

# **Agency problems during the global financial crisis: evidence from the corporate bond market**

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## **Abstract**

I study the effect of corporate governance in the corporate bond market. Especially, I focus on whether the effect of corporate governance is more pronounced during the 2008–2009 global financial crisis than during normal economic periods. Using a sample of Japanese corporate bonds, I find that firms with a close tie with banks issue bonds with higher yields during the global financial crisis than during normal economic periods. In addition, find that firms with higher managerial ownership issue bonds with higher yields during the global financial crisis. These results suggest that bondholders are more sensitive to any agency costs associated with corporate governance during the global financial crisis.

**Keywords:** Financial crisis; Yield spreads; Banks; Managerial ownership

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# 1. Introduction

The global financial crisis that originated in the subprime mortgage market in the US shocked the financial markets around the world.<sup>1</sup> In the US, corporate bond market was severely affected in terms of price and liquidity in the subprime crisis. The subprime crisis dramatically increased yield spreads in the US corporate bond market, and deteriorating liquidity contributed to the widening of yield spreads (Dick-Nielsen et al., 2012; Friewald et al., 2012). The subprime shock also contributed negatively to the Japanese corporate bond market.

Japan has one of the largest corporate bond markets in the world. Generally, investors in the Japanese corporate bond market are domestic, and the impact of overseas investors' behavior had been limited. However, following the failure of Lehman Brothers, the Japanese corporate bond market became unstable. Bank of Japan (2009) reports that the functioning of corporate bond markets in Japan deteriorated during the global financial crisis, and the environment surrounding corporate finance drastically worsened. Indeed, the total amount of primary corporate bond issuance decreased during the financial crisis. Primary issuance for private-sector was basically limited to those rated AA or higher, and the amount of issuance of bonds rated single A or lower was very small. One of the major factors behind malfunctioning in the Japanese was the decline in the risk-taking capacity of domestic investors. Investors in the corporate bond markets were more concerned about the uncertainty over the outlook for economic activity, and then became reluctant to invest in risky corporate bonds. As a result, compared with the normal economic periods, investors demanded higher yields for risky corporate bonds during the global financial crisis, suggesting that the risk premiums were higher for risky corporate bonds during the global financial crisis than during normal economic periods.

In this study, I focus on the Japanese corporate bond market, and explore the effect of corporate governance on corporate bond yield spreads during the global financial crisis. In particular, I contrast the effect of corporate governance on corporate bond yield spreads during the global financial crisis with its effect during normal economic periods, and examine whether the effect of corporate governance is stronger during the global financial crisis. Because the global financial crisis was an unexpected economic event, it presents an interesting opportunity to investigate the effect of corporate governance on corporate bond yield spreads during a period of financial distress.

For empirical analysis, this study use a sample of newly issued corporate bonds on

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<sup>1</sup> Bricogne et al. (2012), Chor and Manova (2012), and Claessens et al. (2012) provide evidence for the decline in international trade during the global financial crisis.

Japanese non—financial firms. Japanese firms have various types of corporate governance characteristics. One feature of the Japanese corporate governance is the strength of the client firms' ties with banks, hereafter referred to as bank ties. Japanese firms have traditionally relied heavily on bank financing. After financial deregulation and capital market liberalization, the importance of Japanese firms has recently decreased. However, most of Japanese firms have still rely more strongly on bank financing, and keep close relationship with banks. Moreover, in the Asian financial crisis, the strength of the firm's ties to banks could have a significant impact on firm performance (Baek et al., 2004). Thus, the strength of the firm's ties to banks is an important aspect of the Japanese corporate governance for my investigation. As another aspect of Japanese corporate governance, I focus on the equity ownership held by managers, often referred to as managerial ownership. As Berle and Means (1932) note, when ownership is separated from management, managers hold little equity in the firm and shareholders are too dispersed to monitor managers. In such situations, managers can use their managerial discretion to enjoy private benefits of control that are often detrimental to investors. However, as managerial ownership increases, their preferences for adopting management policies change, thereby influencing the quality of corporate governance.

Empirical analyses show that bank ties and managerial ownership have a significant impact on corporate bond yield spreads during the global financial crisis. Firms with higher bank ownership face higher yield spreads. The impact of bank ownership is stronger during the global financial crisis than during the normal economic periods. Firms that rely more on bank debt face higher yield spreads. The impact of bank debt is pronounced during the global financial crisis. In addition, bank tie measure based on principal component analysis is positively correlated with yield spreads. The impact of bank tie measure is larger during the global financial crisis. Finally, firms with higher managerial ownership face higher yield spreads. The effect of managerial ownership is larger during the global financial crisis. I perform a variety of robustness checks. My results are robust to various alternative specifications with respect to the types of security firms serving as bond underwriters, adjusted credit rating variables, nonlinearities in the control variables, the removal of extreme observations, and restricted sample.

Overall, my results provide support for the view that corporate governance become more important during the financial crisis. Bondholders get more interested in any agency costs associated with corporate governance during the global financial crisis. The impact of corporate governance in the corporate bond markets is larger for firms with weak corporate governance systems.

