Evidence on the Determinants and Economic Consequences of Delegated Monitoring

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Abstract

This paper investigates the determinants and consequences of public-debt holders’ decision to delegate monitoring to banks. Specifically, we consider cross-acceleration provisions, which require the payment on the public debt to be accelerated when the other debt payments are accelerated. We find that cross-acceleration provisions are more likely to be included in public-debt agreements when the borrower has higher inherent risk and when the borrower’s performance is more difficult to measure. We also find that the public-debt agreement is more likely to include a cross-acceleration provision when the borrower uses delegated monitors with greater incentives to provide higher quality monitoring. In addition, using a Heckman selection model, we find that interest spreads on bonds decrease in the presence of a cross-acceleration provision. As a supplementary analysis, we find that cross-acceleration covenants seem to give banks more bargaining power in bank loan issues. For high-quality dedicated monitors, we find that the existence of a cross-acceleration provision is associated with higher loan spreads.
1. Introduction

A central premise of financial intermediation is that creditors monitor borrowers’ performance. Although monitoring can reduce the agency problems between borrowers and lenders, it can create agency problems among the lenders. Diamond (1984) suggests that a range of monitoring outcomes will arise when there are multiple lenders. At one extreme, all lenders monitor, resulting in a duplication of monitoring costs. At the other extreme, all lenders attempt to free ride on the monitoring of others, resulting in no monitoring. Fama (1990) extends this analysis developing the hypothesis that when firms borrow from more than one lender, duplication of monitoring costs will be avoided by delegating monitoring to a “credible specialist.” Banks are more likely to be “credible specialists” than public-debt holders because their claims are more concentrated and bank debt is less costly to renegotiate than public debt (Fama, 1985; Smith and Warner, 1979).¹

Our paper focuses on Fama’s (1990) argument by investigating the determinants of public-debt holders’ decision to delegate monitoring to banks, and by examining the effects of delegated monitoring on the interest rate spreads charged on corporate bonds. We suggest that public-debt holders use cross-acceleration provisions as a mechanism to delegate monitoring to banks. Cross-acceleration provisions allow acceleration of debt payments whenever any of the firm’s other debt is repaid early. Thus cross-acceleration provisions potentially benefit public debt holders by allowing them to act on the monitoring actions performed by private debt holders. However, delegated monitoring is

¹ Although common in private debt, Begley and Freedman (2004) report that financial covenants are rare in public debt. This finding is consistent with the arguments of Smith and Warner (1979) and Leftwich (1983) that private lenders have greater access to private information and are better able to enforce and renegotiate covenants than are public-debt holders. This comparative advantage may make it efficient for public-debt holders to delegate monitoring using financial covenants to private lenders.
not costless. If the delegated monitor shirks or incorrectly classifies the borrower’s creditworthiness, then the public debt holder can potentially suffer increased losses. Given these costs and benefits, it is not surprising that cross-acceleration provisions are not ubiquitous. In our sample roughly 61% of the public debt issues have cross-acceleration provisions. We provide evidence on the largely unexplored cost-benefit trade-off of delegated monitoring.

We argue that cross-acceleration provisions are more likely to be used when the agency costs of debt are likely to be higher. Financial covenants provide one of the central mechanisms that banks use to reduce these costs (Smith and Warner, 1979). When the borrowers’ performance deteriorates, financial covenants allow banks to either accelerate payments or force borrowers to take actions to preserve lenders’ claims. This argument suggests that cross-acceleration provisions are more likely to be included in the contract when financial covenants are more likely to be violated, i.e., when the borrower has higher inherent risk. We also argue that when information asymmetry between borrowers and public-debt holders is more serious, public-debt holders are more likely to mitigate information problems by delegating monitoring to banks with private information about the borrower. Specifically, we expect to see these provisions when the borrower has relatively poor credit quality, poor financial performance, is smaller, is more volatile, is more leveraged, and when the borrower has more growth options, or generally has worse financial reporting quality.

We also argue that cross-acceleration provisions are more likely to be used when the delegated monitor is likely to provide more valuable services. We therefore expect cross-acceleration provisions are more likely to be included when the delegated monitors
have greater incentives to exert effort and when they are more capable monitors. Banks that hold a relatively larger proportion of the loan have greater incentives to provide higher quality monitoring and banks that have a better reputation in the private debt market are likely to be more capable monitors. In theory, public debt agreements will only include a cross-acceleration provision when it has a net benefit. We therefore hypothesize that the interest rates on corporate bonds decrease in the presence of this provision.

We investigate these hypotheses using a sample of borrowers that have entered into both public and private debt contracts. Specifically, to test whether banks’ incentives to monitor borrowers affect the use of cross-acceleration provisions, we require sample firms to have borrowed from the syndicated loan market within 5 years before they issue public debt. We collect public debt data from the FISD database and bank loan data from the LPC Dealscan database. We are able to successfully identify 1,424 public debt issues (issued by 419 firms) that have bank loans issued before public debt issuances from 1994 to 2006. Out of these 1,424 issues, 842 issues have treasury-spread data, which is used to explore the effect of cross-acceleration provisions on the costs of public debt.

We find that cross-acceleration provisions are more likely to be included in public-debt agreements when the borrower’s default risk is higher, *i.e.*, when borrowers are smaller, have poor credit ratings, or have subordinated public debt. These provisions are also more likely for borrowers with higher absolute value of discretionary accruals, suggesting that borrowers whose performance is more difficult to measure are more likely to have delegated monitoring.
Our results also suggest that cross-acceleration provisions are more likely when the delegated monitor has the incentive to provide high quality monitoring. Specifically, we find that public-debt agreements are more likely to contain a cross-acceleration provision when the firm has a syndicated loan where the lead lender holds a relatively larger or more concentrated share of the loan at the time that the public debt is issued. However, we find that the lead lenders’ reputation in the syndicated loan market is not associated with the use of cross-acceleration provision in the public-debt agreement.

Consistent with our hypotheses on the consequences of cross-acceleration provisions, we document that the treasury spread charged on public debt agreements that contain this provision is 78 basis points lower. This result is robust to the inclusion of a Heckman self-selection correction. The magnitude of our results are economically significant given the average spread in our sample is 145 basis points over the treasury rate.

In a supplementary analysis, we examine whether delegated monitors are compensated for their monitoring role, and whether higher quality monitors receive higher compensation. We argue that banks, especially high-incentive banks, can acquire more bargaining power at loan issuance when the borrower’s outstanding public debt contains a cross-acceleration provision. This argument suggests that bank loan spreads for borrowers with outstanding public debt vary with the use of cross-acceleration provisions and the quality of the delegated monitor. To test this hypothesis, we search the Dealscan database to find bank loans issued during the period when the public debt is outstanding. We identify 802 bank loans (issued by 480 firms) from 1994 to 2006 that have prior issued public debt outstanding.
Although we find no evidence that bank loan spreads are significantly related to either cross-acceleration provisions or monitoring quality, we do find that the existence of a cross-acceleration provision is associated with higher loan spreads for lenders who are higher quality monitors. These high-quality monitors appear to be able to command a premium in the presence of a cross-acceleration provision. For example, bank loans in which lead lenders own 51% of the bank loan (i.e., 90th percentile in our sample) can charge an additional 26 basis points in the presence of this covenant.

Our paper extends the cross-monitoring literature by providing evidence on public-debt holders’ explicit delegation of monitoring to banks. Previous research assumes that public-debt holders benefit from the cross-monitoring mechanism because the monitoring by banks reduces the borrower’s overall credit risk. For example, Datta et al. (1999) show that on average IPO public-debt issues charge lower spreads in the presence of bank debt. Datta et al. (1999) implicitly assume that all public-debt holders acquire benefits from the cross-monitoring mechanism. Our paper shows that, in addition to this implicit cross-monitoring effect, some public debt issues explicitly tie their payment schemes to banks’ monitoring. That is, these issues require accelerated payment when banks decide not to waive technical defaults and demand accelerated payments. In addition, our paper shows that there is cross-sectional variation in the demand for cross monitoring. Finally, our paper contributes to the literature by showing that cross monitoring is not free for the borrower, since superior delegated monitors can charge higher spreads to compensate for the monitoring role they play.

The rest of the paper is organized as follows. Section 2 provides background for our study. We discuss our hypothesis development in Section 3. We describe our sample
in Section 4 and our research design in Section 5. We present our empirical results and supplementary analysis in Section 6 and conclude in Section 7.

