The Evolving Nature of Japanese Corporate Governance: Guaranteed Bonds vs. Rated Bonds

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Abstract

We investigate a large set of corporate bonds issued in Japan using a competing risks approach and find evidence of self-selection where issuers with unrated, bank-guaranteed bonds have more information asymmetry, are less reliant on bond financing, and possess poorer firm quality. Japanese banks provide credit guarantees to small or opaque firms with weaker financial profiles, thus reducing the risk of issuer default, as well as saving on the costs of a public offering and obtaining a credit rating. These results are driven by both issuer-specific, or "supply-side," factors and external / investor-focused "demand-side" factors but supply-side variables such as firm size, profitability, and leverage are the most significant determinants of bond yield spreads. After factoring in the guarantee's annual fee, the cost of a privately placed, bank-guaranteed bond is similar to the cost of a private loan backed by a bank loan guarantee. The bank guarantee therefore serves as valuable (but costly) protection for investors who invest in these riskier issuers' bonds. However, after the U.S. financial crisis, bond issuers have begun to rely more on credit ratings as a potentially cheaper monitoring / corporate governance mechanism.

1. Introduction

A firm faces several choices when issuing a corporate bond in terms of what maturity to offer, collateral to provide (if any), placement method (public or private), as well as whether to obtain a bond rating and/or bank guarantee. We focus on the relatively unexplored area of an issuer's decision to obtain a bank guarantee rather than seek a credit rating for its bond. Unlike a credit rating, which does not create credit risk for the rating agency, a bank guarantee not only provides a "certification effect" by the guarantor financial institution but also explicitly strengthens the credit quality of the bond because the financial institution's creditworthiness creates additional financial support for the issuer. Thus, credit ratings and bank guarantees are not perfect substitutes but offer some of the same benefits in terms of certifying the credit quality of the bond issue.[2] Accordingly, we explore the effect of bank guarantees on corporate bond yields and also examine how the relative importance of monitoring / corporate governance mechanisms such as credit ratings and bank guarantees can change over time and thus influence a bond issuer's financing decisions.

In theory, either a bank guarantee or a strong credit rating can lower bond yields for the issuer. Therefore, we examine how the choice of bank guarantees and bond ratings affect corporate bond yields and how this choice can vary over time. In this way, we are able to use a unique data set to test Rajan's (1992) theoretical model of a borrower's choice between obtaining debt from an informed lender (the guarantor bank in our case) or from

[2] As noted above, bank guarantees and bond ratings are not exact substitutes. Instead, the role of guarantor banks in Japan can be more closely compared to the role of insurance companies for municipal bonds in the U.S. before the financial crisis of 2007-2008. For example, about 50% of municipalities in the U.S. purchased insurance from bond insurance companies such as MBIA and Assured Guaranty before the crisis to obtain investment grade ratings and reduce the cost of debt. By comparing the yields of insured and uninsured bonds of the same municipal bond issuers, Wilkoff (2012) differentiates between the "insurance" effect and self-selection effect of municipal bond issuers which purchase credit insurance. However, we cannot make this type of distinction between insurance and self-selection effects because few Japanese bond issuers sell both guaranteed and unguaranteed bonds. Thus, as described above, we focus on a related, but different, set of questions than Wilkoff (2012) and other research which examines the U.S. municipal bond market.

"arm's length" creditors (e.g., bond investors). In his model, the informed lender can resolve informational asymmetries that benefit the borrower but this type of lender also exerts influence over what the borrower can do with the funds. Thus, weaker firms might find the benefits of informed lending outweigh the costs while stronger firms might prefer arm's length debt.

Our study is the first attempt to investigate the role of banks and rating agencies simultaneously from the perspective of new bond issues, particularly those issued outside the U.S. Since banks in the U.S. do not typically guarantee bonds, Japan, with the world's second largest corporate bond market, is an ideal country to compare the influence of banks with that of rating agencies.[3] According to the Nomura Institute of Capital Markets Research published (in Japanese) in 2008, Japanese banks are the largest owner of corporate bonds in Japan.[4] Thus, Japanese banks buy many of the bonds that they underwrite or guarantee.[5,6] In the U.S., most unrated bonds are issued through private placements and purchased by life insurance companies (Carey, Prowse, Rea, and Udell, 1993). Whether

[3] Compared to U.S. corporate bond markets, the Japanese corporate bond market is an excellent venue for analyzing an issuer's choice between bank guarantees and bond ratings because Japanese firms have a real choice in this matter, whereas most firms issuing in the U.S. feel obligated to obtain ratings in order to appeal to a wider array of institutional investors. Yamori, Nishigaki, and Asai (2006) explain that Japanese firms can issue bonds without ratings and there are no regulations or investment policies that require the use of ratings by Japanese institutional investors.

[4] The details of the ownership are as follows: banks (42%), insurance companies (22%), public pension funds (12%), corporate pension funds (6%), investment trust (2%), local and central governments (14%), corporations (1%), and others such as foreign investors and individual investors (1%). We do not have any specific ownership data broken down by bonds issued via public offerings and private placements.

[5] Bank guarantees for Japanese corporate bonds are 100% irrevocable and unconditional and thus principal plus interest payments are fully guaranteed for the life of the bond.

[6] It would be ideal if we could obtain an individual bank's holdings of specific bonds to identify how these holdings might affect the bank's guarantee and monitoring efforts. Unfortunately, these data are not available but, as noted in an earlier footnote, Japanese banks own the biggest share of Japanese corporate bonds (42% in aggregate terms). From this, we can infer that, in contrast to U.S. banks which typically do not hold many corporate bonds, Japanese banks have a strong incentive to monitor these private, guaranteed bonds because these banks are likely to be both guarantors and investors in some of these issues. These inter-relationships are also reinforced by the Japanese keiretsu-style of governance.

firms acquire bond ratings typically depends on a firm's size and opacity which in turn affects the choice of bond issuance, namely, bonds issued via public offerings or issued through private placements.[7]

Although we focus on the Japanese corporate bond market due to its rich set of bond and bank loan data, the subject of bank guarantees is also important for other large and growing bond markets such as those found in China. Dhawan and Yu (2015) show that the majority of rated corporate bonds in China are explicitly guaranteed in the form of collateral or a joint liability agreement. In addition, Luo, Ye, and Hu (2016) indicate that local governments implicitly guarantee all Chinese corporate bonds.

By combining data from several different sources related to not only corporate bonds but also bank loans, our study of the Japanese market provides the most detailed and complete analysis of an issuer's choice of obtaining either a bank guarantee or credit rating. This study is also the first to analyze the time variation in this choice within a major bond market. Our analysis and the research on the Chinese market cited above also shows that the effect of bank guarantees is an important one in many large bond markets even though these guarantees are not extensively used for U.S. bonds. In addition, we analyze whether the decision to use a bank guarantee is driven mainly by issuer-specific characteristics such as the firm's financial condition or if investor-focused and external market conditions are more likely to influence this decision. In effect, we control for "supply-side" factors such as the issuer's financial health and whether these factors outweigh "demand-side" forces such as bond investors' appetite for corporate bonds and external financial market conditions like the returns and volatility in equity markets, as well as the overall level of yields on corporate

[7]Hereafter, bonds issued via public offerings are called public bonds and those issued through private placements are called privately placed bonds or, simply, private bonds.

bonds.

We examine corporate bonds in Japan using panel regressions, a 2-stage Heckman model, as well as competing risks models, and find that new bonds with a bank guarantee are issued at significantly lower yields than those without it. Financially weaker and more opaque firms may be forced by corporate bond investors to obtain bank guarantees because they are unable to get a satisfactory rating. In order to control for this possible selection bias, we apply a Heckman model and find that weaker and smaller Japanese firms typically self-select to request a bank guarantee issue via a private placement bond, as opposed to obtaining a credit rating and issuing a public bond.[8] However, our results are robust to any self-selection effects. In addition, a competing risks framework confirms that our initial results are robust to alternative estimation techniques.

A bank guarantee's effect on bond yields and issuer choices

Using a unique data set of 3,746 guaranteed and 7,326 unguaranteed new corporate bonds issued in Japan during 1998 - 2014, we report that bonds with a bank guarantee are, on average, associated with yields that are 51-65 bps lower than other bonds without a guarantee, after controlling for other factors that can affect yield spreads. We also show that larger, more transparent firms choose relatively weaker monitors (credit rating agencies) while smaller, more opaque firms depend on potentially stronger monitors (banks), which offer an explicit guarantee when firms sell new bonds.[9] In addition, we observe that firms that issue

[8] There is not a very large market for smaller, speculative risk public bonds in Japan and thus financially weaker firms are typically forced to issue private bonds rather than public ones. Thus, the Japanese capital markets are, in effect, influencing the self-selection path for the bond issuer. However, the statistical aspects of potential self-selection bias that we study here are still relevant, regardless of whether the issuer or bond market participants are influencing the choice of bond issuance method because, in reality, this choice is jointly determined by both the bond issuer and the investors in these corporate bonds.

[9] A bank typically has greater incentive to monitor a debt issuer since it has direct exposure to the firm's credit risk via the bank guarantee. That is, the risk of being called on this guarantee translates into the bank having "skin in the game," albeit on a contingent basis. In contrast, a rating agency simply issues a rating and thus there is no direct credit exposure for the rater. However, due to the rating's "certification effect" there is some

bonds through a bank guarantee have greater information asymmetry, are less reliant on bond financing, and possess poorer financial profiles than firms that sell bonds without a bank guarantee. The bank guarantee therefore serves as valuable (but costly) protection for investors who invest in these riskier issuers' bonds.

Further, our results hold during all periods of our analysis, including the 2007-2008 financial crisis, and are robust to time variation in bond and stock market conditions, as well as evolving issuer preferences for ratings over guarantees. For example, we observe cyclical variations in the issuance of guaranteed bonds with greater issuance of these bonds when global economic conditions are strong. Guaranteed bond activity was greatest during 2002-2007 and declined precipitously during the post-U.S. financial crisis period (2009-2014) as Japanese banks curtailed their credit risk by reducing their exposure to unrated corporate debt. Over this period, it appears that the rising reputation of Japanese rating agencies such as R&I and JCR after 2007 also encouraged bond issuers to obtain credit ratings rather than rely on bank guarantees as a monitoring / corporate governance mechanism.[10] We also find, even after controlling of potential endogeneity, that issuer-specific supply-side factors are statistically and economically significant determinants of yield spreads.[11]

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longer-term reputational risk if the rating firm is perceived to issue ratings that do not reflect the borrower's true credit risk. In our empirical tests, we explicitly control for the issuer's reliance on bond financing (via the variable, *TBTD*), as well as the dependence of the borrower on bank loans from the guarantor bank (via *GBBL*). In this way, we can control for the guarantor bank's incentives and overall motivation to monitor the borrower. As shown later, most of our analysis uses the *TBTD* variable because *GBBL* is based on a survey of banks and thus greatly limits the number of observations (e.g., over 9,000 with *TBTD* versus approximately 1,000 with *GBBL*).

[10] In 2007, the U.S. Securities and Exchange Commission assigned the Nationally Recognized Statistical Rating Organization (NRSRO) designation for two Japanese rating agencies, Rating & Investment Information (R&I) and Japan Credit Rating Agency (JCR). Starting in 2007, Japanese bond issuers could obtain SEC-recognized ratings from R&I and JCR, which charge lower rating fees and assign higher ratings than the global credit rating agencies, S&P and Moody's. In contrast, S&P and Moody's obtained their NRSRO certification in 1975.

