Institutional Investment Horizon, the Information Environment and Firm Credit Risk

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Abstract

We provide evidence that the impact of the investment horizon of institutional investors on the credit risk of U.S. industrial firms is both statistically significant and economically sizable. Specifically, we find that during the sample period of 2001-2011, higher institutional ownership is negatively related to five-year CDS spreads. This result is primarily driven by short-term institutional investors. Trading by short-term institutional investors also reduces a firm's credit spread, implying that the firm's creditors benefit from the improved information environment created by short-term institutions. On the other hand, long-term institutional ownership is positively related to a firm's credit spread. Concentrated ownership of both types of institutional investors increases a firm's risk level, consistent with conflicts of interest between shareholders and bondholders and the existence of private benefit enjoyed by blockholders at the expense of other stakeholders. However, during the financial crisis period from 2007 to 2008, higher ownership by long-term institutional investors is associated with lower credit risk of firms. Hence, long-term institutions play an important role in enhancing financial stability during the crisis period by mitigating risk. These results are robust to estimation with endogenous institutional ownership.

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1. Introduction

Over the past six decades, institutional investors have grown to represent the most influential class of capital providers to the U.S. markets.[1] As important sources of external finance, such investors, especially those with large stock ownership stakes, have both the incentives and the ability to play an active role in monitoring, information-gathering, and intervening in portfolio firms' investment and financing decisions. Institutional investors also actively collect information of portfolio firms and trade based on private information, which can improve a firm's informational environment, and reduce information asymmetry between the firm's insiders and outside capital providers (e.g. Shleifer and Vishny (1986), Porter (1992), Maug (1998), Gillan and Starkes (2000), Chen, Harford, and Li (2007), Yan and Zhang (2009), Edmans (2009) and Michaely and Vincent (2012)). Much the extant literature on the role of institutions in corporate governance focuses on institutional investors' impact on shareholders, notwithstanding the importance of debt financing for firms in the U.S. market.[2] Studies that do look at how institutional investors affect bondholders usually treat such investors as a homogenous group, without differentiating them by their *investment horizon* (e.g. Bhojaraj and Sengupta (2003), Ashbaugh-Skaife, Collins and LaFond (2006), Cremers, Nair and Wei (2007), Switzer and Wang (2013)). The main objective of this paper is to provide new evidence on this score.

Bushee (2004) asserts that the common approach to classifying institutions by their legal types (e.g. bank trusts, insurance companies, pension funds, independent advisers) has a key disadvantage in that there is tremendous variation within categories with respect to investment horizons and sensitivity to short-term news. Porter (1992) notes that pension funds and some other institutional investors are typically assumed to be ideal long-term investors. However, many institutions, especially pension funds, trade actively. Recent work confirms the importance of investment horizon as it affects monitoring, the information environment, investment and financing decisions, and firm performance (see e.g. Gaspar, Massa, and Matos (2005), Chen,

[1] In 1950, the aggregate equity held by institutions amounted to $8.7 billion or about 6.1% of total outstanding equity in the US. By the end of 2009, total institutional equity holdings grew to $10,238.7 billion, somewhat more than 50% of total outstanding equity (Conference Board (2010)).

[2] For example, in 1980 (2009), total outstanding bond is $3,569 ($34,747) billion, compared with $1,534 ($20,228) billion total outstanding equity (Conference board, ibid).

Harford and Li (2007), Yan and Zhang (2009), Marchica (2011), Chang Chen and Dasgupta (2012), Aghion, Reenen and Zingales (2013)).

Institutional investors can play an important monitoring role to reduce managerial opportunistic behavior and agency conflicts between management and stakeholders, which would benefit bondholders as well, resulting in lower CDS spreads. We call this phenomenon the *shared benefit hypothesis*. On the other hand, institutional investors, especially institutional blockholders who are less subject to free-rider issues than small shareholders (Gossman and Hart (1980), Shleifer and Vishny (1986)), may cause severe agency costs of debt due to risk shifting or asset substitution (Jensen and Meckling (1976)), debt overhang (Myers (1977)), adverse payout policies, and takeover or restructuring risk (e.g. Parrino (1997), Bhojaraj and Sengupta (2003), Cremers, Nair and Wei (2007), Klein and Zur (2011)). These phenomena are consistent with the *wealth transfer hypothesis*, whereby institutions facilitate a transfer from bondholders to shareholders, which increases the agency cost of debt. In addition, outside blockholders may enjoy private benefit through their market power and voting blocks at the expense of the interests of minority shareholders and bondholders. Therefore, *private benefit hypothesis* and *wealth transfer hypothesis* imply that institutional blockholders or activisms are detrimental to bondholders.

Since the seminal work of Merton (1974), many structural credit risk models price corporate debt as contingent claims over the asset value of the issuing firm. In practice, however, it is difficult for investors in the secondary credit market to observe a firm's assets directly, so they have to infer an issuer's credit quality from the available accounting data and other publicly available information. Therefore, a firm's information environment affects its credit spreads (Duffie and Lando (2001), Maxwell and Miller (2004), Yu (2005)). From this perspective, institutional trading can improve the firm's information environment, and in turn affect its credit risk. Michaely and Vincent (2012) assert that the role of institutions in reducing asymmetric information is paramount.

In this research, we add richness to the tests of the effects of institutional investors in reducing information asymmetries, and shedding new light on the shared benefit vs. wealth transfer and private benefit hypotheses. We classify institutional investors based on their observed trading behavior and provide direct tests of the impact of institutional stock holdings and investment horizons on firms' credit risk levels during normal and crisis periods. We also

look at how the participants in the CDS market identify this information from the stock market. Our results show that the factors of investment horizon, as well as ownership level and ownership concentration can significantly affect CDS pricing. Specifically, we find that during the sample period of 2001-2011, higher institutional ownership is negatively related to five-year CDS spreads. This result is primarily driven by short-term institutional investors. Trading by short-term institutional investors also reduces firms' credit spreads, which indicates that firms' bondholders benefit from the improved information environment created by short-term institutions. On the other hand, long-term institutional ownership is positively related to a firm's credit risk. Concentrated ownership of both types of institutional investors increases a firm's risk level, consistent with conflicts of interest between shareholders and bondholders and the existence of the private benefit enjoyed by outside blockholders. However, during the financial crisis period from 2007 to 2008, higher ownership by firms' long-term institutional investors is associated with reduced credit risk. Hence, long-term institutions play an important role in enhancing financial stability during the crisis period by mitigating risk. These results are robust to estimation with endogenous institutional ownership. The remainder of the paper is organized as follows. In the next section, we provide an outline of the hypotheses. In section 3 we describe the data and methodology. Section 4 presents the results of the analyses. The paper concludes with a summary in section 5.

2. Development of Hypotheses

2.2 Short-term institutional investors and credit risk

The information environment is extremely important for bondholders for assessing firms' credit risk levels. Duffie and Lando (2001) argue that credit spreads are higher in circumstances where investors must rely on imperfect accounting information about asset values. Mansi, Maxwell and Miller (2004) show that auditor quality and tenure matter to bondholders as they impact a firm's information environment. Yu (2005) demonstrates that a lack of accounting transparency could signal hidden bad news of the firm. Firms with higher disclosure rankings/higher perceived accounting transparency have lower levels of credit spreads. Institutional investors have the incentive to collect information about the firm because of the high stakes under risk. In addition, due to economies of scale, institutions have a smaller cost of

information gathering than individual investors. Institutional trading based on private information, as well as monitoring via "exit", will improve a firm's information environment, which will benefit all the outside investors including bondholders. How does the institutional investment horizon affect the quality of information concerning the firm? Edmans (2009) asserts that short-term institutional investors are beneficial. Their ability to sell improves the information embedded into prices and creates a more transparent information environment via the "Wall Street Walk". Yan and Zhang (2009) show that short-term trading predicts future stock returns, reflecting such an informational advantage. Long-term institutions, neither have the ability to predict short-term returns, nor do they have superior long-term information, and may not serve to reduce the cost of capital. Chang, Chen and Dasgupta (2012) also show that short-term institutions improve the transparency of the information environment through informed trading and monitoring via "exit", allowing firms to issue securities that are more sensitive to information asymmetry at lower cost. Although direct internal monitoring, or monitoring via "voice" or intervention, can increase a firm's value, effective internal monitoring may require a lengthy holding period to realize potential gains, thus short-term institutional investors usually monitor the firm via "exit", or "vote with their feet", due to their short-term focus. Their trading based on private information and monitoring via "exit" create a more transparent environment. From this perspective, short-term institutional investors are effective in reducing information asymmetry problem, resulting in lower costs to bondholders as reflected as lower credit spreads.

Some studies assert that institutional investors with short investment horizons myopically price the firm, and such short-term focus has adverse effects on the portfolio companies. This is known as *short-term pressure hypothesis*. Myopic mispricing combined with high levels of ownership by short-horizon institutions could force managers adopt short-term strategies that are detrimental to firms' long-run performance in order to prevent a large scale selling of the stocks held by such shareholders. Porter (1992) notes that a short-term focus by institutional investor forces managers to be overly concerned with short-term performance metrics such as quarterly earnings. Bushee (1998, 2001) demonstrates that the presence of transient/short-term investors increases the probability that managers will reduce R&D to reverse an earnings decline, and increase the firm's expected near-term earnings. Burns, Kedia and Lipson (2010) show that transient institutions/short-term institutional investors are likely to focus management attention on short-term reported performance, that provide incentives to manipulate earnings. Dallas

(2012) argues that the recent financial crisis was preceded by a period of financial firms seeking short-term profit regardless of long-term consequences. To sum up, short-term pressure hypothesis implies that short-term institutional ownership is positively related to firms' credit spreads.

Edmans (2009), on the other hand, argues that liquid market and transient shareholders in the U.S. do not exacerbate myopia, but rather enhance the allocational efficiency of prices: informed trading can encourage long-term investment by impounding the workings of the price mechanism. From this perspective, short-term institutions are not detrimental to portfolio firm's innovation and long-run development. Aghion, Reenen and Zinglales (2013) show a positive relation between firm's innovation and institutional ownership. They also demonstrate that both transient and dedicated/long-term institutions have a positive association with innovation. As long as the investment is not extremely riskier than the projects on a firm's portfolio to cause a risk-shifting problem, short-term institutional ownership is negative related to the firm's credit spreads. Therefore, the validity of short-term pressure hypothesis is an open question based on extant literature.

