Corporate Governance, Credit Risk and Bondholder Wealth

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ABSTRACT

Corporate Governance, Credit Risk and Bondholder Wealth

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My dissertation explores the importance of corporate governance from the perspective of bondholders of samples of US financial and industrial firms. It consists of three related essays which collectively cohere to represent my understanding of the topic. The conflicts of interest between creditors and shareholders and between corporate insiders and outside capital providers are addressed to explain the impact of a comprehensive governance mechanisms on bondholder wealth, which is measured either by the default probability implied by the structure credit model or by Credit Default Swap (CDS) spread. I consider both the non-crisis and crisis periods through different essays, which provide the ideal setting to examine the effectiveness of governance on bondholder wealth for different market conditions. Specifically, I explain how important governance provisions affect a manager's opportunistic behavior, a firm's investment decision and risk-taking behavior, and information environment, which in turn affect bondholder wealth. Such governance provisions include internal governance mechanism, such as the role played by the board of directors and a firm's equity ownership structure, and external governance provisions through the market for corporate control and the trading activities of institutional investors. My dissertation serves to advance the governance literature in several dimensions: a) it re-examines the usefulness of shareholder favorable governance

provisions from a different angle through the eye of creditors, and tries to explain why some shareholder governance provisions turn out to be ineffective; b) it compares the riskiness of financial and non-financial firms, and how creditors view governance factors differently for two types of firms; c) it emphasizes the role of institutional investors and tests how their investment horizons and ownership levels affect industrial firms' riskiness, and how such an impact varies across different market conditions. My general results show that governance attributes have a significant impact on a firm's credit risk, and this impact varies across the type of the firm. Ownership structure and takeover vulnerability are more important for non-financial firms than for financial firms. Board structure and accounting transparency have greater impact on financial firms. When I restrict to a sample of banks and use the credit risk model to estimate default risk, the impact of board structure remains. Given the important governance role of equity ownership structure for non-financial firms and the importance of institutional investors in the U.S. capital markets, I specifically look at institutional monitoring on industrial firms' credit risk. My results show that institutional investment horizon, ownership structure, trading behavior and market conditions are all important determinants of industrial firms' credit risk.

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Chapter 1: Introduction

My dissertation consists of three related essays exploring the topic of corporate governance, credit risk and bondholder wealth. Corporate governance is defined by Shleifer and Vishny (1997) as "Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment." Denis and McConnell (2003) define corporate governance a set of mechanisms "that induce self-interested corporate controllers (those that make decisions regarding how the company will be operated) to make decisions that maximize the value of the company to its owners (the suppliers of capital)." The separation between ownership and control leads to agency conflicts, together with the information asymmetry problem, allowing self-interested corporate insiders to transfer a firm's resources to themselves at the expense of the suppliers of capital. Such behavior could impair a firm's overall financial situation, leaving creditors, and not just shareholders vulnerable to losses.[1] By both definitions, corporate governance mechanisms are designed to benefit not only stockholders (hereafter referred to as shareholders), but also bondholders. As a matter of fact, debt financing has been an important and major financing method for U.S. firms.[2] Bondholders' interests should also be one of the primary concerns to corporations, investors and policymakers. However, following the agency model of Jensen and

[1] The term "creditor" refers to a party (person, organization, company, or government) that is the lender of property, service or money, and has a claim of a second party (called debtor or borrower). As bondholder is the most important type of creditor, creditors and bondholders are used interchangeable in my dissertation.

[2] For example, in 1980 (2009), total outstanding bonds in the US amounted to $3,569 billion ($34,747 billion), compared with $1,534 billion ($20,228 billion) for total outstanding equity (Conference board (2010)).

Meckling (1976), there is an extensive literature that looks at the effects of corporate governance on shareholders, and the conflicts of interests between corporate insiders and shareholders. The Best Practices approach of policymakers and practitioners is in part based on academic studies that demonstrate that corporate governance mechanisms can significantly affect stock prices and shareholder wealth. Furthermore, as noted by Baker, Greenwood and Wurgler (2003, Page 262): "Relative to the literature on equity financing patterns, and relative to the actual importance of debt finance in the U.S. economy, the literature on debt financing patterns is surprisingly underdeveloped". Given the importance of debt financing for US firms, it is surprising that the literature on the impact of governance mechanisms on bondholder wealth is relatively underdeveloped for both financial and non-financial firms. My dissertation attempts to provide new evidence on this score, and looks at the impact of comprehensive governance attributes on bondholder wealth. The global financial crisis of 2007-08 also motivates this research. Credit risk of banks is recognized as a key feature of the liquidity panic in the US financial system and the recent global financial crisis.[3] This risk has been attributed to poor governance practices, although very few studies have actually tried to measure the impact of governance on credit risk for financial firms directly. In this dissertation, I try to find out whether there a direct link between governance and the credit market and credit crisis.

Governance mechanisms in the U.S. can be broadly characterized as being either internal or external to the firm (Denis and McConnell, 2003). The internal mechanisms of primary interest include monitoring by the board of directors and the firm's equity ownership structure. Board characteristics such as board composition, size, independency,

[3] See Financial Stability Board, Bank for International Settlements Senior Supervisors Group, "Risk Management Lessons from the Global Banking Crisis of 2008."

expertise, diversity and board major tasks such as determining the level and structure of executive compensation, all have an impact on firm performance and valuation based on previous literature[4]. Therefore, corporate governance could affect bondholder wealth as well because priced corporate bonds can be regarded as contingent claims on the firm's assets. A firm's equity ownership structures such as the identity of shareholders and size of their stock holdings are both relevant factors as they determine the incentive and power for shareholders to monitor the firm. More importantly, the ownership level could also help intensify or reduce the conflicts of interest between shareholders and bondholders, and between equity blockholder and minority shareholders and bondholders. Therefore, ownership structure also affects bondholder wealth. The external governance mechanisms mainly include monitoring by the takeover market and the legal system that protects investors' rights. The takeover market, or market for corporate control, has been very active in the U.S. When a firm performs badly, there is an incentive for outside parties to seek control of the firm. Poorly performing firms are more likely to be the target and managers of poorly performing firms are more likely to be fired. Therefore, the mere threat of change in control can provide managers incentive to keep firm value high and avoid an attack from the outside parties. Therefore, in the U.S., active takeover market disciplines managers and reduces the shareholder/manager agency problem. On the other hand, the takeover market might intensify the agency problem by providing mangers a channel of empire building rather than acting on behalf of shareholders. Compared with other countries, the securities laws are well developed in the U.S., and the legal systems that protect investors' rights are also important external governance

[4] See Denis and McConnel (2003) and Hermalin and Weisbach (2003) for reviews of the related literature.

mechanisms in the U.S. Filing and regular disclosure requirements by the stock exchanges and the SEC as well as shareholder litigation are all effective ways to reduce the information asymmetry problem, discipline firm managers, and protect investors. Specifically, Sarbanes-Oxley Act of 2002 (SOX) was enacted as a reaction to a number of major corporate and accounting scandals, and benefit firms and investors by increasing corporate transparency, improving the firms' internal controls, increasing investors' confidence of financial reporting, and reducing capital costs.[5] To sum up, governance mechanisms that intend to reduce managerial opportunistic behaviors could also benefit bondholders. In addition, governance mechanisms that improve firm's information environment also benefit bondholder and reduce credit risk as the information environment is extremely important for bondholders to assess a firm's credit risk. Since the seminal work of Merton (1974), many structural credit 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 (e.g., Duffie and Lando, 2001, Maxwell and Miller, 2004, Yu, 2005). Therefore, governance provisions favoring shareholders that constrain managerial opportunistic behavior and mitigate information asymmetry between corporate insiders and outside capital providers could also benefit bondholders.

However, governance mechanisms favoring shareholder might not benefit bondholders due to the conflicts of interest between shareholders and bondholders. Shareholders might expropriate bondholder wealth in various forms such as encourage

[5] See, among others, Ashbaugh-Skaife, Collins, Kinney and LaFond (2007), Rittenberg and Miller (2005), Arping and Sautner (2013).

risk shifting, a.k.a. risk substitution, constitute debt overhang problem, affect dividend payment policy, and influence firms' takeovers and restructuring activities. In other words, powerful shareholders could transfer bondholder wealth to themselves and constitute a ***wealth transfer*** problem due the conflict of interest between shareholders and bondholders. This problem increases the ***agency cost of debt***. There are different forms of expropriation by shareholder of bondholder wealth. ***1) Risk Shifting***: 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 limited liability 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. Bhojaraj and Sengupta (2003) find that concentrated ownership by institutional investors (higher shareholder power) has an adverse impact on bond yield and rating. John, Litov, and Yeung (2008) show a positive relation between investor protection and firm's risk-taking for manufacturing firms. ***2) Debt Overhang***: As noted by Myers (1977), firms near or in financial distress may not be able to exploit promising valuable projects because shareholders are unwilling to finance these projects, which will lower their expected future cash flows and increase their risk of bankruptcy. ***3) Dividend payment policy***: Dhillon and Johnson (1994) show that bondholder have a negative response to dividend increases. ***4) Takeover and restricting***: Firms with strong shareholder rights and weak managerial power (weak anti-takeover provisions) are more vulnerable to takeover, resulting in increased leverage, especially in the case of leveraged buyouts (e.g. Warga

and Welch, 1993, Billett, Jiang and Lie, 2010). Increase in leverage implies an increase in the probability and the deadweight cost of a possible future bankruptcy and reordering the claims priority in bankruptcy, therefore reducing the value of the outstanding bonds. [6] Hence, bondholders of firms with strong shareholder rights will demand higher credit spreads as compensation for the added risk they face (see, e.g., Shleifer and Vishny, 1986), Klock, Mansi, and Maxwell, 2005, Cremers, Nair, and Wei, 2007). Klock, Mansi and Maxwell (2005) examine antitakeover provisions, as proxied by the Gompers, Ishii, and Metrick (2003) G-Index, on bond yield spreads and find that weak shareholder rights (strong antitakeover provisions) lower the cost of debt financing, suggesting that antitakeover provisions benefit bondholders. Cremers et al. (2007) find that higher institutional block holdings (higher shareholder rights) are associated with higher yields if the firm is exposed to takeovers. Parrino (1997) illustrates the wealth transfer from bondholders to shareholders in the case of the Marriott spinoff. In addition, my dissertation also looks at the impact of shareholders, especially institutional shareholders with concentrated ownership on minority shareholders and bondholders. The results imply that there is an evidence of expropriation by shareholders with concentrated ownership of other stakeholders. Therefore, the conflicts of interest between shareholders and bondholders will complicate the problem of identifying governance variables that serve both, and the impact of governance provisions on bondholder wealth is partially an empirical question that I will explore in my dissertation.

[6] Bond covenants that prevent from issuing bonds of equal or higher seniority may not protect existing bondholders as the covenants might not hold in the case of financial distress. Warner (1977), Barrett and Sullivan (1988), Franks and Torous (1989), Weiss (1990), and Eberhart et al. (1990), among others, show evidence of violations of absolute priority rule (APR): Bankruptcy reorganization proceedings are leaving shareholders and junior creditors with valuable assets, even when senior claimants receive only partial settlement.

Formally, credit risk is defined as the risk of loss due to debtor's non-payment of the principal or interest on a loan or a specific line of credit in a timely manner. Such an event is called a default. In my dissertation, I use credit risk or default probability to measure bondholder wealth: ceteris paribus, higher credit risk/default probability implies lower bondholder wealth.[7] I use the Credit Default Swap (CDS) spread for my first and third essays, and use default probabilities estimated through structure models for my second essay as my sample of U.S. commercial and savings banks do not have sufficient CDS information. Previous studies have used several variables to measure bondholder wealth or the cost of debt financing. For industrial firms, the measurements mainly include corporate bond yield spreads (see, e.g. Klock, Mansi, and Maxwell, 2005, Cremers, Nair, and Wei, 2007), credit ratings (see, e.g. Bhojraj and Sengupta, 2003, Ashbaugh-Skaife, Collins, and LaFond, 2006), credit default swap spreads (see, e.g. Yu, 2005, Carlson and Lazrak, 2010), and other accounting variables and restrictive model based default probabilities. For financial firms, the commonly used measures of risk are market-based indicators such as stock returns volatility, or accounting-based risk measurement such as the z-score, or income variation (see, e.g. Laeven and Levine, 2009, Saunders, Strock and Travlos,1990). For my first (Chapter 2) and third (Chapter 4) essays, I use CDS spread to measure bondholder wealth/credit risk/default probability.

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

[7] In my dissertation, I use the default probability of credit spread to measure bondholder wealth, recovery rate is not considered here. The quoted CDS spreads reflect the participants' belief of the default risk in a timely basis and reasonably reflect the firm's credit risk in an efficient market.

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 in 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, I use CDS spreads as my major dependent variable in my dissertation. However, as the sample of U.S. commercial and savings banks for my second essay (Chapter 3) does not enough CDS information, I use a structural credit model to estimate the default probability as a measurement of bondholder wealth.