I contribute to the extant literature in several ways. First, I extend the growing literature on the relation between corporate governance mechanisms and corporate bond yield spreads

(Anderson et al., 2003; Bhojraj and Sengupta, 2003; Anderson et al., 2004; Klock et al., 2005; Ortiz-Molina, 2006; Cremers et al., 2007; Ertugrul and Hegde, 2008; Qiu and Yu, 2009; Anderson et al., 2010; Liu and Jiraporn, 2010; Bradley and Chen, 2011; Tanaka, 2014) by demonstrating that the effect of corporate governance is pronounced during the global financial crisis than during normal economic periods. Second, earlier works focus on the impaired functioning of the corporate bond market, and show that the effect of liquidity measures in the US corporate bond market is pronounced during the global financial crisis (Dick-Nielsen et al., 2012; Friewald et al., 2012). In contrast to these papers, this paper studies the impact of corporate governance in the corporate bond market during the global financial crisis. Third, it has been widely argued that weak corporate governance had a significant impact on firm performance during the 1997-1998 East Asia financial crisis. Firms with weak corporate governance could have lower firm performance during the crisis: exchange rate (Johnson et al., 2000), stock returns (Mitton, 2002), cumulative stock returns (Lemmon and Lins, 2003), and holding stock returns (Baek et al., 2004). This paper contribute to the existing literature by showing that corporate governance contribute positively to corporate bond yield spreads during the subprime financial crisis.<sup>2</sup>

The remainder of this paper is organized as follows. Section 2 presents the hypotheses being tested in the analysis. Section 3 describes the data, specifies the variables used in the analysis, and presents the summary statistics. Section 4 provides the empirical results from the regression models. Section 5 concludes.

## **2. Hypotheses**

### **2.1. Bank ties and yield spreads**

The extant literature provides theoretical arguments regarding the relation between bank ties and corporate bond yield spreads. Generally, Japanese banks establish a close relationship with both equity and debt holdings. As a large shareholder, banks could exercise influential power over client firms. In addition, banks could use their bargaining power to keep their interests respected as a creditor. However, if banks do not serve an effective monitor, higher bank ownership and reliance on bank debt means weak corporate governance. In weak corporate governance system, managers could not be under effective monitoring. In particular, managers have more incentives to expropriate other investors during the financial crisis. Furthermore,

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<sup>2</sup> Several prior studies examine the influence of corporate governance on financial firms performance during the 2007-2008 financial crisis (Beltratti and Stulz 2012; Erkens et al., 2012; Minton et al., 2014).

although the close relationship with banks allow client firms to have easy access to bank loans, asymmetric information problems become more serious for other investors that do not have full information on whether or not their funds are being deployed appropriately. For these reasons, if bondholders view the strength of bank ties as the lack of an effective corporate governance system, they require firms with stronger bank ties to issue bonds with higher yields. Thus, I expect that firms with stronger bank ties ownership experience higher corporate bond yield spreads.

Hypothesis 1: Firms with stronger bank ties experience higher corporate bond yield spreads.

On the other hand, stronger bank ties can benefit bondholders. Banks keep a close relationship with client firms. They monitor and participate in firm management, and rescue underperforming client firms. By doing so, banks gather information about client firms. More importantly, a strong bank tie allows the client firms to have easy access to bank loans. When banks monitor client firms, monitoring costs by bondholders decrease (Datta et al., 1999). For these reasons, if bondholders view the strength of bank ties as stronger corporate governance system, they allow firms with stronger bank ties to issue bonds with lower yields. Thus, I expect that firms with stronger bank ties enjoy lower corporate bond yield spreads.

Hypothesis 2: Firms with stronger bank ties enjoy lower corporate bond yield spreads.

Based on these arguments, if the costs associated with the strength of bank ties with client firms outweigh the benefits for bondholders, firms with stronger bank ties have higher corporate bond yield spreads. In an opposite case, firms with stronger bank ties have lower corporate bond yield spreads. Thus, the net effect of the strength of bank ties on corporate bond yield spreads is an empirical question.

However, the effect of the strength of bank ties in the corporate bond markets can be expected to change during the global financial crisis. The uncertainty over the outlook for the financial and economic environment made bondholders risk—averse during the global financial crisis. Consequently, bondholders are more sensitive to any costs associated with the strength of bank ties with client firms, and then demand higher yields for firms with stronger bank ties during the global financial crisis than during normal economic periods. Thus, the effect of bank ties is larger during the global financial crisis than during normal economic periods.

Hypothesis 3: The effect of bank ties is larger during the global financial crisis than during normal economic periods.

## 2.2. Managerial ownership and yield spreads

The extant literature provides theoretical arguments regarding the relation between managerial ownership and corporate bond yield spreads. First, given the separation of ownership and management in the firm, managers have less incentive to pursue value—maximization objectives. However, higher equity ownership mitigates managers' incentives to pursue their own interests and aligns managers' interests with those of shareholders. Generally, limited liability shareholders expropriate bondholder wealth by investing in risky projects (the asset substitution problem) (e.g., Jensen and Meckling, 1976). Higher equity ownership provides managers with incentives to increase their equity value by implementing more risky projects. If bondholders are concerned about managers' incentives to implement more risky projects, they require the managers to issue bonds with higher yields. Second, when managers control a substantial fraction of the firm's equity, they have incentives to entrench themselves against other corporate governance mechanisms. Entrenched managers can enjoy private benefits of control through sufficient voting power, thereby lowering firm performance (e.g., Morck et al., 1988; McConnell and Servaes, 1990). Self—serving activities often have adverse effects on bondholders. For example, when managers reduce future cash flows that will be sufficient to meet debt obligations, the potential default risk of debt is higher, thereby generating a conflict of interests between managers and bondholders. Perceiving such managers' incentives, bondholders require the managers to issue bonds with higher yields. Thus, I expect that firms with higher managerial ownership experience higher corporate bond yield spreads.