Overall, the impact of short-term institutional investors on a firm's credit risk depends on the trade-off of their role in reducing information asymmetry and adverse impact on firm's investment decisions:

Hypothesis 1a: short-term institutional investors reduce information asymmetries which benefit bondholders, as reflected in lower credit spreads.
Hypothesis 1b: the pressure from short-term institutional investors has adverse effects on the firm, as reflected in higher credit spreads.

2.2 Long-term institutional investors and credit risk

Although short-term institutional investors prefer to monitor via "exit", long-term institutional investors prefer to monitor the firm via voice or direct intervention[3] in order to reduce managerial opportunism and the agency conflicts between managers and stakeholders. The extant literature shows that effective internal monitoring will increase the firm's

[3] Such interventions would include asserting their voting power, writing open letters to management or the board, requesting special disclosures, holding public meetings, engaging in private negotiations with management, etc.

performance and value, which will benefit both shareholders and bondholders. This is referred to as the *shared benefits hypothesis*. Long-term institutions are often regarded as effective internal monitors to reduce the pressure for managerial myopic and opportunistic behavior and boost firm's long-run performance (see e.g. Bushee (1998, 2001), Gaspar, Massa, and Matos (2005), Chen, Harford and Li (2007)). Therefore, shared benefits hypothesis predicts a negative relation between long-term institutional ownership and firms' credit spreads. On the other hand, due to their influential role in intervening in firms' investment and financing decisions, long-term institutional investors can cause the conflicts of interest between shareholders and bondholders, increasing the wealth transfer from bondholder wealth to shareholders (*wealth transfer hypothesis*). Jensen and Meckling (1976) propose a risk shifting/asset substitution problem that stockholders have incentives to force managers to invest in new projects that are extremely risky to increase both the mean and the variance of future cash flows. As a consequence, their creditors bear higher default risk, while shareholders benefit if the project is successful. Thus, convexity in cash flow payoffs will increase levered firms' default probabilities, which will benefit shareholders at the expense of bondholders. As noted by Myers (1977), firms near financial distress may not be able to exploit promising valuable projects, which will lower their expected future cash flows and increase their risk of bankruptcy. Dhillon and Johnson (1994) show that bondholder have a negative response to dividend increases. Parrino (1997) illustrates the wealth transfer from bondholders to shareholders in the case of the Marriott spinoff. To sum up, the impact of institutional ownership on a firm's credit risk depends on the trade-off of shared benefits effect and wealth transfer effect:

Hypothesis 2: The impact of long-term institutional ownership on a firm's credit risk depends on the trade-off of shared benefit and wealth transfer effect.

2.3 Concentrated ownership, shareholder activism and credit risk

Although ownership concentration can provide institutional investors incentive and power to effectively monitor the firm and reduce managerial opportunism, the presence of outside blockholders can accelerate the conflicts of interest between shareholders and bondholders than dispersed shareholders. Firms with strong shareholder rights are more likely to be taken over and result in an increase in leverage, especially in the case of leveraged buyouts

(e.g. Warga and Welch (1993), Billett, Jiang and Lie (2010)). Hence, bondholders of firms with concentrated shareholder ownership, representing strong shareholder rights, will demand higher credit spreads as compensation for the added risk they face (see Shleifer and Vishny (1986), Klock, Mansi, and Maxwell (2005), Cremers, Nair, and Wei (2007)). In addition, a large of literature shows the adverse impact of shareholder activism on bondholder wealth. Moody's special comment in 2007 provides numerous examples of firms in concessions to shareholder activists that have eroded firms' credit quality. A common theme in negative rating actions revolves around a company's financial polity that increase dividend or share buyback program achieved through higher leverage. Li and Xu (2010) confirm that hedge fund activism increases credit risk by exacerbating shareholder expropriation of bondholder wealth in the context of bank loan contracting. Their results show that after the targeting announcement by hedge fund activists, hedge fund target firms pay higher spreads, put up more collateral, and have shorter loan maturities. Becker, Cronqvist, and Fahlenbrach (2008) show that blockholders increase firms' payouts. Klein and Zur (2011) find hedge fund activism significantly reduces existing bondholders' wealth by destroying collateral value (e.g. dissipating cash and current assets through special dividend disbursement) and increasing firm leverage.

More importantly, outside ownership concentration could provide institutional investors strong market power and ability to exercise undue influence over management to secure benefits that are detrimental to other stakeholders, including minority shareholders and bondholders (Shleifer and Vishny, 1997; Bhojraj and Sengupta, 2003), which is known as *private benefit hypothesis*. It is different from wealth transfer hypothesis that exits between shareholders and bondholders. Private benefit is enjoyed only by shareholders with concentrated ownership at the expense of other stakeholders. Examples of private benefit include easier access to private information, below-market transfer prices, underwriting or advisory contracts, etc. Bhojraj and Sengupta (2003) claim that concentrated institutional ownership has an adverse effect on bond yields and ratings due to the private benefits enjoyed by institutional blockholders. Private benefit hypothesis suggests that concentrated ownership is positively related to credit spreads. Based on extensive evidence on the detrimental effects of institutional investors with concentrated ownership, we propose the following hypothesis:

Hypothesis 3: The impact of ownership concentration generally has an adverse impact of bondholder wealth, as reflected in increased credit spreads.

3. Data and methodology

3.1 Data and sample

We collect quarterly institutional holdings data from the first quarter of 2000 to the fourth quarter of 2011 from the Thomson-Reuters Institutional Holdings (13F) Database (formerly known as the 13F CDA- Spectrum database), accessible through Wharton Research Data Services (WRDS). This database provides quarterly information on institutional common stock holdings and transactions starting from 1980, as reported on Form 13F filed with the SEC. Institutional managers with $100 million or more in assets under discretionary management are required by law to report their equity positions greater than 10,000 shares or $200,000 to SEC on a quarterly basis. Our initial sample includes all the firms covered in this database and free of survivorship bias as the database contains the filings of defunct institutions. Observations with incorrect data are dropped from the sample (i.e. institutional ownership percentage larger than one hundred). Firm accounting information is collected from the Compustat quarterly file. We use quarterly observations to align with available quarterly institutional holding data. Firms' market data such as stock price, trading volume, shares outstanding, are collected from the CRSP daily file.

We use credit default swap (CDS) spreads to measure a firm's credit risk. A CDS is an over-the-counter contract, where the protection buyer makes a fixed premium payment, the spread, to the protection seller to exchange for compensation if certain pre-specified credit event occurs. Hull, Predescu and White (2004) explain the attractive features of CDS spreads as proxies for default spread. CDS quoted spreads provided by a broker from dealers reflect the dealer's commitment to trade. Bond yield spreads and credit ratings provided by commercial rating companies reflect no commitments for the bond to be traded at listed prices or ratings. Secondly, the CDS spread does not require a benchmark risk-free rate, as it is already quoted in the spread directly. Bond yield spreads are based on a potentially questionable benchmark risk free rate (Ericsson, Jacobs, and Oviedo (2009)). Thirdly, there is a greater variation of CDS spreads than credit ratings, that is, there are various CDS spreads within a given credit rating, which is more useful for empirical research. Fourthly, CDS spreads reflect firms' credit risk levels more accurately than bond spreads as the latter might also incorporate non-default components including liquidity and tax effects (Longstaff, Mithal, and Neis (2005)). Finally, as the CDS spreads are quoted on a daily bases, they can better reflect current public information

and capture the participants' responses and perceptions on a timely bases. On the other hand, bond quotes from the secondary market are updated no frequently than a monthly basis. Therefore, CDS data can be used by researchers, regulators, and financial practitioners to monitor how the market views credit risk of any entity on which a CDS is available. Based on these considerations, we use CDS spreads as our dependent variable in this study.

Daily quoted CDS spreads are collected from the Markit Group from the calendar years 2001 to 2011. We first use the most liquid 5-year maturity contracts on US dollar-dominated senior unsecured debt (SNRFOR) with modified restructuring (MR) for US based issuers. As a robustness check, we also use contracts with other maturities (i.e. 1-, 2-, 3-, 5-, 10, and 20-year). We take average of daily spreads to obtain a quarterly spread as our dependent variable. We also control for firm and market conditions that might affect a firm's credit spreads. Specifically, we control a firm's credit rating (*CRATE*), market wide default risk measured by the difference between interest rates of Moody's Aaa rating corporate bonds and Baa rating corporate bonds (*DEF*). We also control the term structure of interest rates as measured by the difference between 10-year interest rate swap rate and 1-year interest rate swap rate (*SLOPE*). The accounting and market variables used in this study include firm size (*LNSIZE*), measured by the natural log of a firm's inflation adjusted market capitalization, return on asset to measure a firm's profitability (*ROA*), book to market ratio to measure a firm's growth opportunity (*BM*), dividend payment dummy variable (*DIV*), tangibility (*TAN*), stock return over the previous quarter ($RET_{t-3,t-1}$) and over the nine months preceding the last quarter ($RET_{t-12,t-4}$), stock return volatility(*VOL*), log of stock price (*LOGP*) and stock average turnover ratio (*TURN*) used to control for liquidity and transaction cost, and S&P500 dummy variable (*SP500*) to represent for S&P500 index membership[4].

The sample consists of all U.S. industrial firms (SIC codes between 2000 to 5999 in line with pervious literature[5]) with information of CDS contracts. After eliminating missing observations, our final sample consists of unbalance panel of 515 firms from 2001 to 2011, with 13,960 firm/quarter observations. We use 2011 as the base year to adjust for inflation where appropriate and winsorize ownership and control variables at the top and bottom 0.5% of their

[4] Adding additional control variable leverage ratio generates quality similar results.

[5] See, e.g., Barclay and Smith (1995), Brockman and Turtle (2003), and Datta, Iskandar-Datta, and Raman (2005).

distributions to mitigate the effect of outliers. The details of the variable names, definitions and data sources are shown in Table 1.

[Insert Table 1 about here]

3.2 Classification of short- and long-term institutional investors

For each firm and each quarter covered in the Thomson-Reuters database, we identify short-term and long-term investors based on their aggregate portfolio turnover over the past four quarters, following Yan and Zhang (2009), as follows.

