Bond Investors’ Trading Horizon and the Cost of Debt

Abstract

This paper examines the effects of institutional bond ownership on the cost of debt. Empirical evidence shows that higher long-term institutional ownership lowers the cost of debt whereas short-term ownership increases capital supply uncertainty and debt cost. These findings are robust to controlling for bond/investor characteristics and using investors’ funding structure as an instrumental variable. The results suggest that short-term investors’ capital uncertainty contribute to fragility in the corporate bond market. Conversely, long-term institutional ownership enhances corporate governance, thereby lowering the cost of debt.

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1. Introduction

Institutional investors have been the most represented group of holders of U.S. firms in the past several decades. A number of papers have investigated what characteristics of institutional investors may fostor their active monitoring strategies, that produce shared benefits, or information trading strategies, that generate private benefits (Shleifer and Vishny, 1986; Kahn and Winton, 1998; Maug, 1998). The literature suggests that institutional investors perform two primary functions. First, institutional shareholders can improve the quality of corporate governance (Shleifer and Vishny, 1986; Maug, 1998; Kahn and Winton, 1998). Institutional investors perform this function by engaging in active monitoring (Chen, Harford, and Li, 2007), influencing corporate decision making (Harford, Kecskés, and Mansi, 2018), or promoting voting rights and protective provisions (Bhojraj and Sengupta, 2003; Elyasiani, Jia, and Mao, 2010). Second, institutional holdings can improve firms' information environment and reduce the information asymmetry that adversely affects firms' value (Healy, Hutton, and Palepu, 1999; Bushee and Noe, 2000; Ajinkya, Bhojraj and Sengupta, 2005; Boone and White, 2015). By pressing the management to disclose more information, institutional investors help improve the information environment and reduce the cost of information gathering and information asymmetry.

Despite voluminous studies, empirical evidence on the benefits of institutional ownership is mixed. Elyasiani, Jia, and Mao (2010) find that institutional ownership is an imprecise measure when it comes to understanding the function of institutional investors. For example, Fich, Harford, and Tran (2015) show that without a proper control for the measure of institutional holdings, the premiums of institutional ownership can be positive, insignificant, or negative. Similarly, the effect of short-term institutional trading is ambiguous. Some studies suggest that short-term institutional trading increases liquidity and pricing efficiency,[1] whereas others find that it increases volatility and fragility in the market, lowers informativeness of trades, and exacerbates fire sales.[2] These findings suggest that the benefits of institutional ownership are likely to depend on their trading horizon and characteristics.

A good example is that short-term and long-term institutional investors have different incentives

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[1] See, for example, Berkman and Eleswarapu (1998), Yan and Zhang (2009), Hendershott, Jones, and Menkveld, (2011), and Akbas, Jiang, and Koch (2018).

[2] See, for example, Froot, Scharfstein, and Stein (1992), Cella, Ellul, and Giannetti (2013), Weller (2017), Goldstein, Jiang, and Ng (2017) and Cai, Han, Li, and Li (2019).

and investment agendas. Long-term institutional investors are more likely to monitor the firm and influence managers' decisions. As these investors can spread both costs and benefits of ownership over a long period of time, they are better able to monitor managers effectively (Chen, Harford, and Li, 2007; Harford, Kecskés, and Mansi, 2018). In contrast, short-term institutional investors are mainly interested in short-term gains and thus less willing to expend efforts on monitoring and influencing management. Rather than making efforts to influence management, short-term traders tend to vote with their feet by selling their shares when they are dissatisfied with firms' performance. Also, some investors trade more frequently due to uncertain funding sources, not valuation reasons (Gordon, Cici, and Gibson, 2007).[3] Since firms need to refinance periodically, capital supply uncertainty creates a problem for bond issuers. Prior research has investigated the role of short- and long-term institutional investors and its effect on stock performance.

The extant literature has focused on the role of institutional stock investors, and given much less attention to institutional bond investors. As a result, little is known about the role of institutional bond ownership in corporate governance and the benefits these institutions may bring to firms and individual investors. Due to a lack of voting rights, it is not clear whether institutional bond investors can have the power to mitigate agency problems. Moreover, due to their passive investment role, whether institutional bond investors can actively influence firms' decision remains a question. In this paper, we examine the functions of institutional bond investors and their effects on the cost of debt.

We begin our analysis by exploring the relationship between institutional bond ownership and bond yield spreads. We first ask the question of whether institutional bond ownership leads to a lower cost of debt. If institutional bond investors can improve corporate governance that benefits bondholders or reduces information risk associated with bond default, bond value should increase with institutional bond ownership and decrease the cost of debt. We then examine whether the investment horizon of institutional investors matters for firms' cost of debt. In particular, we investigate whether short-term investors have differential effects on bond yield spreads. To determine institutional investment horizon, we use the method developed by Massa, Yasuda, and Zhang (2013), which measures the portfolio turnover rate at the investor's level. Lastly, we

[3] Institutions facing more withdrawals due to recent poor performance are more likely to have fire sale to prevent further outflows, and investors who experience more inflows due to good performance need to invest more to consume excess liquidity. This type of trading pattern does not contain information and should be independent with valuation (Gordon, Cici, and Gibson, 2007).

investigate the economic channels through which institutional bond ownership affects bond pricing. This analysis sheods light on the mechanism of the insituttional ownership effect on yield spreads.

Using Lipper eMAXX institutional ownership data, we examine the role of institutional bond ownership in the pricing of corporate bonds and document several new findings that contribute to the current literature. First, we find evidence that institutional bond ownership increases firms' bond value. Bond yield spreads have a significantly negative relation to the fraction of bonds held by institutional investors. The effect of institutional bond ownership is of economic importance. On average, a one-percent increase in institutional bond ownership is associated with a reduction of 10.7 basis points in yield spreads.

Second, the benefit of institutional bond ownership increases with the investor's holding horizon. Long-term institutional bond ownership increases the value of bonds and lowers the cost of debt whereas the short-term institutional bond ownership increases debt cost. A one-percent increase in long-term bond ownership is associated with a reduction of 6.8 basis points in bond yield spreads. Conversely, a one-percent increase in short-term ownership increases yield spreads by 8.8 basis points.

Third, we find that the effects of institutional bond ownership work through the channels of corporate governance, capital provision, and information asymmetry. There is evidence that long-term institutional bond ownership reduces the cost of debt through effective monitoring, and contracting that protects bondholders' rights through covenants. On the other hand, short-term institutional bond ownership increases uncertainty in capital supply and raises the risk premium and underwriting fees when firms issue new bonds. Although short-term institutional bond investors can help reduce information asymmetry through their trading, this benefit is outweighed by the cost of uncertain capital supply, leading to a net positive relation between yield spreads and short-term institutional bond ownership. The results support the view that institutions' capital provision affects asset pricing (He and Krishnamurthy, 2013; Brunnermeier and Sannikov, 2014; He Kelly, and Manela, 2017).

Finally, we show that the effect of institutional bond ownership is not a proxy for that of institutional stock ownership. Consistent with the literature that institutional stock investors improve the quality of corporate governance (see Harford, Kecskés, and Mansi, 2018), we find that long-term institutional stock ownership increases bond value. More importantly, we find that long-term bond ownership continues to have a negative effect on the cost of debt even after controlling for the effect of institutional stock ownership, whereas the short-term bond ownership has a positive effect. The results strongly suggest that institutional bond ownership has a significant effect on the cost of debt over and beyond that of institutional stock ownership.

The negative association between institutional bond ownership and the cost of debt could be induced by endogeneity. We take several steps to address this issue. First, although our variable of investment horizon is predetermined, which is unrelated to investors' contemporaneous trading, we use the lagged horizon variable to further alleviate the concern that the level of institutional bond ownership and the yield spread could be simultaneously determined. We find no evidence of this problem driving the effect of institutional ownership. Second, the measure of investors' trading horizons may be correlated with omitted variables. To address this concern, we use investors' funding structure as an instrument to capture an investor's incentive to trade, given that investors with a volatile funding structure are more likely to be short-term traders (He and Krishnamurthy, 2013; Brunnermeier and Sannikov, 2014). Following Cella, Ellul, and Giannetti (2013), we use the correlation between fund performance and withdrawals as an instrumental variable for investors' trading horizon as investors with a higher positive correlation are more likely to experience unstable capital withdrawal and thus trade more frequently to meet this funding constraint. Using this instrumental variable, we find our results are robust.

The flow-to-performance relation is well documented in the mutual fund literature (see Christoffersen, Mutso, and Wermers, 2014). Due to illiquidity, corporate bond funds are more sensitive to performance-driven outflows than equity funds (Chen, Goldstein, and Jiang, 2010; Goldstein, Jiang, and Ng, 2017), which results in a concave flow-to-performance relation (see Figure 1). As such, fund outflows tend to be more responsive to the past poor performance in the corporate bond market. Thus, forced sales to prevent further capital withdrawal are more likely to occur the corporate bond market than in the equity market. Cella, Ellul, and Giannetti (2013) shows that stock investors with a short trading horizon create price pressure mainly during the market turmoil. This paper shows that short-term bond investors result in a higher cost of debt even in the quiet market period.

Overall, there is strong evidence that long-term institutional bond ownership reduces the cost of debt by mitigating agency problems for creditors. On the other hand, short-term institutional ownership has a detrimental effect on debt cost as these investors focus on short-term gains and their investment turnover increases firms' funding uncertainty. Our results highlights the active monitoring ability of long-term bondholders as well as the financial fragility caused by short-term bond investors.

The most related literature to ours is Coppola (2022). Coppola (2022) relies on NAIC insurance holdings to signify long-term investors and Morningstar mutual fund holdings for short-term investors, but this approach glosses over diverse trading strategies within these categories. For example, Choi, Hoseinzade, Shin, and Tehranian (2020) and Anand, Jotikasthira, and Venkataraman (2021) highlight that bond fund managers adopt heterogeneous liquidity management strategies, which results in varied trading strategies among these managers. Figure 2 further illustrates this point, depicting a decline of more than 50% in the average churn rates of asset management companies—from 0.4 to 0.2 after 2011. This significant time-series difference suggests a shift, with some fund managers evolving into long-term trading investors—a transformation that Figure 3a substantiates by revealing an increase in long-term fund holdings to 15.89% in 2016, while long-term insurers accounted for 27.41%.

Furthermore, insurers also exhibit diverse trading horizons, a phenomenon that has become increasingly pronounced as the outsourcing of insurance assets to third-party managers has grown steadily[4]. We dissect insurers' holdings based on the identities of the entities managing the insurers' general account assets and distinguish among three categories: insurer self-managed entities (e.g., MetLife Insurance), insurance-management divisions (e.g., MetLife Investment Management), and insurers outsourcing to unaffiliated asset managers (e.g., BlackRock, Wellington, and other asset managers). Figure 2 demonstrates that insurer self-managed entities exhibit the lowest churn rate among these three categories, while unaffiliated asset managers record the highest. Figure 3d further elucidates this point, indicating that insurers self-managed are ultimately long-term investors, with nearly zero representation in short-term ownership. In contrast, the insurance-managed division and the unaffiliated asset managers in total account for approximately one-third of short-term bond ownership. Therefore, employing the historical trading horizons of each trading account in eMAXX, including asset managers and insurers, would offer a more refined and accurate metric for categorizing long-term and short-term investors in the bond markets.

[4] According to NAIC's report, around 37% of insurers outsource more than 50% of their assets to unaffiliated asset managers, like BlackRock, Conning, NEAM, Wellington, and J.P. Morgan. P&I's survey data also showed that the ten largest asset managers represented 69% of worldwide insurance AUM (including affiliated and unaffiliated asset managers).

The remainder of the paper is organized as follows. Section 2 discusses the data and the measures of investor trading horizon. Section 3 reports the main empirical results. Section 4 explores the mechanisms of the institutional ownership effect. Section 5 summarizes the major findings and concludes the paper.

2. Data and measures of the investment horizon

Our data come from a variety of sources. Institutional bond holdings are from the Thomson Reuters eMAXX database. The eMAXX database contains survivorship-biased free information on quarter-end holdings for about 24,000 institutional investors since the second quarter of 1998. It covers details of holdings for Treasury/Agency, ABS, MBS, and corporate and municipal bonds by insurance companies, mutual funds, leading pension funds, and other institutional investors. It provides information of over 50,000 issuers of both public and private debts with a total par amount of more than 7 trillion dollars.[5] We exclude bonds not in US dollar denomination or traded in foreign markets.

Our main objective is to examine the relation between the bond ownership structure and the cost of debt. Bond data come from three primary sources: DataStream, the National Association of Insurance Commissioners database (NAIC), and the Trade Reporting and Compliance Engine (TRACE). Although TRACE has most complete data, its coverage starts only in July 2002. We supplement the TRACE data by the DataStream data (since January 1990), and the NAIC database from January 1994. We use the standard filtering procedure to clean up the data and merge them.[6] To match institutional ownership records, we calculate the quarterly average yield for each bond in excess of the Treasury bond yield with the same maturity. These yield spreads are used as the measure for the cost of debt.

We first combine the bond data with eMAXX ownership data and then merge them with the data from Mergent's Fixed Investment Securities Database (FISD), which contains issue- and

[5] See Thomson Reuters' information brochure.

[6] We first exclude bonds with maturity less than one year or longer than 30 years to avoid any redemption effect and delete the observations with abnormal bond prices, that is, a price exceeds 150 or below 50. We then remove bonds with any option feature (convertible, puttable, redeemable/callable, exchangeable), bonds with sinking funds, and a floating coupon structure to avoid confounding effects on the cost of debt. Further, we follow the data screening procedure in Bessembinder et al. (2009) to filter out canceled, corrected and commission trades in TRACE. To avoid overlapping observations, we select data by giving a priority first to TRACE, then NAIC and lastly DataStream.

issuer-specific information, such as coupons, issue date, maturity date, issue size, ratings, provisions and other characteristics for bonds maturing in 1990 or later. Accounting information, institutional stock ownership data and stock prices for public firms are from the Compustat, CRSP, and Thomson Reuters 13F database, respectively. The final sample includes 9,549 bonds issued by 2,557 firms, with a total of 106,098 bond-quarter observations over the period from 2002:Q3 to 2016:Q4.

