Three Essays on CEO Compensation and the Agency Problem of Debt

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Abstract

Jensen and Meckling [1976] propose that compensating a manager with debt-like payment, a.k.a. "*inside debt*", can be a mechanism to mitigate the agency problem of debt. Recent empirical papers document that higher inside debt held by a chief executive officer ("CEO"), which is measured by the present value of their supplemental retirement benefits, is associated with more conservative management and lower cost of debt. However, the grant of inside debt might originate from rent extraction purposes, and happens to encourage risk aversion among CEOs. Therefore, it remains unclear whether companies use CEO inside debt as a mechanism to mitigate the agency problem of debt. To address this question, my thesis examines how U.S. public companies adjust their use of CEO inside debt in three corporate events that involve changes to the agency problem of debt.

In the first essay (Chapter 4), I show that new active blockholders adjust CEO inside debt-equity ratios to increase total firm value, not just equity value. These investors are more like to arise when CEO inside debt-equity ratios are not properly set up to maximize total firm value. The speed of adjustments towards the appropriate ratios triples in the presence of active blockholders, but returns to the normal level once these investors "exit". Such compensation adjustments are associated with positive stock and bond abnormal returns over the active block holding period. I also find that new active blockholders arise and restructure compensation when the old structures over-align CEOs' incentives to either shareholders' or debtholders' interests. I argue that superb stock-picking skill, a mean-reverting process of compensation changes, or co-founding firm characteristics cannot explain the large compensation adjustments during active blockholders' presence. Instead, these blockholders actively affect CEO compensation structures by appointing their favored directors into the targeted firms' boards, especially into the compensation

or governance committees.

In the second essay (Chapter 5), I show that companies raise their CEO inside debt to address the heightened agency problem of debt due to increased leverage, after they remove anti-takeover provisions ("ATPs"). By using a difference-in-difference-in-difference analysis, I document significant increases in CEO inside debt-equity ratios after companies remove ATPs. Inside debt also rises significantly after ATP removals, which accounts for 70% of increases in the overall ratios. In contrast, inside equity significantly decreases after companies remove ATPs, as these companies reduce the stocks and options awarded to their CEOs. These findings are robust to different explanatory variables, matching samples, and removals of certain ATPs. Further analysis displays that inside debt-equity ratios increase continually for the first three years after ATP removals. This trend coincides with the after-ATP-removal spike in leverage, which is caused by increased debt issuance. I also show that increasing inside debt-equity ratios, especially increasing inside debt, helps companies reduce the cost of borrowing after ATP removals. However, increasing inside debt can only address part of the heightened agency problem of debt, as companies still face more costly debt financing after ATP removals. Despite the increase in inside debt and decrease in inside equity, CEOs take more risks after their companies remove ATPs. This result suggests that removing ATPs can substitute for the role of inside equity in providing CEOs with more risk-taking incentives.

In the third essay (Chapter 6), I explore the timing strategies for bond issuances based on disclosures of CEO inside debt. During the months before proxy statement releases, new changes in CEO inside debt are private information to companies' insiders. Companies can exploit this information asymmetry to issue bonds when the market, based on publicly available information of inside debt, perceives these companies' debt agency problems as relatively insignificant. I find that companies cluster their bond offerings in the immediate quarters after (before) disclosures of positive (negative) inside debt changes. The tendencies to time bond issuances based on inside debt disclosures also increase with the magnitudes of the disclosed changes. In addition, the adoption of these timing strategies is more observable when the issuing firms are regular issuers or when the new issues do not include covenants, especially the debt-restriction covenants. Finally, I verify that these timing strategies help reduce the cost of borrowing. The bonds issued at favorable times, i.e. right after positive change disclosures or before negative change disclosures, have lower offering yield spreads than those issued at non-favorable times.

Declaration

I certify that:

1. this thesis comprises only my original work towards the Doctor of Philosophy,
2. due acknowledgment has been made in the text to all other materials used, and
3. this thesis is fewer than the maximum word limit of 100,000 words in length, exclusive of tables, maps, bibliographies, and appendices.

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Contents

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CHAPTER 1

Introduction

In their seminal paper, Jensen and Meckling [1976] suggest that a solution to the agency problem of debt is to base the manager's compensation on both debt and equity values. In other words, a manager's compensation should contain one component whose payment priority resembles that of debt (a.k.a. *"inside debt"*), and one of equity (a.k.a. *"inside equity"*). After the U.S. Securities Exchange and Commission (the "SEC") revised the disclosure rules in 2006, empirical papers start using the present value of supplemental retirement benefits held by a chief executive officer ("CEO") as a proxy for CEO inside debt. These empirical studies, together with the theoretical paper by Edmans and Liu [2011], confirm Jensen and Meckling's prediction. High CEO inside debt is associated with conservative management and reduced agency cost of debt.[1] However, it remains unclear whether U.S. companies use CEO inside debt as a mechanism to address the agency problem of debt. The grant of supplemental retirement benefits (i.e. inside debt) might originate from rent extraction purposes, as argued in Bebchuk and Fried [2004] and Bebchuk and Jackson Jr [2005], and happens to encourage risk aversion among CEOs. Hence, this thesis aims to investigate whether companies use CEO inside debt as a mechanism to address the agency problem of debt. More specifically, I examine how companies adjust their use of CEO inside debt in three corporate events that in-

[1] For example, CEOs refrain from taking risks (Sundaram and Yermack [2007], Cassell et al. [2012]), accumulate more unused cash (Liu et al. [2014]), and tend to make diversified acquisitions (Phan [2014]). As a result, the agency problem of debt is mitigated and companies can raise debt at a relatively lower cost, including fewer restrictive covenants and offering lower yield spreads (Wei and Yermack [2011], Anantharaman et al. [2013], Dang and Phan [2016], Freund et al. [2018]).

volve changes to the agency problem of debt. These corporate events include: (i) active blockholder emergence, (ii) anti-takeover provision removal, and (iii) bond issuance.

Chapter 2 presents a comprehensive literature review on the agency problem of debt and CEO inside debt. The agency problem of debt, also known as the shareholder-debtholder agency conflict, generally refers to any managerial decisions that benefit shareholders at debtholders' expense. First, I review relevant papers that model the agency problem of debt. For theoretical frameworks, I discuss two famous examples of the shareholder-debtholder agency conflict: the risk-shifting problem (Jensen and Meckling [1976]) and the underinvestment problem (Myers [1977]). When reviewing empirical studies, I focus on explaining why certain proxies are commonly used to measure the agency problem of debt. Second, I examine the literature that shows how inside debt can align a CEO's incentives to creditors' interests, thus mitigating the agency problem of debt. I first explore two theoretical papers that explain how inside debt affects a CEO's choice of risk (Jensen and Meckling [1976]) and choice of efforts (Edmans and Liu [2011]). Next, I describe the institutional details that qualify supplemental retirement benefits for a measure of inside debt. Finally, I review empirical evidence of mitigated agency cost of debt in the presence of high CEO inside debt.

Chapter 3 presents the dataset that I have manually collected from SEC EDGAR for this thesis. This dataset contains CEO compensation of nearly six thousand U.S. public companies from the fiscal years 2006 to 2017. First, I describe the typical structures and contents of three compensation tables, from which I extract the necessary data. Second, I provide the descriptive statistics of different components in CEO compensation of U.S. public firms. Third, I compare and contrast my measure of CEO inside debt-equity ratio with those that are commonly used in the literature.

Chapter 4 investigates whether new active blockholders[2] incentivize CEOs to increase total firm value or to increase only equity value. This study aims to shed light on the debate over how active blockholders, defined as 13D investors, create value for shareholders

[2] "New active blockholders" refer to the 13D investors that emerge after 2007, as compared with those that emerged before this year. For the rest of this thesis, two terminologies "new active blockholders" and "active blockholders" both refer to the same group of 13D filers, and are used interchangeably.

of the companies that they target. On the one hand, the "active monitoring hypothesis" predicts that active blockholders monitor the entrenched CEOs and improve firm value, which benefits both shareholders and debtholders (Shleifer and Vishny [1986], Brav et al. [2008]). On the other hand, the "wealth extraction hypothesis" argues that active blockholders do not create any value but utilize their large holdings to force the management to shift risks from shareholders to debtholders (Bhojraj and Sengupta [2003], Klein and Zur [2011]). By investigating how new active blockholders affect the balance in CEOs' incentives between debtholders' and shareholders' interests, I document evidence that active blockholders aim to increase total firm value, not just equity value.

I collect from various SEC filings the data on CEO compensation and active blockholders' presence in 5,775 U.S. public companies from 2006 to 2017. First, I build on the optimal contracting studies to measure the deviation from a *target* inside debt-equity ratio that incentivizes a CEO to maximize total firm value. This deviation measure captures how much the current pay structure is inappropriate to maximize firm value, as disclosures of large deviations trigger negative stock and bond price reactions. Second, I examine how new active blockholders adjust these deviations, and relate such adjustments to changes in stock and bond values. If the "active monitoring hypothesis" holds, active blockholders would reduce deviations from the *target* structures, which increases both equity and bond values. If the "wealth extraction hypothesis" holds, active blockholders would inflate deviations from the *target* structures, which increases equity value but decreases bond value.

I find evidence that supports the "active monitoring hypothesis". Deviations from the *target* pay structures are large before active blockholders emerge, but significantly decline once these investors are present. These strong compensation adjustments disappear after active blockholders "exit". Reduced deviations from the *target* structures are associated with increases in both stock and bond returns over the active block holding period. In addition, new active blockholders arise and restructure compensation when the initial inside debt-equity ratios over-align CEOs' incentives to either shareholders' or debtholders' interests. Stock and bond returns both increase significantly when active blockholders adjust equity-biased pay structures. Even when active blockholders fix debt-biased pay structures, which involves reducing inside debt more than inside equity, stock returns rise significantly while bond returns do not fall. These findings suggest that the gains to shareholders in the companies targeted by active blockholders do not come from the losses to their debtholders.

Next, I explore three alternative explanations for the coincidence of active blockholders' presence and significant adjustments in CEO inside debt-equity ratios. First, active blockholders might be able to anticipate which companies would restructure CEO compensation by themselves, and largely invest in these companies to gain from the beneficial adjustments. If superb stock-picking skill can explain the main finding, all the companies attracting the same blockholders would experience strong CEO pay adjustments, regardless of the investors' filing types. However, I find that companies in which blockholders disclose monitoring intentions have significantly larger adjustments than those in which the same blockholders only disclose investment intentions. Second, deviations from the *target* structures might follow a mean-reverting process in which large values would be followed by strong declines, even without the presence of active blockholders. I run a placebo test on a group of matched firms that have the same industries and compensation adjustments as those of the targeted firms during two years before active blockholders arise. I find that the result in the placebo test is significantly different from that in the main test. Third, some firm characteristics might co-determine the presence of active blockholders and CEO compensation adjustments. I run another placebo test on a group of matched firms that have the same industries and propensities to attract new active blockholders as those of the targeted firms. I also observe significant difference between this placebo test and the main test.

Finally, I investigate the channel for active blockholders to adjust CEO compensation. Consistent with Bebchuk et al. [2020], I show that the compensation adjustments by active blockholders are significantly stronger when these investors can appoint their favored directors into the targeted firms' boards. The effect is the strongest if the directors are appointed into compensation or governance committees. However, board representation is not the only channel for active blockholders to restructure CEO compensation. Active blockholders with industry experience or concentrated resources can still strongly adjust CEO inside debt-equity ratios, even when they do not appoint any directors.

Chapter 5 examines the changes in CEO inside debt-equity ratios after companies remove firm-level antitakeover provisions ("ATPs"). On the one hand, the "complementary monitoring hypothesis" predicts decreases in CEO inside debt-equity ratios. Removing ATPs is considered as an improvement in shareholder governance, which is often associated with increased use of inside equity to mitigate the shareholder-manager agency conflict (Hartzell and Starks [2003], Clifford and Lindsey [2016]). On the other hand, the "optimal contracting hypothesis" predicts increases in CEO inside debt-equity ratios. Leverage often increases and the agency problem of debt is exacerbated after companies remove ATPs, which should be addressed by increased use of inside debt (Jensen and Meckling [1976], Edmans and Liu [2011]). By using a difference-in-difference-in-difference ("diff-in-diff-in-diff") analysis, I find that inside debt-equity ratios, as well as inside debt, significantly increase after companies remove ATPs.

First, I identify 525 unique S&P 1500 firms that remove ATPs between 2009 and 2017, which I refer to as the "repeal firms". Next, I assign 469 unique matched firms that have the same industries and propensities to remove ATPs as those of the repeal firms. The propensity scores take into account any proposals to remove ATPs within the last five years and some other existing governance mechanisms. Finally, I validate the argument that leverage significantly increases after companies remove ATPs by using Garvey and Hanka [1999]'s model, since there is no direct evidence for this argument.

For the main test, I conduct a diff-in-diff-in-diff analysis, which compares the changes in CEO inside debt-equity ratios between repeal firms and their matches, before and after ATP removals. I find that repeal firms increase their CEO inside debt-equity ratios significantly more than their matches after ATPs are removed. Repeal firms also significantly increase their CEO inside debt after removing ATPs, which accounts for 70% of the increases in the overall ratios. In contrast to the "complementary monitoring hypothesis", inside equity significantly decreases after repeal firms remove ATPs, as they reduce stock and option awards to their CEOs. These main findings do not change when I (i) use number of removed ATPs as the main explanatory variable, (ii) change the matching sample, or (iii) consider the removals of certain ATPs. Additional analysis shows that inside debt-equity ratios significantly rise for the first three years after repeal firms remove ATPs. This trend coincides with the periods in which repeal companies issue more debt and significantly increase their leverage. These findings all support the "optimal contracting hypothesis" that repeal firms increase their CEO inside debt-equity ratios after removing ATPs to address the heightened agency problem of debt that is caused by heavier use of leverage.

The "optimal contracting hypothesis" argues that companies mitigate the shareholder-debtholder agency conflict, by granting their CEOs more inside debt, to avoid costly debt financing. Consistent with this argument, I find that increasing inside debt-equity ratios helps repeal firms reduce their offering yield spreads of new debt issues after they remove ATPs. The effect mainly comes from increasing inside debt rather than from decreasing inside equity. Furthermore, increasing inside debt can substitute for the role of covenants in reducing the offering yield spreads.

However, I observe that repeal companies still have higher cost of borrowing than their matches after ATPs are removed. Debtholders still expect that CEOs of repeal firms have stronger risk-taking incentives after these companies remove ATPs, despite their increasing inside debt and decreasing inside equity. It is possible that removing ATPs can substitute for the role of inside equity in providing CEOs with more risk-taking incentives. The subsequent changes in investment policies of repeal firms, as compared with those of their matches, support this conjecture. CEOs of repeal firms take significantly more risks, making more investments and accumulating less cash, than their matches do after ATPs are removed. Tobin's Q and returns on assets also increase more in repeal firms than in matched firms, which suggests that these risky investments do not harm firm value.

Chapter 6 explores whether the timing of bond issuances is associated with disclosures of changes in CEO inside debt. Higher inside debt is associated with lower cost of debt because CEOs are more aligned to debtholders' interests (Anantharaman et al. [2013], Dang and Phan [2016], Freund et al. [2018]). During the months before proxy statement releases, the new changes in CEO inside debt are private information to companies' insiders. Companies can exploit this information asymmetry to issue bonds when the market, based on publicly available information of inside debt, perceives these companies' debt agency problems as relatively insignificant. More specifically, companies can choose to offer bonds right after disclosing increases or before disclosing decreases in their CEO inside debt. Alternatively, companies might not adopt these timing strategies because they can have other more flexible methods to affect security prices. One such method is to adjust the flows of voluntary news disclosures around corporate events (Lang and Lundholm [2000], Brockman et al. [2008], Ahern and Sosyura [2014]). I find evidence that companies time their bond offerings based on their disclosures of CEO inside debt. Bond offerings cluster in the immediate quarters after disclosures of increases or before disclosures of decreases in their CEO inside debt.

For the main analysis, I compare the concentration of bond offerings in the immediate quarters before or after disclosures with that in the second quarters after disclosures, which are the control quarters. For each firm-quarter, I capture the concentration of bond offerings by using three measures: indicator of offering incidence, number of new bond issues, and size of the offerings. In the years that issuing companies disclose positive changes in their CEO inside debt, the concentration of bond offerings significantly increases in the immediate quarters after disclosures. To the contrary, bond offerings cluster in the immediate quarters before disclosures when issuing companies disclose negative changes in their CEO inside debt. These results are robust to all three measures of bond offering concentration. Furthermore, the tendencies to adopt the timing strategies based on CEO compensation disclosures increase with the magnitudes of the disclosed changes.

However,the above-described strategies require companies to issue bonds within narrow windows of time around compensation disclosures. Hence, only companies that can issue bonds quickly or those that have quite a severe agency problem of debt are willing to adopt these timing strategies. First, regular bond issuers tend to time their bond issuances based on inside debt disclosures. These firms normally have shelf registrations and established relations with underwriters, which allows them to issue bonds at short notice. Second, issuers of long-term bonds have slightly stronger tendencies to adopt these timing strategies than those of short-term bonds. However, the difference between these two groups of issuers is not significant. Third, companies tend to adopt these timing strategies more when their bond issues do not include restrictive covenants, especially the debt-restriction covenants. Holders of such bonds are more vulnerable to the agency problem of debt, so their issuers need to offer these bonds when the market perceives this agency conflict as relatively insignificant.

Chapter 7 concludes the thesis. First, I summarize the motivations and main findings of three essays; and briefly explain how the results are interesting. Second, I propose some preliminary ideas for future research on (i) how CEOs treat inside debt in financial distress; (ii) how inside debt might affect non-financial decisions; and (iii) how companies determine their inside debt dynamically.

CHAPTER 2

Literature Review

2.1 Agency problem of debt

2.1.1 Theoretical framework

The agency problem of debt occurs when the manager takes actions that benefit shareholders at debtholders' expense. Two well-known examples of these opportunistic actions are the risk-shifting problem in Jensen and Meckling [1976] and the underinvestment problem in Myers [1977]. When modeling the agency problem of debt, both papers make the following assumptions:

[1] The manager acts in the shareholders' interests.[1]

[2] The debt is issued before the manager makes the investment decision. The debtholders cannot prevent the manager from making the "wrong" decision.[2]

The risk-shifting problem

According to Jensen and Meckling [1976], the risk-shifting problem occurs when the manager promises to take the safe project when raising debt, but switches to the risky one afterwards. In their model, a manger-owned company with no outstanding debt has two mutually exclusive projects that differ in the idiosyncratic risks, but are otherwise

[1] In Jensen and Meckling [1976], the manager is also the company owner who can sell a fraction of his shares to the outside investors. In Myers [1977], there is not a manager but instead "a firm (...) which acts in its stockholders' interest".

[2] Myers [1977] requires that the debt matures after the investment decision is made.

identical (i.e. same expected payoffs, and same systematic risks). The market value of the cash flow from each project is the same, so the manager-owner of a sole-equity company will be indifferent between the two projects.

However, his preference will change if the manager-owner can issue bond before making the investment decision. With outstanding bond, holding equity is similar to holding a European call option whose strike price equals the face value of the bond. Since the value of a European call option increases with the variance of the payoff, equity value is higher if the risky project is chosen. Given assumption [1], the manager-owner strictly prefers the risky project. However, signaling the intention to take the risky project will decrease bond price. Given assumption [2], the manager-owner has the incentive to execute the following strategy. First, he promises to take the safe project and sells the bond at a higher price. After selling the bond, he opts to take the risky project. By doing so, the manager-owner shifts risk from the shareholders to the (naive) bondholders.

One might argue that there is no real agency problem in this case because the manager-owner also weakly prefers the risky project when there is no debt outstanding. Therefore, Jensen and Meckling relax the assumption of equal market value. They now assume that the cash flow of the safe project has a higher market value than that of the risky project. The manager-owner of a sole-equity firm now strictly prefers the safe project. By choosing the risky project instead, the manager-owner will cause a loss to the total firm value. However, the manager-owner still has the incentive to shift risk if the gain from differential bond prices, which is the wealth extracted from the bondholders, can cover the loss in equity value.

The underinvestment problem

According to Myers [1977], the under-investment problem occurs when the manager, due to outstanding debt, forgoes some investment opportunities that yield positive net present value ("NPV"). In this model, investment is a real option that the manager can choose whether to exercise or not. The manager of a sole-equity firm will choose to invest if the project yields a positive NPV, i.e. whenever the payoff exceeds the initial outlay.

However, the investment choice will change if the manager raises debt before deciding whether to invest or not. Note that the manager does not yet observe the payoff of the investment at the time that he raises debt. The manager of this levered firm chooses to invest only if the payoff can cover both the initial outlay and the debt repayment. Any project whose payoff is higher than the initial outlay but lower than the sum of this outlay and debt repayment will be rejected, even though it yields a positive NPV; because this positive NPV will all go to debtholders. The payoff to shareholders will be zero, just like when the manager does not invest and the firm goes bankrupt.[3]

The expected value to debtholders will be lower when the manager requires a higher payoff to start investing. When the investment threshold is low, debtholders earn non-zero payoff whenever the project yields a positive NPV. However, debtholders will earn non-zero payoff in fewer states, i.e. the probability of earning is lower, if the manager delays investment until observing a very high payoff.

In addition, Myers shows that the manager's preference for risky projects (due to assumption [1]) might intensify the under-investment problem. The author first models the fact that positive NPV all goes to debtholders in some states as a wealth transfer from shareholders, who make the investment decision, to debtholders, who contribute nothing. Next, he relaxes the assumption that discretionary investment opportunities do not affect the variance of market value. If more investment can reduce the variance of market value, the wealth transfered to debtholders will become even larger. A manager, who acts in the shareholders' interests and prefers more risks, will have even stronger incentive to reduce investment, thus worsening the underinvestment problem. If the manager focuses on increasing risk by exercising some negative-NPV projects, the value of wealth transfer becomes negative, which redirects the wealth transfer to shareholders as shown in Jensen and Meckling [1976].

[3] "Limited liability" is assumed here, so the shareholders are only liable up to the amount that they have invested in the firm.

2.1.2 Empirical evidence

Increasing cost of debt

Both Jensen and Meckling [1976] and Myers [1977] agree that debtholders, in practice, are neither naive nor powerless as simplified in the models. Rational debtholders will expect that the manager might shift-risk or under-invest. Therefore, they require a higher rate of return to cover for either the possible losses or the monitoring costs to prevent the manager from expropriating their wealth. A higher rate of return on debt will reduce bond prices, increase bonds' yield-to-maturity, or increase bank loans' interest rates. Likewise, credit rating agencies take into account the possibility that the borrowers might not repay the debt in full to issue their "opinions" on the debt quality (White [2010]). These agencies are more likely to issue bad ratings when the agency problem of debt, hence the likelihood of default, is higher. In short, empirical studies often proxy for the heightened agency problem of debt by using the following measurements:

1. decreasing bond returns: Warga and Welch [1993], Maxwell and Rao [2003], Maxwell and Stephens [2003], Billett et al. [2004], Adams and Mansi [2009], Billett et al. [2010], Klein and Zur [2011], Jory et al. [2017]

2. increasing yield spreads[4]: Klock et al. [2005], Ortiz-Molina [2006], Cremers et al. [2007], Chava et al. [2009], Qiu and Yu [2009], Francis et al. [2010], Dahiya et al. [2020]

3. deteriorating credit ratings: Bhojraj and Sengupta [2003], Maxwell and Rao [2003], Maxwell and Stephens [2003], Cremers et al. [2007], Imbierowicz and Wahrenburg [2013]

The agency problem of debt is often studied in association with the corporate events or corporate policy changes that benefit shareholders. The first type of such events involve changes in the asset structures and/or in the cash flow distributed to shareholders. Some

[4] For the bond sample, yield spreads equal bond yields minus yields of the Treasury bonds with similar duration or maturity. For the bank loan sample, yields spreads equal interest rate minus LIBOR rate.

of these incidences, among others, include: mergers (Billett et al. [2004], Imbierowicz and Wahrenburg [2013]), LBOs (Warga and Welch [1993]), spin-offs (Maxwell and Rao [2003]), and share repurchases (Maxwell and Stephens [2003]).

The second type of changes that might intensify the agency problem of debt involves the strengthening of shareholder governance, such as blockholders' presence (Bhojraj and Sengupta [2003], Klein and Zur [2011], Jory et al. [2017], Dahiya et al. [2020]), or enhanced shareholder rights (Klock et al. [2005], Cremers et al. [2007], Chava et al. [2009], Qiu and Yu [2009], Francis et al. [2010]).

The third type of events involve changes in CEOs' incentives, which might be triggered by compensation restructuring (Ortiz-Molina [2006], Billett et al. [2010]) or CEO turnover (Adams and Mansi [2009]).

The wealth transfer from debtholders to shareholders

Jensen and Meckling [1976] model the wealth transfer from debtholders to shareholders as a result of the risk-shifting problem. Myers [1977] argues that the underinvestment problem occurs because the manager, acting for the shareholders' interests, wants to reduce or even reverse the wealth transfer from shareholders to debtholders. Hence, the existence of a wealth transfer from debtholders to shareholders is also viewed as evidence of the shareholder-debtholder agency conflict.

Empirical papers often rely on the negative correlation between abnormal stock returns and bond returns around a corporate event to conclude about the existence and the magnitude of the wealth transfer. The significantly positive abnormal stock returns and their negative correlation with abnormal bond returns suggest that there is wealth transfer from bondholders to shareholders. However, the magnitude of this wealth transfer is quite small. On average, bondholders' losses can account for only 6 percentage points increase in equity returns during LBOs (Warga and Welch [1993]), 4.8 dollars increase in the market value of equity durings spin-offs (Maxwell and Rao [2003]), and 3.5 to 5 percentage points increase in equity returns after hedge fund blockholders arise (Klein and Zur [2011], Jory et al. [2017]).

There is also indirect evidence of wealth transfer from debtholders to shareholders. Imbierowicz and Wahrenburg [2013] find significant increases in abnormal stock returns and in CDS spreads, when companies unexpectedly increase leverage or when they are acquired. The authors interpret this positive correlation between abnormal stock returns and CDS spreads as evidence of wealth transfer from debtholders to shareholders. Dahiya et al. [2020] show that the increase in the cost of bank loans after hedge fund blockholders emerge clusters in the quartile of the sample that contains the targeted firms with the highest cumulative abnormal stock returns. The authors also interpret this finding as evidence of wealth transfer initiated by large shareholders.

Increasing leverage

Another proxy for the intensified agency problem of debt is high book leverage. However, high book leverage is a "noisy" proxy because there are two competing bodies of literature that assess its impact of debtholders' value.

On the one hand, high leverage might exacerbate the agency problem of debt. First, high leverage increases the risk of bankruptcy, which reduces the value to debtholders because of dead-weight loss and reordering of priority claims (Warga and Welch [1993]). Franks and Torous [1994] find evidence that senior debtholders are willing to compensate the shareholders to avoid reorganization via filing for for Chapter 11.[5] Early empirical studies document that the Absolute Priorty Rule ("APR") - the rule that ensures repayment to senior debtholders before any other stakeholders in case of bankruptcy - is violated in favor of the shareholders in 75% of the studied sample (Franks and Torous [1989], Weiss [1990], Eberhart et al. [1990], Eberhart and Senbet [1993]).

Second, the risk-shifting and the underinvestment incentives both increase with leverage. In Jensen and Meckling [1976]'s model, higher leverage will increase the exercise price of the European call option to which equity is equivalent. To offset the decline in option value caused by higher exercise price, the manager needs to increase the variance of the payoff, i.e. increase risks. Mello and Parsons [1992] show that the agency cost of debt

[5]Senior debtholders give up 9.5% of firm value, by allowing for APR violation, to the shareholders during informal reorganization. During bankruptcy reorganization, the shareholders only get 2.3%.

increases and total firm value decreases with bond payment, by using a contingent claims model to estimate the incentive effect of capital structure. Leland [1998] shows that the optimal level of debt decreases with the agency cost caused by Jensen and Meckling's risk-shifting problem.[6] Myers [1977]'s underinvestment problem is also worsened with higher leverage because the payoff threshold for the manager to start investing increases with leverage. Parrino and Weisbach [1999], by utilizing numerical simulation method, document evidence of the underinvestment problem and conclude that this agency problem increases with leverage.[7]

The corporate events or changes that cause decreasing bond prices or increasing yield spreads are often accompanied by increases in leverage. Leverage increases in targeted firms after LBOs (Warga and Welch [1993]), in combined firms after mergers (Dann and DeAngelo [1988], Ghosh and Jain [2000]), and even in the targeted firms of failed mergers (Berger et al. [1997], Safieddine and Titman [1999]). Garvey and Hanka [1999] show that leverage decreases after shareholder rights are weakened due to changes in state legistration. Klein and Zur [2011] and Jory et al. [2017] argue that hedge fund blockholders persuade the managers of the targeted firms to increase leverage and distribute the funds as dividend payout, which might explain why bondholders in these companies lose after hedge fund blockholders arise.

Many empirical works also suggest that even the concern of leverage increase is sufficient for creditors to raise the cost of debt. Cremers et al. [2007] and Farre-Mensa [2010] show that the positive correlation between enhanced shareholder rights and the cost of debt disappears when issuing companies include the covenants that restrict new debt creation. Chava et al. [2009] display that this positive correlation becomes even stronger when borrowing companies have low leverage, arguing that such companies are

[6] Specifically, the author shows that an optimal capital structure balances the tax benefits of debt with the costs associated with this security, including the default cost and the agency cost resulting from the risk-shifting problem.

[7] The authors show that a hypothetical company with 20% of leverage requires a rate of return that is 0.14% higher than the return to yield a zero NPV project to start investing. This very same company, however, is willing to accept a project whose rate of return is 2.35% lower than the return to yield a zero NPV project, because the project can produce a cash flow that is eight times more volatile than the firm's cash flow. The required rate of return for positive (negative) NPV project increases (decreases) with leverage.

more prone to leverage-increasing acquisitions.

On the other hand, a body of the literature stresses the benefits of using more debt on firm value, thus arguing that high leverage does not necessarily exacerbate the agency problem of debt. First, interest payment can be deducted from the taxable income, creating a tax-shield the companies (Miller [1977]). Second, high leverage might be used as a form of corporate governance. Jensen [1986] propose that debt creation might solve the free cash flow problem because the bankruptcy legal enforcement forces the manager to invest the free cash flow in profitable projects. Hart and Moore [1998] construct a model in which the heavy use of long-term debt discourages the manager from building empire (i.e. investing in negative NPV projects). Also working on empire-building incentive, Zwiebel [1996] suggests that the manager might voluntarily raise debt to constrain his own future empire-building activities, in exchange for no control challenges. Some empirical works also document that the increase in leverage improves investment efficiency (Safieddine and Titman [1999]), and reduces the over-investment in real assets (DMello and Miranda [2010]). In line with these findings, Klein and Zur [2009] suggest that hedge fund activists increase leverage to address the free cash flow problem in the company that they target.

2.2 Inside debt

2.2.1 Inside debt and the agency problem of debt - theoretical explanation

Inside debt and managerial choice of risks

Theories on the agency problem of debt assume that the manager always acts in the best interests of shareholders. Jensen and Meckling [1976] argue that this assumption is relevant if compensation to this manager solely depends on equity value. The authors then propose that a solution to the agency problem of debt, or more precisely to the risk-shifting problem, is to base managerial compensation on both debt and equity values.