[11] As we later show in Model 5 of Table 4, a one-standard deviation increase in an issuer's Z-score can lower yield spreads by 18.1 bps. For example, this change represents a 34% reduction in the average yield spread of 53.1 bps for a rated, publicly traded bond.

The effects of fees and flotation costs on borrowing costs

Another key aspect of bond issuance is the effect of the bank guarantee fee and underwriting costs on the firm's overall borrowing cost. Using data from the Ministry of Economy, Trade, and Industry of Japan and the Japan Credit Rating Agency (JCR), we find that total flotation costs for private placement bonds with a bank guarantee are much higher on a relative basis than those for public bonds with ratings. As shown in Appendix 2, even though the total flotation costs of public bonds (in yen) can be nearly nine times greater than those of private placement bonds with bank guarantees (105 million vs. 12.2 million yen), the former are much lower than the latter in terms of total relative cost (in bps). For example, a 2% annual coupon, 5-year maturity private placement bond with a bank guarantee typically has flotation costs and guarantee fees of 610 bps paid upfront. A comparable publicly issued and rated bond would have a 79 bps upfront fee plus a 5 bps annual credit monitoring fee (or, equivalently, 21.8 bps per year). Ideally, we would like to use underwriting fees for each bond issue to perform formal tests of these costs across rated vs. guaranteed bonds but unfortunately these data are not available. So, we must rely on the sample calculation presented in Appendix 2 to help understand the relevant costs but we cannot use it for our empirical analysis.

The "all-in" cost of the guaranteed bond can therefore be higher than a rated bond once the annualized cost of the guarantee and other flotation costs are included. As the example of a 5-year bond in Appendix 2 illustrates, the upfront costs of 610 bps for a guaranteed, private placement bond is much higher than the typical upfront costs of 79 bps (plus the 5 bps annual monitoring fee) for a rated, public bond. Based on a hypothetical 200 million yen 5-year Japanese bond with a 2% yield to maturity (and a 2% annual coupon), the annualized flotation cost for the 5-year PUG bond is 129.4 bps, compared to 21.8 bps for a

comparable 5-year rated bond.[12]

Thus, despite a private, unrated (but guaranteed) bond's lower yield spread of 26.0 bps when compared to a rated public bond's 53.1 bps, the overall cost of the guaranteed bond is, on average, 80.5 bps more expensive than a rated bond. We can see this by adding the annual yield spreads to each bond's respective annualized flotation costs (e.g., 26.0 bps + 129.4 = 155.4 bps for guaranteed bonds vs. 53.1 + 21.8 bps = 74.9 bps for rated bonds). The higher annualized cost of a guaranteed bond (155.4 bps vs. 74.9 bps) suggests that a bank guarantee is a valuable form of credit support to external creditors and thus the issuer's yield spread reflects this support (although guarantor banks are able to extract gains from this arrangement). A small issuer is still better off with this private, guaranteed bond when compared to the alternative of incurring a large amount of fixed, upfront fees if the firm were to issue a public, rated bond.[13] From the borrower's perspective, the bank guarantee fee more than offsets the cost savings of the guarantee but still provides a cheaper alternative than a public, rated bond issue (while also compensating the bank for the increased credit risk). This empirical finding of more costly bank debt is consistent with the theoretical analysis of informed bank lending vs. arm's length debt in Rajan (1992). That is, smaller, weaker borrowers rely on the bank guarantee while stronger firms obtain ratings.

In our (documented) discussions with officials at Japanese banks such as Mitsubishi

[12] These annualized flotation costs are computed using a time-value-of-money approach where the upfront cost (e.g., 610 bps for the guaranteed bond) is set as the present value term, the number of periods is 5 years, the annual discount rate is 2%, and the future value is set to zero. Then, we can solve for the annualized payment that would be equivalent to the upfront cost of 610 bps. This results in a value of 129.4 bps per year. Repeating this same exercise for the upfront cost of 79 bps for the rated bond results in a value of 16.8 bps per year (to which we must also add the 5 bps annual monitoring fee to obtain the rated bond's annualized cost of 21.8 bps).

[13] For example, even if Japanese bond investors were willing to assume the high credit risk of such an issue, the firm issuing this public bond offering would incur relatively large upfront public underwriting fees. In turn, this would make the cost of such a public issue much more expensive (in bps) than issuing a private, guaranteed bond. So, via their guarantee fees, commercial banks can capture most of the gains associated with issuing a private bond but this option is still cheaper than a public, rated bond from a smaller issuer's perspective.

UFG Financial Group and Mizuho Bank, a bond guarantee fee is effectively the same as a loan guarantee fee. A bank's usual fee for a private corporate loan guarantee is approximately 150 bps of the total loan amount for small- and medium-size firms, and 50-80 bps for large firms.[14] This cost is within 6 bps of our 155.4 bps estimate of the total annual costs of issuing a privately placed, guaranteed bond for a smaller issuer. Since the guarantees for both private bonds and corporate loans pose similar levels of credit risk to the bank, it seems reasonable that the costs of each type of credit support would also be similar. .

In sum, there has been a significant amount of research on issuer characteristics of public and private bonds but no study other than the current analysis which directly compares rated vs. guaranteed bonds and the joint interactions between an issuer's choices of public vs. private *and* rated vs. guaranteed. This study is a first attempt to further our understanding of these important debt issue choices.

The rest of our study is outlined as follows. Section 2 reviews the relevant literature, and section 3 describes our empirical predictions and methods. Section 4 provides details on our sample and section 5 explains the empirical results. Finally, section 6 provides some conclusions.

2. **Relevant Literature**

Given that we are focusing on an issuer's choices related to issuing a public vs. private bond, as well as between a bank guarantee and a bond rating, we briefly summarize below some of the relevant literature in these areas.

According to Levine (2002), bank-based corporate governance in Japan made a

[14] The approximate definition of small and medium size firms in Japan is as follows. For construction, general manufacturing, and transportation industries: book value of equity below 300 million yen and total employees below 300; Wholesale industry: book value of equity below 100 million yen and total employees below 100; Service industry: book value of equity below 50 million yen and total employees below 100; Retail industry: book value of equity below 50 million yen and total employees below 50.

contribution to post-war economic growth by effectively mobilizing and allocating capital to firms. For instance, Japanese firms have a close long-term relationship with a particular bank, i.e., a main bank. Previous studies find both positive and negative effects of the main bank relationship. Even though U.S. banks are not allowed to own equity of a firm, Japanese banks are permitted to have up to 5% stock ownership. Current research has identified two main benefits of a close bank-borrower relationship due to increased bank monitoring: 1) reduced agency costs and lower financial distress costs. For example, Prowse (1990) argues that, because Japanese banks are both debtholders and stockholders, they have strong incentives to monitor firms, and the agency problems in Japanese firms are therefore less severe than those in U.S. firms. Hoshi, Kashyap, and Scharfstein (1990) and Kester (1991) claim that the bailout of a troubled firm by main banks can reduce the costs of financial distress significantly.

On the other hand, the close relationship between bank and firm can result in some negative effects due to a Myers-type debt overhang problem. Weinstein and Yafeh (1998) find that while the strong bank-firm relationship in Japan improves access to capital, it does not necessarily lead to higher growth or profitability because banks discourage firms to make investments in positive and risky net present value projects. These banks extract rents from their client firms in return for providing capital and coinsurance.[15] Kang and Stulz (2000) find that Japanese firms with a greater proportion of bank loans performed worse and invested less than other firms during the economic recession of 1990–1993 because risk-averse banks curtailed capital to the client firms.

The model of Wu and Yao (2012) shows that main bank rent extraction significantly affected investment and financing decisions of Japanese firms over the financial deregulation

[15] Japanese banks charge loan guarantee fees to their client firms.

period in the 1980s. In addition, Campbell and Hamao (1994) find that a substantial number of Japanese firms changed their financing method from bank loans (bank-based) to bonds (market-based) after deregulation.

We find that Japanese firms have slowly evolved into a more advanced form of market-based corporate governance, thus shifting away from bank-guaranteed, private bonds without ratings to rated, public bonds without bank guarantees over the 1998-2014 period. In particular, even though firms have issued bonds at 51-65 basis points lower when backed by a bank guarantee, most Japanese firms could not tolerate the high-cost rent extraction of the bond guarantee by banks and adopted lower-cost bond ratings during the latter portion of our sample. In Appendix 1, we report that bonds with bank guarantee decreased significantly after the financial crisis in 2007-2008 because risk-averse banks stopped offering bond guarantees while simultaneously a greater fraction of Japanese firms preferred to issue public bonds supported by credit ratings.

As mentioned in the Introduction, we also note that the NRSRO designation of two Japanese rating agencies such as R&I and JCR by the SEC in 2007 coincided with a significant decrease in guaranteed bonds. Han, Pagano, and Shin (2012) show that Japanese issuers might now prefer ratings from these Japanese agencies because the reputational advantage of the global rating firms disappeared when the news of the U.S. subprime mortgage scandal became widely known in 2007-2008. This reduction in the relative value of a global agency's rating has therefore helped accelerate the move towards a more self-reliant, independent Japanese bond market which can credibly rate and monitor corporate bonds without the support of ratings from global agencies and without the need for local bank guarantees. Thus, corporate bond yield spreads and issuer choices have been affected by the

shift from a bank-based monitoring system to a market-based model that relies on credit ratings.

Prior research also shows that corporate bond issuers must consider the costs and benefits associated with: a) public vs. private bonds and b) credit ratings vs. guarantees. For example, consistent with the Rajan (1992) model described in the Introduction, Carey, Rea, Prowse, and Udell (1993) show that opaque firms in the U.S. issue privately placed bonds while transparent firms sell public bonds. In addition, Carey, Post, and Sharpe (1998) find that the firms that choose private bonds and non-bank loans have higher risk than public bonds.

In addition, previous studies find that rating agencies have reputational capital through special knowledge and / or skills in evaluating credit risk information because not only can they mitigate information asymmetry in the credit markets but they can also provide a delegated monitoring service for investors. This service can be valuable to a corporate issuer in Japan. However, several other studies assert that the monitoring roles of rating agencies often fail due to untimely or inaccurate ratings.[16] Thus, rating agencies may be relatively weak external monitors because their monitoring function depends on competitive pressure within the ratings industry, the financial incentives of the rating firms, as well as the quality of information provided by issuers.

3. Research Methods

The vast majority of studies (Carey, Prowse, Rea, and Udell, 1993; Poon, 2003; Poon, Lee, and Gup, 2009; and Han, Moore, Shin, and Yi, 2013) indicate that unrated bonds, as well as bonds with unsolicited ratings, should have higher yield spreads because they are usually

[16]Becker and Milbourn (2011) claim that increased competition in the credit rating industry caused by Fitch's entry to the industry has resulted in lower ratings quality by Moody's and S&P, as they now compete more vigorously for ratings business by lowering their credit standards. Bolton, Freixas, and Shapiro (2012) establish a model that rating agencies are more likely to assign inflated ratings when economic growth is strong, and competition in the credit rating industry results in increased market inefficiency such as "rating shopping."

issued by firms with low quality and high information asymmetry. Hence, we hypothesize that unrated or privately placed Japanese bonds are sold at *higher* yields than other types of bonds in Japan and they are more likely to be issued by firms with weaker financial quality and greater information asymmetry.