2.1 Investment horizon

The investor's investment horizon is not directly observable but is reflected in the turnover rate. Short-term investors have a higher investment turnover than long-term investors. Thus, we can use portfolio turnover rates or churn rates to measure an investor's trading horizon. Following the literature, we measure investor *j*'s portfolio churn rate ($CR_{j,t}$) in period *t* as

$$CR_{j,t} = \frac{\sum_{i=1}^{Q_j} \left| V_{i,j,t} - V_{i,j,t-1}(1+R_{i,t}) \right|}{\sum_{i=1}^{Q_j} (V_{i,j,t} + V_{i,j,t-1}) / 2} \qquad (1)$$

where Q_j denotes all bonds held by investor *j*, $V_{i,j,t}$ is the investment value and $R_{i,t}$, is the rate of return on bond *i* held by investor *j* in period (quarter) *t*. This measure is widely used in the literature to gauge investment turnover (see, among others, Massa, Yasuda, and Zhang, 2013; Carhart, 1997; Barber and Odean, 2000; Gaspar, Massa, and Matos, 2005; Cella, Ellul, and Giannetti, 2013). The churn rate is also calculated each quarter to match the quarterly institutional ownership data.

We average churn rates across the past four quarters, from *t*-1 to *t*-4, to obtain investor *j*'s portfolio turnover rate:

$$AVG\_CR_{j,t} = \frac{1}{4}\sum_{\tau=1}^{4} CR_{j,t-\tau} \,. \qquad (2)$$

This measure is used to differentiate short- and long-term institutional investors. We sort all institutional investors into terciles by turnover rate and classify investors in the top tercile as short-term investors and those in the bottom tercile as long-term investors.

2.2 Bond ownership structure

To obtain a bond-level measure of turnover rates, we calculate the weighted average of turnover rates ($IT_{i,t}$) across all investors holding a particular bond *i* in quarter *t*:

$$IT_{i,t} = \sum_{j \in S_j} w_{i,j,t} \left(\frac{1}{4}\sum_{\tau=1}^{4} CR_{j,t-\tau}\right) = \sum_{j \in S_j} w_{i,j,t} (AVG\_CR_{j,t}) \quad (3)$$

where S_i denotes all institutional investors of bond *i*, and $w_{i,j,t}$ is the ownership weight of investor *j*'s holding of bond *i* in quarter *t*. As this measure is inversely related to investors' holding horizon, a bond with a high turnover rate has a high intensity of investors with a short-term investment horizon and vice versa. [7]

The institutional bond ownership ($Bond\_IO_{i,t}$) is measured by the ratio of all institutional investor holdings to the total outstanding par amount. The short- and long-term institutional ownership ($Bond\_SIO_{i,t}$ and $Bond\_LIO_{i,t}$) are the ownership measures for short- and long-term investors.[8]

The measures ($IT_{i,t}$, $Bond\_SIO_{i,t}$ and $Bond\_LIO_{i,t}$) of investment horizon have several desirable features. First, the procedure of constructing these measures mitigates the endogeneity concern. We construct the churn rate using all bonds held by an institutional investor. Averaging across bonds lessens the impact of a shock to an individual bond on the turnover measure. At the bond level, we average the churn rates across all investors of a bond (for $IT_{i,t}$) or aggregate the ownership across all institutions (for $Bond\_SIO_{i,t}$ and $Bond\_LIO_{i,t}$). This two-step construction procedure allays the concern that these measures proxy for bond-specific characteristics or risk. Second, these measures are predetermined. As we use the investor's portfolio data from the past four quarters to construct the measures, they should not correlate with current trading behavior or redemption shocks. Third, to the extent that these measures are constructed from historical data, they are likely to underestimate the effect of the actual turnover, which will actually work against our hypothesis. Thus, a finding of a significant effect of these turnover measures will provide strong evidence for the importance of institutional bond ownership on the cost of debt.

2.3 Summary statistics

[7] The weight for bond *i* of investor *j* in quarter *t* is a ratio of the par-amount held by investor *j* and the par-amount held by all institutional investors in bond *i*.
[8] See Yan and Zhang (2009) for a similar definition.

The eMAXX database reports institutional bond holdings at both the individual manager level (fund-level) and individual investor level (firm-level). The fund-level holding represents the individual account that an institutional investor manages, and the firm-level holding reflects the aggregation of positions across funds in a fund family. We use the finest holding portfolio (fund-level) to construct the investor's churn rate ($CR_{j,t}$) as it allows heterogeneous behaviors across funds in the same fund family and better captures the impact of the actual trading frequency (Dass and Massa, 2014).[9] The bond investor turnover rate ($IT_{i,t}$), and the short- and long-term institutional ownerships ($Bond\_SIO_{i,t}$ and $Bond\_LIO_{i,t}$) are all measured at the fund level.

Panel A of Table 1 provides summary statistics for churn rates over the sample period. Bond investors' portfolio turnover rates are highly skewed with a substantial dispersion.[10] The mean rate is 0.36, and the median is 0.12. It shows that long-term investors dominate the corporate bond market. We use the classification code of investors provided by eMAXX to determine the type of institutions. When breaking down the churn rate into different types of investors, we find that short-term investors are concentrated in the group of mutual funds.

Panel B of Table 1 shows ownership structure and bond characteristics. The dispersion of bond investors' investment horizons is high. The average (median) investor turnover rate ($IT_{i,t}$) is 0.20 (0.19), with a range from 0.10 to 0.38. On average investors' investment horizon is 30 months (=12 months/ (0.20×2)). Some bonds (in the 5th percentile) have investors holding their positions for about 60 months (=12 months/(0.10×2)), while others (in the 95th percentile of IT) have just 16 months (=12 months/(0.36×2)).

Panel B summarizes bond ownership by different investors. The mean (median) bond ownership is 51% (50%). On average long-term bond investors account for 38% (74%) of total bond outstanding amount (total institutional holdings). While short-term institutional investors account for only 15% (29%) of the outstanding amount (total institutional holdings), short-term trading activity drives the skewness of the IT distribution to the right, indicating that these investors have a significant impact on the overall turnover.

The eMAXX database provides the information for bond and issuer characteristics such as credit

[9] This differs from the measure of stock ownership in the literature. The usage of the firm level in stock ownership literature is due to data unavailability as Thomson Reuter's 13F doesn't provide the holding data at the fund level.
[10] The stock's ownership doesn't have this right-skewed features (Cella, Ellul, and Giannetti, 2013).

ratings (*Rating*), time to maturity (*TimetoMaturity*), coupon, maturity variety (*MatVariety*), and total bond outstanding amount (*TotBondAmt*). We use these characteristics as control variables in panel regressions. Panels B and C show summary statistics of these variables. Panel C also reports the firm-level of stock ownership, book-to-market ratio (*BM*), profitability ratio (*Profit Margin*), debt-to-asset ratio (*Leverage*), total asset (*LogTA*) and other financial variables. We use important financial/accounting variables as controls when examining the subsample of bonds issued by public firms. The Appendix provides detailed variable description.

3. Empirical results

3.1 Bond investor horizon and the cost of debt

We begin our analysis by investigating the effects of ownership and investment horizons on bond yield spreads in the secondary market. We hypothesize that institutional bondholders with different investment horizons play different roles in affecting the cost of debt. To test this hypothesis, we run the following regression:

$$YSP_{i,t+1} = \beta_1 \cdot Bond\_IO_{i,t} + \beta_2 \cdot IT_{i,t} + \beta_3 \cdot X_{i,t} + \beta_4 \cdot Y_{k,t} + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (4)$$

where $YSP_{i,t+1}$ denotes the bond's average yield spread in quarter *t*, $Bond\_IO_{i,t}$ is its total institutional ownership, $IT_{i,t}$ is the investor turnover rate, $X_{i,t}$ and $Y_{k,t}$ are control variables for bond *i* and firm *k*, and α_d and α_t represent the industry fixed effect and year-quarter time fixed effect. All standard errors account for clustering at the bond level. While investment horizon and ownership measures are predetermined, we nevertheless use the bond yield spread one-quarter ahead (*t*+1) to further alleviate the concern about potential endogeneity.

Following the literature, we include bond ratings (*Rating*), the Amihud illiquidity measure (*Illiquidity*), maturity (*TimetoMaturity*), coupon rate (*Coupon*), a bond's outstanding amount (*SZ*), maturity variety (*MatVariety*), total outstanding amount of bonds (*TotBondAmt*), and the lagged yield spread as control variables. Additionally, we include the book-to-market ratio (*BM*), profitability ratio (*ProfitMargin*), debt to asset (*Leverage*), and total asset (*LogTA*) as controls for bonds issued by public firms. To ensure the robustness of bond ownership effect, we control the effect institutional stock ownership (*Stock IO*) for public firms.

Table 2 reports the results of regressions with different specifications. Columns 1, 2, 5, and 6 use both private and public bond issues, and columns 3, 4, 7, and 8, use only bonds issued by public firms. We regress both bonds yield spreads in the current quarter (*t*) in models 1, 2, 5, and 6 and one-quarter ahead (*t*+1) in models 3, 4, 7, and 8. Our main interest is the coefficient of institutional ownership, Bond_IO, which is significantly negative at the 1% level across the board, suggesting that bonds with higher institutional ownership have lower yield spreads. The effect of institutional bond ownership is of economic significance. Given the coefficient estimate in column 4, an increase in one percentage of aggregate bond ownership (Bond_IO) is associated with a reduction of 10.7 basis points in the yield spread.

Consistent with the literature (e.g., Bhojraj and Sengupta, 2003), we find that institutional stock ownership has a negative effect on bond yield spreads. More importantly, institutional bond ownership continues to have a negative coefficient significant at the 1% significance level, even after controlling for the effect of stock ownership. The evidence suggests that institutional bond ownership has a significant effect on yield spreads over and beyond the effect of institutional stock ownership.

The stability of ownership can affect the cost of debt, and we use the investor turnover rate (IT) to capture this effect. A bond with a higher IT tends to have a higher (lower) proportion of short-term (long-term) institutional investors. The right panel of Table 2 shows that the coefficient of IT is significantly positive at the 1% level, indicating that higher turnover rates are associated with higher yield spreads. This finding suggests that the benefit of institutional ownership is reduced if bond ownership is dominated by short-term institutional investors. In terms of economic significance (column 8), on average a one-percentage-point increase in institutional bond ownership (Bond_IO) is associated with a reduction of 9.7 basis points in yield spreads. Holding Bond_IO constant, a one-standard-deviation (0.09) increase in the bond's investor turnover rate (IT) results in a 16.3 basis points increase in the yield spread. [11]

To assess the direct effect of investment horizon, we include long- and short-term bond ownership variables (Bond_LIO and Bond_SIO) as regressors and estimate their effects separately:

[11] This is equivalent to 66 months (=12 months/ (0.09×2)) shorter trading horizons.

$$YSP_{i,t+1} = \beta_1 \cdot Bond\_LIO_{i,t} + \beta_2 \cdot Bond\_SIO_{i,t} + \beta_3 \cdot X_{i,t} + \beta_4 \cdot Y_{j,t} + \alpha_d + \alpha_j + \varepsilon_{i,t}$$

(5)

Table 3 shows that Bond_LIO has a significantly negative coefficient and Bond_SIO has a significantly positive coefficient. A one percentage point increase in long-term ownership (Bond_LIO) is associated with a reduction of 6.8 basis points in yield spreads (column 4) whereas the same amount of increase in short-term ownership (Bond_SIO) leads to an increase of 8.8 basis points in yield spreads (column 4).[12] Consistent with the result in Table 2, bonds with high turnover rates are associated with higher yield spreads.

A concern is the effect of the investor's turnover rate could be driven by the stale price in the corporate bond market. For example, the positive coefficient of IT might be due to the tendency that short-term investors prefer investing in higher yield bonds at the beginning of the period and that price in the bond market does not adjust fast enough due to infrequent trading. To mitigate this concern, we use a subsample of liquid bonds in the regression.[13] The coefficient of IT is still positive at 0.26 and significant at the 1% level. Thus, it is unlikely that the effect of turnover rates is driven by stale prices.

The investor's turnover rate becomes more important in the crisis and post-crisis periods than in the pre-crisis periods. During the financial crisis, as short-term investors face more redemption needs, they become more active. After the subprime crisis, mutual fund investors became more interested in corporate bonds. The bond asset under management by the mutual fund almost tripled from 2008 to 2014 to more than $1.8 trillion. We find that (in untabulated results) the coefficient of the investor's turnover rate (IT) is larger during the crisis and post-crisis periods than that before the financial crisis.[14]

Moreover, the effect of the investor's turnover rate is stronger for junk bonds and long maturity bonds. In Table 4, we interact the investor's turnover rate (IT) with Rating and Junk (dummy) in columns 1 and 2. The result shows that the effect of turnover rates (IT) is higher for low-rated

[12] Or, one standard deviation increase in long-term ownership reduces 1.32%, and one standard deviation increase in short-term ownership increases by 0.62% in bond yield spreads.
[13] These bonds have an Amihud Illiquidity measure is below the median.
[14] The coefficient of IT is 0.02 in pre-crisis period (before 2007:Q4), 1.118 in the financial crisis period (2008Q1:2009Q4), and 0.27 after crisis period (after 2010Q1).

bonds. When including an IT interaction variable with maturity and long-term dummy in columns 3 and 4,[15] we find that the effect of IT is stronger for bonds with a longer maturity.

Overall, there is strong evidence that institutional bond ownership and turnover rates play an important role in affecting the cost of debt. The investment horizon of institutional investors has a larger effect during the financial crisis and the post-crisis period and for bonds with a poorer rating and longer maturity.