In other words, the compensation of a manager should contain one component whose payment priority resembles that of debt (a.k.a. *"inside debt"*), and one of equity (a.k.a. *"inside equity"*). Jensen and Meckling argue that any gains from inside equity due to excessive risk-taking will be offset by losses from inside debt. Therefore, the manager has weaker incentives to shift risks from shareholders to debtholders when he holds more inside debt. Specifically, when the ratio between inside debt and inside equity perfectly mimics the firms' debt-equity ratio, the manager would have no incentives to shift risks between shareholders and debtholders.

Inside debt and managerial choice of efforts

Edmans and Liu [2011] models the optimal mix of inside debt and inside equity to maximize total firm value. In their main model, the managerial compensation contains both inside debt ($\boldsymbol{\beta}$) and inside equity ($\boldsymbol{\alpha}$), as a fraction of outside debt and outside equity respectively. In practice, managerial compensation is not set as a fraction, but rather as an absolute amount or number.[8] The assumption of fractional compensation simplifies the derivation of the model, while still preserving the important characteristics of inside debt and inside equity. If the firm remains solvent, the manager receives a fixed payment that equals a fraction $\boldsymbol{\beta}$ of the debt face value. If the firm goes bankrupt, the manager receives a fraction $\boldsymbol{\beta}$ of the remaining firm value. Similarly, the manager receives a fraction $\boldsymbol{\alpha}$ of equity market value in the solvency state, and nothing in the bankruptcy state.

First, Edmans and Liu formally verify Jensen and Meckling [1976]'s argument that high inside debt makes the manager less willing to choose the risky project. The intuition is that inside debt can be partially or totally lost in case of bankruptcy, so the manager has an incentive to avoid bankruptcy by choosing the safe project. More formally, the manager in the model chooses between two mutually exclusive investment projects: a safe project versus a risky one. Debtholders prefer the safe project because it has lower

[8] Inside debt is set as a fixed dollar amount. Inside equity is awarded in number of shares or options. However, Edmans and Liu's assumption of fractional compensation does not largely deviates from industry practice because the manager only makes decision in one single period during which the value of outside debt and equity remains unchanged.

probability of bankruptcy, and generates higher cash flow in the bankruptcy state. In contrast, shareholders prefer the risky project because it generates a higher cash flow in the solvency state, despite its higher probability of bankruptcy. A higher inside debt fraction $\boldsymbol{\beta}$ increases the personal loss to the manager if he chooses the risky project and the chosen project fails. Hence, the manager only chooses the risky project if the cash flow it generates in the solvency state is high enough, thus higher inside equity, to cover this loss. In technical term, the cash flow generated by the risky project in the solvency state must surpass a cut-off point which is an increasing function of the inside debt fraction $\boldsymbol{\beta}$.

Next, Edmans and Liu propose that high inside debt can motivate managerial effort in case of bankruptcy. The intuition is that how much the manager receives from inside debt during bankruptcy strongly depends on the liquidation value, so he is willing to work hard to protect the firm's remaining value. In the model, the manager, by exerting effort, can increase the probability that firm value rises by a certain amount if the firm goes bankrupt For example, maintaining factories and machines might later increase the liquidation value in case of bankruptcy, but would not add much value if the firm remains solvent. The manager faces the trade-off that exerting more effort increases his expected payoff, but doing so is costly to himself. The optimal levels of effort balance this trade-off, thus maximizing the manager's expected wealth.[9] The optimal effort level is an increasing function of inside debt fraction $\boldsymbol{\beta}$. The manager is more willing to exert effort if he can capture a larger fraction of the benefits stemming from this effort. For its impact on the manager's choice of effort, inside debt might also mitigate Myers [1977]'s underinvestment problem during financial distress or bankruptcy (Weiss [1990], Eberhart and Senbet [1993], Listokin [2007]). [10]

[9]The manager is risk-neutral. His utility function is the expected value of the compensation package.

[10]During bankruptcy, a manager whose compensation is only based on equity value is reluctant to invest in maintaining the fixed assets or coming up with an effective reorganization, even though these investments increase firm value. That is because the these investments only benefit the debtholders. However, if the manager's compensation entitles him to receive some benefits out of the firm value in bankruptcy, he is more willing to make the investment to preserve the firm value.

2.2.2 Supplemental retirement benefits - a measure of inside debt

Revised disclosure rule by SEC in 2006

It is worth noting that no further studies on inside debt were conducted after Jensen and Meckling [1976] until 2000s, possibly because there was no measure for such debt-like compensation. However, some papers after Jensen and Meckling's study still question why managerial compensation only depends on equity value.[11] Sundaram and Yermack [2007] is one of the first papers to revisit inside debt, noting that many large U.S. public companies compensate their CEOs with the retirement benefits that resemble debt obligations. Since the U.S. Securities and Exchange Commission ("SEC") revised the disclosure rule in 2006 requiring more detailed disclosures of the executives' retirement benefits, this debt-like compensation has attracted more media attentions and research efforts.

Before 2006, companies were not required to disclose the value of the supplemental defined-benefit pensions and non-qualified deferred compensations that they offered exclusively to their top executives. The existence and sizable magnitude of these benefits only drew public attention after a series of scandalous bankruptcies and accounting frauds were reported between mid 1990s and early 2000s. Some academics suggested that these non-qualified retirement benefits were used to hide excessive executive rents, hence urging for more transparent disclosure rules for these types of compensation (Bebchuk and Fried [2004], Bebchuk and Jackson Jr [2005]). Hence, the SEC revised the disclosure rule related to executive compensation that applied for fiscal years ending on or after December 15, 2006. The new disclosure rules were intended, among other purposes, to (i) "*provide investors with a clearer and more complete picture of the compensation earned by a company's (...) highest paid executive officers*", and (ii) "*provide better information about key financial relationships among companies and their executive officers*".[12] The

[11] For example, see Dewatripont and Tirole [1994], Listokin [2007].

[12] More information can be found at https://www.sec.gov/rules/final/2006/33-8732afr.pdf

newly revised rule also requires more detailed disclosure for all different tranches of vested and unvested stocks and options that the executives are holdings at fiscal year end. More details about the new disclosure requirements for each type of executive compensation are provided in the next chapter, which describes data collection process.

Common facts about retirement benefits in U.S.

Many U.S. public companies offer defined-benefit ("DB") pensions to their employees. As the name of the plan suggests, the companies guaranteed a fixed amount of benefits to their employees after they retire or after they have been with the companies for a certain number of years. DB pension plans are broadly divided into qualified plans and non-qualified plans. Qualified plans which are governed by the Employee Retirement Income Security Act of 1974 ("ERISA") must be offered to all employees. Qualified plans are funded and secured. The funds for qualified DB plans are set aside and inaccessible by any creditors. In case of bankruptcy, the Pension Benefit Guaranty Corporation ("PBGC"), a U.S. government agency, guarantees a maximum monthly payment of US$ 5,812.50 (US$ 69,750 a year) as of 2020 for a participant employee who retires at the age of 65.[13] Any contributions into qualified DB pension plans are "qualified" for tax deduction. However, the annual benefit of qualified DB plans for one participant cannot exceed the lesser of (i) 100% of the participant's average compensation for the highest three consecutive calendar years, or (ii) US$ 230,000 as for year 2020.[14]

The capped amount of US$ 230,000 is argued to be too low for an executive, whose annual compensation before retirement can total millions of dollars, to maintain his post-employment life. Hence, many companies offer non-qualified DB pension plans, also known as Supplemental Executive Retirement Plans ("*SERPs*"), to their senior executives. In general, the companies that offer SERPs claim that they do so to retain the key talents. Some companies explain that they need to provide sufficient retirement benefits

[13] "*Maximum Monthly Guarantee Tables*", PBGC website, accessed on March 2020, https://www.pbgc.gov/wr/benefits/guaranteed-benefits/maximum-guarantee

[14] "*Retirement Topics - Defined Benefit Plan Benefit Limits*", the Internal Revenue Service website, accessed on March 2020, https://www.irs.gov/retirement-plans/plan-participant-employee/retirement-topics-defined-benefit-plan-benefit-limits

to their executives so that these executives can focus on increasing firm's value now. Others vaguely claim that SERPs are now an industry norm, so a competitive compensation package needs to contain these DB pension plans. SERPs are generally unfunded and unsecured by the employing companies, meaning that the benefits of these plans will become general unsecured debt in case of bankruptcy. SERPs are definitely not insured by the PBGC, and contributions into these plans are not qualified for tax deduction.

According to the Internal Revenue Service ("IRS"), SERPs are one type of Nonqualified Deferred Compensation plans ("NQDC plans").[15] NQDC plans allow participants to delay receiving the compensation until some time in the future, without incurring any tax payment until the funds are distributed. Beside SERPs, companies can elect or allow the executives to elect deferring into NQDC plans any excess salary, bonuses, or benefits that are not tax deductible. For example, any compensation in excess of US$ 1 million is not eligible for tax deduction according to section 162(m) of the Internal Revenue Code ("IRC").[16] Another example NQDCPs use is when the companies offer defined-contribution pension plans to their employees. The capped contribution for tax deduction is US$19,500 as in year 2020.[17] If the companies want to contribute more than this limit for their top executives, they can make the excess contributions into NQDC plans. After the SEC revised the disclosure rule in 2006, companies are required to disclose the pension benefits and other NQDC plans separately.

A series of bankruptcies in mid 1990s stirred up a lot of public criticism as their contemporary executives got the full retirement benefits while the retired executives and employees lost almost everything.[18] Debtors-in-possessions simply filed for court permission to assume the compensation plans of all incumbent executives, claiming that doing so was necessary to retain key people. The bankruptcy courts normally approved

[15] "Nonqualified Deferred Compensation Audit Techniques Guide (June 2015)", the Internal Revenue Service website, accessed on March 2020, https://www.irs.gov/businesses/corporations/nonqualified-deferred-compensation-audit-techniques-guide

[16] "*Code 162*", Legal Information Institute - Cornell Law School website, accessed on March 2020, https://www.law.cornell.edu/uscode/text/26/162

[17] "*Retirement Topics - 401(k) and Profit-Sharing Plan Contribution Limits*", the Internal Revenue Service website, accessed on March 2020, https://www.irs.gov/retirement-plans/plan-participant-employee/retirement-topics-401k-and-profit-sharing-plan-contribution-limits

[18] "*Managers Staying Dry As Corporations Sink*", The New York Times, accessed on March 2020, https://www.nytimes.com/1996/10/14/business/managers-staying-dry-as-corporations-sink.html

such kinds of compensation motions (Mayer and Caplan [2006], Massel [2007], Suhreptz [2008]). "The legislature took notice and acted" - Suhreptz [2008]. The Bankruptcy Abuse Prevention and Consumer Protection Act that was enacted in 2005 has a new section 503(c) to restrict the use of Key Employee Retention Plans ("KERPs") during the bankruptcy process.

The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005

The enactment of the Bankruptcy Abuse Prevention and Consumer Protection Act ("BAPCPA"), and section 503(c) in particular, makes it much more difficult for companies-in-Chapter-11 to offer special KERPs-like compensation plans just to retain key insiders. The bankruptcy courts, however, are more likely to approve the compensation plans that provide incentives based on firm performance metrics (Mayer and Caplan [2006], Adler et al. [2009]).

A well-known and relevant example is the case of Dana Corporation ("Dana"), an automobile parts maker, which filed for bankruptcy protection under Chapter 11 on March 3, 2006. On June 29, 2006, Dana filed the Initial Compensation Motion, which was then accompanied by a Supplement to Motion, that seek authority to fully assume the pension benefits (SERPs) of the CEO - Michael J. Burns ("Mr. Burns"). This motion was subjected to objection from the U.S. Trustee, the Creditors' Committee, the Equity Committee, the Ad Hoc Noteholders' Committee, and the Unions.[19] For example, the committee of unsecured creditors claims that:

"Ironically, the recently-filed Supplement to the Motion makes matters substantially worse, not better, for creditors. The cosmetic changes to certain of the Employment Agreements do not solve the 503(c) issues. The approach set forth in the Supplement misaligns Executives interests with those of creditors by seeking - without any justification - to assume Mr. Burns prepetition SERP that, if allowed, would have otherwise been paid with other unsecured creditors."[20]

[19] More information about the first motion and the court's opinion can be found at: http://www.nysb.uscourts.gov/content/re-06-10354-brl-dana-corporation-0

[20] More details about this objection can be found at: https://bankruptcylitigationblog.lexblogplatform.com/wp-content/uploads/sites/427/creditor%20comm%20objection%20to%20mgmt%20plan.pdf

The Initial Compensation Motion was denied. After that, Dana filed the Second Compensation Motion that essentially made CEO compensation contingent on good performance outcomes. Specifically, Dana proposed to assume only 60% of the CEO's pension benefits, conditioning on Dana's emergence from bankruptcy and non-termination of pension plans for other employees. The remaining 40% were treated as general unsecured debt. If the conditions for assumption were not met, the whole pension benefits of the CEO became general unsecured claims. The Second Compensation Motion was approved.[21]

The non-qualified retirement plans are offered mainly to retain key executives, so they should be treated as KERPs if the companies file for Chapter 11. Under BAPCPA, it is very difficult for the company-in-distress to guarantee the full payment of its CEO' non-qualified retirement benefits. The CEO will lose a part or even all of his non-qualified retirement benefits in case of bankruptcy, unless he manages to come up with an effective reorganization or liquidation plan. Therefore, a CEO with large non-qualified retirement plans has the incentives to avoid bankruptcy and, if bankruptcy is unavoidable, to retrieve as much value as possible for the general unsecured debtholders.

2.2.3 Inside debt and the agency problem of debt - empirical evidence

It is worth noting that empirical studies on inside debt do not work on the dollar amount of this compensation, but rather work on some versions of its ratio with inside equity. The theoretical frameworks in Jensen and Meckling [1976] and Edmans and Liu [2011] motivate the use of the relative leverage ratio which equals inside debt-equity ratio divided by firm's debt-equity ratio. Wei and Yermack [2011] propose a slightly different measure, which is often referred to as the relative incentive ratio. Relative incentive ratio equals option delta of inside debt divided by option delta of inside equity, then scaled by the same ratio calculated for firm's outside debt and outside equity.

The majority of empirical papers agree that inside debt helps mitigate the agency

[21] More information about the second motion and the court's opinion can be found at: http://www.nysb.uscourts.gov/content/re-06-10354-brl-dana-corporation-1

problem of debt. Bond prices react positively to the disclosures of high inside debt level or to announcements of corporate decisions motivated by high inside debt holdings. Wei and Yermack [2011] find positive bond returns when companies disclose for the first time that inside debt accounts for a large proportion in their CEOs' compensation. Phan [2014] report positive abnormal bond returns when companies announce diversified mergers which result from their CEOs' high inside debt holdings. Bondholders also pay higher prices, hence requiring lower yield spreads, for the new bonds issued by the companies with high CEO inside debt (Dang and Phan [2016], Freund et al. [2018]). Examining the cost of bank loans, Han [2011] and Anantharaman et al. [2013] also find a negative relation between the borrowing firms' CEO inside debt and the yield spreads of the loans. These two papers also show that borrowing firms which have high CEO inside debt include fewer restrictive covenants with the new debt issues.

Empirical papers focus on its effect to discourage the managerial risk-shifting incentives to explain how inside debt mitigates the agency problem of debt. Most empirical papers document the positive correlation between high CEO inside debt and conservative management. The CEOs with high inside debt take less risk (Sundaram and Yermack [2007]), by reducing investment in risky projects, such as R&D activities (Cassell et al. [2012]) or non-diversified acquisitions (Phan [2014]). They accumulate plenty of unused cash whose marginal value to shareholders diminishes (Liu et al. [2014]). They are more willing to reduced leverage when it is too high, but is reluctant to increase leverage when it is too low (Brisker and Wang [2017]). Examining the impact of inside debt in a specifically risky business, Bennett et al. [2015] conclude that the banks whose CEOs hold large inside debt from 2006 have lower default risks during the 2009 financial crisis.

However, some papers argue that inside debt aligns CEOs' and debtholders' interests only when inside debt is unfunded and unsecured like junior outside debt (Anantharaman et al. [2013], Colonnello et al. [2017]). When CEOs are insured against the losses of their inside debt holdings in the bankruptcy state, the incentive-alignment role of this compensation is weakened (Gerakos [2010]).

2.2.4 Inside debt and shareholders' value - empirical evidence

There is a mixed conclusion about the impact of CEO inside debt on shareholders' value. On the one hand, a group of studies suggest that high inside debt is detrimental to equity value, most likely because it discourages the CEOs from making risky investment. Wei and Yermack [2011] find negative stock price reactions to disclosures of excessively high CEO inside debt. Similarly, Phan [2014] show that shareholders react negatively to the announcements of diversified mergers that are motivated by high CEO inside debt. Liu et al. [2014] argue that the excessive cash holdings caused by high CEO inside debt is wasteful for shareholders. Bebchuk and Fried [2004] and Bebchuk and Jackson Jr [2005] even claim that the retirement benefits (i.e. inside debt) are only the rents that CEOs manage to extract from their companies, and have no incentive effect on the managerial behaviors.

On the other hand, a group of studies suggest that high CEO inside debt can benefit shareholders, most likely because it helps reduce the cost of capital. Freund et al. [2018] show that shareholders of the companies with high CEO inside debt react positively when these companies raise new bonds at a lower cost. A recent paper by Shen and Zhang [2020] finds that high CEO inside debt even helps reduce the cost of equity, especially among the companies with high leverage. The conclusion about the role of inside debt is especially positive in studies on bank CEOs. During the 2009 financial crisis, the banks whose CEOs hold large inside debt from 2006 have better supervisory ratings (Bennett et al. [2015]), and better asset quality (Van Bekkum [2016]).

2.2.5 Determinants of inside debt

Theoretical explanation

As mentioned in section 2.2.1, Jensen and Meckling [1976] suggest that the optimal inside debt-equity ratio should be the firm's debt-equity ratio. Such an arrangement can totally mitigate the risk-shifting problem. Edmans and Liu [2011] verify that setting CEO inside debt-equity ratio equal to firm's debt-equity ratio is optimal if the manager only affects firm value by making the choice of risk (i.e. choosing between risky and safe projects). In Edmans and Liu's model, that is equivalent to setting the ratio $\boldsymbol{\beta}/\boldsymbol{\alpha}$ equal to 1, or $\boldsymbol{\beta} = \boldsymbol{\alpha}$. The argument is similar to that of Jensen and Meckling [1976]. When $\boldsymbol{\beta} = \boldsymbol{\alpha}$, the manager holds a fixed fraction ($\boldsymbol{\beta}$ or $\boldsymbol{\alpha}$) of the total firm value. Hence, he only chooses the risky project if he observes that its expected cash flow is higher than that of the safe project, and vice verse.

However, Edmans and Liu argue that the manager can also increase firm value by exerting effort. The more effort that the manager exerts, the more likely that firm value will be improved. Hence, more inside debt (inside equity) should be granted if the the managerial effort for bankruptcy (solvency) state is more valuable. The value of each type of managerial effort to the firm value depends on how much likely that its corresponding state will occur and how much incremental value can be created. The authors suggest that these two variables vary cross-sectionally, hence arguing that the optimal inside debt-equity ratio depend not only on capital structure but also on other firm characteristics.

Edmans and Liu conclude that the optimal inside debt-equity ratio balances the trade-off between its effect on project choice and managerial effort choice. Therefore, the optimal CEO inside debt equity ratio might not always be the firm's debt-equity ratio. High bankruptcy threat, high incremental value in bankruptcy state, or bad risky investment with very low cash flow in the bankruptcy state are some characteristics that motivate the heavy use of inside debt. In contrast, a company with low probability of bankruptcy, high incremental value in solvency state, and good risky investment with quite high cash flow even in the bankruptcy state should compensate its manager with more inside equity. In fact, Edmans and Liu claim that the majority of US public companies should fall in the second group where inside equity is used more than inside debt. There are two reasons. First, most public companies are quite far from bankruptcy. Second, the incremental value is normally higher in the solvency state than in the bankruptcy state.

Empirical evidence

Campbell et al. [2016] base on the theoretical frameworks in Jensen and Meckling

[1976] and Edmans and Liu [2011] to estimate the optimal mix between inside debt and inside equity. Their regression model contains multiple characteristics that capture asset structures, capital structures, investment opportunities, risk levels, and CEOs' age and tenure. This paper confirms Edmans and Liu's prediction that the optimal inside debt-equity ratio need not be the firm capital structure. Both stock and bond prices increase when the inside debt-equity ratio shifts towards an optimal ratio estimated from a selection of firm characteristics. This value change does not occur when the inside debt-equity ratio shifts towards the firm's debt-equity ratio.

Freund et al. [2018] use Campbell et al.'s model to estimate the "optimal" structure between inside debt and inside equity. They show that the cost of new bond issues decreases, and stock prices react positively to announcements of new bond issues when CEO compensation of the borrowing companies is set close to the "optimal" structure. In a related working paper, Akins et al. [2019] demonstrate that creditors raise CEO inside debt above the optimal level that is estimated by using Campbell et al.'s model, when these investors take control of the companies after covenant violations.

Even though firm's leverage might not be the only determinant of CEO inside debt, this characteristic is still arguably considered as the most important determinant. Sundaram and Yermack [2007] show that CEOs' pension values increase with firm leverage. Cassell et al. [2012] find a qualitatively similar result, showing that inside debt, which include both pensions and deferred compensations, increases with industry median debt-equity ratio. Cen [2010] finds a non-linear inverted U-shape relation between firm leverage and CEO inside debt. However, he also shows that the negative correlation between firm leverage and inside debt only exists in 4% of the total sample.

However, some papers claim that inside debt, or more precisely the supplemental non-qualified retirement benefits, are rents that the CEOs manage to extract from their companies, rather than an incentive device (Bebchuk and Fried [2004] and Bebchuk and Jackson Jr [2005]). Liu et al. [2014] find a result that is somehow consistent with this conclusion, documenting a positive correlation between Gompers et al. [2003]'s G-Index measured in 2006 and inside debt level in the subsequent years. The authors interpret this result as evidence of managerial rent extraction. Despite working on the optimal contracting theory, Campbell et al. [2016] also report such a positive correlation between G-Index and CEO inside debt in their robustness check. These findings suggest that CEO inside debt, like any other forms of CEO compensation, also depends on the strength of corporate governance.

CHAPTER 3

Data

3.1 Data collection

Existing empirical studies on inside debt mostly use data from ExecuComp, which only covers CEO compensation of S&P 1500 companies. Restricting the analysis to large companies does not provide a complete picture of CEO compensation practice among U.S. public companies, especially when inside debt is still a relatively new research topic. Specifically in the next chapter, I investigate the impact of blockholders, defined as shareholders holding above five percent of equities, on the adjustments of the CEO inside debt-equity ratios. Focusing on S&P 1500 companies might underestimate the result since it is harder for an investor to own above five percent of equities in a large company. In addition, ExecuComp does not specify the filing dates of the proxy statements from which the compensation data are obtained. Since the main analyses of the thesis are based on event-study, determining the dates when the information of CEO compensation becomes public is important. Therefore, I manually collect the data on CEO compensation directly from form DEF 14A (a.k.a the "proxy statement") that U.S. public companies file with the U.S. Securities and Exchange Commission (the "SEC").

I collect the data of CEO compensation packages from any proxy statements that were filed between January 1, 2007 and December 31, 2018. The SEC identifies a company by using its Central Index Key ("CIK"). After collecting the compensation data from SEC EDGAR, I merge them with financial data from Compustat by using the GVKEY-CIK linking table provided by the Wharton Research Data Service (the "WRDS"). After excluding the observations that have no (i) financial data, (ii) outstanding debt, or (iii) two consecutive years of stock trading data, I obtain the final sample of 38,469 observations. The sample spans 12 fiscal years from 2006 to 2017 and contains 5,775 public companies, with an average of 3,200 companies per one fiscal year. About 56% of the companies offer inside debt to their CEOs.

Figure 3.1 provides the total number of companies and the fraction of companies offering CEO inside debt for each fiscal year. The number of companies that offer inside debt remains quite stable across the years. However, there is a slight increase in both the absolute number and in the proportion of companies with inside debt after the financial crisis in 2009.

Figure 3.1: **Number of firms in dataset by fiscal years**

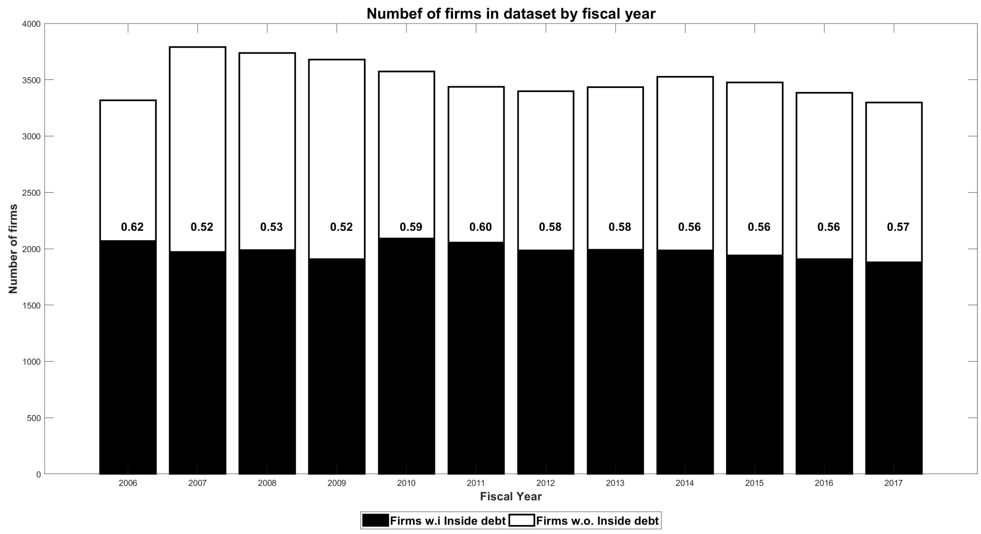


Table 3.1 compares the companies that offer CEO inside debt with those that do not offer CEO inside debt. Large companies are more likely to offer inside debt than small ones. The average company that pays inside debt has the total asset value of US$ 20.67 billion and the market value of US$ 10.10 billion, as compared to US$ 3.18 billion and US$ 2.17 billion of the average company that does not pay inside debt. Tangible assets account for 23.07% of total assets in the companies with inside debt, but only 17.32%

in those without inside debt. The companies offering inside debt also have higher book leverage (24.87%) than those without inside debt (21.09%). In addition, the companies that pay inside debt are likely to be mature companies which have lower market-to-book ratio (1.62), lower R&D spendings over sales (6.26%), and lower sales growth rate (7.21%). The corresponding figures for the companies that do not pay inside debt are 2.71, 66.20%, and 17.80%, respectively. Since they are large and mature firms, the companies that offer inside debt also give their CEOs larger compensation packages. For example, the average inside-debt-company pays its CEO US$ 16.56 million in annual total compensation, while the CEO of the average no-inside-debt-company only earns half of that amount (US$ 8.89 million). All the differences in sample means are significant at 1% level. The findings are consistent with the predictions by Jensen and Meckling [1976] and Edmans and Liu [2011].

Table 3.1: **Characteristics of companies with and without inside debt**

	Inside debt			**No Inside debt**			**Difference**	
	Mean	**Median**	**SD**	**Mean**	**Median**	**SD**	**Diff. in Mean**	**t-stat**
Firm characteristics:								
Total Assets (US$ billion)	20.668	3.0675	24.625	3.1758	0.3298	8.9165	17.493	60.28
Market value (US$ billion)	10.100	2.0594	16.419	2.1747	0.2778	6.6671	7.9251	56.47
Tangible Assets	0.2307	0.1440	0.2436	0.1732	0.0762	0.2228	0.0575	24.40
Market-to-Book	1.6213	1.3129	0.9417	2.7104	1.4837	1.8992	-1.0890	-33.55
Book leverage	0.2487	0.2197	0.1963	0.2109	0.1219	0.2469	0.0378	15.84
R&D expenditures	0.0626	0.0000	0.4908	0.6620	0.0000	3.1566	-0.5994	-32.62
Sales growth	0.0721	0.0471	0.2351	0.1780	0.0728	0.6017	-0.1059	-20.12
Annual CEO compensation (US$ million):								
Salary	2.4219	0.7750	14.422	1.5772	0.4000	12.001	0.8447	7.133
Bonus	0.9450	0.3850	1.2731	0.4377	0.1501	0.8055	0.5073	31.05
Stock grants	2.6668	1.5554	3.2035	1.5684	0.5752	2.6490	1.0984	32.39
Option grants	1.6581	0.9533	2.0167	0.9749	0.3610	1.7009	0.6832	28.93
Other compensation	0.4559	0.0819	1.8066	0.2210	0.0243	1.2610	0.2349	15.33
Total compensation	16.563	3.9892	87.373	8.8937	1.0377	66.378	7.6696	10.41
N		21,773			16,696			

3.2 Inside debt

I follow existing empirical works to measure inside debt by using the present value of pensions and non-qualified deferred compensations. ExecuComp provides one aggregate value for all pension plans (“*pension_value_tot*”) and one aggregate value for all non-qualified deferred compensation plans ("*defer_balance_tot*"). For this thesis, I collect the data for each of a CEO's retirement plans and aggregate over all pension plans and over all deferred compensation plans. However, I exclude, where there is information, any qualified pension plans from inside debt calculation. Some papers argue that inside debt aligns CEOs' and debtholders' interests only when inside debt is unfunded and unsecured like general outside debt (Gerakos [2010], Anantharaman et al. [2013], Colonnello et al. [2017]).

3.2.1 Defined-benefit pension plans under new disclosure rules

Figure 3.2: **Example of Pension Benefits Table**

PENSION BENEFITS

Name (a)	Plan name (b)	Number of years credited service (#) (c)	Present value of accumulated benefit ($) (d)	Payments during last fiscal year ($) (e)
PEO				

Source: https://www.sec.gov/rules/final/2006/33-8732afr.pdf , page. 53186

Figure 3.2 shows the table that SEC recommends for reporting the pension benefits of named executive officers ("NEOs"). The new disclosure rule requires a company to report for each pension plan applicable to each NEO:

(i) the number of years of credited service (column (c))

(ii) the actuarial present value of accumulated benefit at fiscal year end (column (d))

(iii) any payments of the pension benefits made to the NEO during the last fiscal year (column (e))

Columns (c) and (d) are strictly required; whereas column (e) can be omitted if the company did not distribute any money out of the pension plans during the last fiscal year. Note that the values in columns (c) and (d) are in aggregate (i.e. the amount or number cumulates over the period that the NEO serves), while the value in column (e) is reported only for the fiscal year in question.

The present value of accumulated benefit (column (d)) is the most important column in the pension table. Before the rule was revised, a company only had to disclose one single number for the accumulated pension benefit of all pension plans offered to all employees. With the new rule, outside investors can observe the exact amount of DB pension that a company "owes" its NEOs, and compare the benefits among the NEOs or with other peer companies. The company must also disclose any formula, valuation method, and important assumptions used to calculate the this present value in the footnotes and narrative section accompanying the pension table. The narrative section should specify the normal retirement age used to calculate the reported present value, and where applicable, the earliest retirement age without any benefit reduction for the NEOs.

The number of years of credited service (column (c)) is also a mandatory item. With this information, the investors can monitor if the company has unreasonably inflated the pension benefits by giving its NEOs too many extra credits for the years that they did not serve. The company can give its NEOs some extra years of credited service as a reward, but this information should be disclosed in the footnotes.