First, we calculate the aggregate purchase and sale for each institution each quarter:

$$CR_{buy_{k,t}} = \sum_{i=1}^{N_k} \left| S_{k,i,t} P_{i,t} - S_{k,i,t-1} P_{i,t-1} - S_{k,i,t-1} \Delta P_{i,t} \right| \qquad S_{k,i,t} > S_{k,i,t-1} \qquad (1)$$

$$CR_{sell_{k,t}} = \sum_{i=1}^{N_k} \left| S_{k,i,t} P_{i,t} - S_{k,i,t-1} P_{i,t-1} - S_{k,i,t-1} \Delta P_{i,t} \right| \qquad S_{k,i,t} \leq S_{k,i,t-1} \qquad (2)$$

Where $P_{i,t}$ is the stock price for stock i at the end of quarter t, and $S_{k,i,t}$ is the number of shares of stock i held by institutional investor k at the end of quarter t. We adjust for stock splits and dividends by using the CRSP price adjustment factor, and adjust stock volume by using the CRSP volume adjustment factor, respectively. $CR_{buy_{k,t}}$ and $CR_{sell_{k,t}}$ are institution k's aggregate purchase and sale for quarter t, respectively. Institution k's churn rate for quarter t is then defined as:

$$CR_{k,t} = \frac{\min(CR_{buy_{k,t}}, CR_{sell_{k,t}})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t} P_{i,t} + S_{k,i,t-1} P_{i,t-1}}{2}} \qquad (3)$$

Next, we estimate each institution's average churn rate over the past four quarters as:

$$AVG_{CR_{k,t}} = \frac{1}{4} \sum_{j=0}^{3} CR_{k,t-j} \qquad (4)$$

Given the above average churn rate for each institution each quarter, we sort all institutional investors into two groups each quarter based on their median average churn rate. Institutional investors with an above median churn rate are classified as short-term institutional investors, while those with below median churn rate are classified as long-term institutional investors. Chart A of Figure 1 shows the time series of the mean and median of average churn

rate for our sample institutions. The median and mean of the time series average churn rate fall in the range of 7.2% to 9.9%, and 11.3% to 14.5%, respectively. We aggregate institutional ownership information for each firm-quarter based on the type of institutional investors. Chart B of Figure 1 shows the market value of total institutional stock holdings, market value of long-term institutional stock holdings and market value short-term institutional stock holdings, respectively for our sample institutions. The market value of stocks held by our sample institutions increased from 2001 and reached to a perk of $14 trillion in September, 2007, then fell down to $6.9 trillion in March 2009.

[Insert Figure 1 about here]

In addition, for each firm, we consider the total institutional ownership (IO_total), ownership by the largest five institutions (IO_top5), ownership by all blockholders (IO_block) while blockholder is defined as institutions owns at least 5% of a firm's total outstanding shares. Then we split IO_total into short-term institutional ownership (IO_total_short) and long-term institutional ownership (IO_total_long), IO_top5 into IO_top5_short and IO_top5_long, and IO_block into IO_block_short and IO_block_long. Table 2 Panel A to Panel C provides summary statistics of institutional ownership variables for our sample firms, after matching institutional ownership with accounting, market and CDS information.

[Insert Table 2 about here]

Panel A of Table 2 shows summary statistics of the variables, and Panel B provides the Person correlation coefficients of the variables of our sample. The market capitalization of the median firm is $ 9.3 billion in 2011 dollars. 98% of the sample firms are components of S&P 500 firms, and can be regarded as large companies.[6] About 82% of the sample firms have at least one institutional blockholder. Long-term institutions in general hold larger portion of sample firms' total outstanding shares than short-term institutions do. Panel C of Table 2 provides description of the largest ten institutions based on market value of stock holdings at the end of year 2006 (pre-crisis), and 2011 (post-crisis), respectively. The panel reports the rank, the name, total market capitalization of stockholdings, investment horizon (short-term or long-term) based

[6] If we use 2 billion and 10 billion as cutoffs, 41% firms of our sample are categorized as large-caps with market capitalization above $10 billion, 42% are mid-caps with market capitalization between $2 billion to $10 billion, and 17% are small-caps with market capitalization below $ 2 billion.

on average churn rate of Equation (3), and the legal type of the largest twenty institutions. The full legal type of institutions includes bank trust (BNK), insurance company (INS), investment company (INV), independent investment advisor (IIA), corporate (private) pension fund (CPS), public pension fund (PPS), university and foundation endowments (UFE) and miscellaneous (MSC).[7] The largest twenty institutions are dominated by banks, investment companies, and independent investment advisors, and dominated by long-term institutions. Banks such as State Street, Mellon bank, Northern Trust, Bank of America are classified as long-term type. Goldman, JP Morgan, and Fidelity are classified as short-term type.

3.3 Empirical methodology

Estimating the impact of institutional ownership on firm's credit spread might have self-selection bias as institutional investors might choose portfolio firms based on their risk appetites. In order to test whether institutional ownership is endogenously related to firm's credit spread, we perform Hausman (1978) test of endogeneity. As previous literature shows a home bias of institutional investment, we use three instrumental variables to capture the exogenous tendency of institutional investors to invest firms that are geographically close: INSTRU_all, estimated as the average of total institutional ownership estimated across all the other firms located in the same state in U.S.; INSTRU_short, estimated as the average of short-term institutional ownership estimated across all the other firms located in the same state in U.S.; INSTRU_long, estimated as the average of long-term institutional ownership estimated across all the other firms located in the same state in U.S. As the credit spread of one firm is unlikely to affect the institutional ownership proxies of all other firms in the same state (the instrument), the instrument is unlikely to correlate with the error term of the CDS regression equation (6). We exclude states with only one firm because we can compute the instrumental variable only for state with more than one firm at each quarter end, causing the deletion of only 221observations.

To perform the Hausman test, we first perform an OLS regression of the institutional ownership equation (5) on the instrumental variable and all the other exogenous variables. We include firm-fixed effects that control for potential omitted variable bias and year-fixed effects.

[7] Due to a mapping error, Thomson-Reuters' legal type classification is not accurate after 1998. We thank Brain Bushee for provision of an alternative updated classification scheme.

The *institutional ownership* variables correspond to each of the ownership proxy group (e.g. IO_total, IO_total_short, IO_total_long, etc.) measured at the end of quarter t. The instrumental variables and firm control variables are lagged one quarter. η_i are the time-invariant firm-fixed effects and υ_t are the year fixed effect. The variable $resid$ is the regression residual that we need to use in the second stage of the Hausman test.

$$Institutional\ ownership\ variable_{i,t} = \beta_0 + \beta_1 instrument_{i,t-1} + \beta_2 LNMKT_{i,t-1} + \beta_3 RET_{i,t-3\_t-1} + \beta_4 RET_{i,t-12\_t-4} + \beta_5 LOGP_{i,t-1} + \beta_6 TURN_{i,t-1} + \beta_7 VOL_{i,t-1} + \beta_8 BM_{i,t-1} + \beta_9 LEV_{i,t-1} + \beta_{10} ROA_{i,t-1} + \beta_{11} DIV_{i,t-1} + \beta_{12} SP500_i + \eta_i + \upsilon_t + resid_{i,t} \quad (5)$$

[Insert Table 3 about here]

Table 3 shows the results of regression (5), the determinants of total institutional ownership and concentrated ownership. It shows that there is indeed a home bias as the coefficient of the instrumental variable for each ownership proxy is significantly positive at 1% level[8]. Model (1) shows that institutional investors prefer stocks with high turnover, high returns in the previous quarter, low volatility, and non-S&P500 membership. Models (2) and (3) show the different preferences for short-term and long-term institutions. While short-term institutions prefer profitable, low dividend paying, high turnover, and non-S&P500 stocks, long-term institutions are indifferent with those factors. In addition, short-term institutions prefer stocks with positive last quarter's return and previous three quarter's return, while long-term institutional holding is negatively related to past return. Models (5) and (8) show that short-term institutional investors with concentrated ownership prefer small firms, stocks with high turnover and non-S&P500 membership, while long-term institutions with concentrated ownership show different preferences.

In the second stage of the Hausman (1978) test, we perform the regression of CDS spreads on institutional holding and all the other control variables (lagged by one quarter) in the CDS equation, as well as the variable *resid* as regressors:

[8] The F-statistics of the instrument coefficient are all above 10, therefore it seems that our coefficient estimators do not suffer weak instruments bias.

$$CDS\ spread_{t+1} = \gamma_0 + \gamma_1 Institutional\ holding\ variable_{i,t} + \gamma_2\ resid_{i,t} + \gamma_3\ CRATE_{i,t} + \gamma_4\ SLOPE_{i,t} + \gamma_5 DEF_{i,t} + \gamma_6\ LNSIZE_{i,t} + \gamma_7 RET_{i,t-2\_t} + \gamma_8\ VOL_{i,t} + \gamma_9\ ROA_{i,t} + \gamma_{10}\ BM_{i,t} + \gamma_{11}\ TAN_{i,t} + \eta_i + \upsilon_t + \varepsilon_{i,t} \quad (6)$$

Table 4 shows the second stage regression results of Hausman (1978) test of endogeneity.

[Insert Table 4 about here]

The results of the regression confirm that with the exception of total institutional ownership, all the other ownership proxies are endogeneous variables, as the coefficients of ownership proxy residuals are significant at 1% significance level. Given this endogeneity, we proceed to use two-stage-least-squares to estimate the impact of institutional ownership on firms' credit spreads. Specifically, the first stage regression is the same as described as equation (5); we predict the institutional ownership proxies (lagged one quarter related to credit spread measurement) using the instrumental variables along with all the exogenous firm-specific variables (lagged by two quarters). For the second stage regression shown in equation (7), we use the predicted values of endogenous institutional ownership proxies from the first stage (except for IO_total) in the CDS equations.

$$CDS\ spread_{t+1} = \gamma_0 + \gamma_1 (predicted) Institutional\ holding\ variable_{i,t} + \gamma_2\ CRATE_{i,t} + \gamma_3\ SLOPE_{i,t} + \gamma_4 DEF_{i,t} + \gamma_5 LNSIZE_{i,t} + \gamma_6\ RET_{i,t-2\_t} + \gamma_7\ VOL_{i,t} + \gamma_8\ ROA_{i,t} + \gamma_9\ BM_{i,t} + \gamma_{10}\ TAN_{i,t} + \eta_i + \upsilon_t + \varepsilon_{i,t} \quad (7)$$

4. Regression Results

4.1 Institutional ownership and CDS spreads

We first use the most liquid five-year CDS contract spread to measure a firm's credit risk. Table 5 Panel A shows our results of the second step 2SLS regression. [9]

[Insert Table 5 about here]

[9] The standard errors shown in the following tables are adjusted for heteroscedasticity and clustered at the firm level.