3.2 Addressing potential endogeneity

To address the concern about potential endogeneity, we use investors' funding structure as an instrumental variable for investor's turnover (or short- and long-term ownership). Institutions under different funding constraints exhibit different trading behaviors. Institutional investors with volatile funding sources may trade more not because of valuation benefits. Institutions who experience more withdrawals due to the poor performance are more likely to incur fire sale to prevent further outflows, and investors who experience more inflows of funds due to the good performance need to invest more to consume excess liquidity. This type of trading pattern does not contain information and should be independent with valuation (Gordon, Cici, and Gibson, 2007). Thus, controlling for the impact of the funding structure permits exogenous variations in investor horizon.

We use the trading performance sensitivity (*TPS*) to capture the relation of volatile funding structure to trade frequency. *TPS* is measured by the correlation between investors' past performance (at quarter t-1) and the subsequent net flows (at quarter t) computed over a rolling window of ten quarters.[16] The net flows are approximated by the change in assets under management for each institutional investor (see also Cella, Ellul, and Giannetti, 2013).

Institutions with higher *TPS* tend to have more volatile funding and are more likely to have a shorter trading horizon or higher churn rate. Table 1 shows evidence that *TPS* is correlated with institutional investors' trading horizon. On average, mutual funds have larger positive *TPS* (0.008) and larger churn rates (0.535) relative to insurance companies (-0.053/0.241), revealing that fund

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[15] "Junk" equals one when a bond belongs to non-investment grade. "LongTerm" equals one when a bond has longer than 7 years to matured.

[16] If there is less than four quarters for a specific bond, we drop this observation.

managers change their holdings more frequently due to past performance. Using *TPS* as an instrument helps to capture the exogenous variation in investors' trading horizon due to funding shocks. We calculate weighted average *TPS* across bonds' investors similar to *IT* to obtain the bond-level measure and use it as the instrument variable in the two-stage least squares regression.

Panel A of Table 5 shows the results for the first and second stage regressions when bond investors' turnover rate (*IT*) is treated as the endogenous variable. The result of the first-stage regression shows that *IT* is positively correlated with the instrument variable *TPS* at the 1% significance level. Using the predicted value of *IT* from the first stage, the result of the second-stage regression continues to show that bonds with higher *IT* have a higher cost of debt.

Panel B of Table 5 shows the result of two-stage least squares regressions which treat bond's short-term/long-term ownership (Bond_SIO / Bond_LIO) as endogenous variables. The results in columns 1 and 2 show that Bond_LIO is negatively related to *TPS*, while Bond_SIO is positively related to that, consistent with the intuition that investors with lower (higher) performance-flow correlation trade less (more) frequently. The result in the second-stage regression is consistent with Table 3. Overall, the results confirm that bonds with high investor turnover rates are associated with higher bond yield spreads, and this relation is unikely due to unobserved characteristics or information effects.

3.3 Robustness tests

3.3.1 Propensity score matching analysis

Another potential concern is the selection bias. The short- and the long-term investors may choose bonds to invest based on some characteristics, for example, long-term investors like insurance companies prefer bonds with an investment grade, and short-term investors prefer bonds with low transaction costs. It could be investors' characteristics, rather than the bond investor's ownership, that drives our results.

We address this concern using propensity score matching analysis. We first define the treatment group as those bonds in the top-tercile Bond_LIO each quarter, and the control group as bonds in the bottom-tercile Bond_LIO. We then use all the variables to run the logit regression to obtain the propensity score. Using the nearest-neighbor one-to-one matching, we identify the matched control groups for bonds with a high-level of long- and short-term ownerships, respectively.

Panel A of Table 6 shows the balancing test results for both before and after matching. We report the difference between treatment and control groups (treatment – control) and the significance level. Results show that the difference beween treatment and control groups are statistically significant before matching. Bonds with a high-level of long-term (or short-term) ownership have different characteristics than those bonds with a low-level of long-term (or short-term) ownership. For example, bonds with more short-term ownership has a worse rating, shorter maturity, higher coupon, higher leverage, but lower profit margin. After matching, these differences are overwhelmingly insignificant, suggesting that the matching using PSM is quite effective.

As there are still a few variables exhibiting some differences after matching, we further control for these variables in the regression. Panel B continues to show that long-term ownership is associated with lower yield spreads, whereas short-term ownership is associated with higher spreads. Thus, our results are robust to the selection bias issue.

3.3.2 Control for other institutional ownership characteristics

The literature has shown that the cost of debt is negatively related to the level of stock ownership for different types of institutional investors (see Bhojraj and Sengupta, 2003; Elyasiani, Jia, and Mao, 2010). Also, the literature has suggested that the dual ownership and concentrated ownership enhance monitoring (see Jiang, Li, and Shao, 2010; Fich, Harford, and Tran, 2015), which can lower the firm's cost of capital. It is unclear whether institutional bond ownership is a proxy for these effects or it has an independent effect on debt cost. To address this issue, we run the horse-race regressions that include three different institutional ownership variables: stock ownership, dual ownership, and concentrated ownership.

Online Appendix Table 1 reports the results of regressions that include different types of institutional stock ownership. Bushee (1998, 2001) groups 13F stock investors into transient investors, dedicated investors, and quasi-indexers according to their portfolio turnover and portfolio diversification. We examine the robustness of our results to different measures of the stock investor horizon using the following regressions:

$$YSP_{i,t+1} = \beta_1 \cdot Bond\_LIO_{i,t} + \beta_2 \cdot Stock\_DED_{k,t} + \beta_3 \cdot X_{i,t} + \beta_4 \cdot Y_{k,t} + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (6)$$

$$YSP_{i,t+1} = \beta_1 \cdot Bond\_SIO_{i,t} + \beta_2 \cdot Stock\_TRA_{k,t} + \beta_3 \cdot X_{i,t} + \beta_4 \cdot Y_{k,t} + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (7)$$

where we treat Bushee's transient stock investors as short-term institutional stock investors (Stock_TRA) and dedicated stock investors as long-term institutional stock investors (Stock_DED).

As shown in Online Appendix Table 1, only long-term bond ownership rather than long-term stock ownership is significantly associated with the debt cost reduction. For short-term investors, institutional stock ownership has a negative effect on the cost of debt, whereas short-term bond ownership has a positive effect. The results show that short-term institutional stock investors exert a different effect on bond yield spreads than short-term institutional bond investors, which may suggest that these short-term investors play different roles.

Columns 1 and 2 in Online Appendix Table 2 reports the results of regressions that include the additional control-dual ownership (DEO). Dual ownership is the fraction of equity held by dual holders, those financial conglomerates whose affiliates simultaneously hold stocks and bonds of the same firm. The result shows that dual ownership (DEO) has a significantly negative effect on bond yield spreads. More importantly, the effects of institutional bond ownership and the investors' trading horizon remain highly significant, suggesting that these effects are not proxy for the DEO effect.

Columns 3 and 4 in Online Appendix Table 2 reports the results of regressions that control for the investors' concentrated ownership on bonds (Bond_FHHI). The Bond_FHHI is a 1 – Herfindahl index of institutional bondholders. We use the proportion of bonds (in terms of value) held by each institutional bondholder of each firm to calculate the Herfindahl index. The higher the value of Bond_FHHI, the less concentrated the institutional investors in the bond is, and greater difficulty to reach a consensus in renegotiating with counterparties (Bolton and Scharfstein, 1996). The result shows that variables of our primary interest remain highly significant, and the bond concentrated ownership (Bond_FHHI) is not significantly related to bond yield spreads. The results continue to show that institutional bond ownership and investment horizon have separate independent effects on the cost of debt.

4. Channels of institutional bond ownership effect

We next explore the channels through which institutional bond ownership work to affect bond yield spreads. We consider three important channels: corporate governance, capital supply, and information asymmetry in the following analysis.

4.1 Monitoring channel

The literature has suggested that institutional investors can enhance corporate governance. Long-term institutional investors tend to be more effective in improving the quality of corporate governance as they have a long-term interest in the firm performance. If so, long-term institutional bond investors should be in a better position to mitigate agency costs for creditors, thereby reducing the cost of debt than short-term institutional bond investors. In addition, this governance effect should be stronger for firms with more severe conflicts between creditors and shareholders as the marginal benefit of institutional monitoring is expected to be greater for these firms.

We first estimate the expected default rate using Merton's (1974) model, to proxy for the agency cost of bondholders. Bonds with an expected default rate higher than the sample median are considered to be high default risk bonds. Firms with risky debt tend to have greater agency problems between stockholders and bondholders (see Jensen and Meckling, 1976; Myer, 1977; Smith and Warner, 1979). In addition, we consider bond illiquidity, measured by the Amihud measure, as another proxy for the agency cost of bondholders. Investors holding illiquid securities are harder to discipline managers and therefore face more managerial agency problem (see Edman, Fang, and Zur, 2013).

Using these two measures to proxy for the effect of agency costs of debts, we run the following regressions:

$$YSP_{i,t+1} = \beta_1 \cdot LIO_{i,t} + \beta_2 \cdot SIO_{i,t} + \beta_3 \cdot LIO_{i,t} \cdot HighEDF_{k,t} + \beta_4 \cdot SIO_{i,t} \cdot HighEDF_{k,t} + \beta_5 \cdot X + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (8)$$

$$YSP_{i,t+1} = \beta_1 \cdot LIO_{i,t} + \beta_2 \cdot SIO_{i,t} + \beta_3 \cdot LIO_{i,t} \cdot HighIll_{j,t} + \beta_4 \cdot SIO_{i,t} \cdot HighIll_{j,t} + \beta_5 \cdot X + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (9)$$

where $HighEDF_{k,t}$ has a value equal to one when the firm's expected default rate is larger than the median firm in a given quarter, and $HighILL_{j,t}$ equals one when the bond's illiquidity measure is in the first quartile. A high expected default rate and high illiquidity of the bond indicate more serious agency conflicts (or weaker creditor protection).

Moreover, we separate the sample by high and low betas to rerun regression (8). We expect that long-term ownership effect will concentrate in those bonds with high default risk but low beta.

This hypothesis is in line with the strategic default literature, which suggest is a hump-shaped between equity beta and default probability due to shareholders' option to default strategically (Garlappi and Yan, 2011). In such case, the conflict between bondholders and shareholders is expected to be high when firms have high default risk but low beta.

Columns 1 and 2 in Table 7 show that long-term bond ownership has a greater effect on yield spreads for firms with a high expected default rate and for bonds that are highly illiquid. The results support the hypothesis that the effect of long-term bond ownership is larger for firms with greater agency costs. Columns 4 and 5 report the regressions of subsamples of high and low betas and show evidence that the effect of reducing the cost of debt when the default rate is high only exists when the equity beta is low, which is consistent with the strategic default literature.

Another way to assess the monitoring role of institutional investors is to examine the effect of bond covenants. A monitoring mechanism is that institutional investors can pressure the management to introduce covenants to protect bond investors. The contracting efficiency literature suggests that when there is an inherent agency risk for bondholders from shareholders or managers, the likelihood of covenant inclusion is higher (see Chava, Kumar, and Warga, 2010). Long-term bond investors can gain control rights by requiring covenant inclusion when firms issue new bonds, and firms would be more likely to cater to their current bondholders' needs if the bond ownership structure is persistent. The bond ownership structure is more persistent if the current bondholder is more likely to provide capital to a firm when it issues new bonds.

To see whether bond ownership is persistent, we regress the future (*t*+1) bond ownership against the current (*t*) bond ownership. Table 8 shows that the coefficient of current ownership is positive and highly significant, suggesting that bond ownership is highly persistent. This finding implies that firms will likely consider the long-term investor relation in their financing decisions.

Since long-term investors care more about the long-term performance, they are more likely to pressure the firm to include protective covenants for creditors in bond contracts. In the same way, the firm's manager is more likely to cater to long-term investors' needs to issue a bond with covenants. To investigate this possibility, we run the following panel regression using firm-year observations:

$$CovenantPer_{k,y+1} = \beta_1 \cdot B\_LIO_{k,y} + \beta_2 \cdot B\_SIO_{k,y} + \beta_3 \cdot Y_{k,y} + \alpha_d + \alpha_y + \varepsilon_{k,y} \qquad (10)$$

where $CovenantPer_{k,y+1}$ is the ratio of the number of newly issued bonds with covenants to the number of total new issuances for firm *k* in year *y*+1, and $B\_LIO_{k,y}$ is the average long-term bond ownership across all bonds issued by firm *k* in year *y*.

Table 9 shows that the coefficients of B_LIO are significantly positive. The results suggest that firms with more long-term bondholders will cater their needs to issue more bonds with covenants. This finding supports the hypothesis that long-term bond investors play an active monitoring role as they can gain control rights by requiring more covenants in bond contracts. On the other hand, we don't observe this relation for short-term bond investors (see results in columns 2 and 3).

4.2 Funding supply uncertainty channel

The literature has shown that institutions' demand affect stock prices (Gomper and Metrick, 2001) and suggested that institutional intermediaries' frictions, especially the capital constraint, affects the demand of assets and their prices (He and Krishnamurthy, 2013; Brunnermeier and Sannikov, 2014). Because institutional investors in corporate bonds are heavily herding, and more responsive to negative performance than equity investors (Goldstein, Jiang, and Ng, 2017; Cai, Han, Li, and Li, 2019), their demand can potentially play a significant role in affecting bond prices and the cost of debt.

In light of the literature, we explore the channel of funding and demand uncertainty on the cost of debt. We hypothesize that the cost increase effect is due to the friction of capital supply uncertainty rotted by the short-term investor's unstable funding structure. Due to the capital supply uncertainty, firms with more short-term bond ownership will have higher uncertainty of finding potential buyers when issuing new bonds, thus resulting in higher refinancing costs (offering yields) and issuance costs (e.g., underwriting fees).