2. Background and Motivation

2.1 Literature Review

Diamond (1984) suggests that when a firm borrows from multiple lenders inefficiencies arise if monitoring costs are duplicated because all borrowers monitor, or if agency problems between borrowers and lenders are not mitigated because no borrowers monitor. A potentially more efficient solution is for most lenders to delegate monitoring to a small number of other lenders who are best able to monitor the borrower. This reduces the agency problems between the borrower and lender without undue duplication of efforts. Diamond (1991) and Rajan (1992) both suggest that public-debt holders are likely to delegate monitoring to banks. Banks have a comparative monitoring advantage because bank contracts are relatively less costly to renegotiate than public debt contracts. Renegotiations of public debt covenant violations are likely to be costly because renegotiation typically requires agreement of two thirds of the bondholders and public bonds are often diffusely held. Consistent with their arguments, Begley and Freedman (2004) find that less than 5% of the public-debt agreements contain financial covenants for their sample of 1990’s bond contracts.

Previous research focusing on cross monitoring by lenders includes Booth (1992) and Datta et al. (1999). Both of these papers consider how interest rates are affected by the presence of another type of lender. Booth (1992) examines how past issues of public debt affect the rates charged on bank loans while Datta et al. (1999) examine how the existence of a banking relationship affects the rate charged on initial public debt
offering. Both papers find that the presence of another lender results in a reduced rate on
the newly issued debt. This cross-monitoring literature tests whether the implicit contract
between different classes of lenders improves firms’ credit quality and benefits other
lenders. Our paper differs from these papers by examining an explicit cross-monitoring
mechanism (i.e., cross-acceleration provision) that allows public-debt holders to directly
benefit from the monitoring performed by banks.

2.2 Cross-Monitoring Covenants

The two mechanisms that lenders often explicitly include in debt contracts to allow
some lenders to potentially “benefit” from the monitoring efforts provided by other
lenders are cross-default and cross-acceleration provisions. These two covenants are
often loosely defined or used interchangeably (Taylor and Saneson, 2006), but there is a
fundamental difference between them. Harvey (2004) notes that cross-default provisions
allow the payments of debt to be accelerated whenever the borrower defaults on other
instruments. Debt repayment does not depend on whether other lenders actually require
accelerated the payment due to the default. On the other hand, cross-accelerations only
allow payments to be accelerated when other debt has been accelerated. The practitioner
literature suggests that this distinction is particularly important when the borrower has
debt with varying seniority and that the use of cross-acceleration and cross-default
provisions likely depends on the seniority of the debt.

According to Widen (2002), in order to secure their position at renegotiation
without interference from subordinated-debt holders, senior-debt holders usually impose
more restrictive covenants on the borrower than do subordinated-debt holders. In
addition, to ensure senior-debt holders are included in all renegotiations, senior debt
should cross default on all other significant indebtedness particularly subordinated debt.
In contrast, senior-debt holders usually do not allow subordinate debt to contain a cross-
default provision to protect their position at the renegotiation table. However, subordinate
debt is allowed to include a cross-acceleration provision. In doing so, subordinate debt
holders do not take part in the renegotiation after defaults, but their interests can be
protected if senior-debt holders decide to accelerate the payments.

Consistent with these arguments and the widely accepted premise in the academic
literature that bank debt is senior to public debt (Longhofer and Santo, 2003), we expect
that bank debt has more restrictive covenants and includes more strict cross-default
covenants. On the other hand, indenture agreements are less likely to include cross-
default provisions, but we expect these agreements to contain cross-acceleration

We also examine covenants contained in public-debt agreements (for those firms
on the FISD database), and we find that cross-acceleration provisions, although not
ubiquitous, are commonly included in public-debt agreements. Of the 5,910 public-debt
agreements on the database with covenant data, roughly 60% include cross-acceleration
provisions. In contrast, cross-default provisions are observed in less than 4% of the
public-debt agreements covered on the FISD database (less than 2% in our sample). Since
cross-default provisions are rare in public debt contracts, our study focuses on cross-
acceleration provisions.

3. **Hypothesis Development**

Cross-acceleration provisions provide a mechanism for public-debt holders to
avoid costly monitoring of borrowers by delegating this monitoring to other lenders. We
argue that cross-acceleration provisions are likely to be more valuable when the delegated monitor can take actions to reduce the agency costs of debt. When the borrower’s performance deteriorates, financial covenants allow banks to either accelerate payments or force borrowers to take actions to preserve lenders’ claims. This argument suggests that cross-acceleration provisions are more likely to be included in the contract when financial covenants are more likely to be violated, i.e., when the borrower has higher credit risk.

The borrower’s credit risk is likely to be associated with firm characteristics. For example, we expect that cross-acceleration provisions are more valuable to smaller firms, firms with a lower ROA, a higher leverage, higher return volatility, or a worse credit rating, because these firms are more likely to default. This argument is consistent with Roberts and Sufi (2007) who document that covenant violations increase monotonically as the book value of the firm’s assets decreases and as the credit rating of the firm declines. They also find that covenant violations are greater for firms with a book leverage ratio greater than five percent.

In addition to inherent risk, we argue that when the borrower’s performance is more difficult to measure at inception of debt issuances, public-debt holders have more incentives to rely on banks’ monitoring of the borrower due to banks’ access to private information. Bharath et al. (2008) argue that when the borrower has a lower financial reporting quality, the borrower prefers bank debt financing to public debt because banks can mitigate the information problems using their private information. Therefore, we specifically hypothesize that when firms have more growth options, fewer harder assets,
or low quality financial statements, public-debt holders are more likely to use cross-acceleration provisions and rely on banks to monitor.

Based on these arguments, our first and second hypotheses are:

H1: Public-debt indenture agreements are more likely to include cross-acceleration provisions when the borrowers’ credit risk is higher.

H2: Public-debt indenture agreements are more likely to include cross-acceleration provisions when the borrowers’ performance is more difficult to measure.

The benefit of cross-acceleration provisions to public-debt holders will also depend on the quality of the monitoring provided by these other lenders. If banks utilize timely and accurate signals of deterioration in credit quality then delegated monitoring provides a lower-cost monitoring alternative than direct monitoring by the public-debt holders. However, delegated monitoring can increase the lenders’ losses if the monitor shirks, or increase the borrower’s losses if the monitor incorrectly classifies the borrower’s type. If lenders act either too quickly or not quickly enough in default decisions then the benefits of relying on delegated monitoring are likely to be low. The quality of lenders’ monitoring is likely to depend both on the strength of their incentives to monitor and on their expertise.

Based on these arguments, our third and fourth hypotheses are:

H3: Public-debt indenture agreements are more likely to include cross-acceleration when private debt holders have stronger incentives to monitor the borrower.

H4: Public-debt indenture agreements are more likely to include cross-acceleration provisions when the private debt holders have relatively more expertise in monitoring the borrower.

If cross-accelerations provisions reduce the moral hazard problems in the debt contract, then public-debt holders may demand less price protection. Therefore, we hypothesize that the interest charges on indentures should be lower in the presence of this
cross-acceleration covenant. This argument is consistent with Bradley and Robert’s (2004) finding that debt covenants serve to mitigate agency costs of debt. It is also consistent with Datta et al.’s (1999) finding that the existence of banks as other lenders lowers the interest rates on public debt. The fifth hypothesis is:

**H5:** Public-debt agreements that include cross-acceleration provisions charge a lower interest spread.

4. **Sample Selection**

To test our hypotheses, we require firms in our sample to have borrowed from the syndicated loan market before they issue public debt. We collect public debt information from the FISD database, and bank loan information from the LPC database. The FISD database has detailed information on public-debt agreements, including the covenants contained in those agreements over the period June 1961 to February 2007. We focus on public-debt agreements entered into by U.S. corporations between January 1994 and February 2007 because our analyses require detailed data on the provisions included in the firm’s bank loans and bank loan data on the LPC database is only available over this period.

We then merge the data from the FISD database with COMPUSTAT (to obtain financial data for the firm issuing the public debt) and with the LPC Dealscan database of syndicated debt (to obtain data on the firm’s bank loans). In merging FISD and COMPUSTAT, we require a minimum of three months between fiscal year end and public debt issuances to ensure debt holders have current financial information. We acquire ownership information of loan lenders from bank loans within five years before the public-debt issuances. In our primary analysis, we include 1,424 public debt issues, of
which 876 issues include a cross-acceleration provision.\textsuperscript{2} Our sample represents 419 firms.\textsuperscript{3} Out of the 1,424 issues, 842 include the treasury spreads data on the FISD database, which is required for the cost of debt analysis. Defined by FISD, a treasury spread refers to the interest spread over the interest rate on T-notes of similar maturity.

5. Research Design

We conduct two analyses to test our hypotheses. In the first analysis, we investigate the determinants of the decision to include cross-acceleration provisions in public-debt agreements. In the second analysis we examine the effect of cross acceleration provisions on the interest spread charged in the public debt agreement.