According to section 409(a)(2), the company should not distribute money out of the non-qualified plans before the NEOs reach the normal retirement age unless deemed necessary. Some of the special considerations, among others, include (i) pre-specified earliest retirement age without any benefit reduction, (ii) disability or death, (iii) change in corporation ownership or control, and (iv) unforeseeable emergencies.[1] Information about such occurrences must be disclosed in the footnotes.

3.2.2 Non-qualified deferred compensation plans under new disclosure rules

Nonqualified Deferred Compensation Table ("NQDC Table"), an example of which is illustrated in Figure 3.3, is a new table. It includes any non-DB pension plans that allow the NEOs to defer their compensation on a basis that is not tax-qualified. Similar to the

[1] "*U.S. Code 409A. Inclusion in gross income of deferred compensation under nonqualified deferred compensation plans*", Legal Information Institute - Cornell Law School website, accessed on March 2020, https://www.law.cornell.edu/uscode/text/26/409A

Figure 3.3: **Example of table disclosure for NQDCPs**

NONQUALIFIED DEFERRED COMPENSATION

Name (a)	Executive contributions in last FY ($) (b)	Registrant contributions in last FY ($) (c)	Aggregate earnings in last FY ($) (d)	Aggregate withdrawals/ distributions ($) (e)	Aggregate balance at last FYE ($) (f)
PEO					
PFO					

Source: https://www.sec.gov/rules/final/2006/33-8732afr.pdf , page. 53187

Pension Table, NQDC Table requires a company to report (in dollar amount) for each NQDC plan applicable to each NEO:

(i) contributions made by the NEO (column (b))

(ii) contributions made by the company (column (c))

(iii) any interest or other earnings accrued during the last fiscal year (column (d))

(iv) any withdrawals by or distributions to the NEO during the last fiscal year (column (e))

(v) the total balance of the plan at the fiscal year end (column (f))

Again, the company does not need to disclose the withdrawals/distributions (column (e)) if it did not pay any money out of the NQDC plans. Note that only the value in column (f) is in aggregate.

The NEO himself can elect to defer a part of his compensation, subject to company's permission, into the NQDC plans to avoid paying immediate income tax.[2] The company must disclose this permission in the narrative section, including the type of compensation (e.g., salary, bonus) and the limits of contributions allowed (e.g. by percentage of compensation). An example of such disclosure is as follows: "*A participant may defer between 10% and 75% of his or her salary and between 25% and 100% of his or her annual incentive for each fiscal year*"[3]

[2]If, for example, the NEO plans to move to a different state with lower income tax rate after he retires, he has the incentive to delay paying tax on his income today.

[3]"*Proxy statement of Genworth Financial, Inc.*", SEC EDGAR filing database, accessed on March 2020, https://www.sec.gov/Archives/edgar/data/1276520/000119312507072789/ddef14a.htm

Similarly, the company can elect to contribute certain amount into the NQDC plans for the NEOs. The contributions can be made in different ways. The company might guarantee to contribute a fixed amount every year, regardless of the executive's contributions. The company might also make a matching contribution, contributing a percentage of income if the executive also contributes a certain amount. An example of a matching contribution is as follows: "*For each participant in the Restoration Plan who contributes at least 5% of his or her eligible pay to the Savings Plan Feature of our Retirement and Savings Plan, we will contribute an amount each year equal to 4% of the participant's eligible pay (salary and annual incentive paid, minus any deferred salary and/or annual incentive) in excess of the annual compensation limit in Section 401(a)(17) of the Internal Revenue Code*"[4]

Before the rule amendment, the company only had to disclose the above-market or preferential earnings of NQDC plans when the compensation was earned. Under the new disclosure rule, outside investors can observe the full value of the earnings and how much they grow every year. The narrative section should disclose any relevant information used to calculate the earnings. For instance, the company should specify whether the interest rate is fixed or is based on returns of some mutual funds or securities. Company is also advised to disclose about who makes the investment choice for the funds in the plans and how often this investment choice is revised.

The disclosure requirements for withdrawals or distributions of NQDC plans are quite similar to those of DB pension plans. Where applicable, the company needs to specify the events whose occurrence can legally trigger the payment out of the NQDC plans.

Finally, the aggregate balance of each NQDC plan calculated at fiscal year end is still the most important item of this table. The disclosure of this item allows outside investors to monitor the existence and magnitude of each NQDC plan for each NEO year by year. Before the rule amendment, outside investors could only observe the value of

[4]"*Proxy statement of Genworth Financial, Inc.*", SEC EDGAR filing database, accessed on March 2020, https://www.sec.gov/Archives/edgar/data/1276520/000119312507072789/ddef14a.htm
Note that the "Restoration Plan" is the NQDC plan offered exclusively to senior executives, while the "Savings Plan Feature of our Retirement and Savings Plan" is the defined-contribution pension plan offered to all employees.

NEOs' NQDC plans when the money was actually distributed to the executives.

3.2.3 Inside debt and its components

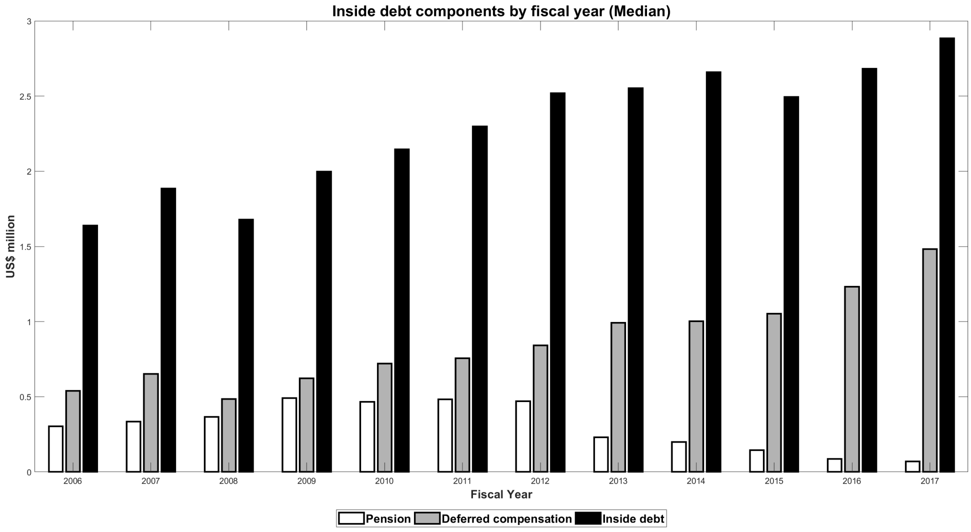
Table 3.2: **Inside debt and its components**

	Mean	**SD**	**Min**	**Q25**	**Median**	**Q75**	**Max**	**N**
Inside debt (US$ million)	7.0921	13.223	0.0011	0.6879	2.1974	7.2165	170.78	21,773
Pension (US$ million)	3.7207	9.0000	0.0000	0.0000	0.3230	3.1878	99.630	21,773
Deferred compensation (US$ million)	3.3714	8.4533	0.0000	0.1109	0.7987	2.7944	98.558	21,773
Pension/Inside debt	0.4234	0.4304	0.0000	0.0000	0.3038	0.9148	1.0000	21,773

Table 3.2 summarizes important statistics of inside debt and its components in the sample of companies that offer CEO inside debt. The distribution of inside debt value is rightly skewed. The average inside debt value is US$ 7.09 million while the median value is only US$ 2.20 million. The right skewness also occurs with the distributions of pension value and deferred compensation value. The average pension value and deferred compensation value are US$ 3.72 million and US$ 3.37 million, respectively; while the median values are only US$ 0.32 million and US$ 0.80 million. Overall, deferred compensation plans are more commonly used than pension plans. Among the companies that pay their CEOs inside debt, 40% do not offer supplemental pensions, but only 18% do not offer non-qualified deferred compensation plans. On average (median), pension value accounts for 42.34% (30.38%) of total inside debt value.

Figure 3.4 displays how the median dollar values of inside debt and of its components change over fiscal years. The value of inside debt noticeably increases starting from 2009, slows down in 2013, and begins to increase again after 2015. Without adjusting for inflation, the median dollar value of inside debt remains stable around US$ 2.5 million from 2012. Another noticeable trend is the declining use of pension and increasing use of deferred compensation starting from 2013. The greatest discrepancy between these two components occurs in 2017 when the median value of deferred compensation reaches US$ 1.5 million while that of pension barely reaches US$ 0.1 million.

Figure 3.4: **Inside debt and its components by fiscal years**



3.3 Inside equity

Inside equity is measured as the market value of a CEO's outstanding stock and option awards. For each tranche of options, I obtain the number of outstanding options, the exercise price, and the exercise date from the "Outstanding Equity Awards Table" in the proxy statement. I also collect the number of outstanding stock awards from the same table. The market value of option awards are computed by using the Black-Scholes formula adjusted for dividend payment. Current stock price is the closing price of the latest trading date before fiscal year end date. Risk-free rate is one-month Treasury Bill rate. Dividend yield equals cash dividend (including dividend on preferred stocks) divided by total equity value (including value of preferred stocks). Stock volatility is the standard deviation of daily stock returns over 12 months before fiscal year end date. The market value of stock awards equal current stock price multiplied by the total number of outstanding stock awards.

Figure 3.5: **Example of table disclosure for outstanding equity holdings**

OUTSTANDING EQUITY AWARDS AT FISCAL YEAR-END

	Option awards					Stock awards			
Name	Number of securities underlying unexercised options (#) Exercisable	Number of securities underlying unexercised options (#) Unexercisable	Equity incentive plan awards: Number of securities underlying unexercised unearned options (#)	Option exercise price ($)	Option expiration date	Number of shares or units of stock that have not vested (#)	Market value of shares or units of stock that have not vested ($)	Equity incentive plan awards: Number of unearned shares, units or other rights that have not vested (#)	Equity incentive plan awards: Market or payout value of unearned shares, units or other rights that have not vested ($)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
PEO									
PFO									
A									

Source: https://www.sec.gov/rules/final/2006/33-8732afr.pdf , page. 53183

3.3.1 Outstanding equity awards under new disclosure rules

Outstanding Equity Awards Table, an example of which is displayed in Figure 3.5, is also a new table. It discloses the information of any equity-like awards that the NEO is holding at fiscal year end. The table separates option awards from stock awards. For the option awards, the table discloses the number of unexercised options for each option tranche, where each option tranche is categorized by exercise price (column (e)) and expiration date (column (f)). The company is also required to separate the unexercised options, where applicable, into three sub-groups: exercisable options (column (a)), unexercisable options (column (b)), and unearned options (column (c)). Before the rule was revised, the company only needed to disclose the most recently granted options. Hence, outside investors or researchers who want to examine the option portfolio held by one NEO needed to either check the proxy statements of several years back or use an approximation process (e.g. Core and Guay [2002]'s one-year approximation process). The new rule gives the outside investors and researchers a more accurate picture of each NEO's option holdings at each fiscal year end.

For the stock awards, the table reports the number of nonvested stocks, separating between earned nonvested stocks (column (g)) and unearned nonvested stocks (column (j)). The market value of each group of stock when granted is given in the column on its right.

3.3.2 Inside equity and its components

Table 3.3: **Inside equity and its components**

	Mean	SD	Min	Q25	Median	Q75	Max	N
Inside equity (US$ million)	20.126	41.252	0.0182	1.3450	5.6940	18.590	387.79	38,469
Option value (US$ million)	10.296	23.067	0.0000	0.1985	1.8654	8.8853	149.58	38,469
Stock value (US$ million)	9.8309	29.375	0.0000	0.1240	1.6261	7.1097	238.22	38,469
Option/Inside equity	0.5527	0.3703	0.0000	0.1970	0.6054	0.9219	1.0000	38,469

Table 3.3 summarizes the important statistics of inside equity and its components. Similar to inside debt, the distribution of inside equity value is rightly skewed. The average inside equity value is US$ 20.13 million while the median value is only US$ 5.69 million. The right skewness also occurs with the distributions of option value and stock value. The average option value and stock value are US$ 10.30 million and US$ 9.83 million, respectively; while the median values are only US$ 1.87 million and US$ 1.63 million. Option value on average (median) accounts for 55.27% (60.54%) of total inside equity value.

Figure 3.6: **Inside equity and its components by fiscal years**

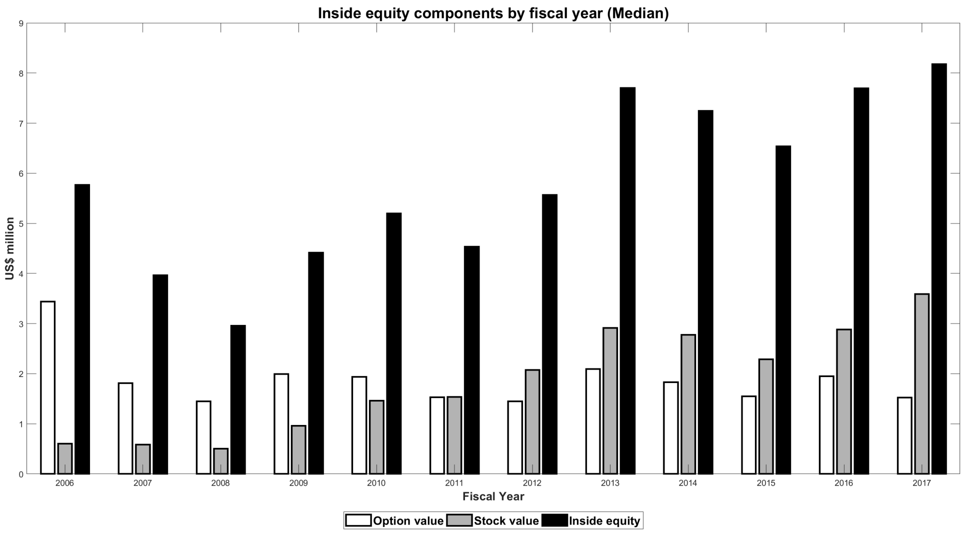


Figure 3.6 displays how the median dollar values of inside debt and of its components change over fiscal years. The dollar value of inside debt significantly decreases during the financial crisis, and starts increasing after 2012. Option awards are more popular before and during the financial crisis. However, the value of stock awards has surpassed that of option awards since 2012.

3.4 Different measures of inside debt-equity structures

3.4.1 The Relative leverage ratio

The theoretical frameworks by Jensen and Meckling [1976] and Edmans and Liu [2011] motivate the use of the "*Relative leverage ratio*". This ratio equals inside debt divided by inside equity, scaled by the same ratio for firm's debt and equity:

$$\text{Relative leverage ratio} = \frac{d/e}{D/E}$$

d and e are inside debt and inside equity, respectively. D is long-term debt, including the portion in current liabilities. E is the market value of outstanding equities. All variables are measured at fiscal year end. Since the raw ratio is heavily skewed, most empirical papers use the natural logarithm transformation of the ratio.

3.4.2 The Relative incentive ratio

Wei and Yermack [2011] propose another measure which is often referred to as the "*Relative incentive ratio*". Accroding to these authors, a suitable measure to capture the CEO's incentives between debt and equity should reflect how much CEO inside debt increases when he increases the firm's debt value, relative to the same increment when he increases the firm's equity value. Therefore, they propose using the ratio of ratio between option deltas as following:

$$\text{Relative leverage ratio} = \frac{\Delta d/\Delta D}{\Delta e/\Delta E}$$

Δd, Δe, ΔD, and ΔE are the marginal changes, given one unit change in total firm value, in inside debt, inside equity, outside debt, and outside equity respectively. For inside debt, Δe equals total number of outstanding stock awards (N_shares_CEO) plus the option delta calculated by using the Black-Scholes formula ($Option\_delta\_CEO$) multiplied by the number of options (N_option_CEO) and then aggregated over J tranches of options. The marginal change for outside equity, ΔE, is calculated in the same way as for inside debt. Compustat reports total number of outstanding shares (N_shares_F), total number of options that a company offers to its employees ($N\_options\_F$), weighted-average option exercise price, and weighted-average time to maturity[5] at fiscal year end.

$$\frac{\Delta e}{\Delta E} = \frac{N\_shares\_CEO + \sum_{j=1}^{J} N\_options\_CEO_j * Option\_delta\_CEO_j}{N\_shares\_F + N\_options\_F * Option\_delta\_F}$$

Wei and Yermack [2011] argue that calculating the marginal changes in inside debt and outside debt is more challenging for two reasons. First, most companies do not go bankrupt or even financially distressed, so the change in debt value should be very small. Second, there is no detail on the exact maturity date of any outside debt whose remaining life exceeds five years. Hence, the authors suggest approximating the ratio between these two marginal changes by using the ratio between the dollar value of inside debt and outside debt:

$$\frac{\Delta d}{\Delta D} \approx \frac{d}{D}$$

The authors explain that such an approximation is acceptable because they are more interested in the relation between two marginal values rather than the magnitude of each value. Note that empirical papers also use the log value instead of the raw Relative incentive ratio.

[5]When the weighted-average time to maturity is missing, I follow Wei and Yermack [2011] and assume that this value is four years.

3.4.3 The Inside debt-equity ratio

These two relative measures are not exactly suitable for the purposes of this thesis. This thesis investigates how shareholders adjust the mix of inside debt and inside equity in some corporate events that might intensify the agency problem of debt. According to existing literature, these events are often associated with significant changes in firm leverage. Using the relative compensation ratios, which also contain the firm's debt, can contaminate the interpretation. It will be hard to conclude whether the observed changes, if any, come from the compensation components or from the capital structure components. Therefore, I use the Inside debt-equity ratio which is simply measured as inside debt divided by inside equity in this thesis. The Inside debt-equity ratio is also the variable that Jensen and Meckling [1976] examine when they propose the use of inside debt to mitigate the agency problem of debt. Again, this ratio is also rightly skewed so I will use its log value for any numerical analysis.

3.4.4 A comparison of three measures

Table 3.4: **Different measures of inside debt - inside equity mix**

	Mean	**SD**	**Min**	**Q25**	**Median**	**Q75**	**Max**	**N**
Inside debt / Inside equity	0.8882	1.2359	0.00003	0.0712	0.3061	1.1009	3.9096	21,773
Ln (Inside debt / Inside Equity)	-1.4115	1.9856	-10.375	-2.6427	-1.1838	0.0962	1.3634	21,773
Relative leverage	1.2007	1.2025	0.0025	0.2101	0.7461	1.8496	3.6892	21,773
Ln (Relative leverage)	-0.6513	1.6646	-6.0113	-1.5601	-0.2929	0.6150	1.3054	21,773
Relative incentive	1.1426	1.1103	0.1817	0.3130	0.7145	1.7365	3.5379	21,773
Ln (Relative incentive)	-0.5329	1.4969	-5.7713	-1.1125	-0.3030	0.5677	1.2960	21,773

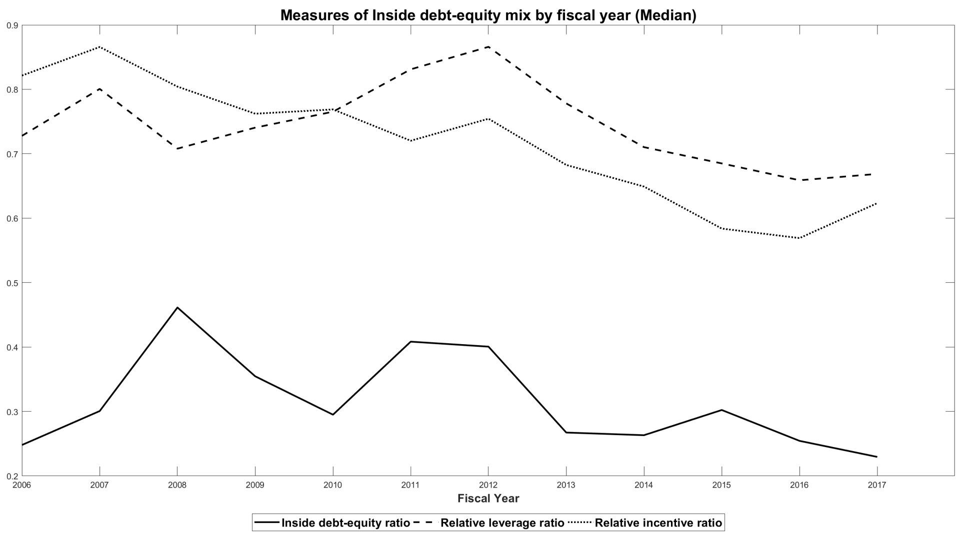
Table 3.4 summarizes the main statistics of the three measures and their log values in the sample of companies that offer inside debt. The inside debt-equity ratio has the smallest value of three measures. The average inside debt-equity ratio is 0.89 while the median value is only 0.31. For a median CEO, inside debt accounts for a quarter of his total wealth in the company, which is not a trivial amount. After the logarithm transformation, the mean and median values of the inside debt-equity ratio become more comparable.

The mean value of the relative leverage ratio is 1.20, meaning that the inside debt-equity ratio exceeds the firm's debt-equity ratio. However, the median value of this ratio is only 0.75. The relative leverage ratio only exceeds one in about 30% of the sample, but this fat right tail inflates the mean value. The logarithm transformation can partially address this skewness. The average value of the log ratio becomes negative (-0.65) which reflects the fact that the majority of the observations lie below one. Jensen and Meckling [1976] suggest that the optimal relative leverage ratio should be one for every company. However, Edmans and Liu [2011] argue that the optimal relative leverage ratio might vary across firms depending on the firms' characteristics. They also claim that for the majority of firms, this ratio is below one because inside equity is more effective than inside debt in incentivizing the CEOs' efforts. The summary statistics in this table are consistent with the argument in Edmans and Liu's paper.

The distribution of the relative incentive ratio is quite similar to that of the relative leverage ration. The distribution is rightly skewed, with the mean value of 1.14 and the median value of 0.72. In about 30% of the sample, the relative ratio surpasses one. Again, the logarithm transformation can partially address this skewness. Wei and Yermack [2011] also assume that the optimal relative incentive ratio should be one, following Jensen and Meckling [1976]. However, Campbell et al. [2016] show that the optimal relative incentive ratio is also firm-specific as suggested by Edmans and Liu [2011].

Figure 3.7 displays how the three ratios change over the years. The inside debt-equity ratio, depicted by the solid line, undergoes more noticeable changes over time. The dashed and dotted lines, which depict the relative leverage ratio and the relative incentive ratio, are smoother. However, the three lines follow quite similar trends which increase between 2010 and 2012 and steadily decline after that.

Figure 3.7: **Different measures of inside debt-equity structures by fiscal years**



CHAPTER 4

New active blockholders and the adjustments of CEO inside debt-equity ratios

4.1 Introduction

The presence of active blockholders - defined as the filers of form SC 13D - is considered beneficial for shareholders.[1] Nevertheless, how these investors create value for shareholders still remains controversial. On the one hand, active blockholders could increase total firm value, which involves increasing both equity and debt values, by addressing corporate governance issues.[2] On the other hand, active blockholders can push for corporate changes that transfer wealth from debtholders to shareholders.[3] I revisit this debate by investigating how active blockholders adjust the managerial incentives between shareholders' and debtholders' interests. A recent study by Bebchuk et al. [2020] finds that active blockholders normally do not require any operational or personnel changes, but often ask for board representation (see also Klein and Zur [2009]). Agrawal and Nasser [2019] show that blockholders on boards are associated with significant changes in CEO compensation. This evidence suggests that active blockholders do not directly adjust

[1] An investor must file a form 13D when he/she comes to own more than five percent of a company's outstanding equities with the intention of affecting that company's management or control. Short-term abnormal stock returns around the announcements of 13D filings range between 3.3% and 6.97% for event windows between two and thirty days. Long-term abnormal stock returns range from 9.38% to 11.35% for one to two years after the filings (Denes et al. [2017])

[2] See Shleifer and Vishny [1986], Maug [1998], Brav et al. [2008], Boyson and Mooradian [2011], Sunder et al. [2014], Bebchuk et al. [2015], Bebchuk et al. [2020]

[3] See Bhojraj and Sengupta [2003], Cremers et al. [2007], Klein and Zur [2011], Jory et al. [2017], Dahiya et al. [2020]

any firm policies. Instead, these investors give CEOs the incentives to make the changes for them. Therefore, studying how active blockholders restructure CEO compensation can reveal how these investors intend to affect the value of different stakeholders. ***"Do active blockholders incentivize CEOs to increase total firm value or to increase only equity value?"*** By examining changes in the ratios between CEO debt-like and equity-like compensations after active blockholders arise, I find evidence that active blockholders adjust CEO compensation in a way that increases total firm value.

The main methodology includes three tests. First, I examine the pre-blockholder deviation from a *target* compensation structure that should incentivize a CEO to maximize firm value. Second, I examine how this deviation measure changes in the presence of active blockholders. Third, I relate the changes in stock and bond returns over the active block holding period with the change in this deviation measure over the same period. Two competing hypotheses provide contrasting predictions for these three tests.

On the one hand, blockholders might arise and monitor the entrenched CEOs who are maximizing their private benefits instead of maximizing firm value (Shleifer and Vishny [1986]). A large equity holding mitigates the free-rider problem because it gives the blockholders a substantial share of the increased value, which is sufficient to cover the monitoring cost (Maug [1998], Bolton and Von Thadden [1998], Kahn and Winton [1998]). There is empirical evidence that active blockholders often target undervalued companies, such as those with low Tobin's Q, low returns on assets, or low sales growth (see Brav et al. [2015b] for a review). The presence of active blockholders, especially hedge fund blockholders, is associated with improved firm performance (Brav et al. [2008], Boyson and Mooradian [2011], Bebchuk et al. [2015], Brav et al. [2015a], Brav et al. [2018]). According to this "active monitoring hypothesis", active blockholders are more likely to choose companies whose CEO compensation structures largely deviate from the *target* ratios because these CEOs are not maximizing the firm value. Active blockholders then reduce deviations from the *target* pay structures, which would increase both stock and bond prices.

On the other hand, blockholders might utilize the strong influences coming from their large equity holdings to push for changes that temporarily increase shareholders' value at debtholders' expense.[4] Klein and Zur [2011] argue that companies targeted by active blockholders are performing relatively well before these investors arise. These companies later adopt policy changes under the blockholders' influences to benefit shareholders at debtholders' expense, such as increasing leverage, or initiating large dividend payouts (see also Jory et al. [2017]). The presence of blockholders is also associated with higher cost of debt and lower credit ratings (Bhojraj and Sengupta [2003], Cremers et al. [2007], Dahiya et al. [2020]). According to the "wealth extraction hypothesis", active blockholders are more likely to arise in companies whose CEO compensation structures do not deviate much from the *target* ratios because these companies have the most value to extract. These active blockholders then inflate the equity-like component to give CEOs more risk-taking incentives, which increases deviations from the *target* structures. Such compensation adjustments would increase stock value but decrease bond value.

I build on recent studies of CEO compensation to construct a measure that can capture a "sub-optimal" pay structure. I collect data on CEO compensation from the proxy statements of 5,775 U.S. public companies during the fiscal years from 2006 to 2017. First, I compute the CEO pay structure - the inside debt-equity ratio - by using the natural logarithm of the ratio between inside debt and inside equity. Inside debt is measured by using the present value of supplemental defined benefit pensions and non-qualified deferred compensations that a CEO holds at fiscal year end. Inside debt is unfunded and unsecured like junior debt, so it aligns a CEO's incentives to debtholders' interests.[5] Inside equity is measured by using the market value of the stock and option awards that a CEO holds at fiscal year end. The value of inside equity increases with stock

[4]This is a special case of a more general body of literature which predicts that blockholders could take advantage of their large voting rights to engage in actions that benefit themselves at the expense of other stakeholders, e.g. minor shareholders and debtholders (Lease et al. [1983], Barclay and Holderness [1989], Barclay et al. [1993], Dyck and Zingales [2004]). Transferring weath from debtholders to shareholders by increasing firm's risks might benefit the blockholders in the short run, but is detrimental to the dispersed shareholders in the long-run because of costly debt financing (Jensen and Meckling [1976], Myers [1977]).

[5]High inside debt motivates CEOs to run their companies in a conservative manner, reducing risky investments (Sundaram and Yermack [2007], Cassell et al. [2012], Phan [2014]), and accumulating unnecessary cash (Liu et al. [2014]). Since incentives of the CEOs with high inside debt are more aligned with debtholders, the cost of debt decreases (Wei and Yermack [2011], Sunder et al. [2014], Dang and Phan [2016], Freund et al. [2018])

price and volatility, so it aligns a CEO's incentives to shareholders' interests. Second, I regress the inside debt-equity ratio on the firm and CEO characteristics that are specified in Campbell et al. [2016], and use the predicted value from this regression to proxy for the *target* inside debt-equity ratio. According to optimal contracting theory, this *target* compensation structure is optimal to maximize firm value because it balances the managerial incentives between shareholders' and debtholders' interests, given other relevant characteristics (Jensen and Meckling [1976], Edmans and Liu [2011]). Third, I calculate the deviation from the *target* pay structure by using the absolute difference between the actual inside debt-equity ratio and the *target* ratio.[6] This deviation measure captures how much a CEO pay structure is inappropriate to maximize firm value. I validate this argument by showing that both stock and bond prices react negatively to public disclosures of large deviations from the *target* pay structures. This validation test also controls for other types of information that are disclosed in the proxy statements and, therefore, might contaminate the interpretation of price reactions.

An active blockholder is an investor that indicates the monitoring intention by filing a form 13D when this investor acquires more than five percent of a company's outstanding equities.[7] Public disclosures of inside debt became mandatory in 2006 after the U.S. Securities and Exchange Commission (the "SEC") revised their disclosure regulation. Therefore, the main analysis examines impact of the investors that became active blockholders between 2007 and 2016. These investors are the "new active blockholders" as compared with those that became active blockholders before 2007. For the rest of this study, two terminologies "new active blockholders" and "active blockholders" both refer to the same group of 13D filers, and are used interchangeably.[8] On average, active blockholders retain their 13D filing status and block holdings for nearly three years and then "exit".[9] For each targeted company, I only include the first active blockholder that

[6] In the additional analysis, I find that the main conclusions do not depend on the sign of the difference.

[7] There is no theoretical definition of how large the equity holdings should be for a shareholder to become a blockholder. The five-percent cut-off is selected only because crossing this threshold triggers mandatory disclosures. Investors that only have investment purposes when acquiring the five-percent blocks of shares, file form 13G, which is shorter and more simple than form 13D.

[8] In the robustness check, I show that the main conclusions do not change when I consider the impact of any present active blockholders regardless of their entry years.

[9] Following Boyson and Mooradian [2011], I consider that an active blockholder exits if one of the

emerge in the period 2007 - 2016. When multiple blockholders emerge in the same year, I only count the investor that remains active for the longest period. In the final sample, there are 1,186 unique companies that attract new active blockholders in the period 2007 - 2016.

I begin the main analysis by showing that active blockholders often emerge when CEO pay structures are not properly designed to maximize total firm value. The incidence of active blockholders is positively correlated with lagged deviations from the *target* pay structures. The regression also controls for the firm characteristics that, according to prior studies, also attract active blockholders. In addition, I find that companies that attract new active blockholders often have weak corporate governance, as proxied by low institutional ownership concentration (Hartzell and Starks [2003]). The large deviations from the *target* pay structures might result from this corporate governance issue and therefore, are hard to correct without the intervention of outside powerful shareholders.