Hayashi (2004), however, finds that bank guarantees can generate lower yields for privately placed bonds. Thus, we expect that opaque firms with lower financial quality will choose to pursue a bank guarantee to obtain a lower yield. Because a bank guarantee can be viewed as superior to a bond rating (due to stronger monitoring and the coinsurance effect of a bank's support for the client's bonds), we also expect that guaranteed bonds are sold at *lower* yields than other types of bonds. Further, we posit that guaranteed bonds are more likely to be issued by firms that rely on unrated and / or private bonds because these firms are less likely to benefit further from obtaining ratings once they have a bank guarantee.

We also anticipate that the yields on bonds with a bank guarantee issued during the 2007-2008 global credit crisis might be affected by this crisis period (either positively or negatively depending on how investors perceive the value of this guarantee during stressful market conditions). The likelihood of obtaining a bank guarantee during this period might also be affected by the crisis. In addition, we expect that factors related to investors' demand for coporate bonds such as the volatility of the S&P 500 stock index, the return on the Nikkei stock index, and the aggregate yield spread on investment grade Japanese corporate bonds might *increase* the cost of debt,[17] while a bond rating by S&P or Moody's

[17] We include the VIX volatility index to proxy for world-wide risk conditions that are exogenous to the Japanese corporate bond market. That is, it is meant to control for overall risk levels in the global capital markets. In addition, the Nikkei stock market returns represent an alternative investment opportunity set for investors and thus higher Japanese equity market returns might weaken the demand for Japanese corporate bonds (and could drive up yield spreads). The average of the aggregate yield spread on investment-grade Japanese corporate bonds are also included as another proxy for investor demand-side effects as higher aggregate bond yield spreads might mean lower demand for Japanese corporate bonds (in general) and thus lead to higher yield spreads for any new issuer of bonds.

could be associated with *lower* yield spreads.[18]

In addition, we conjecture issuer-specific factors that affect the supply of corporate bonds such as firms with more information asymmetry and poorer firm quality are *less* likely to solicit ratings from a ratings agency and, instead, are more likely to issue bonds with a bank guarantee. We also examine whether firms with high growth potential (market-to-book ratio), greater bank loan (short-term and long-term bank loan ratio), and more collateral (higher depreciation and amortization expenses) significantly affect an issuer's decision to obtain a bond guarantee.

To test the predictions outlined above, we examine corporate bonds in Japan using panel regressions, a two-stage Heckman model, as well as a competing risks model.[19] With regard to the measures of information asymmetry, we use issue size and idiosyncratic risk as proxy variables. For example, we use the total amount of the debt issue (in yen) and idiosyncratic stock return volatility (Goyal and Santa-Clara, 2003) as our proxies for information asymmetry (with larger issue size and lower idiosyncratic risk suggesting less severe informational symmetries).

To measure firm quality, we use the Altman z-score metric, as well as the individual financial variables included in the z-scores, such as operating cash flow ratio, total debt ratio, and total asset turnover ratio. Furthermore, we choose not only issue-specific variables such as bond maturity, issue amount, and issue methods, but also include issuer-specific variables

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[18] Han, Pagano, and Shin (2012) find that the yields of bonds rated by global rating agencies (Moody's or S&P) are significantly lower than those by Japanese rating agencies (R&I or JCR) prior to the U.S. financial crisis.

[19] A competing risks model provides a unified way to compare multiple mutually exclusive choices. As shown later in Table 7, the competing 'risks' are actually the firm's choices related to issuing a guaranteed bond contingent upon the issuer's past reliance on bank loans from the guarantor. In addition, the competing risks framework enables us to explore in a consistent manner a firm's choices related to issuing to three key types of bonds (guaranteed but unrated, rated but not guaranteed, as well as unrated and not guaranteed). For more details on the competing risk method, see Gray (1988), Fine and Gray (1999), and He, Chong, Li, and Zhang (2010).

such as total asset turnover ratio and total debt ratio in the following models to capture the firm's operating efficiency and financial leverage.

$$YS = \alpha + \beta X + \gamma Y + \varphi \quad (1)$$

Equation (1) is a panel regression model, where YS is the yield spread between new corporate bonds and comparable maturity Japanese government bonds. Beyond industry and time dummy variables, we include two types of independent variables that serve as proxies for information asymmetry, firm quality, and an important interaction term between independent variables which isolates the effects of a bond that is unrated but guaranteed and privately placed (e.g., denoted as "PUG"). The definitions of issue-specific variables, X, as well as issuer-specific and investor demand variables, Y, are presented in Appendix 3. Our sample is a panel data set that consists of new bonds issued from April 1998-September 2014 that are combined with cross-sectional, issue-specific variables across different industries. Consequently, it is important to use fixed effects models to control for industry- and time-specific effects, as well as to adjust the standard errors for time and industry clustering as the same firm may issue several bonds in a cluster or many firms may issue bonds at the same time due to a lower interest rate environment.

We include Altman's z-score (ZS variable) in our panel regressions of Equation (1) to incorporate an estimate of the default probability of an unrated bond. As a robustness check, we later replace the firm's aggregate z-score with three individual financial ratios of an issuer: total debt ratio (TD), operating cash flow ratio (OCF), and total asset turnover ratio (SOA) because Standard & Poor's (2012) considers these financial ratios to be the most important determinants of long-term credit ratings.

In testing our theoretical predictions, we expect the bank guarantee dummy variable (GUA) and the unrated-guarantee-private placement interaction term (PUG) to be negative

and significant if: (1) a bond with a guarantee and / or (2) an unrated, privately placed bond with a bank guarantee are sold with lower yields, respectively.

Whereas Equation (1) is a panel regression model, we specify a probit model in Equation (2) to see which factors influence a bond issuer's choices regarding the selection of a bank guarantee, private placement, and bond rating.

$$W = \delta + \theta X + \nu Y + \psi \qquad (2)$$

In the above equation, W is a binary variable, and equals 1 if a bond issuer jointly opts for three choices: a bank guarantee, no bond rating, and a private placement, or 0 otherwise.[20] Similar to Equation (1), we include in this probit model both issue-specific variables, X, and issuer-specific / investor demand variables, Y, as described earlier. We expect that privately placed, unrated bonds by financially weaker, more opaque firms with smaller borrowing needs are more likely to obtain a bank guarantee.

Because we can observe the yield spreads of both guaranteed and unguaranteed bonds, we also employ the 2-stage Heckman model to determine if guaranteed, unrated, and privately placed bonds are sold at lower yields than other unguaranteed bonds while explicitly controlling for possible self-selection bias. This technique has been used in prior studies when bond issuers self-select into one type of bond issuance over another method due to systematic differences in the issuer's or bond investor's characteristics (e.g., financial condition, firm size, yields on alternative securities, etc.). As a first stage, we estimate the probit model as described by Equation (2) above and use the inverse Mills ratio (IMR) from this model as an independent variable in a second stage panel regression model of yield spreads. This second stage model is similar to the panel regression model described earlier

[20] In the standard probit model shown later in Table 5, we focus primarily on the three-variable interaction, PUG, as the dependent variable W because it represents the most common form of guaranteed bond in our sample.

in Equation (1) except that the IMR from the first stage model is included as an additional independent variable.[21]

4. Data and Descriptive Statistics

The data consists of new corporate bonds denominated in Japanese yen from April 1998 to September 2014.[22] The yields of Japanese corporate bonds, their issue characteristics, Japanese government bond yields, and issuer financial variables are obtained from the Nikkei NEEDS database. Because the NEEDS database provides only R&I ratings, we collect ratings assigned by S&P, Moody's, and JCR via Bloomberg. Only straight corporate bonds issued by non-financial firms with more than one-year of maturity are included. Out of 11,072 bonds meeting the criteria, we further eliminate 1,996 due to negative yield spreads. The 11,072 bonds do not include bonds issued by the utility industry because this industry is heavily regulated and few bonds are unrated.[23]

Table 1 reports the descriptive statistics of 11,072 new bonds in Japan in five panels. Panel A shows the number of new bonds, their yields, and their mean yield spreads by year, Panel B displays new bond issues by industry, Panel C describes the maturity and issue amount of new bonds, Panel D shows issue characteristics, and Panel E reports correlations of yield spreads (YS) between unrated, privately placed, and guaranteed bonds, respectively. According to Panel A, the mean yield spreads jumped after the Asian financial crisis in 1998 (94 bps) and 1999 (84 bps), as well as after the global financial crisis in 2009 (64 bps). The

[21] Details of this model and its results are provided in Table 6.

[22] Due to the after-effects immediately following the U.S. financial crisis, the number of unrated, guaranteed, and privately placed bonds declined dramatically from 2009 to 2014.

[23] The bonds are issued by a total of 1,793 firms. We find that 107 firms switch issue method from private placement to public offerings, but the switch does not affect our results when these firms are omitted from the sample. We also remove bonds with negative yield spreads and end up with 9,076 rated and unrated bonds. We divide the bonds by industry into three sectors, manufacturing, non-manufacturing, and transportation, to control for industry effects.

number of new bond issues decreased sharply in 2009 (333 bonds) due to the crisis and have remained low ever since that time. Panel B shows that mean yield spreads are very similar regardless of industry, while Panel C indicates the average maturity is 6.07 years and the average issue amount is 10.6 billion yen.

In Panel D, we report issue characteristics and find that there are 4,287 rated bonds and 6,785 unrated bonds. When it comes to rated bonds, each bond is rated by at least one rating agency such as R&I, JCR, Moody's, or S&P. While the number of publicly placed bonds represents the majority of bond issues during this period, 5,781 (52%), the number of privately placed bonds is still substantial at 5,291 (48%). We also count bond pairs such as rated vs. guaranteed bonds, rated bonds vs. bonds issued via different issue methods, and guaranteed bonds vs. public and private bond issues. Regarding the group of rated vs. guaranteed bonds, the rated and unguaranteed bonds (4,287 or 38.72% of the total) are the most popular combination, followed by unrated and guaranteed bonds (3,746 or 33.83%). In Appendix 1, we display graphs that show the annual time series variation in several types of bonds (guaranteed vs. non-guaranteed, public vs. private, rated vs. unrated, and PUG vs. non-PUG). As noted earlier, one can see from these graphs that bond issuance (particularly for PUG-type bonds) has decreased significantly during the 2009-2014 post-crisis period as Japanese borrowers (like their U.S. counterparts) retrenched and Japanese banks reduced their credit risk by issuing fewer guarantees for unrated bonds. In addition, the elevation of the Japanese rating agencies in 2007 to NRSRO status raised the stature of credit ratings as an important monitoring mechanism relative to traditional bank guarantees. Thus, the issuance of PUG bonds varies depending on market conditions, as well as the financial health of the corporate borrowers.[24]

[24] Appendix 1 shows a declining trend of new corporate bond issues in Japan since 2003. According to Japan

Lastly, Panel E of Table 1 presents correlation coefficients between the yield spreads of unrated bonds, bonds with private placements, and guaranteed bonds. The combination of unrated and privately placed bonds has the highest correlation (0.76), followed by guaranteed and privately placed bonds (0.75), as well as unrated and guaranteed bonds (0.57). This provides further evidence that Japanese firms tend to choose either two types of bonds: 1) unrated but guaranteed private placement bonds and 2) rated but unguaranteed public bonds.