To test our hypothesis that public debt is more likely to include a cross-acceleration provision when the borrower is riskier, we use several variables to measure the borrower’s credit risk. Our first variable is a measure of firm size, \textit{Size}, which is calculated as the natural log of total assets the year before they enter into the public-debt agreement. Larger borrowers are assumed to be less risky. Our second measure is \textit{Leverage}, which is calculated as total debt divided by total assets. Our third measure is the Return on Assets, \textit{ROA}, which is calculated as income before extraordinary items scaled by assets (measured the year before they enter into the public debt). Our fourth measure is the firms’ credit rating, \textit{SP Rate}, which is a transformation of the S&P rating, from 1 (AAA) to 22 (D).\textsuperscript{4} Our final measure is the standard deviation of returns, \textit{STD Ret}, which is measured as the standard deviation of the residuals from the market model

\textsuperscript{2} We exclude convertible bonds and private placements contained in the FISD database.

\textsuperscript{3} There are 4,867 firms not covered by COMPUSTAT, and 1,097 firms do not issue bank loans within 5 years prior to public debt issued or are not covered by LPC.

\textsuperscript{4} We collect the S&P ratings from the FISD database for the analysis of the determinants of cross-acceleration provisions because there are about 11% of public debt issuers lacking data item 280 in COMPUSTAT at issuance. Ratings in FISD are issue specific and we employ the first S&P rating that incurs within 6 months of the issuance date for each public debt. If S&P does not rate the issuance during the period, then we employ Moody’s ratings instead, such situations are rare though.
using daily returns of the year prior to the debt issuance. We require at least 100 observations of daily returns to be included in the market model. We expect that smaller firms, and firms with higher leverage, a lower ROA, a worse credit rating and higher return volatility, are more likely to include cross-acceleration provisions in an indenture agreement.

Our second hypothesis predicts that borrowers whose performance is more difficult to measure will be more likely to have cross-acceleration provisions. We use two measures of the difficulty of measuring the borrower’s performance to test this hypothesis. The first is $Q$, which is calculated as $(\text{total assets} - \text{book value of equity} - \text{deferred taxes} + \text{market value of equity})$ divided by total assets. Firms with a higher $Q$ have fewer “hard” assets and more growth options, which are difficult to value. Following Bharath et al. (2008), the second is a measure of accounting quality, $\text{Accruals}$, which is calculated as the absolute value of discretionary accruals, where discretionary accruals are the errors from the modified Jones model estimated annually for each Fama/French industry classification. We assume that the performance of firms with higher discretionary accruals is more difficult to measure.

We also expect the decision to include a cross-acceleration provision in the public debt contract to depend on attributes of the debt contract. We expect public-debt agreements that have a longer maturity and that offer a bigger amount to be more likely to have cross-acceleration provisions. $\text{Maturity}$, as the natural log of the maturity of the public debt obligation measured in months. We measure the relative size of the loan, $\text{Offer Size}$, by scaling the amount of the public debt issuance by assets. We also include
the seniority of the public debt as a control variable. We use an indicator variable equal to 1 if the debt is senior, \textbf{Senior}, zero otherwise.

We develop two different measures of lenders’ monitoring incentives to test our third hypothesis that cross-acceleration covenants are more likely to be included when the lender has stronger incentives to monitor. The first proxy is a lender Herfindahl index, \textbf{Herf}, which is calculated for each borrower. To construct this index, we first accumulate the market share of each lender for the bank loans issued within five years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share and scaled by 10,000. Concentrated lenders are assumed to have stronger incentives to provide high quality monitoring. The second variable, \textbf{Lead Share}, is calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within five years before the issuance of the public debt. Lead lenders with a relatively larger percentage of the loan are assumed to have stronger incentives to provide better monitoring (Sufi, 2007). We test our fourth hypothesis using an indicator variable, \textbf{Industry Leader}, that is equal to one if any of the lead arrangers of the bank loan is a top ten lender (in terms of total syndicated loan market share) in the five years before the loan is issued. We assume that these industry leaders will have the most monitoring expertise.

To test our hypotheses, we create an indicator variable, \textbf{Crss_Accl}, which is one if the public-debt agreement has a cross acceleration provision; zero otherwise. We then estimate the following Probit regression to examine the determinants of the decision to include this provision in the contract:

\[
\text{Crss_Accl} = \beta_0 + \beta_1 \text{Size} + \beta_2 \text{Leverage} + \beta_3 \text{ROA} + \beta_4 \text{STD Ret} + \beta_5 \text{SP Rate} \\
+ \beta_6 Q + \beta_7 \text{Accruals} + \beta_8 \text{Offer Size} + \beta_9 \text{Maturity} + \beta_{10} \text{Senior} + \beta_{11} \text{Herf}
\]
\[ + \beta_{12} \times \text{Industry Leader} + \varepsilon \]  \hspace{1cm} (1)

**Variable Definitions:**

- **Crss_Accl:** An indicator variable that equals one if the public-debt agreement includes a cross-acceleration provision, and zero otherwise.
- **Size:** Calculated as the LN(assets) (COMPUSTAT data item 6),
- **Leverage:** Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);
- **ROA:** Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);
- **STD Ret:** Standard deviation of the residuals from the market model using daily returns of the year prior to the debt issuance. We require at least 100 observations of daily returns to be included in the market model.
- **SP Rate:** Transformation of S&P rating, from 1 (AAA) to 22 (D).
- **Q:** Calculated as (assets – book value of equity – deferred taxes + market value of equity) / assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);
- **Accruals:** Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of
  \[ \text{Accruals} = \alpha_0 + \alpha_1 (\Delta \text{Revenues} - \Delta \text{AR}) + \alpha_2 \text{PPE} + \varepsilon \]
  Where
  - \text{Accruals} = \text{Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets}
  - \Delta \text{Revenues} = \text{Change in annual revenues / average assets}
  - \text{PPE} = \text{Net property, plant and equipment / average assets}
  - \Delta \text{AR} = \text{Change in accounts receivable / average assets}
- **Offer Size:** Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);
- **Maturity:** Calculated as the natural log of the loan’s maturity in months;
- **Senior:** Indicator variable equal to 1 if debt is senior, zero otherwise;
- **Herf:** To construct this index, we first accumulate the market share of each lender for the bank loans issued within five years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10,000.
- **Industry Leader:** Indicator variable equal to 1 if any of lead arrangers of the bank loans is a top ten lender (in terms of market share) in the five years before the public debt is issued.

To test our fifth hypothesis, we conduct a second analysis that examines the effect of cross-acceleration provisions on the interest rate spreads charged on public debt using the following OLS model:
**Treasury Spreads** = \( \beta_0 + \beta_1 \text{Crss\_Accl} + \beta_2 \text{Size} + \beta_3 \text{Leverage} + \beta_4 \text{ROA} + \beta_5 \text{STD\_Ret} + \beta_6 \text{SP\_Rate} + \beta_7 Q + \beta_8 \text{Accruals} + \beta_9 \text{Offer\_Size} + \beta_{10} \text{Maturity} + \beta_{11} \text{Senior} + \varepsilon \) 

(2)

In Equation (2), **Treasury Spreads** is defined by FISD as the interest charges on the indenture over the interest rates on a T-note with similar maturity. We argue that cross-acceleration provisions allow public-debt holders to free ride on banks’ monitoring and therefore decrease the cost of debt. Therefore, we expect the coefficient on **Crss\_Accl** to be negative. We also expect smaller firms, firms with a higher leverage, a lower ROA, higher return standard deviation, or a worse credit rating to have a higher spread. In addition, we argue firms with more opaque information environment to pay a higher spread (Bharath et al., 2008), so we expect the coefficient on **Q** and **Accruals** to be positive. Further we include bond characteristics as control variables, i.e., **Offer\_Size**, **Maturity** and **Senior**.

Considering that the decision of the use of cross-acceleration provisions and interest rates are determined endogenously, we employ a Heckman model to adjust the selection bias. Bradley and Roberts (2004) highlight the importance of adjusting this selection bias and use a similar approach to deal with the endogenous relation between bank debt interest spreads and covenants. Our first stage model is adapted from Equation (1), where we include **Herf**, **Lead\_Share** and **Industry\_Leader** as instrumental variables.\(^5\) Inverse mills ratios calculated from the first stage are then used in Equation (2) to adjust the selection bias. We follow Maddala (1983) approach to adjust the standard errors due to this two-stage procedure.