Hypothesis 4: Firms with higher managerial ownership experience higher corporate bond yield spreads.

On the other hand, managerial ownership can benefit bondholders. First, when managers own a substantial fraction of the firm's equity, managers' interests become closely aligned with those of shareholders. Higher equity ownership often provides managers with incentives to increase their equity value by enhancing firm performance (e.g., Denis and McConnell, 2003). Higher performance leads to an increase in future cash flows, thereby lowering the potential default risk. Perceiving such manager's incentives, bondholders allow them to issue bonds with lower yields. Second, when managerial ownership increases more, the wealth of managers becomes less diversified. In such situations, managers become concerned about the undiversifiable risk of their equity ownership and are less willing to undertake risk—taking activities (Bagnani et al., 1994; Kim and Liu, 2011). As a result, the agency costs of debt in the

form of risk—shifting might decrease, and managers' interests become better aligned with those of bondholders. Anticipating such managers' incentives, bondholders allow managers to issue bonds with lower yields. Thus, I expect that firms with higher managerial ownership enjoy lower corporate bond yield spreads.

Hypothesis 5: Firms with higher managerial ownership enjoy lower corporate bond yield spreads

Based on these arguments, if the costs associated with higher managerial ownership outweigh the benefits for bondholders, firms with higher managerial ownership have higher corporate bond yield spreads. In an opposite case, firms with higher managerial ownership have lower corporate bond yield spreads. Thus, the net effect of managerial ownership on corporate bond yield spreads is an empirical question.

However, the effect of managerial ownership in the corporate bond markets can be expected to change during the global financial crisis. The uncertainty over the outlook for the financial and economic environment made bondholders risk—averse during the global financial crisis. Consequently, bondholders are more sensitive to any costs associated with managerial ownership, and then demand higher yields for firms with higher managerial ownership during the global financial crisis than during normal economic periods. Thus, the impact of managerial ownership is stronger during the global financial crisis than during normal economic periods.

Hypothesis 6: The impact of managerial ownership is stronger during the global financial crisis than during normal economic periods.

### **3. Data and variables**

#### **3.1. Sample construction**

I begin the sample construction with newly issued and publicly traded straight corporate bonds in Japan. The data come from the Japan Securities Dealers Association, which provides detailed information, such as yields, issue size, issue maturity, credit ratings, and other bond characteristics on newly issued corporate bonds in Japan. My sample covers the period from 2005 to 2009. The sample period begins in fiscal year 2005 because prior to 2005, information on the level of managerial ownership is not provided by *Yakuin Shikihou* (published by *Toyo Keizai Shimposha*), which contains detailed information on all the directors of publicly traded Japanese firms. My sample period ends in fiscal year 2009, which is generally considered the

final year of the global financial crisis. The bond—specific data are merged with data from the Nikkei NEEDS database and Nikkei Financial Quest, which provides information on balance sheets, financial statements, and corporate governance for publicly traded Japanese firms, and with information on corporate governance that is manually collected from the annual editions of *Yakuin Shikihou*, and *Yuka Shoken Houkokusho*, which corresponds to 10—k filings in the US. Then, I screen my sample as follows. First, my sample is restricted to bond issues with a fixed rate. Next, I exclude firms in finance and highly regulated industries, such as electricity and gas from my sample. Third, I remove data for Japan Railway Company (JR), Japan Tobacco Inc. (JT), and Nippon Telegraph and Telephone Corporation (NTT) from my sample because these firms were previously under the control of the government and remain subject to its influence. Finally, I remove unlisted firms and investment trusts for which financial information is unavailable. My sample data set is not panel data because some firms issue bonds only once during the sample period, and others issue bonds many times every year. Thus, in the analyses, I use data pooled over the sample period.

As argued earlier, I have an interest in whether the impact of corporate governance is stronger during the global financial crisis than during normal economic periods. Therefore, I split my sample period into the pre—crisis period and the crisis period. However, when the impaired functioning of the Japanese corporate bond market began and ended reach no consensus. Table 1 presents the distribution of bonds with a credit rating of BBB for each credit rating agency. The number of bonds with a credit rating of BBB for JCR and R&I decreased since the second half of 2007. And the number of bonds increased in the second half of 2009. These suggest that firms with lower credit ratings, such as BBB face the difficulty in issuing bonds from the second half of 2007 to first half of 2009. After the failure of Lehman Brothers, the Japanese financial markets became unstable, thereby leading to a decline in the risk-taking capacity of domestic investors (Bank of Japan, 2009). For these reasons, I consider the period from the first half of fiscal year 2005 to the second half of fiscal year 2007 as the pre-crisis period which represents normal economic conditions. I date the crisis period from the second half of fiscal year 2008 to the first half of fiscal year 2009.<sup>3</sup> In subsequent analysis, I will compare the results for the global financial crisis with those for the pre—crisis period.

### 3.2. Yield spreads

My measure of the cost of corporate public debt financing is *Yield spreads*, which is defined as the at—issue yield to maturity on straight corporate bonds in excess of the yield to

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<sup>3</sup> As the robustness check of my results, I varied the start and end months of the crisis period by up to six month. However, I obtain similar results.



maturity on government bonds, with the closest maturity as a benchmark. The yield data on government bonds are from the Japan Securities Dealers Association.