My first essay compares the credit risk of financial firms with those of non-financial firms, and investigates the different impacts of major internal governance

mechanisms and external market monitoring through the threat of potential takeovers on the credit risk of financial and non-financial firms, respectively. My results show that financial firms generally have lower credit spread levels and volatilities than non-financial firms. Governance attributes have differential effects across firm types: board independence and financial transparency have a greater impact on credit risk of financial firms than on non-financial firms. Ownership structure and takeover vulnerability are more important for non-financial firms than for financial firms. For non-financial firms, CEO ownership has a nonlinear relation with credit risk levels with an inflection point of around 40%: at ownership levels below (above) the inflection point, increased CEO ownership is associated with increased (decreased) credit risk. These results are consistent with both an incentive alignment and entrenchment effects: at a low level of ownership, the interests of CEOs are more aligned to shareholders than bondholders, but at a high level of ownership, the CEO's interest is more aligned with those of bondholders. For financial firms, CEO ownership is associated with lower default probability only when CEOs hold a large fraction of the firm's shares.

My second essay estimates the default probabilities of a panel of U.S. commercial and savings banks using a structural credit model and examines the impact of internal governance mechanisms such as monitoring by the board of directors and equity ownership structure on the default probabilities of U.S. banks. The estimated five-year cumulative default probabilities are time-varying, with a significant jump observed in the year prior to the financial crisis of 2008.[8] Generally speaking, corporate governance

[8] Camara, Popova and Simkins (2009), among other, find a similar pattern. I.e., there is an upward trend during June 2007 to October 2008 for the 20-day moving average of the default probability for 144 global financial firms with traded option in the U.S.

structures have a greater impact on US commercial banks than savings institutions. After controlling for firm specific characteristics, commercial banks with larger boards and older CFOs are associated with significantly lower credit risk levels. Lower ownership by institutional investors and more independent boards are also associated with having lower credit risk levels, although these effects are somewhat less significant. For all the banks in my sample, large board size and older CFO are associated with lower credit risk levels. When we restrict the sample to consider the joint effects of the governance variables, the results on board size are still maintained.

My third essay investigates the important role of institutional investors in corporate governance and its impact on industrial firms' credit risk during both crisis and non-crisis periods. I specifically focus on institutional investment horizons, trading activities and their ownership levels and examine how those factors affect a firm's credit risk. I 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 benefits 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. Chapters 2 to 4 correspond to my three essays. I conclude in Chapter 5.

Chapter 2: Default Risk and Corporate Governance in Financial vs. Non-Financial Firms

This chapter will attempt to provide new evidence on the importance of various governance provisions from the perspective of bondholders, and will look at the predictive power and different impacts of various governance variables on credit spreads for financial firms and non-financial firms, respectively. Specifically, I test three basic hypotheses:

a) Ho1: default spreads should be the same for both non-financial and financial firms vs.

H_A1: default spreads should differ by firm type: financial firms might have lower risk, on average due to beneficial regulatory provisions (such as deposit insurance, capital requirements or activity restrictions in banking industry) that cushion their risk relative to non-financial firms. Financial firms may also have lower risk to the extent that they are more adept at managing default risk due to their diversified portfolios of assets vs. non-financial firms. On the other hand, bank regulations might increase risk-taking incentives (see, e.g., Merton 1977, Keeley, 1990). This chapter will compare the default risks across financial and non-financial firms.

b) Ho2: governance factors do not affect default spreads for firms vs.

H_A2: governance factors have significant effects on default spreads.

c) Ho3: governance factors have the same impact across financial and non-financial firms vs.

H_A3: governance variables relevant to financial firms may not be pertinent to non-financial firms, and vice versa.

My results show that financial firms indeed generally have lower credit default swap spreads, as well as lower standard deviation of spread than non-financial firms. I also find that while governance variables are comparable across firm types, the impact of these variables on the default spreads are significantly different for financial firms vs. non-financial firms. Board independence and financial transparency have a greater impact on financial firms than on non-financial firms. The firm's ownership structure and takeover vulnerability are more important for non-financial firms than for financial firms. For non-financial firms, CEO ownership has a nonlinear relation with credit risk levels with an inflection point of around 40%. At ownership levels below (above) the inflection point, increased CEO ownership is associated with increased (decreased) credit risk. These results are consistent with both incentive alignment and entrenchment effects: at a low level of ownership, the interests of CEOs are more aligned to shareholders than bondholders; while at high level of ownership, the interests of CEOs are more aligned to bondholders than shareholders. For financial firms, CEO ownership is associated with lower default probability only when CEOs hold a large fraction of the firms' shares.

The remainder of this chapter is as follows. The next section 2.1 provides a brief review of the extant literature on the impact of governance on default risk. Section 2.2 outlines my hypotheses on how the selected governance variables affect default risk. Section 2.3 discusses the data. The empirical results follow in Section 2.4. This chapter concludes with a brief summary in Section 2.5.

2.1 Literature Review

As mentioned in Chapter 1, the separation between ownership and control and information asymmetries problems allow self-interested corporate insiders to transfer a firm's resources to themselves at the expense of other stakeholders. Such behavior could impair a firm's overall financial situation, leaving creditors, and not just shareholders vulnerable to losses. Governance mechanisms that are designed to reduce the manager/shareholder agency conflict and improve a firm's information environment benefit both shareholders and bondholders. However, conflicts of interest between shareholders and bondholders will complicate the problem of identifying governance variables that serve both. For levered firms, such conflicts include but are not limited to the mentioned risk shifting/asset substitution problem, debt overhang, restructuring risk and dividend payment policy discussed in Chapter 1. This chapter also looks at the equity ownership structure of a firm, especially focuses insiders' ownership as it determines insiders' incentive and power to make decisions within a corporation.

Higher ownership by corporate insiders can align their interests to those of outside shareholders. However, high ownership could also entrench insiders, allowing them pursue personal benefits and job security without fear of reprisal at the expense of other stakeholders. From the perspective of creditors, increase in ownership makes a manager's interests more aligned with those of shareholders and encourages risk taking, as long as a manager's increased wealth investment in the firm is not so large as to make them increasingly sensitive to the firm's non-systematic risk. As a manager's non-human wealth investment and/or non-diversifiable firm specific human capital is large enough, their level of risk averseness will be reflected in more conservative investment policies

that are detrimental to shareholders, yet beneficial to bondholders. Higher ownership by outside shareholders, in contrast, could give shareholders power to monitor corporate insiders and influence their decisions in order to limit entrenchment effects and encourage risk-taking. The current literature shows mixed and conflicting results on the effects of insiders' ownership on creditors. Baganani, Milonas, Saunders and Travlos (1994) show a non-linear relation between managerial ownership and bond returns. Anderson, Mansi, and Reeb (2002) show a negative relation between managerial ownership and yield spreads for a panel of 278 industrial firms from 1993 to 1998, implying that CEO equity holdings serve to alleviate managerial shirking and opportunism. Ortiz-Molina (2006) shows that CEO stock and option ownership is positively related to at-issue yield spread, and this relation is weaker at higher levels of ownership. [9] Kim and Lu (2011) show when external governance is weak, CEO ownership is concavely related to the firm's risk taking, meaning that both incentive alignment and entrenchment effects are present.[10]

In sum, governance provisions favoring shareholders that mitigate information asymmetry between corporate insiders and investors, and constrain managerial opportunistic behavior could also benefit creditors, but also strong shareholder rights can cause risk substitution problem due to the agency cost of debt, which destroys bondholder wealth. While strong manager rights or weak shareholder rights could better avoid

[9] This paper uses a sample of new debt issues from 1993 to 2000 and use both stock ownership and stock option to measure a CEO's incentive. The results show an increasing and concave relation between managerial incentives and yield spreads, and this concavity is driven primarily by managerial stock options holdings rather than stock ownership.

[10] Specifically, at lower level of CEO ownership, increasing CEO ownership aligns the CEO's interest with those of shareholders, while high level of CEO ownership exacerbate the risk-reducing effect, and aligning the CEO's interest with those of bondholders.

takeover or other forms of expropriation by outside shareholders, but also can entrench managers and facilitate managerial opportunism. In addition to the arguments about ownership structures, for creditors, it is really a trade-off between the managers' opportunistic behavior and the shareholders possibility to expropriate bondholders.

Much of the current literature on corporate governance and debtholder wealth focuses on either a governance index value, such as the G-index created by Gompers et al. (2003), or on individual governance indicators (e.g., Klock et al., 2005, Cremers et al., 2007, Bhojraj et al., 2003). In this paper, I use a set of governance variables rather than one single ranking provided by commercial governance rating firms in order to eliminate the possibility of measurement errors. The results of Daines, Gow and Larcker (2010) indicate that there is a high degree of measurement error in the rating processes across different commercially available corporate governance rating firms. In addition, the rankings provided by those firms have no predictive ability of governance related outcomes such as accounting restatements, shareholder suits, operating performance, and stock returns as promised. Secondly, and more importantly, in assessing the individual corporate governance variables rather than a single governance ranking, I can see clearly not only how the individual governance variable can affect bond default risk, but also can test how these provisions substitute for or complement each other and their differential impacts on bond default risk.

I use CDS spreads to measure the firm's credit risk and hondholder wealth rather than the commonly used bond yield spreads, credit rating, or other measurements used in previous literature, based on the attractive features of CDS data mentioned in Chapter 1. To the best of my knowledge, this is the first article to examine a set of comprehensive

governance variables and their effects on bondholder risk for both financial and non-financial firms, respectively, by using CDS data. I attempt to answer three main questions: a) Are CDS spreads lower for financial firms than for non-financial firms? We might expect to answer this question in the affirmative: financial firms might have lower risk, on average due to beneficial regulatory provisions (such as default insurance, capital requirements, and activity restrictions) that cushion their risk relative to non-financial firms. They may also be more adept at managing default risk due to their diversified portfolios of loans vs. non-financial firms. b) Do governance attributes affect CDS spreads? c) Do the governance variables have differential effects on financial vs. non-financial firms? To address b) and c), I look at several governance variables that have been deemed as significant in the literature, including board structure, financial transparency, takeover vulnerability, and CEO power and ownership.

2.2 Governance Attributes and Default Spreads

2.2.1 Board structure variables: size, expertise, and independence

The principal conclusions of Mace (1971) were that "directors serve as a source of advice and counsel, serve as some sort of discipline, and act in crisis situations". A board should monitor and provide oversight role on corporate insiders' actions on behalf of stakeholders, for example, controlling the process by which top executives are hired, promoted, assessed, and if necessary, dismissed. More importantly, the board should provide critical resources to the firm, such as building networks and connections, and play a role in the setting of strategy or the selection of projects. Directors have a fiduciary duty to protect shareholders' interests. As Adams, Hermalin and Weisbach (2010) mention, boards can become the center of attention when things go wrong. The directors

of Enron and Worldcom, in particular, were held liable for the fraud that occurred; Enron directors had to pay $168 million to investor plaintiffs, of which $13 million was out of pocket. Worldcom directors had to pay $36 million, of which $18 million was out of pocket. Directors' reputations are likely to be important in the market for directorships. Fich and Shivdasani (2007) show that a firm's outside directors see a significant drop in other board seats held. Holmstrom (1999) states that the reputational concerns cause the agents to shy away from risky projects. From this perspective, a firm's board plays an important role in affecting firm's credit risk.

Previous empirical studies show mixed results on the impact of board size on firm performance. From the agency theory perspective, a smaller board may be advantageous due to coordination and communication issues, director free rider problems, and internal conflicts (see, e.g., Jensen, 1993, and Eisenberg Sundern, and Wells, 1998). However, a relatively large board have benefits as well: The *Resource dependency theory* by Pfeffer and Salancik (1978) states that a firm's board of directors provides precious resources of human capital and social/relational capital. Therefore, large boards, especially those with diversified board members, are beneficial by providing beneficial diverse expertise (e.g. Zahra and Pearce, 1989, Hillman and Dalziel, 2003). Such expertise may be of greater value in distress states, when credit risk is paramount. I use the total number of directors on a board to measure board size and the fraction of directors with more than four directorships on other firms to measure the board expertise. I hypothesize that a larger board and board with greater expertise would diminish the likelihood of default, i.e. there is a negative relationship between board size and credit risk level, and between board expertise and credit risk levels. Board independence

reflects the board's ability to provide independent monitoring and provide the oversight role of management actions in order to reduce managerial opportunism. A number of researchers have argued that outside directors bear a reputation cost if the performance is poor, which leads them to monitor management actions more carefully and may avoid risky projects. Thus the credit risk level would be lower with a more independent board. I use the fraction of outside directors (non-executive director) on a board, audit committee independency and nominating committee independency to measure board independence.

2.2.2 Firm's Financial Transparency

Financial transparency can reduce the information asymmetry between outside capital providers and corporate insiders, as well as among outside investors, which will in turn reduce agency costs. Transparent and accurate financial reporting can better facilitate stakeholders to monitor insiders' actions. For bondholders, a firm's information environment is extremely important for them to assess the firm's credit risk levels. Duffie and Lando (2001) show that firms with imperfect accounting information are associated with higher credit spreads. 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. Therefore, a transparent information environment could reduce credit spread.

I use audit committees independence as a proxy for financial transparency. The audit committee is an operating committee selected from members of a firm's board of

directors. The major responsibilities of the audit committee include overseeing the financial reporting and disclosure process, overseeing hiring, performance and independence of the external auditors, overseeing regulatory compliance, monitoring the internal control process the internal audit, and discussing risk management policies and practices with management. Audit committee plays an important role in facilitating effective monitoring and limiting managers' self-serving behavior or misreport firm performance. Independent audit committee reflects high level of monitoring or oversight role and is measured as a dummy variable that is equal to one if audit committee is comprised wholly of outside independent directors, and is equal to zero otherwise. As an independent audit committee tends to improve financial transparency, reduce information asymmetry and discipline managers, I hypothesize that this variable is negatively related to the firm's credit risk.