After they emerge, 13D filers retain their filing status and holdings as active blockholders for about three years, and exit. During the presence of these investors, deviations from the *target* compensation structures significantly decline, controlled for other changes in firm and CEO characteristics. The magnitude of the adjustments towards the *target* structures in companies that have new active blockholders is 3.5 times larger than the sample median. On average, 80% of the deviations before active blockholders emerge are wiped out during the presence of these investors. For the companies that attract no new active blockholders, only 25% of the initial deviations can be wiped out in the same period. These large compensation adjustments disappear after active blockholders exit. Hence, it is very likely that active blockholders make these compensation adjustments.

Next, I examine how stock and bond returns, which proxy for shareholders' and debtholders' values, change when active blockholders adjust CEO pay structures. I essentially follow the approach in Klein and Zur [2011], regressing abnormal stock and bond returns on changes in deviations from the *target* structures. However, I calculate

followings happens: (1) the active blockholder discloses below five-percent stock ownership by filing form 13D/A or 13F, (2) the active blockholder switches to a passive block holding position by filing form 13G, (3) the targeted firm is delisted, or (4) December 31, 2018.

abnormal returns over the whole active block holding period, instead of just over the first year of active block holding as in Klein and Zur [2011]. First-year returns capture the expected rather than the realized value implication of CEO pay adjustments, which often last throughout the active block holding period. However, using block-holding-period returns has its own disadvantage because many co-founding events might happen during this period. Controlling for some of these co-founding events and for the changes in other firm characteristics, I find that reduced deviations from the *target* structures are positively correlated with abnormal stock and bond returns over the years of active blockholders' presence.[10] Reduced deviations are associated with annualized abnormal stock returns of 9.2 percent, and bond returns of 2.3 percent. The way that active blockholders adjust CEO inside debt-equity ratios benefits both shareholders and debtholders, hence increasing total firm value.[11]

For a further analysis, I investigate if the result is asymmetric between deviations starting from above the targets (i.e. debt-biased pay structures) and deviations starting from below the targets (i.e. equity-biased pay structures). Debt-biased pay structures induce CEOs to run their companies more conservatively, which does not harm debtholders but harms shareholders.[12] Equity-biased pay structures tempt CEOs to take more risky investments to inflate the value of their equity-based holdings, which decreases debtholders' value. The long-run losses to shareholders due to costly debt financing could be partially offset by the short-run increases in stock prices. Consistent with these arguments, I show in the validation test that shareholders' value is more negatively affected under debt-biased pay structures than under equity-biased structures.[13] Hence, it is possible that active blockholders only arise and adjust debt-biased pay structures, but ignore equity-biased ones. Such an asymmetric result could be consistent with either of the two

[10]The controls include dummies for share repurchases, leverage buyouts, spin-offs, SEOs, and acquisition announcements (where the active-block-companies are the target).

[11]The majority of existing bonds are non-senior and unsecured so their payment priorities rank below those of senior bank loans. If these junior bondholders benefit from the new CEO inside debt-equity ratios, so should the senior debtholders.

[12]See Wei and Yermack [2011], Phan [2014].

[13]Specifically, I find negative stock price reactions to large deviations from either above or below the *target* pay structures. However, the magnitude of the negative stock returns is larger when the deviations are caused by too much inside debt, which suggests that equity value is damaged more under debt-biased pay structures.

competing hypotheses. The "active monitoring hypothesis" can argue that active blockholders only focus on fixing the type of compensation deviations that potentially brings about higher gains because monitoring is costly (Almazan et al. [2005], Gantchev [2013]). The "wealth extraction hypothesis" can argue that active blockholders only target relatively safe companies where debtholders have plenty of value to extract (Klein and Zur [2011], Cremers et al. [2007]).

I show that active blockholders arise and adjust CEO pay structures when the deviations are caused by either too much inside debt or too much inside equity. Stock and bond returns both increase significantly as active blockholders fix equity-biased pay structures. Bond returns do not fall, and stock returns significantly rise when debt-biased pay structures are adjusted. These findings suggest that the gains to shareholders do not come from the losses to debtholders, which is consistent with the "active monitoring hypothesis".

I also conduct additional tests to rule out three alternative explanations for the coincidence of reduced deviations and the active blockholders' presence.

First, it is possible that active blockholders can predict which companies would restructure CEO compensation by themselves, and largely invest in these companies to gain from the beneficial adjustments. I utilize the fact that many active blockholders also hold above five percent of equities in other companies but only disclose investment purposes rather than monitoring purposes for these block holdings. If superb stock-picking skill can explain the main finding, all the companies attracting the same blockholders would experience strong CEO pay adjustments, regardless of the investors' filing types. However, I find that the companies in which blockholders disclose monitoring intentions have significantly stronger compensation adjustments than those of the companies in which the same blockholders only disclose investment intentions.

Second, the deviation measure might follow a mean-reverting process in which large deviations would later decline, even without the active blockholders' presence. I conduct a placebo test similar to that in Brav et al. [2015a] to address the mean-reversion concern. I identify a group of matched firms that have the same industries and compensation adjustments as those of the targeted firms during two years before active blockholders arise. I run a placebo test in which I assume that active blockholders arise in the matched firms, but not in the truly targeted firms. If mean reversion explains the main finding, I should observe the same result in the placebo test as that in the main test. However, the result in the placebo test is significantly different from that in the main test.

Third, it is possible that some firm characteristics co-determine the presence of active blockholders and the adjustments of CEO compensation. I identify another group of matched firms that have the same industries and propensities to attract new active blockholders as those of the targeted firms. I run another placebo test on the new matched firms, and also find that the result in the placebo test is significantly different from that in the main test.

Finally, I investigate the channel for active blockholders to restructure CEO compensation in the targeted companies. Executive compensation is determined by the board of directors. Hence, an effective channel for active blockholders to affect CEO pay is to appoint their favored directors into the boards of the targeted firms (Agrawal and Nasser [2019], Bebchuk et al. [2020]). Bebchuk et al. [2020] argue that appointing directors is also an efficient channel since it can "save face" for the targeted firms' management, hence triggering less resistance. I determine that a director is appointed by an active blockholder if any of the following criteria applies: (i) the active blockholder discloses in a form 13D or 13D/A that it has nominated this director; (ii) the director is a fund manager of the active blockholder; or (iii) the director is a close relative (i.e. spouse, sibling, or child) of an active blockholder's fund manager. Indeed, active blockholders that appoint their favored directors into the boards can adjust CEO pay to the target structures more than those that do not appoint directors. The impact is the strongest if the directors are appointed into the compensation or governance committees. When active blockholders cannot appoint their favored directors, it is very likely that they face strong resistance from the targeted firms' management. If these active blockholders want to adjust CEO compensation, they need to have certain advantages or powers to negotiate with the targeted firms. Indeed, I find that active blockholders with industry experience, or with only one active block holding can adjust CEO compensation more than those that do not have these advantages.

This study revisits the debate over how active blockholders increase equity value by investigating how these investors adjust CEO inside debt-equity ratios. Existing papers have studied the impact of active blockholders on leverages (Klein and Zur [2011]), dividend payouts (Brav et al. [2008], Klein and Zur [2009]), Tobin's Q (Boyson and Mooradian [2011], Bebchuk et al. [2015]), mergers (Greenwood and Schor [2009], Boyson et al. [2017]), asset sales (Brav et al. [2015a]), and innovations (Brav et al. [2018]). Some of the prior works have examined changes in CEO compensation structures after active blockholders arise. Brav et al. [2008] show decreases (increases) in the proportions of fixed payments (equity-based payments) among the targeted firms after active blockholder intervene, as compared to the industry-matched non-targeted firms. Clifford and Lindsey [2016] find that not only the proportions of equity-based payments but also the dollar value of total compensation increases in the presence of active blockholders. However, there are three major differences between previous papers and this study. First, this study focuses on the prospective compensation that CEOs would receive in the future, not the compensation that has already been granted. Prospective compensation should have a stronger incentive effect than the already-granted compensation. Second, the compensation structure used in this study concerns both the shareholder-manager and the shareholder-debtholder agency problems; while the measures in prior papers only reflect the shareholder-manager conflict. Third, I study compensation practices of all U.S. public firms with Compustat data, not just the S&P 1500 firms like in the previous papers. Hence, the analyses in this study are not biased towards large companies, but rather apply universally to any public companies.

My study also contributes to the growing literature on inside debt which is a relatively new topic thanks to the revised disclosure rule in 2006. Campbell et al. [2016] show that adjustments towards the "optimal" inside debt-equity incentive ratios increase firm value, but do not explain how these adjustments happen. My research suggests that the intervention of some active blockholders is one of the forces behind these "optimal" compensation adjustments. In a related working paper, Akins et al. [2019] show upward adjustments to the *target* inside debt-equity structures that are caused by the debtholders that take control of the companies after covenant violations.

4.2 Literature review

4.2.1 Inside debt-equity ratio and its optimal value

Jensen and Meckling [1976] question why CEO compensation is only based on equity value. They argue that equity-biased compensation incentivizes a CEO to increase shareholders' value by taking sub-optimal risks at debtholders' expense. Rational debtholders, anticipating this risk-shifting problem, would require higher returns for their loans. Hence, shareholders end up paying the costs of the CEOs' excessive risk-taking behaviors. The authors propose that a CEO should be paid in both debt-like compensation (a.k.a. "inside debt") and equity-like compensation (a.k.a. "inside equity"). They also argue that the ratio between these two components, the inside debt-equity ratio, should exactly mimic the firm's capital structure. Since a part of the CEO's wealth now resembles a debt-like obligation and can be lost in the bankruptcy state, the CEO has no incentive to shift risks from shareholders to debtholders.

Edmans and Liu [2011] prove that a mix of debt and equity in CEO compensation can form an optimal contract. They show that the inside debt-equity ratio should perfectly mimic the capital structure, as suggested by Jensen and Meckling [1976], if compensation structure only affects a CEO's choice of risks. However, Edmans and Liu suggest that compensation structure can also affect a CEOs' choice of efforts. More specifically, they suggest that inside debt and inside equity encourage CEO's efforts in two different states. Inside debt encourages the CEO's efforts to protect the liquidation value in the bankruptcy state. The more liquidation value the CEO can protect, the more of his inside debt can he retain. On the other hand, inside equity encourages the CEO's efforts to increase equity value in the solvency state. The more equity value the CEO can increase, the more from inside equity can he earn. Overall, a CEO who is paid in relatively more inside debt (inside equity) tends to prefer safe (risky) projects, and work harder during the bankruptcy (solvency) state. Edmans and Liu conclude that the optimal inside debt-equity ratio should depend on other characteristics, such as asset structure, and investment opportunities, in addition to the capital structure. In the majority of firms, the inside debt-equity ratios should be lower than the firm's capital structures since inside equity is more effective than inside debt in incentivizing the CEOs.

The theoretical framework from Jensen and Meckling [1976] and Edmans and Liu [2011] motivates the use of relative leverage ratio which equals inside debt-equity ratio divided by firm's debt-equity ratio. Wei and Yermack [2011] propose a slightly different measure, which is often referred to as the relative incentive ratio. The relative incentive ratio equals option delta of inside debt divided by option delta of inside equity, then scaled by the same ratio calculated for firm's outside debt and equity.

Campbell et al. [2016] estimate the optimal relative incentive ratio based on firm and CEO characteristics which are consistent with the theories in Jensen and Meckling [1976] and Edmans and Liu [2011]. More specifically, they regress the relative incentive ratios on those characteristics and use the predicted values to proxy for the optimal ratios. They validate their measure of optimal ratios by showing positive stock and bond price reactions to the releases of proxy statements which disclose movements towards the optimal ratios. Freund et al. [2018] also use Campbell et al.'s model to estimate the optimal relative incentive ratios. These authors show that the cost of debt, measured by the offering bond yield spreads, is the lowest when CEO compensation is set at the optimum. Akins et al. [2019] show that creditors raise the relative incentive ratios above the optimal levels which are also estimated by using Campbell et al. [2016]'s model when these creditors take control of the companies after covenant violations.

Most empirical papers conclude that large CEO inside debt is associated with more conservative firm policies: less investment spending (Cassell et al. [2012]), higher cash accumulation (Liu et al. [2014]), reduced risks and risk-taking incentives (Sundaram and Yermack [2007], Wei and Yermack [2011], Phan [2014], Brisker and Wang [2017]). Large CEO inside debt also helps firms raise new debt at a lower cost, either by including fewer covenants (Han [2011], Anantharaman et al. [2013]) or by offering lower yield spreads (Dang and Phan [2016], Freund et al. [2018]).

However, some papers argue that inside debt aligns CEOs' and debtholders' interests only when inside debt is unfunded and unsecured like junior debt (Anantharaman et al. [2013], Colonnello et al. [2017]). When CEOs are insured against the losses of their inside debt holdings in the bankruptcy state, the incentive-alignment role of this compensation is weakened (Bebchuk and Fried [2004], Gerakos [2010]).

4.2.2 The "active monitoring hypothesis"

The incidence of active blockholders

The "active monitoring hypothesis" predicts that a blockholder with the monitoring intention arises when the CEO is not maximizing firm value. Shleifer and Vishny [1986] argue that a large shareholder (i.e. a blockholder) might have the incentive to monitor the entrenched manager to increase firm value. The large holding mitigates the free-rider problem because it gives the blockholder a substantial share of the increased value which is sufficient to cover the monitoring cost. Many theoretical papers after Shleifer and Vishny [1986] also show that the monitoring incentive increases with the fraction of equity holdings (Maug [1998], Bolton and Von Thadden [1998]). Kahn and Winton [1998] suggest that the monitoring blockholder also gain by purchasing stocks of the companies where market least expects improvements, taking actions to improve firm value, and then selling the stocks at higher prices.

More recent empirical papers focus on the influence of active blockholders on firm value. These investors file form 13D once their holdings cross the five-percent threshold to notify that they have accumulated shares to affect the targeted firms' management. Empirical studies show that active blockholders often target poorly performing companies which often have low Tobin's Q, low returns on assets, or low sales growth rate (see Brav et al. [2015b] for a comprehensive review). There is also evidence which suggests that CEOs of these targeted firms are extracting rents before active blockholders arise because a large proportion of their compensation comes from fixed payment (Brav et al. [2008], Clifford and Lindsey [2016]).

Under the "active monitoring hypothesis", active blockholders are more likely to arise when the CEO inside debt-equity ratios largely deviate from the target levels as the CEOs are not maximizing firm value. Too high ratios which contain too much inside debt discourage CEOs from making profitable investments (Cassell et al. [2012], Liu et al. [2014]). Too low ratios which contain too much inside equity exacerbate the CEOs' risk-taking incentives, which increases the cost of debt and makes it harder for companies to raise capital (Wei and Yermack [2011], Sunder et al. [2014], Freund et al. [2018]).

Hypothesis H10: *The incidence of new active blockholders is positively correlated with lagged deviations from the target CEO inside debt-equity ratios.*

The impact of active blockholders

The "active monitoring hypothesis" also predicts that blockholders will make changes to improve firm value. The presence of these active blockholders, especially hedge fund activists, is associated with better firm performance (Brav et al. [2008], Boyson and Mooradian [2011], Bebchuk et al. [2015], Brav et al. [2015b]). The improvements might happen because the active blockholders (i) get the target firms sold to appropriate acquirers (Greenwood and Schor [2009], Boyson et al. [2017]), (ii) replace the entrenched CEOs (Sunder et al. [2014]), (iii) make the target firms spin off unnecessary plants (Brav et al. [2015a]), or (iv) encourage more innovations (Brav et al. [2018]). Many papers also document positive changes in CEO compensation after active blockholders emerge, although these compensation changes are deemed positive solely from the shareholders' perspectives. For example, the proportions of fixed payments decrease while those of equity-based payments increase in the presence of active blockholders (Brav et al. [2008], Bebchuk et al. [2015], Clifford and Lindsey [2016]).

Under the "active monitoring hypothesis", active blockholders will adjust CEO inside debt-equity ratios towards the target levels. Such changes to CEO compensation structures should increase total firm value, i.e. increase both shareholders' and debtholders' values.

Hypothesis H20: *The presence of new active blockholders is associated with decreases in deviations from the target CEO inside debt-equity ratios.*

Hypothesis H30: *The changes in deviations from the target CEO inside debt-equity ratios are positively correlated with both stock and bond abnormal returns over the active block holding period.*

4.2.3 The "wealth extraction hypothesis"

The incidence of blockholders

In general, the "wealth extraction hypothesis" predicts that blockholders utilize the strong influences coming from their large equity holdings to engage in actions that benefit themselves at the expense of other stakeholders, e.g. minor shareholders and debtholders (Lease et al. [1983], Barclay and Holderness [1989], Barclay et al. [1993], Dyck and Zingales [2004]). Specifically, the blockholders might take advantage of their large voting rights to push for changes that increase risks and temporarily benefit shareholders but harm debtholders.[14] Consistent with this argument, bond returns are found to decrease after hedge fund blockholders arise (Klein and Zur [2011], Jory et al. [2017]). Klein and Zur [2011] argue that these hedge fund blockholders target companies that are performing well, as proxied by high earnings per share, high returns on assets, and high operating cash flows. Such firms have more value for these blockholders to extract.

Under the "wealth extraction hypothesis", active blockholders are more likely to arise when CEO inside debt-equity ratios are close to the target levels. Campbell et al. [2016] show that firm value is higher when CEO compensation structures approach the target levels. Freund et al. [2018] show that the cost of debt is the lowest when CEO compensation structures in the issuing firms are set at the target levels.

Hypothesis H1A: *The incidence of new active blockholders is negatively correlated with lagged deviations from the target CEO inside debt-equity ratios.*

[14] Transferring weath from debtholders to shareholders by increasing firm's risks might benefit the blockholders in the short run, but is detrimental to the dispersed shareholders in the long-run because of costly debt financing (Jensen and Meckling [1976], Myers [1977])

The impact of active blockholders

The "wealth extraction hypothesis" predicts that blockholders will engage in actions that increase shareholders' value at debtholders' expense. The presence of blockholders is associated with lower bond returns and lower credit ratings (Bhojraj and Sengupta [2003], Cremers et al. [2007]). Companies targeted by hedge fund activists often increase leverage and initiate large payout to shareholders, which might explain the negative bond returns that accompany positive stock returns over the first year after activists emerge (Klein and Zur [2011], Jory et al. [2017]). Dahiya et al. [2020] compare the bank loan yield spreads between hedge-fund-targeted firms and their non-targeted matches, before and after the hedge fund blockholders emerge. They find that the spread discrepancies significantly expand after these active blockholders emerge, but only for the top quarter of targeted firms that incur the highest stock return increases.

Under the "wealth extraction hypothesis", the active blockholders will inflate inside equity to give CEOs more risk-taking incentives, hence shifting the inside debt-equity ratios away from the target levels. Such compensation adjustments incentivize CEOs to take more risks to increase equity value, which benefits shareholders but harm debtholders.

Hypothesis H2A: *The presence of new active blockholders is associated with increases in deviations from the target CEO inside debt-equity ratios.*

Hypothesis H3A: *The changes in deviations from the target CEO inside debt-equity ratios are positively (negatively) correlated with stock (bond) abnormal returns over the active block holding period.*

4.3 Variable construction and data description

4.3.1 Inside debt-equity ratio

I search on SEC EDGAR for all the proxy statements that are filed during the calendar years from 2006 to 2018, and collect the data about the CEOs and their compensation packages. The data about the CEOs contain their age and the year when they became CEOs.[15] The data on CEO compensation for the main analysis are collected from three tables in the proxy statements as described below.

I merge the compensation data collected from SEC EDGAR with the financial data in Compustat using the GVKEY-CIK linking table provided by Wharton Research Data Services ("WRDS"). The companies in the final sample must have non-missing financial data for at least three consecutive years. For each firm-year observation, the company must also have trading stock prices (from CRSP) over the last two years. The final sample contains 38,469 firm-year observations, which covers 5,775 U.S. public companies from the fiscal years 2006 to 2017.

I follow the existing literature and measure CEO inside by using the present value of defined-benefit pensions (*Pension_value*) and total balances of non-qualified deferred compensations (*Defer_balance*):

$$\text{Inside debt} = \text{Pension\_value} + \text{Defer\_balance}$$

I obtain these two values from the "Pension Benefits" and "Non-Qualified Deferred Compensations" tables, respectively. Where a company separates the qualified pension benefits from the supplemental non-qualified ones, I only include the non-qualified benefits in the inside debt measure. Unlike the qualified component, supplemental non-qualified pension benefits are unfunded unsecured like a firm's junior debt, so only the non-qualified pensions, but not the qualified component, should match the theoretical criteria of inside debt (Edmans and Liu [2011], Anantharaman et al. [2013]).

CEOs defer receiving inside debt payments until they retire, and are not taxed for this income until the money is distributed. Inside debt payments are generally not secured by the firms' assets so CEOs may lose part of or all this payment in case of bankruptcy.[16]

[15] When the proxy statements do not provide information on CEO age and the year of becoming CEO, I manually search for this information from online articles.

[16] CEO salary might feature a coupon bond as the CEO first invests his human capital in the firm and then receives salary as the periodic coupon payment. Edmans and Liu [2011] argue that salary is often forfeited in case of bankruptcy so salary does not qualify as debt-like compensation. Most empirical papers do not include salary in the calculation of inside debt. In practice, most CEOs might still receive their salaries even in bankruptcy. However, almost certain payment under bankruptcy also disqualifies

Under the Bankruptcy Abuse Prevention and Consumer Protection Act ("BAPCPA") enacted in 2005, the company undergoing Chapter 11 bankruptcy proceedings can reject any executory contracts. The assumption of any executory contracts must be approved by the creditors' committee and the bankruptcy court. For example, when Dana Corp. filed for Chapter 11 in 2006, only 60% of the CEO's retirement benefits were assumed, while the remaining 40% became general unsecured claims.

I measure CEO inside equity by using the market value of stock and option awards that a CEO holds at the end of the fiscal year:

$$\text{Inside equity} = N\_shares * prcc\_f + \sum_{j=1}^{J} N\_options_j * Option\_value_j$$

I collect the number of shares (N_shares), and the number of unexercised options (N_options) with their corresponding exercise prices and expiration dates from the "Outstanding Equity Awards" table. I multiply the number of shares with the closing stock price at fiscal year end (prcc_f) to obtain the market value of stock holdings. I calculate the value for each tranche of options by using the Black-Scholes formula (Option_value), and sum over "J" tranches to obtain the market value of a CEO's option holdings.[17]

Following the literature, I measure inside debt-equity ratio, *Inside_DE*, by using the natural logarithm of the ratio between inside debt and inside equity. The log transformation is necessary because the unlogged ratio between these two components is heavily right skewed. By construction, this measure of inside debt-equity ratio excludes observations with no outstanding equity awards. Where the CEO has no inside debt, I follow Campbell et al. [2016] and replace this observation with the log of the smallest non-zero ratio in the sample (0.0000312).

Prior studies on inside debt work on the relative leverage ratio which equals CEO inside debt-equity ratio scaled by the (logarithm of) firm's debt-equity ratio. This paper

salary as inside debt because such a payment will not encourage efforts. In robustness check, I include present value of salary in the calculation of inside debt, following Cassell et al. [2012]. The result is still significant

[17]Risk-free rate is one-month Treasury Bill rate. Dividend yield equals cash dividend (including dividend on preferred stocks) divided by total equity value (including value of preferred stocks). Stock volatility is the standard deviation of daily stock returns over the year before fiscal year end date.

focuses on the relation between active blockholders' presence and CEO compensation. Using the relative ratio makes it hard to conclude whether the observed effect (if any) comes from changes in CEO compensation or changes in capital structures. Therefore, I do not scale the inside debt-equity ratios in the main analyses. Instead, I control for firm's debt-equity ratio in all regressions to ensure that the results are comparable with those in prior studies, even though I also include book leverage, which is highly correlated with firm's debt-equity ratio. In the robustness check, I show that the conclusion of this paper does not qualitatively change when I either use the relative leverage ratio or the relative incentive ratio.

The inside debt-equity ratio is the measure of compensation structure in this paper. Henceforth, I use two terms "inside debt-equity ratio" and "compensation structure" interchangeably.

4.3.2 Target inside debt-equity ratio

I use the median regression in Campbell et al. [2016] to estimate the *target* inside debt-equity ratio (*Target_Inside_DE*). Specifically, *Target_Inside_DE* is the predicted value from the following regression:

$$\begin{aligned} Inside\_DE_{i,t} = {} & \beta_0 + \beta_1 * Ln(Firm\_DE_{i,t}) + \beta_2 * Leverage_{i,t} + \beta_3 * Idiosyn\_Risks_{i,t} \\ & + \beta_4 * 1\_(Investment\_Grade_{i,t}) + \beta_5 * Ln(Assets_{i,t}) + \beta_6 * Fixed\_Assets_{i,t} \\ & + \beta_7 * \text{Market-to-Book}_{i,t} + \beta_8 * R\&D\_Expenditures_{i,t} \\ & + \beta_9 * 1\_(Liquidity\_Constraint_{i,t}) + \beta_{10} * 1\_(\text{Tax-loss-carried-forward}_{i,t}) \\ & + \beta_{11} * CEO\_Age_{i,t} + \beta_{12} CEO\_Tenure_{i,t} + \gamma * FF17_i + \epsilon_{i,t} \end{aligned} \tag{4.1}$$

The use of these variables is mainly motivated by two theoretical works on inside debt by Jensen and Meckling [1976] and Edmans and Liu [2011]. When a company has a lot of debt, the risk-shifting problem is more severe, leading to higher cost of debt. Hence, the company should pay its CEO in more inside debt to mitigate this agency problem (Jensen and Meckling [1976], Sundaram and Yermack [2007], Cen [2010]). Firm's debt-equity ratio (*Ln(Firm_DE)*) and debt-over-assets ratio (*Leverage*) capture this effect. Similarly, a company with very risky business, as it has either high idiosyncratic risks (*Idiosyncratic_Risks*) or no investment-graded bond (*1_(Investment_Grade)* = 0), should award its CEO more inside debt (Jensen and Meckling [1976] and Edmans and Liu [2011]). Next, a company with high liquidation value should use more inside debt to encourage its CEO to protect this value in case of bankruptcy; whereas a company with many investment opportunities should use more inside equity to incentivize the CEO to create more value under insolvency state (Edmans and Liu [2011]). High book value of total assets (*Ln(Assets)*) and high fraction of tangible assets (*Fixed_Assets*) proxy for large liquidation value. High market-to-book ratio (*Market-to-Book*) and high ratio of R&D expenditures over sales (*R&D_Expenditures*) proxy for many investment opportunities. Indicators of liquidity constraint (*1_(Liquidity_Constraint)*) and of tax-loss-carried-forward (*1_(Tax-loss-carried-forward)*), despite having no theoretical explanation, are included due to their common presence in empirical studies.

In addition, the model controls for CEO age, CEO tenure and industry fixed effects. An older CEO normally holds more pension benefits than a younger one (Freund et al. [2018]). CEO tenure might capture some private benefits accumulated to the status of being a CEO. Finally, the compensation practices in the industry to which a company belongs should affect that company's compensation structure.

The result of this regression is not the focus of this paper, and is therefore reported in Appendix 4.A1. The *target* inside debt-equity ratio is the measure of *target* compensation structure in this paper. Henceforth, I use two terms "*target* inside debt-equity ratio" and "*target* compensation structure" interchangeably.

4.3.3 Deviations from the *target* inside debt-equity ratios and firm value

I measure how much current compensation structure deviates from its *target* structure by using the absolute value of the difference between current inside debt-equity ratio

(*Inside_DE*) and the predicted value (*Target_Inside_DE*) from regression (4.1):

$$Deviation\_fr\_Target_{i,t} = \left| Inside\_DE_{i,t} - Target\_Inside\_DE_{i,t} \right| \quad (4.2)$$

A large value of this deviation measure indicates that the current compensation structure differs very much from the level required to properly address the agency problems. One drawback of this deviation measure is that it cannot capture the sign of the deviation. In other words, the measure cannot differentiate the compensation structure with relatively too much inside debt (i.e. inside debt-equity ratio is above its *target* level) from the one with relatively too much inside equity (i.e. inside debt-equity ratio is below its *target* level). I will separately examine these two cases in the additional analysis section. However, Figure 4.1 shows that the distributions of this deviation measure in these two separate cases are not significantly different.

[Figure 4.1 goes here]

I conduct an additional test to verify that deviation from the *target* structure can be a fair proxy for an improperly calibrated CEO pay structure. I relate stock and bond abnormal returns around proxy statement releases with the deviations that are disclosed in these proxy statements.[18] I also control for changes in the newly granted compensation and for some other types of information that are also disclosed in the proxy statements. These types of information might contaminate the interpretation of price reactions. These types of information include: (i) CEO retirement, (ii) requirement of (super)majority voting, (iii) classification of board, (iv) election of new independent directors, (v) election of new executive directors, and (vi) proposals for issues other than director election, executive compensation, and auditing/accounting company choice. The regression also includes firm and year fixed effects.

[18] In an untabulated result, I also re-run the main test in Campbell et al. [2016] to verify that adjusting CEO compensation to the *target* structure generally increases both stock and bond returns. Freund et al. [2018] use a similar approach to estimate the optimal structure between inside debt and inside equity (scaled by the firms capital structure). They show that the cost of new bond issues decreases, and stock prices react positively to announcements of new bond issues when CEO compensation of the borrowing companies is set close to the optimal structure.

The result of this validation test is reported in Appendix 4.A2. Stock and bond prices both react negatively to disclosures of large deviations from the *target* inside debt-equity ratios. This result suggests that total firm value decreases when the current CEO compensation structures largely deviate from the *target* levels.

In Figure 4.2, I plot Tobin's Q, adjusted for stock price reactions to new proxy statement releases, against the raw differences between inside debt-equity ratios and their *target* levels. The inverted U-shape relation also suggests that either too high or too low compensation structures compared with the *target* levels are detrimental to firm value. In short, the deviation measure can capture how much inappropriate the current compensation structures are to maximize firm value.

[Figure 4.2 goes here]

4.3.4 New active blockholders

To identify new blockholders with monitoring incentives, i.e. new active blockholders, I search on SEC EDGAR for all forms 13D that were filed from the calendar years of 2007 to 2018. An investor who comes to own more than five percent of a company's outstanding equities with the intention of affecting the firm's management or control must file form 13D within 10 days of crossing the five percent ownership threshold.[19]

One company can be the subject of multiple forms 13D filed by different investors. For each company, I only count the earliest filing in the sample period. If multiple filings occur in the same year, I only count the 13D investor who stays as active blockholder for the longest period of time. For example, UBS AG and Noonday Asset Management LP both filed form 13D and became active blockholders in Alliance Data Systems Corp in fiscal year 2007. Noonday Asset Management LP left in fiscal year 2008, while UBS AG remained active until 2013. I only count one event for UBS AG. This filtering process leaves 1,186 unique companies that were targeted by new active blockholders between the fiscal years of 2007 and 2016. For the main analysis, I only consider the impact of

[19] If an investor comes to own more than five percent of a firm's equities and only has investment purpose, the investor only has to file form 13G, which is shorter and requires less frequent disclosure than form 13D. I follow the literature and refer to the 13G filers as passive blockholders.

these new active blockholders who entered the targeted firms after the fiscal year 2007. For robustness check, the main result does not qualitatively change when I include any active blockholders entering any time during 1995 - 2017 or when I use another strategy to identify active blockholders.

4.3.5 Descriptive statistics

The full sample is an unbalanced panel of 5,775 U.S. public companies from the fiscal years of 2006 to 2017, which contains 38,469 firm-year observations. This full sample is used to estimate the *target* inside debt-equity ratios. However, the main regressions use difference variables or lagged values so only 35,549 observations from the fiscal years of 2007 to 2017 are included in the main analyses.