### 3.3. Bank ties and managerial ownership

In this study, the strength of the firm's tie with banks are measured based on two broad indicators of banks' influential power over firm management in the institutional context of Japan: equity ownership and debt ownership. The first bank tie is measured through bank ownership. Japanese banks are permitted to hold the share of client firms. Equity ownership allows banks to exert influence over the management of client firms, and affect the quality of corporate governance. Thus, bank ownership helps determine the strength of bank ties. I use total bank ownership among the top-ten shareholders to measure the strength of bank ties through equity ownership (*Bank ownership*) (Higgins, 2013). Information on the equity ownership held by banks among top-ten shareholders comes from *Japan Company Handbook*. The second bank tie is measured through bank debt. Japanese firms have traditionally relied more on bank financing, and keep long-term relationship with client firms. Bank debt is most obvious and important relationship with client firms. I use the ratio of bank loans outstanding to total debt to measure the strength of bank ties through debt holding (*Bank debt*) (Baek et al., 2004). Information on data for total bank loans outstanding comes from Nikkei Financial Quest. More importantly, the above two ties are aggregated vis principal component analysis to estimate the factor that accounts for the most variation in the set of two bank ties (*Bank ties*). The factor estimated by principal component analysis is advantage because this capture the information from two bank ties to reflect fully how banks exert their control over client firms (Higgins, 2013).

Managerial ownership is captured by the percentage of equity ownership held by managers (*Managerial ownership*). This variable ignores stock options and may not fully represent managerial incentives. However, earlier works rely on the percentage of equity held by managers. In contrast to stock options that do not accord voting rights, stock ownership is a more accurate measure of managers' shares of voting rights. Managers' ability to make corporate decisions depends on the current percentage of voting rights that they hold.

### 3.4. Control variables

#### 3.4.1. Corporate governance characteristics

To control for other corporate governance characteristics that could affect yield spreads, I use the proportion of outside directors on the board and the board's size. Outside directors play

an important role in monitoring managers and disciplining their self-interested activities. Firms can improve the oversight capacity of managers by appointing outside directors to the board. In particular, outside directors can oversee the financial accounting process and enhance the integrity of financial accounting reports (Anderson et al., 2004). Thus, firms with a higher proportion of outside directors on the board are expected to have lower yield spreads. This variable is defined as the proportion of outside directors on the board as a percentage (*Outside directors*). The identification of outside directors comes from *Yakuin Shikihou*. The board's size can affect the quality of corporate governance. The smaller board can make quick corporate decisions, thereby effectively controlling any agency problems among board members. In contrast, when the board is larger, the workload is allocated among a number of directors. These directors can improve the effectiveness of monitoring (Anderson et al., 2004). I measure board's size as the number of directors (*Board size*).<sup>4</sup> Data on the number of directors come from *Yakuin Shikihou*.

#### 3.4.2. Issue characteristics

To control for bond characteristics that could affect corporate bond yield spreads, I use issue's size, issue's maturity, and credit ratings. The larger bonds with larger size are riskier. Thus, larger bonds are expected to have higher corporate bond yield spreads. I measure the bond's size as the natural logarithm of the amount issued (*Issue size*). The effect of bond's maturity on corporate bond yield spreads is unclear.<sup>5</sup> If bondholders demand higher returns on bonds with longer maturities to compensate for the investment risk over a longer period, bonds with longer maturities have higher corporate bond yield spreads. In contrast, bondholders could require riskier firms to issue bonds with shorter maturities and higher yields. Bonds with longer maturities have lower corporate bond yield spreads. I measure bond's maturity as the number of years to maturity (*Issue maturity*). Because higher credit ratings indicate lower default risks, bonds with higher credit ratings can have lower corporate bond yield spreads. Generally, credit ratings in the Japanese corporate bond markets are from at least one of four credit rating agencies: Standard & Poor's (S&P), Moody's, Japan Credit Rating Agency (JCR), and Rating & Investment Information (R&I). The problem is that most bonds have multiple credit ratings. To reflect multiple credit ratings, I first convert each credit rating into a numerical index and then calculate an average credit rating score (*Credit ratings*) (Anderson et al., 2003; Klock et al., 2005; Ortiz-Molina, 2006). Table 2 presents the conversion numbers for the S&P, Moody's, JCR,

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<sup>4</sup> When calculating the number of board members, I do not include audit and supervisory board members (*Kansayaku*).

<sup>5</sup> See Goss and Roberts (2011) for a more detailed discussion.

and R&I credit ratings. For example, a bond with an A<sup>−</sup> rating from S&P and an A<sup>+</sup> rating from R&I is assigned an average score of 14. However, the effect of corporate governance mechanisms on potential default risk has already been incorporated into credit ratings. Indeed, previous studies report a significant relation between corporate governance mechanisms and credit ratings (Bhojraj and Sengupta, 2003; Ashbaugh-Skaife et al., 2006; Liu and Jirapvorn, 2010). To address any collinearity problems, as a second step, I regress an average credit rating score on corporate governance variables and then calculate the residual. The residual contains information about firm's creditworthiness, but excludes the effect of corporate governance mechanisms on credit ratings. I use this residual as a proxy variable for credit ratings in the regression models (*Ratings*).<sup>6</sup> This variable is expected to be negatively correlated with corporate bond yield spreads.