To investigate this possibility, we run the following panel regressions:

$$OfferSpread_{k,y+1} = \beta_1 \cdot B\_LIO_{k,y} + \beta_2 \cdot B\_SIO_{k,y} + \beta_2 \cdot Y_{k,y} + \alpha_d + \alpha_y + \varepsilon_{k,y} \qquad (11)$$

$$GrossSpread_{k,y+1} = \beta_1 \cdot B\_LIO_{k,y} + \beta_2 \cdot B\_SIO_{k,y} + \beta_2 \cdot Y_{k,y} + \alpha_d + \alpha_y + \varepsilon_{k,y} \qquad (12)$$

where $OfferSpread_{k,y+1}$ is the average offering yield spread in the subsequent year y+1, $GrossSpread_{k,y+1}$ is the average gross spread, including underwriting fees, management fees, and the selling concession in year y+1, $B\_SIO_{k,y}$ is the average short-term bond ownership across all bonds for the issuer and $Y_{k,y}$ includes control variables for firm k in year y.

In addition, the investment horizon effect should be larger when firms are less able to adjust to the capital supply shock, for example, higher rollover risk. We use the firm's short-term debt ratio (short-term debt scaled by total debt) to proxy the rollover risk. More debts to mature in the near future raise the firm's rollover risk. Therefore, the difference in the effects of long-term and short-term institutional ownership should be more significant when the firm has more short-term debts.

Columns 1 and 4 in Table 10 shows the results of regressions. The significantly positive coefficients for $B\_SIO_{k,y}$ in both regressions suggest that firms with larger short-term institutional bond ownership have higher refinancing and issuance costs. Columns 2, 3, 5, and 6 report the subsample analysis based on rollover risk. Firms with short-term debt in the top (bottom) quartile of rollover risk have higher rollover risk. Firms with high rollover risk have significantly positive coefficients for $B\_SIO_{k,y}$ and significantly negative coefficients for $B\_LIO_{k,y}$.

The results support the argument that capital supply uncertainty influences firms' capital structure choices in the presence of supply shocks (see Ivashina and Sun, 2011; Massa, Yasuda, and Zhang, 2013). Firms facing larger potential credit supply shocks have higher refinancing and issuance costs. Short-term institutional bond ownership with high turnover rates elevates capital supply uncertainty, leading to higher costs of refinancing.

4.3 Information asymmetry channel

We next examine whether the lower cost of debt associated with long-term institutional ownership is due to the reduction in information risk. Information risk of corporate bonds arises when firm managers have private information that adversely affect default risk of bonds. Boehmer and Kelley (2009) find evidence that high institutional stock ownership reduces information risk as it attracts more analyst coverage, reduces analyst forecast dispersion, and thus improves the information environment. It is unclear whether high long-term institutional bond ownership can have a similar effect. In this section, we examine this issue.

We use the average analyst dispersion (AnalystDisp) over the past four quarters (t-1 to t-4) to proxy for the level of information asymmetry for a firm. We run the following regression to see if higher long-term ownership has a greater effect on firms facing information asymmetry:

$$YSP_{i,t+1} = \beta_1 \cdot B\_LIO_{i,t} + \beta_2 \cdot B\_LIO_{i,t} \cdot AnalystDisp_{k,t} + \beta_3 \cdot X_{i,t} + \beta_4 \cdot Y_{k,t} + \alpha_d + \alpha_t + \varepsilon_{i,t} \quad (13)$$

Table 11 reports the results. As shown, the coefficient of the interaction term with B_LIO and AanlystDisp is not significant.

We further examine whether the long-term or short-term bond investors can better improve the information environment using the following regressions:

$$AnalystDisp_{k,y+1} = \beta_1 \cdot B\_LIO_{k,y} + \beta_2 \cdot Y_{k,y} + \alpha_d + \alpha_y + \varepsilon_{k,y} \quad (14)$$

$$AnalystDisp_{k,y+1} = \beta_1 \cdot B\_SIO_{k,y} + \beta_2 \cdot Y_{k,y} + \alpha_d + \alpha_y + \varepsilon_{k,y} \quad (15)$$

where the dependent variable is the analyst forecast dispersion for firm *k* in next year *y*+1, and $B\_LIO_{k,y}$ is the average long-term bond ownership for firm *k* in year *y*.

Columns 3 and 4 in Table 11 show that long-term institutional bond investors cannot reduce information asymmetry. On the other hand, the coefficient of short-term institutional bond ownership $B\_SIO_{k,y}$ is significantly negative. This result is consistent with the finding of Yan and Zhang (2009) that the presence of short-term institutional stock investors improves the information environment. One possible reason short-term institutional investors prefer more information production because it reduces information asymmetry and lower the trading cost, which is beneficial for investors with high turnover rates.

Collectively, the results suggest that long-term and short-term institutions perform different functions in the corporate bond market. High long-term institutional bond ownership results in better corporate governance, which lowers the cost of debt. Although high short-term institutional bond ownership improves firms' information environment, it can induce capital supply uncertainty. The cost of funding uncertainty appears to outweigh the benefit of the improved corporate information environment, leading to a positive relation between short-term institutional bond ownership and the cost of debt.

5. Conclusion

In this paper, we explore the role of institutional bond ownership in affecting the cost of debt. We find that higher institutional bond ownership is associated with lower yield spreads. When further dividing institutional investors into short-term and long-term bondholders, we find a negative relation between yield spreads and the long-term institutional bond ownership, but a positive relation between yield spreads and the short-term institutional bond ownership. Further analysis suggests that short-term institutional bond ownership incurs funding uncertainty which has an adverse impact on the cost of debt.

We further investigate the economic channels through which institutional bond ownership affects the cost of debt. We find that higher long-term institutional bond ownership improves the quality of corporate governance through effective monitoring and mitigating the agency problems associated with bondholders. Firms with higher long-term institutional bond ownership include more protective covenants in their bond contracts to reduce agency problems. These benefits contribute to the low cost of debt. The effect of long-term bond ownership is larger for firms with higher default rates, lower bond liquidity, and worse protections for bondholders against firms' strategic default options.

On the other hand, higher short-term institutional bond ownership is associated with higher costs of debts. The adverse effect of short-term institutional bond investors mainly works through the channel of capital supply. Higher short-term institutional bond ownership causes uncertainty in capital supply to the firm, which increases underwriting costs and offering yields of new bonds, especially when the firm faces high rollover risk.

Our results show that long-term institutional bond investors play a larger role in monitoring and mitigating conflicts between creditors and shareholders than short-term institutional bond investors. The evidence of different institutional roles is consistent with previous findings that institutional investors have different investment objectives and incentives. Institutional investors interested in long-term investment performance devote more efforts to monitor managers and influence their decisions. On the other hand, institutional investors chasing short-term gains tend to focus on information gathering and short-term trading profits. The incentive for short-term trading profits leads to high portfolio turnover of these investors and cause uncertainty in firms' capital supply, which has an adverse effect on firms' costs of debt.

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Figure 1. Flow-performance relations for bond funds and stock funds. This figure shows the flow-performance relation for corporate bond funds and stock funds from Goldstein, Jiang, and Ng (2017).

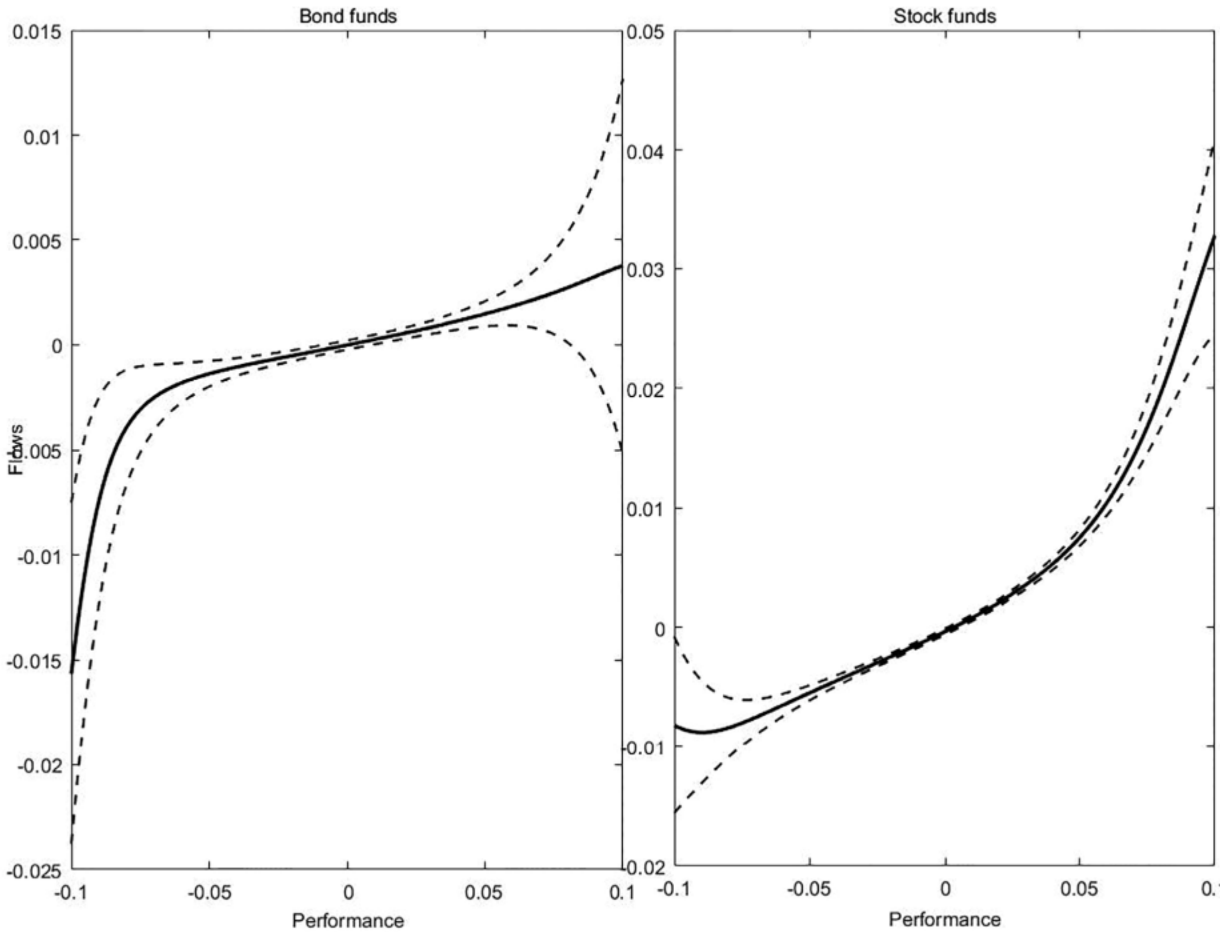


Figure 2. Churn rates in different management firms

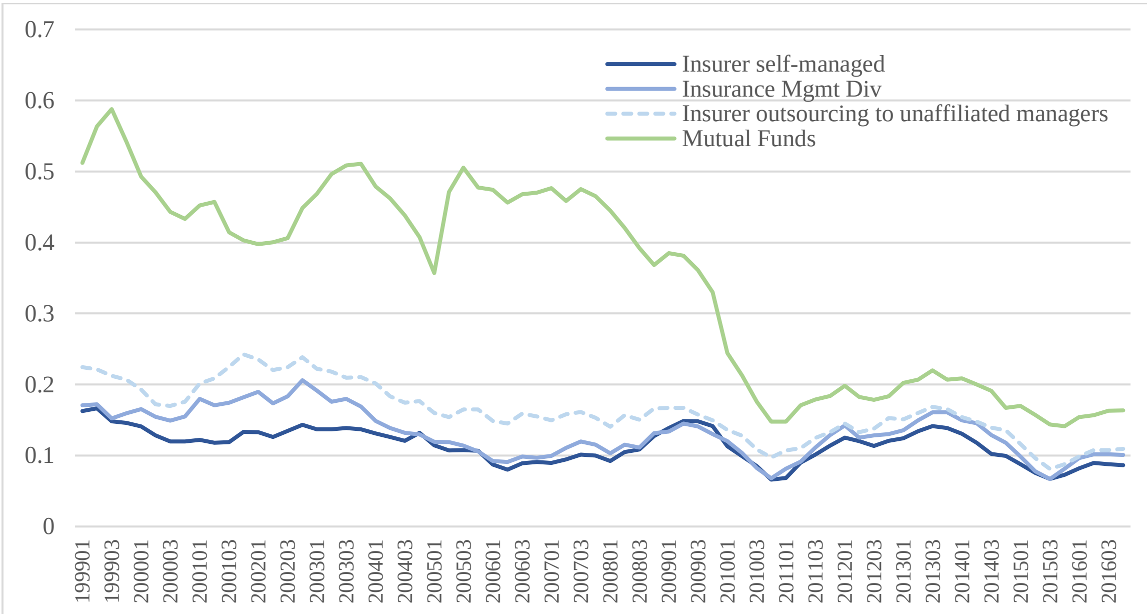
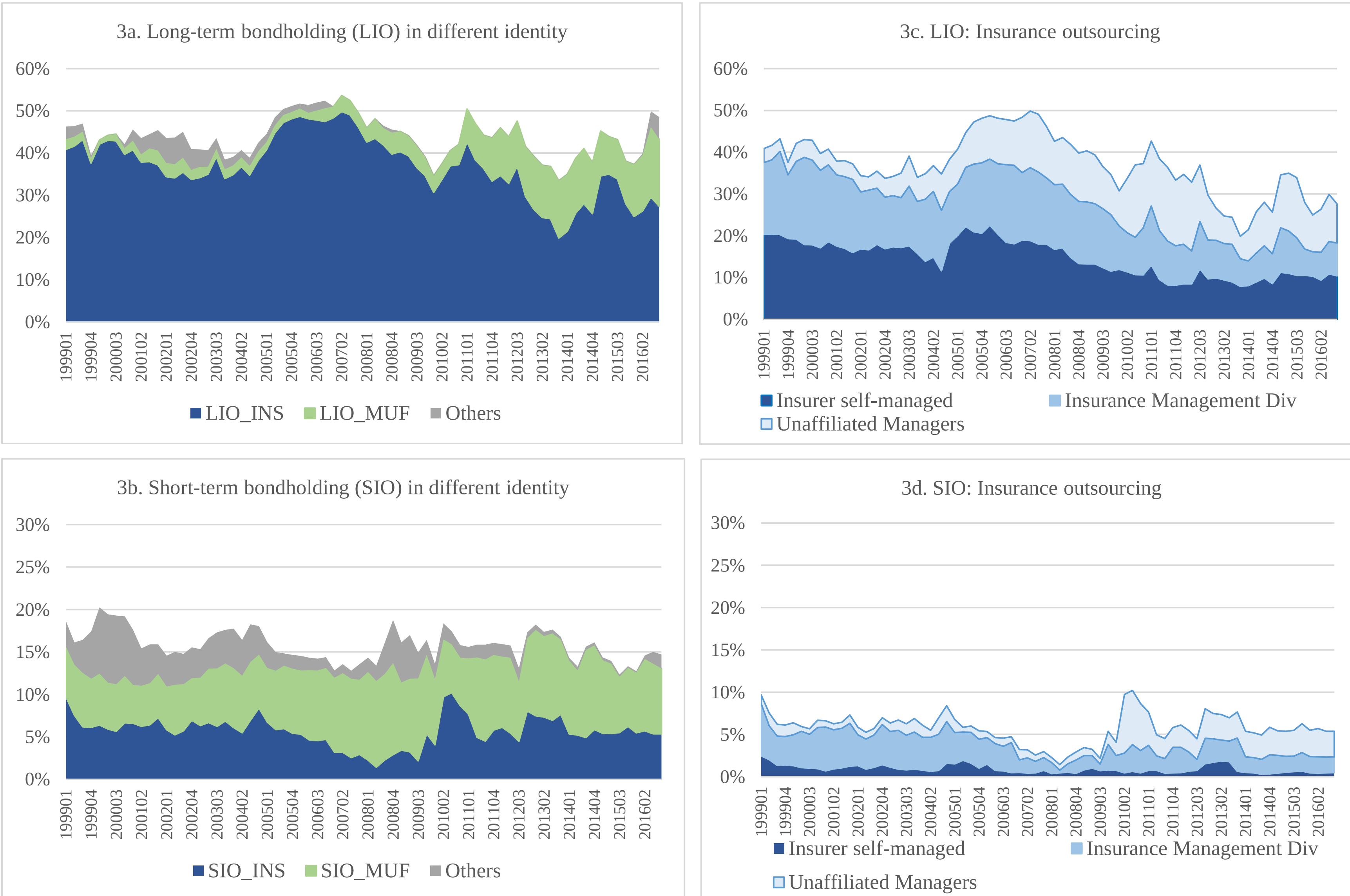