\(^5\) We also try separate Probit models where **Herf** and **Lead\_Share** are used as instrumental variables, respectively, and the results on the effect of cross-accelerations is even stronger.
6. Results

6.1 Main Analysis

Table 1 provides descriptive statistics for the firms in our sample partitioned by the presence of a cross-acceleration provision in the firm’s public debt. 876 out of 1,424 (62%) of our public debt sample include this provision. Firms with cross-acceleration provisions are smaller, have a larger returns variance, and have worse credit ratings. This indicates that these firms are riskier. We also find that firms using cross-acceleration provisions have larger absolute value of discretionary accruals, suggesting that the performance of these firms is more difficult to measure. Firms with cross-acceleration provisions also appear to have a more concentrated group of lenders, with the lead lender holding a relatively larger share of the loan. This suggests that firms with cross-acceleration provisions, on average, borrow from banks with higher monitoring incentives.

Table 2 presents the correlations of the variables in our models. Bolded statistics represent correlations greater than 25%. Both Size and S&P Ratings appear to be significantly correlated with several variables, although no correlation is greater than 50%. Two of our measures of the quality of monitoring, the Herf and Lead Share, are 92% correlated, which is desirable since these are two alternative measures of the same construct.

Table 3 presents the results of our tests examining the determinants of the choice to include cross-acceleration provisions in the firm’s public debt contract. Model 1 and 2 include Herf and Lead Share, respectively, as our measure of incentives to monitor.
Consistent with our first hypothesis and with the Table 1 univariate statistics, the results of our Probit analysis indicates that riskier firms are more likely to include cross-acceleration provisions in their debt contracts. In both models, we find that larger firms, firms with better credit ratings, and debt issues that are senior are less likely to have cross-acceleration provisions included in the contract. These results are both statistically and economically significant. An one standard deviation increase in SIZE is associated with an 11.8% decrease in the likelihood of including cross-acceleration provisions in public debt contracts.\(^6\) One credit rating step, on the other hand, is associated with a 2% likelihood of including such covenants.

Consistent with our second hypothesis we find that the more unexplained accruals the borrower has the more likely that the issue includes a cross-acceleration provision. This suggests that when it is more difficult to measure the borrowers’ performance, we are more likely to see the firm use cross-acceleration covenants. Again this result appears to be economically significant with a one standard deviation increase in Accruals leading to a 7% decreased in the likelihood of a cross-acceleration provision. In contrast we do not find a significant coefficient on Q.

The estimated coefficients on our measures of the lender’s monitoring incentives are generally significant in the predicted direction supporting our third hypothesis. When the bank loan ownership is more concentrated or when the lead arrangers hold a relatively larger share of the loan, the public-debt agreement is more likely to include cross-acceleration provisions. An increase in Herf (Lead_Share) by one standard deviation is associated with 7.2% (11.7%) increase in the likelihood of having cross-acceleration provisions.

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\(^6\) The standard deviations of Size and Accruals of the overall sample are 1.55 and 0.043, respectively. The coefficients of marginal effects are -0.076 and 1.617, respectively.
provisions in public-debt agreements.\textsuperscript{7} In contrast, we do not find results consistent with the prediction in hypothesis four that private lenders’ reputation or expertise increases public-debt holders’ delegation of monitoring to private lenders.

Table 4 reports the results on our second analysis, examining the effect of cross-acceleration provisions on the treasury-spreads of the firm’s public debt agreements predicted by hypothesis five. In the OLS model, we find that interest rates are higher in the presence of cross-acceleration provisions. This result is not surprising given that firms with higher agency costs of debt are more likely to include cross-acceleration provisions in their public debt agreements. In contrast, we find interest rates decrease with the existence of cross-acceleration provisions in the Heckman model once we have controlled for differences in the type of borrower likely to included this provision in their public debt contract. The difference between the two models highlights the importance of controlling for the selection issue, as suggested by Bradley and Roberts (2004). The estimated coefficients on our control variables indicate that interest rates decrease with \textbf{Size}, \textbf{ROA} and \textbf{Senior}, and decrease with \textbf{SP Rate}, \textbf{STD Ret}, \textbf{Accruals}, \textbf{Offer Size}, and \textbf{Maturity}. All of these findings are consistent with our predictions.

\textit{6. 2 Supplementary Analysis}

In addition to the consequence of cross-acceleration provisions on public debt issues, we are also interested in the effect of this provision on subsequent bank debt issues. It is unclear whether banks that act as delegated monitors will be able to recover any of the costs of providing this service. Banks can observe whether the borrower has outstanding indenture agreements that contain cross-acceleration provisions. If there is a

\textsuperscript{7}The standard deviations of \textbf{Herf} and \textbf{Lead Share} of the overall sample are 0.18 and 19.6, respectively. The coefficients of marginal effects are 0.04 and 0.006, respectively.
cross-acceleration provision, then as Rajan (1992) discusses, the bank has bargaining power over the borrower, potentially extracting surpluses from the borrower after the initiation of the bank debt contract.

One potential solution to this problem is for the firm to contract with a bank that has the incentives to be a high quality monitor, and compensate them for providing high quality monitoring. Based on these arguments, we hypothesize that banks that act as a delegated monitor charge a higher spread, especially those who have higher incentives to monitor the firm.

To test this hypothesis we examine the determinants of the spread over LIBOR for syndicated bank loans the firm entered into while the public debt is outstanding. Unlike the analysis in prior sections, the public debt issues in this sample do not need to be preceded by bank debt. In contrast, in this sample, public debt issues precede bank debt issues. Therefore, the public debt issues range from 1974 to 2006, whereas the bank debt data is from 1994 to 2006. We include 802 bank loans in our sample, representing 480 firms.

We include the \textit{Crss\_Accl} variable to measure whether the public debt contract contains cross-acceleration provisions. We use two measures of the quality of the monitoring provided by the bank \textit{Herf} and \textit{Lead Share}, and interact these variables with \textit{Crss\_Accl} to capture whether high-quality delegated monitors can charge more for their monitoring services.

In this analysis we also include our controls for credit quality (\textit{Size}, \textit{Leverage}, \textit{ROA}, \textit{Rating}, \textit{SP Rate}, \textit{Std Ret}), loan characteristics (\textit{Maturity}, \textit{Offering Size},
Senior), and measures of the difficulty measuring the borrower’s performance (Q and Accruals). Specifically, we estimate the following model:

\[
\text{LIBOR Spreads} = \beta_0 + \beta_1 \times \text{Size} + \beta_2 \times \text{Leverage} + \beta_3 \times \text{ROA} + \beta_4 \times \text{STD Ret} + \beta_5 \times \text{SP Rate} + \beta_6 \times \text{Rating} + \beta_7 \times Q + \beta_8 \times \text{Accruals} + \beta_9 \times \text{Offer Size} + \beta_{10} \times \text{Maturity} + \beta_{11} \times \text{Secured} + \beta_{12} \times \text{Herf} + \beta_{13} \times \text{Crss_Accl} + \beta_{14} \times \text{Crss_Accl} \times \text{Herf} + \varepsilon
\]

\[
(3)
\]

Variable Definitions:
- **Size**: Calculated as the LN(assets) (COMPUSTAT data item 6).
- **Leverage**: Calculated as total debt/Assets (COMPUSTAT (data9 + data34)/data6);
- **ROA**: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);
- **STD Ret**: Standard deviation of the residuals from the market model using daily returns of the year prior to the debt issuance. We require at least 100 observations of daily returns to be included in the market model.
- **SP Rate**: Transformation of S&P rating, from 1 (AAA) to 22 (D). If the firm is not rated by the S&P then this variable is equal to 0.
- **Rating**: Indicator variable equal to 1 if data280 is not missing, zero otherwise.
- **Q**: Calculated as (assets – book value of equity – deferred taxes + market value of equity) / assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);
- **Accruals**: Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of
  \[
  \text{Accruals} = \alpha_0 + \alpha_1 (\Delta \text{Revenues} - \Delta \text{AR})_{t,1} + \alpha_2 \text{PPE}_{t,1} + \varepsilon_{t,1}
  \]
  Where
  \[
  \begin{align*}
  \text{Accruals} &= \text{Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets} \\
  \Delta \text{Revenues} &= \text{Change in annual revenues / average assets} \\
  \text{PPE} &= \text{Net property, plant and equipment / average assets} \\
  \Delta \text{AR} &= \text{Change in accounts receivable / average assets}
  \end{align*}
  \]
- **Offer Size**: Calculated as the offering amount of the bank debt scaled by assets (COMPUSTAT data item 6);
- **Maturity**: Calculated as the natural log of the loan’s maturity in months;
- **Secured**: Indicator variable equal to 1 if the loan is secured, zero otherwise;
- **Herf**: To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10,000;
- **Crss_Accl**: Indicator variable equal to 1 if the public debt includes a cross-acceleration provision and 0 otherwise.
Table 5 reports the results of this LIBOR spreads regression, examining the effect of cross-acceleration provisions on the cost of bank debt. The first column of the results includes Herf as our measure of the quality of the monitor, while the second column of results includes Lead Share as our measure of the quality of the monitor. The results indicate that lenders that are likely to provide high quality monitoring are able to charge higher spreads in the presence of cross-acceleration provisions. In terms of economic significance, lead lenders who own 51% of the bank loan (i.e., 90\textsuperscript{th} percentile in our sample) can charge more LIBOR spreads by 26 basis points in the presence of this covenant. This is economically significant given that the average LIBOR spreads in our sample is 108 basis points. However, lead lenders who own low ownership cannot extract more rents due to this covenant.