Table 4.1 summarizes characteristics of the companies that are included in the main analyses. The average CEO in my sample has a smaller (in dollar value) compensation package than the average S&P 1500 CEO as reported in Cassell et al. [2012]. The average CEO in my sample holds US$ 2.74 million in inside debt and US$ 15.27 million in inside equity, whereas Cassell et al. [2012] report US$ 7 million and US$ 60 million respectively for the average S&P 1500 CEO. Since two thirds of my sample are small non-S&P-1500 firms, the average size of the compensation package is smaller than in a sample which contains only S&P 1500 firms. The mean and median values of the unlogged ratio between inside debt and inside equity are 0.2439 and 0.0247 respectively. Previous papers report the mean and median values for this ratio of around 0.4 and 0.04 for S&P 1500 firms.[20] This large difference occurs mainly because more than 45% of the CEOs in my sample do not have inside debt[21] compared with only 30% in the S&P 1500 sample (Edmans and Liu [2011]). The logarithm transformation partially addresses the skewness, as the mean and median values of the inside debt-equity ratio are -4.5767 and -2.6139, respectively.

[Table 4.1 goes here]

[20]See Cen [2010], Cassell et al. [2012], Campbell et al. [2016], Brisker and Wang [2017]

[21]This does not mean that these companies do not offer defined-benefit pensions or non-qualified deferred compensation to their other named executive officers.

Table 4.2 compares characteristics of companies targeted by new active blockholders with those of the average non-targeted firms in the same industries. The characteristics are measured one year before the new active blockholders arise. The targeted companies are smaller, thus offering smaller compensation packages to their CEOs, than the average non-targeted firms in the same industries. Compared with the non-targeted firms, the targeted firms also have lower market-to-book ratios, higher idiosyncratic risks, and lower dividend yields. The difference in firm characteristics between targeted and non-targeted companies in my sample is consistent with what is documented in previous studies.[22] Specifically, the targeted firms have significantly larger deviations from the *target* inside debt-equity ratios the those of the non-targeted firms before new active blockholders emerge.

[Table 4.2 goes here]

4.4 Deviations from the *target* inside debt-equity ratios and the incidence of new active blockholders

In this section, I test two competing hypotheses regarding the relation between new active blockholder incidence and lagged deviations from the *target* inside debt-equity ratios. Hypothesis H10 is consistent with the "active monitoring hypothesis", while Hypothesis H1A is consistent with the "wealth extraction hypothesis".

Hypothesis H10: *The incidence of new active blockholders is positively correlated with lagged deviations from the target CEO inside debt-equity ratios.*

Hypothesis H1A: *The incidence of new active blockholders is negatively correlated with lagged deviations from the target CEO inside debt-equity ratios.*

To test these two hypotheses, I regress the incidence of 13D filings on lagged deviations

[22] See Brav et al. [2008], Boyson and Mooradian [2011], Bebchuk et al. [2015], Brav et al. [2015b]

from the *target* inside debt-equity ratios by using the following Probit regression:

$$
\begin{aligned}
Pr\left[New\_Active\_Block_{i,t}\right] = \alpha + \beta * Deviation\_fr\_Target_{i,t-1} + \theta * X_{i,t-1} \\
+ \delta * Year\_FE_t + \gamma * Industry\_FE_i + \epsilon_{i,t}
\end{aligned}
\tag{4.3}
$$

New_Active_Block is a dummy variable which equals one if the firm has a new 13D investor in a given fiscal year, and equals zero if otherwise. By construction, the incidence of new active blockholders is not double counted and only occurs in 1,186 unique firm-year observations (as described in section 4.3.4). *Deviation_fr_Target* is the deviation from the *target* inside debt-equity ratio as constructed in equation (4.2). I check that forms 10K and proxy statements of the previous fiscal years are publicly available when 13D investors acquire the block holdings.[23] For control variables (X), I include the popular explanatory variables that have been used in prior works to predict the rise of active blockholders: natural logarithm of assets (*Ln(Assets)*), market-to-book ratio (*Market-to-Book*), sales growth rate (*Sale_Growth*), return on assets (*Returns_on_Assets*), long-term debt over assets (*Book_Leverage*), R&D expenses over sales (*R&D_Expenditures*), dividend yield (*Dividend_Yield*), analyst coverage (*Ln (1 + N_Analysts)*), Herfindahl index of sales in two-digit SIC code industries (*Sales_HHI*).[24] Edmans et al. [2013] show that high stock liquidity facilitates block formation, hence I also include their measure of stock liquidity (*Stock_Liquidity*).[25] Details on how to construct these variables are provided in Appendix 4.A4. Industry and year fixed effects are also included. The regression contains 31,731 firm-year observations between the fiscal years 2007 and 2016.

[Table 4.3 goes here]

The result of regression (4.3) is reported in Table 4.3. The coefficient of *Deviation_fr_Target*, $\boldsymbol{\beta}$, equals 0.0187, and is significant at 1% level (column 1). The marginal effect of this main explanatory variable is 0.0014, when control variables are kept at their mean values. When the deviation measure moves from the second quartile (3.40) to

[23] In the cases where financial and executive compensation data of the fiscal years “t-1” are not publicly available at block acquisitions, I use the data of the fiscal years “t-2”.

[24] See Clifford [2008], Brav et al. [2015b], Edmans et al. [2013]

[25] This measure of stock liquidity is essentially the negative of Amihud [2002]'s il-liquidity measure.

the third quartile (6.03), the probability of attracting new active blockholders increases by 0.37 percentage points (= [6.03 - 3.40]*0.0014). Given that new active blockholders only arise in 1,186 out of 31,731 observations, this 0.37 percentage point change corresponds to an increase of 10% in the unconditional probability. This positive correlation suggests that active blockholders often arise in companies whose CEO pay structures are not properly set to maximize firm value. This result confirms Hypothesis H10 (i.e. the "active monitoring hypothesis") and rejects Hypothesis H1A (the "wealth extraction hypothesis").

After I control for the presence and the ownership concentration of other institutional investors, $\boldsymbol{\beta}$ becomes 0.0173, and is significant at 5% level (column 2). I also find that active blockholders often arise in companies with low institutional ownership concentration. This finding is indicative of the correlation between weak governance by institutional investors and improper CEO pay structures, which has been found in prior studies (Hartzell and Starks [2003], Almazan et al. [2005], Ertimur et al. [2010]). The finding also suggests that new active blockholders often arise in companies where the inappropriate compensation structures are hard to fix due to weak internal governance, hence the necessity of interventions from external investors.

The coefficients of the control variables are consistent with existing findings in the literature. Active blockholders are more likely to emerge in smaller firms with lower market-to-book ratios, higher book leverages, and lower dividend yields.[26] Overall, the results in Table 4.3 are consistent with the explanation that active blockholders target companies that have bad performances and inappropriate CEO compensation structures.

4.5 New active blockholders' presence and the adjustments of inside debt-equity ratios

In this section, I investigate how the new active blockholders whose emergence is studied in section 4.4 adjust CEO inside debt-equity ratios in the companies that they target.

[26]See Brav et al. [2008], Boyson and Mooradian [2011], Brav et al. [2015b], Clifford and Lindsey [2016]

Specifically, I test two competing hypotheses which belong to the "active monitoring hypothesis" and the "wealth extracting hypothesis", respectively:

Hypothesis H20: *The presence of new active blockholders is associated with decreases in deviations from the target CEO inside debt-equity ratios.*

Hypothesis H2A: *The presence of new active blockholders is associated with increases in deviations from the target CEO inside debt-equity ratios.*

First, I estimate how much the inside debt-equity ratio has moved towards or away from its *target* level based on the change in the deviation measure:

$$Deviation\_Decrease_{i,t} = -\left[Deviation\_fr\_Target_{i,t} - Deviation\_fr\_Target_{i,t-1} \right] \tag{4.4}$$

I take the negative value of the change to ease the interpretation. A positive value of *Deviation_Decrease* means the CEO compensation structure has been adjusted closer to the *target* level, and vice versa. Therefore, a positive correlation between active blockholders' presence and *Deviation_Decrease* confirms hypothesis H20, while a negative correlation confirms hypothesis H2A.

Next, I track the subsequent changes in the block holdings and in the filing statuses of the new active blockholders whose filing decisions are studied in section 4.4. I collect all the forms 13D/A[27], 13G, 13G/A and 13F filed by these investors. I follow Boyson and Mooradian [2011] and consider that an active blockholder exits when whichever of the following events happens first: (1) the active blockholder discloses below five percent equity ownership by filing form 13D/A or 13F, (2) the active blockholder switches to a passive block holding by filing form 13G, (3) the targeted firm is delisted, or (4) December 31, 2018. Active blockholders often exit in the third years from their initial 13D filings, hence they normally restructure compensation in three years, including the years of emergence. For example, WPM LP filed a form 13D and became an active blockholder in Fidelity National Information Services Inc in October 9, 2009 (fiscal year 2009). This investor exited after it filed a form 13D/A in March 13, 2013 (fiscal year

[27]Any changes to the investors ownership larger than 1% of firm's equities must be updated via form 13D/A within 10 days of the changes.

2013), announcing an ownership of below 1%. For this targeted company, the active blockholder is present in the fiscal years from 2009 to 2012 inclusively.

Finally, I relate the changes in deviations from the *target* inside debt-equity ratios with the presence of new active blockholders by running the following regression:

$$\begin{aligned} Deviation\_Decrease_{i,t} = \alpha + \beta * Active\_Block_{i,t} + \theta * X_{i,t} \\ + \delta * Year\_FE_t + \gamma * Firm\_FE_i + \epsilon_{i,t} \end{aligned} \tag{4.5}$$

Active_Block is a dummy variable that equals one if a company has a present new active blockholder in a given fiscal year, and equals zero if otherwise.[28] I also include a dummy variable, *After_Active_Block*, to capture the changes after new active blockholders exit. Following the above example of WPM LP which emerged in 2009 and exited in 2013, *After_Active_Block* equals one for the fiscal years from 2013 to 2017, and equals zero for any other fiscal years. Control variables (X) include the firm and CEO characteristics that are normally used in the inside debt literature. Continuous control variables include: change in firm capital structure (Δ *Ln(Firm_DE)*), change in debt-over-assets ratio (Δ *Book_Leverage*), change in idiosyncratic risks (Δ *Idiosyncratic_Risks*), change in total assets (Δ *Ln(Assets)*), change in fixed assets ratio (Δ *Fixed_Assets*), change in market-to-book ratio (Δ *Market-to-Book*), change in R&D expenditures over sales (Δ *R&D_Expenditures*). Dummy control variables and CEO characteristics include: indicator of liquidity constraint (*1_(Liquidity_Constraint)*), indicator of tax-loss-carried-forward (*1_(Tax-loss-carried-forward)*), indicator of investment grade (*1_(Investment_Grade)*), CEO age (*CEO_Age*) and CEO tenure (*CEO_Tenure*). I also include firm and year fixed effects to account for any unobserved characteristics that might affect the adjustments of CEO compensation structures. The regression contains 35,549 firm-year observations from the fiscal years 2007 to 2017.

[Table 4.4 goes here]

[28]The presence of active blockholders is based on public information available at the end of each fiscal year. Companies decide their CEO compensation, and thus its adjustments over the lagged value, after the fiscal years end. Therefore, *Deviation_Decrease* and *Active_Block*, despite having the same year subscripts, are not exactly contemporaneous. Lagging *Active_Block* is not necessary.

The result of regression (4.5) is reported in Table 4.4. The coefficient of *Active_Block*, $\boldsymbol{\beta}$, equals 0.8133 and is significant at 1% level (column 1). The positive coefficient suggests that the adjustments towards the *target* inside debt-equity ratios are significantly stronger in the presence of active blockholders. Suppose that a company attracting no new active blockholder annually adjusts its CEO compensation to the *target* structure at the sample-median level (0.3119). The magnitude of this adjustment for a company that has an active blockholder, but is otherwise comparable, is 3.6 times larger ([0.3119 + 0.8133]/0.3119 = 3.6). About 80% (= [0.3119 + 0.8133]*3/4.1729) of the deviation before a new active blockholder emerges (4.1729) is wiped out during the three years of this investor's presence. A median company with no new active blockholders can only reduce about 25% (= 0.3119*3/3.7829) of the initial deviation (3.7829) in three years. Hence, the speed of adjustments towards the *target* ratios is also three times higher among the companies that have new active blockholders. This result confirms Hypothesis H20 (i.e. the "active monitoring hypothesis") and rejects Hypothesis H2A (i.e. the "wealth extraction hypothesis").

I find that ownership concentration by other institutional investors also facilitates the adjustments towards the *target* compensation structures (column 2). The impact of new active blockholders just slightly decreases after I control for institutional ownership concentration as $\boldsymbol{\beta}$ becomes 0.7929 and is still significant at 1% level (column 2). This finding is consistent with the conclusion in Hartzell and Starks [2003]. Similarly, $\boldsymbol{\beta}$ becomes 0.8001 and is still significant at 1% level when I use industry-year fixed effects instead of only year fixed effects (column 3). These results suggest that the presence of other influential investors or industry trends also affect the adjustments of the inside debt-equity ratios, but not to a substantial extent.

After new active blockholders exit, the adjustments towards the *target* pay structures are not significantly different between the (previously) targeted firms and the firms which never attract any new active blockholders. The coefficient of *After_Active_Block* is positive but insignificant. Since the significantly strong compensation adjustments start when new active blockholders emerge and end when these investors exit, it is highly possible that new active blockholders cause these compensation adjustments

4.6 Adjustments of inside debt-equity ratios and value changes

The evidence from the previous two sections suggests that new active blockholders often arise and adjust the pay structures that do not incentivize CEOs to maximize firm value. In this section, I examine if such compensation adjustments are associated with higher total firm value or are associated with only higher equity value. Specifically, I test the following two hypotheses which belong to the active monitoring explanation and the wealth extracting explanation, respectively:

Hypothesis H30: *The changes in deviations from the target CEO inside debt-equity ratios are positively correlated with both stock and bond abnormal returns over the active block holding period.*

Hypothesis H3A: *The changes in deviations from the target CEO inside debt-equity ratios are positively (negatively) correlated with stock (bond) abnormal returns over the active block holding period.*

I use cumulative abnormal returns over the active block holding period to capture the change in firm value under new active blockholders' presence. I estimate the loadings of excess monthly stock returns on Carhart's four factors (Carhart [1997]) during period [m - 25, m - 1], where m is the month of 13D filings. I then use these loadings to calculate the monthly "normal" excess returns. Monthly abnormal stock returns equal actual excess returns minus "normal" excess returns. Cumulative abnormal stock returns ($Stock\_CARs$) is the sum of monthly abnormal returns from the month of 13D filings to the month that active blockholders exit. When the blockholders are still active, the "exit" month is December 2018.

I follow Bessembinder et al. [2008] to calculate the abnormal bond returns by using the matching portfolio model. If a targeted company has multiple outstanding bonds, I only include the bond with the largest trading volume during the active block holding period. For each bond issued by the targeted companies, I assign a group of bonds matched on rating and maturity. There are six rating groups: AA and above, A, BBB, BB, B, and below B. There are three maturity groups: below five years, between five to ten years, and above ten years. These matching bonds are issued by the companies that never attract any new active blockholders during the sample period 2007 - 2016. Monthly abnormal bond returns equal returns of bonds issued by the targeted firms minus the volume-weighted-average returns of the matching bonds. *Bond_CARs* is the sum of monthly abnormal returns from the month of 13D filings to the month that active blockholders exit, or December 2018 if the active blockholders are still present.

I calculate the change in the deviation from the *target* inside debt-equity ratio over the active block holding period as follows:

$$Deviation\_Decrease_{i,exit} = -[Deviation\_fr\_Target_{i,exit} - Deviation\_fr\_Target_{i,entry}] \tag{4.6}$$

$Deviation\_fr\_Target_{entry}$ is the deviation from *target* inside debt-equity ratio one year before new active blockholders arise. $Deviation\_fr\_Target_{exit}$ is the deviation measure one year before new active blockholders exit. For example, WPM LP entered the targeted company in 2009 and exited in 2013. $Deviation\_fr\_Target_{entry}$ is the deviation measure for the fiscal year 2008. $Deviation\_fr\_Target_{exit}$ is the deviation measure for the fiscal year 2012.

I regress the stock and bond cumulative abnormal returns on the changes in the deviations over the active block holding period:

$$\begin{aligned} CARs_i = \alpha + \beta * Deviation\_Decrease_{i,exit} + \theta * X_{i,exit} \\ + \delta * Year\_FE_{exit} + \gamma * Industry\_FE_i + \epsilon_i \end{aligned} \tag{4.7}$$

Dependent variable, *CARs*, is either *Stock_CARs* or *Bond_CARs*. Control variables include changes in other firm characteristics over the active block holding period: natural logarithm of assets (*Ln(Assets)*), market-to-book ratio (*Market-to-Book*), sales growth rate (*Sales_Growth*), return on assets (*Returns_on_Assets*), long-term debt over assets

(*Book_Leverage*), R&D expenses over sales (*R&D_Expenditures*), dividend yield (*Dividend_Yield*). For example, the change in asset value over the active block holding period is measured as $\Delta LASSET_{i,exit} = LASSET_{i,exit} - LASSET_{i,entry}$. Many other corporate events might happen during the active blockholders' stay. These events might also affect stock and bond returns. Hence, I control for the occurrence of some corporate events that might be related to changes in stock and bond values.[29] These events include: share repurchases, leverage buyouts, spin-offs, SEOs, and acquisition announcements (where the companies with active blockholders are the targets). Finally, I also control for the fixed effects of exit years and industries. There are 1,186 unique companies that attract new active blockholders, 23% of which have outstanding bonds.

[Table 4.5 goes here]

The results of regression (4.7) are reported in Table 4.5. The coefficient of *Deviation_Decrease*, $\boldsymbol{\beta}$, equals 0.0792 for stock CARs, and equals 0.0190 for bond CARs (columns 1 and 3). Both estimates are significant at 1% level. Following the result in section 4.5, new active blockholders on average reduce the deviations by 3.3756 units over their holding period. Such compensation adjustments are associated with an increase of 27 percent (= 3.3756 * 0.0792) in the equity value and an increase of 6.4 percent (= 3.3756 * 0.0190) in the bond value. The annualized stock (bond) returns are 9.2 (2.3) percent given the average active block holding period of 2.7 years. These findings suggest that new active blockholders incentivize CEOs to increase total firm value, rather than to increase only shareholders' value. This result confirms Hypothesis H30 (i.e. the "active monitoring hypothesis") and rejects Hypothesis H3A (i.e. the "wealth extraction hypothesis").

The changes in other firm characteristics and the occurrence of some corporate events can also affect stock and bond returns. Stock and bond returns both increase when firm performances are improved, as proxied by higher market-to-book ratios, higher sales growth, and higher returns on assets. Consistent with Klein and Zur [2011], I find that such policy changes as dividend increases, share repurchases, or leverage buyouts benefit

[29] See Greenwood and Schor [2009], Klein and Zur [2011], Brav et al. [2015a], Boyson et al. [2017]

the shareholders but harm the debtholders. However, the impacts of such changes are not significant in my study.

I find that stock returns significantly decrease if the target firms raise capital via seasonal equity offerings. In addition, shareholders gain if the targeted firms spin off some of their businesses, which is consistent with Brav et al. [2015a]. However, the result is not significant.

Bond returns decrease while stock returns increase if there are announcements that the targeted firms might be acquired. This finding is consistent with prior studies which show that acquisitions benefit target shareholders but harm the target debtholders (Maxwell and Stephens [2003], Greenwood and Schor [2009]). Sunder et al. [2014] also conclude that the agency cost of debt increases if active blockholders depend on the market of corporate control for governance.

4.7 Deviations from above and below the *target* inside debt-equity ratios

The results of the main analyses so far support the "active monitoring hypothesis". However, the deviation measure used in the main analyses is an absolute value so it cannot distinguish between a deviation caused by too much inside debt and one caused by too much inside equity.

When the inside debt-equity ratio is higher (lower) than the *target* ratio, the pay structure contains relatively too much inside debt (inside equity) than optimum. I refer to the pay structures having too much debt (too much inside equity) as the "debt-biased pay structures" (the "equity-biased pay structures"). Campbell et al. [2016] show that there are some asymmetries in the market reactions to reduced deviations starting from above and below the *target* compensation structures. I also observe these asymmetries in the validation test which relates stock and bond price reactions to disclosures of compensation deviations (Appendix 4.A2). Bond prices react negatively to disclosures of equity-biased pay structures, but not to disclosures of debt-biased structures. Stock prices react negatively to both types of deviations. However, the magnitude of the negative reactions to debt-biased pay structures (-0.0031) is larger than that of the equity-biased structures (-0.0019).

When the compensation contains too much inside debt, a CEO runs his firm in a more conservative way, which reduces the cost of new debt financing. However, the conservative CEO also makes fewer investments so shareholders do not benefit from the cheap financing, but lose from decreasing expected profits. Therefore, bond returns remain unchanged while stock returns significantly decrease when companies disclose debt-biased pay structures.

One the other hand, an equity-biased pay structure tempts the CEO to make more risky investments to increase equity value. The agency problem of debt becomes more severe, resulting in more costly debt financing. This explains why bond returns significantly decline when companies disclose equity-biased pay structures. Shareholders' value might increase thanks to more investments, but it might also decrease because the cost to raise capital for these investments has risen. The negative stock reactions to disclosures of equity-biased pay structures indicate that the negative effect dominates the positive one.

Since monitoring is costly (Almazan et al. [2005], Gantchev [2013]), new active blockholders might prioritize the cases where the potential gains to them are higher. Hence, it is possible that active blockholders arise and fix the debt-biased pay structures, but ignore the equity-biased pay structures. To explore this possibility, I construct two indicators for debt-biased and equity-biased pay structures and interact the main explanatory variables with these two indicators. The overall conclusion is still consistent with the "active monitoring hypothesis".

4.7.1 Two directions of deviations and incidence of new active blockholders

First, I investigate whether new active blockholders prefer companies with debt-biased pay structures over those with equity-biased structures. The Probit regression (4.3) is modified as follows:

$$
\begin{aligned}
Pr[New\_ActBlock_{i,t}] = \alpha &+ \beta_1 * Deviation\_fr\_Target_{i,t-1} * 1\_(\text{Too high inside debt}_{i,t-1}) \\
&+ \beta_2 * Deviation\_fr\_Target_{i,t-1} * 1\_(\text{Too high inside eq}_{i,t-1}) \\
&+ \theta * X_{i,t-1} + \delta * Year\_FE_t + \gamma * Industry\_FE_i + \epsilon_{i,t}
\end{aligned} \tag{4.8}
$$

1_(Too high Inside debt) equals one if the inside debt-equity ratio exceeds the *target* ratio, and equals zero if otherwise. *1_(Too high Inside equity)* equals one if the inside debt-equity ratio is below the *target* ratio, and equals zero if otherwise. Other model specifications are similar to those in regression (4.3).

If new active blockholders prioritize fixing the debt-biased pay structures, $\boldsymbol{\beta_1}$ should be positive and significant while $\boldsymbol{\beta_2}$ should become insignificant. However, the result in Table 4.3 (columns 3) indicates that new active blockholders emerge when both types of biased pay structures happen. $\boldsymbol{\beta_1}$ equals 0.0166 and is significant at 5% level; $\boldsymbol{\beta_2}$ equals 0.0218 and is significant at 1% level. These two estimates barely change when I also control for the presence and holdings of other institutional investors (column 4).

4.7.2 New active blockholder's presence and two directions of adjustments

Next, I examine whether new active blockholders only adjust the pay structures that initially contained too much inside debt, but ignore those with too much inside equity by modifying regression (4.5) as follows:

$$
\begin{aligned}
Deviation\_Decrease_{i,t} = \alpha &+ \beta_1 * Active\_Block_{i,t} * 1\_(\text{Too high Inside debt}_{i,entry}) \\
&+ \beta_2 * Active\_Block_{i,t} * 1\_(\text{Too high Inside equity}_{i,entry}) \\
&+ \theta * X_{i,t} + \delta * Year\_FE_t + \gamma * Firm\_FE_i + \epsilon_{i,t}
\end{aligned} \tag{4.9}
$$

1_(Too high Inside debt) equals one if the inside debt-equity ratio exceeds the *target* ratio, and equals zero if otherwise. *1_(Too high Inside equity)* equals one if the inside debt-equity ratio is below the *target* ratio, and equals zero if otherwise. These two indicators are constructed based on the deviations in the years before active blockholders arise so that the indicators are consistent with those used in the Probit regression (4.8).[30] Other model specifications are similar to those in regression (4.5).

$\boldsymbol{\beta_1}$ should be positive and significant while $\boldsymbol{\beta_2}$ should become insignificant if new active blockholders focus solely on fixing the debt-biased pay structures. The result in Table 4.4 (column 4) shows that these blockholders adjust CEO pay structures towards the *target* levels despite the initial directions of the deviations. $\boldsymbol{\beta_1}$ equals 0.8644 and $\boldsymbol{\beta_2}$ equals 0.7993. Both estimates are significant at 1% level. The adjustments are indeed slightly stronger when the deviations started from above the *target* (i.e. too much inside debt) than when they started from below the target (i.e. too much inside equity). Again, the estimates barely change after I control for the presence and holdings of other institutional investors (column 5).

4.7.3 Two directions of adjustments and value changes

Finally, I examine how stock and bond prices change when debt-biased pay structures and equity-biased pay structures are fixed respectively.

$$\begin{aligned} CARs_i = \alpha &+ \beta_1 * Deviation\_Decrease_{i,exit} * 1\_(\text{Too high Inside debt}_{i,entry}) \\ &+ \beta_2 * Deviation\_Decrease_{i,exit} * 1\_(\text{Too high Inside equity}_{i,entry}) \\ &+ \theta * X_{i,exit} + \delta * Year\_FE_{exit} + \gamma * Industry\_FE_i + \epsilon_i \end{aligned} \tag{4.10}$$

When the dependent variable is stock returns, $\boldsymbol{\beta_1}$ equals 0.1070 and $\boldsymbol{\beta_2}$ equals 0.0619 (Table 4.5, column 2). Both estimates are significant at 1% level. This result suggests that the gains to shareholders are indeed higher when the debt-biased pay structures are fixed. When the dependent variable is bond returns, $\boldsymbol{\beta_1}$ equals 0.0019 but is insignificant; $\boldsymbol{\beta_2}$ equals 0.0273 and is significant at 1% level (Table 4.5, column 4). As new active block-

[30] The coefficients barely change if I construct indicators based on lagged deviations.

holders fix the debt-biased structures, which involves decreasing the inside debt-equity ratios, shareholders gain but bondholders do not lose. Hence, the gains to shareholders do not come from the losses to debtholders

Overall, the results in this section support the "active monitoring hypothesis" rather than the wealth extraction explanation. New active blockholders restructure CEO compensation in the targeted firms to increase total firm value instead of increasing only shareholders' value. These investors adjust the pay structures that are undesirable to either shareholders or debtholders. Even when active blockholders fix the pay structures that used to over-align CEOs' incentives with the debtholders' interests, such adjustments do not harm the debtholders.

4.8 Additional analysis

4.8.1 Three alternative explanations

The design of the main analyses partially addresses the endogeneity issue. The deviations from the target pay structures are large before active blockholders emerge. Significant declines in these deviations start when new active blockholders enter the companies and stop when these investors exit. Hence, it is highly possible that new active blockholders cause the reductions in the deviations from the target pay structures. I also conduct additional tests to rule out three alternative explanations for the coincidence of reduced deviations and active blockholders' presence.

Reverse causality

Active blockholders might retain their large holdings because they can predict in which companies the adjustments in CEO compensation and, thus the increasing firm value, would occur. If this explanation holds, it is the reduced deviations from the *target* structures that determine the active blockholders' presence, and not the other way round. I utilize the fact that many investors choose to become active blockholders in some firms (the 13D firms), but to become passive blockholders in other firms (the 13G firms). If blockholders' presence is determined by the adjustments in CEO compensation, I would observe no significant difference in CEO compensation adjustments between 13D and 13G firms that attract the same new blockholders. I re-run regression (4.5) but change the main explanatory variable. *Active_Block* equals one for the company in which the shared blockholder is active, and equals zero if this investor is passive. The new regression include only 13D and 13G companies that simultaneously have the same blockholders.

[Table 4.6 goes here]

I find that CEO compensation structures are adjusted to the *target* levels faster in the 13D firms than in the 13G firms that attract the same blockholders (Table 4.6, columns 1). The coefficient for the main explanatory variable equals 0.7541 and is significant at 1% level. The estimate barely changes after I control for ownership by other institutions (column 2). Hence, it is unlikely that active blockholders remain in the targeted firms because they can anticipate the adjustments in CEO compensation structures. This conclusion does not change when I separate the adjustments from above or below the *target* structures (Table 4.6, columns 3 and 4).

One might argue that investors strategically file form 13D in the firms where they expect that the reduced deviations from the *target* compensation structures are likely to happen. However, Edmans et al. [2013] explain that investors should have no incentives to file form 13D if they do not really want to affect the management or control of the companies that they target. First, 13D filers must amend their initial filings within ten days upon any changes in stake of one percent, which can cause a price impact against these investors and prevent them from subsequently trading on their private information. Investors with only investment purposes should file form 13G, which requires amendments upon any changes in stake of five percent within 45 days after the end of the calendar year. Second, filing form 13D can pose the active investors as a threat to the targeted firms' managers, making it more difficult for them to get access to information of these firms. Third, investors signal their intentions of affecting control or management by filing form 13D. If the investors do not intervene and firm performance does not improve, they can lose their reputation, especially when they are institutional investors. For these reasons, prior works on activism considers 13D filings as proxy for intervention purposes and 13G filings as proxy for investment purposes. Most empirical tests of intervention versus stock-picking are based on differences between subject firms of forms 13D and those of forms 13G (Clifford [2008], Brav et al. [2008, 2015a], Clifford and Lindsey [2016]).

Placebo tests

The deviations from the *target* inside debt-equity ratios might follow a mean-reverting process. In this case, large deviations would certainly be followed by strong declines, even without the presence of active blockholders. To test this possibility, I run a placebo test similar to that in Brav et al. [2015a]. I identify a sample of matched firms that have the same industries and compensation adjustements as those of the targeted firms during two years before active blockholders arise. If a targeted firm has higher (lower) inside debt-equity ratio than the *target* ratio, then so does its matched firm. The matching process requires that the targeted firms have three consecutive years of compensation data before active blockholders arise. There are 153 targeted firms that do not meet this requirement so I exclude these companies from the placebo test. In the placebo test, I assume that new active blockholders arise in the matched firms, but not in the truly targeted firms.

[Table 4.7 goes here]

Columns 1 and 2 in Table 4.7 report the estimates of regressions conducted on the true-event and pseudo-event samples, respectively. In the pseudo-event sample, pseudo active blockholders' presence is even associated with widened deviations, as the coefficient equals -0.1731 and is significant at 5% level. The difference between the estimate in the true-event sample and that in the pseudo-event sample is significant at 1% level (column 3). Other coefficients of the two regressions do not differ very much.

It is also possible that some firm characteristics co-determine the presence of active blockholders and the adjustments of CEO compensation. Hence, I conduct another placebo test in which the matched firms are assigned based on industries and the propensities to attract new active blockholders. The propensity scores are estimated by using the Probit regression that is specified in section 4.4. The results for this placebo test is reported in Table 4.7, columns 4 to 6. The main coefficient in the placebo test equals 0.1922 but is insignificant. The difference between the estimate in the true-event sample and that in the pseudo-event sample is significant at 1% level (column 6) The estimated impact of active blockholders' presence on reduced deviations is significantly lower in the pseudo-event sample than in the true-event sample.