### 3.4.3. Firm characteristics

To control for firm characteristics that could affect corporate bond yield spreads, I include profitability, leverage, growth opportunities, tangibility, size, and age in my specifications. Better performing firms are less likely to default and are expected to have lower corporate bond yield spreads. I measure firm's profitability as the pretax income as a percentage of total assets (*ROA*). Firms with higher leverage are likely to default and are expected to have higher corporate bond yield spreads. I define firm's leverage as interest-bearing debt (short-term loans, long-term loans due in one year, bonds outstanding due in one year, commercial paper outstanding, remaining long-term loans, and remaining bonds outstanding) as a percentage of total assets (*Leverage*). Firms with higher growth prospects are likely to be subject to greater default risks and are expected to have higher corporate bond yield spreads. I measure firm's growth opportunities as the sum of the market value of equity, plus the book value of total debt, divided by the book value of total assets (*Tobin's Q*). Because tangible assets serve as a collateral for creditors in the event of bankruptcy, firms with more tangible assets are expected to have lower corporate bond yield spreads. I measure firm's tangibility as the ratio of tangible assets to total assets as a percentage (*Tangible assets*). Larger firms tend to enjoy economies of scale and stable performances. Thus, larger firms are expected to have lower corporate bond yield spreads. I measure firm's size as the natural logarithm of total assets (*Firm size*). Older firms have survived competition in the markets over longer periods and have often established a reputation as creditworthy firms in the markets. Thus, older firms are expected to

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<sup>6</sup> I estimate the residual from the regression of an average credit rating score on bank ownership, bank debt, managerial ownership and board size. In the subsequent analyses, I use different lists of corporate governance variables across different specifications, and correspondingly I re-estimate the residual without the impact of corporate governance for each specification.

have lower corporate bond yield spreads. I measure firm's age as the natural logarithm of the years elapsed since establishment (*Firm age*).

### 3.5. Descriptive statistics

Table 3 presents summary statistics of the variables used in the analysis during the two different subperiods. Panel A provides the descriptive statistics for the pre-crisis period and Panel B provides the descriptive statistics for the crisis period. In Panel A, *Yield spreads* averages 43.774 basis points with a standard deviation of 34.689 basis points. *Bank ownership* has a mean of 3.393% with a standard deviation of 2.784%. *Bank debt* has a mean of 12.994% with a standard deviation of 12.1%. *Bank ties* has a mean of 0.020 with a standard deviation of 0.921. *Managerial ownership* has a mean of 1.182% with a standard deviation of 5.141%. In Panel B, *Yield spreads* averages 53.355 basis points with a standard deviation of 49.732 basis points. Yield spreads are higher in the crisis period than in the pre-crisis period, suggesting that bondholders demand higher yields for newly issued corporate bonds during the crisis period. *Bank ownership* has a mean of 3.299% with a standard deviation of 2.881%. *Bank debt* has a mean of 10.946% with a standard deviation of 12.275%. *Bank ties* has a mean of -0.115 with a standard deviation of 1.099. *Managerial ownership* has a mean of 0.392% with a standard deviation of 2.334%. The levels of managerial ownership are much lower in Japanese firms than in US firms. Managerial ownership is lower in the crisis period than in the pre-crisis period, suggesting that firms with higher managerial ownership are unlikely to issue bonds during the crisis period.

## 4. Multivariate regression results

### 4.1. Basic results

In this section, I examine the impact of bank ownership, bank debt and managerial ownership on corporate bond yield spreads. To test my hypotheses, I use the following specification:

$$\begin{aligned} \text{Yield spreads} = & \alpha_0 + \alpha_1 \text{Bank ownership} + \alpha_2 \text{Bank debt} + \alpha_3 \text{Bank ties} + \alpha_4 \text{Managerial ownership} \\ & + \alpha_5 \text{Outside directors} + \alpha_6 \text{Board size} + \alpha_7 \text{Issue size} + \alpha_8 \text{Issue maturity} + \alpha_9 \text{Ratings} \\ & + \alpha_{10} \text{ROA} + \alpha_{11} \text{Leverage} + \alpha_{12} \text{Tobin's Q} + \alpha_{13} \text{Tangible assets} + \alpha_{14} \text{Firm size} + \alpha_{15} \text{Firm age} + \varepsilon \end{aligned}$$

where  $\alpha$  is the coefficient and  $\varepsilon$  is the error term. The dependent variable is *Yield spreads*. My

key independent variables are *Bank ownership*, *Bank debt* and *Managerial ownership*. If the costs associated with these variables outweigh the benefits for bondholders, the coefficients are expected to be positive. If the benefits outweigh the costs, the coefficients are expected to be negative. The control variables include corporate governance characteristics, bond characteristics, and firm characteristics as well as industry — and half year — specific effects.

Table 4 reports the regression results. This table presents four different specifications. In Model 1, I use a specification with *Bank ownership*. Model 2 reports the results with *Bank debt*. Model 3 includes both *Bank ownership* and *Bank debt*. Model 4 is based on the specification with *Bank ties*. Regarding Model 1, in Column 1, the coefficient on *Bank ownership* is not significant. The coefficient on *Managerial ownership* is significantly positive at the 1% level, suggesting that firms with higher managerial ownership face higher yield spreads. In Column 2, the coefficient on *Bank ownership* is also significantly positive at the 5% level. The magnitude of the coefficient in Column 2 is larger than the one in Column 1. The coefficient on *Managerial ownership* is significantly positive. The magnitude of the coefficient in Column 2 is larger than the one in Column 1. I can reject the hypothesis that the estimated coefficients from two regressions are the same at the 1% level.