As evident from Table 5, total institutional ownership is negatively related to a firm's credit spread. In Model (1), the coefficient of *IO_total* is significantly negative at 5% level, suggesting that bondholders share the benefits of monitoring by institutional investors to reduce managerial opportunistic behavior, or the improved firms' information environment. However, this result is driven by short-term institutions only. As shown in Model (2), the coefficient of *IO_total_short* is -0.227 and is significant at 1% level, while the coefficient of *IO_total* is not significant. Based on these estimates, a 1-percent increase in the ownership by short-term institutions leads to a 0.227 percentage point decrease of firm's credit spread holding other variables constant. These results imply that institutions with short-term investment horizon have a positive impact on bondholder wealth, if we use credit spreads to measure bondholder wealth. The results are consistent with the findings of Yan and Zhang (2009), Chang, Chen and Dasgupta (2012), who find that short-term institutional investor can reduce a firm's information asymmetry and improve informational environment through intense trading activity, monitor via "exit". Therefore, our hypothesis 1a is supported. Model (3) and (4) in Panel A show that long-term institutional ownership is positively related to a firm's credit spread. Keeping short-term institutional ownership constant, a one-percent increase in long-term institutional ownership is associated with a 0.065 percentage point increase of firm's credit spread. Therefore, agency cost of debt dominates the shared benefit through monitoring. If this is the case, we would expect a higher impact of long-term institutional investors with concentrated ownership on a firm's credit risk. The results from next section confirm this expectation.

In order to further check the informational role of short-term institutional investors, we examine the change of the institutional ownership proxies, following Gompers and Metrick (2001) and Yan and Zhang (2009). Specifically, we decompose the total ownership proxies (e.g. *IO_all*) into the lagged level (*Lag_IO_all*) and the change of levels (Δ*IO_all*) over the previous quarter. Panel B of Table 5 shows the impact of the trading by different institutional investors on a firm's credit spread. Model (1) shows that both the demand shock (*Lag_IO_all*) and the trading (Δ*IO_all*) by institutional investors are negatively related to a firm's credit spread. This result is driven by short-term institutional investors only, as is shown in Model (2). Model (4) shows that after accounting for short-term institutional ownership and trading, the trading by long-term institutions has no impact on firms' credit spread. Hence, trading by short-term institutions

improves the firm's information environment, which benefits bondholders. The above results support hypothesis 1a and the wealth transfer hypothesis.

4.2 Concentrated ownership, shareholder activism and credit risk

Table 6 shows the impact of concentrated ownership by institutions with different investment horizons on a firm's credit spread. We use two measures of ownership concentration: blockholders who own at least 5% of a firm's total outstanding shares, and the largest five institutions. Models (1) - (4) show similar results. Concentrated ownership has a negative impact on a firm's credit risk and bondholder wealth. The total blockholder ownership, ownership by long-term blockholders and short-term blockholders are all positively related to a firms' credit risk. The investment horizon now is no longer a distinguishing factor that can influence a firm's credit spread, as we can see that all the ownership concentration proxies are significantly positive at 1% level. These results are in accordance with Bhojaraj and Sengupta (2003), Cremers, Nair and Wei (2007) who also document conflicts of interest between shareholders and bondholders, and are in accordance with Bhojrj and Sengupta (2003) who document the private benefits enjoyed by institutional blockholders on other stakeholders. Our results imply that from the perspective of debtholders, the wealth transfer effect, and private benefits caused by institutional stockholders with concentrated ownership is a serious concern that outweighs fairly negligible shared benefit effects.

4.3 Crisis vs. non-crisis period

We further separate our sample into two periods: a "normal" period from 2001 to 2006 and a crisis period from 2007-2008. Table 7 shows the impacts of institutional ownership on a firm's credit spread for these two samples, separately. The results for the normal period are similar to our full sample regression results. However, the crisis period results differ substantively. Model (2) of Panel B shows that during the crisis period, short-term institutional ownership is associated with higher credit risk, as shown in model (2). There might be several potential explanations. Funding shortfalls is a major concern for corporations and institutions during financial crisis. Decline in assets value, margins increase, or investors withdraw funds could cause a liquidity squeeze, which could cause liquidation funds prematurely or fire sales. This behavior can deteriorate liquidity in the market and cause further losses, which impact the

portfolio firms and the overall financial stability. Shleifer and Vishny (2011) argue that fire sales occur during financial crisis because corporations need to sell assets to repay debt but other corporations in the same industry (specialist industry buyers who could extract high value from the assets) are unable to bid because the industry specialists are financially encumbered. Funding problems could lead to sharp decline in liquidity and stock prices. Therefore, during the crisis, stable long-term institutional investors stabilize portfolio firms' prices, while frequent trading, especially selling activities, by short-term institutions will cause liquidity and price decline and increase the possibility of fire sale, which in turn will increase firm's default probability and bankruptcy risk. Indeed, Cella, Ellul, and Giannetti (2011) find that short-term institutional investors, characterised by high turnover, reduce their equity holdings more than other investors do during market declines. Due to this reason, short-term institutions that used to be liquidity providers during normal period now may turn into liquidity demanders. Mitchell and Pulvino (2011) argue that the disappearance of long-term financing caused arbitrageurs to withdraw liquidity from these markets, generating further price divergence during recent crisis. Another complementary explanation is that different from long-term institutions that focus on monitoring and firm's long run development, short-term institutions avoid direct internal monitoring via "voice" but monitor via "exit" and trading, and focus on short-run trading profits. Model (6) shows the existence of positive relation between concentrated ownership by short-term institutions and credit spread. Therefore, firms' default or bankruptcy risk induced from frequent trading, especially selling, and agency cost of debt are not concerns for short-term investors, resulting a serious adverse impact at times of market stress.

The result of Panel B in Model (3) shows that although long-term institutors tend to induce more risk-taking during normal period, higher ownership by such investors is associated with lower credit risk levels during crisis period. The stable investment or funding provided by long-term institutions prevents corporations from financial distress, fire sales, liquidation and bankruptcy. Although long-term institutions induce more risk-taking by corporations and increase agency cost of debt during normal period, their investment behavior might change during the abnormal crisis period, they may adopt conservative investment strategies. As we can see that during the crisis period, the concentrated ownership by long-term institutional investors do not adversely affect bondholder wealth anymore, while it does harm bondholder wealth during normal period. The results show that the conflicts of interest between long-term

institutional blockholders and bondholders are mitigated during such period as both try to avoid default and bankruptcy. When the ownership variables of both long-term and short-term institutions are jointly included in model (4), the impact of short-term institutions on credit spreads is no longer significant. In addition, with the differential effects of short-term and long-term institutional investors, the total institutional ownership has no impact on a firm's credit risk, as shown in model (1).

The results from crisis period indirectly support the argument that although frequent trading by short-term institutions during normal period improve corporations' financial environment, long-term institutions perform an important role in enhancing financial stability during crisis period, and provide better monitoring and stable funding to reduce the likelihood of fire sale and bankruptcy, as is reflected in lower credit spreads.

[Insert Table 7 about here]

4.4 Robustness test

4.4.1 CDS contracts with different maturity

In addition to 5-year CDS spread, we also use contracts with maturities of 1-year, 2-year, 3-year, 10-year and 20-year in the analysis. As shown in Panel A of Table 8, we find that the general conclusion from 4.1 does not change even we use contracts with different maturities. That is, total institutional ownership is negatively associated with firms' credit spreads. Ownership by short-term (long-term) institutions decreases (increases) firms' credit spreads. Both short-term and long-term institutions with concentrated ownership positions serve to increase firms' credit spreads. In sum, the negative (positive) relation of short-term (long-term) institutional ownership on firms' credit spreads does not change with the maturity of different contracts. Furthermore, concentrated ownership has a negative impact on bondholder wealth, and this impact does not change with the increase in the maturity of the contracts.

[Insert Table 8 about here]

4.4.2 Alternative definitions of short-term and long-term institutions

Instead of separating institutions based on their median average churn rate over the past four quarters, $AVG_{CR_{k,t}}$, as a robustness check, we separate institutions into three tertile portfolios based on $AVG_{CR_{k,t}}$, following Yan and Zhang (2009). Panel A of Table 9 shows the regression results based on this alternative definition of short-term and long-term institutions. As the table shows, our main conclusions do not change: short-term institutional ownership is significantly negatively related to 5-year CDS spread while long-term institutional ownership is significantly related credit spread. Concentrated ownership by short-term and long-term institutions is positively related to credit spread. Thus, our results in Section 3 are robust to this alternative definition of institution type.

We use alternative definition of turnover, considering net flows and redemptions based on Equation (3)' below:

$$CR_{k,t} = \frac{CR_{buy_{k,t}} + CR_{sell_{k,t}} - abs\ (NetFlows)}{\sum_{i=1}^{N_k} S_{k,i,t-1} P_{i,t-1}} \qquad (3)'$$

We then classify short-term and long-term institutional investors following the same procedures in Part 3.2, and perform the 2SLS regression. The findings are consistent with our prior conclusion.

We also perform fixed effect panel regressions using Bushee's (1998, 2001) classification of institutional investors. Bushee classifies institutions into "transient", "dedicated" and "quasi-indexers" based on their past investment behavior. Specifically, "transient" institutions are characterized as having high portfolio turnover and highly diversified portfolio holdings. This type of institutions tends to be short-term focused. "Dedicated" institutions are characterized by extremely low portfolio turnover and large investments in portfolio firms; "Quasi-indexers" are also characterized by low turnover, but they have diversified holdings. Both dedicated and quasi-indexers provide long-term, stable ownership to portfolio firms. The regression results based on Bushee classification show that: during the non-crisis period from 2001 to 2006, total ownership by transient institutions is significantly negatively related to credit spread at 10% level, while ownership by dedicated and quasi-indexers are not significant with the presence of transient institutions. During the crisis period, ownership by dedicated and quasi-indexer institutions is significantly negatively related to credit spread. So our main conclusions that short-term

institutional investors reduce firm credit risk during normal period, while long-term institutional investors reduce firm credit risk during the crisis period are maintained based on Bushee's classification.