In terms of the control variables, we find that riskier borrowers have larger spreads on their private debt agreements. More specifically as leverage and return volatility increase and credit ratings get worse, firms are charged larger interest rates. Firms that are required to provide collateral are also charged a relatively larger rate. Finally, as ROA increases, rates decrease.

\textbf{6.3 Robustness Checks}

While loan ownership concentration and lead arrangers’ ownership can be a proxy for the quality of private lenders’ monitoring of the firm, it is possible that these two variables proxy for an omitted risk variable in the model. That is, our finding that concentrated ownership (or high lead lenders’ ownership) is associated with higher likelihood of inclusion of cross-acceleration provisions may be due to omitted variables. We use an instrumental variables approach to address this endogeneity issue. It is always
challenging to find instrumental variables. Theoretically, the cross-acceleration provisions and bank loan ownership concentration (or lead arrangers’ ownership) may be determined by the same set of risk and information asymmetry variables. One way to solve this problem is to use an empirical approach of choosing variables that are correlated with $\text{Herf}$ and $\text{Lead Share}$ but not with $\text{Crss\_Accl}$.

We find that a firm’s tangibility ($\text{Tang}$), measured as net PP&E (COMPUSTAT data item 8) divided by total assets (COMPUSTAT data item 6), is not correlated with $\text{Crss\_Accl}$, but significantly correlated with $\text{Herf}$ and $\text{Lead Share}$. $\text{Tang}$ and $\text{Crss\_Accl}$ have a Pearson correlation coefficient of 0.009 with a p-value of 0.75, while $\text{Tang}$ and $\text{Herf}$ (Lead Share) have a correlation of 0.215 (0.178) with a p-value of less than 0.01 (0.01). Therefore, we use $\text{Tang}$ as the identifying instrumental variable in our $\text{Herf}$ and $\text{Lead Share}$ prediction models. In addition to this instrumental variable, we also include loan characteristics, i.e., bank loan size (deflated by firm size) and maturity, in the first stage model.

The first stage regression results from the two-stage-least-squares model are presented in Table 6. $\text{Herf}$ and $\text{Lead Share}$ are negatively correlated with $\text{Size}$ but positively correlated with $\text{Leverage, Std Ret, SP Rate}$ and $\text{Accruals}$. These findings are largely consistent with Sufi’s (2007) argument that the syndicated loans of firms with higher information asymmetry tend to have higher debt ownership concentration and higher ownership by lead arrangers. Further, we find Herf and Lead Share are negatively correlated with bank loan size and maturity, and $\text{Tang}$. Again, these results are consistent with Sufi’s (2007) findings.
The results of the second stage of the 2SLS model are displayed in Table 7. Table 7 shows that the results reported in Table 3 do not seem to be driven by the endogeneity issue. We continue to find that better monitoring quality is positively associated with the likelihood of using cross-acceleration provisions.

There may be similar endogeneity concerns in our LIBOR spread models: cross-acceleration and LIBOR spreads could also be endogenously determined. To address this issue, we employ a Heckman self-selection correction model in addition to the 2SLS methodology we use in Table 7. Equation (1) is estimated by the Probit model to generate an inverse Mills ratio. The second stage then includes this inverse Mills ratio in the LIBOR spreads determination model. The untabulated results show that the results reported in Table 4 are robust to these endogeneity adjustments. We still find that lenders that provide higher quality monitoring require higher compensation for their delegated monitoring.

Finally, in addition to using modified Jones model to compute absolute value of discretion accruals to proxy for accounting quality, we also use a cross-sectional Dechow and Dichev (2002) model to estimate discretionary accruals. Our results continue to hold using this alternative accruals measure.

7. Conclusion

This paper extends the cross-monitoring literature by providing direct evidence on the determinants and consequences of public-debt holders’ decision to delegate monitoring to private lenders, such as banks. Previous research considers only the benefit from the cross-monitoring mechanism that all public-debt holders obtain because bank

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8 The correlation between Tang and LIBOR spreads is small, 8%, and therefore we continue to use this variable to identify Herf and Lead Share. The results of the first stage model are largely similar to those reported in Table 5, so we do not report them for brevity.
monitoring reduces the borrowers overall credit risk. Rather than focusing on this implicit cross-monitoring effect, we consider explicit delegated monitoring included in some public debt issues that directly tie their payment schemes to banks’ monitoring. Specifically, we examine the covenant that requires accelerated payment when banks decide not to waive technical defaults and instead demand accelerated payments.

Our paper shows that there is cross-sectional variation in the demand for cross monitoring. Specifically, we find that cross-acceleration provisions are more likely to be included in public-debt agreements when the borrower has higher inherent risk and when the borrower’s performance is more difficult to measure. We further find that the public-debt agreement is more likely to include a cross-acceleration provision when the borrower uses delegated monitors with greater incentives to provide higher quality monitoring. As a consequence of this provision, we find that public debt issues that include this provision require a lower spread.

In addition, our paper contributes to the literature by showing that cross monitoring is not free for the borrower: superior delegated monitors can charge higher spreads to compensate for the monitoring role they play.
References


Table 1
Descriptive Statistics by Cross-Acceleration Provision

<table>
<thead>
<tr>
<th>Variable</th>
<th>Public Debt Does not Contain Cross-Acceleration Provision</th>
<th>Public Debt contains Cross-acceleration Provision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (Median)</td>
<td>Std Dev</td>
</tr>
<tr>
<td>Size</td>
<td>9.43 (9.55)</td>
<td>1.31</td>
</tr>
<tr>
<td>Leverage</td>
<td>0.37 (0.34)</td>
<td>0.17</td>
</tr>
<tr>
<td>ROA</td>
<td>0.05 (0.05)</td>
<td>0.05</td>
</tr>
<tr>
<td>STD Ret</td>
<td>0.02 (0.02)</td>
<td>0.01</td>
</tr>
<tr>
<td>SP Rate</td>
<td>7.94 (8.00)</td>
<td>3.06</td>
</tr>
<tr>
<td>Q</td>
<td>1.72 (1.35)</td>
<td>0.91</td>
</tr>
<tr>
<td>Accruals</td>
<td>0.03 (0.02)</td>
<td>0.04</td>
</tr>
<tr>
<td>Offer Size</td>
<td>12.61 (12.61)</td>
<td>0.76</td>
</tr>
<tr>
<td>Maturity</td>
<td>4.74 (4.80)</td>
<td>0.79</td>
</tr>
<tr>
<td>Senior</td>
<td>0.98 (1.00)</td>
<td>0.15</td>
</tr>
<tr>
<td>Herf</td>
<td>0.11 (0.08)</td>
<td>0.11</td>
</tr>
<tr>
<td>Lead Share</td>
<td>18.93 (13.93)</td>
<td>14.70</td>
</tr>
<tr>
<td>Industry leader</td>
<td>0.43 (0)</td>
<td>0.50</td>
</tr>
<tr>
<td>Number of Obs.</td>
<td>548</td>
<td>876</td>
</tr>
</tbody>
</table>

Note: ***, ** and * represent 1%, 5% and 10% significance, respectively. Mean (Median) for the firms with cross-acceleration provisions is statistically different than the mean (median) for the firms without cross-acceleration provisions using a T-Test (Wilcoxon Signed rank test).

Variable Definitions:
Size: Calculated as the LN(assets) (COMPUSTAT data item 6),
Leverage: Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);
ROA: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);
SP Rate: Transformation of S&P rating, from 1 (AAA) to 22 (D).
**STD Ret:** The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.