Figure 3. Decomposition of long-term and short-term institutional bond ownership



Appendix

Variables	Definitions
	Investor Heterogeneity
$CR_{j,t}$	The investor j's portfolio turnover rate (CR, churn rate) at quarter t. It is used to proxy investor's trading horizon. It is the investor's aggregate purchase and sale of bonds divided by his average bond holdings using quarterly data in e-MAXX.
$IT_{i,t}$	The bond i's average investor turnover rate (IT) at quarter t. It is the weighting average of the churn rates across the bond's all investors.
$Trading\ Performance\ Sensitivity_{i,,t}$	The bond i's average trading performance sensitivity at quarter t. The trading sensitivity is the correlation between each institutional investor-j's portfolio performance at quarter t-1 (the returns of the bonds held in their portfolios) and the change in assets under management at quarter t computed over a rolling window of 10 quarters before quarter t. It is the weighting average across the bond's all investors (similar to IT).
$B\_IO_{i,t}$	The bond i's ownership of institutional investors in the percentage of outstanding amount at quarter t.
$B\_LIO_{i,t}$	The bond i's ownership of long-term institutional investors in the percentage of outstanding amount at quarter t. The classification of a long-term investor is determined by the investor j's historical average churn rate ($CR_{j,t}$).
$B\_SIO_{i,t}$	The bond i's ownership of short-term institutional investors in the percentage of outstanding amount at quarter t. The classification of short-term investor is determined by the investor j's historical average churn rate ($CR_{j,t}$).
$B\_LIO^{a}_{k,y}$	The firm k's (weighted) average ownership of long-term institutional investors in the percentage of the outstanding amount in year y. The weight is the percentage of the outstanding amount of bond i (belong to firm k) relative to the total outstanding amount.
$B\_SIO^{a}_{k,y}$	The firm k's (weighted) average ownership of short-term institutional investors in the percentage of the outstanding amount in year y. The weight is the percentage of the outstanding amount of bond i (belong to firm k) relative to the total outstanding amount.
$B\_SIOIns_{i,t}$	The bond i's ownership of short-term/insurance company institutional investors in the percentage of outstanding amount at quarter t.
$B\_SIONonIns_{i,t}$	The bond i's ownership of short-term/non-insurance company institutional investors in the percentage of outstanding amount at quarter t.
$S\_IO_{k,t}$	The firm k's stock ownership of institutional investors in the percentage of total shares at quarter t.
$S\_DED_{k,t}$	The firm k*'s* stock ownership of dedicated (long-term) investors in the percentage of total shares at quarter t. The classification of dedicated investor is based on Bushee's classification.
$S\_TRA_{k,t}$	The firm k*'s* stock ownership of transient (short-term) investors in the percentage of total shares at quarter t. The classification of transient investor is based on Bushee's classification.

	Bond and Firm Characteristic
Yield Spread $_{i,t}$	The bond i's yield spread (in percentage) in the secondary market at quarter t. It is the quarterly average spread between the trading yield for corporate bond and the Treasury constant maturities rate with the corresponding maturity.
Rating $_{i,t}$	The indicator variable of bond i's credit rating at quarter t. An ordinal number is ranging from 1 to 8. The value 1 represents for prime bonds ("Aaa" in Moody, "AAA" in S&P, or "AAA" in Fitch), 2 for high grade bonds, 3 for upper medium grade bonds, 4 for lower medium grade bonds, 5 for non-investment grade speculative bonds, 6 for highly speculative bonds, 7 for substantial risk bonds, and 8 for the lowest grade bonds ("C" in Moody, "D" in S&P, or "DDD", "DD", "D" in Fitch).
Coupon $_{i}$	The bond i's fixed coupon rates. We take the natural logarithm transformation in the regression.
TimeToMaturity $_{i,t}$	The bond i's time to maturity (years) at quarter t. The natural logarithm of the total proceeds is used in the regression.
SZ $_{i,t}$	The bond i's total outstanding amount (in thousand dollars) at quarter t. The natural logarithm of the total proceeds is used in the regression.
MatVariety $_{k,t}$	The firm k's maturity variety at quarter t. The proxy for the firm's bond maturity variety is the ratio of the number of maturities in which the firm has bonds outstanding to the total number of its bond outstanding. It is followed the Dass and Massa (2014)'s measures (MV-2).
TotBondAmt $_{k,t}$	The firm k's total bond outstanding amount (in thousand dollars) at quarter t. The natural logarithm of the total proceeds is used in the regression.
BM $_{k,t}$	The firm k's book to market ratio at quarter t.
ProfitMargin $_{k,t}$	The firm k's operating profit margin after depreciation at quarter t.
LogTA $_{k,t}$	The firm k's total amount of assets (in billion dollars) at quarter t. The natural logarithm of one plus the total asset is used in the regression.
Leverage $_{k,t}$	The firm k's total debt to total asset ratio at quarter t.
LongTerm_Leverage $_{k,t}$	The firm k's long-term debt to book equity ratio at quarter t.
Offering YieldSpread $_{k,y+1}$	The firm k*'s* (weighted) average offering yield spread (in percentage) in the primary market in year y+1. The yield spread is the spread between the issuing yield for corporate bond i (belong to firm k) and the Treasury constant maturities rate with the corresponding maturity. The weight is the percentage of the issuing amount relative to the total issuing amount at the same year.
Gross Spread $_{k,y+1}$	The firm k's (weighted) average gross spread (in percentage) in year y+1. The gross spread is the total of underwriting fees, management fees, and the selling concessions divided by the issue size. The weight is the percentage of the issuing amount relative to the total issuing amount at the same year.
CovenantPer$_{k,y+1}$	The firm k's percentage of numbers of newly issued covenant-bonds relative to the numbers of total new issuances in year y+1
AnalystDisp $_{k,y+1}$	The firm k's dispersion of analysts' forecasts of one-year EPS, measured by standard deviation of analyst forecasts in year y+1.

Tot_OfferingAmt$_{k,y}$	The firm k's total amount of capital proceeds from bond issuance (in thousand dollars) at year y. The natural logarithm of the total proceeds is used in the regression.
OfferingMaturity$_{k,y}$	The firm k's (weighted) average offering maturity with the natural logarithm transformation in the regression. The weight is the percentage of the issuing amount relative to the total issuing amount at the same year.
AvgMaturity$_{k,y}$	The firm k's (weighted) average maturity in year y. Maturities are averaged across all outstanding bonds, and the weight is the percentage of the outstanding amount relative to the total bond outstanding.

Table 1. Summary statistics for investors, bonds, and firms

Summary statistics of the main variables are presented below. Panel A presents statistics for institutional investor's account level (investor account j at quarter t). Panel B presents statistics for the bond level (bond i at quarter t), and Panel C presents statistics for the firm level (firm k at quarter t or at year y). The sample period is from 2002:Q3 to 2016:Q4 with public and private firms.

Variable		Mean	Std Dev	5th Pctl	Median	95th Pctl
Panel A: Institutional Investor's level						
$CR_{j,t}$	444,857	0.360	0.560	0.022	0.120	1.804
$CR\_Insurance_{j,t}$	242,572	0.241	0.445	0.015	0.080	1.151
$CR\_MutualFund_{j,t}$	112,604	0.535	0.646	0.047	0.241	1.804
Trading Performance Sensitivity j,t	359,935	-0.034	0.375	-0.658	-0.034	0.591
Trading Performance Sensitivity_Insurance j,t	218,902	-0.053	0.368	-0.669	-0.051	0.556
Trading Performance Sensitivity_Mutual Fund	93,739	0.008	0.382	-0.624	0.003	0.645
$Portfolio\ Size_{j,t}$	411,182	2507	12287	30	500	9000
$Percentage\ Ownership_{j,t}$	411,182	1.63%	7.68%	0.01%	0.18%	5.37%
$Portfolio\ Weight_{j,t}$	411,182	1.60%	7.65%	0.00%	0.17%	5.24%
Panel B: Bond Level						
$Yield\ Spread_{i,t}$	187,755	2.265	1.776	0.539	1.794	5.724
$B\_IO_{i,t}$	173,915	0.512	0.200	0.193	0.504	0.856
$B\_SIO_{i,t}$	134,384	0.150	0.120	0.012	0.123	0.377
$B\_LIO_{i,t}$	162,690	0.381	0.182	0.105	0.366	0.704
$IT_{i,t}$	182,950	0.204	0.088	0.097	0.186	0.375
$Rating_{i,t}$	185,733	3.291	1.139	2.000	3.000	5.000
$Coupon_{i}$	185,962	1.910	0.316	1.253	2.001	2.293
$TimetoMaturity_{i,t}$	187,755	9.358	7.227	2.321	7.040	26.760
$SZ_{i,t}$	187,755	12.034	1.794	8.511	12.489	14.322
Panel C: Firm Level						
$MatVariety_{k,t}$	63,762	0.582	0.160	0.258	0.693	0.693
$TotBondAmt_{k,t}$	64,132	13.041	1.426	10.748	12.954	15.533
$S\_IO_{k,t}$	17,968	0.654	0.186	0.286	0.684	0.901
$S\_DED_{k,t}$	17,968	0.054	0.060	0.000	0.046	0.188
$S\_TRA_{k,t}$	17,968	0.125	0.084	0.000	0.111	0.300
$BM_{k,t}$	18,022	0.641	0.463	0.131	0.530	1.470
$ProfitMargin_{k,t}$	18,022	0.167	0.138	0.013	0.135	0.441
$LogTA_{k,t}$	22,049	9.621	1.578	7.313	9.476	12.510
$Leverage_{k,t}$	18,018	0.291	0.152	0.055	0.277	0.571
$LongTerm\_Leverage_{k,t}$	18,758	1.122	1.631	0.191	0.661	3.469
$Offering\ YieldSpread_{k,y+1}$	2,513	2.114	1.968	0.026	1.653	5.947
$Gross\ Spread_{k,y+1}$	1,967	8.338	66.168	2.047	6.283	17.082
$CovenantPer_{k,y+1}$	2,512	79.22%	38.71%	0%	100%	100%
$AnalystDisp_{k,y+1}$	2,069	0.074	0.229	-0.213	0.048	0.383
$B\_LIO^{a}_{k,y}$	2,159	38.52%	16.85%	13.94%	36.89%	71.49%
$B\_SIO^{a}_{k,y}$	2,115	13.17%	9.29%	1.26%	11.40%	31.33%
$Tot\_OfferingAmt_{k,y}$	2,513	14.006	1.336	12.206	13.816	16.418
$OfferingMaturity_{k,y}$	2,511	11.302	7.834	4.286	10.000	30.000