2.2.3 Firm's Takeover Vulnerability

As discussed above, bondholders of firms that are more exposed to takeover are disadvantaged relative to their counterparts due to increased leverage that raises the probability of default and of an adverse reordering the claim priorities. This represents another type of expropriation of bond holders by shareholders. I use the E-index created by Bebchuk, Cohen and Ferrell (2009) to measure a firm's takeover vulnerability. The E-index covers six provisions, including staggered boards, supermajority requirements for mergers, poison pills, golden parachute arrangements, limits to shareholder amendments of the by-laws, and supermajority requirements for charter amendments; each provision is allocated one point so the E-index ranges from score 0 to 6. Higher scores represent

lower shareholder rights and in turn lower takeover vulnerability. I expect that firms with lower takeover vulnerability enjoy lower default probabilities, as reflected in lower credit default spreads.

2.2.4 CEO Power and Ownership

CEO power is measured by a dummy variable equal to one if the CEO also serves as the chairman of the board, and zero otherwise. If the CEO is also the chairman of a board, I believe the CEO has more power to influence decision making and credit risk. I use CEO stock ownership instead of total ownership by corporate insiders since it is not subject to the bias arising by changes in the number of insiders through time (see, e.g., Kim and Lu, 2011). In addition, CEOs tend to have the most influence on decision making than other insiders. CEO stock ownership is therefore a preferable variable for measuring entrenchment vs. alignment effects of insiders and their risk-taking behavior. From the perspective of bondholders, an increase in ownership makes manager's interest more aligned to those of shareholders and encourages risk taking, as long as a manager's increased wealth investment in the firm is not so large as to make them increasingly sensitive to the firm's non-systematic risk, i.e. *incentive alignment effect*. As manager's non-human wealth investment and/or non-diversifiable firm specific human capital is large enough, their risk averse will be reflected in more conservative investment policies that are detrimental to shareholders, yet beneficial to bondholders. Therefore, *entrenchment effect* predicts a negative relation between CEO ownership and credit risk. Based on the argument, I expect a concave relation between CEO ownership and credit

risk. As in previous studies, I control for ownership by institutional investors when I analyse the impact of CEO ownership on a firm's credit risk.

In my tests of the impact of governance variables on credit spreads, I also control for several firm specific characteristics as well as market variables used in previous studies, including: firm size, leverage, profitability, book to market ratio, and return volatility. In addition, I use depth to control the liquidity of credit default swap market and control the firm's bond rating.

2.3 Data Description

I separate financial firms and non-financial firms by their 4-digit Standard Industrial Classification (SIC) code. Firms with one-digit SIC code 6 are classified as financial firms, while other firms are classified as non-financial firms. The accounting and market data used in this study are obtained from three sources: Board Analyst, Markit Group and Bloomberg. Corporate governance data are extracted from the Board Analyst database, a division of the Corporate Library datasets, accessible from the Wharton Research Data Service (WRDS) platform. The latter provides detailed data on board structure, director positions, committee assignments, compensation, audit fees, ownership structure and takeover defences for 1,500 to 3,000 U.S. companies since 2001. The data used in this chapter are from proxy years 2001 to 2006, which cover the fiscal years 2000 to 2005. Governance variables that are missing from the Board Analyst database are collected manually from the corresponding factors in the Corporate Governance quotient (CGQ) of Institutional Shareholder Service (ISS). I measure the takeover vulnerability by using the E-index created by Bebchuk, Cohen and Ferrell

(2009), downloaded from the authors' website. Since the E-index only cover the years 2000, 2002, 2004, and 2006 for my sample period, I use the lagged index value to fill out the remaining sample years.

The daily CDS spread data are obtained from the Markit Group for the calendar years 2001 to 2006. I use the highly liquid five year maturity contracts on U.S. dollar-dominated senior unsecured debt (SNRFOR) with modified restructuring (MR) for US based issuers. I take the average of daily spreads to obtain a yearly spread for my dependent variable. I also use the average of daily depths to measure the contract liquidity, and the average bond rating as an additional control variable. The governance and control variables are lagged by one year when I match CDS data. This setup mitigates endogeneity concerns due to reverse causality. My initial sample consists of 11,751 firm-year observations. I delete observations if the five year CDS spread, depth, or rating data are missing. The control variables of market and accounting data are collected from Bloomberg. I merge the governance data and CDS data to obtain a sample of 2,359 firm-year observations for non-financial firms and 450 firm-year observations for financial firms without missing variables. Table 1 shows the detailed definition and data sources of the variables used.

[Insert Table 1 about here]

Panel A-D of Table 2 provides descriptive statistics of the variables in my models for sample firms. It is apparent that financial firms generally have lower default swap spreads and lower standard deviation of spreads than non-financial firms. The means and median tests of differences confirm that both the mean and median of credit spreads of

non-financial firms are higher than those of financial firms. This is consistent with the hypothesis that financial firms enjoy the benefits of regulatory provisions that limit their risk relative to that borne by non-financial firms. They may also be more capable of managing default risk due to their greater diversification of assets. Panel D of Table 2 further separates the financial institutions into five categories based on their 4-digit SIC codes: depository banking institutions, nondepository credit institutions, insurance companies, security & commodity brokers and holding & other investment offices. As the panel shows, depository banking institutions have the lowest mean, median and standard deviation of credit spreads while insurance companies have the highest spreads. Several governance variables are comparable between financial firms and non-financial firms. Some differences are observed, however. For example, CEO ownership for financial firms is higher than non-financial firms, while the average institutional ownership for non-financial firms is higher.

[Insert Table 2 about here]

Table 3 shows the Pearson correlation coefficients matrix for non-financial firms and financial firms, respectively. For non-financial firms, bond rating, liquidity, size, and ROA are significantly negatively correlated with default spreads. Leverage and BM have positive and significant correlations with default spreads. Board size, the number of outside directors, independent compensation and nominating committees, have significant negative correlations with default spreads probability, consistent with my hypotheses. CEO power and ownership are significantly negatively and positively correlated with default spreads. On the other hand, institutional ownership and financial transparency are not significantly correlated with default spreads.

For financial firms, the control variables are significantly correlated with default risk with the expected signs. However, with the exception of board size, in sharp contrast to the results for non-financial firms, the governance variables are not significantly correlated to default spreads. In the next section, I will formally test the relationships between governance variables and default spreads.

[Insert Table 3 about here]

2.4 Empirical Results

Table 4 presents the regression results for models that relate the firm's default spread to the governance variables and the control variables. The models allow for both fixed firm and year effects. [11]

$$CDS\_5y_{t+1} = \alpha + \sum \beta_i \, governance\ variables_{i,t} + \gamma_1 CEOhold_{i,t} + \gamma_2 CEOhold2_{i,t} + \eta_i + \upsilon_t + \varepsilon_{i,t+1} \quad (1)$$

A firm's governance variables and control variables are lagged one year relative to its CDS spread. η_i are the time-invariant firm-fixed effects, υ_t are the year fixed effect, $\varepsilon_{i,t+1}$ is the regression residual.

[Insert Table 4 about here]

I note that with the exception of the book to market ratio, the control variables that are significant are not common to both non-financial firms and financial firms. For

[11] When I add industry dummy variables based on two-digit SIC code for non-financial firms. Both the sign and scale of the coefficient of my testing governance variables remain quite similar so my results and conclusion do not change. For example, for Model (3), the coefficient of BDEXP with industry dummies included is -1.11**, compared with -1.06** without industry dummies; the coefficient of E_value is -0.44*** with industrial dummies, compared with -0.42*** without industrial dummies. Here I only report the results without industrial dummies included.

non-financial firms, firm size is positively correlated with default spreads, suggesting that larger firms are more likely to take on riskier projects. Lower ROA, higher book to market ratio, and higher stock return volatility are associated with higher default spreads. Similarly, the governance variables that affect default spreads differ between non-financial firms and financial firms. For non-financial firms, Model 1 shows that greater board expertise, compensation committee independency and effective takeover defence, represented by high E_value, can significantly decrease the next year's default spreads. Model 3 shows that board expertise and effective takeover defence effect remain robust even after considering a firm's ownership structure. This result implies that for non-financial firms, board expertise is valuable, especially for bondholders. In addition, these results imply that bondholders are concerned with takeover risk as takeover defence provisions can significantly predict lower default probability. On the other hand, for financial firms, Model 1 shows that default probability is negatively related to board size, the size of the outside director contingent, and the quality of the firm's financial transparency. The outside board directors and financial transparency variables remain important in Model 3, when the ownership structure is considered.

We can see from Model 2 for non-financial firms, CEO power, as proxied by the inverse of dumsep, is inversely related with default probability. Thus, while CEO power might be not beneficial to shareholders, it reduces the risks to bond holders. There is a concave relation between CEO ownership and default risk, as indicated by the positive and negative coefficients on the stand-alone and squared terms, respectively, which is consistent with both incentive alignment effects and entrenchment effects as levels of CEO ownership increase. At a low level of CEO ownership, default risk increases with

CEO ownership. At a higher level of ownership, the default probability is a decreasing function of CEO ownership, with an inflection point at about 40 % based on my sample. This result is consistent with Bagnani, Milonas, Saunders, and Travlos (1994), who also show such nonlinear effects of managerial ownership and bondholder wealth where bondholder wealth is measured by bond return. Kim and Lu (2011) indirectly support my results, showing that there is a concave relation between CEO ownership and a firm's risk level, although they use R&D expenditure as a proxy for firms' risk. Specifically, they show that at a low level of CEO ownership, CEO incentives are more aligned with those of shareholders and they invest more in risky projects; when their ownership of the firm is relatively high, they tend to invest more conservatively due to their growing concern of non-systematic risk and their job security, so their incentives are more aligned with that of bondholders. For financial firms, CEO ownership is negatively related to default probability only when a CEO has a large fraction of shares.

To summarize, the results show that for non-financial firms, board expertise, firm's takeover vulnerability, institutional ownership, CEO power and ownership are the key determinants of default probabilities. For financial firms, however, board independency and financial transparency are the paramount factors that decide the debt default spread, with weak evidence of CEOs who avoid risky projects when they have concentrated ownership in the firm.

To further shed light on how CEO ownership affects default risk, I look at how a CEO affects the company's net cash position, reflected in its net cash ratio. The net cash ratio is defined as the cash and near cash item divided by net assets, where net assets is the total assets less cash and near cash item. While I use lagged values of governance

variables to predict the next year's default spreads, the net cash ratio and CEO ownership are examined contemporaneously. Table 5 presents the results.

[Insert Table 5 about here]

As shown in Table 5, CEO ownership has a nonlinear relation with the net cash ratio. When CEO ownership represents less than 40% of the firm's total shares outstanding, net cash flow is a decreasing function of ownership, implying that CEOs will be less likely to behave in an opportunistic manner, as such behavior will be detected more easily at low net cash levels. In other words, CEO incentives are more aligned with those of shareholders when CEO ownership is low (less than 40% in my sample). [12]

2.5 Concluding Remarks

This chapter explores the direct impact of various corporate governance attributes that are deemed important to shareholders on the credit risk of financial and non-financial firms in the U.S. The results show that both the risk levels as well as the factors affecting risk differ considerably between financial firms and non-financial firms. This result may reflect structural factors, such as regulatory provisions (such as default insurance) that limit the riskiness of financial firms relative to non-financial firms. Financial firms may also provide lower risk for bondholders to the extent that they are more adept at managing default risk due to their diversified portfolios of assets vs. non-financial firms. More independent boards and a high level of financial transparency are associated with lower default probability for financial firms only. For non-financial firms, greater board expertise, and lower takeover exposure are associated with lower bond

[12] These results are robust when I also control for other CEO characteristics including age and tenure.

default probability. CEO ownership has a concave impact on bond default probability, showing both incentive alignment and entrenchment effects exist as CEO ownership increases, with an inflection point at 40% based on my sample. Topics for future work include exploring the time varying nature of bond default risk and of the governance mechanisms that affect such risk, with particular attention to the role of the underlying state of the economy. The latter does seem to matter for shareholder risk, as we note that over the Great Recession (January 2007-December 2009), the U.S. Financial Sector Equity Index fared considerably worse (falling by 51.9%) than the Industrial Sector, proxied by the DJIA (which fell by 35.9%). The next chapter focuses on U.S. banking firms and explores their default probabilities.