**Q:** Calculated as (assets – book value of equity – deferred taxes + market value of equity) / assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);

**Accruals:** Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

$$\text{Accruals} = \alpha_0 + \alpha_1(\Delta\text{Revenues} - \Delta\text{AR})_{i,t} + \alpha_2\text{PPE}_{i,t} + \varepsilon_{i,t}$$

Where
- $\text{Accruals} =$ Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets
- $\Delta\text{Revenues} =$ Change in annual revenues / average assets
- $\text{PPE} =$ Net property, plant and equipment / average assets
- $\Delta\text{AR} =$ Change in accounts receivable / average assets

**Offer Size:** Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

**Maturity:** Calculated as the natural log of the loan’s maturity in months;

**Senior:** Indicator variable equal to 1 if debt is senior, zero otherwise;

**Herf:** To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10000;

**Lead Share:** Calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within 5 years before the issuance of the public debt

**Industry Leader:** Indicator variable equal to 1 if any of lead arrangers of the bank loans is a top 10 lender (in terms of market share) in the five years before the public debt is issued.
Table 2
Pearson Correlation Analysis (p-values in the parentheses)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Size</th>
<th>Leverage</th>
<th>ROA</th>
<th>STD Ret</th>
<th>SP Rate</th>
<th>Q</th>
<th>Accruals</th>
<th>Offer Size</th>
<th>Maturity</th>
<th>Senior</th>
<th>Herf</th>
<th>Lead Share</th>
<th>Industry Leader</th>
</tr>
</thead>
<tbody>
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<td>Crss_Accl</td>
<td><strong>-0.35</strong> (0.01)</td>
<td>0.03 (0.26)</td>
<td>-0.01 (0.72)</td>
<td>0.16 (0.01)</td>
<td><strong>0.32</strong> (0.01)</td>
<td>-0.04 (0.17)</td>
<td>0.17 (0.01)</td>
<td>-0.11 (0.01)</td>
<td>-0.02 (0.41)</td>
<td>-0.24 (0.01)</td>
<td>0.22 (0.01)</td>
<td>0.18 (0.01)</td>
<td>-0.02 (0.54)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.01 (0.82)</td>
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<td>-0.10 (0.01)</td>
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<td>Leverage</td>
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<td><strong>0.25</strong> (0.01)</td>
<td><strong>0.31</strong> (0.01)</td>
<td>-0.14 (0.01)</td>
<td>0.16 (0.01)</td>
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<td>ROA</td>
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<td><strong>0.59</strong> (0.01)</td>
<td>-0.03 (0.24)</td>
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<td>-0.04 (0.10)</td>
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<tr>
<td>STD Ret</td>
<td>0.47 (0.01)</td>
<td>-0.07 (0.01)</td>
<td>0.26 (0.01)</td>
<td>-0.07 (0.01)</td>
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<tr>
<td>SP Rate</td>
<td><strong>-0.33</strong> (0.01)</td>
<td>0.19 (0.01)</td>
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<td>Q</td>
<td>-0.03 (0.34)</td>
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<td></td>
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<td>-0.21 (0.01)</td>
<td>-0.00 (0.99)</td>
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<td></td>
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<tr>
<td>Maturity</td>
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<td>-0.10 (0.01)</td>
<td>0.09 (0.01)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Senior</td>
<td>-0.24 (0.01)</td>
<td>-0.22 (0.01)</td>
<td>0.01 (0.72)</td>
<td></td>
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<td></td>
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<tr>
<td>Herf</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.92 (0.01)</td>
<td></td>
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<tr>
<td>Lead Share</td>
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<td></td>
<td></td>
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<td>0.12 (0.01)</td>
<td></td>
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</table>

Note: Bold indicates a correlation greater than 0.25, which is potentially economically significant.

**Variable Definitions:**

**Crss_Accl:** Indicator variable equal one if the debt has a cross-acceleration provision, and zero otherwise.

32
Size: Calculated as the LN(assets) (COMPUSTAT data item 6),
Leverage: Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);
ROA: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);
STD Ret: The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.
SP Rate: Transformation of S&P rating, from 1 (AAA) to 22 (D).
Q: Calculated as (assets – book value of equity – deferred taxes + market value of equity) / assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);
Accruals: Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of
\[ Accruals = \alpha_0 + \alpha_1 (\Delta Revenues - \Delta AR)_{i,t} + \alpha_2 PPE_{i,t} + \varepsilon_{i,t} \]
Where
- Accruals = Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets
- ΔRevenues = Change in annual revenues / average assets
- PPE = Net property, plant and equipment / average assets
- ΔAR = Change in accounts receivable / average assets
Offer Size: Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);
Maturity: Calculated as the natural log of the loan’s maturity in months;
Senior: Indicator variable equal to 1 if debt is senior, zero otherwise;
Herf: To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10000;
Lead Share: Calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within 5 years before the issuance of the public debt
Industry Leader: Indicator variable equal to 1 if any of lead arrangers of the bank loans is a top 10 lender (in terms of market share) in the five years before the public debt is issued.
Table 3
Determinants of the Decision to Include Cross-Acceleration Provisions in Public-debt Agreements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th>Model 2</th>
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</thead>
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<td></td>
<td>Pred</td>
<td>Coefficient</td>
<td></td>
<td>Coefficient</td>
</tr>
<tr>
<td></td>
<td>Sign</td>
<td>(Z-Stat)</td>
<td></td>
<td>(Z-Stat)</td>
</tr>
<tr>
<td>Intercept</td>
<td>?</td>
<td>1.47</td>
<td>(1.73)*</td>
<td>1.60</td>
</tr>
<tr>
<td>Size</td>
<td>-</td>
<td><strong>-0.21</strong></td>
<td><strong>(-5.53)</strong>*</td>
<td><strong>-0.21</strong></td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td>-0.38</td>
<td>(-1.63)</td>
<td>-0.34</td>
</tr>
<tr>
<td>ROA</td>
<td>-</td>
<td>0.28</td>
<td>(0.29)</td>
<td>0.20</td>
</tr>
<tr>
<td>Std Ret</td>
<td>+</td>
<td><strong>-3.42</strong></td>
<td>**(-0.77)</td>
<td><strong>-2.57</strong></td>
</tr>
<tr>
<td>SP Rate</td>
<td>+</td>
<td><strong>0.06</strong></td>
<td><strong>(3.15)</strong>*</td>
<td><strong>0.06</strong></td>
</tr>
<tr>
<td>Q</td>
<td>+</td>
<td>-0.03</td>
<td>(-0.52)</td>
<td>-0.02</td>
</tr>
<tr>
<td>Accruals</td>
<td>+</td>
<td><strong>4.38</strong></td>
<td><strong>(3.79)</strong>*</td>
<td><strong>4.44</strong></td>
</tr>
<tr>
<td>Offer Size</td>
<td>+</td>
<td>0.07</td>
<td>(1.12)</td>
<td>0.06</td>
</tr>
<tr>
<td>Maturity</td>
<td>+</td>
<td>-0.03</td>
<td>(-0.63)</td>
<td>-0.04</td>
</tr>
<tr>
<td>Senior</td>
<td>?</td>
<td><strong>-0.59</strong></td>
<td><strong>(-3.44)</strong>*</td>
<td><strong>-0.61</strong></td>
</tr>
<tr>
<td>Herf</td>
<td>+</td>
<td><strong>1.09</strong></td>
<td><strong>(3.41)</strong>*</td>
<td></td>
</tr>
<tr>
<td>Lead Lenders</td>
<td>+</td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Share</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry leader</td>
<td>+</td>
<td>-0.14</td>
<td><strong>(-1.79)</strong>*</td>
<td>-0.12</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>1,424</td>
<td></td>
<td>1,404</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td></td>
<td>0.1493</td>
<td></td>
<td>0.1430</td>
</tr>
</tbody>
</table>

Note: t-statistics in the parentheses are Huber-White heteroscedasticity adjusted. 
***, ** and * represent 1%, 5% and 10% significance, respectively.