The two placebo tests are to show directly that the main regression produces different results if other samples of firms are assumed to be targeted. In Appendix 4.A3, I re-run regression (4.5) on the sample that contains only truly targeted firms and matched firms. The results are comparable with those presented in Table 4.7.

4.8.2 A channel for active blockholders to affect CEO compensation

Executive compensation is solely determined by the board of directors. Hence, an effective channel for active blockholders to affect CEO pay is to appoint their favored directors into the boards of the targeted firms. Bebchuk et al. [2020] argue that appointing directors is also an efficient channel since this solution can "save face" for the targeted firms' management, hence triggering less resistance. Agrawal and Nasser [2019] find strong monitoring impact on CEO compensation when the board of directors contain blockholders.

I examine whether new active blockholders adjust CEO compensation to the *target* structures by appointing their favored directors into the boards. First, I obtain a sample of newly appointed directors from Boardex. Next, I determine that a director is appointed by an active blockholders if one of the following conditions applies: (i) the active blockholder claims to nominate the director in a form 13D or 13D/A, (ii) the director is also the fund manager of the active blockholder, (iii) the director is a close relative (i.e. spouse, child, or sibling) of the the active blockholder's fund manager.

I re-run regression (4.5) and interact this new indicator with the main explanatory variable as follow:

$$
\begin{aligned}
Deviation\_Decrease_{i,t} = \alpha + \beta * Active\_Block_{i,t} \\
+ \lambda * Active\_Block_{i,t} * 1\_(\text{appoint director}_{i,t-1}) \\
+ \theta * X_{i,t} + \delta * Year\_FE_t + \gamma * Firm\_FE_i + \epsilon_{i,t}
\end{aligned} \tag{4.11}
$$

1_(appoint director) is an indicator that equals one if active blockholders appoint their directors into the boards, and equals zero if otherwise. Note that appointments of directors are lagged one year to ensure that the directors have been in the boards when CEO compensation structures are determined.

[Table 4.8 goes here]

The result of regression (4.11) is reported in Table 4.8, column 1. $\boldsymbol{\beta}$ decreases to 0.6131 and is only significant at 10% level. $\boldsymbol{\lambda}$ equals 0.2884 and is significant at 1% level. The impact of new active blockholders is 47% stronger when these investors appoint their favored directors into the boards than when they do not appoint directors.

The effect of appointing directors on compensation adjustments might vary across the committees into which the directors are appointed. I replace the indicator of director appointment by several indicators, each of which equals one if active blockholders appoint directors into a particular committee, and equals zero if otherwise. The result is reported in Table 4.8, column 2. The impact of active blochkolders is the strongest when they can appoint directors into the Compensation committees (coefficient equals 0.3642, significant at 1%), followed by the Governance committees (coefficient equals 0.2948, significant at 5%). Appointing directors into the Nominating committees can also give the blockholders some advantages in adjusting CEO compensation (coefficient equals 0.0625, significant at 10%). If the active blockholders can only appoint directors into the Auditing or any other committees, their impact on CEO compensation does not significantly differ from that of the blockholders which do not appoint directors.

Appointing new directors to the boards is not the only channel for active blockholders to affect CEO compensation in the targeted firms. I show that the active blockholders that do not appoint directors can still enforce the compensation changes if they have industry experience or powers to negotiate with the management of the targeted firms.

First, I determine that an active blockholder has industry experience if this investor owned a 13D investment in a company of the same two-digit SIC code industry as that of the currently targeted firm. To identify experienced active blockholders, I track the 13D filings back to 1995. I find that active blockholders with experience in the industries to which targeted firms belong can reduce the compensation deviations more than those without industry experience (Table 4.8, column 3). The coefficient for the active blockholders who do not appoint directors but have industry experiences is 0.1705 and significant at 5%. In contrast, the coefficient for active blockholders who do not appoint directors and have no industry experience becomes insignificant. Since the experienced active blockholders understand the business nature of the industries, they are highly capable of persuading the CEOs to accept the new compensation structures that are close to the *target* levels.

Second, active blockholders that have only one 13D investment at a time can concentrate all of their attentions and resources on monitoring this only target company. Hence, they should be more capable of affecting CEO compensation than those that have multiple 13D investments. Indeed, the result in Table 4.8, column 4 supports this argument. The coefficient for the active blockholders that do not appoint directors and have a single 13D investment equals 0.1574 and is significant at 5% level.

4.8.3 Robustness check

In this section, I verify that the main finding in my paper does not result from any specific methodologies. The coefficients of active blockholders' presence ($\boldsymbol{\beta}$ in regression (4.5)) for different modifications to the main analysis framework are reported in Table 4.9.

[Table 4.9 goes here]

First, I change some specifications of the regression that is used to estimate the *target* inside debt-equity ratios. The results do not change when I: (i) use fixed effects based on different industry categories, (ii) include institutional ownership variables in the regression to estimate the *target* ratios, (iii) use an OLS regression to estimate the *target* ratio, (iv) use a Panel regerssion to estimate the *target* ratio.

Second, I use different measures for the *target* compensation structure. The result is only significant at 10% when I use industry-median inside debt-equity ratios as the *target* levels. I also use firm capital structures as the *target* inside debt-equity ratios as proposed in Jensen and Meckling [1976]. The result is still positive, but insignificant. This result is consistent with conclusion in Edmans and Liu [2011] that perfectly matching inside debt-equity ratio with firm capital structure is not always optimal.

Third, I try different measures of compensation structures between inside debt and inside equity. To begin with, I try adding the present value of expected cash payment to inside debt holdings by following the instructions in Cassell et al. [2012].[31] [32] The result is significant at 5% level, but the magnitude of the estimate becomes smaller. Next, I try using the relative measures of compensation structures between inside debt and inside equity that are often seen in prior studies on inside debt. Relative leverage ratio equals inside debt-equity ratio divided by firm's debt-equity ratio. Relative incentive ratio equals inside debt divided by the option delta of inside equity, all scaled by the same ratio for firm's debt and equity (see Wei and Yermack [2011]). The estimates are both significant at 1% level.

Finally, I try different strategies to identify investors with active monitoring incentives. Fich et al. [2015] show that institutional investors have the highest monitoring incentives when their holding value in the companies lie in the top 10% of these investors' portfolios. I use this strategy to identify which companies have monitoring investors and find that

[31] There are different views about whether salary and bonus should be considered inside debt. Edmans and Liu [2011] argue that salary and bonus will be lost for sure in case of bankruptcy. These types of cash payment do not affect the CEO's choice of efforts in case of bankruptcy, so they cannot be included in inside debt. On the other hand, some papers view that the CEOs have lent their human capital to the companies in advance, and the salary and bonus serve as coupon payment. In this sense, salary and bonus resemble a debt-like obligations that the companies owe their CEOs.

[32] I first calculate: Expected decision horizon = (Industry median tenure - CEO tenure) + (Industry median age - CEO age). If the expected decision horizon is negative, the present value of expected cash payment equals the sum of salary and bonus in this fiscal year. If the horizon is positive, the present value of expected cash payment equals the sum of salary and bonus in this fiscal year multiplied by the horizon.

the result is significant at 5% level, but the magnitude of the estimate becomes smaller. I also try including any present 13D investors that emerged at any time during 1995 - 2016, and the result is significant at 1% level.

4.9 Conclusion

This study documents evidence that new active blockholders restructure CEO compensation to increase total firm value, not just equity value. I build on existing literature to estimate the *target* compensation structures, and verify that large deviations from these *target* structures are detrimental to both shareholders and debtholders. I find that new active blockholders are more likely to arise in companies with large deviations from the *target* structures. These investors then significantly decrease the deviations during their stay in the companies. Bond abnormal returns over the active block holding period are positively correlated with the reduced deviations over the same period, indicating that the agency cost of debt has decreased. Shareholders also benefit from these compensation adjustments since stock abnormal returns also increase when deviations from the *target* structures are reduced. In addition, new active blockholders arise and restructure compensation when the old structures over-align CEOs' incentives to either shareholders' or debtholders' interests. Even when active blockholders fix the pay structures that used to contain too much inside debt, stock returns significantly increase while bond returns do not fall. These findings suggest that active blockholders create value by addressing the agency problem of debt, not exacerbating it.

I run a series of tests to establish the causal link between active blockholders' presence and reduced deviations from the *target* compensation structures. I show that deviations do not decrease in the companies that: (i) attract the same blockholders but as passive investors, (ii) have similar compensation adjustments two years before active blockholders arise, or (iii) have similar propensities to attract new active blockholders. In short, reduced deviations from the *target* compensation structures are not observed in comparable firms that do not have new active blockholders. I also show that a channel for active blockholders to restructure CEO compensation is to appoint their favored directors into the boards of the targeted firms, especially into the compensation or governance committees.

The conclusion by Klein and Zur [2011] and Jory et al. [2017] that active blockholders transfer wealth from bondholders to shareholders cannot explain the results in my study. Instead, the results are consistent with the explanation that active blockholders arise to address corporate governance issues and increase total firm value (Shleifer and Vishny [1986], Maug [1998], Bolton and Von Thadden [1998], Kahn and Winton [1998]). Furthermore, the finding that active blockholders restructure CEO compensation in a way that mitigates the debtholder-shareholder conflict supports Jensen and Meckling [1976]'s argument: shareholders also want to mitigate the agency cost of debt because they, as the last claimants over total firm assets, would finally have to bear this cost.

The impact of active blockholders on firm value has been the topic of heated debate, both from academic works[33] and from media coverage[34]. My study finds evidence that active blockholders restructure CEO compensation to benefit both shareholders and debtholders, thus increasing total firm value. Hence, it provides a positive angle to evaluate the impact of these increasingly powerful investors on the performance U.S. public companies.

[33] See review papers by Brav et al. [2010], Edmans [2014]

[34] See, Roger L. Martin, *Activist Hedge Funds Arent Good for Companies or Investors, So Why Do They Exist?*, Harvard Business Review, August 20, 2018; see also Yuliya Ponomareva, *Shareholder Activism Is On The Rise: Caution Required*, Forbes, December 20, 2018; see also Dominik Breitinger and Sophie Hardach, *Activist investors are more powerful than ever. Heres what that means for the economy*, World Economic Forum, September 5, 2018.

4.10 Figures and Tables

Figure 4.1: **Distribution of differences from *target* inside debt-equity ratios**

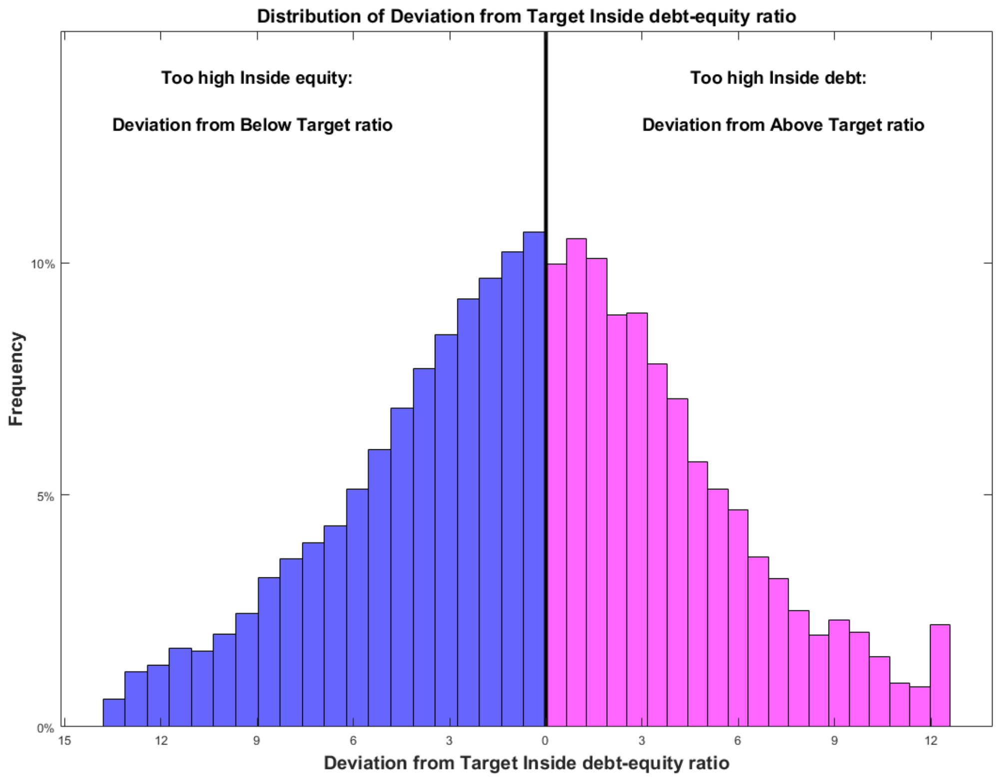


Figure 4.2: **Deviations from *target* inside debt-equity ratios and Tobin's Q around proxy statement releases**

The observed Tobin's Q (the blue dots) is calculated by using stock prices one day after proxy releases. Deviation from *target* inside debt-equity ratios are calculated from the information disclosed from these newly released proxy statements. The red solid line plots the predicted values of the following OLS regression: $Y = \alpha + \beta * X + \gamma * X^2$; where Y is Tobin's Q, and X is the differences between inside debt-equity ratios and their *target* levels. The shaded area represents the 99% prediction interval of the above-mentioned regression.

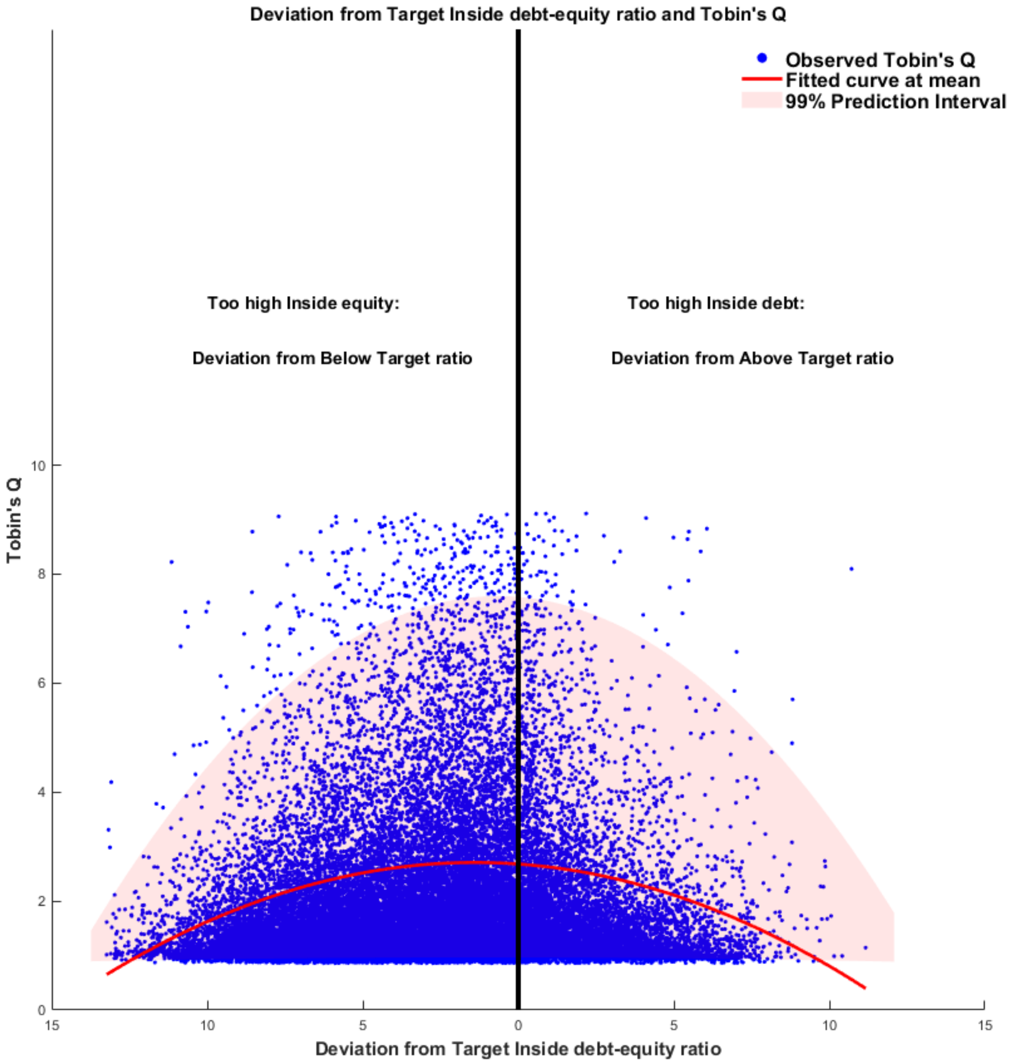


Table 4.1: **Descriptive Statistics**

This table reports the descriptive statistics of variables used in the main regressions. Details on how to construct these variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels.

	Mean	SD	Q25	Q50	Q75	N
CEO characteristics:						
Inside debt (US$ million)	2.7436	8.9714	0.0000	0.0073	0.7233	35549
Inside equity (US$ million)	15.2766	34.2394	0.7636	3.7009	13.4381	35549
Inside debt ÷ Inside equity	0.2439	0.5819	0.0000	0.0247	0.3042	35549
Inside debt-equity ratio	-4.5767	4.5004	-10.3762	-2.6139	-1.1899	35549
Deviation_fr_Target	3.9216	2.7921	1.5449	3.4033	6.0344	35549
CEO_Age	55.3863	7.9521	51.0000	55.0000	60.0000	35549
CEO_Tenure	6.8575	5.7941	3.0000	6.0000	9.0000	35549
Firm characteristics:						
Ln(Assets)	6.6864	2.1139	5.2046	6.7304	8.1310	35549
Market-to-Book	1.9592	1.5780	1.0548	1.4080	2.1676	35549
Book_Leverage	0.2230	0.2268	0.0268	0.1639	0.3480	35549
Ln(Firm_DE)	-1.4791	2.0081	-2.2378	-1.1616	-0.2670	35549
Fixed_Assets	0.1922	0.2315	0.0227	0.0942	0.2711	35549
R&D_Expenditures	0.4510	2.6060	0.0000	0.0000	0.0551	35549
Idiosyncratic_Risks	-2.3744	0.5798	-2.8023	-2.3819	-1.9755	35549
1_(Liquidity_Constraint)	0.3179	0.4657	0.0000	0.0000	1.0000	35549
1_(Tax-loss-carried-forward)	0.5316	0.4990	0.0000	1.0000	1.0000	35549
1_(Investment_Grade)	0.0499	0.2177	0.0000	0.0000	0.0000	35549
Change variables:						
Deviation_Decrease	0.1512	1.5608	-0.2480	0.3119	0.5211	35549
Δ Ln(Assets)	0.0541	0.1542	-0.0164	0.0592	0.1020	35549
Δ Market-to-Book	-0.0313	0.4093	-0.1090	-0.0381	0.1053	35549
Δ Book_Leverage	0.0059	0.0469	-0.0112	0.0020	0.0100	35549
Δ Ln(Firm_DE)	0.0686	0.6264	-0.1852	0.0762	0.1808	35549
Δ Fixed_Assets	0.0009	0.0203	-0.0047	0.0012	0.0045	35549
Δ R&D_Expenditures	-0.0016	0.0094	-0.0074	0.0000	0.0000	35549
Δ Idiosyncratic_Risks	0.0153	0.2283	-0.1096	0.0185	0.1191	35549

Table 4.2: **Characteristics of companies targeted by new active blockholders**
This table compares companies targeted by new active blockholders (*13D targeted companies*) with those in the same industries that never attract any new active blockholders (*Non-targeted companies*). Characteristics are measured one year before active blockholders arise. Values in column (5) equal values in column (1) minus those in column (3). Details on how to construct variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels. Industries are categorized based on two-digit SIC code. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	13D targeted firms		**Non-targeted firms**		**Difference**	
	Mean (1)	**SD (2)**	**Mean (3)**	**SD (4)**	**Diff. (5)**	**t-stat (6)**
CEO characteristics:						
Inside debt (US$ million)	1.8220	7.8140	3.5380	1.4480	-1.7160***	-3.1733
Inside equity (US$ million)	10.8500	28.1400	19.1551	5.3640	-3.1900***	-3.8888
Inside debt-equity ratio	-7.9028	4.1787	-2.5848	1.2697	8.3051***	4.9056
Deviation_fr_Target	4.1729	2.5454	3.7829	0.8310	0.3900***	5.5655
CEO_Age	54.3629	9.0310	55.3691	1.0609	-1.0062***	-3.8134
CEO_Tenure	6.8918	5.9861	6.7201	0.6282	0.1717	0.9858
CEO characteristics:						
Ln(Assets)	6.2520	1.8070	6.4294	0.9159	-0.1774***	-3.4627
Market-to-Book	1.8044	1.3879	2.1044	0.6377	-0.3000***	-7.7522
Book_Leverage	0.2185	0.2293	0.2165	0.0402	0.0020	0.2957
Ln(Firm_DE)	-3.8173	5.2734	-3.8235	1.7432	0.0062	0.0673
Fixed_Assets	0.2005	0.2392	0.1852	0.1487	0.0153***	2.8527
Idiosyncratic_Risks	-2.3093	0.5111	-2.3574	0.2696	0.0481***	3.5478
Dividend_Yield	0.0104	0.0237	0.0139	0.0082	-0.0035***	-3.9935

Table 4.3: **Deviations from *target* inside debt-equity ratios and emergence of new active blockholders**

This table reports estimates of the regression that relates the incidence of new active blockholders with lagged deviations from *target* inside debt-equity ratios. *New_Active_Block*, equals one if the firm is a subject of form 13D, and equals zero if otherwise. *Deviation_fr_Target* is the absolute difference between actual inside debt-equity ratio and *target* ratio. *1_(Too high Inside debt)* equals one if inside debt-equity ratio exceeds the *target* level, and equals zero if otherwise. *1_(Too high Inside equity)* equals one if inside debt-equity ratio is below the *target* level, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels. t-statistics are given in the parentheses. Marginal effects of main regressors, where other control variables are kept at their mean values, are reported in the square brackets. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)
Dependent variable: New_Active_Block$_t$ = 1 if 13D filing in year t; 0 if otherwise				
Deviation_fr_Target$_{t-1}$	**0.0187***	**0.0173**		
	(2.6522)	**(2.4539)**		
	[0.0014]	**[0.0013]**		
Deviation_fr_Target$_{t-1}$ × 1_(Too high Inside debt)			**0.0166**	**0.0155**
			(2.4326)	**(2.4509)**
			[0.0012]	**[0.0011]**
Deviation_fr_Target$_{t-1}$ × 1_(Too high Inside equity)			**0.0218***	**0.0208***
			(2.9710)	**(2.9974)**
			[0.0016]	**[0.0015]**
Control variables (measured at fiscal year end t-1)				
Ln(Assets)	-0.1437***	-0.1414***	-0.1446***	-0.1423***
	(-14.8762)	(-14.4873)	(-14.8162)	(-14.4307)
Market-to-Book	-0.1037***	-0.1030***	-0.1029***	-0.1023***
	(-8.4082)	(-8.3559)	(-8.3386)	(-8.2887)
Sale_Growth	-0.0234	-0.0237	-0.0234	-0.0237
	(-0.8269)	(-0.8362)	(-0.8249)	(-0.8373)
Return-on-Assets	0.0672	0.0679	0.0637	0.0645
	(1.2399)	(1.2537)	(1.1742)	(1.1895)
Book_Leverage	0.2968***	0.2945***	0.2983***	0.2957***
	(5.1853)	(5.1394)	(5.2123)	(5.1615)
R&D_Expenditures	-0.0033	-0.0034	-0.0032	-0.0033
	(-0.7118)	(-0.7014)	(-0.7183)	(-0.7051)
Dividend_Yield	-1.7802***	-1.7599***	-1.7668***	-1.7465***
	(-2.8440)	(-2.8138)	(-2.8154)	(-2.7855)
Sales_HHI	-0.0872	-0.0932	-0.0879	-0.0942
	(-1.3873)	(-1.4638)	(-1.3983)	(-1.4790)
Stock_Liquidity	-0.1086	-0.1334	-0.1031	-0.1280
	(-0.5757)	(-0.7217)	(-0.5415)	(-0.6861)
Ln(1 + N_Analysts)	0.2180***	0.2202***	0.2158***	0.2182***
	(14.4422)	(14.6020)	(14.2803)	(14.4546)
Ln(1 + N_Inst_Investors)		-0.0141		-0.0142
		(-1.0948)		(-1.1019)
Inst_Own_HHI		-0.1399**		-0.1396**
		(-2.1384)		(-2.1309)
Ln(1 + N_Inst_Blocks)		0.0740		0.0729
		(1.5960)		(1.5710)
Year FE	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes
N	31,731	31,731	31,731	31,731
Pseudo R^2	0.042	0.043	0.043	0.043

Table 4.4: **New active blockholders' presence and reduced deviations from *target* inside debt-equity ratios**

This table reports estimates of the regression that relates annual reductions in deviations from *target* inside debt-equity ratios with the presence of active blockholders. *Deviation_Decrease* is the negative of the change in deviation from *target* inside debt-equity ratio over it lagged value. *Active_Block* equals one if an active blockholder is still present at fiscal year end, and equals zero if otherwise. *1_(Too high Inside debt)* equals one if inside debt-equity ratio exceeds the *target* level when active blockholders arise, and equals zero if otherwise. *1_(Too high inside equity)* equals one if inside debt-equity ratio is below the *target* level when active blockholders arise, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels. t-statistics are given in the parentheses. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Deviation_Decrease$_t$ = − [Deviation_fr_Target$_t$ − Deviation_fr_Target$_{t-1}$]					
Active_Block$_t$	**0.8133*****	**0.7929*****	**0.8001*****		
	(6.8324)	**(6.6740)**	**(6.6340)**		
Active_Block$_t$ × 1_(Too high Inside debt)				**0.8644*****	**0.8419*****
				(4.8567)	**(4.7339)**
Active_Block$_t$ × 1_(Too high Inside equity)				**0.7993*****	**0.7795*****
				(6.4162)	**(6.2690)**
Control variables (measured at fiscal year end t)					
After_Active_Block	0.0849	0.0884	0.1036	0.0661	0.0702
	(0.5712)	(0.5946)	(0.6793)	(0.4459)	(0.4733)
Δ Ln(Assets)	-0.0985	-0.0480	0.4127	-0.0990	-0.0485
	(-0.2614)	(-0.1276)	(0.6939)	(-0.2626)	(-0.1287)
Δ Ln (Firm_DE)	-0.0093	-0.0129	-0.0570	-0.0095	-0.0130
	(-0.1120)	(-0.1548)	(-0.4314)	(-0.1135)	(-0.1562)
Δ Book_Leverage	-0.1473	-0.0332	-1.1875	-0.1461	-0.0321
	(-0.0862)	(-0.0194)	(-0.4589)	(-0.0854)	(-0.0188)
Δ Idiosyncratic_Risks	-0.0290	-0.0224	0.0279	-0.0291	-0.0225
	(-0.1331)	(-0.1028)	(0.0689)	(-0.1334)	(-0.1031)
Δ Market-to-Book	0.1110	0.1076	0.2601	0.1109	0.1075
	(1.0261)	(0.9951)	(1.1937)	(1.0251)	(0.9941)
Δ R&D_Expenditures	-0.0873	-0.0842	-0.0926	-0.0875	-0.0844
	(-0.5996)	(-0.5159)	(-0.6830)	(-0.6010)	(-0.5171)
Δ Fixed_Assets	2.0596	1.5381	0.8255	2.0635	1.5419
	(0.7529)	(0.5634)	(0.2122)	(0.7542)	(0.5647)
1_(Liquity_Constraint)	-0.4920	-0.5106	-1.3098	-0.4906	-0.5093
	(-0.7027)	(-0.7318)	(-1.1042)	(-0.7007)	(-0.7298)
1_(Tax-loss-carry-foward)	0.6730	0.7350	0.5719	0.6728	0.7348
	(0.5284)	(0.5785)	(0.4844)	(0.5282)	(0.5783)
1_(Investment_Graded)	0.5865	0.3734	0.8887	0.5830	0.3700
	(0.6051)	(0.3792)	(1.1895)	(0.6005)	(0.3753)
CEO_Age	-0.0234***	-0.0234***	-0.0232***	-0.0234***	-0.0234***
	(-6.5827)	(-6.5948)	(-6.5097)	(-6.5861)	(-6.5980)
CEO_Tenure	-0.0022	-0.0040	-0.0025	-0.0022	-0.0040
	(-0.2040)	(-0.3649)	(-0.2306)	(-0.2054)	(-0.3663)
Ln (1 + N_Inst_Investors)		-0.0098			-0.0098
		(-0.6845)			(-0.6887)
Inst_Own_HHI		0.3341***			0.3343***
		(4.7582)			(4.7642)
Ln (1 + N_Inst_Blocks)		0.0117			0.0112
		(0.2764)			(0.2645)
Year FE	Yes	Yes	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Ind x Year FE	No	No	Yes	No	No
N	35,549	35,549	35,549	35,549	35,549
Adj. R^2	0.4316	0.4325	0.4337	0.4315	0.4325

Table 4.5: **Reduced deviations from *target* inside debt-equity ratios and changes in security returns**

This table reports estimates of the regression that relates stock and bond abnormal returns during block holding period with reduced deviations from *target* inside debt-equity ratios. The dependent variables are cumulative abnormal monthly stock and bond returns measured from one month before active blockholders enter to one month after they "exit". *Deviation_Decrease*$_{exit}$ is the negative of the change in deviation when active blockholder "exit" over deviation at their entrance. *1_(Too high Inside debt)* equals one if inside debt-equity ratio exceeds the *target* level when active blockholders arise, and equals zero if otherwise. *1_(Too high Inside equity)* equals one if inside debt-equity ratio is below the *target* level when active blockholders arise, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels. t-statistics are given in the parentheses. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)
Dependent variable:	**Stock CARs**		**Bond CARs**	
Deviation_Decrease$_{exit}$	**0.0792*****		**0.0190*****	
= − [**Deviation_fr_Target**$_{exit}$ − **Deviation_fr_Target**$_{entry}$]	**(7.6608)**		**(3.3841)**	
Deviation_Decrease$_{exit}$		**0.1070*****		**0.0019**
× **1_(Too high Inside debt)**		**(3.0708)**		**(0.1991)**
Deviation_Decrease$_{exit}$		**0.0619*****		**0.0273*****
× **1_(Too high Inside equity)**		**(5.5778)**		**(8.0102)**
Changes in firm characteristics over active block holding period:				
Δ Ln(Assets)	0.1060*	0.1038*	0.0021	0.0029
	(1.8553)	(1.8063)	(0.4512)	(0.5965)
Δ Market-to-Book	0.1302***	0.1302***	0.0264**	0.0307*
	(6.4449)	(6.4438)	(2.3513)	(1.7352)
Δ Book_Leverage	-0.0177**	-0.0179**	-0.0008	-0.0009
	(-2.2201)	(-2.2262)	(-0.6002)	(-0.6688)
Δ Dividend_Yield	0.3561	0.4291	-0.0831	-0.0870
	(0.1827)	(0.2204)	(-1.4099)	(-1.4703)
Δ Sales_Growth	0.3187***	0.3189***	0.1201**	0.1204***
	(2.5844)	(2.5857)	(2.2405)	(4.6591)
Δ Return-on-Assets	0.4510***	0.4498***	0.0225**	0.0221**
	(2.9329)	(2.9273)	(2.3873)	(2.3402)
Δ R&D_Expenditure	2.4211*	2.4139*	0.0012	0.0011
	(1.8586)	(1.8533)	(0.5177)	(0.5112)
1_(Investment Graded)			0.0064	0.0064
			(0.3098)	(0.3074)
Corporate events over active block holding period:				
1_(Share Repurchases)	0.0132	0.0133	-0.0526	-0.0521
	(1.1128)	(1.1194)	(-0.8640)	(-0.8547)
1_(Leverage Buyouts)	0.0956	0.0971	-0.0059	-0.0050
	(0.8293)	(0.8415)	(-0.1998)	(-0.1640)
1_(Spin-offs)	0.9473	0.9442		
	(1.3813)	(1.3762)		
1_(Seasonal Equity Offerings)	-0.1354*	-0.1340*	-0.0158	-0.0153
	(-1.7827)	(-1.7627)	(-1.1171)	(-1.0798)
1_(Acquisition announcements)	0.1350*	0.1356*	-0.0327*	-0.0324*
	(1.6929)	(1.6999)	(-1.7308)	(-1.7019)
N	1,186	1,186	273	273
Adj. R^2	0.183	0.181	0.063	0.075