5. Conclusions

This study provides evidence that institutional ownership and investment horizon perform important roles in credit market pricing. On the one hand, institutional investors provide monitoring services, and their trading improves the information environment, which can boost firms' overall performance, reduce information asymmetry and benefit bondholders in general. On the other hand, however, concentrated ownership by institutional investors may enhance the agency cost of debt and increase the private benefit enjoyed by shareholders at the expense of minority shareholders and bondholders. Our results show that the impact of investment horizons of institutional investors on industrial firms' credit risk levels is both statistically significant and economically sizable, after considering endogeneity of institutional ownership. Over the entire sample period of 2001-2011 and the non-crisis period from 2001 to 2006, higher institutional ownership is negatively related to CDS spreads. This result is primarily driven by short-term institutional investors, which suggests that firms' creditors benefit from the improved information environment created by short-term institutions. Concentrated ownership of both short-term and long-term institutional investors generally increases firms' credit risk for the entire sample period, supporting the existence of a conflict of interest between shareholders and bondholders and the private benefit of institutional blockholders. However, during the financial crisis period from 2007 to 2008, higher ownership by firms' long-term institutional investors reduces firms' credit risk. Therefore, long-term institutions play an important role during the crisis period to reduce firms' credit risk and avert the threat of bankruptcy. Our results should be of considerable interest to researchers, practitioners and policy makers.

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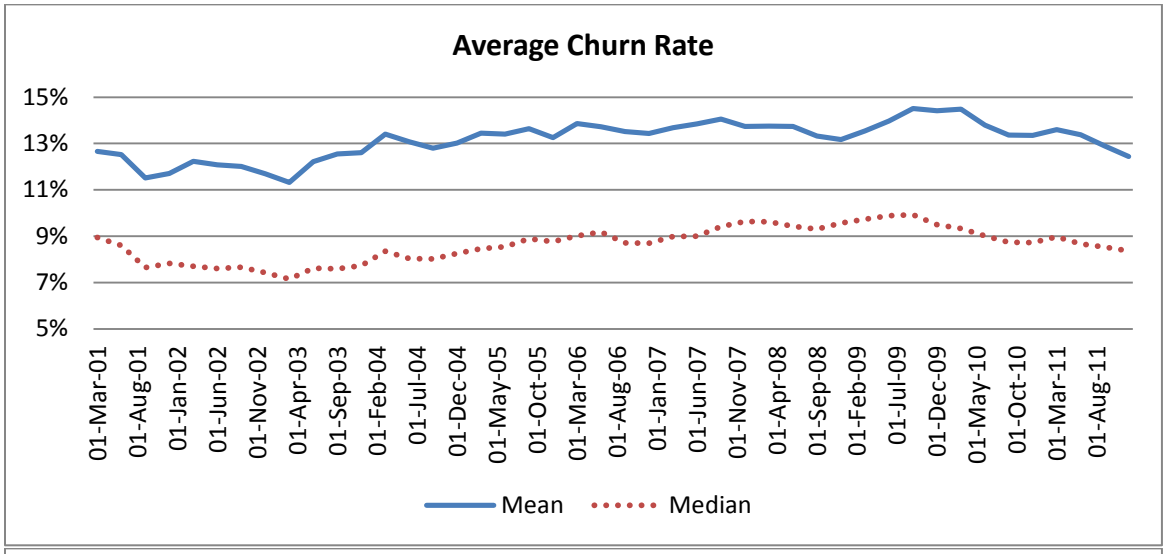
Figure 1 Chart A: Time series of mean and median of average churn rate
Figure 1 Chart B: Time series of the market value of different institutional ownership



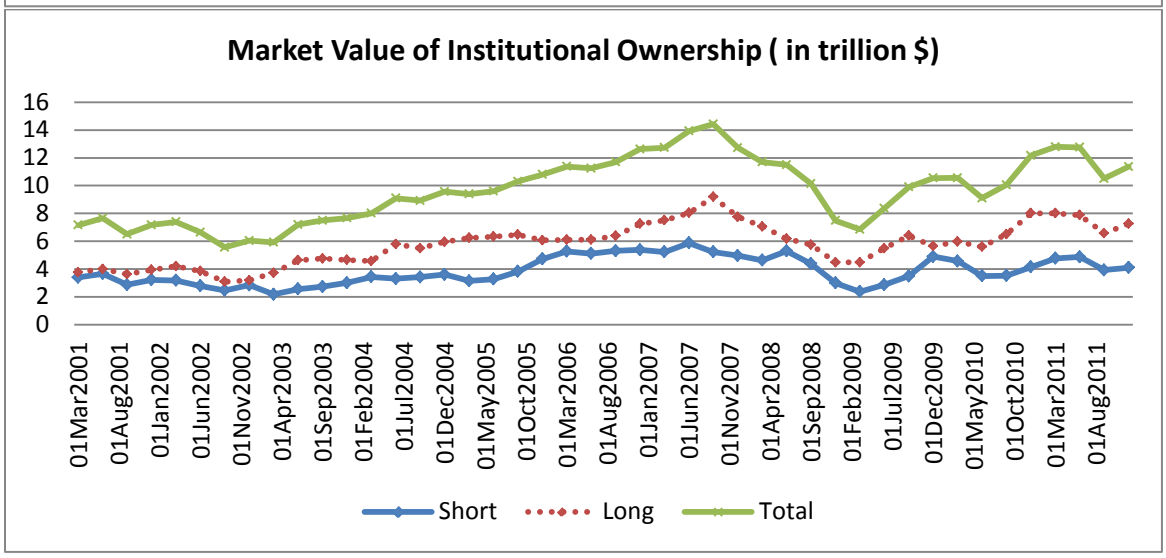


Table 1 Variable Definition and Data Sources

Variables	Definitions	Data Sources
LNMKT	Natural logarithm of the market capitalization ($Mil) in 2011 dollars	Compustat, Bureau of Labor Statistics (BLS)
LNSIZE	Natural logarithm of the book value of total asset ($Mil) in 2011 dollars	Compustat, Bureau of Labor Statistics (BLS)
RET_t-3,t-1	Cumulative stock return over the past three months t-3 to t-1	CRSP
RET_t-12,t-4	Cumulative stock return over the nine months preceding last quarter t-12 to t-4	CRSP
LOGP	Log of stock price, adjusted for split and dividend	CRSP
TURN	Average turnover over the previous quarter t-3 to t-1	CRSP
VOL	Return volatility over the previous quarter t-3 to t-1	CRSP
BM	Ratio of the book value of equity per share to stock price	Compustat
ROA	Ratio of income before extraordinary items to total assets	Compustat
DIV	Ratio of dividend per share to stock price	Compustat
TAN	Tangibility, measured by the ratio of net ppe to total asset	Compustat
LEV	Ratio of total debt over total asset	Compustat
SP500	S&P 500 dummy variable equals to one if the firm is a S&P 500 firm and 0 otherwise.	Compustat
CDS_Iy	Average daily quoted spreads for I-year CDS contracts within a quarter; I could be 1, 2, 3, 5, 10, 20	Markit
CRATE	Natural log of the average rating (Rating), changed to numerical scale from letter scale: 1-D, 2-CCC, 3-B, 4-BB, 5-BBB, 6-A, 7-AA, 8-AAA;	Markit
DEF	Difference between interest rates of Moody's Aaa rating corporate bonds and Baa rating corporate bonds	Federal Rserve H15 Report
SLOPE	Difference between 10-year interest rate swap rate and 1-year interest rate swap rate	Federal Rserve H15 Report
INSTRU_all	Average of total institutional ownership estimated across all the other firms located in the same State in US; instrumental variable	CDA/Spectrum s34, CRSP, Compustat
INSTRU_short	Average of short-term institutional ownership estimated across all the other firms located in the same State in US; instrumental variable	CDA/Spectrum s34, CRSP, Compustat
INSTRU_long	Average of long-term institutional ownership estimated across all the other firms located in the same State in US; instrumental variable	CDA/Spectrum s34, CRSP, Compustat
IO_total	Ratio of total stock holding percentage by all institutions over the shares outstanding at the end of quarter t-1	CDA/Spectrum s34, CRSP
IO_total_short	Ratio of total stock holdings percentage by short-term institutions over the shares outstanding	CDA/Spectrum s34, CRSP
IO_total_long	Ratio of total stock holdings percentage by long-term institutions over the shares outstanding	CDA/Spectrum s34, CRSP
IO_top5	Ratio of total stock holdings percentage by the largest five institutions over the shares outstanding	CDA/Spectrum s34, CRSP
IO_top5_short	Ratio of total stock holdings percentage by short-term institutions out of the largest five institutions over the shares outstanding	CDA/Spectrum s34, CRSP
IO_top5_long	Ratio of total stock holdings percentage by long-term institutions out of the largest five institutions over the shares outstanding	CDA/Spectrum s34, CRSP
IO_block	Ratio of total stock holdings percentage by all institutional blockholders over the shares outstanding	CDA/Spectrum s34, CRSP
IO_block_short	Ratio of total stock holdings percentage by short-term institutional blockholders over the shares outstanding;	CDA/Spectrum s34, CRSP

IO_block_long	Ratio of total stock holdings percentage by long-term institutional blockholders over the shares outstanding	CDA/Spectrum s34, CRSP
Firm Dummies	Firm dummy variables, based on permno	CRSP
Year Dummies	Year dummies, constructed for all years from 2001 to 2011	CRSP

Table 2: Summary Statistics
Panel A provides the summary statistics of the variables

Variable	N	Mean	Std Dev	Lower Quartile	Median	Upper Quartile
CDS_5y	13,446	0.0185	0.0467	0.004	0.0078	0.0184
CRATE	13,894	1.545	0.280	1.386	1.609	1.792
Slope	13,960	1.725	1.174	0.470	1.730	2.890
Def	13,960	1.170	0.532	0.890	1.000	1.250
ROA	13,960	0.011	0.022	0.005	0.012	0.021
BM	13,960	0.446	0.542	0.257	0.418	0.646
TAN	13,960	0.336	0.207	0.162	0.291	0.496
LEV	13,960	0.310	0.172	0.194	0.288	0.397
LNMKT	13,960	8.875	1.447	7.939	8.854	9.792
LNSIZE	13,960	9.215	1.156	8.352	9.139	10.068
Ret_t-3,t-1	13,960	0.027	0.194	-0.072	0.027	0.121
Ret_t-12,t-4	13,960	0.099	0.382	-0.111	0.072	0.255
LOGP	13,960	3.392	0.744	3.013	3.495	3.913
TURN	13,960	0.009	0.007	0.005	0.007	0.011
VOL	13,960	0.022	0.014	0.013	0.018	0.026
DIV	13,960	0.005	0.005	0.000	0.004	0.007
SP500	13,960	0.980	0.140	1.000	1.000	1.000
IO_total	13,960	0.690	0.167	0.601	0.714	0.807
IO_total_short	13,960	0.284	0.122	0.194	0.270	0.363
IO_total_long	13,960	0.406	0.119	0.333	0.408	0.484
IO_block	11,615	0.183	0.111	0.092	0.160	0.249
IO_block_short	11,615	0.059	0.075	0.000	0.052	0.095
IO_block_long	11,615	0.124	0.097	0.059	0.106	0.173
IO_top5	13,960	0.260	0.090	0.198	0.250	0.310
IO_top5_short	13,960	0.080	0.075	0.028	0.061	0.119
IO_top5_long	13,960	0.180	0.088	0.121	0.171	0.227