Turning to Model 2, in Column 3, the coefficient on *Bank debt* is significantly positive at the 5% level, suggesting that firms that rely more on bank loans issue bonds with higher yields. The coefficient on *Managerial ownership* is significantly positive. In Column 4, the coefficient on *Bank debt* is also significantly positive at the 1% level. The magnitude of the coefficient in Column 4 more doubles than the one in Column 3. I can reject the hypothesis that the estimated coefficients from two regressions are the same. The coefficient on *Managerial ownership* is significantly positive. The magnitude of the coefficient in Column 4 is larger than the one in Column 3.

With respect to Model 3, in Column 5, *Bank ownership* has no significant coefficient. The coefficient on *Bank ownership* is significantly positive at the 5% level in Column 6. *Bank debt* has significant and positive coefficient in Columns 5-6. The magnitude of the coefficient in Column 6 more doubles than the one in Column 5. I can reject the hypothesis that the estimated coefficients from two regressions are the same. These results support Hypotheses 1 and 3. The coefficient on *Managerial ownership* is significantly positive in Columns 5 and 6. The magnitude of the coefficient in Column 6 is larger than the one in Column 5. I can reject the hypothesis that the estimated coefficients from two regressions are the same at the 1% level. These results support Hypotheses 4 and 6.

Considering Model 4, *Bank debt* has significant and positive coefficient in Columns 5-6. The magnitude of the coefficient in Column 6 more doubles than the one in Column 5. I can reject the hypothesis that the estimated coefficients from two regressions are the same. These

results support Hypotheses 1 and 3. The coefficient on *Managerial ownership* is significantly positive in Columns 5 and 6. The magnitude of the coefficient in Column 6 is larger than the one in Column 5. I can reject the hypothesis that the estimated coefficients from two regressions are the same at the 1% level. These results support Hypotheses 4 and 6.

Overall, I find that firms with higher bank ownership experience higher corporate bond yield spreads during the global financial crisis than during normal economic periods. In addition, firms that rely more on bank loans experience higher corporate bond yield spreads during the global financial crisis than during normal economic periods. These results suggest that bondholders are more sensitive to any agency costs associated with the strength of bank ties with client firms. Furthermore, I find a positive relation between bank tie measure and yield spreads. The impact of bank tie measure is stronger during the global financial crisis than during normal economic periods. Finally, I find that firms with higher managerial ownership face higher corporate bond yield spreads. In particular, the effect of managerial ownership is stronger during the global financial crisis than during normal economic periods. The results are in line with the view that bondholders are more concerned about the costs associated with managerial ownership during the global financial crisis, and then they require higher yields for firms with higher managerial ownership during the global financial crisis than during normal economic periods. My results are in line with the view that managerial agency problems can make countries with weak corporate governance systems vulnerable to the effects of a sudden loss of investor confidence (Johnson et al., 2000; Lemmon and Lins, 2003; Baek et al., 2004).

## 4.2. Sample selection issue

In this study, one concern is sample selection issue that is the non-randomness of firms that could issue bond during the global financial crisis. These firms are likely to differ from firms that could only issue bonds during the normal period. Therefore, my results might suffer from sample selection bias, thereby leading to biased and inconsistent coefficients. I address any selection bias by using Heckman's (1979) two-stage estimation procedure. In the first stage, I estimate the selection equation which is whether the firm is in my sample. Previous studies argue that as firms become better known in the markets, they become increasingly likely to issue bonds (Faulkender and Petersen, 2006; Ertugrul and Hegde, 2008). To identify the selection equation, I use two dummy variables as measures of whether firms are well known in the markets: The first is a dummy variable that takes a value of 1 if the firm's equity trades on the first section of the Tokyo Stock Exchange and 0 otherwise, and the second is a dummy variable that takes a value of 1 if the firm is included in the Nikkei Stock Average and 0 otherwise. The Nikkei Stock Average is the stock index that includes 225 firms representative of

the Japanese firms. The probit model in the first—stage also includes *ROA*, *Leverage*, *Tobin's Q*, *Tangible assets*, *Firm size*, and *Firm age* as independent variables. For the probit regression, I use an additional sample of publicly traded non—financial firms that are not included in my sample. In the first—stage, I estimate the Inverse Mills ratio from the selection equation, and add it to basic model in the second—stage to correct for any selection bias. My findings remain statistically significant even after controlling for sample selection terms.

### 4.3. Robustness checks

I conduct a variety of robustness tests to verify my findings. In particular, I check whether my results are robust to various alternative specifications concerning the types of security firms that serve as bond underwriters, adjusted credit rating variables, nonlinearities in the control variables, the removal of extreme observations, and the restricted sample

The extant literature explores the role of banks in underwriting corporate bonds, especially through security firms that are bank subsidiaries, by focusing on two competing views: the certification view and the conflict—of—interest view.<sup>7</sup> In the certification view, issues underwritten by bank—subsidiary security firms can have lower yields than those underwritten elsewhere because the close bank—firm relationship mitigates the asymmetric information problem that generally exists between issuers and security firms. Alternatively, in the conflict—of—interest view, banks have incentives to enjoy the private benefits that are detrimental to bondholders and that can trigger conflicts of interest between banks and bondholders. In such an environment, bondholders demand higher yields for issues underwritten by bank—subsidiary security firms. To control for the impact of the types of security firms that serve as bond underwriters on yields, I construct a binary variable that takes a value of 1 if the bank—owned security firm underwrites the issue and 0 otherwise. My principal results remain unchanged even after controlling for the types of security firms serving as bond underwriters.