Table 4.6: **Active blockholders vs. Passive blockholders and reduced deviations from *target* inside debt-equity ratios**

This table reports estimates of the regression that compares the impact on CEO compensation adjustments when the blockholders are active versus when those same investors are passive. *Deviation_Decrease* is the negative of the change in deviation from *target* inside debt-equity ratio over it lagged value. *Active_Block* equals one if the new blockholder is a 13D investor, and equals zero if a 13G investor. *1_(Too high Inside debt)* equals one if inside debt-equity ratio exceeds the *target* level when active blockholders arise, and equals zero if otherwise. *1_(Too high inside equity)* equals one if inside debt-equity ratio is below the *target* level when active blockholders arise, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. Continuous variables are winsorized at 1% and 99% levels. t-statistics are given in the parentheses. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)
Dependent variable: Deviation_Decrease$_t$ = − [Deviation_fr_Target$_t$ − Deviation_fr_Target$_{t-1}$]				
Active_Block$_t$ = 1 if investor filed 13D;	**0.7541*** **	**0.7398*** **		
0 if investor filed 13G;	**(3.5727)**	**(3.5046)**		
Active_Block$_t$			**0.8939*** **	**0.8721*** **
× 1_(Too high Inside debt)			**(2.7552)**	**(2.6862)**
Active_Block$_t$			**0.7083*** **	**0.6965*** **
× 1_(Too high Inside equity)			**(3.1157)**	**(3.0625)**
Control variables (measured at fiscal year end t)				
After_Active_Block	0.1630	0.1661	0.1635	0.1666
	(0.5846)	(0.5919)	(0.5872)	(0.5943)
Δ Ln(Assets)	0.7555	0.7394	0.7538	0.7375
	(1.3215)	(1.2960)	(1.3182)	(1.2925)
Δ Ln(Firm_DE)	0.1413	0.1448	0.1412	0.1447
	(1.0508)	(1.0727)	(1.0505)	(1.0723)
Δ Book_Leverage	-1.1778	-1.1849	-1.1873	-1.1938
	(-0.4139)	(-0.4171)	(-0.4173)	(-0.4204)
Δ Idiosyncratic_Risks	-0.3469	-0.3404	-0.3469	-0.3404
	(-0.8900)	(-0.8733)	(-0.8900)	(-0.8732)
Δ Market-to-Book	0.0555	0.0629	0.0558	0.0631
	(0.3297)	(0.3731)	(0.3309)	(0.3745)
Δ R&D/Sales	0.1759	0.2442	0.1754	0.2438
	(0.7557)	(1.0378)	(0.7546)	(1.0373)
Δ PP&E/Assets	1.3171	0.8809	1.3212	0.8858
	(0.2598)	(0.1742)	(0.2606)	(0.1752)
1_(Liq.Constraint)	-0.0317	-0.0337	-0.0288	-0.0307
	(-0.4673)	(-0.4971)	(-0.4251)	(-0.4531)
1_(Tax-loss-carry-foward)	0.0011	-0.0015	0.0036	0.0010
	(0.0151)	(-0.0214)	(0.0503)	(0.0145)
1_(Investment_Graded)	-0.1391	-0.1227	-0.1390	-0.1227
	(-0.4898)	(-0.4325)	(-0.4896)	(-0.4325)
CEO_Age	-0.0223***	-0.0223***	-0.0224***	-0.0223***
	(-4.1833)	(-4.1695)	(-4.2014)	(-4.1866)
CEO_Tenure	-0.0031	-0.0036	-0.0030	-0.0035
	(-0.4243)	(-0.4871)	(-0.4154)	(-0.4790)
Ln (1 + N_Inst_Investors)		0.0086		0.0089
		(0.3740)		(0.3866)
Inst_HHI		0.2857***		0.2881***
		(2.7956)		(2.8181)
Ln (1 + N_Inst_Blocks)		-0.0257		-0.0279
		(-0.4576)		(-0.4977)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	12,686	12,686	12,686	12,686
Adj. R^2	0.3406	0.3413	0.3406	0.3413

Table 4.7: ***Reduced deviation* from Target compensation structure *does not occur in Pseudo events***

This table compares estimates of regressions conducted on the true-event sample with those conducted on the pseudo-event samples. *Deviation_Decrease* is the negative of the change in deviation from *target* inside debt-equity ratio over it lagged value. *(Pseudo) Active_Block* equals one if an (pseudo) active blockholder is still present at fiscal year end, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. In columns (1), (2), (4), and (5) t-statistics are given in the parentheses. In columns (3) and (6), χ^2 statistics for tests of different estimates are given in the parentheses. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Pre-activism trend matched			**Propensity score matched**		
	(1)	(2)	(3)	(4)	(5)	(6)
	True events	**Pseudo events**	**Diff.**	**True events**	**Pseudo events**	**Diff.**
Dependent variable: $\textbf{Deviation\_Decrease}_t = -[\textbf{Deviation\_fr\_Target}_t - \textbf{Deviation\_fr\_Target}_{t-1}]$						
(Pseudo) Active_Block$_t$	**0.7117*** **	**-0.1731** **	**0.8848*** **	**0.8269*** **	**0.1922**	**0.6347*** **
	(8.1468)	**(-2.1202)**	**(45.770)**	**(6.8721)**	**(0.9200)**	**(95.749)**
After_Active_Block	0.1156	-0.6061	0.7218***	0.1212	-0.2932	0.4144***
	(1.4026)	(-2.8756)	(29.042)	(1.0663)	(-1.4813)	(22.164)
Δ Ln(Assets)	0.4517**	0.4470**	0.0047	-1.8198***	-1.8230***	0.0032
	(2.3884)	(2.3752)	(0.4530)	(-5.6948)	(-5.7113)	(0.0328)
Δ Ln(Firm_DE)	0.0729	0.0727	0.0002	0.0241	0.0210	0.0032
	(1.5571)	(1.5523)	(0.0220)	(0.3437)	(0.3011)	(0.2145)
Δ Book_Leverage	-1.5253	-1.5349	0.0096	-0.4136	-0.4515	0.0379
	(-1.3747)	(-1.3840)	(0.8370)	(-0.2653)	(-0.2902)	(0.1391)
Δ Idiosyncratic_Risks	0.1729**	0.1747**	-0.0018	0.0603	0.0575	0.0028
	(2.5037)	(2.5368)	(1.0339)	(0.5868)	(0.5660)	(0.0324)
Δ Market-to-Book	0.0576	0.0564	0.0012	-0.1014	-0.1077	0.0062
	(1.3054)	(1.2856)	(0.2507)	(-1.2570)	(-1.3494)	(0.2142)
Δ R&D/Sales	0.5520	0.5554**	-0.0034	-0.1452	0.2030	-0.3482
	(1.2178)	(2.0131)	(0.0001)	(-0.1309)	(0.3806)	(0.1409)
Δ PP&E/Assets	4.6530**	4.6467**	0.0063	3.8064	3.7631	0.0433
	(2.4923)	(2.4892)	(0.2646)	(1.5222)	(1.5124)	(0.0555)
1_(Liq.Constraint)	-0.0097	-0.0100	0.0003	-0.0702	0.0045	-0.0747
	(-0.2158)	(-0.2218)	(0.1798)	(-0.2761)	(0.0263)	(0.1647)
1_(Tax-loss-carry-foward)	-0.0341	-0.0349	0.0008*	-0.7301	-0.7125	-0.0176
	(-0.7657)	(-0.7844)	(3.7303)	(-1.1694)	(-1.1452)	(0.1353)
1_(Inv.-graded-bond)	0.1064	0.1068	-0.0004	0.1335	0.1240	0.0095
	(0.6392)	(0.6412)	(0.2196)	(0.1309)	(0.1221)	(0.0109)
CEO_Age	-0.0247***	-0.0247***	¡ 0.0001	-0.0238***	-0.0238***	¡ -0.0001
	(-12.8222)	(-12.8275)	(0.0994)	(-7.1826)	(-7.1832)	(0.0651)
CEO_Tenure	-0.0070**	-0.0071**	0.0001	0.0076*	0.0075*	0.0002
	(-2.4046)	(-2.4239)	(1.0252)	(1.7033)	(1.6656)	(0.4230)
Year FE	Yes	Yes		Yes	Yes	
Firm FE	Yes	Yes		Yes	Yes	
N	34,924	34,924		35,549	35,549	

Table 4.8: **Channels for new active blockholders to reduce deviations from *target* inside debt-equity ratios**

This table presents estimates of the regression that relates reduced deviations from *target* inside debt-equity ratios with some active blockholders' actions or characteristics. t-statistics are given in the parentheses. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

Dependent variable: Deviation_Decrease$_t$	(1)	(2)	(3)	(4)
Active_Block$_t$	**0.2884*** **		**0.2851** **	**0.2855** **
× 1_(appoint director)$_{t-1}$	**(4.0552)**		**(2.5532)**	**(2.5559)**
Active_Block$_t$		**0.3642*** **		
× 1_(appoint director to Compensation Comm.)$_{t-1}$		**(3.2752)**		
Active_Block$_t$		**0.2948** **		
× 1_(appoint director to Governance Comm.)$_{t-1}$		**(1.9932)**		
Active_Block$_t$		**0.0625* **		
× 1_(appoint director to Nominating Comm.)$_{t-1}$		**(1.9328)**		
Active_Block$_t$		-0.1600		
× 1_(appoint director to Audit Comm.)$_{t-1}$		(-0.6834)		
Active_Block$_t$		0.2138		
× 1_(appoint director to Other Comm.)$_{t-1}$		(0.4966)		
Active_Block$_t$			**0.1705** **	
× 1_(had active blocks in same industry)			**(2.2772)**	
Active_Block$_t$				**0.1574** **
× 1_(have only one 13D investment)				**(1.9724)**
Active_Block$_t$	0.6131*	0.6357***	0.6040*	0.5798*
	(1.8462)	(2.6378)	(1.6684)	(1.7427)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes
Institutional ownership	Yes	Yes	Yes	Yes
N	35,549	35,549	35,549	35,549
Adj. R^2	0.4633	0.4632	0.4309	0.4302

Table 4.9: **Robustness Check**

This table reports the estimated impact of active blockholders' presence on reduced deviation from *target* structures when some model specifications are modified. t-statistics are given in the parentheses. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Model changes	**Coefficients**	**t-stat**	**Adj. R^2**
Model to estimate *target* ratios	Industry FE based on two-digit SIC code in *target* regression	0.5057***	(2.8363)	0.5711
	Institutional ownership included in *target* regression	0.4831***	(2.7251)	0.5729
	OLS for *target* regression	0.4872***	(4.2488)	0.5350
	Panel for*target* regression	0.3208**	(2.4936)	0.5733
Measure of *target* ratios	Industry median as *target* ratio	0.5750*	(1.8685)	0.1086
	Firm debt-equity as *target* ratio	0.2053	(1.3586)	0.2336
	Salary included in Inside debt measure	0.5487**	(2.2809)	0.2717
	Reduced deviation in Relative leverage ratio	0.3042***	(2.7134)	0.4806
	Reduced deviation in Relative incentive ratio	1.1578**	(2.3921)	0.5128
Definition of active blockholders	Active blockholders if holding value in top 10% of portfolio	0.0955**	(1.9808)	0.6321
	Active blockholders if any 13D investors are present	0.3967***	(5.1607)	0.6324

4.11 Appendix

Appendix 4.A1: **Model to estimate the *target* inside debt-equity ratios**
This table reports estimates of the median regression which relates inside debt-equity ratios with other firm and CEO characteristics. The predicted values from this regression are used as *target* inside debt-equity ratios in the main regressions. Details on how to construct variables are provided in Appendix 4.A4. Industry fixed effects are based on Fama & French 17 industries. t-statistics are given in the parentheses. *, **, *** indicate significance at 10%, 5%, and 1% levels.

Dependent variable: Inside_DE	
Ln(Firm_DE)	0.1200***
	(21.5748)
Book_Leverage	-0.8740***
	(-7.9293)
Idiosyncratic_Risks	-0.7081***
	(-15.8704)
Ln(Assets)	0.0342***
	(2.6789)
Fixed_Assets	0.7605***
	(6.4434)
Market-to-book	-0.2943***
	(-21.2798)
R&D_Expenditures	0.0110
	(1.4254)
1_(Liquidity_Constraint)	0.0306
	(0.6459)
1_(Tax-loss-carried-forward)	-0.3290***
	(-7.4227)
1_(Investment_Graded)	0.7881***
	(8.5044)
CEO_Age	0.0492***
	(19.7049)
CEO_Tenure	0.0301***
	(8.8760)
Ind FE	Yes
N	38,469
Pseudo R^2	0.2656

Appendix 4.A2: **Stock and bond prices reactions to disclosures of deviations from *target* inside debt-equity ratios**

This table reports estimates of the regression that relates stock and bond cumulative abnormal returns (CARs) around proxy statement releases with the deviations from *target* inside debt-equity ratios that these statements disclose. *Deviation_Decrease* is the negative of change in deviation from *target* inside debt-equity ratio over the lagged deviation. *1_(Too high Inside debt)* equals one if inside debt-equity ratio exceeds the *target* level in the previous year, and equals zero if otherwise. *1_(Too high Inside equity)* equals one if inside debt-equity ratio is below the *target* level in the previous year, and equals zero if otherwise. Standard errors are robust. t-statistics are given in the parentheses. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Bond CARs [-5, 5]		**Stock CARs [-1, 1]**	
	(1)	(2)	(3)	(4)
Deviation_fr_Target	**-0.0013*** **		**-0.0021*** **	
	(-2.5897)		**(-4.8576)**	
Deviation_fr_Target		**0.0004**		**-0.0031*** **
× 1_(Too much inside debt)		**(0.0184)**		**(-3.4246)**
Deviation_fr_Target		**-0.0026*** **		**-0.0019*** **
× 1_(Too much inside equity)		**(-2.8200)**		**(-4.4008)**
Other compensation information in proxy statements:				
ΔLn(Salary/TDC)	-0.0033	-0.0036	-0.0140***	-0.0141***
	(-0.8581)	(-0.8529)	(-6.7205)	(-6.7451)
ΔLn(Equity Grants/TDC)	-0.0011	-0.0007	0.0108**	0.0108**
	(-0.1532)	(-0.0995)	(2.3951)	(2.3884)
ΔLn(Bonus/TDC)	0.0090	0.0118	-0.0074	-0.0071
	(1.1483)	(1.3869)	(-1.0103)	(-0.9600)
ΔLn(Other Compensation/TDC)	-0.0266	-0.0387**	0.0143	0.0153
	(-1.6213)	(-2.1845)	(0.9710)	(1.0347)
Non-compensation-related information in proxy statements:				
1_(CEO retirement)	0.0041	0.0045	0.0064*	0.0058*
	(0.9459)	(0.9873)	(1.9191)	(1.7325)
1_(Majority voting requirement)	-0.0102	-0.0108	-0.0038	-0.0044
	(-0.8826)	(-0.9092)	(-0.4696)	(-0.5473)
1_(Classify board)	0.0086**	0.0107**	0.0001	-0.0005
	(1.9932)	(2.4294)	(0.0388)	(-0.1409)
1_(Other Proposals)	-0.0012	-0.0016	-0.0037	-0.0037
	(-0.2702)	(-0.3401)	(-1.2659)	(-1.2500)
1_(New independent directors)	-0.0000	0.0010	0.0049	0.0049
	(-0.0109)	(0.2559)	(1.4216)	(1.4235)
1_(New executive directors)	0.0108	0.0102	-0.0010	-0.0011
	(1.2876)	(1.1969)	(-0.1094)	(-0.1236)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	6,855	6,855	38,469	38,469
Adj. R^2	0.2534	0.2621	0.1827	0.1829

Appendix 4.A3: **Reduced deviations from *target* compensation structures in targeted firms and matched firms**

This table compares the adjustments in compensation structures between truly targeted firms and matched firms. *Deviation_Decrease* is the negative of the change in deviation from *target* inside debt-equity ratio over it lagged value. *Active_Block* equals one if an active blockholder is still present at fiscal year end, and equals zero if otherwise. Details on how to construct the control variables are given in Appendix 4.A4. In column (1), matched firms are assigned based on changes in deviations from *target* structures before new active blockholders arise. In column (2), matched firms are assigned based on propensity to attracht new active blockholders. Industries are categorized based on two-digit SIC code. Standard errors are robust. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Pre-activism trend matched	**Propensity score matched**
	(1)	(2)
Dependent variable: Deviation_Decrease$_t$		
Active_Block$_t$	**0.9421***** **(5.8661)**	**0.6877***** **(4.3471)**
After_Active_Block	0.7574*** (6.2683)	0.3364 (0.6094)
ΔLn(Assets)	-3.5681*** (-10.7349)	-0.9449*** (-5.9078)
ΔLn(Firm_DE)	-0.7978*** (-5.4016)	-0.0779*** (-5.8311)
ΔBook_Leverage	-1.8841 (-1.6030)	1.1575*** (2.7876)
ΔIdiosyncratic_Risks	-0.3431** (-2.3093)	0.5483*** (4.8820)
ΔMarket-to-Book	-0.7257*** (-7.2493)	-0.0424 (-0.9427)
ΔR&D/Sales	67.9831*** (6.9002)	0.0787 (0.5305)
ΔPP&E/Assets	-15.6424*** (-8.3126)	-1.6969* (-1.7882)
1_(Liq_Constraint)	0.3371*** (5.4677)	-0.5954** (-2.0069)
1_(Tax-loss-carry-forward)	0.3165*** (3.2437)	-0.2703*** (-2.8003)
1_(Inv.-graded-bond)	-0.6655** (-2.3442)	-0.3403*** (-3.7412)
CEO_Age	-0.0185*** (-3.2833)	-0.0328*** (-3.3314)
CEO_Tenure	0.0156** (1.9677)	0.0219* (1.8120)
Year FE	Yes	Yes
Firm FE	Yes	Yes
N	15,423	14,120
Adj. R^2	0.178	0.175

Appendix 4.A4: **Variable construction**

Variable	**Variable construction**	**Data source**
Ln(Assets)	Ln (at) ; total assets (at)	Compustat
Fixed_Assets	ppent / at ; net PP&E (ppent), total assets (at)	Compustat
Market-to-book ratio	(prcc_f * csho + at - ceq) / at ; stock price (prcc_f), shares outstanding (csho), total assets (at), book value of shareholder equities (ceq)	Compustat
Ln(Firm_DE)	(dlc + dltt) / (prcc_f * csho) long-term debt (dlc), long-term component in short-term debt (dltt), stock price (prcc_f), shares outstanding (csho)	Compustat
Book_Leverage	(dlc + dltt) / at ; long-term debt (dlc), long-term component in short-term debt (dltt), total assets (at)	Compustat
R&D_Expenditures	xrd / sale or 0 if missing xrd ; R&D expenditure (xrd), sales (sale)	Compustat
Idiosyncratic_Risks	Ln (standard deviation of ϵ); residuals from regressing firm returns on CRSP value-weighted returns over 24 months before fiscal year end date (ϵ)	CRSP
1_(Liquidity_Constraint)	1 if operating income before depreciation (oibdp) is negative; 0 if otherwise	Compustat
1_(Tax-loss-carry-forward)	1 if tax loss carry forward (tlcf) is positive; 0 if otherwise	Compustat
1_(Investment_Grade)	1 if the firm has investment-grade bond; 0 if no investment-grade bond	FISD
Dividend_Yield	(dvc + dvp) / (prcc_f * csho + preferred equity) ; common dividend (dvc), preferred dividend (dvp), preferred equity is the first non-missing value of redemption value (pstkrv), or liquidating value (pstkl), or carrying value (pstk)	Compustat
Sales_Growth	(sale - lagged sale) / (lagged sale) ; Sales (sale)	Compustat
Return-on-assets	oibdp / at ; operating income before depreciation (oibdp), total assets (at)	Compustat
Stock_Liquidity	$-Ln(1 + \frac{1}{D}\sum_{t=1}^{D} \left\| \frac{ret_t}{vol_t} \right\| * 1000)$; daily stock return (ret), daily trading volume (vol), number of trading days(D)	CRSP
Sales_HHI	Herfindahl index of sales (sale) in two-digit SIC code industry	Compustat
N_Analyst	Number of analysts covering firms over 365 days before fiscal year end date	IBES
N_Inst_Investors	Number of institutional investors at fiscal year end date	Thompson Reuter 13F
Inst_Own_HHI	Herfindahl index of institutional ownership percentage at the fiscal year end date	Thompson Reuter 13F
N_Block	Number of institutional blockholders at fiscal year end date	Thompson Reuter 13F

CHAPTER 5

The removals of anti-takeover provisions and CEO inside debt-equity ratios

5.1 Introduction

This chapter studies how the ratios between CEO inside debt and inside equity (a.k.a. the CEO inside debt-equity ratios) change after companies repeal some of their firm-level anti-takeover provisions ("ATPs"). On the one hand, removing ATPs makes it easier for shareholders to replace entrenched CEOs via market of corporate control, thus enhancing shareholder governance.[1] Strengthened shareholder governance is normally associated with increased use of CEO equity-like compensation (a.k.a inside equity) to mitigate the shareholder-manager agency conflict.[2] On the other hand, removing ATPs exposes companies to greater takeover vulnerability, which triggers increased use of debt financing and worsens the shareholder-debtholder agency conflict.[3] Optimal contracting theory suggests that companies should address the heightened agency problem of debt by granting their CEOs more debt-like compensation (a.k.a inside debt). Otherwise, companies would face costlier debt financing.[4] Hence, whether CEO inside debt-equity ratios increase or decrease after companies remove their ATPs is an interesting empirical question. The net changes of the ratios depend on the extent to which these better-

[1]See Gompers et al. [2003], Bebchuk et al. [2009], Cuñat et al. [2012].
[2]See Hartzell and Starks [2003], Clifford and Lindsey [2016].
[3]See Harris and Raviv [1988], Israel [1991], Zwiebel [1996], Berger et al. [1997], Safieddine and Titman [1999], Morellec [2004], Klock et al. [2005], Chava et al. [2009].
[4]See Jensen and Meckling [1976], Edmans and Liu [2011], Campbell et al. [2016].

governed companies are willing to use CEO inside debt to address the heightened agency problem of debt. I find significant increases in CEO inside debt-equity ratios among the S&P 1500 firms that remove ATPs between 2009 and 2017, as compared with their matches which do not remove ATPs.

On the one hand, CEO inside debt-equity ratios might decrease after companies remove ATPs. Removing ATPs is considered as an improvement in shareholder rights as this change is associated with rising stock prices (Gompers et al. [2003], Cuñat et al. [2012]). Many studies also document a complementary relation between enhanced shareholder governance and the use of inside equity. Hartzell and Starks [2003] show that high institutional ownership concentration is associated with high pay-for-performance sensitivity. Fahlenbrach [2009] finds a negative relation between the number of present ATPs and the proportion of equity-like compensation. Clifford and Lindsey [2016] document increases in the proportions of equity-like compensation under the influences of active blockholders. The companies that remove ATPs have enhanced shareholder governance. The "complementary monitoring hypothesis" predicts that these better-governed companies would compensate their CEOs with more inside equity so their CEO inside debt-equity ratios should decrease after companies remove ATPs.

On the other hand, CEO inside debt-equity ratios might increase after companies remove ATPs. Companies become more vulnerable to takeover risks after they remove ATPs [5], which makes CEOs increase debt financing to deter the potential acquirers.[6] Garvey and Hanka [1999] show that companies use less debt financing after they experience stronger state protection from takeover. Berger et al. [1997] and Safieddine and Titman [1999] both find that leverage increases after unsuccessful takeover attempts. Op-

[5]Some papers argue that the ATPs do not capture the takeover protection (Klausner [2013], Catan and Kahan [2016]). Cremers and Ferrell [2014] show that the negative impact of ATP presence on firm value is stronger when the firm belongs to an industry that is experiencing a high level of merger activities. The authors claim that the presence of ATPs affects firm value through a takeover channel. Karpoff et al. [2017] conclude that ATPs reflect takeover deterrence after addressing the endogeneity problem by using instrumental variables.

[6]In a positive way, high leverage can signal CEOs' commitments to undertaking only positive-NPV projects instead of building empires (Jensen [1986]), hence making control fights unnecessary (Zwiebel [1996], Morellec [2004]). In a negative way, higher leverage can reduce the gains to prospective acquirers, hence discouraging these raiders from initiating the control fights (Harris and Raviv [1988], Israel [1991], Novaes and Zingales [1995]).

timal contracting theory suggests that CEOs should be compensated with more inside debt to mitigate the shareholder-debtholder conflict, which is intensified by increased leverage (Jensen and Meckling [1976], Edmans and Liu [2011]). Otherwise, these companies would have to raise debt at a higher cost. Empirical studies also find a positive correlation between firm leverage and CEO inside debt (Sundaram and Yermack [2007], Cen [2010], Cassell et al. [2012]).[7] The companies that remove ATPs, thus lowering their takeover defenses, are very likely to increase leverage. The "optimal contracting hypothesis" predicts that these highly-levered companies would compensate their CEOs with more inside debt so their CEO inside debt-equity ratios should increase after companies remove ATPs.

I track the changes in 17 out of 24 ATPs that are included in Gompers et al. [2003]'s Governance Index (the "*G-Index*").[8] After 2006, the Institutional Shareholder Services (the "*ISS*") only reports 17 out of 24 ATPs of the G-Index.[9] However, the new database now reports the provisions on an annual basis instead of once every two years as in the old database, making it more precise to track the adoption or repeal of any provision. I identify 525 S&P 1500 companies that reduce the numbers of ATPs between 2009 and 2017.[10] These companies are the *"repeal firms"*.[11] I identify a group of "*matched firms*" that have the same industries and propensities to remove ATPs as those of the repeal firms. The regressors in the Probit model to calculate propensity scores include voting results of proposals to remove ATPs (Cuñat et al. [2012]) and corporate governance variables (Hartzell and Starks [2003], Greenwood and Schor [2009], Schepker and Oh [2013]).

I follow existing literature to calculate the CEO inside debt-equity ratio by using the

[7] Cen [2010] finds a non-linear inverted U-shape relation between firm leverage and inside debt. However, he shows that the negative relation only occurs in 4% of the total sample.

[8] Prior works use either changes in firm-level ATPs (Klock et al. [2005], Cremers et al. [2007], Chava and Roberts [2008], Chava et al. [2009]) or the passage of state-level antitakeover laws to proxy for changes in takeover defense (Garvey and Hanka [1999], Francis et al. [2010]).

[9] Public disclosures of CEO inside debt did not become mandatory until 2006.

[10] The main analysis involves examining changes in CEO compensation from three years before to three years after ATP removals, so I only consider ATP removals that happen after 2009.

[11] If a company reduces its number of ATPs multiple times during the sample period, I count the first event year.

natural logarithm of the ratio between inside debt and inside equity.[12] Inside debt equals the present value of supplemental defined-benefit pensions and non-qualified deferred compensations that a CEO holds at fiscal year end. Inside debt aligns a CEO's incentives to debtholders' interests since its payment priority resembles that of junior debt (Jensen and Meckling [1976], Edmans and Liu [2011]). Inside equity equals the market value of the stock and option awards that a CEO holds at fiscal year end. Inside equity aligns a CEO's incentives to shareholders' interests because its value increases with stock price and volatility. The CEOs who have higher inside debt-equity ratios tend to run their companies in a conservative manner, reducing risky investments (Sundaram and Yermack [2007], Cassell et al. [2012]), accumulating more unused cash (Liu et al. [2014]) or making more diversified acquisitions (Phan [2014]). This conservative management style is argued to result in lower cost of debt financing (Wei and Yermack [2011], Anantharaman et al. [2013], Freund et al. [2018]).

Before conducting the main analysis, I verify that repeal companies use significantly more debt financing after they remove ATPs, as compared with their peers. To the best of my knowledge, there is no direct evidence for this argument. I use the "net leverage change" measure from Garvey and Hanka [1999] to capture the change in book leverage due to changes in the financing methods (i.e. issuing debt versus issuing equity). I find that repeal firms use significantly more debt financing after removing ATPs than their matched firms do. More specifically, the significant increase in debt financing lasts for the first three years after ATPs are removed and disappears in the fourth year.

For the main test, I conduct a diff-in-diff-in-diff analysis which compares changes in CEO inside debt-equity ratios between repeal firms and their matches before and after ATP removals. I find that repeal companies significantly increase their CEO inside debt-equity ratios after they remove ATPs, as compared with the matched firms. The abnormal increases in inside debt-equity ratios after companies remove ATPs are three times larger than the sample-average adjustment rate. I also demonstrate that repeal

[12] Convention in the literature is to scale the inside debt-equity ratio by the natural logarithm of firm capital structure. This convention might have followed the theoretical framework in Edmans and Liu [2011]. However, I do not scale the inside debt-equity ratio because the removals of ATPs are followed by increasing leverage, making it hard to interpret which part of the overall ratio is moving.

firms significantly increase inside debt after removing ATPs, which accounts for 70% of the increases in the overall ratios. In contrast, inside equity significantly declines after companies remove ATPs. These findings support the "optimal contracting hypothesis". In addition, I observe that repeal companies significantly increase their inside debt-equity ratios during the first three years after ATP removals, which coincides with the significant increase in debt financing. This observation reinforces the argument that companies increase their CEO inside debt-equity ratios to address the heightened agency problem resulting from heavier use of leverage.

The results in this main test do not support the "complementary monitoring hypothesis". The value of inside equity remains unchanged for the first two years after companies remove ATPs and start to significantly decline from the third year. Further analysis shows that the decreasing value of inside equity might result from the declining use of stock and option awards in CEO compensation after repeal firms remove ATPs. These observations suggest a substitutive relation between enhanced shareholder governance and inside equity.

For robustness check, I modify several specifications in the main test to address some bias concerns. First, I use the number of removed ATPs to replace the indicator of repeal firms as the main explanatory variable. This new regressor can capture the variations in compensation changes among the repeal firms which are caused by different number of removed ATPs, besides the differences between repeal firms and matched firms.[13] Second, the main finding might be driven by the selected matching sample. To address this concern, I use the full sample of S&P 1500 firms that do not remove ATPs as the matched companies.[14] Third, I treat all ATPs equally in the main test, whereas Bebchuk et al. [2009] argue that only six of these provisions (the "E-Index") really matter to corporate governance. Indeed, I find that the observed relation between removing ATPs and com-

[13] This check is only conducted for the years that are observed after ATPs are removed. It is not relevant to run this regression for the years before ATPs are removed because the number of removed ATPs is not known in those years.