[Insert Table 1 here]

Table 2 reports the univariate t-test results of mean differences in issue and issuer characteristics between private, unrated, guaranteed (PUG) bonds and other non-guaranteed bonds (non-PUG). Issuers of the PUG bonds have greater information asymmetry as measured by idiosyncratic risk and firm size. For example, firms with PUG bonds have greater idiosyncratic risk (e.g., average market model standard errors = 0.00088 vs. the unguaranteed bonds' value of 0.00050) and smaller total assets (62.2 billion yen) even though these issuers have lower systematic risk (0.5745). Furthermore, PUG bonds have a shorter mean maturity (4.70 years) and smaller issue amount (596.475 million yen). With respect to firm quality, the picture is somewhat mixed in that firms with PUG bonds have lower operating cash flow (0.0191) and rely less on bond financing (0.1775 vs. 0.2621 for the Total Bonds Ratio, which equals total bond debt / total debt) and more on bank loans from guarantor banks (.1725 for the Guarantee Bank Loan Ratio, which equals total loans obtained

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Macro Advisors (https://www.japanmacroadvisors.com/page/category/economic-indicators/finance/bank-lending), the Japanese government asked firms to increase bank loans in 2003 because the loan-to-deposit ratios for Japanese banks were very low due to sluggish loan demand, coupled with risk-averse investors' increased appetite to hold relatively safe bank deposits. As a result, bank lending has become easier to firms rather than bond issues, and bank lending in Japan has dramatically increased since 2004.

from guarantor bank / total bank loans).[25] All the mean differences are significant at the 1% level except for the market-to-book ratio and the guarantee bank loan ratio.[26]

Overall, these findings, in conjunction with those shown in Table 1, confirm that firms which use bank guarantees often opt to issue unrated bonds via the private placement market (i.e., smaller, less profitable, and more opaque firms typically rely on bank guarantees and issue private bonds).

[Insert Table 2 here]

In Table 3, we compare mean yield spreads between different types of bonds on a univariate basis. We report in the first two rows of this table that guaranteed bonds (mean yield spread = 26.03 bps) are issued at significantly lower interest rates than unguaranteed bonds (mean = 62.86 bps). The mean yield spreads of privately placed bonds (44.67 bps) are also significantly lower than those of publicly offered bonds (58.98 bps). The differences in yield spreads between guaranteed and rated bonds are most likely due to the observation that the three primary choices between rated vs. unrated, guaranteed vs. unguaranteed, and private vs. public are highly correlated with each other. Since these choices are inter-related, we compute additional yield spreads based on interactions between an issuer's joint choices related to obtaining either a bond rating or a bank guarantee, as well as between public or private placements.

Accordingly, we compare six different pairs of rated, unrated, guaranteed, unguaranteed, privately placed, and publicly issued bonds, and confirm that bonds with a bank guarantee are associated with significantly lower yield spreads. Most importantly, one

[25] However, these PUG issuers also have positive operating characteristics such as lower financial leverage (0.4048), greater asset turnover ratio (1.0525), and a higher z-score (1.7429) relative to other bond issuers.

[26] We also performed Wilcoxon tests of the medians, and the results are similar.

can see from the last row of Table 3 that private, unrated, and guaranteed bonds have significantly lower yields than non-PUG bonds at the 1% level (26.0 bps vs. 53.1 bps with a t-statistic of -28.56). This difference of 27.1 bps shows, on a univariate basis, the average reduction in the annual coupon rate associated with a firm's choice to issue a guaranteed bond rather than a rated bond.

[Insert Table 3 here]

5. Empirical Results

A. Panel Regression Results

Table 4 reports the empirical results of three panel regression models suggested by Equation 1, where the bond's yield spread, YS, is the dependent variable. The first model in Table 4 provides a baseline model that controls for Altman's z-score and then, as a robustness check, we re-estimate the regressions in model (3) by controlling for individual financial ratios typically employed in the z-score (rather than just the z-score itself) because these ratios are considered to be the most important determinants of corporate credit ratings (e.g., Standard & Poor's, 2012). Models 2-4 also include "demand-side" factors such as market-wide bond and equity conditions (COR, VIX, and NIK), as well as firm-specific idiosyncratic risk and some dummy control variables (IR, MS, and CR). In model 4, we isolate the effect of PUG bonds by adding a dummy variable which equals 1 if the bond is private, unrated, and guaranteed bond. We also control for time and industry effects in all models.[27]

In model (1) of Table 4, the coefficients of the unrated bond variable, UNR, and the guaranteed bond variable, GUA, are both significant at the 1% level, which indicates that unrated bonds are sold at higher interest rates (+15.87 bps), while guaranteed bonds are issued at lower yields (-64.69 bps), after controlling for the model's other factors. However,

[27] We do not report the year and industry dummies in Table 4 to save space.

the privately placed bond variable, PP, is not significant. In models 2-4, we also find that stock market volatility coincides with higher bond yields because both the coefficients of VIX and IR are positive and significant. In addition, the proxy for bond investor-related demand (i.e., the yield on investment grade bonds, COR) is positive and significant. In contrast, the other proxy for market conditions (NIK) is insignificant. We also report that a bond of a financially weaker firm is issued at a higher yield because the coefficients of the ZS variable is negative while the parameter for leverage (TD) is positive. In addition, we find that bigger, older firms (AGE, LTA) with more tangible assets (proxied by DA) correspond to lower yields. These results suggest that demand-driven factors play a significant role but that issuer-related / supply-side forces such as a firm's age, z-score, idiosyncratic risk, asset size, and tangible assets are the primary drivers influencing the variations in yield spreads. We conclude that the bank debt guarantee, after controlling for other factors such as the choices related to issue method and bond rating, is the primary factor that relates to a lower cost of debt.

Due to the joint relationship between the choices related to bank guarantees (GUA), private placements (PP) and bond ratings (UNR), we include in model (4) of Table 4 a three-variable interaction term, PUG (privately placed, unrated, and guaranteed bonds) rather than include GUA, PP, and UNR as separate variables.[28] We do this because, as noted earlier regarding the results of Tables 1-3, firms typically choose one of two paths in terms of bond issuance (privately placed, unrated, and guaranteed or public, rated, and not guaranteed). We find that the PUG variable is negative and significant at the 1% level, and confirm that a

[28] We also added three pairwise two-way interaction terms such as UP (Unrated and Private Placement), UG (Unrated and Guaranteed), and PG (Private Placement and Guaranteed) variables to Model 4 in addition to the GUA, PP, UNR, and PUG variables, but UG, PG, and PUG variables are omitted due to high levels of collinearity between these interaction terms.

bank guarantee can still lead to lower yield spreads of 62.3 bps for privately placed bonds that are unrated but guaranteed. This result is consistent with the earlier univariate findings of Table 3 that guaranteed, unrated bonds can be sold at lower yield spreads than other bonds.

Moreover, according to the results from Models 1-4 in Table 4, we claim that an issuers' decision to obtain a bank guarantee or rating is primarily driven by supply factors rather than demand factors because the former are more significant statistically and economically than the latter. For example, a one-standard deviation increase in a firm's Z-score can lower public, rated bond's yield spread by 18.1 bps (a 34% reduction). But, it is possible that both the supply factors and demand factors are endogenously determined and driven by broader macroeconomic forces. Thus, it is possible that an issuer's Z-score could be influenced by the equity returns or corporate bond yields in Japan because all of these variables are affected by the overall performance of the Japanese economy.

We test several two-stage linear regression models to control for this possible confounding effect. In the first stage, we include SOA, TD, OCF, COR, VIX, NIK as independent variables and treat ZS as the dependent variable in order to examine the impact of the macroeconomic factors on the firm-specific supply factor. We find that the COR variable is positively related to the ZS variable at the 1% significant level. In the second stage, we estimate the ZS_Hat variable (which are the fitted values of the ZS variable from the first stage regression). We then replace the ZS variable in Model 2 with ZS_Hat, and find that the coefficient of the ZS_Hat variable is still negative (-0.0516) and significant at the 1% level (t = -3.24) after controlling for possible endogeneity with the macroeconomic variables. We provide the results of the second stage model in Model 5. Hence, our results are robust to this potential endogeneity problem. Thus, we find that firm-specific supply-side factors are significant and economically important determinants while demand-side factors other

than the VIX index are not as strong, even after controlling for possible endogeneity.

[Insert Table 4 here]

B. Probit Model Results

In Table 5, we examine a firm's decision to issue a bond which is jointly unrated, privately placed, and guaranteed by a bank via two different probit models (per Equation 2). The dependent variable is equal to 1 if a bond is jointly *guaranteed, unrated,* and *privately placed*.[29] The results in Table 5 are generally different than our findings based on the univariate tests reported in Table 2 and thus demonstrate the importance of using a multivariate approach to account for possible confounding effects. Consistent with multivariate panel regression tests of Table 4, our probit tests show that a weaker and smaller firm is more likely to obtain a bank guarantee (and forego a bond rating). For example, larger firms (LTA) and companies with greater financial strength (ZS) are less likely to obtain a bank guarantee. In contrast, those firms with higher dependence on bank loans (BLTD) and larger growth prospects (MTB) are more likely to acquire a guarantee. As can be seen by the insignificant coefficients for VIX and NIK in Table 5, these results provide additional support that external market conditions other than COR are not significant determinants of an issuer's decision to issue a private, unrated, and guaranteed bond.[30] In general, we confirm that issuers with greater information asymmetry and poorer financial quality seek a bank

[29] The SEC variable is omitted in Table 5 because of multi-collinearity. It should be kept in mind that only 12.84% of the bonds in our 1998-2014 sample are collateralized (i.e., 1,422 out of 11,072) because, according to private communications with Japanese institutional investors and a Nomura Institute of Capital Markets Research report (2009), bond issuers with reliable cash flows but few tangible assets are attractive to bank guarantors and bond investors, so collateral is not typically required for these issuers. Thus, private bond issuers in Japan usually have a mutually exclusive choice between obtaining a bank guarantee or posting collateral but most firms prefer (or are only able to obtain) the bank guarantee.

[30] In contrast to VIX and NIK, higher levels of investment grade corporate bond yields (COR) are associated with a lower probability of PUG issuance. This suggests that weak overall demand for bonds (and concomitantly higher bond yields) lead to fewer opportunities to issue PUG bonds. However, the firm- and bond-specific factors appear to still be the main factors influencing the PUG bond choice.

guarantee.

[Insert Table 5 here]

C. Heckman Self-Selection Model and Competing Risk Model Results

The panel regressions of Table 4 and the conventional probit models of Table 5 suggest that a firm's decision to issue a private, unrated, and guaranteed bond (i.e., when PUG = 1) could be endogenously determined with issuer-related factors such as financial strength (ZS), leverage (TD), and issue size (LIA). To see if self-selection bias might be affecting our results, we employ a 2-stage Heckman method where we use a probit model (i.e., model (2) of Table 5) in the first stage to compute an inverse Mills ratio (IMR) and then include this additional variable in a second stage panel regression (i.e., similar to model (4) of Table 4). To estimate the IMR variable from the probit model, we use two additional variables (MTB and BLTD) and find that these instruments are statistically valid factors that are correlated with IMR but uncorrelated with the model's residuals.[31]

We find in Table 6 that the coefficient on the IMR variable is positive and insignificant, which confirms that self-selection bias does not materially affect our results even if some issuers do self-select into private, unrated, and guaranteed bonds. The PUG coefficient indicates that the bank guarantee's effect on yield spreads is -64.74 bps, which is quite close to the -62.28 bps parameter estimate for the PUG variable reported earlier in model (4) of Table 4. Thus, self-selection bias does not materially affect our main findings.