It has been argued that credit ratings from foreign credit rating agencies (S&P and Moody's) are lower than those from Japanese credit rating agencies (JCR and R&I) (Shin and Moore, 2003; Han et al., 2012). Using an average credit rating score as a credit rating variable is unlikely to fully control for the effect of credit ratings on yield spreads. To correct for the differences among credit ratings, I arbitrarily add a value of 1 to each conversion number for S&P and Moody's in Table 2. For example, a bond with an A— rating from S&P and an A+ rating from R&I is assigned an average score of 14.5. The adjusted conversion numbers are applied to all credit ratings by foreign credit rating agencies. The results remain statistically

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<sup>7</sup> See, e.g., Hamao and Hoshi (2000), Konishi (2002), and Kang and Liu (2007) for empirical analyses highlighting the importance of Japanese banks in underwriting corporate bonds.

significant after controlling for the adjusted credit rating variable.

I allow for any nonlinearities between control variables and yield spreads by including the squared term of *Leverage* as an additional control variable (Anderson et al., 2003; Anderson et al., 2004; Klock et al., 2005). The regression model, including the squared term of *Leverage*, yields qualitatively similar results.

I check whether my results are driven by observations with extreme values. I define extreme observations as those for which any one of the continuous variables has a value that is more than four standard deviations from the mean. The removal of extreme observations does not affect my results.

The number of bonds issued by each firm is likely to vary significantly during the sample period. Therefore, one could argue that firms with many issues are overrepresented in my sample (Ortiz-Molina, 2006). To address this concern, I restrict the sample to allow only one bond issuance per firm-year. In particular, for firms with multiple issues in a given year, I choose the bond with the longest maturity. Moreover, when facing more than one bond with the longest maturity, I select the bond with the larger amount issued among them. Using this restricted sample, I obtain qualitatively similar results.

## **5. Conclusion**

In this paper, I examine the relation between corporate governance and corporate bond yield spreads. In particular, I compare the effect of corporate governance on corporate bond yield spreads during the global financial crisis with its effect during normal economic periods, and examine whether the effect of corporate governance is more pronounced during the global financial crisis. I test my hypotheses by using a sample of newly issued corporate bonds on Japanese non- financial firms.

I find evidence consistent with my hypotheses. Firms with a strong tie with banks face higher yield spreads. The impact of bank tie is stronger during the global financial crisis than during the normal economic periods. Finally, firms with higher managerial ownership face higher yield spreads. The effect of managerial ownership is larger during the global financial crisis.

Overall, my results show that bondholders get more interested in any agency costs associated with corporate governance during the global financial crisis. Thus, the impact of corporate governance in the corporate bond markets during the global financial crisis depends on the quality of corporate governance.



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**Table 1.** The distribution of bonds with a credit rating of BBB

Fiscal year	Half period	S&P	Moody's	JCR	R&I
2007	First half			23(17)	16(13)
	Second half			5(5)	5(5)
2008	First half			8(6)	7(5)
	Second half				2(2)
2009	First half			4(2)	5(4)
	Second half	3(1)	3(1)	9(8)	11(6)

This table shows the distribution of bonds with a credit rating of BBB for each credit rating agency. Numbers in parentheses are the number of firms as issuers.

**Table 2.** Credit rating numerical conversions

Conversion number	S&P	Moody's	JCR	R&I
19	AAA	Aaa	AAA	AAA
18	AA+	Aa1	AA+	AA+
17	AA	Aa2	AA	AA
16	AA-	Aa3	AA-	AA-
15	A+	A1	A+	A+
14	A	A2	A	A
13	A-	A3	A-	A-
12	BBB+	Baa1	BBB+	BBB+
11	BBB	Baa2	BBB	BBB
10	BBB-	Baa3	BBB-	BBB-
9	BB+	Ba1	BB+	BB+
8	BB	Ba2	BB	BB
7	BB-	Ba3	BB-	BB-
6	B+	B1	B+	B+
5	B	B2	B	B
4	B-	B3	B-	B-
3	CCC	Caa	CCC	CCC
2	CC	Ca	CC	CC
1	C	C	C	C

This table provides the credit rating conversion number for the S&P, Moody's, JCR, and R&I credit ratings.

**Table 3. Summary statistics**

Panel A. Pre-crisis period					
Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Yield spreads (basis points)	43.774	34.550	34.689	0.800	267.400
Issue size (¥ billion)	4.937	4.605	0.546	3.401	7.155
Issue maturity (years)	6.661	5.125	3.035	2.000	20.000
Credit ratings	13.530	13.500	1.842	10.000	18.000
Bank ownership (%)	3.393	3.000	2.784	0.000	14.300
Bank debt (%)	12.994	10.822	12.100	0.000	62.942
Bank ties	0.020	-0.062	0.921	-1.572	2.933
Managerial ownership (%)	1.182	0.056	5.141	0.000	50.532
Outside directors (%)	12.715	10.000	14.431	0.000	66.667
Board size	12.024	11.000	4.383	5.000	31.000
ROA (%)	4.623	4.233	4.223	-17.402	23.932
Leverage (%)	36.158	34.662	14.742	0.000	70.221
Tobin's Q	1.297	1.199	0.358	0.899	3.980
Tangible assets (%)	38.006	37.662	19.935	0.097	83.042
Firm size (¥)	27.779	27.895	1.134	24.377	30.149
Firm age (years)	4.008	4.111	0.786	0.693	4.828
Panel B. Crisis period					
Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Yield spreads (basis points)	53.355	44.050	49.732	5.400	472.500
Issue size (¥ billion)	5.174	5.011	0.740	3.401	7.601
Issue maturity (years)	6.684	5.000	2.901	2.000	20.000
Credit ratings	15.032	15.000	1.728	11.000	18.333
Bank ownership (%)	3.299	2.900	2.881	0.000	14.400
Bank debt (%)	10.946	8.638	12.275	0.000	70.322
Bank ties	-0.115	-0.262	1.099	-1.572	3.908
Managerial ownership (%)	0.392	0.041	2.334	0.000	21.139
Outside directors (%)	16.133	12.500	16.651	0.000	80.000
Board size	12.568	12.000	4.133	5.000	30.000
ROA (%)	4.175	3.858	4.755	-20.625	16.743
Leverage (%)	32.167	32.125	15.296	0.999	69.551
Tobin's Q	1.094	1.047	0.207	0.452	1.924
Tangible assets (%)	40.652	38.345	19.876	7.764	91.002
Firm size (¥)	28.211	28.330	1.132	25.145	31.111
Firm age (years)	4.046	4.241	0.765	0.693	4.828