Table 2. Institutional bond ownership and the cost of debt

This table reports the regression result for bond institutional ownership and the cost of debt during the period 2002:Q3 to 2016:Q4. We estimate the regression model for the bond yield spread in the secondary market on the aggregate bond ownership (Bond IO_{it}) in columns (1) – (4) and on the bond investor's trading intensity measure (IT_{it}) in columns (5) – (8). We test the contemporaneous bond yield spread (t) as well as those in the next quarter (t+1). We include credit rating ($Rating_{it}$), Amihud Illiquidity ($Illiquidity_{it}$), time to maturity ($TimeToMaturity_{i,t}$), maturity variety ($MatVariety_{k,t}$), total bond outstanding amount ($TotBondAmt_{k,t}$), coupon rate ($Coupon_i$), bond's outstanding amount (*SZ*), and the lag yield spread as explanatory variables for all bonds sample. We add book to market ratio (BM_{kt}), profitability ratio ($ProfitMargin_{kt}$, operating profit margin after depreciation), debt to asset ratio ($Leverage_{k,t}$), total asset ($LogTA_{k,t}$), and institutional stock ownership (Stock IO_{it}) for the subset of bonds issued by public firms. The industry and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent	Yield Spread $_{i,t}$		Yield Spread $_{i,t+1}$		Yield Spread $_{i,t}$		Yield Spread $_{i,t+1}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bond $IO_{i,t}$	-	-	-	-	-	-	-	-0.097***
	(-8.55)	(-6.20)	(-6.22)	(-4.07)	(-7.64)	(-5.54)	(-5.59)	(-3.61)
$IT_{i,t}$					0.254***	0.083**	0.326***	0.163***
					(7.39)	(2.43)	(5.34)	(2.94)
$Rating_{i,t}$	0.161***	0.102***	0.098***	0.078***	0.157***	0.099***	0.094***	0.076***
	(18.20)	(16.06)	(7.26)	(6.80)	(18.07)	(16.44)	(7.02)	(6.66)
Illiquidity $_{i,t}$	0.341***	-0.009	0.229***	0.018	0.339***	-0.001	0.246***	0.028
	(9.35)	(-0.32)	(4.81)	(0.39)	(9.18)	(-0.02)	(5.14)	(0.61)
$TimeToMaturity_{i,t}$	0.005***	0.005***	0.007***	0.006***	0.005***	0.005***	0.007***	0.006***
	(12.16)	(12.32)	(11.41)	(10.90)	(12.84)	(13.04)	(11.92)	(11.17)
$Coupon_i$	0.203***	0.125***	0.156***	0.097***	0.210***	0.125***	0.173***	0.103***
	(12.40)	(9.88)	(6.91)	(3.97)	(12.86)	(9.72)	(7.27)	(4.05)
$SZ_{i,t}$	-0.001	0.008**	-	0.001	-0.006	0.007**	-	-0.005
	(-0.24)	(2.58)	(-2.73)	(0.01)	(-1.54)	(2.13)	(-4.25)	(-1.07)
Lag Yield $Spread_{i,t}$	0.839***	0.900***	0.813***	0.874***	0.840***	0.899***	0.811***	0.871***
	(112.40)	(168.40)	(74.42)	(77.87)	(114.70)	(165.60)	(74.10)	(75.71)
MatVariety $_{k,t}$	0.001	-0.053*	0.022	0.004	-0.009	-0.070**	0.015	-0.012
	(0.01)	(-1.93)	(0.43)	(0.10)	(-0.29)	(-2.55)	(0.31)	(-0.31)
TotBondAmt $_{k,t}$	-0.005	-	-	-0.010	-0.007	-	-0.020**	-0.009
	(-1.05)	(-2.77)	(-2.62)	(-1.36)	(-1.57)	(-3.06)	(-2.56)	(-1.45)
BM $_{k,t}$			0.289***	0.153***			0.297***	0.156***
			(9.84)	(4.738)			(10.65)	(5.04)
ProfitMargin $_{k,t}$			-	-0.142**			-	-0.148**
			(-3.36)	(-2.20)			(-3.26)	(-2.27)
Leverage $_{k,t}$			0.477***	0.343***			0.467***	0.338***
			(7.75)	(5.67)			(7.66)	(5.56)
LogTA $_{k,t}$			-	-			-	-0.028***
			(-4.59)	(-3.41)			(-4.64)	(-3.23)
Stock $IO_{i,t}$			-	-			-	-0.093***
			(-4.62)	(-3.03)			(-4.41)	(-2.66)
Intercept	0.149	-0.063	0.874***	0.321***	0.154	-0.066	0.811***	0.348***
	(1.51)	(-0.86)	(6.19)	(2.84)	(1.58)	(-0.89)	(6.12)	(3.02)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of	111,582	112,411	38,425	39,002	107,456	106,098	37,959	37,774
R-Square	92.24%	92.40%	92.70%	92.45%	92.19%	92.51%	92.69%	92.26%

Table 3. Long- and short-term ownership and the cost of debt

This table reports the regression result for the long/short-term institutional ownership and the cost of debt during the period 2002:Q3 to 2016:Q4. We estimate the regression model for the bond yield spread in the secondary market on the bond's long-term ownership (Bond_LIO $_{i,t}$) and on the bond's short-term ownership (Bond_SIO $_{i,t}$) across the panel. We test the bond yield spreads in the next quarter (t+1) to avoid any confounding issue happen in the same quarter. The same set of control variables in Table 2 is included here. The industry and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	Yield Spread $_{i,t}$		Yield Spread $_{i,t+1}$	
	(1)	(2)	(3)	(4)
Bond_LIO$_{i,t}$	-0.132***	-0.053***	-0.132***	-0.068**
	(-7.17)	(-2.68)	(-4.82)	(-2.18)
Bond_SIO$_{i,t}$	0.123***	0.065***	0.157***	0.088**
	(4.98)	(2.63)	(4.54)	(2.23)
Rating$_{i,t}$	0.142***	0.091***	0.089***	0.075***
	(17.86)	(14.77)	(6.40)	(6.08)
Illiquidity $_{i,t}$	0.300***	0.015	0.232***	0.024
	(7.63)	(0.50)	(4.47)	(0.60)
TimeToMaturity$_{i,t}$	0.005***	0.004***	0.007***	0.006***
	(12.65)	(11.43)	(11.46)	(10.89)
Coupon$_{i}$	0.162***	0.097***	0.146***	0.086***
	(11.79)	(7.70)	(6.24)	(3.34)
SZ$_{i,t}$	-0.021***	0.006	-0.030***	-0.005
	(-4.31)	(1.42)	(-4.74)	(-0.93)
Lag Yield Spread$_{i,t}$	0.856***	0.910***	0.811***	0.872***
	(135.90)	(155.50)	(70.66)	(69.82)
MatVariety $_{k,t}$	-0.071**	-0.090***	0.007	-0.036
	(-2.30)	(-3.24)	(0.15)	(-0.88)
TotBondAmt $_{k,t}$	-0.008*	-0.011***	-0.017**	-0.012*
	(-1.86)	(-2.74)	(-2.13)	(-1.70)
BM $_{k,t}$			0.310***	0.160***
			(11.14)	(5.00)
ProfitMargin $_{k,t}$			-0.209***	-0.132**
			(-2.88)	(-1.99)
Leverage $_{k,t}$			0.493***	0.365***
			(7.66)	(5.84)
LogTA $_{k,t}$			-0.034***	-0.023**
			(-3.91)	(-2.48)
Stock IO$_{i,t}$			-0.136***	-0.010***
			(-4.63)	(-2.81)
Intercept	0.540***	-0.0342	0.936***	0.366***
	(5.80)	(-0.44)	(6.97)	(3.17)
Industry FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
No. of Observations	86,945	85,627	36,111	35,944
R-Square	93.19%	93.04%	92.83%	92.31%

Table 4. Credit ratings and maturity

This table reports how the result of investors' trading horizon change according to rating and time to maturity. The model is similar to Table 2. We estimate the regression model for the bond yield spread in the secondary market on the bond investor's trading intensity measure (IT_{it}) and its interaction with rating and maturity. To examine the effect in different credit quality, we include "Rating" and a dummy variable – "Junk," which equals one when credit rating belong to in junk-rated. For the maturity effect, we include "TimeToMaturity" and a dummy variable – "LongTerm," which equals one when time to maturity is larger than seven years. The industry and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	Yield Spread $_{i,t+1}$			
	(1)	(2)	(3)	(4)
Bond $IO_{i,t}$	-0.0953***	-0.0758***	-0.0971***	-0.128***
	(-3.606)	(-2.885)	(-3.636)	(-4.399)
$IT_{i,t}$	-0.222	-0.0184	0.133*	0.0987*
	(-1.130)	(-0.323)	(1.762)	(1.781)
$IT_{i,t}$ x $Rating_{i,t}$	0.114*			
	(1.897)			
$IT_{i,t}$ x $Junk_{i,t}$		0.723***		
		(5.097)		
$IT_{i,t}$ x $TimeToMaturity_{i,t\ i,t}$			0.00328	
			(0.622)	
$IT_{i,t}$ x $LongTerm_{i,t\ i,t}$				0.217***
				(4.562)
$Rating_{i,t}$	0.0523***	0.0509***	0.0762***	0.0776***
	(3.272)	(4.686)	(6.676)	(6.752)
$Illiquidity_{i,t}$	0.0300	0.0400	0.0284	0.0179
	(0.647)	(0.856)	(0.613)	(0.389)
$TimeToMaturity_{i,t}$	0.00609***	0.00685***	0.00539***	0.00444***
	(11.44)	(11.47)	(4.956)	(8.008)
$Coupon_{i}$	0.102***	0.0884***	0.103***	0.0971***
	(4.037)	(3.556)	(4.025)	(3.910)
$SZ_{i,t}$	-0.00417	-0.00439	-0.00544	-0.00495
	(-0.822)	(-0.905)	(-1.068)	(-0.991)
Lag Yield $Spread_{i,t}$	0.870***	0.858***	0.871***	0.869***
	(77.59)	(72.24)	(75.59)	(73.89)
MatVariety $_{k,t}$	-0.00927	-0.0106	-0.0122	-0.00384
	(-0.241)	(-0.276)	(-0.311)	(-0.0962)
TotBondAmt $_{k,t}$	-0.00954	-0.0107	-0.00942	-0.0101
	(-1.469)	(-1.630)	(-1.451)	(-1.512)
BM $_{k,t}$	0.156***	0.169***	0.156***	0.153***
	(4.996)	(5.224)	(5.024)	(4.679)
ProfitMargin $_{k,t}$	-0.153**	-0.176***	-0.148**	-0.156**
	(-2.351)	(-2.679)	(-2.268)	(-2.343)
Leverage $_{k,t}$	0.342***	0.355***	0.338***	0.347***
	(5.680)	(5.811)	(5.559)	(5.560)
LogTA $_{k,t}$	-0.0284***	-0.0275***	-0.0282***	-0.0289***
	(-3.320)	(-3.121)	(-3.266)	(-3.356)
Stock $IO_{i,t}$	-0.0915***	-0.0785**	-0.0931***	-0.101***
	(-2.600)	(-2.229)	(-2.661)	(-2.906)
Intercept	0.416***	0.448***	0.357***	0.424***
	(3.437)	(4.093)	(3.049)	(3.547)
Industry FE	YES	YES	YES	YES
Year-Quarter FE	YES	YES	YES	YES
Observations	37,774	37,774	37,774	37,774
R-squared	0.923	0.923	0.923	0.922

Table 5. Two-stage least squares regression

This table reports the result for the two-stage least squares using the average trading performance sensitivity as an instrument variable ($IV_{i,t}$). Panel A shows the first stage and second stage regression result when the bond investor's trading intensity measure (IT_{it}) is the endogenous variable. Panel B shows the first stage and second stage result when the bond's short-term/long-term ownership ($Bond\_SIO_{i,t}$ / $Bond\_LIO_{i,t}$) are the endogenous variables. The model setting is similar to Table 2 and Table 3. The t-statistics are reported in parentheses. "***","**",and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A. The instrumental variable for investor turnover

	First Stage	**Second Stage**	
Dependent Variable	$IT_{i,t}$	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$
	(1)	(2)	(3)
Average Trading Performance Sensitivity ($IV_{i,t}$)	0.055***		
	(11.59)		
$Bond\_IO_{i,t}$		-0.148***	-0.087***
		(-9.17)	(-5.10)
$IT_{i,t}$		0.854*	1.430***
		(1.85)	(2.94)
$Rating_{i,t}$	0.018***	0.095***	0.072***
	(19.71)	(9.35)	(7.15)
$TimeToMaturity_{i,t}$	-0.001***	0.008***	0.007***
	(-12.19)	(13.23)	(10.98)
$Coupon_{i}$	-0.068***	0.281***	0.237***
	(-32.26)	(8.31)	(6.86)
$SZ_{i,t}$	0.032***	-0.056***	-0.055***
	(36.08)	(-3.61)	(-3.40)
Lag Yield $Spread_{i,t}$	0.009***	0.788***	0.850***
	(16.60)	(160.7)	(155.17)
MatVariety $_{k,t}$	0.024***	0.012	0.037
	(4.94)	(0.42)	(1.27)
TotBondAmt $_{k,t}$	0.007***	-0.022***	-0.004
	(7.64)	(-3.70)	(-0.67)
BM $_{k,t}$	-0.021***	0.329***	0.184***
	(-13.6)	(25.8)	(12.57)
ProfitMargin $_{k,t}$	-0.018***	-0.337***	-0.275***
	(-3.15)	(-10.72)	(-7.99)
Leverage $_{k,t}$	0.047***	0.488***	0.291***
	(9.04)	(13.42)	(7.55)
LogTA $_{k,t}$	0.002***	-0.031***	-0.022***
	(2.59)	(-7.43)	(-4.82)
Intercept	-0.355***	0.561***	0.358*
	(-16.24)	(2.78)	(1.71)
Industry FE	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes
No. of Observations	40,225	40,105	40,225
R-Square	31.90%	90.48%	89.45%