Chapter 3: Default Risk Estimation, Bank Credit Risk, and Corporate Governance

Credit risk of banks is recognized as a key feature of the liquidity panic in the U.S. financial system and the global financial crisis of 2008. This risk has been attributed to poor governance practices, although very few studies have actually tried to measure the impact of governance on credit risk for financial firms directly. This chapter examines the value of corporate governance from the creditors' respective rather than from shareholders' perspective. In particular, I provide new evidence on the impact of governance structures on the credit risk of a panel of U.S. banks as viewed by creditors. Recent studies looking at governance effects on financial firms have looked at how shareholders returns are affected by risk indicators, as in Aebi, Sabato,and Schmid (2012) or on the behavior of the risk indicators - e.g. Laeven and Levine (2009). My approach differs from that of Aebi, Sabat, and Schmid (2012) who also look at risk indirectly, in that I look at how governance affects the probability of default through time. I also differ from Laeven and Levine (2012), in that I consider explicitly the probability of default for a fairly large sample of U.S. banks.[13]

In addition to providing new estimates of the default probabilities of banks, I also consider the impact on default risk of several corporate governance mechanisms that have been deemed in the literature to be beneficial to shareholders. However, to the extent that these mechanisms hamper the interests of debt holders, the "extra" costs of corporate debt financing may be detrimental to shareholder value ex post. Such costs may in part explain

[13] Laeven and Levene (2012) study risk effects in an indirect manner, as reflected by various indicators, as they are affected by corporate governance variables. They use an international sample that includes only 10 U.S. banks.

why there are mixed results on most empirical papers that measure governance mechanisms on performance as measured by stock prices, or accounting indicators. Gompers, Ishii, and Metrick (2003) devise a trading strategy that longs (shorts) firms with strong (weak) governance characteristics that generates abnormal returns of 8.5% per year during the 1990's for sample firms. In contrast, Johnson, Moorman, and Sorescu (2009) suggest that these results are caused by industry clustering, and that governance per se does not add value. Cunat, Gine, and Guadalupe (2012) provide evidence that corporate governance provisions contained in shareholder votes that are decided by small margins do affect the stock market value of S&P500 firms. They do not consider the effects of such votes on bondholders. Since my study separates the effects of corporate governance indicators on both shareholders and bondholders, I can explain clearly why some shareholder favorable governance provisions turn out to be ineffective. My analysis is conducted on a panel of U.S. banks, including commercial banks and savings banks. The results should be of considerable interest to researchers, practitioners and policy makers.

As the banks in my sample with governance variables do not contain sufficient CDS information but have sufficient accounting and financial information, I therefore choose a credit risk model to estimate the default probability of those banks through time. Currently, two main approaches to modeling default probability are used as benchmarks in the literature: reduced-form models of credit risk and structural models of credit risk. The reduced-form approach does not provide an explicit link between default and the structure of the firm. As such, it is of little use in establishing the role of governance variables or other variables internal to the firm on credit risk (e.g. Duffie and Singleton,

1999). In contrast, the structural credit approach provides an intuitive picture, as well as an endogenous explanation for default. It generates default probabilities from accounting and financial information, and thus can be used to provide and update credit information in a timely manner, based on information with respect to different firms' financial constraints, and governance policies. Merton's (1974) seminal structural model is a starting point in the credit risk modeling literature. Merton model preserves all the essential property of the structural model and the analytical expression for the firm's equity value can be mapped in a straightforward and parsimonious manner into the implied asset value and asset volatility through time. In addition, other structural models can be nested into the algorithm to predict the forward default probabilities. Black and Cox (1976), Leland (1994), Leland and Toft (1996), Collin-Dufresne and Goldstein (2001), Zhou (2001) and Huang and Huang (2003) provide alternative approaches to that adopted herein. In this chapter, I choose structural credit approach to estimate sample banks' default probabilities, following Merton type structural model.

3.1 The Credit Risk Model

Following Merton (1974), I assume that the underlying asset valuation follows a geometric Brownian motion process:

$$\frac{dV}{V} = \mu_V dt + \sigma_V dW \tag{1}$$

where μ_V is the mean rate of return on firm asset; σ_V denotes asset volatility; and dW is the increment of a standard Brownian motion. The drift will be replaced by the risk free

rate, r, under the risk neutral world.[14] The exogenous default boundary is denoted by K. Conditional on time zero, the default event occurs when the asset value hits or falls below the default boundary for the first time. Upon default, I assume the firm liquidates immediately with assets dispersed in accordance with the Absolute Priority Rule (APR). The cumulative first passage default probability of a firm going bankrupt over the period (0, T) is given by:[15]

$$p(0,T) = N\left(\frac{-b - aT}{\sigma_V\sqrt{T}}\right) + e^{\frac{-2ab}{\sigma_v^2}} N\left(\frac{-b + aT}{\sigma_V\sqrt{T}}\right)$$

Where,

$$a = \mu_V - 0.5{\sigma_V}^2, b = ln\left(\frac{V_0}{K}\right) \tag{2}$$

$p(0,T)$ is the cumulative probability from time 0 to time T. $N(.)$ is the cumulative probability of a standard normal distribution. There are several ways to define the exogenous default boundary K. Merton (1974) uses the face value of the debt as a default trigger and sets $K = D$. KMV $CreditMonitor^{TM}$ defines a firm's exogenous default boundary as the book value of its short-term debt plus one-half of its long-term debt, arguing that the firm will always have to service short-term debt, but can be more flexible in servicing the long-term debt. [16] Since the firm's equity can be viewed as a call option on its assets under the structural model, the expected value of equity is an increasing

[14] I also use the change of current book value of asset and previous book value of asset divided by previous book value of asset to measure μ_V. The major regression results by using this alternative default probability are qualitatively similar and therefore not reported. For example, the coefficient of *ln board size* is -0.0495 and is significant at 0.001 level with an adjusted R-square at 0.109.

[15] See Black and Cox (1976) and Leland and Toft (1996) for more details.

[16] The firm KMV is named after Kealhofer, McQuown and Vasicek, the founders of the company in 2002. It has since been sold to Moody's. It produces commercially acceptable credit methods.

function of maturity. Thus, the pressure to liquidate emanates from the firm's short-term liabilities, especially short-term debt. I use this measurement of exogenous default boundary as it is considered to be relatively more realistic. As the asset is non-tradable its price cannot be observed in marketplace. I use the algorithm developed by Ronn and Verma (1986), based on Black-Sholes (1973) option pricing framework, to compute the unknown asset price and volatility by solving following two equations simultaneously: [17]

$$E = VN(d_1) - Ke^{-rT}N(d_2) \tag{3}$$

$$\sigma_E = \frac{V}{E}N(d_1)\sigma_V \tag{4}$$

Where,

$$d_1 = \frac{ln\left(\frac{V}{K}\right)+\left(r+\frac{\sigma_V^2}{2}\right)T}{\sigma_V\sqrt{T}},\ d_2 = d_1 - \sigma_V\sqrt{T} \tag{5}$$

The equity price and volatility are denoted by E and σ_E, respectively. Equations (3) and (5) show this relationship as inspired by Black and Scholes (1973). Equation (4) restricts the relationship between the equity volatility and asset volatility and can be derived by Ito's lemma. As equity prices are observed in the market and the corresponding equity volatility can be calculated by the high-frequency daily equity price data, the asset value V and asset volatility σ_V can be computed by solving these two non-linear equations simultaneously given the exogenous default boundary K and maturity T in year. I use the

[17] Brockman and Turtle (2003) provides alternative approach that views equity as a down-and-out call option (DOC) instead of a standard European call option. Here I use Black-Sholes and Merton type model. It provides computational simplicity.

five-year cumulative default probabilities estimated by the above structural models as proxies for the credit risk levels.

3.2 Corporate Governance Hypotheses

Due to the conflicts of interest of shareholders and bondholders mentioned in Chapter 1, I expect that default risk will be higher for firms with corporate governance mechanisms in place that are designed to maximize shareholder wealth at the expense of creditors, due to the increased indirect cost of debt and direct bankruptcy costs. In addition, since managerial opportunistic behaviors or *moral hazard problem* could impair a firm's overall financial situation, leaving creditors vulnerable to losses, I expect that corporate governance mechanisms that are designed to resolve moral hazard problem and reduce managerial opportunistic behaviors will benefit both bondholders, and shareholders, which will increase the firms' value and lower their default risk. Governance mechanisms that induce large shareholders such as institutional investors to monitor management rather than to secure their own benefits at the expense of other investors will have similar effects, while this effect depends on the trade-off of the institutional investors' independent monitoring role and the *wealth transfer* effect. I choose several widely used proxies for governance quality based on previous literature and Chapter 2 of my dissertation: board size, board independence, separation between CEO and Chairman, Institutional Ownership, Insider holdings by top management and directors to examine their effect on banks' default probabilities.[18]

[18] Fama and Jensen (1983), Yermack(1996), Davis, Schoorman and Donaldson (1997), Eisenberg, Sundgren, and Wells (1998), Denis and Sarin (1999), Davis (1999), Ryan and Wiggins (2004), Laeven and Lavine (2012), and Aebei, Sabato, and Schmid (2012).

Hypothesis 1: The board size of a bank is negatively related to its default probability.

In this Chapter I especially test the impact of board size on banks' credit risk levels based on credit risk models. Chapter 2 shows no (negative) significant relation between board size and financial firms' CDS spreads when the firms' ownership structure is considered (not considered). Here, I separate commercial banks and savings banks from all the financial firms examined in Chapter 2, and test the impact of board size of a bank and its default probability.

Hypothesis 2: The proportion of the independent outsiders on the board is negatively related to the bank's credit risk.

I propose that board independence reflects the board's ability to provide independent monitoring and oversight role of management actions so as to reduce moral hazard problem and lead to better firm overall performance, which could benefit all stakeholders including bondholders. In addition, due to fiduciary responsibility and reputation and career concern, a firm's independent directors pay more attention to prevent a firm from stress state and default event, which leads them to monitor management actions more carefully and may avoid risky projects.. Previous studies show mixed results concerning the impact of board independence and the firm's stock market performance. The impact of these variables on credit risk has been largely ignored. Chapter 2 shows that board independence is significantly negatively related to financial firms' credit risk measured by CDS spreads. Here I check whether this factor is robust and is still significantly negatively related to banks' default probability by using alternative measurement of default probability by credit risk model.

In addition, I also test whether board other characteristics, such as CEO age, CFO age, and the proportion of busy directors who are active CEOs of other firms, on a firm's default risk.

Hypothesis 3: The impact of institutional ownership on the credit risk level of banks depends on the trade-off between the institution's independent monitoring role, and its power to redistribute wealth.

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 default risk. 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, consistent with the *wealth transfer hypothesis*, whereby institutions facilitate a transfer from bondholders to shareholders, which increases the agency cost of debt. Therefore, *wealth transfer hypothesis* implies that institutional blockholders or activisms are detrimental to bondholders. Chapter 4 focuses on the governance role played by institutional investors on a firm's credit risk. Chapter 2 finds no significant relation between institutional ownership and financial firm's credit risk, although it indeed finds a negative relation between institutional ownership and non-financial firm's credit risk. In this chapter, I re-examine the impact of institutional ownership on banks' default probability, and propose that the expected impact of institutional ownership on

bank's credit risk level depends on the trade-off between the shared benefit and wealth transfer hypothesis two effects.

Hypotheses 1-3 are tested using statistical regressions, controlling for several firm specific characteristics as well as market variables including:

a) Leverage: leverage is measured here as the total book value of debt divided by the total book value of assets. Intuitively, the leverage ratio is expected to be positively correlated with a bank's credit risk level.

b) Profitability: I use return on asset to control for the profitability of the banks. This variable is expected to be inversely related to the bank's credit risk.

c) Market-to-book ratio: the market-to-book ratio is measured as the market price divided by the book value of equity per share. This variable is commonly used to capture the firm's growth opportunities. I hypothesize that credit risk should be lower for firms with lower market to book ratios, consistent with the view that safety is associated with value and not growth in times of financial instability.

3.3 Data Description

I start with all the US banks as classified as commercial banks (SIC: 6020), federally chartered saving banks (SIC: 6035) and non-federally chartered saving banks (SIC: 6036) from Compustat during the period 2001-2010. The corporate governance data are extracted from the Corporate Library dataset on the Wharton Research Data Service (WRDS) platform during the period from 2001 to 2007, just prior to the 2008-09 financial crisis. The Corporate Library contains the corporate governance information worldwide collected by GMI (Governance metric international) rating which is the leading independent provider of global corporate governance and ESG ratings. The

governance variables include: *Sep dummy* - equals one if CEO and Chairman are separate individuals; *Board size* is the total number of directors on a given board; *Board Independence* is computed as the number of outside and outside-related directors divided by the board size; *Institutional Holding* is the percent of outstanding shares held by institutions; *Insider Holding* is the estimated as percentage of outstanding shares held by top management and directors, and the estimated percentage of shares held by 5% or greater shareholders, as reported in the company's most recent proxy statement; *Director active CEOs* is the percent of the sum of directors who are active CEOs of public or private companies on a given board. Accounting and market data including the short-term debt, long-term debt and equity prices are extracted from COMPUSTAT and CRSP respectively. The risk free rate is proxied by the rate paid by the fixed-rate payer on an interest rate swap with 1-year maturity which is available in the Federal Reserve H.15 database. The governance and control variables are lagged by one year when I match CDS data. This setup mitigates endogeneity concerns due to reverse causality. Matching the data sources provides me with a sample that consists of a panel of 228 banks with 782 observations. Table 6 provides some descriptive statistics for this sample.

[Insert Table 6 about here]

Panel A of Table 6 reports distributional statistics of the key accounting variables. The largest cohort consists of commercial banks. Such banks are on average about three-times the size of the savings banks. While commercial banks issue more short-term and long-term debt than savings banks, their leverage ratios are lower. Commercial banks are somewhat more profitable than savings banks, based on their return on assets (ROA) and return on equity (ROE). The high standard deviation of total asset indicates that the size

of both commercial banks and saving banks varies dramatically across observations; high positive skewness shows that the majority of the banks in the sample are very large in size.

Panel B of Table 6 shows the distributional characteristics of the governance variables. As shown therein, the average board size consists of about 13 members; commercial bank directors tend to be "busier" than the savings bank directors as reflected by their service as CEO's of other firms. Commercial banks are somewhat more likely to have CEO/Chairman duality. Commercial banks ownership is more dispersed than that of savings banks, as indicated by their lower institutional holding and insider holding ratios.

3.4 Empirical Results

As is shown in Table 7 and Figure 1, there is considerable time variation in the estimated cumulative default probabilities. On the whole, commercial banks are riskier than their savings bank cohorts for years 2008 and 2009. Both commercial banks and savings banks experience a significant increase in risk in the year prior to the 2008-09 financial crisis. My results indicate that simple structural model functions well to predict the trends of default probabilities of banks.

[Insert Table 7 about here]

Figures 1 illustrates the dynamics of the cumulative default probabilities for the banks in my sample.

[Insert Figure 1 about here]

Table 8 shows results of the estimation of equation 5 which relates the default probabilities to the accounting/market control variables as well as the corporate governance indicators:

$$Defprob_{it} = \alpha_0 + \sum_{j=1}^{J} \alpha_{ij} X_{ijt} + \sum_{j=1}^{K} \beta_{ij} Y_{ijt} + \epsilon_{it} \qquad (6)$$

where $Defprob_{it}$ is the estimated default probabilities for bank i at time t; X_{ijt} and Y_{ijt} are the firm specific accounting/market variables and governance indicators respectively.

[Insert Table 8 about here]

As is shown in Table 8A, banks with higher market to book ratios are associated with lower default probabilities, ceteris paribus. Small banks, banks with higher leverage, and banks with lower ROAs are more likely to default. Corporate governance mechanisms have larger effects on commercial banks than on savings banks. Given restrictions on data availability, I first perform the regressions using the governance variables sequentially.

We can see that as board size is significantly negatively related to bank credit risk levels. Hypothesis 1 is well supported. These results are consistent with Chaganti, Mahajan, and Sharma (1985), who find that non-failed companies tended to have larger boards; smaller boards are associated with a higher rate of bankruptcy. Our results are also consistent with Aebi, Sabato, and Schmid (2012), where board size is positively related to banks' performance, measured by stock returns, ROA and ROE. My results support the resource dependency theory, suggesting that large board could provide

valuable expertise, access to more resources through the social and relational ties of board members, high quality advice, which could help to lower banks' credit risk levels.

For commercial banks, as shown in Table 8B, greater board independence is associated with lower bank credit risk. A 1% increase in board independence from its mean (0.84) is associated with a decrease in default probability of 0.059 percentage point. This constitutes an economically meaningful result, given the range of average default probabilities of 0.009% to 0.071% during the period 2001 to 2007. The result implies that independent boards confer higher survival probabilities to banks. For the full sample, although the coefficient of *Board Independence* is not significant, the sign of the coefficient is negative, as expected. Thus, Hypothesis 2 is only partially supported for the commercial banks in my sample. These results are consistent with Ashbaugh-Skaife, Collins, and LaFond (2006) that board independence is positively related to credit ratings. My results are consistent with Chaganti, Mahajan, and Sharma (1985) for savings institutions.

For commercial banks, we can see from Panel B of Table 8 that the coefficient for *Institutional Holdings* variable is 0.05. This implies that a 1% increase in the holding by an institutional from its mean (0.43) is associated with a .0215 percentage point increase in the default probability. The result implies that institutional investors could make bank default probability even higher during normal period. There might be two reasons to explain this result. First, institutional investors may influence management to invest in riskier projects due to the limited liability and convex payoff to equity holders. Second, a large equity position provides institutional investors the incentive and power to extract corporate resources for their own benefits, *private benefit*s, at the expense of interests of

minority shareholders and creditors. In the next Chapter, I will examine the impact of institutional governance on firm's credit risk in more details, with special focuses on institutional investment horizon and their ownership levels. Hypothesis 3 is supported only for the commercial banks of the sample. These results are consistent with Aebi, Sabato, and Schmid (2012), who show that institutional holdings are negatively related to bank performance during the crisis.

Although institutional holdings can impact the credit risk levels of commercial banks, the impact of ownership by banks' insiders on banks credit risk levels is unclear for my sample, based on the coefficient of *Insider Holding*. For other board characteristics, I find that busy directors, as reflected by their service as CEOs of public or private companies, are associated with higher credit risk levels. In addition, while CEO age does not have impact on default probabilities CFO age has a significant effect. We can see that older CFOs have ability to control banks' risk levels more than junior CFOs do, as shown the negative significant relation between CFO age and the bank's default probability.

The governance variables are not significant for the savings banks, as is shown in Table 8C. I also performed the analysis for a smaller sample of all the banks with necessary data to allow for the joint consideration of the governance variables. In this regression of the full sample, the board size and busy director effects are sustained, along with the effects of the accounting/market control variables.

3.5 Concluding Remarks

This chapter explores the impacts of corporate governance structures on credit risk levels of banks in the U.S. The results show that estimated five year default probabilities of U.S. banks are time varying and took a significant jump in the year prior to the financial crisis of 2008-9. The results show that banks with higher market to book ratios are associated with higher default probabilities. In addition, small banks, banks with higher leverage and lower ROA are more likely to default. Corporate governance mechanisms affect commercial banks more than savings institutions in US. The risk taking behaviors of U.S. banks are affected by several governance structure variables, including: board size, board independence, institutional ownership, as well as the age of CFO and whether directors serving other firms as CEOs. I provide evidence that, after controlling firm specific characteristics, commercial banks with larger and more independent boards are associated with significantly lower credit risk levels. These results are consistent with previous chapter on the sample of financial firm. In addition, the results also show that lower ownership by institutional investors and older CFOs are associated with significantly lower credit risk levels, implying that experienced CFO are beneficial. For the full sample including both commercial and savings banks, larger board size, older CFO and less busy directors are associated with lower credit risk levels, also economically and statistically significant. When we restrict the sample to allow for consideration the joint effects of the governance variables, the results on board size and busy directors are maintained. In the next Chapter, I specifically examine the impact of institutional governance on industrial firm's credit risk.

Chapter 4: Institutional Investment Horizon, the Information Environment and Firm Credit Risk

In this chapter, I specifically look at the important role played by institutional stockholders (hereafter referred to as institutional investors in this chapter) in corporate governance and the relation between institutional governance and firm credit risk. Over the past six decades, institutional investors have grown to represent the most influential class of capital providers to the U.S. markets.[19] 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 (see, 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. 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* (see, e.g., Bhojaraj and Sengupta, 2003,

[19] 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)).

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, 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 of wealth 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 chapter, I 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. I 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. i also look at how the participants in the CDS market identify this information from the stock market. My results show that the factors of investment horizon, as well as ownership level and ownership concentration can significantly affect

CDS pricing. Specifically, I 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 chapter is organized as follows. In the next section, I provide an outline of the hypotheses. In section 4.2 I describe the data and methodology. Section 4.3 presents the results of the analyses. The chapter concludes with a summary in section 4.4.

4.1 Development of Hypotheses

4.1.1 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.

4.1.2 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 in order to reduce managerial opportunism and the agency conflicts between managers and

stakeholders. [20] The extant literature shows that effective internal monitoring will increase the firm's 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 bondholders 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,

[20] 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.

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.

4.1.3 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. 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, and 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, I 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.

4.2. Data and Methodology

4.2.1 Data and Sample

I 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. My 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. I 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.

I use credit default swap (CDS) spreads to measure a firm's credit risk due to the advantageous features of CDS explained in the Section 1. Daily quoted CDS spreads are collected from the Markit Group from the calendar years 2001 to 2011. I 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, I also use contracts with other maturities (i.e. 1-, 2-, 3-, 5-, 10, and 20-year). I take

average of daily spreads to obtain a quarterly spread as my dependent variable. I also control for firm and market conditions that might affect a firm's credit spreads. Specifically, I 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*). I 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.[21]

The sample consists of all U.S. industrial firms (SIC codes between 2000 to 5999 in line with previous literature[22]) with information of CDS contracts. After eliminating missing observations, my final sample consists of unbalanced panel of 515 firms from 2001 to 2011, with 13,960 firm/quarter observations. I use 2011 as the base year to adjust for inflation where appropriate and winsorize ownership and control variables at the top

[21] Adding additional control variable leverage ratio does not affect the sign and the magnitude of the coefficients of governance variables, and my results and conclusions remain unchanged.

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

and bottom 0.5% of their distributions to mitigate the effect of outliers. The details of the variable names, definitions and data sources are shown in Table 9.

[Insert Table 9 about here]

4.2.2 Classification of Short- and Long-term Institutional Investors

For each firm and each quarter covered in the Thomson-Reuters database, I 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, I calculate the aggregate purchase and sale for each institution each quarter:

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

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

Where $P_{i,t}$ is the stock price for stock i at the end of quarter t, $\Delta P_{i,t}$ is the price change of stock i from quarter t-1 to quarter t-1, and $S_{k,i,t}$ is the number of shares of stock i held by institutional investor k at the end of quarter t. N_k is the total number of stocks held by institutional investor k. I 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. $\mathrm{CR}_{\mathrm{buy}_{k,t}}$ and $\mathrm{CR}_{\mathrm{sell}_{k,t}}$ are institution k's aggregate purchase and sale for quarter t, respectively. Institution k's churn rate for quarter t is then defined as:

$$\mathrm{CR}_{k,t} = \frac{\min(\mathrm{CR}_{\mathrm{buy}_{k,t}}, \mathrm{CR}_{\mathrm{sell}_{k,t}})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t} P_{i,t} + S_{k,i,t-1} P_{i,t-1}}{2}} \qquad (3)$$

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

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

Given the above average churn rate for each institution each quarter, I 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 2 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. I aggregate institutional ownership information for each firm-quarter based on the type of institutional investors. Chart B of Figure 2 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 my sample institutions increased from 2001 and reached to a peak of $14 trillion in September, 2007, then fell down to $6.9 trillion in March 2009.

[Insert Figure 2 about here]

In addition, for each firm, I 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 I 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 10 Panel A to Panel C provides summary statistics of institutional ownership variables for my sample firms, after matching institutional ownership with accounting, market and CDS information.

[Insert Table 10 about here]

Panel A of Table 10 shows summary statistics of the variables, and Panel B provides the Pearson correlation coefficients of the variables of my 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. 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 10 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, name, total market capitalization of stockholdings, investment horizon (short-term or long-term) based 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). [23] 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

[23] 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.

America are classified as long-term type. Goldman, JP Morgan, and Fidelity are classified as short-term type.

4.2.3 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, I perform Hausman (1978) test of endogeneity. As previous literature shows a home bias of institutional investment, I 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 with headquarters 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). I exclude states with only one firm because I 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, I first perform an OLS regression of the institutional ownership equation (5) on the instrumental variable and all the other

exogenous variables. I include firm-fixed effects that control for potential omitted variable bias and year-fixed effects. 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 I 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 11 about here]

Table 11 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.[24] 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

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

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, I 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:

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

Table 12 shows the second stage regression results of Hausman (1978) test of endogeneity.

[Insert Table 12 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, I 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); I 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 two quarters related to credit spread measurement). For the second stage regression shown in equation (7), I use the predicted values of endogenous institutional ownership proxies from the first stage (except for IO_total) in the CDS equations.

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

4.3 Regression Results

4.3.1 Institutional Ownership and CDS spreads

I first use the most liquid five-year CDS contract spread to measure a firm's credit risk. Table 13 Panel A shows my results of the second step 2SLS regression. [25]

[Insert Table 13 about here]

As evident from Table 13, 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%

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

level, while the coefficient of *IO_total* is not significant. Based on these estimates, a one percentage point 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 I 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, my 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, one percentage point 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, I 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, I examine the change of the institutional ownership proxies, following Gompers and Metrick (2001) and Yan and Zhang (2009). Specifically, I 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 13 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.

4.3.2 Concentrated Ownership, Shareholder Activism and Credit Risk

Table 14 shows the impact of concentrated ownership by institutions with different investment horizons on a firm's credit spread. I 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. My 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.

4.3.3 Crisis vs. Non-crisis Period

I further separate my sample into two periods: a "normal" period from 2001 to 2006 and a crisis period from 2007-2008. Table 15 shows the impacts of institutional ownership on a firm's credit spread for these two samples, separately.

[Insert Table 15 about here]

The results for the normal period are similar to my 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.

4.3.4 Robustness Test

4.3.4.1 CDS contracts with different maturity

In addition to 5-year CDS spread, I 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 16, I find that the general conclusion from 4.1 does not change even I 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 16 about here]

4.3.4.2 Alternative definition of short-term and long-term institutions

Instead of separating institutions based on their median average churn rate over the past four quarters, $\mathrm{AVG}_{\mathrm{CR}_{k,t}}$, as a robustness check, I separate institutions into three tertile portfolios based on $\mathrm{AVG}_{\mathrm{CR}_{k,t}}$, following Yan and Zhang (2009). Table 17 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, my results in Section 4.3 are robust to this alternative definition of institution type.

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

$$\mathrm{CR}_{k,t} = \frac{\mathrm{CR}_{\mathrm{buy}_{k,t}} + \mathrm{CR}_{\mathrm{sell}_{k,t}} - \mathrm{abs}\,(\mathrm{NetFlows})}{\sum_{i=1}^{N_k} S_{k,i,t-1} P_{i,t-1}} \qquad (3)'$$

I 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.

I 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.

4.4 Concluding Remarks

This chapter 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. My 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. My results should be of considerable interest to researchers, practitioners and policy makers.

Chapter 5: Conclusions

In this dissertation I analyze the importance of governance mechanisms from the perspective of bondholders, given the importance of debt financing in the U.S. market and the relative underdeveloped literature in this line of research. The recent financial crisis also motivates this dissertation. On the one hand, monitoring from shareholders reduces conflicts of interests between shareholders and managers, and information asymmetry between insiders and capital providers, such benefits can be shared by bondholders. On the other hand, given the convex payoff and limited liability, shareholders have different risk preferences than those of bondholders. Governance mechanisms that serve shareholder may not serve bondholders in this regard due to the conflict of interests between shareholders and bondholders. Through different chapters in this dissertation, I consider a comprehensive set of governance mechanisms that are deemed to have impact on a firm's investment and financing policy, managerial moral hazard and information environment quality, which should in turn affect the riskiness of a firm and bondholder wealth. I look at the internal monitoring role from the board of directors. Board characteristics such as board size, board independency, board expertise and CEO duality are considered. I also look at a firm's accounting transparency, as well as equity ownership structure, especially the equity holdings of CEO and institutional investors. In addition, the discipline role of the external takeover market is also considered by using the E-index, representing a firm's takeover vulnerability. Given the rapid growth of institutional investors and their active monitoring and trading activity, I examine how institutional investment horizon, ownership and trading affect a firm's credit risk through different channels.

In Chapter 2, I explore the direct impact of various corporate governance attributes that are deemed important to shareholders on the credit risk of financial and non-financial firms in the U.S. The results show that both the risk levels as well as the factors affecting risk differ considerably between financial firms and non-financial firms. This result may reflect structural factors, such as regulatory provisions that limit the riskiness of financial firms relative to non-financial firms. Financial firms may also provide lower risk for bondholders to the extent that they are more adept at managing default risk due to their diversified portfolios of assets vs. non-financial firms. More independent boards and a high level of financial transparency are associated with lower default probability for financial firms only. For non-financial firms, greater board expertise, and lower takeover exposure are associated with lower bond default probability. CEO ownership has a concave impact on bond default probability, showing both incentive alignment and entrenchment effects exist as CEO ownership increases, with an inflection point at 40% based on my sample.

I further look at the impacts of corporate governance structures on credit risk levels of banks in the U.S. in Chapter 3. The results show that estimated five year default probabilities of U.S. banks are time varying and took a significant jump in the year prior to the financial crisis of 2008-9. The results show that banks with higher market to book ratios are associated with higher default probabilities. Small banks, banks with higher leverage and lower ROA are more likely to default. Corporate governance mechanisms affect commercial banks more than savings institutions in US. The risk taking behaviors of U.S. banks are affected by several governance structure variables, including: board size, board independence, institutional ownership, as well as the age of the CFO and

whether directors are serving other firms as CEOs. I provide evidence that, after controlling for firm specific characteristics, commercial banks with larger and more independent boards are associated with significantly lower default risk. These results are consistent with Chapter 2 on the sample of financial firm. In addition, the results also show that lower ownership by institutional investors and older CFOs are associated with significantly lower credit risk levels, implying that experienced CFO are beneficial. For the full sample including both commercial and savings banks, larger board size, older CFO and less busy directors are associated with lower credit risk levels, also economically and statistically significant. When I restrict the sample to allow for consideration of the joint effects of the governance variables, the results on board size and busy directors are maintained. While a smaller board benefits shareholders through the reduced coordination and communication issues, internal conflicts among directors, and free rider problems, a relatively large board serves bondholders especially in distress states through the precious resources of human capital and social/relational capital. The results from both Chapters 2 and 3 show that the monitoring role of the board of directors is an important governance mechanism for bondholders although the board size has different impacts on bondholders and shareholders.

Chapter 4 explores the time varying nature of firm credit risk and of institutional governance that affect such risk through internal direct monitoring, monitoring via "exit" or trading activity, with particular attention to the role of the underlying state of the economy. This chapter 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, 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. My 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 the firms' creditors benefit from the improved information environment created by short-term institutional investors. Concentrated ownership of both short-term and long-term institutional investors generally increases the 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 the firms' long-term institutional investors reduces the firms' credit risk. Therefore, long-term institutions play an important role during the crisis period to reduce the firms' credit risk and avert the threat of bankruptcy.

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Figures

Figure 1: Five-year cumulative first passage default probabilities for 2001-2010

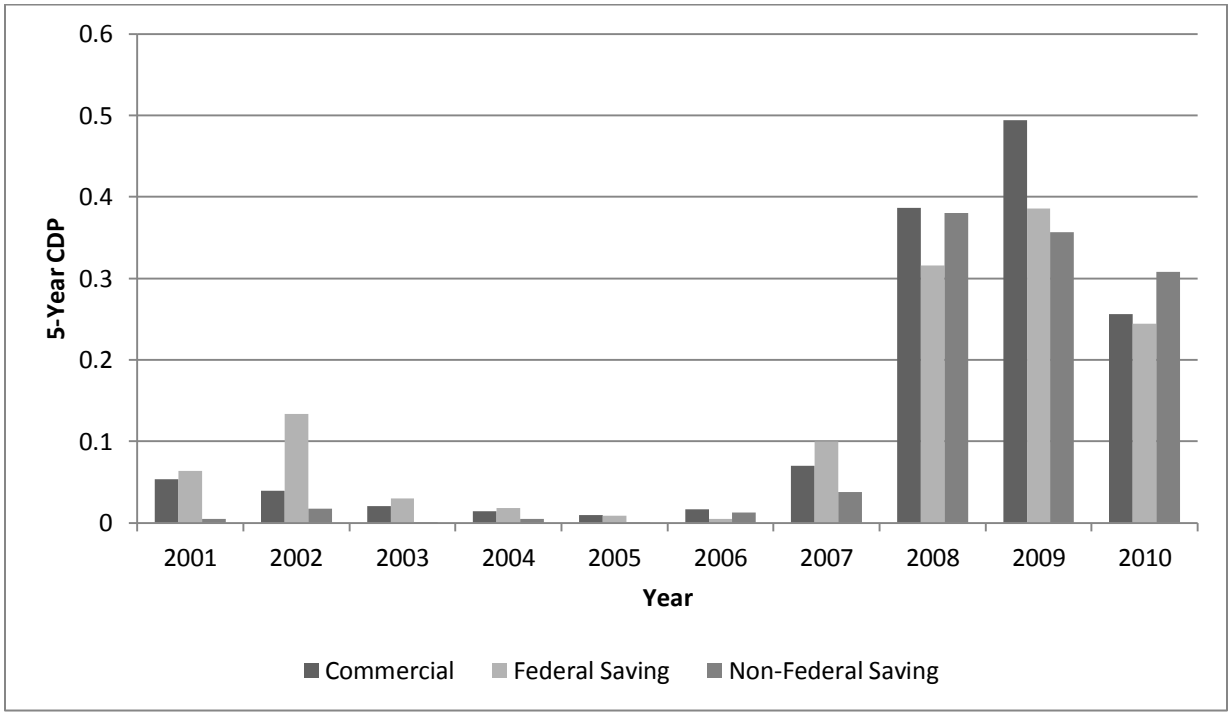
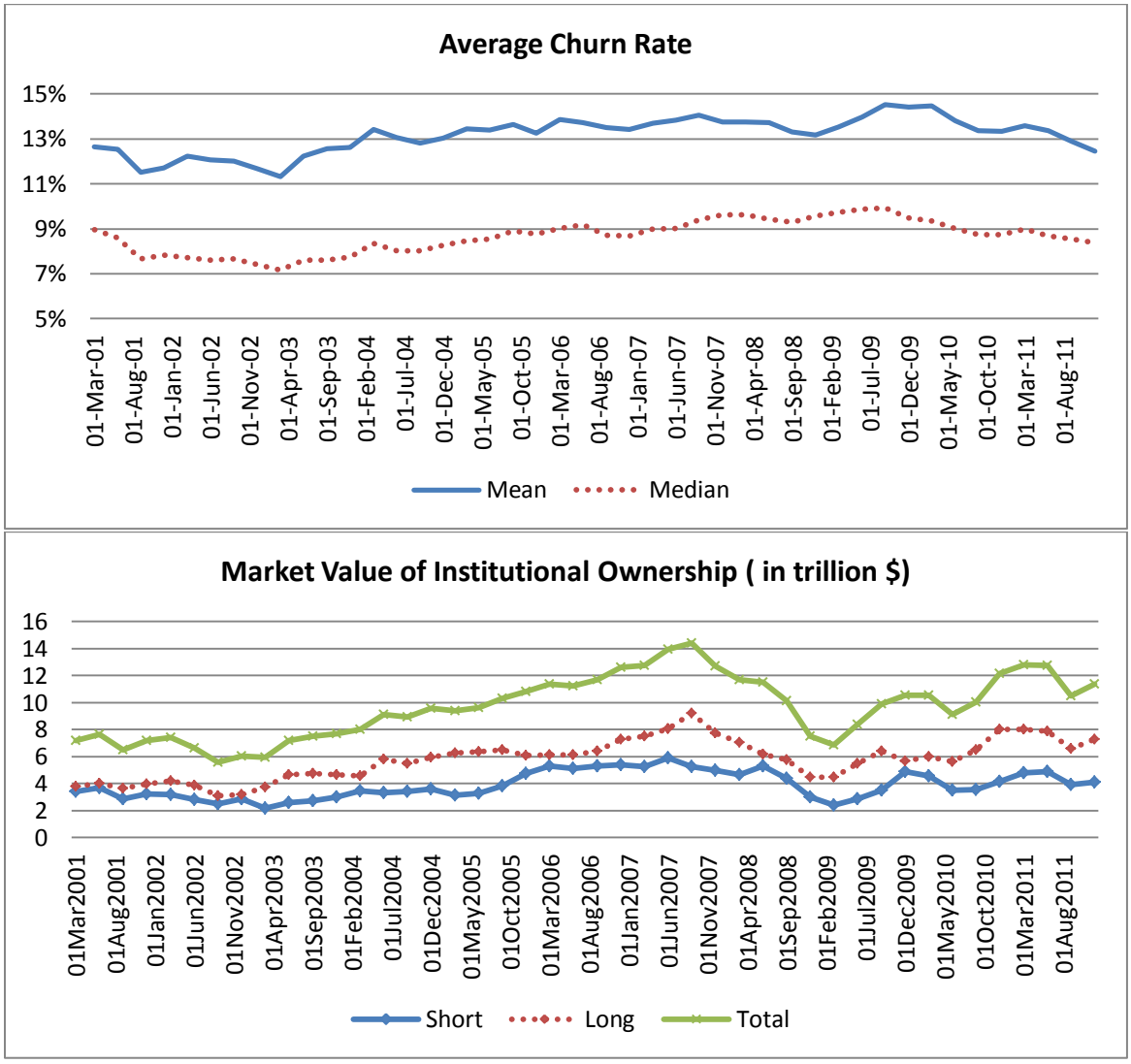


Figure 2: Time series of turnover ratio and institutional ownership
Chart A: Time series of mean and median of average churn rate
Chart B: Time series of the market value of different institutional ownership



Tables

Tables for Chapter 2

Table 1: Variable definition and Sources

Table 1: Variables Definition and Sources

Dependent Variables:	
cds_5y: the credit default swap of five year maturity contracts on US dollar-dominated senior unsecured debt with modified restructuring for US based issuers.	Markit Group
Governance Variables:	
BDSIZE: ln(total number of directors on a board)	Board Analyst
*BDOUTSIDE:*number of independent directors over number of total directors	Board Analyst
dumsep: 1 if CEO and chairman is not separate individual, and 0 if not. CEO power is measured by the inverse of dumsep;	Board Analyst, CGQ
dumaudit: 1 if audit committee is comprised wholly of independent directors, 0 if not.	Board Analyst, CGQ
dumcomp: 1 if compensation committee is comprised wholly of independent directors, 0 if not.	Board Analyst, CGQ
dumnom: 1 if nominating committee is comprised wholly of independent directors, 0 if not.	Board Analyst, CGQ
BDEXP: number of directors with more than 4 directorships over number of total directors	Board Analyst
E_value: anti-takeover governance score	Bebchuk et al. 2009
CEOhold: stock held by CEO over the total shares outstanding	Board Analyst
CEOhold2: squire term of CEOhold	Board Analyst
Insti: stocks held by institutional investors over total shares outstanding.	Board Analyst
Control Variables:	
*Lsize:*log(total book value of asset)	Bloomberg
ROA: return on asset; Bloomberg item: RETURN_ON_ASSET	Bloomberg
LEVERAGE: total debt to total asset; Bloomberg item: TOT_DEBT_TO_TOT_ASSET	Bloomberg
BM: book value to market value; 1 over Bloomberg item: PX_TO_BOOK_RATIO	Bloomberg
Vol: volatility of stock returns over the previous 180 trading days; Bloomberg Item: VOLATILITY_180D	Bloomberg
depth: the number of contributor prices used to build the composite price data. We use it to measure the liquidity	Markit Group

rate: the average of the Moody's and S&P ratings adjusted to the seniority of the instruments and rounded to not include the "+" and "-"levels, ranging from D-AAA. We converted to rate 1-8: 1-D, 2-CCC, 3-B, 4-BB, 5-BBB, 6-A, 7-AA, 8-AAA;	Markit Group
Tan: net fixed asset (property, plant, and equipment) to total asset; Bloomberg Item: BS_NET_FIX_ASSET	Bloomberg
Capexp: capital expenditure to net asset; Bloomberg Item: CAPITAL_EXPEND	Bloomberg
netcash: cash and near cash item to net asset; net asset is total asset less cash and near cash item; Bloomberg Items: BS_CASH_NEAR_CASH_ITEM; BS_TOT_ASSET	Bloomberg

Table 2: Descriptive Statistics

Panel A: Industry firms

Variable	N	Mean	Std. Dev.	Lower Quartile	Median	Upper Quartile
			Panel A: Non-financial firms			
cds_5y (%)	2359	1.62	3.01	0.36	0.69	1.71
rate	2348	4.72	1.20	4.00	5.00	5.00
depth (%)	2359	6.54	4.73	3.01	4.64	8.87
Lsize	2184	8.90	1.33	8.07	8.85	9.71
ROA	2170	0.04	0.10	0.02	0.04	0.08
LEVERAGE	2184	0.30	0.16	0.20	0.28	0.39
BM	1976	0.50	0.45	0.26	0.41	0.62
Vol	2017	0.35	0.18	0.23	0.31	0.42
tan	2181	0.34	0.22	0.16	0.30	0.51
capexp	2180	0.06	0.13	0.03	0.04	0.07
netcash	2183	0.08	0.22	0.01	0.04	0.10
BDSIZE	2357	2.33	0.21	2.20	2.30	2.48
BDOUTSIDE	2357	0.84	0.09	0.80	0.88	0.90
BDEXP	2357	0.15	0.14	0.00	0.11	0.23
Dumsep	2325	0.33	0.47	0.00	0.00	1.00
dumaudit	2355	0.93	0.26	1.00	1.00	1.00
dumcomp	2342	0.93	0.25	1.00	1.00	1.00
dumnom	2269	0.85	0.36	1.00	1.00	1.00
E_value	2359	2.57	1.31	2.00	3.00	4.00
CEOhold	1895	0.01	0.05	0.00	0.00	0.00
Insti	1864	0.71	0.17	0.60	0.74	0.84
			Panel B: Financial firms			
cds_5y (%)	450	0.69	1.68	0.27	0.42	0.66
rate	446	5.27	1.04	5.00	5.00	6.00

depth (%)	450	6.62	4.64	2.96	4.92	9.34
Lsize	413	10.27	1.83	8.74	10.29	11.53
ROA	412	0.03	0.03	0.01	0.02	0.04
LEVERAGE	413	0.29	0.23	0.09	0.22	0.46
BM	357	0.51	0.26	0.34	0.46	0.61
Vol	357	0.26	0.12	0.18	0.22	0.31
tan	362	0.25	0.37	0.01	0.02	0.55
capexp	377	0.03	0.05	0.00	0.01	0.04
netcash	411	0.05	0.12	0.00	0.02	0.04
BDSIZE	450	2.42	0.27	2.20	2.40	2.64
BDOUTSIDE	450	0.83	0.10	0.78	0.87	0.91
BDEXP	450	0.16	0.13	0.06	0.13	0.25
Dumsep	442	0.38	0.49	0.00	0.00	1.00
dumaudit	449	0.94	0.24	1.00	1.00	1.00
dumcomp	442	0.95	0.21	1.00	1.00	1.00
dumnom	438	0.89	0.32	1.00	1.00	1.00
E_value	450	2.42	1.28	2.00	3.00	3.00
CEOhold	336	0.02	0.05	0.00	0.00	0.00
Insti	338	0.68	0.17	0.56	0.69	0.80

Panel C: Tests of differences

This table reports p-values for the null hypothesis of no difference in means and medians of financial and non-financial firms, respectively. *** denotes statistical significance at the 1% level.

CDS_5y (%)	N	Mean	Median
Non-financial Firms	2359	1.617	0.689
Financial Firms	450	0.688	0.423
Differences		0.929***	0.266***
p_value		<.0001	<.0001

Panel D:

Variable: CDS_5y (%)	Obs.	Mean	Std. Dev.	Median	Lower Quartile	Upper Quartile
Depository Banking Institutions	84	0.341	0.426	0.235	0.179	0.325
Nondepository Credit Institutions	23	0.862	1.368	0.331	0.241	0.722
Insurance Companies	169	0.881	2.583	0.478	0.309	0.832
Security & Commodity Brokers	44	0.587	0.673	0.395	0.277	0.707
Holding & other investment offices	130	0.665	0.645	0.487	0.372	0.652

Table 3: Pearson Correlations

Table 3 shows the Pearson Correlations of independent variables, governance variables and sets of control variables. The details of the variables definition and sources are listed in Table 1. Panel A shows the correlations for industrial firms and Panel B shows those of financial firms. The bold text indicates the significant levels at or better than 0.01 levels.

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Panel A: Non-financial firms																		
cds_5y	A	1																
rate	B	**-0.41**																
depth	C	**-0.15**	**0.07**															
Lsize	D	**-0.08**	**0.32**	**0.37**														
ROA	E	**-0.26**	**0.20**	**0.06**	**0.24**													
LEVERAGE	F	**0.34**	**-0.29**	**-0.06**	-0.01	**-0.13**												
BM	G	**0.28**	**-0.26**	**-0.07**	-0.04	**-0.35**	**0.09**											
Vol	H	**0.52**	**-0.22**	**-0.28**	**-0.15**	**-0.37**	**0.15**	**0.32**										
BDSIZE	I	**-0.13**	**0.22**	**0.22**	**0.37**	0.04	-0.04	**-0.11**	**-0.15**									
BDEXP	J	-0.01	0.00	**0.18**	**0.19**	0.02	0.01	**-0.06**	**-0.18**	**0.07**								
BDOUTSIDE	K	**-0.06**	0.04	**0.17**	0.07	0.01	-0.02	-0.01	**-0.17**	**0.13**	**0.13**							
dumcomp	L	**-0.06**	-0.02	**0.16**	-0.04	-0.01	-0.03	0.03	**-0.09**	**-0.07**	**0.07**	**0.11**						
dumnom	M	**-0.06**	-0.02	**0.26**	-0.02	0.01	-0.04	0.02	**-0.19**	**-0.08**	**0.12**	**0.19**	**0.57**					
dumaudit	N	-0.01	-0.03	**0.18**	-0.02	-0.01	-0.04	0.03	**-0.10**	**-0.07**	**0.06**	**0.09**	**0.70**	**0.54**				
E_value	O	-0.04	**-0.07**	-0.04	**-0.24**	**-0.06**	0.01	**0.09**	-0.03	-0.01	**-0.06**	**0.18**	0.03	0.00	0.02			
ceopower	P	**-0.07**	0.05	**0.15**	0.04	0.02	0.00	-0.01	**-0.14**	**-0.07**	**0.07**	**0.19**	**0.20**	**0.30**	**0.19**	**0.10**		
CEOhold	Q	**0.07**	**-0.09**	-0.05	-0.03	0.03	-0.02	-0.03	**0.08**	-0.06	-0.07	**-0.17**	0.01	-0.01	0.02	**-0.11**	0.05	
Insti	R	-0.03	**-0.15**	**0.11**	**-0.25**	0.04	**-0.12**	0.03	**-0.07**	**-0.24**	0.04	0.05	**0.11**	**0.17**	**0.12**	**0.11**	**0.09**	**-0.10**
Panel B: Financial firms																		
cds_5y	A	1																
rate	B	**-0.20**																
depth1	C	**-0.13**	0.00															
Lsize	D	**-0.26**	**0.48**	**0.29**														
ROA	E	**0.18**	**-0.32**	-0.04	**-0.58**													

LEVERAGE	F	-0.07	-0.07	**0.13**	-0.06	-0.04												
BM	G	0.05	-0.12	0.08	**0.14**	**-0.41**	**-0.32**											
Vol	H	**0.38**	0.00	-0.09	0.12	-0.08	**-0.24**	0.12										
BDSIZE	I	**-0.14**	**0.33**	0.00	**0.51**	**-0.19**	**-0.27**	-0.08	0.00									
BDEXP	J	-0.07	0.11	**0.24**	**0.21**	-0.07	-0.08	0.05	**-0.18**	0.09								
BDOUTSIDE	K	-0.12	0.12	0.06	**0.22**	-0.11	-0.05	0.05	-0.07	**0.31**	**0.16**							
dumcomp	L	-0.06	-0.01	**0.13**	-0.03	-0.03	0.04	0.00	-0.11	-0.02	0.00	**0.20**						
dumnom	M	-0.05	-0.09	**0.20**	-0.11	0.04	0.10	0.03	**-0.35**	-0.08	0.07	**0.16**	**0.53**					
dumaudit	N	-0.06	-0.03	**0.15**	-0.09	-0.01	0.10	0.09	**-0.22**	-0.06	0.05	**0.20**	**0.73**	**0.44**				
E_value	O	0.12	-0.13	**-0.22**	**-0.16**	-0.01	0.07	0.12	0.14	-0.10	-0.05	**0.23**	0.05	0.04	0.07			
ceopower	P	-0.01	0.09	0.02	**0.19**	-0.06	-0.10	0.01	-0.10	0.09	0.02	0.10	0.06	**0.15**	0.10	0.07		
CEOhold	Q	0.12	-0.07	0.06	0.03	0.09	0.02	-0.09	0.04	0.03	-0.09	**-0.31**	-0.13	-0.07	**-0.24**	**-0.31**	-0.03	
Insti	R	-0.03	**-0.33**	**0.22**	**-0.19**	**0.22**	0.14	**-0.22**	0.06	**-0.25**	0.06	0.03	**0.15**	**0.19**	0.07	0.07	-0.01	-0.13

Table 4: Regression Results with CDS_5y as dependent variable

Table 4 shows results of panel regression with fixed firm and year effects, which relates the default probabilities (cds_5y) to the accounting/market control variables as well as the corporate governance indicators. Variable definition and sources are presented in Table 1. P-values are reported below the variable coefficient . ***,**,* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Non-financial firms			Financial firms		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
BDSIZE	-0.51		-0.48	-0.34*		-0.21
	(0.11)		(0.27)	(0.07)		(0.43)
BDEXP	-0.84**		-1.06**	0.00		-0.08
	(0.02)		(0.03)	(0.99)		(0.83)
BDOUTSIDE	-0.80		0.08	-0.96***		-1.31**
	(0.19)		(0.92)	(0.01)		(0.01)
dumnom	0.02		0.15	-0.01		0.01
	(0.87)		(0.39)	(0.87)		(0.91)
dumcomp	-0.31*		-0.35	0.13		0.21
	(0.10)		(0.12)	(0.38)		(0.29)
dumaudit	0.21		0.16	-0.25*		-0.29*
	(0.22)		(0.44)	(0.07)		(0.09)
E_value	-0.18**		-0.42***	0.00		-0.11
	(0.05)		(0.00)	(0.99)		(0.22)
CEOhold		26.27***	24.78***		2.44	3.77
		(<.0001)	(<.0001)		(0.35)	(0.19)
CEOhold2		-32.98***	-31.27***		-7.44*	-16.01*
		(<.0001)	(<.0001)		(0.07)	(0.07)
dumsep		0.24*	0.28*		-0.04	0.023
		(0.09)	(0.07)		(0.69)	(0.837)
Insti		-1.23**	-1.23**		-0.16	0.06
		(0.03)	(0.04)		(0.68)	(0.89)
Lsize	0.98***	1.00***	1.07***	-0.03	-0.33	-0.20
	(<.0001)	(<.0001)	(<.0001)	(0.81)	(0.16)	(0.45)
ROA	-2.77***	-1.49*	-1.61*	-0.27	0.54	-0.73
	(0.00)	(0.10)	(0.09)	(0.84)	(0.81)	(0.75)
LEVERAGE	0.09	0.43	0.50	0.11	0.62	0.47
	(0.88)	(0.58)	(0.54)	(0.85)	(0.60)	(0.71)
BM	0.81***	0.79***	0.76***	0.75***	0.71***	0.85***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.00)	(0.00)
Vol	1.54***	1.02**	0.91**	0.51	0.69*	0.40
	(<.0001)	(0.02)	(0.04)	(0.13)	(0.09)	(0.36)
depth1	0.05***	0.05***	0.05**	-0.02*	-0.02	-0.03*
	(0.00)	(0.00)	(0.01)	(0.09)	(0.14)	(0.08)
rate	-0.20	-0.21	-0.27	-0.10	-0.11	-0.15

	(0.15)	(0.32)	(0.23)	(0.29)	(0.49)	(0.36)
Intercept	-4.19**	-6.61**	-3.42	2.32*	2.85	3.85
	(0.03)	(0.01)	(0.24)	(0.07)	(0.20)	(0.10)
Firm FE& Year FE?	Y	Y	Y	Y	Y	Y
Adj. R-squre	0.766	0.764	0.765	0.844	0.810	0.830
Used Obs.	1810	1318	1260	327	204	193

Table 5: Regression Results with netcash ratio as dependent variable for industrial firms

Table 5 shows results of panel regression with fixed firm and year effects, which relates the netcash ratio to the accounting/market control variables as well as the ownership structure of the firm. Variable definition and sources are presented in Table 1. ***,**,* denote statistical significance at the 1%, 5%, and 10% levels, respectively. The adjusted R squire is 0.8266, and the used observation is 1312.

Variable	Estimate	t Value	Pr > |t|
Intercept	0.561***	4.28	<.0001
CEOhold	-0.797***	-2.98	0.003
CEOhold2	0.986***	2.96	0.003
Dumsep	0.000	0.04	0.966
Insti	0.027	1.03	0.304
Lsize	-0.040***	-3.11	0.002
ROA	0.070	1.63	0.103
LEVERAGE	-0.020	-0.56	0.575
BM	-0.001	-0.18	0.855
Vol	0.016	0.81	0.419
tan	-0.402***	-7.23	<.0001
capexp	0.170*	1.79	0.073

Tables for Chapter 3

Table 6: Descriptive Statistics

Panel A. Distribution of accounting variables

Total asset is the sum of book value of total liability and total equity. Following the literatures, I take the logarithm of total book asset value to control for the size of the bank in regression. *Leverage*: I define the leverage ratio as the total book value of debt divided by the total book value of the asset. *ROA* or *ROE* are used to control for the profitability of the banks. The first one is return on asset (ROA) while the second one is return on equity (ROE). *Market to book ratio*: the market to book ratio is defined as the market price divided by the book value of equity per share.

Panel B: Distribution of corporate governance variables

Sep dummy equals one if CEO and Chairman are separate. *Board size* is the total number of directors on a given board. *Board Independence* is estimated as the number of outside directors over the board size. *Institutional Holding* is the percent of outstanding shares held by institutions. *Insider Holding* is the estimated percentage of outstanding shares held by top management and directors. *Director active CEOs* is the percent of the sum of directors who are active CEOs of public or private companies on a given board.

Panel A	Commercial Banks	Savings Banks		All
		Federally Chartered	Not Federally Chartered	
Number of Firms	187	27	14	228
Number of Observations	672	80	30	782
Mean (Unit: $ Millions)				
Total Asset (Book Value)	39951	11774	8763	35872
Short-term debt	4971	1582	1238	4482
Long-term Debt	4152	2476	1686	3886
Common Equity (Book Value)	3539	1053	1107	3192
Leverage	17.27%	25.72%	26.82%	19%
ROA	1.2%	1.1%	0.5%	1.1%
ROE	13%	11.4%	4.8%	12.6%
Market to Book	2.11	1.93	1.44	2.07
Standard Deviation (Unit: $ Millions)				
Total Asset (Book Value)	131823	21761	8790	122812
Short-term debt	20252	3134	1941	18842
Long-term Debt	14842	6042	2679	13917
Common Equity (Book Value)	11259	1635	1166	10487
Leverage	9%	12.27%	16.09%	10.22%
ROA	0.5%	1.1%	1.08%	0.6%
ROE	5.7%	6.6%	11.58%	6.3%
Market to Book	0.78	0.98	0.54	0.81
Skewness				
Total Asset (Book Value)	7.20	3.67	1.41	7.74
Short-term debt	8.68	2.98	2.08	9.34
Long-term Debt	7.17	4.42	2.95	7.56
Common Equity (Book Value)	6.98	2.99	1.45	7.52
Leverage	1.09	-0.08	1.81	1.22

ROA	0.16	6.79	-4.32	2.74
ROE	-1.00	0.66	-3.39	-1.70
Market to Book	0.96	1.70	0.63	1.05

Panel B	Number of observations	Commercial Banks	Savings Banks		All
			Federally Chartered	Not Federally Chartered	
		Mean			
CEO age	232	55.5	59.2	60.6	55.8
CFO age	516	49.2	49.17	46.88	49.11
Sep Dummy	21	0.53	0.6	1	0.54
Board Size	782	13.34	10.75	11.03	12.98
Board Independence	782	0.84	0.79	0.81	0.83
Institutional Holding	396	0.43	0.48	0.53	0.44
Insider Holding	626	0.19	0.33	0.25	0.21
Director active CEOs	782	0.29	0.21	0.22	0.28
		Standard Deviation			
CEO age	232	6.35	7.86	4.16	6.55
CFO age	516	6.67	7.92	5.91	6.79
Sep Dummy	21	0.50	0.50	0	0.50
Board Size	782	3.98	2.75	2.97	3.93
Board Independence	782	0.09	0.10	0.09	0.09
Institutional Holding	396	0.24	0.20	0.12	0.23
Insider holding	626	0.16	0.22	0.15	0.17
Director active CEOs	782	0.27	0.24	0.19	0.26

Table 7: Five year default probabilities for each year for 2001-2010

Year	Full sample	Commercial	Federal Saving	Non-Federal Saving
2001	0.052928	0.053079	0.063562	0.004381
2002	0.051098	0.039564	0.133799	0.017155
2003	0.021078	0.020336	0.030251	0.000164
2004	0.014117	0.013882	0.018030	0.005134
2005	0.009125	0.009723	0.008617	0.000905
2006	0.014653	0.016187	0.004401	0.012271
2007	0.071471	0.070233	0.099905	0.037995
2008	0.379383	0.386714	0.316090	0.380315
2009	0.475212	0.494492	0.385448	0.356553
2010	0.257548	0.256249	0.244417	0.307652

Table 8: Summary of OLS Regression Results

Table 8 shows results of the estimation of equation 6 which relates the default probabilities to the accounting/market control variables as well as the corporate governance indicators:

$Defprob_{it} = \alpha_0 + \sum_{j=1}^{J} \alpha_{ij} X_{ijt} + \sum_{j=1}^{K} \beta_{ij} Y_{ijt} + \epsilon_{it}$ (5), where $Defprob_{it}$ is the estimated default probabilities for bank i at time t; X_{ijt} and Y_{ijt} are the firm specific accounting / market variables and governance indicators respectively. *Sep dummy* equals one if CEO and Chairman are separate. *Board size* is the total number of directors on a given board. *Board Independence* is estimated as the number of outside directors over the board size. *Institutional Holding* is the percent of outstanding shares held by institutions. *Insider Holding* is the estimated percentage of outstanding shares held by top management and directors. *Director active CEOs* is the percent of the sum of directors who are active CEOs of public or private companies on a given board. P-values are reported in ***,**,* denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Full Sample										
Intercept	0.20*** (<.0001)	0.18** (0.04)	0.20*** (<.0001)	0.14** (0.04)	0.16*** (<.0001)	0.14*** (0.00)	0.12*** (<.0001)	0.13*** (<.0001)	0.22*** (<.0001)	0.12*** (<.0001)
Ln Board Size	-0.04*** (0.006)								-0.039*** (0.005)	
CEO AGE		-0.0004 (0.74)								
CFO AGE			-0.001** (0.02)							
Sep Dummy				0.02 (0.27)						
Board Independence					-0.05 (0.19)				-0.018 (0.67)	
Institutional Holding						0.04 (0.12)				
Insider Holding							0.02 (0.39)			
Directors active CEOs								0.03* (0.09)	0.027* (0.08)	
Ln Total Asset	-0.0001 (0.97)	6E-5 (0.99)	-0.006** (0.05)	0.009 (0.89)	-0.003 (0.37)	-0.005 (0.26)	-0.006* (0.07)	-0.005 (0.12)	-0.0012 (0.70)	-0.003 (0.26)
ROA	-2.2*** (0.00)	-2.95 (0.105)	-2.0*** (0.002)	-3.03* (0.09)	-2.2*** (0.00)	-2.48** (0.03)	-2.1*** (0.00)	-2.1*** (0.00)	-2.21*** (0.00)	-2.2*** (0.00)
LEVERAGE	0.06 (0.14)	-0.03 (0.70)	0.10*** (0.01)	-0.03 (0.72)	0.08* (0.06)	-0.02 (0.74)	0.12*** (0.00)	0.08** (0.04)	0.057 (0.16)	0.08** (0.04)
Market to Book value	-0.02*** (<.0001)	-0.03*** (0.00)	-0.02*** (0.00)	-0.03*** (0.00)	-0.02*** (<.0001)	-0.02** (0.02)	-0.02*** (0.00)	-0.02*** (<.0001)	-0.025*** (<.0001)	-0.02*** (<.0001)
Adj. R-Sq	0.07	0.07	0.10	0.07	0.07	0.04	0.08	0.07	0.07	0.06
No. of observations	782	232	516	232	782	395	625	782	782	782

Panel B: Commercial Banks										
Intercept	0.23*** (<.0001)	0.21** (0.03)	0.21*** (<.0001)	0.13* (0.06)	0.19*** (<.0001)	0.17*** (0.00)	0.13*** (<.0001)	0.15*** (<0.0001)	0.26*** (<.0001)	0.14*** (<.0001)
Ln Board Size	-0.04*** (0.003)								-0.044*** (0.00)	
CEO AGE		-9.7E-4 (0.47)								
CFO AGE			-0.0013** (0.04)							
Sep Dummy				0.02 (0.14)						
Board Independence					-0.07* (0.10)				-0.0363 (0.42)	
Institutional Holding						0.05* (0.08)				
Insider Holding							0.04 (0.20)			
Directors active CEOs								0.03 (0.12)	0.03 (0.14)	
Ln Total Asset	-5E-04 (0.87)	3E-04 (0.96)	-6E-03* (0.06)	1E-03 (0.88)	-3E-03 (0.35)	-8E-03 (0.13)	-6E-03* (0.07)	-5E-03 (0.11)	-0.001 (0.67)	-0.004 (0.22)
ROA	-3.77*** (0.00)	-2.06 (0.29)	-4.64*** (<.0001)	-2.28 (0.22)	-3.59*** (0.00)	-3.31*** (0.01)	-4.09*** (0.00)	-3.56*** (0.00)	-3.63*** (0.00)	-3.66*** (0.00)
LEVERAGE	0.10* (0.06)	-0.03 (0.79)	0.16*** (0.00)	-0.01 (0.89)	0.12** (0.02)	0.03 (0.67)	0.18*** (0.00)	0.12** (0.02)	0.097* (0.06)	0.12** (0.02)
Market to Book value	-0.02*** (0.00)	-0.03*** (0.00)	-0.02** (0.02)	-0.03*** (0.00)	-0.02*** (0.00)	-0.02** (0.03)	-0.02** (0.03)	-0.02*** (0.00)	-0.024*** (0.00)	-0.02*** (0.00)
Adj. R-Sq	0.09	0.07	0.15	0.08	0.08	0.05	0.11	0.08	0.0951	0.08
No. of observations	672	209	432	209	672	348	530	672	672	672

Panel C: Saving Banks										
Intercept	0.19*	0.29	0.21*	0.39	0.10	0.00	0.14	0.14*	0.14	0.14*
	(0.06)	(0.41)	(0.08)	(0.22)	(0.40)	(1.00)	(0.13)	(0.07)	(0.30)	(0.08)
Ln Board Size	-0.03								-0.03	
	(0.41)								(0.40)	
CEO AGE		3E-3								
		(0.55)								
CFO AGE			-8E-4							
			(0.59)							
Sep Dummy				-0.06						
				(0.30)						
Board Independence					0.04				0.06	
					(0.72)				(0.56)	
Institutional Holding						0.14				
						(0.18)				
Insider Holding							-0.02			
							(0.74)			
Directors active CEOs								0.02	0.03	
								(0.61)	(0.58)	
Ln Total Asset	-0.01	-0.03	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.007	-0.01
	(0.48)	(0.53)	(0.25)	(0.50)	(0.32)	(0.79)	(0.37)	(0.28)	(0.47)	(0.31)
ROA	-0.65	-10.95	-0.56	-9.70	-0.56	0.46	-0.55	-0.61	-0.58	-0.61
	(0.46)	(0.29)	(0.54)	(0.32)	(0.53)	(0.90)	(0.57)	(0.49)	(0.52)	(0.49)
LEVERAGE	0.07	0.02	0.05	0.12	0.08	0.05	0.09	0.07	0.08	0.07
	(0.38)	(0.96)	(0.56)	(0.75)	(0.34)	(0.85)	(0.34)	(0.40)	(0.35)	(0.37)
Market to Book value	-0.02	-0.01	-0.02***	0.00	-0.01	0.00	-0.02	-0.02	-0.02	-0.01
	(0.14)	(0.74)	(0.01)	(0.94)	(0.20)	(0.96)	(0.23)	(0.17)	(0.14)	(0.18)
Adj. R-Sq	0.01	-0.05	0.00	0.00	0.01	-0.04	0.00	0.01	-0.0037	0.01
No. of observations	110	23	84	23	110	47	95	110	110	110

Tables for Chapter 4

Table 9: Variable Definition and Data Sources

Variables	Definitions	Data Sources
LNMKT	Natural logarithm of the market capitalization ($Mil) in 2011 dollars	Compustat, Bureau of Labor Statistics
LNSIZE	Natural logarithm of the book value of total asset ($Mil) in 2011 dollars	Compustat, Bureau of Labor Statistics
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 10: 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**	**-0.2**

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 11: 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 12: 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 13: 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 14: 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 15: 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 16: 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 17: Robust 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		