Panel B: provides the Pearson correlation coefficients of the variables

		CRATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SLOPE	1	**0.04**																		
DEF	2	0.00	**0.08**																	
LNSIZE	3	**0.40**	**0.06**	0.00																
Ret_t-3,t-1	4	**0.03**	**0.08**	**-0.28**	**-0.03**															
VOL	5	**-0.35**	**0.18**	**0.46**	**-0.19**	**-0.19**														
LEV	6	**-0.48**	**0.14**	**0.09**	**-0.04**	**-0.09**	**0.39**													
ROA	7	**0.35**	**-0.08**	**-0.11**	**0.08**	**0.11**	**-0.38**	**-0.48**												
BM	8	0.01	**0.10**	**0.07**	**0.04**	**-0.04**	0.00	**0.05**	**-0.04**											
TAN	9	**-0.05**	**0.04**	0.00	**0.12**	0.01	**-0.03**	**0.29**	**-0.09**	**0.08**										
IO_all	10	**-0.16**	**-0.11**	0.02	**-0.24**	0.01	**0.06**	**-0.08**	**0.03**	**0.06**	**-0.18**									
IO_all_short	11	**-0.32**	**-0.15**	0.02	**-0.37**	-0.01	**0.16**	**0.03**	**-0.05**	-0.02	**-0.15**	**0.76**								
IO_all_long	12	**0.09**	-0.01	0.00	0.02	**0.02**	**-0.08**	**-0.15**	**0.10**	**0.11**	**-0.11**	**0.72**	**0.10**							
IO_block	13	**-0.46**	**-0.10**	-0.01	**-0.40**	**0.03**	**0.23**	**0.31**	**-0.23**	**0.04**	**-0.06**	**0.53**	**0.39**	**0.40**						
IO_block_short	14	**-0.46**	**-0.14**	**0.04**	**-0.40**	-0.02	**0.25**	**0.27**	**-0.22**	**-0.04**	**-0.08**	**0.42**	**0.73**	**-0.13**	**0.61**					
IO_block_long	15	**-0.23**	**-0.02**	**-0.05**	**-0.19**	**0.05**	**0.10**	**0.18**	**-0.12**	**0.09**	-0.02	**0.35**	**-0.06**	**0.61**	**0.80**	0.02				
IO_largest	16	**-0.29**	**-0.09**	**-0.03**	**-0.30**	**0.03**	**0.15**	**0.16**	**-0.12**	**-0.03**	**-0.08**	**0.45**	**0.26**	**0.41**	**0.78**	**0.38**	**0.69**			
IO_top5	17	**-0.39**	**-0.10**	0.00	**-0.37**	**0.03**	**0.20**	**0.24**	**-0.18**	**0.04**	**-0.06**	**0.71**	**0.49**	**0.56**	**0.92**	**0.55**	**0.73**	**0.86**		
IO_top5_short	18	**-0.44**	**-0.15**	0.01	**-0.42**	-0.01	**0.23**	**0.24**	**-0.20**	**-0.05**	**-0.07**	**0.45**	**0.81**	**-0.16**	**0.54**	**0.95**	**-0.03**	**0.39**	**0.54**	
IO_top5_long	19	**-0.08**	0.01	-0.02	**-0.07**	**0.04**	**0.03**	**0.07**	**-0.04**	**0.09**	-0.01	**0.43**	**-0.12**	**0.81**	**0.60**	**-0.16**	**0.89**	**0.66**	**0.69**	**-0.22**

Panel C: List of the largest twenty institutional investors at the end of year 2006 and 2011, respectively.

This table provide the rank, name, the market value of stock holdings (in $Million), short-term and long-term type classification based on average churn rate of Equation (3), and legal type for the largest twenty institutional investors from Thomson-Reuters database. Full legal types of institutions are provided by Brain Bushee, including bank trust (BNK), insurance company (INS), investment company (INV), independent investment advisor (IIA), corporate (private) pension fund (CPS), public pension fund (PPS), university and foundation endowments (UFE) and miscellaneous (MSC).

	2006 (Pre-crisis)				2011 (Post-crisis)			
Rank	Name	Assets (in $Mil)	Short=1 Long=0	Legal Type	Name	Assets (in $Mil)	Short=1 Long=0	Legal Type
1	BARCLAYS BANK PLC	$709,233	0	BNK	BLACKROCK INC	$685,919	0	IIA
2	FIDELITY MGMT & RESEARCH (US)	$594,613	1	INV	VANGUARD GROUP, INC.	$619,553	0	INV
3	CAPITAL RESEARCH & MGMT CO.	$531,613	0	INV	STATE STR CORPORATION	$557,740	0	BNK
4	STATE STR CORPORATION	$498,334	0	BNK	FIDELITY MGMT & RESEARCH CO	$473,932	1	INV
5	MELLON BANK NA	$431,523	0	BNK	T. ROWE PRICE ASSOCIATES, INC.	$277,247	0	IIA
6	VANGUARD GROUP, INC.	$430,636	0	INV	CAPITAL WORLD INVESTORS	$257,617	0	IIA
7	AXA FINANCIAL, INC.	$314,788	1	INS	WELLINGTON MANAGEMENT CO, LLP	$248,770	1	IIA
8	WELLINGTON MGMT CO, L.L.P.	$296,999	1	IIA	MELLON BANK NA	$232,427	0	BNK
9	LEGG MASON INC	$206,545	0	INV	CAPITAL RESEARCH GBL INVESTORS	$221,047	0	IIA
10	T. ROWE PRICE ASSOCIATES, INC.	$204,944	0	IIA	JPMORGAN CHASE & COMPANY	$188,281	1	BNK
11	GOLDMAN SACHS & COMPANY	$195,777	1	IIA	NORTHERN TRUST CORP	$184,711	0	BNK
12	DEUTSCHE BK AKTIENGESELLSCHAFT	$194,044	1	BNK	AMVESCAP PLC LONDON	$167,250	0	MSC
13	NORTHERN TRUST CORP	$187,411	0	BNK	MSDW & COMPANY	$147,324	0	IIA
14	J.P MORGAN CHASE & CO.	$163,893	1	BNK	FRANKLIN RESOURCES INC	$127,321	0	INV
15	MSDW & COMPANY	$159,360	0	IIA	COLUMBIA MGMT INV ADVISERS LLC	$126,032	0	IIA
16	FRANKLIN RESOURCES INC	$144,756	0	INV	BANK OF AMERICA CORPORATION	$125,063	0	BNK
17	COLLEGE RETIRE EQUITIES	$131,264	0	INS	GOLDMAN SACHS & COMPANY	$121,806	1	IIA
18	JANUS CAPITAL MANAGEMENT LLC	$117,713	1	INV	COLLEGE RETIRE EQUITIES	$102,746	0	INS
19	DODGE & COX	$117,359	0	IIA	MFS INVESTMENT MANAGEMENT	$87,588	0	INV
20	BANK OF AMERICA CORPORATION	$106,428	0	BNK	BLACKROCK ADVISORS, LLC	$86,243	1	IIA

Table 3: Determinants of institutional ownership

This table shows the fixed effect regression results from the following model. Columns (1)-(3) show the total ownership by institutional investors, short-term institutional investors, and long-term institutional investors, respectively. Concentrated ownership by different types of institutional investors are shown in columns (4) – (9). We control both firm and year fixed effects. T-values are reported in parentheses. The final two rows of the table present the number of observations along with the adjusted R^2 . ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

$$Institutional\ ownership\ variable_{i,t} = \beta_0 + \beta_1 instrument_{i,t-1} + \beta_2 LNMKT_{i,t-1} + \beta_3 RET_{i,t-3\_t-1} + \beta_4 RET_{i,t-12\_t-4} + \beta_5 LOGP_{i,t-1} + \beta_6 TURN_{i,t-1} + \beta_7 VOL_{i,t-1} + \beta_8 BM_{i,t-1} + \beta_9 LEV_{i,t-1} + \beta_{10} ROA_{i,t-1} + \beta_{11} DIV_{i,t-1} + \beta_{12} SP500_i + \eta_i + \upsilon_t + resid_{i,t}$$