Panel B. The instrumental variable for long/short term ownership

	First Stage		Second Stage			
Dependent Variable	$B\_LIO_{i,t}$	$B\_SIO_{i,t}$	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
Average Trading Performance Sensitivity ($IV_{i,t}$)	-0.133***	0.038***				
	(-19.58)	(13.06)				
$Bond\_LIO_{i,t}$			-0.399*	-0.716***		
			(-1.88)	(-3.15)		
$Bond\_SIO_{i,t}$					1.385*	2.253***
					(1.87)	(3.11)
$Rating_{i,t}$	-0.028***	0.009***	0.105***	0.086***	0.105***	0.088***
	(-22.81)	(15.85)	(12.64)	(9.78)	(12.20)	(10.75)
$TimeToMaturity_{i,t}$	0.002***	-0.001***	0.008***	0.007***	0.007***	0.006***
	(21.16)	(-7.88)	(12.48)	(11.05)	(14.89)	(11.72)
$Coupon_i$	0.144***	-0.013***	0.261***	0.245***	0.222***	0.165***
	(52.62)	(-11.17)	(7.82)	(6.60)	(14.19)	(10.56)
$SZ_{i,t}$	-0.045***	0.011***	-0.039***	-0.032***	-0.036***	-0.023**
	(-33.09)	(17.66)	(-3.59)	(-2.67)	(-3.79)	(-2.35)
Lag Yield $Spread_{i,t}$	-0.021***	0.004***	0.779***	0.840***	0.782***	0.845***
	(-29.39)	(11.76)	(144.84)	(137.77)	(193.36)	(176.53)
MatVariety $_{k,t}$	-0.021***	0.019***	0.006	0.015	-0.012	-0.003
	(-3.14)	(6.73)	(0.21)	(0.52)	(-0.39)	(-0.10)
TotBondAmt $_{k,t}$	-0.019***	0.001	-0.024***	-0.013*	-0.018***	0.001
	(-14.79)	(1.16)	(-3.66)	(-1.85)	(-3.33)	(0.00)
BM $_{k,t}$	0.017***	-0.008***	0.338***	0.175***	0.342***	0.178***
	(8.07)	(-8.70)	(36.88)	(16.4)	(33.41)	(15.88)
ProfitMargin $_{k,t}$	-0.013*	-0.017***	-0.353***	-0.301***	-0.325***	-0.248***
	(-1.71)	(-5.12)	(-11.21)	(-8.93)	(-9.61)	(-6.85)
Leverage $_{k,t}$	-0.083***	0.014***	0.548***	0.331***	0.562***	0.358***
	(-12.02)	(4.58)	(15.78)	(9.18)	(17.96)	(10.93)
LogTA $_{k,t}$	-0.020***	-0.004***	-0.036***	-0.029***	-0.023***	-0.008
	(-18.9)	(-8.37)	(-6.06)	(-4.73)	(-4.51)	(-1.54)
Intercept	1.201***	-0.057***	0.581**	0.561*	0.181	-0.172
	(41.14)	(-4.54)	(2.05)	(1.88)	(1.39)	(-1.38)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	36,926	36,926	36,783	36,926	36,783	36,926
R-Square	37.11%	17.34%	90.64%	89.64%	90.51%	89.39%

Table 6. Propensity score matching of long/short term ownership and the cost of debt

This table reports the result for propensity score matching for long/short term bond ownerships during the period 2002:Q3 to 2016:Q4. We define the treatment group as those bonds have more than top-tercile short-term (long-term) institutional ownership and the control group for those short (long) term ownership are less than bottom-tercile. To get the propensity score, we use all the variables in the baseline model to run the logit regression. Panel A shows balancing test results between treatment and control groups both before and after matching. Panel B shows the regression result for the matched sample. We conduct the regression for yield spreads on the bond's long-term ownership indicator (LIO_T equals to one if the long-term ownership exceeds top-tercile during the quarter) in columns (1) – (4) and on the bond's short-term ownership indicator (SIO_T) in columns (5) – (8). We test the contemporaneous bond yield spread (t) as well as those in the subsequent quarter (t+1) to avoid any confounding issue happen in the same quarter. The industry fixed effect and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**",and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Balancing tests of the difference between treatment and control groups

	Prematch Difference		**Postmatch Difference**	
	Treat: SIO Tercile	**Treat: LIO Tercile**	**Treat: SIO Tercile**	**Treat: LIO Tercile**
$Rating_{i,t}$	0.754***	-0.059***	0.005	-0.011
	(81.31)	(-6.97)	(0.21)	(-0.30)
$Illiquidity_{i,t}$	-0.022***	0.029***	-0.002	0.055
	(-26.54)	(30.75)	(-0.70)	(1.11)
$TimeToMaturity_{i,t}$	-1.396***	2.663***	0.012	0.155
	(-25.09)	(54.08)	(0.06)	(1.09)
$Coupon_{i}$	0.041***	0.084***	-0.009	-0.007
	(15.35)	(34.94)	(-0.92)	(-0.80)
$SZ_{i,t}$	0.327***	-0.182***	-0.003	-0.084***
	(36.39)	(-16.11)	(-0.16)	(-2.88)
Lag Yield $Spread_{i,t}$	0.801***	-0.717***	-0.002	-0.045
	(44.34)	(-43.75)	(-0.05)	(-1.41)
$MatVariety_{k,t}$	0.049***	0.120***	-0.001	-0.010*
	(34.37)	(88.28)	(-0.26)	(-1.74)
$TotBondAmt_{k,t}$	0.009	-1.058***	-0.011	-0.004
	(0.75)	(-92.65)	(-0.28)	(-0.76)
$BM_{k,t}$	0.053*	-0.127***	0.008	0.001
	(8.98)	(-22.31)	(0.69)	(0.15)
$ProfitMargin_{k,t}$	-0.020***	-0.036***	-0.002	0.003
	(-10.19)	(-18.37)	(-0.64)	(0.92)
$Leverage_{k,t}$	0.040***	-0.081***	-0.006	0.007
	(20.77)	(-41.90)	(-1.51)	(1.56)
$LogTA_{k,t}$	-0.574***	-1.213***	-0.012	0.028
	(-26.38)	(-53.59)	(-0.26)	(0.79)

Panel B: Regressions for the matched samples

Dependent Variable	Yield Spread $_t$		Yield Spread $_{t+1}$		Yield Spread $_t$		Yield Spread $_{t+1}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LIO_T	-0.177***	-0.112***	-0.144***	-0.038***				
	(-5.07)	(-8.04)	(-3.76)	(-2.64)				
SIO_T					0.044*	0.031***	0.019*	0.007
					(1.69)	(3.10)	(1.67)	(0.66)
$Rating_{i,t}$		0.092***		0.06***		0.14***		0.124***
		(5.35)		(3.57)		(10.14)		(8.33)
$TimeToMaturity_{i,t}$		0.009***		0.006***		0.008***		0.006***
		(8.17)		(5.32)		(10.21)		(7.21)
$Coupon_i$		0.229***		0.096**		0.191***		0.119***
		(5.52)		(2.41)		(8.10)		(4.68)
$SZ_{i,t}$	-0.371***	-0.019**	-0.341***	0.001		-0.024**		0.008
	(-16.17)	(-2.00)	(-14.75)	(0.08)		(-2.49)		(0.80)
Lag Yield $Spread_{i,t}$		0.76***		0.86***		0.775***		0.843***
		(32.15)		(36.57)		(51.57)		(55.77)
MatVariety $_{k,t}$	0.859***	-0.016	0.833***	0.122		-0.072*		-0.088*
	(7.61)	(-0.26)	(6.70)	(1.64)		(-1.65)		(-1.88)
TotBondAmt $_{k,t}$		-0.016		0.021		-0.027***		-0.024***
		(-1.23)		(1.57)		(-3.31)		(-2.62)
BM $_{k,t}$		0.456***		0.311***		0.314***		0.182***
		(10.43)		(5.69)		(10.34)		(5.22)
ProfitMargin $_{k,t}$		-0.396***		-0.133		-0.296***		-0.223***
		(-4.24)		(-1.10)		(-4.12)		(-2.90)
Leverage $_{k,t}$		0.6***		0.527***		0.554***		0.51***
		(6.96)		(5.45)		(10.55)		(8.58)
LogTA $_{k,t}$		-0.066***		-0.065***		-0.02***		-0.003
		(-5.75)		(-4.38)		(-2.80)		(-0.34)
Intercept	5.97***	0.500**	5.616***	-0.042	0.766***	0.067	0.904***	-0.15
	(15.28)	(2.46)	(13.11)	(-0.18)	(2.91)	(0.42)	(3.05)	(-0.82)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	6,370	6,370	5,499	5,499	12,222	12,222	10,780	10,780
R-Square	38.78%	90.43%	38.63%	90.98%	34.76%	90.34%	33.74%	89.78%

Table 7. Monitoring effect of bond institutional ownership

This table reports how the regression result to examine the bond institutional ownership's monitoring effect. The model is similar to Table 3 that regressing the bond yield spread in the secondary market on the bond's long-term and short-term ownership (Bond_LIO $_{i,t}$ / Bond_SIO $_{i,t}$) and the interactions with different risk measures for creditors and shareholders. We use Merton's measure to estimate the expected default risk and High Default Risk is a dummy variable equals one when the expected default rate is larger than median. High Illiquidity equals one when the bond's Amihud illiquidity exceeds quartile, and High Beta equals one when the issuer's equity beta is larger than median of the whole firms. The industry and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Yield Spread $_{i,t+1}$				
	All Sample			Low Beta	High Beta
	(1)	(2)	(3)	(4)	(5)
Bond_LIO$_{i,t}$	-0.0171	-0.0566*	-0.0727**	-0.0381	0.00754
	(-0.618)	(-1.724)	(-2.230)	(-1.111)	(0.166)
Bond_SIO$_{i,t}$	0.131***	0.0920**	0.0954**	0.0819**	0.0791
	(3.447)	(2.452)	(2.297)	(2.011)	(1.136)
Bond_LIO$_{i,t}$ x High Default Risk $_{i,t}$	-0.100*			-0.141**	-0.0419
	(-1.902)			(-2.180)	(-0.597)
Bond_SIO$_{i,t}$ x High Default Risk $_{i,t}$	-0.0795			-0.128	-0.00655
	(-1.125)			(-1.447)	(-0.0619)
Bond_LIO$_{i,t}$ x High Illiquidity $_{i,t}$		-0.0626**			
		(-2.489)			
Bond_SIO$_{i,t}$ x High Illiquidity $_{i,t}$		0.0278			
		(0.282)			
Bond_LIO$_{i,t}$ x High Beta $_{i,t}$			0.00609		
			(0.118)		
Bond_SIO$_{i,t}$ x High Beta $_{i,t}$			-0.00921		
			(-0.120)		
High Default Risk $_{i,t}$	0.0534			0.0932***	0.0222
	(1.484)			(2.795)	(0.447)
High Illiquidity $_{i,t}$		0.0671			
		(1.46)			
High Beta $_{i,t}$			-0.0268		
			(-0.898)		
Bond Characteristics	YES	YES	YES	YES	YES
Firm Characteristics	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
Year-Quarter FE	YES	YES	YES	YES	YES
Observations	35,696	36,384	35,691	17,600	18,088
R-squared	0.923	0.923	0.923	0.928	0.922

Table 8. Persistent bond ownership structure

This table reports the regression result to examine the bond ownership's persistence. We conduct firm-year regressions for firm's average bond ownership in the subsequent year ($B\_LIO^{a}_{k,y+1}$ and $B\_SIO^{a}_{k,y+1}$) on the concurrent ownership level ($B\_LIO^{a}_{k,y}$ and $B\_SIO^{a}_{k,y}$). We examine firm's long-term ownership in columns (1) – (2) and short-term ownership in columns (3) – (4). The industry fixed effect and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**",and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	$B\_LIO^{a}_{k,y+1}$		$B\_SIO^{a}_{k,y+1}$	
	(1)	(2)	(3)	(4)
$B\_LIO^{a}_{k,y}$	0.566***	0.487***		
	(54.16)	(26.50)		
$B\_SIO^{a}_{k,y}$			0.565***	0.573***
			(43.08)	(27.18)
$Rating_{k,y}$	-0.02***	-0.024***	0.01***	0.007*
	(-11.96)	(-5.57)	(8.66)	(1.75)
$Tot\_OfferingAmt_{k,y}$	0.002***	0.001***	-0.001***	-0.001***
	(8.15)	(2.94)	(-4.16)	(-4.71)
$MatVariety_{k,y}$	-0.028**	-0.062***	0.019***	0.021*
	(-2.47)	(-3.15)	(2.90)	(1.95)
$TotBondAmt_{k,t}$	-0.015***	-0.015***	0.008***	0.005***
	(-9.96)	(-4.49)	(8.20)	(2.72)
$Coupon^{a}_{k,y}$	0.006	-0.001	0	0.01
	(0.82)	(-0.04)	(-0.12)	(1.17)
$LogTA_{k,y}$		-0.004		0.003
		(-1.28)		(1.38)
$BM_{k,y}$		0.002		0
		(0.39)		(-0.12)
$ProfitMargin_{k,y}$		0.058***		-0.02
		(3.93)		(-1.11)
$Leverage_{k,y}$		-0.07***		0.04***
		(-3.73)		(3.00)
Intercept	0.531***	0.672***	-0.073***	-0.078**
	(15.03)	(14.45)	(-3.81)	(-2.39)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of Observations	13,929	4,717	12,305	4,440
R-Square	50.04%	51.52%	47.07%	51.63%