This table shows the summary statistics for the variables used in the analysis during the two different subperiods. Pre-crisis periods range from the first half of fiscal year 2005 to the second half of fiscal year 2007. Crisis periods range from the second half of fiscal year 2008 to the first half of fiscal year 2009.

**Table 4.** The impact of bank ties and managerial ownership on yield spreads

Independent variable	Model 1		Model 2		Model 3		Model 4	
	(1) Pre-crisis	(2) Crisis	(3) Pre-crisis	(4) Crisis	(5) Pre-crisis	(6) Crisis	(7) Pre-crisis	(8) Crisis
Bank ownership	0.252 (0.440)	1.352** (0.649)			0.574 (0.438)	1.222** (0.575)		
Bank debt			0.291** (0.123)	0.821*** (0.162)	0.287** (0.126)	0.818*** (0.161)		
Bank ties							3.688*** (1.286)	9.627*** (1.658)
Managerial ownership	2.533*** (0.469)	16.414*** (0.657)	2.547*** (0.460)	16.083*** (0.630)	2.619*** (0.461)	16.208*** (0.627)	2.688*** (0.217)	16.354*** (0.557)
Outside directors	0.246** (0.121)	0.005 (0.139)	0.186 (0.124)	-0.168 (0.104)	0.206* (0.124)	-0.136 (0.102)	0.207*** (0.077)	-0.109 (0.088)
Board size	0.413 (0.316)	-0.969 (0.656)	0.267 (0.320)	-1.322** (0.590)	0.242 (0.320)	-1.340** (0.597)	0.171 (0.236)	-1.337*** (0.369)
Issue size	5.426** (2.313)	-0.674 (2.635)	5.785*** (2.217)	1.182 (2.418)	5.748** (2.242)	1.279 (2.391)	5.655*** (1.969)	1.395 (2.323)
Issue maturity	1.045*** (0.359)	0.384 (0.403)	1.141*** (0.355)	0.816** (0.328)	1.159*** (0.356)	0.797** (0.339)	1.207*** (0.340)	0.767* (0.447)
Ratings	-6.761*** (0.959)	-8.276*** (1.613)	-7.543*** (1.004)	-10.093*** (1.267)	-7.554*** (0.992)	-10.159*** (1.278)	-7.529*** (0.744)	-10.315*** (1.060)
ROA	-1.914*** (0.635)	-0.060 (0.640)	-2.036*** (0.719)	-0.036 (0.518)	-2.037*** (0.719)	-0.004 (0.537)	-2.090*** (0.294)	0.025 (0.362)
Leverage	0.796*** (0.151)	0.756*** (0.171)	0.630*** (0.161)	0.500*** (0.170)	0.631*** (0.162)	0.494*** (0.169)	0.604*** (0.117)	0.501*** (0.144)
Tobin's Q	10.638 (7.494)	-2.388 (10.948)	12.728 (7.849)	1.691 (7.863)	12.651 (7.844)	1.941 (7.853)	12.960*** (3.772)	2.095 (7.617)
Tangible assets	-0.512*** (0.140)	-0.462** (0.213)	-0.517*** (0.140)	-0.531*** (0.191)	-0.516*** (0.140)	-0.524*** (0.191)	-0.516*** (0.074)	-0.509*** (0.152)
Firm size	-8.276*** (1.607)	-4.992* (2.672)	-6.476*** (1.666)	-2.044 (2.623)	-6.544*** (1.704)	-2.004 (2.625)	-6.362*** (1.329)	-2.211 (1.964)
Firm age	-11.317*** (2.649)	-0.270 (2.928)	-10.405*** (2.661)	3.303 (2.080)	-10.378*** (2.665)	3.010 (2.267)	-10.073*** (1.316)	2.292 (2.084)
Industry effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Half year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	489	244	489	244	489	244	489	244
$R^2$	0.750	0.895	0.755	0.909	0.755	0.910	0.731	0.893

This table presents the regression results on the impact of bank ties and managerial ownership on corporate bond yield spreads. Pre-crisis periods range from the first half of fiscal year 2005 to the second half of fiscal year 2007. Crisis periods range from the second half of fiscal year 2008 to the first half of fiscal year 2009. The dependent variable is *Yield spreads*. Standard errors in parentheses are corrected for heteroskedasticity and clustered at the firm level. All equations include a constant term as well as industry and half year effects, whose coefficients are unreported. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively.