definition of variables can be found in the appendix.

Panel A presents the summary statistics of the full sample, consisting of both term loans and credit lines over one year. On average, the loan spread over the LIBOR rate is around

195 bps, and the initial time to maturity of the loans is 4.4 years.[8] For the matched bond observations, the spread over the maturity-matched swap rate is close to 395 bps. Due to the maturity restriction, the average time to maturity of the bonds is 4.6 years. The average size of the bonds' face value is roughly half of the loan size, whereas the median sizes are comparable. Regarding firm characteristics, the median market asset is around $6 billion, indicating a sample with relatively large firms. The typical issuer rating is $BB+$, in between investment grade and non-investment grade. On average, the sample contains firms with a positive profitability of 2.8%. The statistics of the calculated loan premia are presented at the bottom of Table 2. The median loan premium is close to 95 bps, indicating a significant spread between the private loan market and the public bond market.

Panel B of Table 2 presents the summary statistics when the sample is restricted to term loans only. The loan premium in the restricted sample ranges from 125-144 bps, aligning more closely with the results reported by Schwert (2020), who examines term loans exclusively. Both the all-in-drawn spread and the matched bond's spread for the restricted sample are larger than those of the full sample. However, the firm characteristics remain roughly unchanged.

I also present the histogram of loan originations in Figure 3, providing an overview of the sample distribution over time. The loan issuance is evenly distributed in most years, but there are sharp declines during market downturns, particularly in 2008, 2020 and 2022. Additionally, Figure 4 illustrates the frequency of appearance for each borrower in the final sample. For example, the first bar indicates that approximately 350 borrowers have only one loan origination with matched bond quotes in the final sample.

4 Results

In this section, I begin by describing the empirical strategy for testing the implications from the theory part. Then I document and discuss the results.

[8]By definition, the all-in-drawn spread is calculated as the sum of the interest rate margin and various fees. However, as also documented by Berg et al. (2016), I find that the reported all-in-drawn spread is extremely close to the interest rate margin. Thus, in this paper, I treat the all-in-drawn spread as the rate that the borrower pays to all syndicate members in a loan contract.

4.1 Testing the repricing option

The theoretical analysis emphasizes how the repricing option value moves with different parameters, as summarized in Section 2.3. To test the implications, it requires the estimations of the expected probability of reaching the up-state q_0^u, the expected short-term credit risk in the up-state λ_1^u, and the current credit risk of λ_0. However, it is difficult to find accurate measures of the expected variables of q_0^u and λ_1^u. To address the concern, I conduct two reversed regressions. First, I test whether the loan premium can predict a future credit improvement to examine whether the loan premium contains information about q_0^u. Second, I test whether there is a positive correlation between the change in credit quality and the loan premium. The correlation between the repricing option value and λ_1^u can be confirmed if a larger credit improvement is associated with a larger loan premium. The first test is specified by,

$$\text{I(Rating improves)} = \beta_1 \text{Loan premium}_{i,t} + \beta_2 \text{Initial rating}_{i,t} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}. \tag{28}$$

The dependent variable is an indicator that equals one if the issuer's rating improves within five years after the loan origination. If the rating remains unchanged or gets downgraded, the variable is zero.[9] The unconditional mean of the rating improvement indicator is roughly 30%. The key explanatory variable is the loan premium (in percentage points) as calculated by the two models introduced in Section 3.1: the reduced-form model estimator and the structural model estimator. The theoretical analysis suggests that if the prepayment compensation is part of the loan premium, a higher premium should predict a future improvement in credit quality. Thus, the estimated coefficient of the loan premium $\hat{\beta}_1$ should be positive. The specification in Equation 28 also includes industry and year fixed effects, as captured by τ_s and θ_t. Since in general it is easier for low-credit firms to have rating improvements, I incorporate the firm's credit rating before the loan issuance as a control variable. In the largest model specification, I also include a set of firm level control variables, denoted by $\boldsymbol{x}_{i,t}$. I cluster the standard errors at the firm and year level.

[9] To determine whether the rating is upgraded, downgraded, or unchanged, I take the following method. First, I find the current credit rating of a firm when the loan is originated. Then, I identify the next assigned rating by S&P of the firm after the loan origination. If the assigned time exceeds five years after loan origination, I treat the rating as unchanged. Otherwise, if the assigned time is within five years, I take the newly assigned rating (which can be upgraded, downgraded, unchanged, or canceled).

The test results are summarized in Table 3. The coefficients of the loan premium are significantly positive across different specifications, indicating a positive association between the loan premium and future credit improvement. In terms of economic significance, the coefficient in column (1) is 0.022, suggesting that a one percentage point increase in the loan premium can predict a 2.2% higher probability of credit improvement. Considering the unconditional mean of credit improvement is 0.3, this result translates to a 7.3% increase in the likelihood of credit improvement. Columns (3) and (4) report the regressions with additional control variables to account for other factors that can affect future rating changes. While the magnitude of the prediction power decreases, the conclusion that the loan premium is positively associated with rating improvement remains robust.

Next, I replace the dependent variable with the actual change in the credit rating score within five years after the loan origination. The regression formula is,

$$\text{Rating score change}_{i,t} = \beta_1 \text{Loan premium}_{i,t} + \beta_2 \text{Initial rating}_{i,t} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}. \quad (29)$$

As suggested by the model, if the firm's credit quality gets more improvement (λ_1^u smaller), the repricing option becomes more attractive. Thus, the compensation to the bank should be positively correlated with the future credit quality (or negatively correlated with the future credit risk). In Equation 29, the dependent variable is measured by the actual change in the rating score in the subsequent five years after the loan origination, where a negative number indicates a rating upgrade (see Table AI). If a larger loan premium contains more compensation for the prepayment risk, it should predict a further upgrade (more negative score change). Therefore, I expect a negative $\hat{\beta}_1$ in this specification.

The test results are presented in Table 4. Across all specifications, the coefficients of the loan premium are negative, consistent with the expectation that the premium should be negatively correlated with future credit risk. The coefficient in column (1) indicates that a one percentage point higher loan premium can predict a future rating score decline of 0.08 (corresponding to an upgraded rating). While the economic magnitude is small, this aligns with the theoretical understanding that prepayment compensation can only account for a small portion of the credit risk.

4.2 Testing the distressed renegotiation

To examine whether the loan premium arises from the distressed renegotiation, I employ the identification strategy based on a U.S. court ruling in 2014, which shook up the industry's long-held assumptions about distressed debt restructuring. I begin by describing the institutional background of the court ruling and illustrating the identification strategies based on it. Then, I present and discuss the empirical results.

4.2.1 Institutional background of Marblegate

The TIA of 1939 was enacted to provide protections to holders of debt securities, with Section 316(b) stating:

> *"the right of any holder of any indenture security to receive payment of the principal of and interest on such indenture security, on or after the respective due dates expressed in such indenture security, or to institute suit for the enforcement of any such payment on or after such respective dates, shall not be impaired or affected without the consent of such holder..."*

In 2014, the for-profit education company Education Management Corp. ("EDMC") restructured approximately $1.3 billion in secured debt and $217 million in unsecured notes issued by EDMC's subsidiaries, through an out-of-court exchange offer. Under the restructuring, secured creditors foreclosed on their collateral and that allowed EDMC to transfer those assets to a newly formed subsidiary of EDMC. In addition, the release of the guaranty by secured creditors caused a release of EDMC's guaranty of the unsecured notes under qualified terms of the TIA. Although the transaction did not amend the unsecured notes' payment terms (or the indenture at all), dissenting noteholders were left only claims against the old EDMC subsidiaries, which at that point had no assets. Consequently, unsecured creditors who declined to participate in the exchange offer would not receive any payment on their notes.