Variable Definitions:
Size: Calculated as the LN(assets) (COMPUSTAT data item 6),
Leverage: Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);
ROA: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);
**SP Rate:** Transformation of S&P rating, from 1 (AAA) to 22 (D)

**STD Ret:** The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.

**Q:** Calculated as (Assets – Book value of Equity – deferred taxes + market value of equity) / Assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);

**Accruals:** Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

\[
\text{Accruals} = \alpha_0 + \alpha_1(D\text{Revenues})_{i,t} + \alpha_2PPE_{i,t} + \epsilon_{i,t}
\]

Where
- \(\text{Accruals}\) = Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets
- \(D\text{Revenues}\) = Change in annual revenues / average assets
- \(PPE\) = Net property, plant and equipment / average assets
- \(\Delta R\) = Change in accounts receivable / average assets

**Offer Size:** Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

**Maturity:** Calculated as the natural log of the loan’s maturity in months;

**Senior:** Indicator variable equal to 1 if debt is senior, zero otherwise;

**Herf:** To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10000;

**Lead Share:** Calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within 5 years before the issuance of the public debt

**Industry Leader:** Indicator variable equal to 1 if any of lead arrangers of the bank loans is a top 10 lender (in terms of market share) in the five years before the public debt is issued.
Table 4
Analysis of the Effects of Cross-Acceleration Provisions on the Treasury Spreads (as a Spread over Interest Rates on T-notes of Similar Maturity) of Public Debt

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>Unadjusted Model</th>
<th>Heckman Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coefficient</td>
<td>Coefficient</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(T-stat)</td>
<td>(T-stat)</td>
</tr>
<tr>
<td><strong>Intercept</strong></td>
<td>?</td>
<td>-201.89</td>
<td>-85.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.70)***</td>
<td>(-0.90)</td>
</tr>
<tr>
<td><strong>Crss_Accl</strong></td>
<td>-</td>
<td>20.68</td>
<td>-78.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.47)***</td>
<td>(-1.78)*</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>-</td>
<td>-5.86</td>
<td>-13.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.70)*</td>
<td>(-2.86)***</td>
</tr>
<tr>
<td><strong>Leverage</strong></td>
<td>+</td>
<td>18.24 (0.99)</td>
<td>5.55 (0.26)</td>
</tr>
<tr>
<td><strong>ROA</strong></td>
<td>-</td>
<td>-204.98 (-2.62)***</td>
<td>-209.16 (-2.25)**</td>
</tr>
<tr>
<td><strong>SP Rate</strong></td>
<td>+</td>
<td>13.73 (8.41)***</td>
<td>15.98 (8.03)***</td>
</tr>
<tr>
<td><strong>STD Ret</strong></td>
<td>+</td>
<td>2812.38 (4.68)***</td>
<td>2726.15 (6.27)***</td>
</tr>
<tr>
<td><strong>Q</strong></td>
<td>+</td>
<td>-1.95 (-0.55)</td>
<td>-2.09 (-0.41)</td>
</tr>
<tr>
<td><strong>Accruals</strong></td>
<td>+</td>
<td>131.28 (1.93)*</td>
<td>267.64 (2.55)**</td>
</tr>
<tr>
<td><strong>Offer Size</strong></td>
<td>+</td>
<td>17.60 (3.38)***</td>
<td>19.35 (2.91)***</td>
</tr>
<tr>
<td><strong>Maturity</strong></td>
<td>+</td>
<td>10.14 (3.16)***</td>
<td>7.97 (1.59)</td>
</tr>
<tr>
<td><strong>Senior</strong></td>
<td>-</td>
<td>-47.50 (-1.89)*</td>
<td>-66.52 (-4.14)***</td>
</tr>
<tr>
<td><strong>Inverse Mills Ratio</strong></td>
<td>?</td>
<td></td>
<td>62.15 (2.30)**</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td>842</td>
<td>828</td>
</tr>
<tr>
<td><strong>R-Squared</strong></td>
<td></td>
<td>0.4402</td>
<td>0.4506</td>
</tr>
</tbody>
</table>

Note: t-statistics in the parentheses are Huber-White heteroscedasticity adjusted, standard errors in the Heckman model is adjusted using Maddala (1983) approach.

***, ** and * represent 1%, 5% and 10% significance, respectively.

**Variable Definitions:**

**Crss_Accl:** An indicator variable for whether the bond issue contains a cross-acceleration provision.

**Size:** Calculated as the LN(assets) (COMPUSTAT data item 6),

**Leverage:** Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);

**ROA:** Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);

**SP Rate:** Transformation of S&P rating, from 1 (AAA) to 22 (D)
STD Ret: The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.

Q: Calculated as (Assets – Book value of Equity – deferred taxes + market value of equity) / Assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);

Accruals: Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

\[ \text{Accruals} = \alpha_0 + \alpha_1 (\Delta \text{Revenues} - \Delta \text{AR}) + \alpha_2 \text{PPE} + \epsilon \]

Where
\[
\text{Accruals} = \frac{\text{Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations}}{\text{average assets}}
\]
\[
\Delta \text{Revenues} = \frac{\text{Change in annual revenues}}{\text{average assets}}
\]
\[
\text{PPE} = \frac{\text{Net property, plant and equipment}}{\text{average assets}}
\]
\[
\Delta \text{AR} = \frac{\text{Change in accounts receivable}}{\text{average assets}}
\]

Offer Size: Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

Maturity: Calculated as the natural log of the loan’s maturity in months;

Senior: Indicator variable equal to 1 if debt is senior, zero otherwise;

Inverse Mills Ratio: Calculated from a Probit model similar to Equation (1), where we include both Herfindahl index and lead banks’ ownership of the loan as instrumental variables.
Table 5
Analysis of the effects of cross-acceleration provisions on the interest rates (as a spread over LIBOR) of syndicated loans entered into after the public debt was issued.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pred</th>
<th>Sign</th>
<th>Coefficient (T-Stat)</th>
<th>Coefficient (T-Stat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>?</td>
<td></td>
<td>125.29 (3.71)***</td>
<td>120.11 (3.50)***</td>
</tr>
<tr>
<td>Size</td>
<td>-</td>
<td></td>
<td>-3.60 (-1.42)</td>
<td>-3.68 (-1.50)</td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td></td>
<td>49.19 (3.18)***</td>
<td>51.37 (3.34)***</td>
</tr>
<tr>
<td>ROA</td>
<td>-</td>
<td></td>
<td>-110.82 (-2.25)**</td>
<td>-116.36 (-2.40)**</td>
</tr>
<tr>
<td>STD Ret</td>
<td>+</td>
<td></td>
<td>1867.97 (6.42)***</td>
<td>1907.64 (6.51)***</td>
</tr>
<tr>
<td>SP Rate</td>
<td>+</td>
<td></td>
<td>4.94 (3.73)***</td>
<td>4.60 (3.44)***</td>
</tr>
<tr>
<td>Rating</td>
<td>-</td>
<td></td>
<td>-74.84 (-4.14)***</td>
<td>-71.90 (-3.99)***</td>
</tr>
<tr>
<td>Q</td>
<td>?</td>
<td></td>
<td>-8.69 (-2.38)**</td>
<td>-9.40 (-2.55)**</td>
</tr>
<tr>
<td>Accruals</td>
<td>+</td>
<td></td>
<td>-4.50 (-0.08)</td>
<td>-1.99 (-0.04)</td>
</tr>
<tr>
<td>Offer size</td>
<td>-</td>
<td></td>
<td>20.86 (-1.19)</td>
<td>-19.85 (-1.14)</td>
</tr>
<tr>
<td>Maturity</td>
<td>+</td>
<td></td>
<td>-6.28 (-1.67)*</td>
<td>-5.49 (-1.48)</td>
</tr>
<tr>
<td>Secured</td>
<td>+</td>
<td></td>
<td>65.76 (7.89)***</td>
<td>65.17 (7.86)***</td>
</tr>
<tr>
<td>Crss_Accl</td>
<td>?</td>
<td></td>
<td>-6.66 (-1.23)</td>
<td>-12.26 (-1.77)*</td>
</tr>
<tr>
<td>Herf</td>
<td>?</td>
<td></td>
<td>-7.71 (-0.22)</td>
<td>---</td>
</tr>
<tr>
<td>Lead Share</td>
<td>?</td>
<td></td>
<td>---</td>
<td>0.08 (0.30)</td>
</tr>
<tr>
<td>Herf * Crss Accl</td>
<td>+</td>
<td></td>
<td>83.58 (2.14)**</td>
<td>---</td>
</tr>
<tr>
<td>Lead Share * Crss Accl</td>
<td>+</td>
<td></td>
<td>0.75 (2.40)**</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>802</td>
<td></td>
<td>0.6465</td>
<td>793</td>
</tr>
<tr>
<td>R-Squared</td>
<td></td>
<td></td>
<td>0.6514</td>
<td></td>
</tr>
</tbody>
</table>

Note: t-statistics in the parentheses are Huber-White heteroscedasticity adjusted.
***, ** and * represent 1%, 5% and 10% significance, respectively.

Variable Definitions:

Size: Calculated as the LN(assets) (COMPUSTAT data item 6),

Leverage: Calculated as total/assets (COMPUSTAT (data9+data34)/data6);

ROA: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);

STD Ret: The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.

SP Rate: Transformation of S&P rating, from 1 (AAA) to 22 (D). If the firm is not rated by the S&P, then this variable is equal 0.

Rating: Indicator variable equal to 1 if data280 is not missing, zero otherwise.