Table 9. Active monitoring effect on firms' new issuance

This table reports the regression result to examine the bond institutional ownership's controlling effect on firm's new issuance. We conduct firm-year regressions for the firm's choice of covenant on firm's long-term and short-term ownership ($B\_LIO^{a}_{k,y}$ and $B\_SIO^{a}_{k,y}$). We use a ratio of numbers of newly issued covenant-bonds and the numbers of total new issuances in the following year, $CovenantPer_{k,y+1}$, as a dependent variable. The industry fixed effect and time fixed effect are used across the panel, and all standard errors are adjusted by the bond's or firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	$CovenantPer_{k,y+1}$		
	(1)	(2)	(3)
$B\_LIO^{a}_{k,y}$	0.151**		0.072*
	(1.99)		(1.83)
$B\_SIO^{a}_{k,y}$		-0.419***	-0.381**
		(-2.69)	(-2.29)
$Rating_{k,y}$	0.01	0.018	0.021
	(0.60)	(0.98)	(1.15)
$Tot\_OfferingAmt_{k,y}$	-0.001	0.001	0.002
	(-0.09)	(0.08)	(0.13)
$OfferingMaturity_{k,y}$	0.003**	0.002*	0.002*
	(2.26)	(1.89)	(1.88)
$TimetoMaturity^{a}_{k,y}$	0.006***	0.007***	0.006***
	(2.76)	(3.13)	(2.92)
$MatVariety_{k,y}$	0.031	0.045	0.056
	(0.35)	(0.48)	(0.60)
$TotBondAmt_{k,t}$	0.002	0.011	0.014
	(0.16)	(0.59)	(0.70)
$Coupon^{a}_{k,y}$	-0.174***	-0.167***	-0.176***
	(-3.10)	(-2.98)	(-3.15)
$LogTA_{k,y}$	0.015	0.009	0.01
	(0.90)	(0.55)	(0.59)
$BM_{k,y}$	-0.099***	-0.096***	-0.098***
	(-3.12)	(-2.98)	(-3.08)
$Leverage_{k,y}$	-0.328***	-0.341***	-0.336***
	(-3.08)	(-3.10)	(-3.05)
Intercept	0.924***	0.866***	0.786**
	(3.33)	(2.83)	(2.50)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. of Observations	1,683	1,645	1,644
R-Square	20.40%	21.02%	21.10%

Table 10. Supply uncertainty effect of bond institutional ownership on new issuance

This table reports the regression result to examine the bond institutional ownership's supply uncertainty effect on firm's new issuance. We conduct firm-year regressions for the firm's refinancing cost on firm's long-term and short-term ownership ($B\_LIO^a_{k,y}$ and $B\_SIO^a_{k,y}$). We examine a firm's average offering yield spread in the following year, $OfferingYieldSpread_{k,y+1}$, in columns (1) – (3) and firm's average gross spread (the aggregate of the underwriting and management fees and the selling concession) in the subsequent year, $GrossSpread_{k,y+1}$, in columns (4) – (6). We use a firm's short-term debt ratio (short term debt scaled by total debt) to proxy rollover risk. In columns (2) and (5), only those firms with high rollover risk (short-term debt ratio is larger than median) are included, and in columns (3) and (6), only firms with low rollover risk are included. The firm characteristics variables are those in Table 9. The industry fixed effect and time fixed effect are used across the panel and all standard errors are adjusted by the bond's or firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Offering Yield Spreads			Gross Spreads		
	All	High Rollover Risk	Low Rollover Risk	All	High Rollover Risk	Low Rollover Risk
	(1)	(2)	(3)	(4)	(5)	(6)
$B\_LIO^a_{k,y}$	-0.827***	-0.672*	-0.761**	-2.650**	-3.774**	-2.563**
	(-2.84)	(-1.69)	(-2.16)	(-2.48)	(-2.57)	(-2.08)
$B\_SIO^a_{k,y}$	1.264**	2.325***	0.999	0.171	6.531*	-0.183
	(2.30)	(3.17)	(1.58)	(0.100)	(1.96)	(-0.092)
Firm Characteristics	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Year-Quarter FE	YES	YES	YES	YES	YES	YES
Observations	1,623	416	1,207	1,403	381	1,022
R-squared	0.570	0.633	0.575	0.404	0.591	0.403

Table 11. Information asymmetry effect of bond institutional ownership

This table reports the regression result to examine the bond institutional ownership's information asymmetry effect. We conduct bond-quarter regressions in columns (1) – (2) to regress yield spreads on long-term ownership ($B\_LIO_{i,t}$). We include a measure to proxy a firm's level of information asymmetry, $AnalystDisp_{k,t}$, the average of analyst dispersion over the past four quarters (t-1 to t-4). In columns (3) – (4), we conduct firm-year regressions for firms' analyst dispersions in the subsequent year, $AnalystDisp_{k,y+1}$, on long-term and short-term ownership ($B\_LIO^a_{k,y}$ and $B\_SIO^a_{k,y}$). The industry fixed effect and time fixed effect are used across the panel and all standard errors are adjusted by the bond's or firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$	$AnalystDisp_{k,y+1}$	
	(1)	(2)	(3)	(4)
$B\_LIO_{i,t}$	-0.223***	-0.086***		
	(-8.11)	(-3.10)		
$B\_LIO_{i,t}$ * $AnalystDisp_{k,t}$	0.019	-0.028		
	(0.49)	(-0.71)		
$B\_LIO^a_{k,y}$			0.003	
			(0.05)	
$B\_SIO^a_{k,y}$				-0.181**
				(-2.38)
Rating	0.109***	0.09***	0.001	0.008
	(11.27)	(9.70)	(0.11)	(0.66)
$Tot\_OfferingAmt_{k,y}$			0.001	0.003
			(0.10)	(0.52)
$OfferingMaturity_{k,y}$			0.001	0.001
			(-0.09)	(-0.29)
TimetoMaturity	0.008***	0.006***	-0.001	-0.001
	(13.82)	(10.55)	(-0.95)	(-0.91)
Coupon	0.22***	0.126***	0.081**	0.079**
	(10.17)	(5.82)	(2.41)	(2.56)
SZ	-0.027***	0.001		
	(-3.28)	(0.09)		
MatVariety	-0.065**	0.005	0.019	0.036
	(-2.09)	(0.19)	(0.35)	(0.69)
TotBondAmt	-0.018***	0.004	0.017*	0.024**
	(-2.76)	(0.63)	(1.89)	(2.16)
$AnalystDisp_{k,t}$	0.034**	0.034**		
	(2.55)	(2.44)		
LogTA	-0.035***	-0.025***	-0.004	-0.007
	(-5.53)	(-3.91)	(-0.37)	(-0.64)
BM	0.294***	0.182***	0.029	0.029
	(11.96)	(8.31)	(0.99)	(0.99)
ProfitMargin	-0.289***	-0.254***	0.169*	0.179*
	(-6.39)	(-5.89)	(1.83)	(1.93)
Leverage	0.4***	0.301***	-0.12	-0.107
	(10.27)	(8.17)	(-1.50)	(-1.28)
Intercept	0.451***	-0.169	-0.355**	-0.472***
	(3.99)	(-1.34)	(-2.11)	(-2.66)
Industry FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
No. of Observations	32,658	33,125	1,528	1,493
R-Square	90.60%	89.69%	8.68%	9.27%

Online Appendix Table 1. Effects of bond and stock institutional ownership

This table reports the regression result for the bond and stock institutional ownership and the cost of debt during the period 1998:Q2 to 2016:Q4. We conduct the regression for the bond yield spread in the secondary market on the bond's long-term ownership ($Bond\_LIO_{i,t}$) and stock's long-term ownership ($Stock\_DED_{k,t}$) in columns (1) – (2), and on the bond's short-term ownership ($Bond\_SIO_{i,t}$) and stock's short-term ownership ($Stock\_TRA_{k,t}$) in columns (3) – (4) for the contemporaneous yield spread (t) as well as the subsequent spread (t+1). The industry fixed effect and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**",and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$	Yield Spread $_{i,t}$	Yield Spread $_{i,t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
$Bond\_LIO_{i,t}$	-0.294***	-0.14***			-0.309***	-0.113***
	(-10.15)	(-5.02)			(-9.39)	(-3.67)
$Stock\_DED_{k,t}$	-0.11	-0.145			-0.141	-0.141
	(-1.06)	(-1.43)			(-1.32)	(-1.34)
$Bond\_SIO_{i,t}$			0.322***	0.105*	0.166**	0.065
			(4.71)	(1.65)	(2.46)	(0.92)
$Stock\_TRA_{k,t}$			-0.564***	-0.444***	-0.561***	-0.422***
			(-7.14)	(-5.25)	(-7.04)	(-5.10)
$Rating_{i,t}$	0.117***	0.095***	0.132***	0.120***	0.132***	0.109***
	(12.13)	(10.71)	(12.42)	(11.56)	(12.49)	(10.85)
$TimeToMaturity_{i,t}$	0.008***	0.005***	0.007***	0.005***	0.008***	0.005***
	(12.96)	(10.41)	(12.41)	(9.67)	(12.79)	(10.09)
$Coupon_i$	0.254***	0.163***	0.212***	0.137***	0.25***	0.153***
	(12.18)	(8.19)	(10.87)	(7.48)	(11.58)	(7.47)
$SZ_{i,t}$	-0.039***	-0.002	-0.024***	0.01	-0.042***	0.008
	(-4.71)	(-0.33)	(-3.07)	(1.55)	(-5.36)	(1.32)
Lag Yield $Spread_{i,t}$	0.773***	0.855***	0.777***	0.861***	0.773***	0.859***
	(74.34)	(75.81)	(71.95)	(72.47)	(69.32)	(70.39)
$MatVariety_{k,t}$	-0.071**	0.005	-0.087**	-0.017	-0.078**	-0.022
	(-2.11)	(0.18)	(-2.55)	(-0.57)	(-2.30)	(-0.73)
$TotBondAmt_{k,t}$	-0.02***	-0.001	-0.022***	-0.001	-0.02***	0.004
	(-2.95)	(-0.11)	(-3.19)	(-0.05)	(-2.86)	(0.62)
$BM_{k,t}$	0.345***	0.188***	0.34***	0.18***	0.335***	0.182***
	(15.30)	(8.86)	(14.99)	(8.27)	(14.66)	(8.57)
$ProfitMargin_{k,t}$	-0.36***	-0.288***	-0.324***	0.019	-0.306***	0.009
	(-8.32)	(-7.33)	(-7.28)	(0.39)	(-6.78)	(0.18)
$Leverage_{k,t}$	0.541***	0.373***	0.576***	0.33***	0.415***	0.333***
	(12.39)	(9.69)	(12.71)	(7.96)	(10.37)	(8.26)
$LogTA_{k,t}$	-0.036***	-0.026***	-0.033***	-0.027***	-0.039***	-0.04***
	(-5.39)	(-4.15)	(-4.88)	(-4.21)	(-5.52)	(-6.58)
Intercept	0.533***	-0.139	0.298**	-0.351***	0.645***	-0.188
	(4.40)	(-1.08)	(2.56)	(-2.72)	(5.18)	(-1.41)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	35,195	35,759	33,085	33,521	32,953	33,088
R-Square	90.57%	89.85%	90.80%	89.95%	90.74%	90.44%

Online Appendix Table 2. Dual ownership and the cost of debt

This table reports the regression result for bond institutional ownership and the cost of debt controlling other types of institutional ownership structure. The model setting is similar to Table 2 and 3. In column (1) and (2), We include the dual holders' equity ownership (DEO). In column (3) and (4), we include the bond institutional investors' concentrated ownership (Bond_FHHI). The industry and time fixed effect are used across the panel, and all standard errors are adjusted by the firm's clustering effect. The t-statistics are reported in parentheses. "***","**", and "*" indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Yield Spread $_{i,t+1}$			
	(1)	(2)	(3)	(4)
Bond IO$_{i,t}$	-0.152***		-0.0948***	
	(-4.814)		(-3.515)	
IT$_{i,t}$	0.239***		0.165***	
	(3.522)		(2.939)	
Bond_LIO $_{i,t}$		-0.107***		-0.0671**
		(-2.874)		(-2.136)
Bond_SIO $_{i,t}$		0.156***		0.0874**
		(2.824)		(2.177)
DEO $_{i,t}$	-0.290***	-0.290***		
	(-4.077)	(-4.075)		
Bond_FHHI $_{i,t}$			-0.0288	-0.0460
			(-0.617)	(-0.921)
Rating$_{i,t}$	0.0765***	0.0789***	0.0767***	0.0756***
	(6.295)	(5.752)	(6.559)	(5.993)
Illiquidity $_{i,t}$	0.0136	-0.0237	0.0322	0.0289
	(0.236)	(-0.502)	(0.679)	(0.709)
TimeToMaturity$_{i,t}$	0.00511***	0.00499***	0.00601***	0.00602***
	(8.968)	(8.559)	(10.93)	(10.74)
Coupon$_{i}$	0.112***	0.0834**	0.103***	0.0849***
	(3.402)	(2.559)	(4.010)	(3.268)
SZ$_{i,t}$	-0.00406	-0.00507	-0.00572	-0.00555
	(-0.513)	(-0.550)	(-1.114)	(-0.947)
Lag Yield Spread$_{i,t}$	0.892***	0.897***	0.871***	0.871***
	(65.86)	(61.50)	(74.78)	(69.07)
MatVariety $_{k,t}$	-0.0344	-0.0641	-0.00784	-0.0314
	(-0.703)	(-1.211)	(-0.195)	(-0.744)
TotBondAmt $_{k,t}$	-0.0103	-0.0121	-0.00882	-0.0113
	(-1.272)	(-1.383)	(-1.337)	(-1.610)
BM $_{k,t}$	0.150***	0.137***	0.156***	0.160***
	(4.181)	(3.898)	(4.963)	(4.933)
ProfitMargin $_{k,t}$	-0.277***	-0.230**	-0.147**	-0.129*
	(-2.630)	(-2.207)	(-2.218)	(-1.931)
Leverage $_{k,t}$	0.324***	0.318***	0.336***	0.364***
	(4.659)	(4.330)	(5.492)	(5.763)
LogTA $_{k,t}$	-0.0138	-0.00413	-0.0279***	-0.0227**
	(-1.533)	(-0.407)	(-3.161)	(-2.414)
Stock IO$_{i,t}$	-0.0672**	-0.0785**	-0.0938***	-0.101***
	(-2.100)	(-2.490)	(-2.613)	(-2.776)
Intercept	0.309**	0.273*	0.366***	0.403***
	(2.220)	(1.915)	(3.089)	(3.297)
Industry FE	YES	YES	YES	YES
Year-Quarter FE	YES	YES	YES	YES
Observations	18,635	17,446	37,218	35,411
R-squared	0.934	0.935	0.923	0.923