As a result, two hold-out noteholders (collectively "Marblegate"), with a par value of around $14 million in unsecured notes, sued against the exchange offer in October 2014. Marblegate alleged that the transaction violated Section 316(b) by effectively depriving them of the practical ability to collect on the notes and that the offer was overly coercive. In December 2014, the court denied Marblegate's motion for an injunction of the exchange offer because they failed to demonstrate a likelihood of irreparable harm and because the balance of the equities and the public interest weighed against granting the injunction. However, the district court ruled that Marblegate was likely to succeed on the merits of its TIA claim. In the end, EDMC proceeded with the exchange offer, but as a consequence of the ruling, EDMC altered certain terms to protect Marblegate's rights, including the removal of the parent guaranty cancellation.

The largest impact of the ruling stems from the court's re-interpretation of the TIA as offering "broad protection against nonconsensual debt restructurings". The court rejected the view that the TIA offers only a "narrow protection against majority amendment of certain core terms." If this view is adopted by other courts, it may become more difficult to implement an out-of-court restructuring without unanimous consent, even if the actions taken are permitted by the indenture. This re-interpretation significantly disrupted the long-held assumptions regarding out-of-court restructurings. There was also concern that giving more leverage to minority noteholders to block a restructuring could result in more bankruptcy filings and increase bankruptcy costs as more litigation ensues.

The overturn of Marblegate in 2017: The defendants filed for a review in the Second Circuit Court of Appeals, where the appeals court largely overturned Marblegate. The Second Circuit found the meaning of Section 316(b) ambiguous and resorted to the legislative history to determine its meaning. In January 2017, the Second Circuit decision restored the law to its pre-Marblegate interpretation. Among other things, the decision provides bond issuers with comfort that they could again seek to implement exchange offers through the use of exit consents without the uncertainty of violating Section 316(b).

4.2.2 Empirical strategy and test results

The ultimate goal is to identify whether the loan premium is a reward to banks for their function of transferring bankruptcy costs to the borrower's stakeholders. To test this, I employ a difference-in-difference analysis utilizing the Marblegate ruling. The case has attracted widespread attention in financial markets and led to greater uncertainties for distressed firms when seeking out-of-court restructurings. Empirically, Kornejew (2024) has documented that the ruling heavily hurts the out-of-court restructurings. The author defines the exposure to

Marblegate as a function of a firm's outstanding bond holdings. A firm with higher exposure to Marblegate experienced a more significant increase in the tendency to file for bankruptcy after the ruling took effect.[10] As suggested by the theoretical discussion, if it is less likely to achieve an out-of-court restructuring, the bank and the borrower should anticipate a reduced chance of saving the bankruptcy costs. As a result, the loan premium should drop after the ruling, especially for firms more exposed to Marblegate (i.e., the *bond-intensive* firms). However, the model also suggests that in normal times, when out-of-court restructurings are easier to implement, the premium should increase in bond intensity. To test these implications, I run the following difference-in-difference regression:

$$\text{Loan premium}_{i,t} = \beta_1 M_t + \beta_2 B_{i,t} + \beta_3 (M_t \times B_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + e_{i,t}, \tag{30}$$

where the binary indicator M_t equals one if the loan is originated in 2015 or 2016, $M_t = \mathbb{1}(\text{year} = 2015, 2016)$. The variable $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median bond holding of the entire sample. The median level of the bond holding intensity, defined as the outstanding bond face value scaled by the book asset value, is equal to 0.26. This is very close to the median bond holding intensity of 0.25 as documented in Kornejew (2024). So, the bond-intensive indicator is defined as $B_{i,t} = \mathbb{1}(\text{bond holding}_{i,t}/\text{book asset}_{i,t} > 0.26)$. The key variable of interest is the interaction between the bond-intensive indicator and the Marblegate indicator ($M_t \times B_{i,t}$), and the coefficient $\hat{\beta}_3$ can capture the impact of the Marblegate ruling on *bond-intensive* firms after the shock.

A standard difference-in-difference regression only compares treated and non-treated groups before and after a shock. However, the Marblegate ruling was reversed in 2017. The statistical power of the reversed ruling might be limited because the overturning in 2017 was not so surprising, and market participants had been wary about policy shifts. To keep a clean difference-in-difference comparison, I first limit the analysis to the sample period before 2017. I estimate the regression as formulated by Equation 30, with a restricted sample period from 1997 to 2016. Table 5 summarizes the results. The dependent variable is the loan premium in bps as measured by different models. The coefficients of the interaction term are negative and

[10] Kornejew (2024) primarily relies on the initial ruling change in December 2014, and uses the data until the end of 2016 before the reversed Second Circuit Decision.

significant across different specifications, confirming the hypothesis that the loan premium will drop for *bond-intensive* firms after the shock, due to a lower chance of implementing out-of-court procedures. The magnitude is economically sizable: the Marblegate ruling has led to a decrease in the loan premium by 18-28 bps for the reduced model specification, and 83-107 bps for the structural model specification. It is also interesting to note that the coefficient for the indicator $B_{i,t}$ is positive and significant. This indicates that before the shock, the *bond-intensive* firms had a larger loan premium, which is consistent with the model implication.

4.2.3 Robustness tests

To validate the main result, I conduct a series of robustness tests. First, I run the same regression on the restricted sample as formulated by Equation 30, but further include year fixed effects while excluding the Marblegate indicator due to multicollinearity:

$$\text{Loan premium}_{i,t} = \beta_2 B_{i,t} + \beta_3 (M_t \times B_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}. \tag{31}$$

The results are summarized in Table 6. The estimation of $\hat{\beta}_3$ remains negative and significant. The size of the Marblegate effect is very close to the previous finding, indicating a robust and economically large effect.

Second, I conduct the same regression as specified by Equation 30, but using the full-period sample, including observations after 2016. The definition of the indicator variable M_t remains unchanged, it equals one when the loan is originated in 2015 or 2016. For observations before 2015 or after 2016, the indicator M_t is zero. The regression results are presented in Table 7. Compared to the results on the restricted sample, the coefficients drop slightly. The estimated $\hat{\beta}_3$ remains significantly negative when using the structural estimator, but it loses significance when using the reduced-form estimator.[11]

Third, I examine whether the drop in the loan premium originates from a decrease in the loan spread or an increase in the bond spread. I run the following regression on the restricted sample,

$$\text{Loan/Bond spread}_{i,t} = \beta_1 M_t + \beta_2 B_{i,t} + \beta_3 (M_t \times B_{i,t}) + \tau_s + e_{i,t}. \tag{32}$$

[11] The observations of the reduced-form estimator might be inaccurate after 2017, since I do not observe the average loss given default after 2017.

The results are presented in Table 8. Column (1) reports the regression where the dependent variable is the loan spread, the coefficient $\hat{\beta}_3$ of the interaction term is significantly negative. Column (2) reports the regression where the dependent variable is the seniority-adjusted bond spread. The coefficient $\hat{\beta}_3$ of the interaction term is not significantly different from zero. These results suggest that the reduction in the loan premium mainly arises from the loan side.

4.2.4 Long-term effect of Marblegate

The results so far have only shown the effect of the initial ruling shock in 2014 based on a sample before the overturn. It is also interesting to examine the long-term effect of the ruling, especially because the ruling has drawn widespread attention and eventually got overturned. To explore this, I conduct a dynamic difference-in-difference regression to allow for a visual examination of the impacts of Marblegate. First, I generate a centered time variable for the year 2014 ($T = 0$), which is the last period before Marblegate. So the first period after the Marblegate implementation is 2015 ($T = 1$), and the second-to-last period before Marblegate is 2013 ($T = -1$), and so on. Then, I interact the treatment variable ($B_{i,t}$) with the set of binary indicator variables $\mathbb{1}_{\pm T}$ for each of the time periods:

$$\text{Loan premium}_{i,t} = \beta_2 B_{i,t} + (\mathbb{1}_{\pm T} \times B_{i,t})\boldsymbol{\delta}_{\pm T} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t} \tag{33}$$

The resulting coefficients of $\boldsymbol{\delta}_{\pm T}$ are plotted in Figure 5. The effects are near zero (only compared to the year 2014) in most of the pre-treatment periods, suggesting a parallel trend before the shock. In addition, there is a significant drop in 2015, 2016 and 2017, indicating a reduction in the loan premium for *bond-intensive* firms after the shock. In addition, I find the Marblegate effect faded away after 2017, indicating the overturning of Marblegate. Overall, it supports the hypothesis that banks charge a loan premium that arises from the saved bankruptcy costs by providing renegotiations during financial distress.

4.2.5 Heterogeneous treatment effects

I conduct triple difference-in-difference tests to identify which types of loans have the strongest treatment effect. As documented by Demiroglu and James (2015), loans from transitional bank lenders are significantly easier to restructure out of court than those from institutional lenders. Motivated by this, I test if the Marblegate effect is centered around loans that are not held in part by collateralized loan obligations (CLOs). It is not possible to directly observe whether a loan is held by CLOs in DealScan, but the database reports an identifier (LIN code) which is used if the loan is traded in the secondary market. I proxy the CLO holding status by whether a loan is associated with a LIN code, and denote this indicator variable as $LIN_{i,t} = \mathbb{1}(LIN \text{ available})$. The regression is specified by,

$$\text{Loan premium}_{i,t} = \beta_3(M_t \times B_{i,t}) + \delta(M_t \times B_{i,t} \times LIN_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \boldsymbol{z}_{i,t}\boldsymbol{\phi} + \tau_s + e_{i,t}. \qquad (34)$$

The triple interaction term can capture whether the LIN-available loans respond differently from LIN-unavailable loans after Marblegate. The term $\boldsymbol{z}_{i,t}$ includes all the regressors generated by the triple interaction, which are $M_t, B_{i,t}, M_t \times LIN_{i,t}, B_{i,t} \times LIN_{i,t}$. Table 9 reports the test results (on the restricted sample). Across all specifications, I find the coefficients for the triple interaction term are positive. When using the reduced-form estimator of loan premium, the coefficient is not statistically significant. However, when using the structural model estimator, the coefficient is statistically and economically significant. The positive sign indicates that when the loan is held in part by CLOs (LIN available), the Marblegate effect becomes smaller. The result is consistent with the hypothesis that for loans associated with institutional lenders, it is harder to renegotiate, making the Marblegate effect smaller.

Apart from the CLO association, the number of lenders can also affect the severity of holdout and free-rider problems in distressed renegotiation. It is generally more likely to renegotiate successfully in traditional bilateral lending relations. Therefore, it is also interesting to examine whether the treatment effect is more pronounced for loans with only one lender. However, in the syndicated loan universe, most of the loans are not bilateral. In the final sample, the median number of lenders is nine, and only a small fraction of loans are lent by one bank. So instead of utilizing the count of lenders, I use the count of lead arrangers which captures the idea that fewer lead arrangers in a syndicate can better facilitate a renegotiation during financial distress. I denote the loans with only one lead arranger by the indicator:

$OneLead_{i,t} = \mathbb{1}$(Number of lead arranger == 1), and test,

$$\text{Loan premium}_{i,t} = \beta_3(M_t \times B_{i,t}) + \delta(M_t \times B_{i,t} \times OneLead_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \boldsymbol{z}_{i,t}\boldsymbol{\phi} + \tau_s + e_{i,t}. \quad (35)$$

If the treatment effect is more centered around loans with only one lead arranger, then the coefficient of the triple interaction should be negative. The test results summarized in Table 10 confirm the hypothesis.

The triple difference-in-difference test provides more insights into the heterogeneity of the treatment effects across different loan types. It further validates the mechanism that the negative Marblegate effect is associated with the ease of renegotiation.

5 Conclusion

This paper examines the source of a substantial interest rate premium charged by banks relative to the credit spread implied by the bond market. The central finding is that a large portion of the loan premium originates from the valuable flexibilities offered by banks, beyond what the capital market can provide. Specifically, banks allow for renegotiations during financial distress, resulting in a wealth transfer from bankruptcy costs to the borrower's stakeholders. I arrive at this finding by using a difference-in-difference analysis based on a U.S. court ruling in 2014, which led to a sudden drop in the probability of out-of-court restructurings. In addition, I show that the prepayment risk is priced in the interest rate and contributes to a minor portion of the loan premium. My findings suggest a value creation function of banks through renegotiations and explain the firms' willingness to borrow from banks.

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Figures and Tables

Figure 3: The distribution of the loan issuance over time of the final sample. The loan issuance is evenly distributed in most years, but there are sharp decreases during market downturns, in 2008, 2020 and 2022.

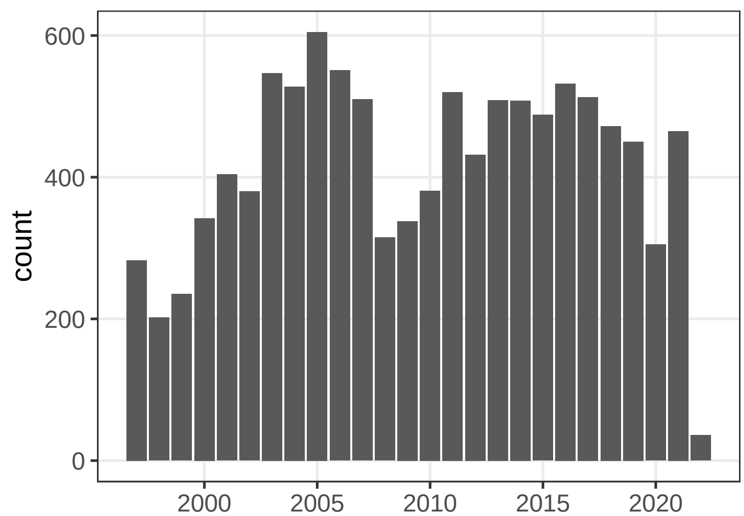


Figure 4: The distribution of the loan issuance among issuers of the final sample. It depicts how often does a borrower appear in the final sample. For example, the first bar indicates that, there are roughly 350 borrowers who only have one loan origination with matched bond quotes in the final sample.

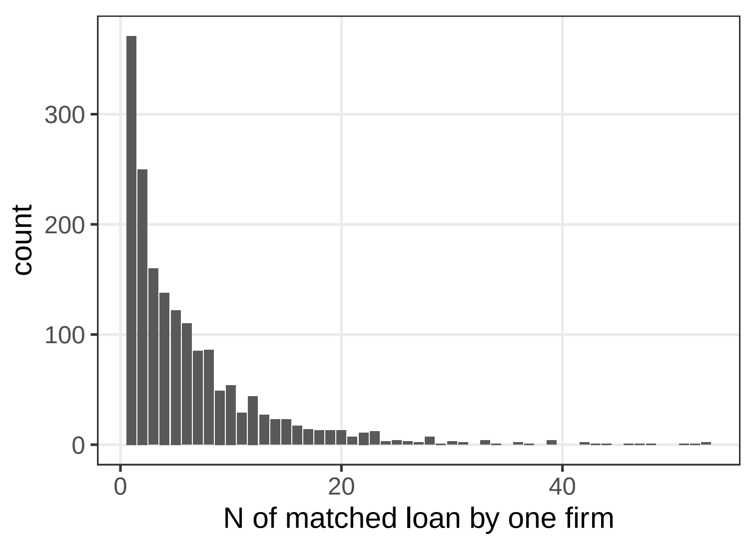


Figure 5: The figure shows the long-term effect of Marblegate on the loan premium through a dynamic difference-in-difference analysis. I estimate Loan premium$_{i,t} = \beta_2 B_{i,t} + (\mathbb{1}_{\pm T} \times B_{i,t})\boldsymbol{\delta}_{\pm T} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}$, where the loan premium (in bps) is as measured by the structural model. The variable $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median bond holding of the entire sample. I generate a centered time variable of year 2014 ($T = 0$), which is the last period before Marblegate. So the first period after the Marblegate implementation is 2015 ($T = 1$), and the second-to-last period before Marblegate is 2013 ($T = -1$), and so on. Then I interact $B_{i,t}$ with the set of the binary indicators $\mathbb{1}_{\pm T}$. After running the regression, I plot the coefficients of the interaction terms.

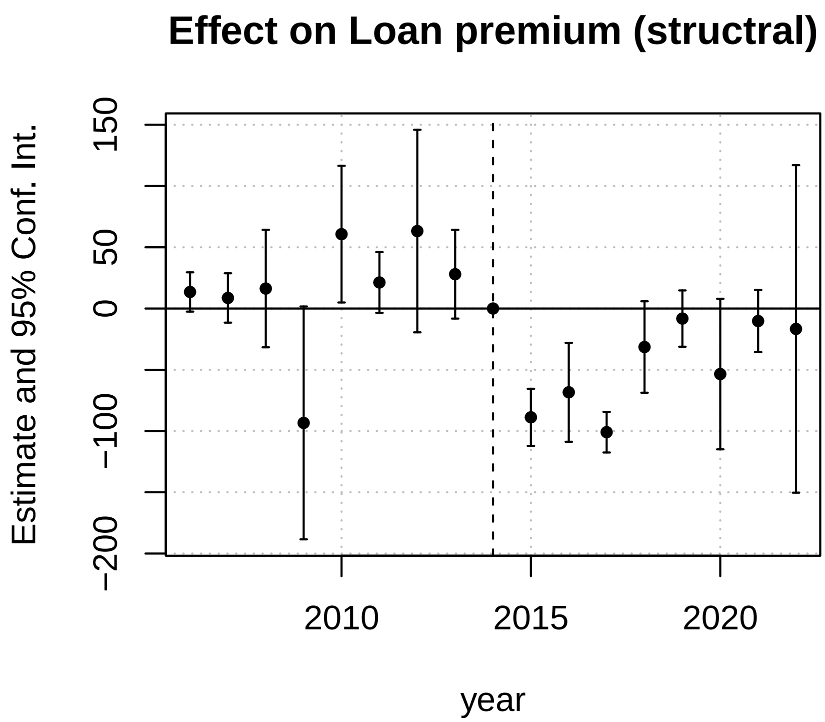


Table 1: The definition and sources of parameters for computing the bond-implied loan spread using the structural model of credit risk.

Parameter	Description	Data	Source
K	Total book debt	Long-term debt plus current liabilities	Compustat
K_S	Senior debt amount	Bank, lease and undrawn debt	Capital IQ
K_J	Junior debt amount	Total book debt minus senior debt	Compustat
V	Quasi-market asset	Total book debt plus market equity	Compustat, CRSP
T	Maturity	Loan and bond maturities	DealScan, FISD
r	Risk-free rate	Maturity-matched LIBOR swap rate	Bloomberg
y_J	Junior debt yield	Daily quote of bond's yield	Refinitiv Eikon

Table 2: Summary statistics. This table documents the summary statistics on the full sample in Panel A and on the restricted sample of term loans only in Panel B. The series of loan premium are winsorized at 0.1% level.

Panel A: Full sample

Variable	N	Mean	SD	Min	P25	Median	P75	Max
Loan characteristics								
All-in-drawn spread (bps)	10,851	195	124	5	112	175	250	1,200
Tranche amount ($M)	10,851	776	1,061	0	175	412	1,000	24,000
Maturity	10,851	4.4	1.4	1	3.4	5	5	12
Term loan	10,851	0.28	0.45	0	0	0	1	1
Secured loan	10,851	0.49	0.5	0	0	0	1	1
Lead arranger count	10,851	3.2	3	0	1	2	4	29
Performance pricing	10,851	0.29	0.46	0	0	0	1	1
Maturity matched rf (%)	10,851	3	1.9	0.15	1.5	2.3	4.6	7.6
Bond characteristics								
Yield to maturity (%)	10,851	6.9	5.8	0.1	3.5	5.7	8.1	50
Yield spread (bps)	10,851	395	554	-558	92	233	481	4,841
Face value ($M)	10,851	404	384	0.001	183	300	500	6,000
Maturity	10,851	4.6	1.6	0.0082	3.6	4.6	5.5	13
Maturity matched rf (%)	10,851	3	1.9	0.18	1.4	2.4	4.6	7.6
Firm characteristics								
Market asset ($B)	8,582	20	52	0.064	2.1	6	17	1,350
Market leverage (%)	8,582	42	22	0	23	39	57	98
Asset volatility	8,440	0.22	0.12	0.013	0.14	0.2	0.27	1.4
Distance to default	8,437	4.7	11	-398	3	5	7.3	54
Trailing stock return (%)	8,482	20	190	-96	-20	6.7	30	11,730
Asset market to book (%)	8,582	124	86	9.5	78	100	139	1,269
Asset tangibility (%)	10,572	40	26	0	15	36	62	98
Profitability (%)	10,341	2.9	2.9	-51	1.8	2.8	4	36
Bond to book asset (%)	10,680	32	29	0.26	16	26	39	621
S&P rating score	8,043	11	3.3	1	9	12	14	25
Loan premium								
Reduced form (bps)	10,851	96	128	-827	50	95	153	662
Structural form (bps)	4,292	57	283	-2,742	13	97	174	2,272

Table 2 - Continued

Panel B: Term loan only

Variable	N	Mean	SD	Min	P25	Median	P75	Max
Loan characteristics								
All-in-drawn spread (bps)	3,073	268	149	5	175	250	325	1,200
Tranche amount ($M)	3,073	536	645	0	135	300	675	5,000
Maturity	3,073	4.8	1.7	1	3.7	5	6	12
Term loan	3,073	1	0	1	1	1	1	1
Secured loan	3,073	0.72	0.45	0	0	1	1	1
Lead arranger count	3,073	3	2.9	0	1	2	4	19
Performance pricing	3,073	0.17	0.38	0	0	0	0	1
Maturity matched rf (%)	3,073	3.2	1.9	0.18	1.6	2.7	4.9	7.6
Bond characteristics								
Yield to maturity (%)	3,073	8.2	6.4	0.13	4.7	6.7	9.5	50
Yield spread (bps)	3,073	503	609	-558	186	334	571	4,805
Face value ($M)	3,073	434	381	0.001	200	329	500	4,800
Maturity	3,073	5	1.9	0.0082	3.8	5.1	6.3	13
Maturity matched rf (%)	3,073	3.2	1.9	0.18	1.5	2.7	4.9	7.6
Firm characteristics								
Market asset ($B)	2,376	14	48	0.064	2	5.2	13	722
Market leverage (%)	2,376	50	22	0.23	33	48	67	98
Asset volatility	2,309	0.21	0.12	0.013	0.13	0.18	0.26	1.4
Distance to default	2,308	3.4	15	-398	2.4	4.3	6.4	54
Trailing stock return (%)	2,325	22	151	-96	-25	4.3	33	3,701
Asset market to book (%)	2,376	120	87	9.5	78	99	133	1,072
Asset tangibility (%)	2,966	37	25	0	14	35	56	97
Profitability (%)	2,894	2.8	2.9	-50	1.7	2.8	3.9	29
Bond to book asset (%)	2,990	36	32	0.26	17	27	44	524
S&P rating score	2,271	13	2.9	3	12	13	14	25
Loan premium								
Reduced form (bps)	3,073	143	144	-765	84	144	207	662
Structural form (bps)	1,544	92	306	-2,742	40	125	207	2,272

Table 3: This table reports the regression of the indicator of issuer's rating improvement on the loan premium (pp). The estimation is specified by $\mathrm{I}_{i,t}(\text{Rating improves}) = \beta_1 \text{Loan premium}_{i,t} + \beta_2 \text{Initial rating}_{i,t} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}$. The dependent variable is a binary indicator that equals one if the rating of the loan issuer gets upgraded within five years after the loan origination. The key variable of interest is the loan premium, as measured by different models or using different data sources. The control variables $\boldsymbol{x}_{i,t}$ are defined in the appendix. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	I(Rating improves within 5 years)			
	(1)	(2)	(3)	(4)
Loan premium (reduced)	0.022***		0.014**	
	(0.006)		(0.006)	
Loan premium (structral)		0.010**		0.007*
		(0.004)		(0.003)
Initial rating	0.036***	0.039***	0.052***	0.062***
	(0.003)	(0.005)	(0.005)	(0.008)
Market leverage			−0.281**	−0.451***
			(0.101)	(0.145)
Asset volatility			−0.022	−0.028
			(0.149)	(0.170)
Trailing return			0.017*	0.011
			(0.010)	(0.012)
Asset M/B ratio			0.040**	0.027
			(0.017)	(0.029)
Asset tangibility			0.040	−0.006
			(0.072)	(0.107)
Profitability			0.932**	0.521*
			(0.373)	(0.263)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7,917	3,314	6,035	3,156
R^2	0.119	0.148	0.159	0.184
Adjusted R^2	0.110	0.127	0.147	0.161
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 4: This table reports the regression of the actual change of issuer's rating score on the loan premium (pp). The estimation is specified by $\text{Rating score change}_{i,t} = \beta_1 \text{Loan premium}_{i,t} + \beta_2 \text{Initial rating}_{i,t} + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}$. The dependent variable is the actual change of the loan issuer's rating within five years after the loan origination. The key variable of interest is the loan premium, as measured by different models or using different data sources. The control variables $\boldsymbol{x}_{i,t}$ are defined in the appendix. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	Rating change (score) within 5 years			
	(1)	(2)	(3)	(4)
Loan premium (reduced)	−0.082***		−0.060**	
	(0.027)		(0.024)	
Loan premium (structral)		−0.032**		−0.022**
		(0.012)		(0.011)
Initial rating	−0.060***	−0.052***	−0.108***	−0.107***
	(0.009)	(0.014)	(0.015)	(0.024)
Market leverage			0.921***	1.064**
			(0.250)	(0.410)
Asset volatility			−0.074	−0.529
			(0.368)	(0.448)
Trailing return			−0.055*	−0.027
			(0.027)	(0.028)
Asset M/B ratio			−0.119***	−0.073
			(0.035)	(0.059)
Asset tangibility			−0.185	0.001
			(0.218)	(0.299)
Profitability			−2.447	−1.295
			(1.704)	(1.658)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7,917	3,314	6,035	3,156
R^2	0.084	0.118	0.131	0.157
Adjusted R^2	0.074	0.096	0.118	0.133
Note:			*p<0.1; **p<0.05; ***p<0.01	

Table 5: This table reports the response of loan premium to the unanticipated ruling shock, the sample is restricted to before and including the year 2016. The regression formula is Loan $\text{premium}_{i,t} = \beta_1 M_t + \beta_2 B_{i,t} + \beta_3 (M_t \times B_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + e_{i,t}$, where the loan premium (bps) is measured by different models, the binary indicator M_t equals one if the loan is originated in 2015 or 2016, $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median of 0.26. The variable of interest is the interaction $M_t \times B_{i,t}$. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	Loan premium (reduced)	Loan premium (structral)	Loan premium (reduced)	Loan premium (structral)
	(1)	(2)	(3)	(4)
Marblegate	13.999*	15.773	21.268***	36.318
	(7.599)	(26.550)	(7.617)	(25.452)
Bond intensive	8.785	60.149***	20.902***	104.523***
	(5.938)	(11.939)	(3.894)	(14.252)
Marblegate*Bond intensive	−18.224**	−83.243***	−27.656**	−107.314***
	(8.384)	(22.174)	(14.022)	(24.458)
Market leverage			−29.555	−238.220***
			(31.336)	(89.686)
Asset volatility			72.098*	−65.108
			(39.627)	(103.517)
Trailing return			10.887***	16.968**
			(4.023)	(6.629)
Asset M/B ratio			−7.843*	−10.482
			(4.465)	(14.506)
Asset tangibility			−7.050	55.456
			(25.080)	(61.809)
Profitability			451.625***	1,104.281***
			(114.658)	(365.170)
Industry FE	Yes	Yes	Yes	Yes
Observations	8,607	3,202	6,352	3,010
R^2	0.050	0.078	0.092	0.129
Adjusted R^2	0.043	0.061	0.082	0.110
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 6: This table reports the response of loan premium to the unanticipated ruling shock, the sample is restricted to before and including the year 2016. The regression formula is $\text{Loan premium}_{i,t} = \beta_2 B_{i,t} + \beta_3(M_t \times B_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + \theta_t + e_{i,t}$. Compared to Table 5, the regressor M_t is removed, but the year fixed effect θ_t is included.

	Dependent variable:			
	Loan premium (reduced)	Loan premium (structral)	Loan premium (reduced)	Loan premium (structral)
	(1)	(2)	(3)	(4)
Bond intensive	8.593	55.754***	15.730***	91.469***
	(5.820)	(13.468)	(4.349)	(15.917)
Marblegate*Bond intensive	−18.532**	−76.998***	−26.378*	−94.086***
	(8.202)	(21.286)	(13.823)	(25.294)
Market leverage			15.643	−153.594*
			(32.668)	(84.872)
Asset volatility			167.508***	167.675
			(52.030)	(200.895)
Trailing return			7.616**	11.669**
			(3.458)	(4.841)
Asset M/B ratio			−5.553	−4.528
			(4.520)	(14.975)
Asset tangibility			−0.093	52.234
			(24.211)	(58.167)
Profitability			432.670***	956.757**
			(117.247)	(390.646)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	8,607	3,202	6,352	3,010
R^2	0.107	0.123	0.143	0.157
Adjusted R^2	0.099	0.101	0.131	0.134
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 7: This table reports the response of loan premium to the unanticipated ruling shock, including the sample period after 2016. The regression formula is Loan premium$_{i,t} = \beta_1 M_t + \beta_2 B_{i,t} + \beta_3(M_t \times B_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \tau_s + e_{i,t}$, where the loan premium (bps) is measured by different models, the binary indicator M_t equals one if the loan is originated in 2015 or 2016, $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median of 0.26. The variable of interest is the interaction $M_t \times B_{i,t}$. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	Loan premium (reduced)	Loan premium (structral)	Loan premium (reduced)	Loan premium (structral)
	(1)	(2)	(3)	(4)
Marblegate	9.245	5.252	14.562**	16.025
	(6.119)	(20.359)	(6.609)	(19.261)
Bond intensive	4.288	46.338***	12.849***	76.036***
	(5.054)	(11.630)	(4.376)	(13.563)
Marblegate*Bond intensive	−14.636**	−69.279***	−21.440	−78.504***
	(7.130)	(17.263)	(13.547)	(20.529)
Market leverage			−17.927	−203.472***
			(27.557)	(75.418)
Asset volatility			65.982**	−84.684
			(32.745)	(76.132)
Trailing return			8.676***	11.565**
			(3.131)	(5.687)
Asset M/B ratio			−6.076**	−11.820
			(2.925)	(7.822)
Asset tangibility			−7.234	28.623
			(20.125)	(45.950)
Profitability			433.414***	1,089.819***
			(107.111)	(332.494)
Industry FE	Yes	Yes	Yes	Yes
Observations	10,852	4,304	8,093	4,093
R^2	0.044	0.072	0.076	0.113
Adjusted R^2	0.039	0.059	0.068	0.099
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 8: This table reports the response of loan spread and seniority-adjusted bond spread to the unanticipated ruling shock, the sample is restricted to before and including the year 2016. The regression formula is Loan/Bond $\text{spread}_{i,t} = \beta_1 M_t + \beta_2 B_{i,t} + \beta_3(M_t \times B_{i,t}) + \tau_s + e_{i,t}$. The dependent variable is the all-in-drawn spread (bps) in column (1), and the seniority-adjusted bond spread (bps) in column (2). The binary indicator M_t equals one if the loan is originated in 2015 or 2016, $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median of 0.26. The variable of interest is the interaction $M_t \times B_{i,t}$. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:	
	Loan AIDS	BILS (reduced)
	(1)	(2)
Marblegate	9.723	−4.277
	(14.918)	(13.250)
Bond intensive	53.792***	45.007***
	(6.195)	(7.619)
Marblegate*Bond intensive	−25.186***	−6.962
	(6.376)	(10.395)
Industry FE	Yes	Yes
Observations	8,607	8,607
R^2	0.128	0.099
Adjusted R^2	0.122	0.093
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 9: This table reports the response of loan premium to the unanticipated ruling shock, for different types of loans. The sample is restricted to before and including the year 2016. The regression formula is Loan premium$_{i,t} = \beta_3(M_t \times B_{i,t}) + \delta(M_t \times B_{i,t} \times LIN_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \boldsymbol{z}_{i,t}\boldsymbol{\phi} + \tau_s + e_{i,t}$, where the loan premium (bps) is measured by different models, the binary indicator M_t equals one if the loan is originated in 2015 or 2016, $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median of 0.26, $LIN_{i,t}$ is an indicator that equals one when the loan is associated with a secondary market identifier (a proxy for CLO association). The variable of interest is the triple interaction $M_t \times B_{i,t} \times LIN_{i,t}$, the coefficients of indicators and other interactions $\boldsymbol{z}_{i,t}$ are omitted in the table. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	Loan premium (reduced)	Loan premium (structral)	Loan premium (reduced)	Loan premium (structral)
	(1)	(2)	(3)	(4)
Marblegate*Bond intensive	-19.711^{***}	-129.152^{***}	-33.148^{**}	-162.531^{***}
	(6.585)	(13.284)	(14.769)	(18.067)
Marblegate*Bond intensive*LIN indicator	12.819	109.716^{**}	20.824	137.399^{***}
	(15.608)	(47.588)	(18.024)	(41.988)
Covariates	No	No	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	8,607	3,202	6,352	3,010
R^2	0.059	0.079	0.101	0.130
Adjusted R^2	0.052	0.061	0.091	0.110
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 10: This table reports the response of loan premium to the unanticipated ruling shock, for different types of loans. The sample is restricted to before and including the year 2016. The regression formula is Loan premium$_{i,t} = \beta_3(M_t \times B_{i,t}) + \delta(M_t \times B_{i,t} \times OneLead_{i,t}) + \boldsymbol{x}_{i,t}\boldsymbol{\gamma} + \boldsymbol{z}_{i,t}\boldsymbol{\phi} + \tau_s + e_{i,t}$, where the loan premium (bps) is measured by different models, the binary indicator M_t equals one if the loan is originated in 2015 or 2016, $B_{i,t}$ is an indicator that equals one when the issuer firm's bond holding is above the median of 0.26, $OneLead_{i,t}$ is an indicator that equals one when the loan only has one lead arranger. The variable of interest is the triple interaction $M_t \times B_{i,t} \times OneLead_{i,t}$, the coefficients of indicators and other interactions $\boldsymbol{z}_{i,t}$ are omitted in the table. Sector fixed effects are based on 2-digits SIC sectors. Standard errors are clustered at issuer firm and year level.

	Dependent variable:			
	Loan premium (reduced)	Loan premium (structral)	Loan premium (reduced)	Loan premium (structral)
	(1)	(2)	(3)	(4)
Marblegate*Bond intensive	-20.560^{*}	-51.870^{*}	-27.208^{*}	-66.972^{*}
	(11.480)	(31.066)	(15.230)	(34.351)
Marblegate*Bond intensive*One lead indicator	-16.963	-181.077^{***}	-33.414^{**}	-205.989^{***}
	(18.284)	(62.502)	(13.261)	(67.420)
Covariates	No	No	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	8,574	3,201	6,330	3,009
R^2	0.054	0.079	0.095	0.131
Adjusted R^2	0.046	0.061	0.085	0.112
Note:				*p<0.1; **p<0.05; ***p<0.01

7 Appendix

Variable definition

Book debt: total long-term debt plus current liabilities.

Market asset: book debt plus equity market capitalization.

Market leverage: ratio of book debt to market asset.

Equity volatility: annualized standard deviation of daily stock returns over the previous year.

Asset volatility: unlevered volatility of the equity volatility.

Trailing stock return: firm's stock return over the previous year.

Subsequent stock return: firm's stock return over the following year.

Distance-to-default: the measured proposed in Bharath and Shumway (2008):

$$DtD = \frac{\ln{(V/D)} - (\mu - 0.5\sigma^2)T}{\sigma\sqrt{T}}$$

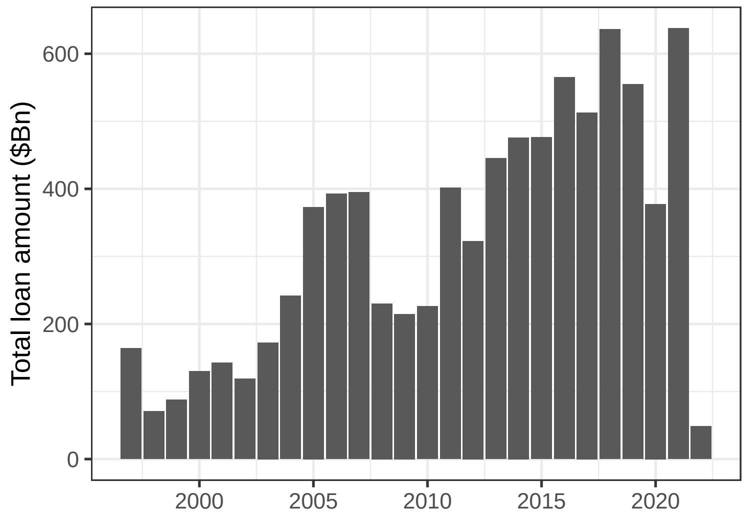
where V is the market asset, D is the book debt, μ is the trailing-year stock return, σ is the asset volatility, maturity is assumed to be 1.

Profitability: ratio of operating income before depreciation to book assets.

Additional figures and tables

Figure A1: The total amount and average amount of loans in the final sample.

(a) Total loan amount by year



(b) Average loan amount by year

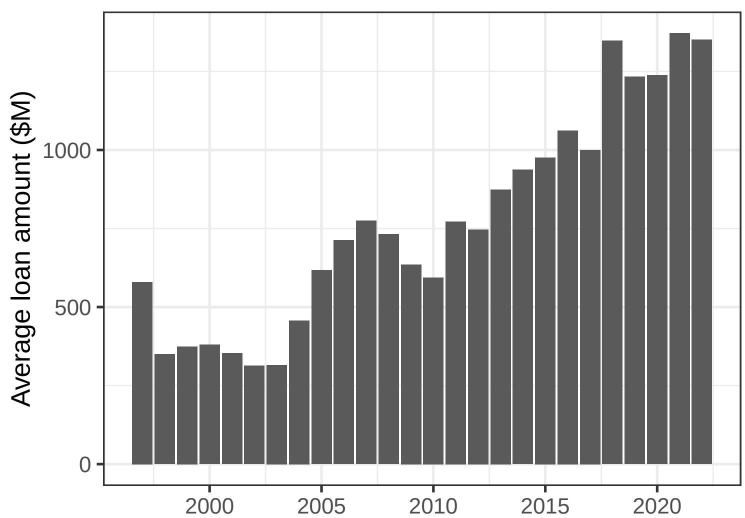
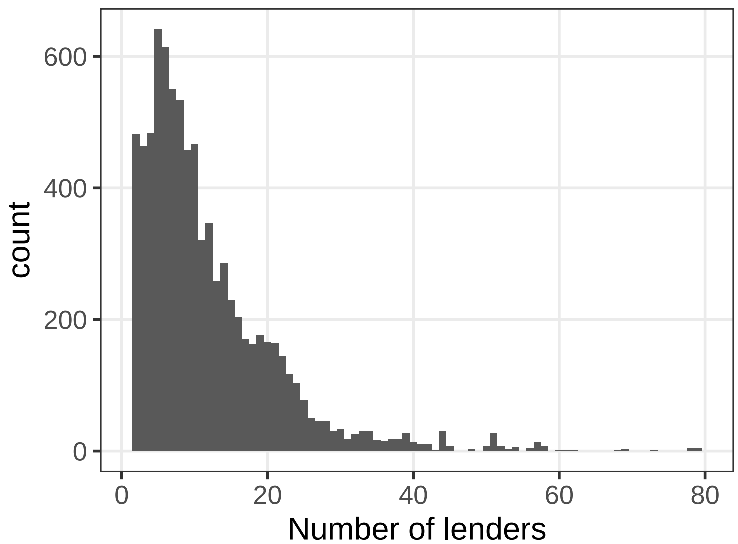
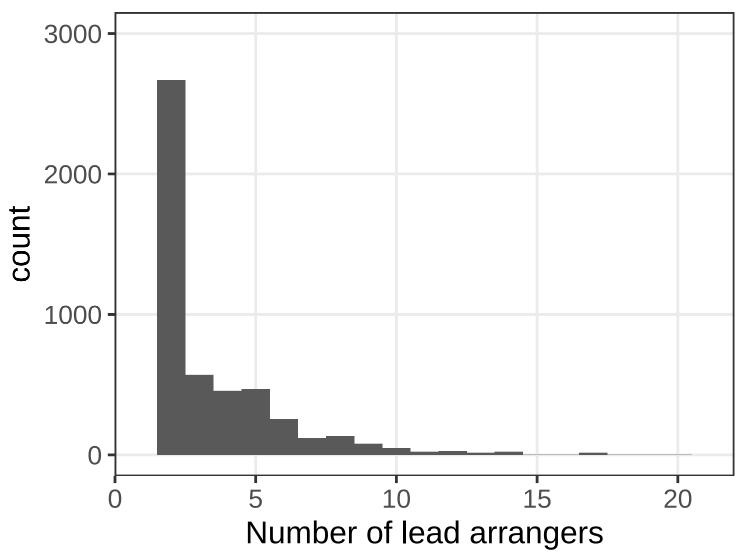


Figure A2: The histogram of the number of lenders and number of lead arrangers of the loans in the final sample.

(a) All lenders



(b) Lead arrangers



Tables

Table AI: Numeric Rating Scores.

Value	S&P	Moody's	Category
1	AAA	Aaa	Investment Grade
2	AA+	Aa1	
3	AA	Aa2	
4	AA-	Aa3	
5	A+	A1	
6	A	A2	
7	A-	A3	
8	BBB+	Baa1	
9	BBB	Baa2	
10	BBB-	Baa3	
11	BB+	Ba1	Non-Investment Grade
12	BB	Ba2	
13	BB-	Ba3	
14	B+	B1	
15	B	B2	
16	B-	B3	
17	CCC+	Caa1	
18	CCC	Caa2	
19	CCC-	Caa3	
20	CC	Ca	
21	C		
25	D	C	Default

Proof

The value of the repricing option P_{ro}, the initial interest rate without prepayment option y^*, and the requested new interest rate y_r^* are given by,

$$P_{ro} = q_0^u(y^* - y_r^*)(1 - \rho_1^u),$$

$$y^* = \frac{\alpha\rho_0 + \alpha(q_0^u\rho_1^u + q_0^d\rho_1^d)}{(1-\rho_0) + q_0^u(1-\rho_1^u) + q_0^d(1-\rho_1^d)}, \quad \text{and} \quad y_r^* = \frac{\alpha\rho_1^u}{1-\rho_1^u}.$$

Denote $\hat{\rho} = q_0^u\rho_1^u + q_0^d\rho_1^d$, y^* can be written as,

$$y^* = \frac{\alpha\rho_0 + \alpha\hat{\rho}}{2(1-\rho_0) - \hat{\rho}}.$$

Prove that $y^* > y_r^*$:

$$\begin{aligned} y^* - y_r^* &= \frac{(\alpha\rho_0 + \alpha\hat{\rho})(1-\rho_1^u) - \alpha\rho_1^u[2(1-\rho_0) - \hat{\rho}]}{[2(1-\rho_0) - \hat{\rho}](1-\rho_1^u)} \\ &= \alpha\frac{\rho_0 + \hat{\rho} + \rho_0\rho_1^u - 2\rho_1^u}{[2(1-\rho_0) - \hat{\rho}](1-\rho_1^u)} \\ &= \alpha\frac{(\rho_0 - \rho_1^u) + (\hat{\rho} + \rho_0\rho_1^u - \rho_1^u)}{[2(1-\rho_0) - \hat{\rho}](1-\rho_1^u)} \end{aligned} \tag{A1}$$

I show that $\hat{\rho} + \rho_0\rho_1^u - \rho_1^u = q_0^u\rho_1^u + q_0^d\rho_1^d + \rho_0\rho_1^u - \rho_1^u = q_0^d(\rho_1^d - \rho_1^u) > 0$. Since both the value of $\rho_0 - \rho_1^u$ and $\hat{\rho} + \rho_0\rho_1^u - \rho_1^u$ are positive, Equation A1 is positive since the denominator is also positive.

Prove that P_{ro} **decreases in** ρ_1^u: Since λ_1^u is irrelevant to q_0^u, I only need to examine the partial derivative of $\tilde{P}_{ro} \equiv (y^* - y_r^*)(1-\rho_1^u)$ with respect to ρ_1^u.

$$\begin{aligned} \tilde{P}_{ro} &= (y^* - y_r^*)(1-\rho_1^u) \\ &= \alpha\frac{\rho_0 + \hat{\rho} + \rho_0\rho_1^u - 2\rho_1^u}{[2(1-\rho_0) - \hat{\rho}]} \\ &= \alpha\left(\frac{(2-\rho_0)(1-\rho_1^u)}{[2(1-\rho_0) - \hat{\rho}]} - 1\right) \end{aligned} \tag{A2}$$

And the partial derivative is,

$$
\begin{aligned}
\frac{\partial \tilde{P}_{ro}}{\partial \rho_1^u} &= \alpha \frac{-(2-\rho_0)[2(1-\rho_0)-\hat{\rho}] + (2-\rho_0)(1-\rho_1^u)q_0^u}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(2-\rho_0)[-2(1-\rho_0) + q_0^u\rho_1^u + q_0^d\rho_1^d + (1-\rho_1^u)q_0^u]}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(2-\rho_0)[-2(1-\rho_0) + q_0^u + q_0^d\rho_1^d}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(2-\rho_0)[-2(1-\rho_0) + 1 - \rho_0 - q_0^d + q_0^d\rho_1^d}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(2-\rho_0)[-(1-\rho_0) - q_0^d(1-\rho_1^d)]}{[2(1-\rho_0)-\hat{\rho}]^2} < 0
\end{aligned} \tag{A3}
$$

Prove that y^* is decreasing in q_0^u: Note that $\frac{\hat{\rho}}{\partial q_0^u} = \rho_1^u - \rho_1^d < 0$, and

$$
\begin{aligned}
\frac{\partial y^*}{\partial q_0^u} &= \alpha \frac{(\rho_1^u - \rho_1^d)[2(1-\rho_0)-\hat{\rho}] + (\rho_0 + \hat{\rho})(\rho_1^u - \rho_1^d)}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(\rho_1^u - \rho_1^d)[2(1-\rho_0)-\hat{\rho} + \rho_0 + \hat{\rho}]}{[2(1-\rho_0)-\hat{\rho}]^2} \\
&= \alpha \frac{(\rho_1^u - \rho_1^d)(2-\rho_0)}{[2(1-\rho_0)-\hat{\rho}]^2} < 0.
\end{aligned} \tag{A4}
$$

To examine whether the option value P_{ro} is increasing or decreasing in q_0^u (i.e. the sign of $\frac{\partial P_{ro}}{\partial q_0^u}$), I define $\hat{P}_{ro} \equiv q_0^u(y^* - y_r^*)$ since q_0^u is irrelevant for $1 - \lambda_1^u$ and $(1+r)^2$, so,

$$
\begin{aligned}
\frac{\partial \hat{P}_{ro}}{\partial q_0^u} &= (y^* - y_r^*) + q_0^u \frac{\partial y^*}{\partial q_0^u} \\
&= \alpha \frac{(\rho_0 - \rho_1^u) + q_0^d(\rho_1^d - \rho_1^u)}{[2(1-\rho_0)-\hat{\rho}](1-\rho_1^u)} + q_0^u \alpha \frac{(\rho_1^u - \rho_1^d)(2-\rho_0)}{[2(1-\rho_0)-\hat{\rho}]^2}
\end{aligned} \tag{A5}
$$

Denote $\epsilon = \rho_1^d - \rho_1^u$,

$$
\frac{\partial \hat{P}_{ro}}{\partial q_0^u} = \alpha \frac{(\rho_0 - \rho_1^u) + q_0^d \epsilon}{[2(1-\rho_0)-\hat{\rho}](1-\rho_1^u)} + q_0^u \alpha \frac{-\epsilon(2-\rho_0)}{[2(1-\rho_0)-\hat{\rho}]^2} \tag{A6}
$$

The first-order condition is,

$$
\begin{aligned}
\frac{\partial \hat{P}_{ro}}{\partial q_0^u} = \alpha\frac{(\rho_0-\rho_1^u)+q_0^d\epsilon}{[2(1-\rho_0)-\hat{\rho}](1-\rho_1^u)} - q_0^u\alpha\frac{\epsilon(2-\rho_0)}{[2(1-\rho_0)-\hat{\rho}]^2} = 0 \\
\frac{(\rho_0-\rho_1^u)+(1-\rho_0-q_0^u)\epsilon}{(1-\rho_1^u)} = \frac{q_0^u\epsilon(2-\rho_0)}{[2(1-\rho_0)+q_0^u\epsilon-(1-\rho_0)\rho_1^d]}
\end{aligned}
\tag{A7}
$$

Denote $\tilde{q} = q_0^u\epsilon$,

$$
\frac{(\rho_0-\rho_1^u)+(1-\rho_0)\epsilon-\tilde{q}}{(1-\rho_1^u)} = \frac{\tilde{q}(2-\rho_0)}{[2(1-\rho_0)+\tilde{q}-(1-\rho_0)\rho_1^d]}
\tag{A8}
$$

It is a quadratic function of $\tilde{q}$,

$$
[(\rho_0-\rho_1^u)+(1-\rho_0)\epsilon-\tilde{q}][2(1-\rho_0)-(1-\rho_0)\rho_1^d+\tilde{q}]-\tilde{q}(1-\rho_1^u)(2-\rho_0)=0.
\tag{A9}
$$

I rewrite it as,

$$
\tilde{q}^2+2(1-\rho)(2-\rho_1^d)\tilde{q}-(1-\rho)(2-\rho_1^d)[(\rho_0-\rho_1^u)+(1-\rho)\epsilon]=0.
\tag{A10}
$$

There always exists roots for this quadratic function because the discriminant is,

$$
[2(1-\rho)(2-\rho_1^d)]^2+r(1-\rho)(2-\rho_1^d)[(\rho_0-\rho_1^u)+(1-\rho)\epsilon]>0.
$$

The positive root is:

$$
\begin{aligned}
\tilde{q} &= -(1-\rho)(2-\rho_1^d)+\sqrt{[(1-\rho)(2-\rho_1^d)]^2+(1-\rho)(2-\rho_1^d)[(\rho_0-\rho_1^u)+(1-\rho)\epsilon]} \\
&= -(1-\rho)(2-\rho_1^d)+\sqrt{(1-\rho)(2-\rho)(2-\rho_1^d)(1-\rho_1^u)}.
\end{aligned}
\tag{A11}
$$

The corresponding root for q_0^u is:

$$
q_0^{u*} = \frac{-(1-\rho)(2-\rho_1^d)+\sqrt{(1-\rho)(2-\rho)(2-\rho_1^d)(1-\rho_1^u)}}{\rho_1^d-\rho_1^u}.
\tag{A12}
$$

I further show that q_0^{u*} approaches 0.75 if ρ approaches zero. Proof is as follows. To get the approximation of a quotient of two small values as shown in Equation A12, I take the expression of the default probability at time 1 as, $\rho_1^u = \rho_0 - \beta$, $\rho_1^d = \rho_0 + \kappa\beta$. This does not mean ρ_1^u and ρ_1^d are perfectly linear in ρ_0, but ρ_1^u and ρ_1^d are simply split with respect to ρ_0. Since ρ_0 is very small, $\beta \approx 0$, and the movement of the credit spread can be asymmetric when $\kappa \neq 1$, where κ is always positive. Suppose the upward movement is not too different from the downward movement, then κ should not be too different from 1. Rewrite Equation A12:

$$q_0^{u*} = \frac{(1-\rho)(2-\rho_1^d)\left[-1+\sqrt{\frac{(2-\rho)(1-\rho_1^u)}{(1-\rho)(2-\rho_1^d)}}\right]}{(1+\kappa)\beta}. \tag{A13}$$

A linear approximation of $-1+\sqrt{\frac{(2-\rho)(1-\rho_1^u)}{(1-\rho)(2-\rho_1^d)}}$ around $\beta = 0$ is:

$$\begin{aligned} -1+\sqrt{\frac{(2-\rho)(1-\rho_1^u)}{(1-\rho)(2-\rho_1^d)}} &\approx -1+\sqrt{\frac{(2-\rho)(1-\rho)}{(1-\rho)(2-\rho)}} + \frac{\beta}{2}\sqrt{\frac{(2-\rho)(1-\rho)}{(1-\rho)(2-\rho)}}\frac{(2-\rho)+(1-\rho)\kappa}{(2-\rho)^2} \\ &= \frac{\beta}{2}\frac{(2-\rho)+(1-\rho)\kappa}{(2-\rho)(1-\rho)}. \end{aligned} \tag{A14}$$

So,

$$\begin{aligned} q_0^{u*} &\approx \frac{(1-\rho)(2-\rho)}{(1+\kappa)\beta}\frac{\beta}{2}\frac{(2-\rho)+(1-\rho)\kappa}{(2-\rho)(1-\rho)} \\ &= \frac{1+(1-\rho)(1+\kappa)}{2(1+\kappa)} \end{aligned}. \tag{A15}$$

If κ is in the range from 0.5 to 1.5, and when λ_0 approaches to zero, then q_0^{u*} will be in the range between 0.7 and 0.83. If $\kappa = 1$, meaning the upward and downward movements are symmetric, then q_0^{u*} will approach 0.75.