[Insert Table 6 here]

In Table 7, models 1 and 2 provide additional empirical results based on a competing risks model, which accounts for simultaneity in the choice between issuing a PUG bond if the

[31] The F-statistics for BLTD and MTB are 18.1 and 3.6, which have p-values of .0001 and .0639, respectively. Thus, both are considered relatively strong instruments. In addition, the partial correlation coefficients of these two variables with the dependent variable, PUG, is .012 for BLTD and .001 for MTB.

firm does (or does not) have prior loans outstanding from the guarantor bank. In addition, model 3 presents our most comprehensive test where the firm has three choices (i.e., three "competing risks"), as it can either issue: 1) unrated and guaranteed bonds; 2) unrated and non-guaranteed bonds; or 3) rated and guaranteed bonds. This provides us with another way to check the robustness of our conventional probit tests reported earlier in Table 5. In contrast to the probit model of Table 5, we estimate three competing risks models to identify which factors lead to an increased likelihood of issuing a guaranteed bond (GBBL, ZS, TBTD, and LTA). Due to data limitations on GBBL in the Nikkei database, models 1 and 2 have fewer observations than model 3 but still confirm that issuers which are smaller, weaker, and less dependent on bond financing are more likely to issue PUG bonds. With a larger sample, Model 3 also corroborates that these three factors (financial strength, firm size/opacity, and bond financing dependency) significantly affect the probability of issuing PUG bonds. Further, the GBBL coefficients of models 1-2 show that firms which rely more heavily on bank loans from guarantor banks (i.e., higher GBBL ratios) are 8.2 times more likely to issue PUG bonds. These findings related to GBBL and TBTD support the notion that the firm's borrowing history (and guarantor banks's monitoring incentives) are important determinants of the type of bonds a firm chooses to issue.

Overall, after controlling for both possible self-selection bias in Table 6 and potential competing risks in Table 7, we confirm our earlier result that it is more likely that a private, unrated, but guaranteed bond will be issued by a smaller, weaker firm that does not rely heavily on bond financing in its capital structure. Thus, Table 7's results support our main findings and demonstrate that these results are robust to alternative estimation methods and are not affected by potential problems associated with simultaneity, self-selection bias, and competing risks.

[Insert Table 7 here]

6. Conclusion

We find that many yen-denominated corporate bonds in Japan are issued without ratings and sold at lower interest rates than rated bonds because most unrated bonds have a bank guarantee. We investigate 11,072 straight new corporate bonds issued in Japan during 1998 - 2014 and show that even though guaranteed bonds are sold at yields which are 51-65 bps lower than unguaranteed bonds, the cost savings from the guarantee are much smaller than the upfront bank guarantee fee that the issuer typically pays to the bank in terms of flotation costs. Therefore, Japanese bond issuers must pay a great deal to obtain a bank guarantee even after incorporating the lower yield spreads. On the other hand, bond investors are willing to accept lower yields for guaranteed bonds than rated ones because of the perceived value of a bank guarantee (via the decreased default risk of these securities).

The issuers of such guaranteed bonds are typically financially weaker, as well as more opaque, and thus appear willing to accept the higher upfront fee in exchange for lowering their annual coupon payments over the life of the bond. In addition, the choice of obtaining a guarantee and foregoing a bond rating appear to be driven more by issuer-specific / supply-side factors such as firm profitability, efficiency, and financial leverage rather than by investor-related or external market conditions. Japanese banks can help resolve information asymmetries for more opaque borrowers and, in the process, these banks are able to capture the value associated with the higher credit risk associated with such borrowers. Thus, Japanese financial institutions provide a valuable (and costly) debt guarantee to small or unknown firms with inferior financial profiles. These results are robust to the possibility of self-selection bias and the endogenous choice of guarantees, ratings, and private placements.

We also find that the reduction in yield spreads due to a bank guarantee disappears during the post-crisis period because investors and issuers begin to rely more on credit ratings. This is a sign that the monitoring / corporate governance mechanism is evolving within the Japanese corporate bond market, as can be seen by the dramatic decline in bank-guaranteed bonds during the post-crisis period. In terms of future avenues of research, one could explore in more depth the differences in default and recovery rates of guaranteed vs. rated bonds.

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Table 1 Descriptive Statistics of New Bond Issues in Japan

Panel A. Annual Yield and Yield Spread

Year	Yield	N	% of Obs.	Yield Spread	N	% of Obs.
1998	2.06	1115	10.07	0.94	1066	11.74
1999	1.95	641	5.79	0.84	583	6.42
2000	1.77	564	5.09	0.61	491	5.41
2001	1.11	612	5.53	0.52	527	5.81
2002	0.89	804	7.26	0.46	627	6.91
2003	0.78	1267	11.44	0.40	1026	11.30
2004	0.85	1050	9.48	0.38	715	7.87
2005	0.84	1003	9.06	0.33	609	6.71
2006	1.34	822	7.42	0.36	517	5.70
2007	1.60	789	7.13	0.40	683	7.53
2008	1.55	464	4.19	0.52	427	4.70
2009	1.48	333	3.01	0.64	308	3.39
2010	1.24	360	3.25	0.61	337	3.71
2011	1.06	298	2.69	0.50	271	2.99
2012	0.77	326	2.94	0.42	304	3.35
2013	0.85	354	3.20	0.43	334	3.68
2014	0.72	270	2.44	0.36	251	2.77
Total		11,072	100		9,076	100

Panel B. Mean Yield Spread by Industry

Industry	N	% of Obs.	Mean Yield Spread
Manufacturing	3272	36.05	51.63
Non-Manufacturing	5063	55.78	53.03
Transportation	741	8.16	58.58
Total	9076	100	

Panel C. Maturity and Issue Amount

	N	Mean	SD	Min	Max
Maturity	11072	6.07	3.54	1	60
Issue Amount	11072	1.06E+07	1.74E+07	8800	4.00E+08

Panel D. Issue Characteristics

	Issue Characteristics	Frequency	Percent(%)
Rated vs. Unrated	Rated	4287	38.72
	Unrated	6785	61.28
Public Offerings vs. Private Placement	Public Offering	5781	52.21
	Private Placement	5291	47.79
Guaranteed vs. Unguaranteed	Guaranteed	3746	33.83
	Unguaranteed	7326	66.17
Secured vs. Unsecured	Secured	1422	12.84
	Unsecured	9650	87.16
Crisis Period vs. Non-Crisis Period	Crisis Period	1314	11.87
	Non-Crisis Period	9758	88.13
Private, Unrated, but Guaranteed (PUG) vs. Non-PUG	PUG	3746	33.83
	Non-PUG	7326	66.17
Rated vs. Guaranteed	Rated & Guaranteed	0	0
	Rated & Unguaranteed	4287	38.72
	Unrated & Guaranteed	3746	33.83
	Unrated & Unguaranteed	3039	27.45
Rated vs. Issue Method	Rated & Public Offering	4277	38.63
	Rated & Private Placement	10	0.09
	Unrated & Public Offering	1504	13.58
	Unrated & Private Placement	5281	47.70
Guaranteed vs. Issue Method	Guaranteed & Public Offering	0	0
	Guaranteed & Private Placement	3746	33.83
	Unguaranteed & Public Offering	5781	52.21
	Unguaranteed & Private Placement	1545	13.95
Total		11072	100

Panel E. Correlations of Yield Spreads (YS) across key bond issue characteristics

	Unrated	Private Placement	Guaranteed
Unrated	1		
Private Placement	0.76	1	
Guaranteed	0.57	0.75	1

All sample bonds are issued by non-financial firms from 1998 to 2014. All new bonds are acquired from the NEEDS database in Japan. The unit of issue amount is 1,000 yen.

Table 2 Two-Sample t-tests of Issue and Issuer Characteristics between Private, Unrated, but Guaranteed (PUG) and Non-PUG Bonds

Variable	Classification	N	Mean	SD	Mean Difference
Idiosyncratic Risk (IR)	PUG	1740	0.00088	0.00046	0.00037
	Non-PUG	6660	0.00050	0.00098	(23.31)***
Total Assets (LTA)	PUG	1976	6.22E+07	1.15E+08	-3.01E+09
	Non-PUG	6480	3.07E+09	6.53E+09	(-20.48)***
Total Debt Ratio (TD)	PUG	1976	0.4048	0.1771	-0.0344
	Non-PUG	6470	0.4393	0.1974	(-6.9593)***
Total Asset Turnover (SOA)	PUG	1973	1.0525	0.6178	0.3619
	Non-PUG	6472	0.6906	0.4797	(27.3107)***
Operating Cash Flow (OCF)	PUG	1972	0.0191	0.1081	-0.0327
	Non-PUG	5585	0.0518	0.0564	(-17.0235)***
Beta (BET)	PUG	1740	0.5745	0.4275	-0.1812
	Non-PUG	6660	0.7558	0.4041	(-16.4571)***
Depreciation Expense (DA)	PUG	1973	0.0271	0.0268	-0.0123
	Non-PUG	6155	0.0394	0.0346	(-14.4546)***
Market-to-Book (MTB)	PUG	1755	1.4996	1.6012	0.0871
	Non-PUG	6422	1.4125	4.6107	(0.7791)
Z-Score (ZS)	PUG	1614	1.7429	3.5081	0.3069
	Non-PUG	6067	1.4359	1.0598	(5.8819)***
Maturity (MAT)	PUG	3746	4.7009	1.4938	-2.0636
	Non-PUG	7326	6.7646	4.0453	(-30.1873)***
Issue Amount (LIA)	PUG	3746	596475	1047722	-1.51E+07
	Non-PUG	7326	1.57E+07	1.95E+07	(-47.3567)***
Guarantee Bank Loan Ratio	PUG	3309	0.1725	0.1678	0.0823
(GBBL)	Non-PUG	11	0.0902	0.1526	(1.6237)*
Total Bonds Ratio	PUG	1970	0.1775	0.1951	-0.0846
(TBTD)	Non-PUG	6128	0.2621	0.1895	(-17.1139)***
Firm Age (AGE)	PUG	3746	40.1593	23.3009	-17.9772
	Non-PUG	7326	58.1366	25.1037	(-36.5181)***

All issue and issuer characteristics data are acquired from the NEEDS database. N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. T-values are reported in parentheses under mean difference column. The unit of issue amount is 1,000 yen, and the unit of total assets is 1 million yen.

Table 3 Difference-in-Means tests of Yield Spreads

	Classification	N	Mean	SD	Mean Difference
Guaranteed	Guaranteed	2437	0.2603	0.2054	-0.3683
vs. Unguaranteed	Unguaranteed	6639	0.6286	0.5241	(-33.7500)***
Rated	Rated	3855	0.5334	0.4484	0.0063
vs. Unrated	Unrated	5221	0.5271	0.5165	(0.6085)
Public Offerings	Public Offering	5264	0.5898	0.5032	0.1430
vs. Private Placement	Private Placement	3812	0.4467	0.4553	(13.9105)***
Unrated & Guaranteed	Unrated & Guaranteed	2437	0.2603	0.2054	-0.2730
vs. Rated & Unguaranteed	Rated & Unguaranteed	3855	0.5334	0.4484	(-28.2393)***
Unrated & Private Placement	Unrated & Private Placement	3805	0.4442	0.4447	-0.0868
vs. Rated & Public Offerings	Rated & Public Offerings	3848	0.5310	0.4382	(-8.6003)***
Guaranteed & Private Placement	Guaranteed & Private Placement	2437	0.2603	0.2054	-0.3295
vs. Unguaranteed & Public Offerings	Unguaranteed & Public Offerings	5264	0.5898	0.5032	(-31.1453)***
Unrated & Guaranteed	Unrated & Guaranteed	2437	0.2603	0.2054	-0.5002
vs. Unrated & Unguaranteed	Unrated & Unguaranteed	2784	0.7605	0.5888	(-39.8658)***
PUG	PUG	2437	0.2603	0.2054	-0.2706
vs. Non-PUG	Non-PUG	3848	0.5310	0.4382	(-28.5627)***

To compute the yield spreads, Japanese government bond yields are subtracted from corporate bond yields with comparable maturities to control for the term structure of interest rates. The corporate and Japanese government bond yields are obtained from NEEDS database. N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. T-values are reported in parentheses under mean difference column.

Table 4. Panel Regression Analyses of Yield Spread (YS)

Panel A. Full Sample Results

	Model 1	Model 2	Model 3	Model 4	Model 5
UNR	0.1587	0.1446	0.1601		0.1859
(Unrated)	(4.75)***	(4.32)***	(5.37)***		(5.29)***
MAT	0.0273	0.0296	0.0309	0.0196	0.0209
(Maturity)	(4.89)***	(5.52)***	(5.82)***	(3.01)***	(3.36)***
PP	-0.0937	-0.1136	-0.1511		-0.2777
(Private)	(-1.04)	(-1.37)	(-1.89)*		(-3.59)***
GUA	-0.6469	-0.5364	-0.5128		-0.5650
(Guaranteed)	(-9.42)***	(-14.91)***	(-12.36)***		(-17.71)***
SEC	-0.1869	-0.2561	-0.1794	-0.2042	-0.1441
(Collateralized)	(-3.77)***	(-4.92)***	(-4.94)***	(-5.46)***	(-4.33)***
LIA	-0.0161	-0.0084	-0.0229	0.0158	-0.0253
(Issue Amount)	(-0.58)	(-0.33)	(-0.88)	(0.90)	(-1.06)
LTA	-0.0664	-0.0363	-0.0359	-0.0352	-0.0277
(Firm Size)	(-4.36)***	(-2.67)***	(-3.49)***	(-2.50)**	(-2.21)**
ZS	-0.0921	-0.0917		-0.0311	
(Z-score)	(-7.43)***	(-8.70)***		(-3.18)***	
ZS_Hat					-0.0516
(Fitted Z-score)					(-3.24)***
SOA			0.0288		
(Asset Turnover)			(1.04)		
TD			0.566		
(Tot. Debt Ratio)			(7.92)***		
OCF			0.0225		
(Oper. Cash Flow)			(0.11)		
TBTD	-0.1939	-0.1049	-0.0779	-0.1512	-0.1329
(Tot. Bonds Ratio)	(-3.63)***	(-2.20)**	(-1.71)*	(-3.15)***	(-3.02)***
DA	-2.1219	-2.2795	-2.595	-2.3498	-2.3581
(Deprec. Exp. Ratio)	(-3.46)***	(-4.58)***	(-6.30)***	(-5.37)***	(-7.48)***
AGE	-0.0021	-0.0016	-0.0005	-0.0009	-0.0004
(Firm Age)	(-4.56)***	(-4.33)***	(-1.63)	(-2.38)**	(-1.12)
COR		0.1616	0.1392	0.1184	0.0924
(Invest. Grade Yield)		(5.81)***	(3.84)***	(3.63)***	(2.01)**
VIX		0.0063	0.0059	0.0099	0.0102
(Volatility Index)		(3.04)***	(3.85)***	(4.61)***	(5.12)***
NIK		-0.2486	-0.1558	-0.6859	-0.2332
(Jap. Equity Returns)		(-0.72)	(-0.42)	(-1.13)	(-0.49)
IR		121.17	116.43	133.63	113.8958
(Idiosyncratic Risk)		(2.43)**	(2.16)**	(2.76)***	(2.48)**
MS		-0.0792	-0.0619	-0.0982	-0.0974
(Global Rating dummy)		(-2.90)***	(-2.28)**	(-2.93)***	(-2.90)***
CR		-0.049	-0.0276		0.0313
(Fin. Crisis dummy)		(-1.06)	(-0.65)		(0.68)
PUG interaction term				-0.6228	
(PP * UNR * GUA)				(-14.00)***	
N	6085	5940	5679	6911	6754
Prob.>F	0.0000	0.0000	0.0000	0.0000	0.0000
R-SQ	0.2345	0.326	0.307	0.2566	0.2567

Panel B. Sub-Sample Results

Variable	Model 2	Model 2-1	Model 2-2
UNR	0.1446	0.2258	0.0717
	(4.32)***	(4.39)***	(1.38)
MAT	0.0296	0.0155	0.0343
	(5.52)***	(3.06)***	(3.89)***
PP	-0.1136	-0.3337	-0.1734
	(-1.37)	(-3.13)***	(-0.27)
GUA	-0.5364	-0.5682	-0.9023
	(-14.91)***	(-11.76)***	(-1.41)
SEC	-0.2561	-0.1387	-0.2317
	(-4.92)***	(-2.89)	(-5.62)***
LIA	-0.0084	-0.0104	0.0685
	(-0.33)	(-0.36)**	(1.41)
LTA	-0.0363	-0.0356	-0.0593
	(-2.67)***	(-2.17)**	(-3.41)***
ZS	-0.0917	-0.0223	-0.0592
	(-8.70)***	(-2.42)**	(-4.11)***
TBTD	-0.1049	-0.2179	0.2063
	(-2.20)**	(-3.92)***	(1.61)
DA	-2.2795	-2.3636	-3.121
	(-4.58)***	(-4.69)***	(-2.45)**
AGE	-0.0016	-0.0008	-0.0009
	(-4.33)***	(-1.64)	(-2.24)**
COR	0.1616	0.0998	0.0396
	(5.81)***	(3.28)***	(0.42)
VIX	0.0063	0.0124	0.0039
	(3.04)***	(5.04)***	(0.96)
NIK	-0.2486	-0.6176	0.0353
	(-0.72)	(-0.98)	(0.04)
IR	121.17	88.0386	720.5342
	(2.43)**	(2.55)**	(3.78)***
MS	-0.0792	-0.1456	0.0705
	(-2.90)***	(-4.47)***	(2.37)**
CR	-0.049		
	(-1.06)		
N	5940	5512	1399
Prob.>F	0.0000	0.0000	0.0000
R-SQ	0.326	0.3013	0.2986

The dependent variable is the yield spread (YS) between new corporate bonds and comparable maturity Japanese government bonds. As shown in Equation (1), the definitions of independent variables are either bond issue-specific (X) or corporate issuer-specific (Y) and are defined as follows.
UNR = a dummy variable equal to 1 if a bond is not rated and 0 otherwise;
MAT = maturity of a bond;
PP = a dummy variable equal to 1 if a bond is issued through a private placement and 0 otherwise;
GUA = a dummy variable equal to 1 if a bond is issued with a bank guarantee and 0 otherwise;
SEC = a dummy variable equal to 1 if a bond is issued with security (collateral) and 0 otherwise;
LIA = log of issue amount;
LTA = log of total assets;
ZS = Altman's Z-score;
ZS_Hat = Fitted values for Altman's Z-score based on a first-stage regression of ZS on firm-specific variables (OCF, SOA, TD) and macro-level factors (COR, VIX, NIK);
SOA = total asset turnover ratio (total sales / total assets);
TD = total debt ratio (total debt / total assets);
OCF = operating cash flow ratio (operating cash flow / total assets);
TBTD = total bonds outstanding out of total debt;
DA = depreciation expenses out of total assets;
AGE = age of the firm since foundation;
COR = daily average of bond yields for BBB-AAA rated industrial Japanese corporate bonds (with 5 year maturity) in Japan on the issue date;
VIX = volatility of S&P 500 stock index in the U.S. on the issue date;
NIK = raw return of the Nikkei Stock Market Index in Japan on the issue date;
IR = idiosyncratic risk of the issuer estimated from the standard errors of market model;
MS =a dummy variable equal to 1 if a bond is rated by a global rating agency such as S&P or Moody's and 0 otherwise;
CR = a dummy variable equal to 1 for a bond is issued during the periods of the 2007-2008 global financial crisis;
PUG = a dummy equals 1 for guaranteed, unrated, and privately placed bonds
Year and industry effects are included in the model but not reported here to conserve space.

In Panel A, Model 5 reports the results from a second-stage regression based on the 2-Stage Least Squares method. Panel B re-examines Model 2 in Panel A with sub-samples. Model 2-1 covers 1998-2008 period and Model 2-2 2009-2014 period.

N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. All t-statistics in the parentheses are calculated with time- and industry-clustered standard errors.

Table 5. Empirical Results from Probit Models

Variable	Model 1	Model 2
MAT	0.0243	0.0251
(Maturity)	(2.05)**	(2.14)**
LIA	-0.6592	-0.6722
(Issue Amount)	(-9.47)***	(-9.51)***
LTA	-0.2742	-0.2524
(Firm Size)	(-4.22)***	(-3.89)***
ZS	-0.1849	-0.2245
(Z-score)	(-3.68)***	(-4.74)***
TBTD	-0.4595	0.1994
(Total Bonds Ratio)	(-2.04)**	(0.52)
DA	-3.5021	-3.6007
(Depreciation Exp. Ratio)	(-2.84)***	(-2.82)***
AGE	-0.0027	-0.0013
(Firm Age)	(-1.48)	(-0.65)
COR	-0.4502	-0.4529
(Invest. Grade Yield)	(-2.36)**	(-2.53)**
VIX	-0.0128	-0.0095
(Volatility Index)	(-1.16)	(-0.89)
NIK	-2.7062	-2.9768
(Japan Equity Returns)	(-1.18)	(-1.39)
IR	-18.4235	-48.6079
(Idiosyncratic Risk)	(-0.15)	(-0.58)
MS	-0.6151	-0.6284
(Global Rating Dummy)	(-3.23)***	(-3.09)***
MTB		0.1077
(Market-to-Book)		(2.19)**
BLTD		0.8319
(Bank Loan Ratio)		(2.65)***
N	6020	6013
Prob.>Chi-SQ	0.0000	0.0000
Pseudo R-SQ	0.6609	0.6688

The dependent variable is PUG (a dummy = 1 for guaranteed, unrated, and privately placed bonds).
The definition of independent variables is as follows.
MAT = maturity of a bond;
LIA = log of issue amount;
LTA = log of total assets;
ZS = Altman's Z-score;
TBTD = total bonds outstanding out of total debt;
DA = depreciation expenses out of total assets;
AGE = age of the firm since formation;
COR = daily average of bond yields for BBB-AAA rated industrial corporate bonds (with 5 year maturity) in Japan on the issue date;
VIX = volatility of S&P 500 stock index in the U.S. on the issue date;
NIK = raw return of the Nikkei Stock Market Index in Japan on the issue date;
IR = idiosyncratic risk of the issuer estimated from the standard errors of market model;
MS =a dummy variable equal to 1 if a bond is rated by a global rating agency such as S&P or Moody's and 0 otherwise;
MTB = market-to-book ratio;
BLTD = short- and long-term bank loans / total debt.

N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. All t-statistics in the parentheses are calculated with time- and industry-clustered standard errors.

Table 6. Empirical Results of Heckman Self-Selection Model

Variable	Coefficient	SE	t-statistics
MAT	0.0275	0.0068	(4.01)***
(Maturity)			
LIA	-0.0279	0.039	(-0.72)
(Issue Amount)			
LTA	-0.0591	0.0262	(-2.25)**
(Firm Size)			
ZS	-0.0999	0.0187	(-5.34)***
(Z-score)			
TBTD	-0.1954	0.054	(-3.62)***
(Total Bonds Ratio)			
DA	-2.9422	0.4211	(-6.99)***
(Depreciation Exp. Ratio)			
AGE	-0.0018	0.0004	(-4.54)***
(Firm Age)			
COR	0.1923	0.0329	(5.83)***
(Invest. Grade Yield)			
VIX	0.0061	0.0021	(2.94)***
(Volatility Index)			
NIK	-0.3738	0.5552	(-0.67)
(Japan Equity Returns)			
IR	126.1548	59.1674	(2.13)**
(Idiosyncratic Risk)			
MS	-0.0605	0.0416	(-1.45)
(Global Rating Dummy)			
PUG	-0.6474	0.0785	(-8.24)***
*(PP*UNR*GUA)*			
IMR	0.0142	0.0608	(0.23)
(Inverse Mills Ratio)			
N	5092		
Prob.>F	0.0000		
R-SQ	0.3249		

The Heckman Model is composed of two equations. The probit selection equation for PUG in the Heckman Model is based on Model 2 in Table 5. The linear YS model of interest is based on Model 4 in Table 4. The market-to-book ratio (MTB) and short- and long-term bank loans / total debt (BLTD) are used as instrumental variables in this Heckman specification. The dependent variable is the yield spread (YS) between new corporate bonds and comparable maturity Japanese government bonds. The SEC variable is omitted due to collinearity. The definition of independent variables is as follows.
MAT = maturity of a bond;
LIA = log of issue amount;
LTA = log of total assets;
ZS = Altman's Z-score;
TBTD = total bonds outstanding out of total debt;
DA = depreciation expenses out of total assets;
AGE = age of the firm since foundation;
COR = daily average of bond yields for BBB-AAA rated industrial Japanese corporate bonds (with 5 year maturity) in Japan on the issue date;
VIX = volatility of S&P 500 stock index in the U.S. on the issue date;
NIK = raw return of the Nikkei Stock Market Index in Japan on the issue date;
IR = idiosyncratic risk of the issuer estimated from the standard errors of market model;
MS =a dummy variable equal to 1 if a bond is rated by a global rating agency such as S&P or Moody's and 0 otherwise;
PUG = a dummy equals 1 for guaranteed, unrated, and privately placed bonds
IMR = Inverse Mills Ratio;

N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. All t-statistics in the parentheses are calculated with time- and industry-clustered standard errors.

Table 7. Empirical Results of Competing Risks Models

	Model 1	Model 2	Model 3
GBBL	8.2179	8.2197	
(Guarantee Bank Loan Ratio)	(13.75)***	(9.45)***	
ZS		0.9918	0.9816
(Z-score)		(-3.51)***	(-4.69)***
TBTD		0.2058	0.2641
(Total Bonds Ratio)		(-8.05)***	(-5.38)***
LTA		0.9393	0.5395
(Firm Size)		(-1.90)*	(-20.75)***
N	3141	1481	7224
No. of Failure Events	2624	1298	1508
No. of Competing Events	506	177	2117
No. of Censored Events	11	6	3599
Prob. > Chi-SQ	0.0000	0.0000	0.0000

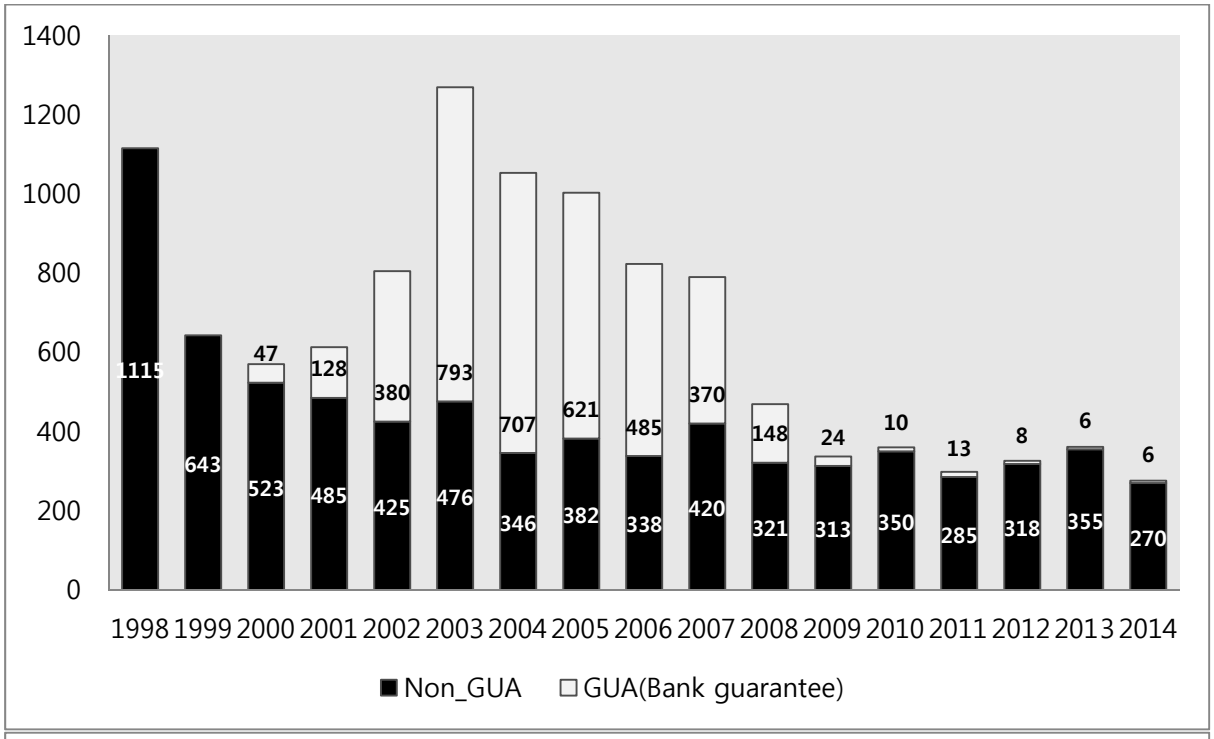
Models 1 and 2 show the effect of bank loan from a guarantee bank on PUG (Privately placed, unrated, and guaranteed) bonds, and the definition of each event in both models is as follows.
Failure event = a firm with guaranteed bank loan issues PUG bonds;
Competing event = a firm with no guaranteed bank loan issues PUG bonds;
Censored event = a firm issues non-PUG bonds regardless of guaranteed bank loan status;

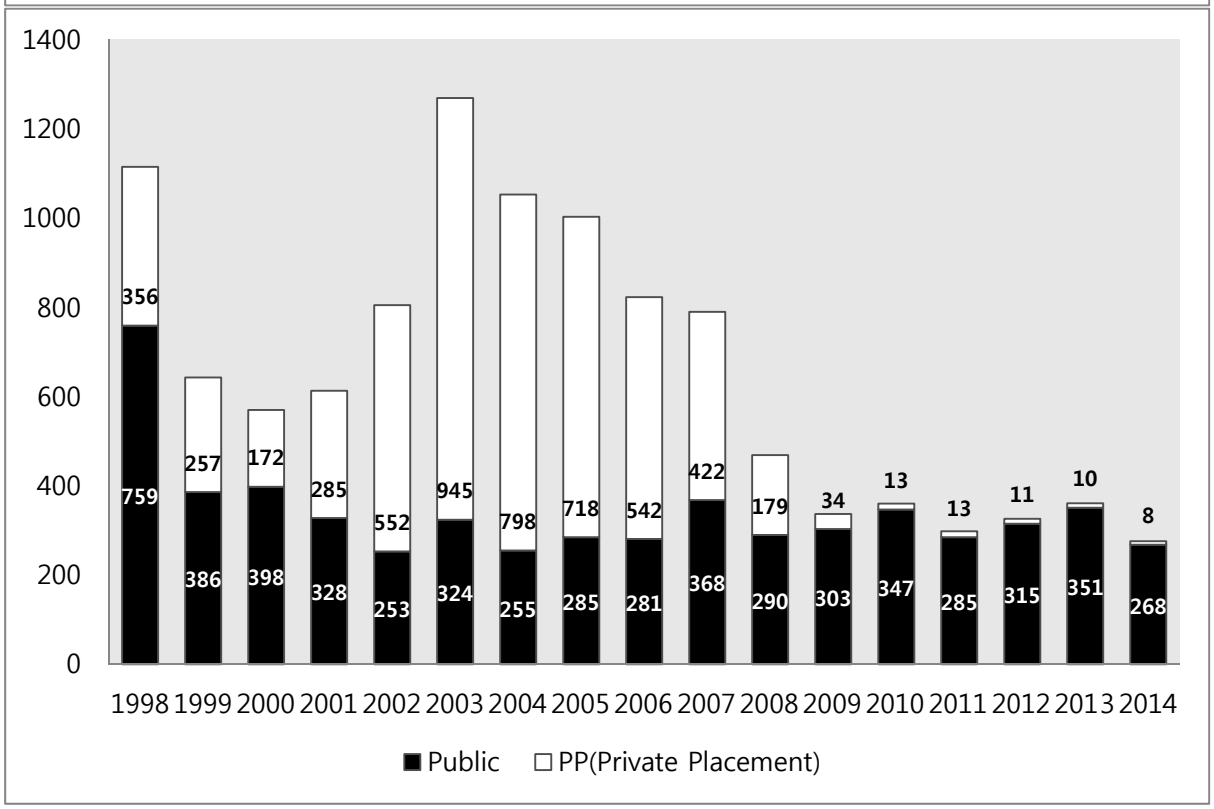
Model 3 examines three different types of bonds (unrated and guaranteed, unrated and unguaranteed, and rated and unguaranteed) through competing risks model, and the definition of each event is as follows.
Failure event = a firm issues unrated and guaranteed bonds;
Competing event = a firm issues unrated and unguaranteed bonds;
Censored event =a firm issues rated and unguaranteed bonds.