	IO_total (1)	IO__total_ short (2)	IO_total_ long (3)	IO_block (4)	IO_block_ short (5)	IO_block_ long (6)	IO_top5 (7)	IO_top5_ short (8)	IO_top5_ long (9)
Instru_all	0.378***			0.176***			0.153***		
	(6.56)			(2.88)			(3.57)		
Instru_short		0.677***			0.331***			0.43***	
		(10.77)			(6.27)			(8.73)	
Instru_long			1.002***			0.548***			0.636***
			(15.38)			(9.17)			(11.94)
LNMKT	0.027	-0.003	0.027	-0.03*	-0.017*	-0.015	-0.010	-0.018**	0.005
	(1.24)	(-0.25)	(1.58)	(-1.95)	(-1.86)	(-0.99)	(-0.95)	(-2.47)	(0.45)
RET_t-3, t-1	0.020***	0.023***	-0.006	0.007	-0.008**	0.013**	0.007	-0.004	0.008
	(2.99)	(4.61)	(-0.97)	(0.97)	(-2.02)	(2)	(1.2)	(-1.08)	(1.41)
RET_t-12,t-4	0.006	0.018***	-0.012***	-0.003	-0.005	0.002	-0.001	-0.002	0.00
	(1.46)	(4.86)	(-3.43)	(-0.61)	(-1.53)	(0.41)	(-0.47)	(-0.73)	(0.19)
LOGP	-0.031	0.001	-0.029	-0.010	0.002	-0.011	-0.014	0.006	-0.018
	(-1.33)	(0.05)	(-1.57)	(-0.56)	(0.23)	(-0.64)	(-1.08)	(0.75)	(-1.37)
TURN	2.558***	2.773***	-0.421	-0.266	0.676***	-1.067***	-0.298	0.616**	-1.077***
	(4.62)	(6.17)	(-1.12)	(-0.65)	(2.67)	(-2.73)	(-0.97)	(2.33)	(-3.12)
VOL	-1.356***	-0.596***	-0.639***	-0.321*	-0.123	-0.13	-0.295**	-0.107	-0.089
	(-6.85)	(-4.36)	(-4.09)	(-1.86)	(-1.04)	(-0.91)	(-2.34)	(-1.01)	(-0.7)
BM	0.010	-0.006	0.0181**	0.003	0.003	0.001	0.008	0.005	0.004
	(0.85)	(-0.64)	(2.25)	(0.31)	(0.43)	(0.16)	(1.11)	(0.89)	(0.61)
LEV	-0.020	-0.088***	0.072***	0.005	-0.018	0.026	0.028	-0.023	0.054**
	(-0.53)	(-3.28)	(2.6)	(0.14)	(-0.84)	(0.87)	(1.17)	(-1.26)	(2.24)
ROA	0.074	0.127***	-0.053	-0.086	-0.029	-0.057	-0.029	0.006	-0.037
	(1.02)	(2.78)	(-0.79)	(-1.09)	(-0.59)	(-0.77)	(-0.49)	(0.16)	(-0.6)
DIV	-1.045	-1.969***	0.828	0.588	-0.82***	1.350	0.419	-0.972***	1.314*
	(-1.06)	(-4.41)	(1.01)	(0.61)	(-2.82)	(1.54)	(0.55)	(-3.45)	(1.81)
SP500	-0.224***	-0.189***	-0.014	0.024	-0.024**	0.062***	-0.007	-0.023***	0.033**
	(-9.15)	(-12.71)	(-0.71)	(1.32)	(-2.21)	(3.39)	(-0.54)	(-2.61)	(2.4)
Firm, Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	13,960	13,960	13,960	11,615	11,615	11,615	13,960	13,960	13,960
Adj. R^2	0.8154	0.7284	0.6838	0.5633	0.4561	0.5081	0.681	0.5357	0.5633

Table 4 Hausman (1978) tests of endogeneity

This table reports the coefficients of the *resid* the CDS equation (6):

$$CDS\ spread_{t+1} = \gamma_0 + \gamma_1 Institutional\ holding\ variable_{i,t} + \gamma_2\ resid_{i,t} + \gamma_3\ CRATE_{i,t} + \gamma_4\ SLOPE_{i,t} + \gamma_5 DEF_{i,t} + \gamma_6\ LNSIZE_{i,t} + \gamma_7 RET_{i,t-2\_t} + \gamma_8\ VOL_{i,t} + \gamma_9\ ROA_{i,t} + \gamma_{10}\ BM_{i,t} + \gamma_{11}\ TAN_{i,t} + \eta_i + \upsilon_t + \varepsilon_{i,t}$$

Where *resid* is the regression residual we get from regression of equation (5). We only report the coefficient estimate, t_statistic and p_statistic of *resid*, corresponding to each ownership proxy, other estimates and statistics for firm and market characteristic variables are not reported. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Variable	Coefficient	T_Stat	P_Stat
RESID（IO_total）	0.104	1.52	0.1289
RESID (IO_total_short)	0.155***	2.91	0.0038
RESID (IO_total_long)	-0.114***	-3.04	0.0025
RESID (IO_block)	-0.778***	-5.39	<.0001
RESID (IO_block_short)	-0.838***	-5.45	<.0001
RESID (IO_block_long)	-0.403***	-4.66	<.0001
RESID (IO_top5)	-0.988***	-4.5	<.0001
RESID (IO_top5_short)	-0.515***	-3.95	<.0001
RESID (IO_top5_long)	-0.263***	-3.73	0.0002

Table 5 Impact of institutional ownership and trading on firms' credit spreads

Panel A shows the results of the second stage of 2sls regression equation (7) to examine the impact of total institutional ownership, ownership by short-term institutional investors and by long-term institutional investors on firms' credit spreads. Panel B shows the results of the second stage of 2sls regression equation (7) to examine the trading by institutional investors on firms' credit spreads. T-values are reported in parentheses. Standard errors are clustered at firm level. The final two rows of the table present the number of observations for each regression along with the adjusted R^2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A. Regression of five-year CDS spread on institutional ownership.

	(1)	(2)	(3)	(4)
Intercept	0.248**	0.271**	0.301**	0.27**
	(2.12)	(2.18)	(2.41)	(2.23)
IO_total	-0.036**	0.057	-0.214**	
	(-2.17)	(0.88)	(-2.45)	
IO_total_short		-0.227***		-0.17***
		(-3.2)		(-2.62)
IO_total_long			0.173***	0.065**
			(3.23)	(2.18)
CRATE	-0.17**	-0.173**	-0.173**	-0.173**
	(-2.43)	(-2.46)	(-2.47)	(-2.47)
SLOPE	0.003***	0.003***	0.003***	0.003***
	(3.47)	(3.26)	(3.34)	(3.3)
DEF	-0.002	-0.001	-0.00	-0.001
	(-1.23)	(-0.76)	(-0.14)	(-0.52)
LNSIZE	0.00	-0.00	0.00	-0.00
	(0.18)	(-0.02)	(0.05)	(-0.07)
RET_t-3,t-1	-0.02***	-0.021***	-0.021***	-0.021***
	(-3.00)	(-3.05)	(-3.03)	(-3.05)
VOL	1.32***	1.334***	1.291***	1.339***
	(6.70)	(6.41)	(6.52)	(6.46)
ROA	-0.198***	-0.173***	-0.179***	-0.173***
	(-3.95)	(-3.39)	(-3.49)	(-3.32)
BM	-0.038***	-0.04***	-0.04***	-0.041***
	(-2.66)	(-2.76)	(-2.73)	(-2.74)
TAN	0.003	-0.001	0.00	-0.001
	(0.12)	(-0.05)	(0.01)	(-0.04)
Firm & Year Fixed Effects	YES	YES	YES	YES
Obs.	13,388	13,388	13,388	13,388
Adj. R^2	0.5145	0.5173	0.5183	0.5135

Panel B. Regression of five-year CDS spread on institutional trading.				
	(1)	(2)	(3)	(4)
Intercept	-0.02	-0.031	0.015	-0.026
	(-0.13)	(-0.19)	(0.09)	(-0.16)
Lag_IO_all	-0.129*	0.090	-0.269***	
	(-1.78)	(1.16)	(-2.66)	
ΔIO_all	-0.149**	-0.003	-0.217**	
	(-2.04)	(-0.05)	(-2.4)	
LAG_IO_all_short		-0.298***		-0.215***
		(-3.49)		(-3.06)
ΔIO_all_short		-0.178***		-0.174**
		(-2.73)		(-2.4)
LAG_IO_all_long			0.243***	0.1**
			(3.44)	(2.38)
ΔIO_all_long			0.127***	0.019
			(2.97)	(0.8)
CRATE	0.023	0.019	0.015	0.016
	(0.27)	(0.2)	(0.16)	(0.17)
SLOPE	0.003***	0.002***	0.002***	0.002***
	(3.3)	(2.78)	(3.01)	(2.9)
DEF	-0.002	-0.00	0.001	0.001
	(-1.25)	(-0.04)	(0.75)	(0.39)
LNSIZE	0.001	-0.001	-0.001	-0.001
	(0.59)	(-0.25)	(-0.24)	(-0.36)
RET_t-3,t-1	-0.022***	-0.024***	-0.025***	-0.024***
	(-3.04)	(-3.16)	(-3.18)	(-3.2)
VOL	1.291***	1.355***	1.304***	1.359***
	(6.18)	(6.12)	(6.23)	(6.24)
ROA	-0.201***	-0.176***	-0.178***	-0.173***
	(-3.7)	(-3.26)	(-3.24)	(-3.12)
BM	-0.042***	-0.044***	-0.043***	-0.044***
	(-2.73)	(-2.81)	(-2.79)	(-2.81)
TAN	-0.002	-0.007	-0.006	-0.007
	(-0.12)	(-0.37)	(-0.3)	(-0.36)
Firm & Year Fixed Effects	YES	YES	YES	YES
Obs.	12,691	12,691	12,691	12,691
Adj. R^2	0.5208	0.5271	0.5287	0.5279

Table 6 Impact of concentrated ownership on firms' credit spreads

This table shows the results of the second stage of 2sls regression equation (7) to test the impact of concentrated ownership by institutional investors on firms' credit spreads. We use ownership by blockholders who own at least 5% of firms' total outstanding shares, and ownership by the largest five institutions to measure the firm's ownership concentration. T-value are reported in parentheses. The final two rows of the table present the number of observations for each regression along with the adjusted R^2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Variable	(1)	(2)	Variable	(3)	(4)
Intercept	-0.023	0.024	Intercept	-0.079	0.064
	(-0.18)	(0.18)		(0052)	(0.6032)
IO_block	0.747***		IO_top5	0.977***	
	(4.77)			(4.58)	
IO_block_short		0.811***	IO_top5_short		0.637***
		(4.82)			(4.42)
IO_block_long		0.428***	IO_top5_long		0.366***
		(4.29)			(4)
CRATE	-0.171**	-0.17**	CRATE	-0.172**	-0.17**
	(-2.18)	(-2.3)		(-2.26)	(-2.41)
SLOPE	0.003***	0.004***	SLOPE	0.004***	0.005***
	(3.57)	(3.99)		(3.76)	(3.99)
DEF	-0.00	0.001	DEF	-0.001	-0.00
	(-0.22)	(0.26)		(-0.47)	(-0.01)
LNSIZE	0.02***	0.016***	LNSIZE	0.015***	0.009***
	(4.35)	(4.14)		(3.9)	(3.03)
RET_t-3,t-1	-0.037***	-0.032***	RET_t-3,t-1	-0.035***	-0.026***
	(-3.95)	(-3.84)		(-3.83)	(-3.53)
VOL	1.213***	1.219***	VOL	1.309***	1.317***
	(7.26)	(7.05)		(7.01)	(6.73)
ROA	-0.067	-0.099*	ROA	-0.081	-0.146***
	(-1.15)	(-1.86)		(-1.46)	(-2.94)
BM	-0.046***	-0.045***	BM	-0.047***	-0.043***
	(-3.07)	(-3.01)		(-3.07)	(-2.9)
TAN	0.008	0.008	TAN	0.006	0.008
	(0.45)	(0.49)		(0.35)	(0.44)
Firm, Year Fixed Effects	YES	YES	Firm, Year Fixed Effects	YES	YES
Obs.	11,113	11,113	Obs.	13,388	13,388
Adj. R^2	0.5543	0.5462	Adj. R^2	0.5467	0.5717

Table 7 Crisis vs. normal period

Panel A shows the second stage regression results of 2sls equation (7) for our sub-sample from 2001 to 2006, where Panel B shows the results for our sample during crisis period. This table corresponds to section 4.1, Table 5 Panel A. The final two rows of the table present the number of observations for each regression along with the adjusted R^2 . Standard errors are clustered at firm level, ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A:2001-2006								
	(1)		(2)		(3)		(4)	
	Coefficient	T_Stat	Coefficient	T_Stat	Coefficient	T_Stat	Coefficient	T_Stat
Intercept	0.216***	4.32	0.239***	4.68	0.191***	3.8	0.21***	3.82
IO_all	-0.014	-1.02	-0.008	-0.55	-0.021	-1.31		
IO_all_short			-0.115***	-3.38			-0.106***	-3.3
IO_all_long					0.086***	2.65	0.062**	2.36
CRATE	-0.179***	-5.32	-0.183***	-5.43	-0.179***	-5.37	-0.185***	-5.38
SLOPE	0.000	0.35	0.00	0.44	0.001**	1.98	0.001*	1.79
DEF	0.007***	4.33	0.006***	3.62	0.004***	2.95	0.004***	3.22
LNSIZE	0.005	1.23	0.005	1.41	0.005	1.36	0.006	1.44
RET_t-3,t-1	-0.011**	-1.97	-0.015***	-2.63	-0.01*	-1.93	-0.014**	-2.58
VOL	0.987***	6.19	0.991***	6.27	1.035***	6.01	1.04***	5.69
ROA	-0.177***	-3.84	-0.147***	-3.13	-0.173***	-3.85	-0.148***	-3.19
BM	-0.011	-0.63	-0.015	-0.89	-0.011	-0.65	-0.015	-0.87
TAN	0.011	0.76	0.007	0.5	0.01	0.7	0.008	0.53
Firm, Year Fixed Effects	YES		YES		YES		YES	
Obs.	6,552		6,552		6,552		6,552	
Adj. R^2	0.6946		0.6974		0.6979		0.699	

Panel B 2007-2008						
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.425***	0.398***	0.442***	0.403***	0.245**	0.294**
	3.7	3.54	3.83	3.46	2.26	2.56
IO_all	-0.019	-0.020	-0.017			
	-1.15	-1.22	-1.02			
IO_all_short		0.092**		0.067		
		2.43		1.57		
IO_all_long			-0.064**	-0.051*		
			-2.39	-1.72		
IO_block					0.525***	
					4.41	
IO_block_short						0.476***
						4.5
IO_block_long						0.033
						0.67
rate	-0.19***	-0.191***	-0.19***	-0.189***	-0.188***	-0.189***
	-4	-4.06	-4	-3.87	-3.8	-3.83
slope	-0.005**	-0.004*	-0.001	-0.001	-0.005***	0.00
	-2.48	-1.79	-0.33	-0.57	-2.66	0.13
def	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	2.93	3.06	3.39	3.24	2.89	3.09
size1	-0.013	-0.013	-0.013	-0.012	-0.005	-0.006
	-1.37	-1.33	-1.35	-1.29	-0.62	-0.68
RET_3	-0.000	-0.001	-0.001	-0.001	-0.009**	-0.009**
	-0.12	-0.13	-0.17	-0.19	-2.01	-1.99
Vol_63	1.140***	1.152***	1.178***	1.178***	0.982***	1.01***
	3.93	3.96	3.95	3.96	3.79	3.86
roa	-0.088	-0.090	-0.088	-0.09	-0.07	-0.069
	-1.44	-1.48	-1.44	-1.49	-1.22	-1.21
bm2	-0.005	-0.005	-0.004	-0.005	-0.006	-0.004
	-0.99	-1.03	-0.93	-1.01	-1.37	-0.94
tan2	-0.011	-0.008	-0.01	-0.006	-0.01	-0.009
	-0.24	-0.17	-0.22	-0.13	-0.23	-0.21
Firm, Year Fixed Effects	YES	YES	YES	YES	YES	YES
Obs.	2829	2829	2829	2829	2829	2829
Adj. R	0.6937	0.6409	0.6404	0.6403	0.6513	0.6532

Table 8 Institutional ownership and CDS contracts with different maturities

Panel A shows the impact of institutional ownership on firms' short-run and long-run credit risk, measured by the credit spreads of CDS contracts with maturities ranging from 1-year to 20-year. We only report the coefficients and t-statistics (in parenthesis) of ownership variables only. Estimates of control variables are not reported here. Firm and year fixed effects are all considered. Standard errors are clustered at firm level.The final raw of the table present the adjusted R^2 . ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A Total Institutional Ownership and CDS spread

	cds_1y	cds_1y	cds_2y	cds_2y	cds_3y	cds_3y	cds_10y	cds_10y	cds_20y	cds_20y
IO_all	-0.057*		-0.05*		-0.045**		-0.028*		-0.028*	
	(-2.03)		(-1.94)		(-2.12)		(-1.90)		(-1.94)	
IO_all_short		-0.292***		-0.266***		-0.228***		-0.157***		-0.147***
		(-2.63)		(-2.81)		(-2.92)		(-2.63)		(-2.68)
IO_all_long		0.079		0.086*		0.061*		0.06**		0.072***
		(0.126)		(1.94)		(1.69)		(2.35)		(2.84)
Adj. R^2	0.3810	0.385	0.4450	0.4504	0.4798	0.4843	0.5543	0.5587	0.5809	0.5850

Panel B Concentrated ownership and CDS spread

	cds_1y	cds_1y	cds_2y	cds_2y	cds_3y	cds_3y	cds_10y	cds_10y	cds_20y	cds_20y
IO_block	1.039***		0.978***		0.834***		0.699***		0.711***	
	(4.11)		(4.26)		(4.42)		(5.04)		(5.32)	
IO_block_short		1.090***		0.977***		0.862***		0.737***		0.732***
		(3.94)		(4.12)		(4.34)		(5.11)		(5.33)
IO_block_long		0.591***		0.571***		0.486***		0.395***		0.398***
		(3.81)		(3.95)		(4.03)		(4.47)		(4.69)
Adj. R^2	0.4122	0.4047	0.4834	0.4742	0.5182	0.5094	0.5955	0.5864	0.6234	0.6135

Table 9 Robustness checks

Panel A shows the results of the second stage of 2sls regression equation (7) to test the impact of institutional investors on firms' credit spreads. Following Yan and Zhang (2009) we separate institutions into three tertile portfolios based on $AVG_{CR_{k,t}}$. Institutions ranked in the top tertile with the highest $AVG_{CR_{k,t}}$ are classified as short-term institutional investors and those ranked in the bottom tertile are classified as long-term institutional investors. All the control variables, firm fixed and year fixed effects are taken into account but not report here. Standard errors are clustered at firm level. The final two rows of the table present the number of observations for each regression along with the adjusted R^2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel B shows use an alternative definition of portfolio turnover, i.e. churn rate in Equation (3)': $CR_{k,t} = \frac{CR_{buy_{k,t}} + CR_{sell_{k,t}} - abs\,(NetFlows)}{\sum_{i=1}^{N_k} S_{k,i,t-1} P_{i,t-1}}$. This panel shows the results of the second stage of 2sls regression equation (7) to test the impact of institutional investors on firms' credit spreads. All the control variables, firm fixed and year fixed effects are taken into account but not report here. Standard errors are clustered at firm level. The final two rows of the table present the number of observations for each regression along with the adjusted R^2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel C shows the results of fixed effect panel regression using Bushee's (1998, 2001) classification of institutional investors. Firm fixed and year fixed effects are controlled. Standard errors are clustered at firm level. The final two rows of the table present the number of observations for each regression along with the adjusted R^2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Institutional types based on sorted tertile portfolio of turnover ratio on Equation (3) Full sample period					
	(1)	(2)	(3)	(4)	(5)
Intercept	0.294**	0.233**	0.260**	0.132	0.082
	(2.47)	(2.01)	(2.20)	(1.07)	(0.64)
IO_total	-0.033**	-0.040**			
	(-2.07)	(-2.31)			
IO_total_short	-0.225**		-0.218**		
	(-2.06)		(-2.01)		
IO_total_long		0.171***	0.100***		
		(2.66)	(2.20)		
IO_top5_short				1.481***	
				(4.36)	
IO_top5_long				0.382***	
				(3.67)	
IO_block_short					3.206***
					(5.65)
IO_block_long					0.724***
					(3.96)
Adj. R^2	0.5168	0.5177	0.516	0.522	0.546

Panel B: Institutional types based on alternative definition of turnover ratio on Equation (3)' Full sample period					
	(1)	(2)	(3)	(4)	(5)

Intercept	0.315**	0.238**	0.29**	-0.005	0.025
	2.37	2.07	2.37	0.135	0.2
IO_all	-0.03*	-0.039**			
	-1.88	-2.28			
IO_total_short	-0.1817		-0.181**		
	-2.53		-2.49		
IO_total_long		0.115***	0.059**		
		3.13	2.21		
IO_block_short				0.834***	
				4.5	
IO_block_long				0.449***	
				3.45	
IO_top5_short					0.782***
					4.39
IO_top5_long					0.331***
					3.91
Adj. R^2	0.5188	0.5167	0.5172	0.5475	0.5342

Panel C: Bushee's (1998, 2001) classification of institutional types

	Normal Period: 2001-2007			Crisis Period: 2007-2008		
Variable	Coefficient	T_ Stat	P_Stat	Coefficient	T_ Stat	P_ Stat
Intercept	0.21***	4.11	<.0001	0.441506	3.76	0.0002
Transient Own	-0.042*	-1.84	0.0661	-0.049	-1.59	0.1131
Dedicated Own	-0.014	-0.87	0.3842	-0.033*	-1.66	0.0975
Quasi-index Own	-0.003	-0.23	0.8184	-0.03*	-1.72	0.087
Adj. R2	0.696			0.6422		