Q: Calculated as (assets – book value of equity + market value of equity)/assets (COMPUSTAT data6-data60+data25*data199)/data6);

Accruals: Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

\[ Accruals = \beta_0 + \beta_1 (\Delta Revenues)_{i,t} + \beta_2 PPE_{i,t} + \epsilon_{i,t} \]

Where

Accruals = Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets

\( \Delta Revenues \) = Change in annual revenues / average assets

PPE = Net property, plant and equipment / average assets

\( \Delta AR \) = Change in accounts receivable / average assets

Offer Size: Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

Maturity: Calculated as the natural log of the loan’s maturity in months;

Secured: Indicator variable equal to 1 if the loan is secured, zero otherwise;

Crss_Accl: Indicator variable equal one if the debt includes a cross acceleration provision, and zero otherwise.

Herf: To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10000;

Lead Share: Calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within 5 years before the issuance of the public debt
Table 6
Determinants of Bank Loan Ownership Herfindahl Index and Lead Arranger’s Ownership as the First Stage Model for 2SLS Estimations

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Model 1 (Herf)</th>
<th>Model 2 (Lead Share)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pred Sign</td>
<td>Coefficient (T-Stat)</td>
</tr>
<tr>
<td>Intercept</td>
<td>?</td>
<td>0.85 (8.89)**</td>
</tr>
<tr>
<td>Size</td>
<td>-</td>
<td>-0.05 (-11.62)**</td>
</tr>
<tr>
<td>Leverage</td>
<td>?</td>
<td>0.13 (4.73)**</td>
</tr>
<tr>
<td>ROA</td>
<td>?</td>
<td>0.06 (0.49)</td>
</tr>
<tr>
<td>Std Ret</td>
<td>+</td>
<td>1.23 (2.46)**</td>
</tr>
<tr>
<td>SP Rate</td>
<td>+</td>
<td>0.01 (3.68)**</td>
</tr>
<tr>
<td>Q</td>
<td>?</td>
<td>0.02 (3.82)**</td>
</tr>
<tr>
<td>Offer_Size (Public Debt)</td>
<td>?</td>
<td>-0.01 (-2.13)**</td>
</tr>
<tr>
<td>Maturity (Public Debt)</td>
<td>?</td>
<td>-0.00 (-0.97)</td>
</tr>
<tr>
<td>Senior (Public Debt)</td>
<td>?</td>
<td>-0.04 (-2.43)**</td>
</tr>
<tr>
<td>Offer_Size (Loan)</td>
<td>-</td>
<td>-0.55 (-11.95)**</td>
</tr>
<tr>
<td>Maturity (Loan)</td>
<td>-</td>
<td>-0.02 (-2.69)**</td>
</tr>
<tr>
<td>Tang</td>
<td>-</td>
<td>-0.10 (-6.40)**</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>1.419</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td></td>
<td>0.3538</td>
</tr>
</tbody>
</table>

Note: t-statistics in the parentheses are Huber-White heteroscedasticity adjusted. ***, ** and * represent 1%, 5% and 10% significance, respectively.

**Variable Definitions:**

**Size:** Calculated as the LN(assets) (COMPUSTAT data item 6),

**Leverage:** Calculated as total/assets (COMPUSTAT (data9+data34)/data6);

**ROA:** Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);

**STD Ret:** The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.
**SP Rate:** Transformation of S&P rating, from 1 (AAA) to 22 (D). If the firm is not rated by the S&P, then this variable is equal 0.

**Rating:** Indicator variable equal to 1 if data280 is not missing, zero otherwise.

**Q:** Calculated as (assets – book value of equity + market value of equity)/assets (COMPUSTAT data6-data60+data25*data199)/data6);

**Accruals:** Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

\[
\text{Accruals} = \alpha_0 + \alpha_1 (\Delta \text{Revenues} - \Delta \text{AR}) + \alpha_2 \text{PPE} + \varepsilon_{i,t}
\]

Where

- \(\text{Accruals}\) = Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets
- \(\Delta \text{Revenues}\) = Change in annual revenues / average assets
- \(\text{PPE}\) = Net property, plant and equipment / average assets
- \(\Delta \text{AR}\) = Change in accounts receivable / average assets

**Offer Size:** Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

**Maturity:** Calculated as the natural log of the loan’s maturity in months;

**Secured:** Indicator variable equal to 1 if the loan is secured, zero otherwise;

**Crss_Accl:** Indicator variable equal one if the debt includes a cross acceleration provision, and zero otherwise.

**Herf:** To construct this index, we first accumulate the market share of each lender for the bank loans issued within 5 years before the issuance of the public debt. We then calculate the Herfindahl index of the lender’s market share/10000;

**Lead Share:** Calculated as the average percentage of the loan held by the lead arrangers’ for all of the bank loans issued within 5 years before the issuance of the public debt

**Tang:** Measured as the amount of property, plant and equipment (COMPUSTAT data item 8) scaled by total asset.
Table 7
Determinants of the Decision to Include Cross-Acceleration Provisions in Public-debt agreements, with a 2SLS adjustment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pred Sign</td>
<td>Coefficient (Z-Stat)</td>
</tr>
<tr>
<td>Intercept</td>
<td>?</td>
<td>1.31 (1.42)</td>
</tr>
<tr>
<td>Size</td>
<td>-</td>
<td>-0.19 (-5.02)**</td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td>-0.34 (-1.47)</td>
</tr>
<tr>
<td>ROA</td>
<td>-</td>
<td>0.43 (0.46)</td>
</tr>
<tr>
<td>Std Ret</td>
<td>+</td>
<td>-3.76 (-0.83)</td>
</tr>
<tr>
<td>SP Rate</td>
<td>+</td>
<td>0.06 (3.17)**</td>
</tr>
<tr>
<td>Q</td>
<td>+</td>
<td>-0.02 (-0.49)</td>
</tr>
<tr>
<td>Accruals</td>
<td>+</td>
<td>4.00 (3.39)**</td>
</tr>
<tr>
<td>Offer Size</td>
<td>+</td>
<td>0.07 (1.10)</td>
</tr>
<tr>
<td>Maturity</td>
<td>+</td>
<td>-0.04 (-0.68)</td>
</tr>
<tr>
<td>Senior</td>
<td>?</td>
<td>-0.59 (-3.44)**</td>
</tr>
<tr>
<td>Pre_Herf</td>
<td>+</td>
<td>1.03 (1.82)*</td>
</tr>
<tr>
<td>Pre_Lead Share</td>
<td>+</td>
<td>0.01 (2.27)**</td>
</tr>
<tr>
<td>Industry leader</td>
<td>+</td>
<td>-0.11 (1.43)</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>1,419</td>
</tr>
<tr>
<td>Pseudo R- Squared</td>
<td></td>
<td>0.1423</td>
</tr>
</tbody>
</table>

Note: t-statistics in the parentheses are Huber-White heteroscedasticity adjusted. *** , ** and * represent 1%, 5% and 10% significance, respectively.

**Variable Definitions:**
- **Size:** Calculated as the LN(assets) (COMPUSTAT data item 6),
- **Leverage:** Calculated as total debt/assets (COMPUSTAT (data9+data34)/data6);
ROA: Return on assets calculated as earnings/assets (COMPUSTAT data18/data6);

SP Rate: Transformation of S&P rating, from 1 (AAA) to 22 (D)

STD Ret: The standard deviation of the residuals from the market model using daily returns from the year before the debt issuance, requiring at least 100 observations in the firm-year.

Q: Calculated as (assets – book value of equity – deferred taxes + market value of equity) / assets (COMPUSTAT data6 - data60 - data74 + data25 * data199)/data6);

Accruals: Calculated as the absolute value of discretionary accruals, where discretionary accruals are the error from the modified Jones model estimated annually for each Fama/French industry classification. The modified Jones model is a regression of

\[ \text{Accruals} = \alpha_0 + \alpha_1 (\text{Revenues} - \Delta \text{AR})_{i,t} + \alpha_2 \text{PPE}_{i,t} + \epsilon_{i,t} \]

Where

\[ \text{Accruals} \] = Earnings before extraordinary items and discontinued operations less operating cash flows from continuing operations / average assets

\[ \Delta \text{Revenues} \] = Change in annual revenues / average assets

\[ \text{PPE} \] = Net property, plant and equipment / average assets

\[ \Delta \text{AR} \] = Change in accounts receivable / average assets

Offer Size: Calculated as the offering amount of the debt scaled by assets (COMPUSTAT data item 6);

Maturity: Calculated as the natural log of the loan’s maturity in months;

Senior: Indicator variable equal to 1 if debt is senior, zero otherwise;

Pre_Herf: Predicted value of the Herf from the two-stage-least-squared model, where the first stage includes the tangibility of the firm as the instrumental variable.

Pre_Lead Share: Predicted value of lead arrangers’ ownership from the two-stage-least-squared model, where the first stage includes the tangibility of the firm as the instrumental variable.

Industry Leader: Indicator variable equal to 1 if any of lead arrangers of the bank loans is a top 10 lender (in terms of market share) in the five years before the public debt is issued.