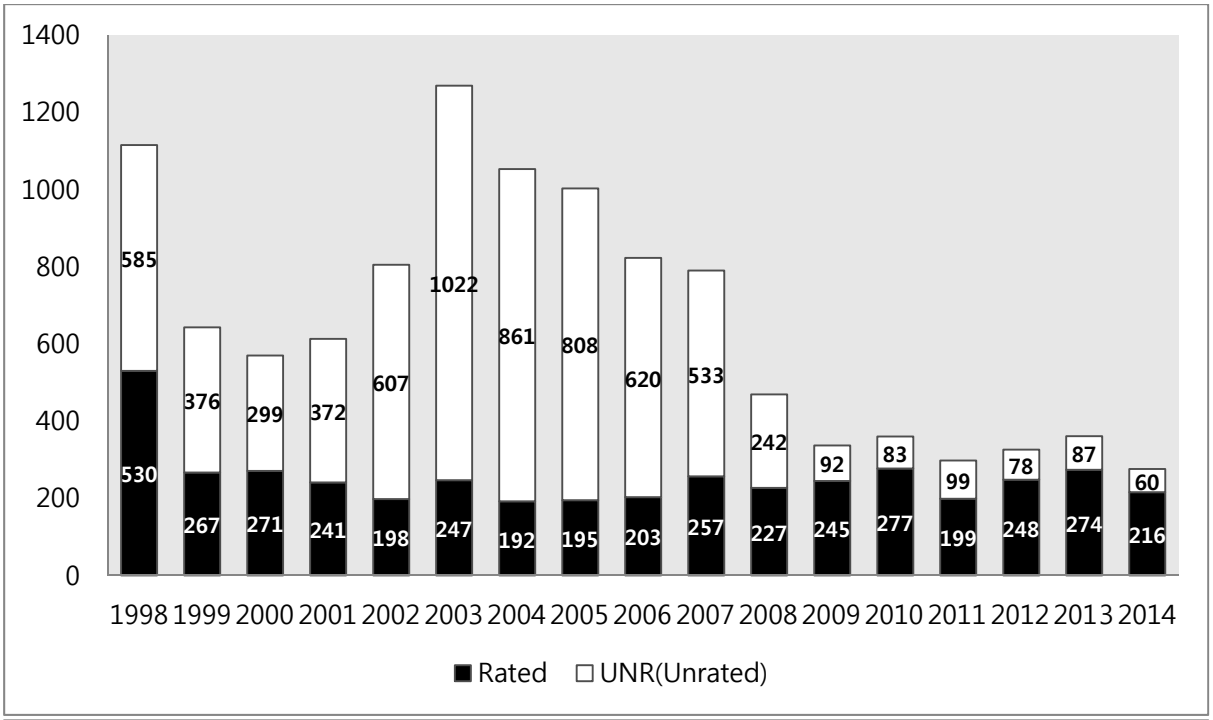
The coefficients of each variable represent sub-hazard ratio, and the definition of each variable is below.
GBBL = bank loans from a guarantee bank / total bank loans,
TBTD = total bonds / total debt;
ZS = Altman's Z-score;
LTA = log of total assets;

The definition of the time in the competing risk models is the time period from the end of the previous fiscal year to the date of the bond issue for the firm with bank guarantee. For example, in Model 1 and 2, the firm that issues the bond with a bank guarantee had the bank loan from a guarantee bank before the end of the previous fiscal year. N is the number of new bonds. The symbols *, **, and *** show significance at the 0.10, 0.05 and 0.01 levels, respectively. All t-statistics in the parentheses are calculated with time- and industry-clustered standard errors.

Appendix 1. Historical Bar Charts between Different Types of Bond Issues



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800
600
400
200
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299
372
607
1022
861
808
620
533
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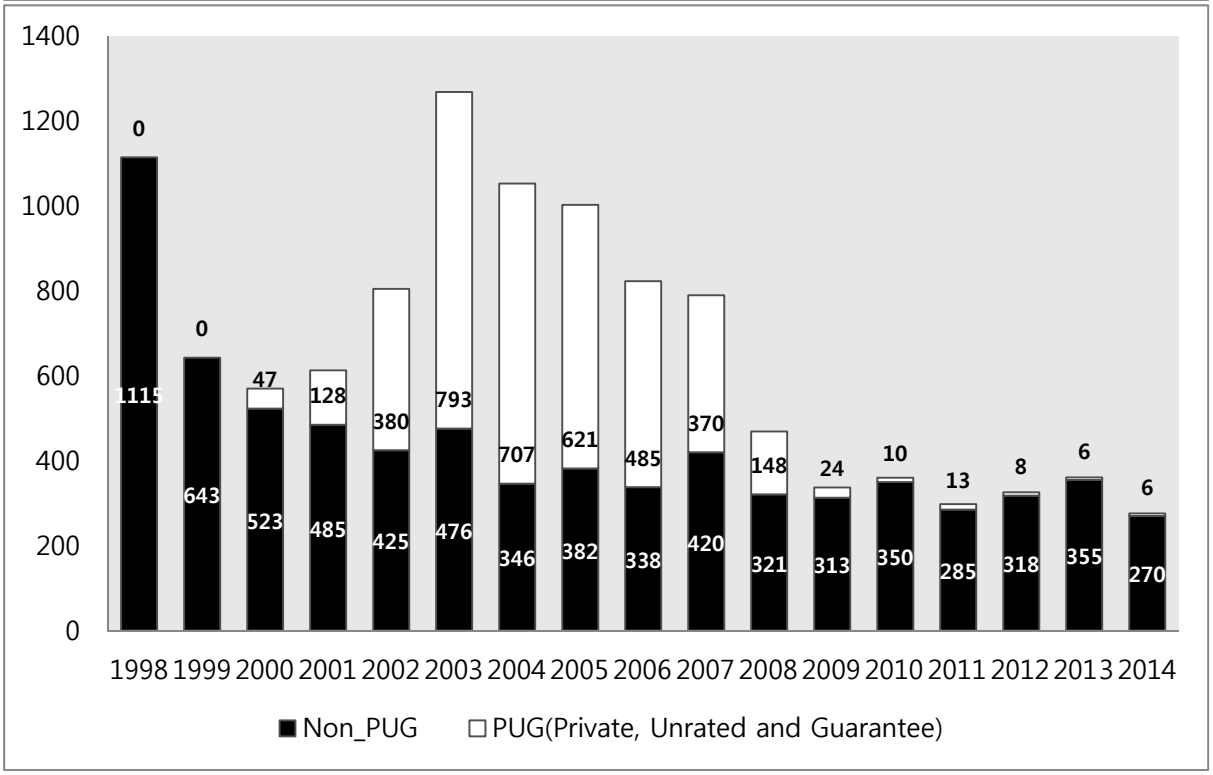
99
78
87
60
530
267
271
241
198
247
192
195
203
257
227
245
277
199
248
274
216
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Rated
UNR(Unrated)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1000
800
600
400
200
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793
707
621
485
370
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13
8
6
6
1115
643
523
485
425
476
346
382
338
420
321
313
350
285
318
355
270
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Non_PUG
PUG(Private, Unrated and Guarantee)

Appendix 2. Comparison of Bond Flotation Costs in Japan (5-year maturity bond)

Expense items	Private Placement with a bank guarantee	Public Offerings with ratings
Financial agent fee	Issue amount x 31 bps x maturity (155 bps for 5 year bond)	Issue amount x 25 bps
Initial registration fee	Issue amount x 10 bps	Issue amount x 9 bps
Underwriting fee	Issue amount x 20 bps	Issue amount x 40 bps
Bank guarantee fee	Issue amount x 85 bps x maturity (425 bps for 5 year bond)	0
Bond rating fee	0	Issue amount x 2 - 5 bps
Bond rating monitoring fee	0	Issue amount x 1 - 5 bps (max 25 bps for 5 years)
Total fee (bps)	**Issue amount x 610 bps**	**Issue amount x 104 bps (max)**

Expense items	Issue amount 200 million yen, 5 year maturity	Issue amount 10 billion yen, 5 year maturity, A rating
Financial agent fee	3.1 million yen	25 million yen
Initial registration fee	200,000 yen	9 million yen
Underwriting fee	400,000 yen	41 million yen
Bank guarantee fee	8.5 million yen	0
Bond rating fee	0	2 - 5 million yen
Bond rating monitoring fee	0	1 - 5 million yen / year (25 million for 5 years)
Total fee (yen)	**12.2 million yen**	**105 million yen**

The information is obtained from the Japan Credit Rating Agency (JCR) and the Ministry of Economy, Trade, and Industry of Japan (www.meti.go.jp)
http://www.meti.go.jp/report/downloadfiles/ji04_07_23.pdf

The definition of relevant fees is as follows. All fees are paid up-front except for the bond rating monitoring fee, which is paid annually.
Financial agent fee: According to the Japanese Commercial Law (Rule 297), when a firm sells a new bond, it is required to hire a financial agent, who is responsible for the payments of principal and interest to bondholders and tax payments to government. The typical financial agent is a bank.
Initial registration fee: a tax that an issuer is required to pay to Japanese government for new bonds.

Appendix 3. Explanatory Variables for Equation (1)

As noted in Section 3, the panel regression model takes the form:

$$YS = \alpha + \beta X + \gamma Y + \varphi \quad (1)$$

Where the X and Y explanatory variables are described as follows:

Issue-specific and Market-wide variables (X):

UNR = a dummy variable equal to 1 if a bond is not rated and 0 otherwise;

MAT = maturity of a bond;

PP = a dummy variable equal to 1 if a bond is issued through a private placement and 0 otherwise;

GUA = a dummy variable equal to 1 if a bond is issued with a bank guarantee and 0 otherwise;

SEC = a dummy variable equal to 1 if a bond is issued with security (collateral) and 0 otherwise;

LIA = log of issue amount;

COR = daily average of bond yields for BBB-AAA rated industrial Japanese corporate bonds (with 5 year maturity) in Japan on the issue date;

VIX = volatility of S&P 500 stock index in the U.S. on the issue date;

NIK = raw return of the Nikkei Stock Market Index in Japan on the issue date;

MS = a dummy variable equal to 1 if a bond is rated by a global rating agency such as S&P or Moody's and 0 otherwise;

CR = a dummy variable equal to 1 for a bond is issued during the periods of global financial crisis;[32]

PUG = a dummy equals 1 for guaranteed, unrated, and privately placed bonds

Issuer-Specific variables (Y):

LTA = log of total assets;

ZS = Altman's Z-score;

SOA = total asset turnover ratio (total sales / total assets);

TD = total debt ratio (total debt / total assets);

OCF = operating cash flow ratio (operating cash flow / total assets);

DA = depreciation expenses out of total assets;

[32] The dummy variable CR = 1 if a bond is issued after April 24, 2007. We use this period because *The Wall Street Journal* first reported problems with the global raters' ratings of subprime debt in "Subprime Cloud Overshadows S&P, Moody's" on April 24, 2007.

AGE = age of the firm since formation;

IR = idiosyncratic risk of the issuer estimated from the standard errors of market model;[33]

MTB = market-to-book ratio (market value of equity / book value of equity);

BET = systematic risk of the issuer obtained from the beta of a market model;

TBTD = total bonds outstanding / total debt;

BLTD = short- and long-term bank loans / total debt;

GBBL = bank loans from a guarantee bank / total bank loans,

Year Dummies: To control for time effects, dummy variables are included for bonds issued during each fiscal year. Our sample bonds are issued for the fiscal years 1998-2014.[34]

Industry Dummies: To control for industry effects, dummy variables are included representing bonds in three different industries such as manufacturing (industrial), non-manufacturing (industrial), and transportation.

[33] We estimate the standard errors based on the market model with 250 days of past stock returns for the firm ending one month prior to the debt issuance. We use a Japanese-specific market portfolio proxy (Nikkei Stock Index) for each of the firms. We also calculate beta (BET) similarly.

[34] We choose April 1, 1998 as the beginning period of our sample as R&I, the largest Japanese rating agency, was founded on that day by the merger of The Japan Bond Research Institute (JBRI) and Nippon Investors Service, Inc. (NIS). Also, the typical fiscal year of Japanese firms also begins on April 1.