[14] The disadvantage of this method is that I cannot assign "pseudo" event years to the matched firms, and thus cannot conduct a diff-in-diff-in-diff regression like how I do in the main analysis. I can only run a diff-in-diff regression in which I compare the changes in compensation among repeal firms before and after they remove ATPs.

pensation changes mainly comes from the removals of six E-Index provisions, especially from the classified/staggered board, poison pills, and golden parachutes provisions.

To further assess if the post-ATP-removal rises in inside debt-equity ratios are consistent with the "optimal contracting hypothesis", I relate these compensation changes with the offering yield spreads of newly issued bonds and bank loans. Optimal contracting studies explain that shareholders contract CEOs to protect debtholders' value by using inside debt because doing so allows companies to raise debt at a lower cost (Han [2011], Anantharaman et al. [2013],Dang and Phan [2016], Freund et al. [2018]). Indeed, I find that increasing CEO inside debt-equity ratios helps repeal firms reduce the offering yield spreads of their new debt issues. The effect mainly comes from increasing inside debt rather than from decreasing inside equity. Prior studies show that including restrictive covenants with the debt issues also helps reduce offering yield spreads for the companies with low takeover protection (Cremers et al. [2007], Farre-Mensa [2010]) However, I show that yield spreads do not significantly change with the inclusion of restrictive covenants if repeal companies increase their CEO inside debt-equity ratios. This result is consistent with the conclusion in Anantharaman et al. [2013] that granting more inside debt can substitute for including restrictive covenants.

However, it is worth pointing out that repeal firms, despite the increases in their CEO inside debt-equity ratios, still have a higher cost of debt than their matched firms. Repeal firms on average pay 18 bps more for new bond issues and 6.5 bps more for new bank loans, as compared with their matches.[15] This excess cost of debt can only be reduced by about 10% when repeal companies increase their CEO inside debt-equity ratios. Prior studies show that offering debt yield spreads increase with managerial stock and option ownership (Ortiz-Molina [2006]) or that existing bond prices decrease upon initiations of managerial equity-like payments (Billett et al. [2010]). Both papers explain that stock and option awards encourage the risk-taking incentives among CEOs, thus motivating these managers

[15]Given that the repeal companies in my paper on average remove 1.5 provisions, bond yield spreads increase by 12 bps while loan yield spreads increase by 4.3 bps for one provision removed. Previous papers show that bond yield spreads increase by 8 bps (Klock et al. [2005]) and loan yield spreads increase by 4 bps (Chava et al. [2009]) per one removed provision. Both of these papers look into the presence of 24 ATPs in G-Index.

to increase shareholders' value at debtholders' expense. Therefore, the observation that repeal companies have a (net) higher cost of debt despite their reduced use of managerial equity awards suggests that removing ATPs might substitute for inside equity in providing CEOs the risk-taking incentives to increase shareholders' value. Some existing evidence supports this conjecture as CEOs face huge career losses if their companies are acquired (Agrawal and Walkling [1994], Hartzell et al. [2004]).[16] Therefore, CEOs should have stronger incentives to increase equity value to avoid being replaced when their companies are more exposed to takeover threat.

To test if removing ATPs can substitute for inside equity, I compare the changes in investment policies between repeal firms and their matches before and after ATPs are removed. If the substitutive relation exists, CEOs of the repeal companies, despite having higher inside debt-equity ratios, should not refrain from making risky investments. Indeed, I find that the total risk levels of repeal firms increase more after they remove ATPs. These companies do not hold a lot of cash, but instead invest more in R&D activities and develop more fixed assets. Prior studies show that high takeover defense is associated with stagnant plan creation and reduced innovation (Bertrand and Mullainathan [2003], Giroud and Mueller [2010], Giroud and Mueller [2010], Atanassov [2013]). Lowering the takeover defense, by removing some ATPs, seems to revert the effect; and increasing CEO inside debt does not interfere with the process. Firm performance, as measured by Tobin's Q and returns on assets, increases more in repeal firms than in their matches. Prior papers find low Tobin's Q and low returns on assets among the companies with many present ATPs (Core et al. [2006], Cremers and Ferrell [2014]), which suggests that these ratios should increase if some ATPs are removed.

This study reveals interesting findings about the dynamics between external governance (i.e. takeover risk) and internal governance (i.e. CEO compensation). CEO inside debt increases to support a necessary change in the financing policy which is triggered

[16] Agrawal and Walkling [1994] show that CEOs of the target firms are more likely to be fired after the acquisition deals succeed, and cannot get high-level positions in other public companies within three years after their old firms are taken. The retained CEOs also face compensation cut following the acquisitions. Hartzell et al. [2004] find that these retained CEOs continue to experience high turnover rates for several years after their old firms are acquired.

by the increased takeover vulnerability. The increased takeover risk, in turn, serves as a sufficient mechanism to motivate CEOs to improve shareholders' value, hence making it unnecessary to increase inside equity.

First, I find that companies significantly increase inside debt after they remove ATPs. This finding appears to contrast the result in Liu et al. [2014] that the G-Index measured in 2006 is positively correlated with CEO inside debt holdings in the subsequent years. However, I would argue that a company with a high G-Index to begin with is also more likely to remove ATPs later, thus more likely to increase its CEO inside debt.[17] Therefore, my finding might explain the dynamics behind the relation found in Liu et al.'s paper. Since I observe that leverage also increases in the same period, I interpret the increase in CEO inside debt as an adjustment that is consistent with the optimal contracting theory. However, Liu et al. interpret the positive relation between G-Index and CEO inside debt as evidence of managerial entrenchment.

Second, I show that removing ATPs can substitute for the use of inside equity in incentivizing CEOs to increase shareholders' value. In a related paper, Fahlenbrach [2009] finds substitutive relations between CEO equity-like compensation and many measures of (strong) corporate governance, except for the measures using ATPs. Instead, Fahlenbrach finds a negative correlation between G-Index and CEOs' pay-for-performance sensitivity, which he interprets as consistent with either a "complimentary effect" or an "entrenchment effect". Schepker and Oh [2013] find complementary relations between the removals of some ATPs and several other internal governance mechanisms, such as independent directorship or ownership by pressure-resistant institutions.

5.2 Literature review

5.2.1 Inside debt-equity ratio

Jensen and Meckling [1976] argue that compensating a CEO in only equity-like pay

[17] In the Probit model to calculate propensity scores, I find that the companies with more present ATPs in prior years are more likely to remove ATPs in the later years.

(a.k.a. inside equity) can encourage him to increase shareholders' value by taking extra sub-optimal risk at debtholders' expense (the risk-shifting problem). Consequently, debtholders will increase the cost of debt, and shareholders have to bear the agency cost of this shareholder-debtholder conflict. If the CEO is also paid in debt-like pay (a.k.a. inside debt), he cannot keep taking more risks to increase equity value because his debt-like pay will be partially or even fully lost in case of bankruptcy. The authors also suggest that the optimal ratio between inside debt and inside equity should be the firm's debt-equity ratio.

Edmans and Liu [2011] propose that inside debt affects not only a CEO's choice of risks, but also his choice of efforts in the bankrupt state. If the CEO works harder in the bankrupt state, he can protect more liquidation value of the firm's assets. The CEO is motivated to do so only if his own wealth also increases with the liquidation value of the firm's assets in the bankrupt state. Inside debt enables the CEO to have the same right on the firm's assets as that of outside debtholders, hence motivating the CEO to work harder in the bankrupt state. The authors also prove that the optimal level of inside debt increases with the level of debt financing.

Empirical papers find quite consistent evidence that high inside debt is associated with conservative management: less investment spending (Cassell et al. [2012]), higher cash accumulation (Liu et al. [2014]), and reduced risk-taking (Sundaram and Yermack [2007], Phan [2014], Brisker and Wang [2017]). High inside debt is associated with increased debtholders' value. Bond prices increase upon announcements of high inside debt holdings (Wei and Yermack [2011]). Phan [2014] finds that bondholders of acquiring firms react positively to the announcements of diversification acquisitions that are motivated by CEOs' high inside debt holdings. Companies whose CEOs hold more inside debt are able to raise debt at lower costs. They either pay narrower yield spreads (Han [2011], Dang and Phan [2016], Freund et al. [2018]) or include fewer covenants with the loans (Anantharaman et al. [2013]).

5.2.2 Firm-level anti-takeover provisions

Gompers et al. [2003] ("*GIM*") propose a "Governance Index" (the "G-Index) that comprises of 24 firm-level anti-takeover provisions ("*ATPs*"). These provisions consist of 22 firm-level provisions and six state laws four of which also coincide with firm-level provisions. Generally, one point is added to the index for each present provision.[18] *GIM* find that a portfolio that longs stocks of companies with the lowest G-Indexes and short those with the highest indexes earns significant positive alpha in a four-factor model (also see Core et al. [2006]).[19] The authors interpret this finding as evidence that the presence of many ATPs is harmful for firm value. They explain that ATPs restrict shareholders' rights, preventing them from taking actions that support the control fights against management's wills. Hence, entrenched managers, protected from being replaced via market of corporate control, can "enjoy the quiet life" (Borokhovich et al. [1997]).

Bebchuk et al. [2009] ("*BCF*") argue that only six ATPs are really important for corporate governance because their presence systematically draws oppositions from institutional shareholders. The authors construct an "Entrenchment Index" (the "E-Index") from these six ATPs.[20] *BCF* show that the results in *GIM* are mainly driven by the six *ATPs* in their E-Index, by replicating *GIM*'s analyses on their E-Index. The results cannot be replicated for the group of provisions that are not included in the E-Index.

There is an ongoing debate about whether G-Index and E-Index can capture takeover protection. On the one hand, some law papers criticize that these indices do not provide any incremental takeover deterrence (Klausner [2013], Catan and Kahan [2016]). On the other hand, many papers can still make the argument that ATPs, and thus the G-Index, measure takeover protection. Cremers and Ferrell [2014] show that the negative impact of G-Index on firm value is stronger when the firms belong to industries that are experiencing a high level of merger activities. The authors claim that G-Index affects

[18] Generally, one point is added to the index for each present provision, except for the *Cumulative voting* provision and the *Confidential voting* provision. For these two provisions, one point is added for each absent provision.

[19] Cremers and Nair [2005] explain that a long-short portfolio based on the G-Index only produces a positive alpha if the stocks are also held by many blockholders, especially by public pension blockholders.

[20] The six provisions include: staggered boards, bylaw amendment limitations, supermajority voting to approve mergers, charter amendment limitations, poison pills, and golden parachute.

firm value through a takeover channel. Karpoff et al. [2017] conclude that these indexes reflect takeover deterrence after they address the endogeneity issue by using instrumental variables. The first instrument utilizes the *ATPs* used the firms whose headquarters lie within 100 miles from that of the firm in question. The second instrument depends on the *ATPs* of the firms that went public within one year of the firm in question. The negative relations between takeover probability and instrumented G-Index and E-Index are both significant.

5.2.3 The "complementary monitoring hypothesis"

Firm performance worsens in the presence of many ATPs. Core et al. [2006] find a significant negative correlation between G-Index and returns on assets. Bebchuk et al. [2009] show that firm valuation, as measured by industry-adjusted Tobin's Q, is negatively correlated with the E-Index throughout the 10-year-period between 1992 and 2002. Cremers and Ferrell [2014] also find the negative relation between G-Index and Tobin's Q over a longer period ranging from 1978 to 2006. Giroud and Mueller [2011] find a negative relation between the G-Index and productivity, but only in the firms belonging to noncompetitive industries.

Therefore, the removals of ATPs is considered as an improvement in shareholder governance. Cuñat et al. [2012] examine abnormal stock returns on the voting days of proposals to enhance shareholders' rights. These proposals include the repeal of some ATPs in the G-Index. The proposals that are closely passed (i.e. the passing vote is within 5% of the threshold) earn the highest positive abnormal returns.

Enhanced shareholder governance is often associed with increased use of inside equity in CEO compensation. Hartzell and Starks [2003] show that high institutional ownership concentration is associated with high pay-for-performance sensitivity. Fahlenbrach [2009] find a negative relation between G-Index and the proportions of equity-like compensation. Consistently, Liu et al. [2014] find a positive correlation between the G-Index measured in 2006 and the ratio of inside debt over sum of inside debt and inside equity in the subsequent years. Clifford and Lindsey [2016] document increases in the proportions of equity-like compensation under the influences of active blockholders.

The companies that remove ATPs have enhanced shareholder governance. The "complementary monitoring hypothesis" predicts that these better-governed companies would compensate their CEOs with more inside equity so their CEO inside debt-equity ratios should decrease after companies remove ATPs.

Hypothesis H0: *Inside debt-equity ratios (Inside equity) significantly decrease (increases) after companies remove ATPs.*

5.2.4 The "optimal contracting hypothesis"

Many theoretical studies predict that CEOs use more debt financing when their companies are more vulnerable to takeovers. The CEOs' ultimate purpose when they increase leverage is to prevent being replaced via market of corporate control. On the one hand, high leverage can signal CEOs' commitments to undertaking only positive-NPV projects instead of building empires, hence making control fights unnecessary (Jensen [1986], Zwiebel [1996], Morellec [2004]) On the other hand, high leverage can reduce the gains to prospective acquirers, hence discouraging these raiders from initiating the control fights. Harris and Raviv [1988] argue that a CEO, who also holds a fraction of the firm's equities, issues debt instead of equity to shift the votes away from the sharholders, making it more difficult for the potential bidder to gather enough votes to replace the CEO. Israel [1991] presents another situation in which more debt in the target firm can reduce the cash flows distributed to the acquirer's shareholders.

There is indirect empirical evidence that leverage increases when companies are more exposed to takeover risks. Companies refrain from using debt financing after their states of incorporation adopt anti-takeover laws (Garvey and Hanka [1999]). Leverage increases after unsuccessful takeover attempts (Berger et al. [1997], Safieddine and Titman [1999]). Creditors do not increase the cost of debt for the companies with low G-Indexes if these companies are restricted from increasing leverage (Cremers et al. [2007], Chava et al. [2009], Farre-Mensa [2010]).[21]

[21] G-Index is negative correlated with the cost of debt. When the bond issues contain covenants that restrict leverage, specify net worth, or allow for poison put, the negative relation is partially or totally

Studies under the optimal contracting theory argue that the shareholder-debtholder agency conflict becomes more severe with high leverage. Hence, companies should signal their commitment to protecting debtholders' value by compensating their CEOs with more inside debt. Otherwise, rational debtholders would increase the cost of debt for these companies (Jensen and Meckling [1976], Edmans and Liu [2011]). Many empirical papers also show that leverage is positively correlated with CEO inside debt. In the arbitrarily earliest empirical study on inside debt, Sundaram and Yermack [2007] show that CEOs' pension values increase with firm leverage. Cassell et al. [2012] find a qualitatively similar result, showing that inside debt, which include both pensions and deferred compensations, increases with industry median debt-equity ratio. Cen [2010] finds a non-linear inverted U-shape relation between firm leverage and CEO inside debt. However, he also shows that the negative correlation between firm leverage and inside debt only exists in 4% of the total sample.

The companies that remove ATPs, thus lowering their takeover defenses, are very likely to increase leverage. The "optimal contracting hypothesis" predicts that these highly-levered companies would compensate their CEOs with more inside debt so their CEO inside debt-equity ratios should increase after companies remove ATPs.

Hypothesis HA: *Inside debt-equity ratios (Inside debt) significantly increase (increases) after companies remove ATPs.*

5.3 Data and sample selection

5.3.1 The removals of anti-takeover provisions ("ATPs")

I obtain the data of ATPs in S&P 1500 firms in 2006 from RiskMetrics. From 2007 to 2017, these data are provided by Institutional Shareholder Services ("ISS"). The new

offset (Cremers et al. [2007]). Farre-Mensa [2010] finds the same conclusion for bank loans. Chava et al. [2009] show that the relation between takeover defense and cost of bank loans only occurs when the borrowing companies currently have low leverage. According to the authors, low-leverage companies with low takeover defense are more subject to leverage increasing takeovers. Hence, the common explanation for the negative relation between G-Index and the cost of debt is that creditors are concerned about increasing leverage under weakened takeover protection.

database does not report all 24 provisions in Gompers et al. [2003] ("*GIM*)". However, the new database is updated annually, instead of once every two years like the old one. Therefore, any new adoption or repeal of provision is reported with less delay. I identify 17 ATPs from ISS's new databases. Similar to *GIM*, I assign one point for each ATP that a company has that in hand. Two exceptions are *Cumulative voting* and *Confidential voting* provisions, as one point is assigned for each *absent* provision. I sum over 17 provisions to obtain *GIM17* which simply captures how many ATPs that a company has in hand. I require that each firm must have at least four consecutive years of non-missing data Details on how to construct *GIM17* are provided in Appendix 5.A1.

[Table 5.1 goes here]

Panel A of table 5.1 summarizes the statistics of these 17 provisions. An average company in the full S&P 1500 sample has about nine present ATPs. This number is similar to an average company in the restricted sample which contains only repeal firms and matched firms. The most common provisions that a company has include: Blank check, Golden parachutes, Bylaw, Charter, Cumulative voting, Confidential voting, and Business combination state law. The majority of these common provisions belong to the strategy that hinders the voting process to pass the acquisition decision.

I consider the changes in ATPs starting from 2009 so that later I can study the changes in CEO compensation up to three years before ATP removals. I determine that a company has removed/repealed ATPs if the total number of present ATPs, i.e. its *GIM17* measure, decreases from the lagged value. Such a company is referred to as a "repeal firm". ATPs are reported by the board meeting dates so I use these dates to determine the corresponding fiscal years in which ATPs are repealed. I follow Gompers et al. [2003] and treat each ATP equally. Therefore, if a firm repeals one ATP but at the same time adopts a new one, I still consider that its takeover defense remains unchanged. [22] I check that repeal companies keep their *GIM17* unchanged for at least three years after they remove ATPs. If one company reduces its number of ATPs several times in

[22] Bebchuk et al. [2009] argue that some ATPs, which they include in their Entrenchment Index (the "E-Index"), might be more important than the others. I specifically consider these E-Index ATPs in the robustness check.

the sample period, I only include the first event. The final "treated" sample includes 525 repeal companies which remove ATPs some time in period 2009 - 2017.

5.3.2 Inside debt-equity ratio

I search on SEC EDGAR for all the proxy statements that are filed during the calendar years from 2006 to 2018, and collect the data on CEOs' compensation packages. I merge the compensation data collected from SEC EDGAR with the financial data in Compustat using the GVKEY-CIK linking table provided by Wharton Research Data Services ("WRDS"). The companies in the final sample must have non-missing financial data for at least three consecutive years. For each firm-year observation, the company must also have trading stock prices (from CRSP) over the last two years.

I follow the existing literature and measure CEO inside by using the present value of defined-benefit pensions ($Pension\_value$) and total balances of non-qualified deferred compensations ($Defer\_balance$):

$$\text{Inside debt} = \text{Pension\_value} + \text{Defer\_balance}$$

I obtain these two values from the "Pension Benefits" and "Non-Qualified Deferred Compensations" tables, respectively. Where a company separates the qualified pension benefits from the supplemental non-qualified ones, I only include the non-qualified benefits in the inside debt measure. Unlike the qualified component, supplemental non-qualified pension benefits are unfunded unsecured like a firm's junior debt, so only the non-qualified pensions, but not the qualified component, should match the theoretical criteria of inside debt (Edmans and Liu [2011], Anantharaman et al. [2013]). Even though ExecuComp also provides compensation data for S&P 1500 firms, which are essentially the sample in this study, my manually collected data can provide a more precise measure of CEO inside debt. My hand-collected data can separate qualified pensions from the non-qualified ones, while ExecuComp only reports one aggregate value for all pension plans.

I measure CEO inside equity by using the market value of stock and option awards that a CEO holds at the end of the fiscal year:

$$\text{Inside equity} = N\_shares * prcc\_f + \sum_{j=1}^{J} N\_options_j * Option\_value_j$$

I collect the number of shares (N_shares), and the number of unexercised options (N_options) with their corresponding exercise prices and expiration dates from the "Outstanding Equity Awards" table. I multiply the number of shares with the closing stock price at fiscal year end (prcc_f) to obtain the market value of stock holdings. I calculate the value for each tranche of options by using the Black-Scholes formula (Option_value), and sum over "J" tranches to obtain the market value of a CEO's option holdings.[23]

I measure the CEO inside debt-equity ratio (*Inside_DE*) equals the natural logarithm of inside debt divided by inside equity:

$$Inside\_DE = Ln\left[\frac{Inside\_Debt}{Inside\_Equity}\right]$$

The logarithm transformation is used in almost any studies on inside debt because the unlogged ratios are heavily right skewed.[24] Following Campbell et al. [2016], I replace the observation with zero inside debt with the minimum ratio of the sample (0.0000312) before applying the log transformation.

The descriptive statistics of the inside debt-equity ratios and their components are reported in Table 5.1, Panel B. An average (median) CEO has US$ 6.46 (1.28) million worth of inside debt, and US$ 53.43 (21.80) million of inside equity. The unlogged ratio between inside debt and inside equity is right-skewed as the mean value is 0.24 while the median value is only 0.05. The skewness is partially mitigated after the log transformation, as the mean of the log ratio is -4.19 while the median is -2.66. The changes in inside debt-equity ratios have quite comparable mean and median values which equal 0.05 and 0.04, respectively.

[23]Risk-free rate is one-month Treasury Bill rate. Dividend yield equals cash dividend (including dividend on preferred stocks) divided by total equity value (including value of preferred stocks). Stock volatility is the standard deviation of daily stock returns over the year before fiscal year end date.

[24]For example, see Wei and Yermack [2011], Cassell et al. [2012], Liu et al. [2014], Phan [2014], Campbell et al. [2016]

5.3.3 Matching sample

I use a Probit regression to estimate the probability of a company's removing ATPs in a particular fiscal year. The explanatory variables include lagged voting results, corporate governance characteristics, and CEO compensation. The predicted probability from this Probit regression is the propensity score for the matching process. The observations are at firm-year level. The dependent variable is *Lower_defense* which equals one if the total number of ATPs in a fiscal year has decreased from its lagged value, and zero if otherwise. The regression includes year and industry (based on two-digit SIC code) fixed effects.

According to Cuñat et al. [2012], companies often decrease their G-Index up to five years after the proposals to remove ATPs are voted. In addition, the more proposals are passed, the more does the G-Index decrease later. For each firm-year observation, I aggregate the characteristics and the voting results of all proposals to remove ATPs over the last five years. *Nproposals* equals log of one plus number of proposals to remove ATPs over the last five years. *Vote_for* equals the average of vote percentages that support the proposals. *Npassed* equals the log of one plus number of proposals that have been passed in the last five years. *ISS_sup* equals the log of one plus number of proposals that are supported by the ISS. *SH_spon* equals the log of one plus the number of proposals that are sponsored by the shareholders. I expect that *Nproposals*, *Vote_for*, and *Npassed* can positively predict the subsequent removals of ATPs. In contrast, *ISS_sup* and *SH_spon* negatively predict the subsequent removals of ATPs

Variables regarding corporate governance are one-year lagged values. To measure the strength of corporate governance, I capture the ownership patterns of influential shareholders and characteristics of the boards.

To measure ownership patterns of important investors, I retrieve from SEC EDGAR any form 13D, 13D/A, 13G, and 13G/A filed during period 2006 - 2017, in addition to using Thompson Reuters 13F database. Active investors who file form 13D often succeed in getting the targeted firms acquired so these 13D filers might influence the targeted firms to weaken their takeover protection (Greenwood and Schor [2009], Boyson et al. [2017]).

I include the indicator *13D_filer* which equals one if a company has any present 13D filers, and zero if otherwise. The presence of large shareholders often facilitates merger deals. I include two variables to capture the impact of those large shareholders. *Nblocks* equals log of one plus number of blockholders (investors with at least five percent stock ownership). *Largest_five_own* is the total ownership percentage of five largest shareholders. I also look specifically into institutional investors which are required to file form 13F quarterly. Although they might not be blockholders, they are large investors with great influence on corporate governance in general. For instance, Hartzell and Starks [2003] show that the concentration of institutional shareholders can also serve as a governance mechanism when the agency conflict between shareholders and CEOs becomes intense. I capture institutional ownership concentration, *Inst_HHI*, by using the Herfindahl index of institutional ownership.

Schepker and Oh [2013] find that CEO duality and the presence of independent directors also affect the removals of ATPs. I obtain the data about board of directors from ISS Director database. *Dual* equals one if the CEO is also the chairman. *NIndeps* equals the log of one plus number of independent directors. *Indep_per* is the percentage of independent directors in the board. These variables are measured for the fiscal year before the ATPs are removed.

I also include log of CEO inside debt and inside equity which are reported for fiscal year before ATP removals. However, I expect the coefficients for these two variables to be insignificant, which would indicate the repeal firms do not have significantly different compensation policies from the matched firms before the events. Finally, I control for the number of ATPs in the previous year, *Lagged_GIM17*. I expect that the companies with a high number of ATPs are more likely to remove some of those provisions.

The result of this Probit regression is reported in Appendix 5.A3. The coefficients of *Nproposals*, *Vote_for*, and *Npassed* are positive and significant at 1% or 5% levels. A company is more likely to remove ATPs if there are many voted proposals to remove ATPs in the previous years, if many shareholders vote for the proposals, or if many of these proposals are passed. *SH_spon* is negatively correlated with the removal of ATPs, meaning that the companies resist removing ATPs if the proposals were sponsored by the shareholders. The presence of an active blockholder (*13D_filer*) increases the likelihood that a company will remove ATPs. A company is more likely to repeal ATPs if the five largest shareholders collectively own a large fraction of the shares (*Largest_five_own*), but not when there are many (dispersed) blockholders. When there are many independent directors in the board (*NIndeps*), a company is more likely to remove ATPs. Finally, a company which had many present ATPs in the previous year (*Lagged_GIM17*) is more likely to remove some of those provisions.

For each repeal firm, I assign a matched firm that belongs to the same industry and has the closest propensity score with those of the repeal firm. The "pseudo" event year for each matched firm is the event year of the repeal firm to which the matched firm is assigned. If one firm is matched with multiple repeal firms, this matched firm is only counted once. The event year of this matched firm is that of the repeal firm with the most similar propensity score. The final sample includes an unbalanced panel of 525 unique repeal firms and 469 unique matched firms.

[Table 5.2 goes here]

Table 5.2 compares characteristics of repeal firms and matched firms during three years before repeal firms remove ATPs. Repeal firms are quite similar to their matches before the events, except for the total number of provisions. On average, repeal firms have 0.2 more ATPs than their matches; the difference is significant at 5% level. However, given that repeal firms and matched firms on average have roughly nine ATPS, the 0.2 difference is quite marginal.

[Figure 5.1 goes here]

Figure 5.1 plots the median value of inside debt-equity ratios for repeal firms and matched firms, from five years before to five years after ATP removals. Repeal firms and matched firms have quite comparable inside debt-equity ratios before ATP removals. After removing ATPs, repeal firms continually increase their inside debt-equity ratios for the first three years, and then keep the ratios roughly unchanged. In contrast, matched firms slightly decrease their inside debt-equity ratios in the same periods.[25]

5.4 Changes in leverage after ATP removals

In this section, I examine whether repeal companies raise more capital from issuing new debt after they remove ATPs and lower their takeover defenses. To the best of my knowledge, there is no direct empirical evidence for this argument, despite the fact that many theoretical studies predict that leverage will increase when a company is more exposed to takeover threat. Even though the ultimate purpose of the CEO when he increases leverage is to prevent control fights, the potential impact of their actions on firm value can be very different. The CEO can use high leverage to signal the commitment to undertaking only positive-NPV projects instead of building empires (Jensen [1986]), hence making control fights unnecessary (Zwiebel [1996], Morellec [2004]). This is the "value-creating channel". On the other hand, the CEO can increase leverage in order to reduce the gains to the prospective acquirers, hence discouraging these raiders from initiating the control fights (Harris and Raviv [1988], Israel [1991], Novaes and Zingales [1995]). This is the "value-destroying channel". Billett [1996] empirically show that the companies with high leverage are less likely to become targets in acquisition deals.

Garvey and Hanka [1999] ("*GH*") show that companies reduce debt financing after they becomes less vulnerable to takeover because their incorporation states adopt antitakeover laws. Following *GH*'s main test, I compare the changes in leverage between repeal firms and their matched firms, before and after the removal of ATPs. I borrow the measure in *GH*'s study, *Net_leverage_change*, which incorporates the effects of net debt and net equity issuances into leverage changes.

$$\text{Net\_leverage\_change} = \frac{L.D + \text{Net debt issues}}{L.A + \text{Net debt issues} + \text{Net equity issues}} - \frac{L.D}{L.A} \tag{5.1}$$

[25]CEO compensation is an annual measure and it is always determined after the corresponding fiscal year ends. Hence, CEO compensation is already decided after ATP removals are announced even in the event year [t]. The divergence between repeal firms and their matches between year [t-1] and year [t] indicates that repeal firms significantly increase their inside debt-equity ratios right after they remove some ATPs. The divergence does not reflect that the ratios start increasing from year [t-1].

$L.x$ denotes the lagged value of variable x. D and A are book value of a company's long-term debt and total assets, respectively. *Net debt issues* equals new debt issued minus retired debt, both measured within the same fiscal year. Likewise, *New equity issues* equals new equities issued minus stock repurchases. *Net leverage change* is calculated at firm-year level.

First, I replicate *GH*'s main test[26], using the current setting of my study. I compare *Net_leverage_change* of repeal firms and their matched firms, before and after the removals of ATPs by using the following regression:

$$\begin{aligned} Net\_leverage\_change_{i,t} &= \alpha + \theta * Repreal\_firm_i * After\_repeal_{i,t} \\ &\quad + \beta * Repeal\_firm_i + \gamma * After\_repeal_{i,t} + \delta * X_{i,t} + \epsilon_{i,t} \end{aligned} \tag{5.2}$$

Net_leverage_change$_{i,t}$ is the change in leverage of firm i in fiscal year t. *Repeal_firm* is a dummy variable which equals one for a repeal firm, and zero for a matched firm. *After_repeal* is a dummy variable which equals to one if the observation occurs after the removal of ATPs, and equals zero if otherwise. I re-use the set of control variables (X) in *GH*'s main analysis.

[Table 5.3 goes here]

The result of regression (5.2) is reported in Table 5.3. The coefficient of the interaction term, $\boldsymbol{\theta}$, equals 0.0153 and is significant at 5% level. Consistent with existing theoretical studies, companies use more debt financing after they remove ATPs and become more vulnerable to takeover threat.

I also track the year-by-year differences in *Net_leverage_change* from three years before to three years after ATPs are removed:

$$\begin{aligned} Net\_leverage\_change_{i,t} &= \sum_{k=-3}^{3} \theta_k * b_{i,t}[t+k] * Repeal\_firm_i \\ &\quad + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \epsilon_{i,t} \end{aligned} \tag{5.3}$$

[26] See Garvey and Hanka [1999], Table III, page 529

b[t + k] is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k $\in$ {-3, ..., 3}, and equals zero if otherwise. I repress the constant in this regression. Hence, $\boldsymbol{\theta_k}$ only capture the year-by-year differences in leverage changes between repeal firms and their matches.

I plot the estimates of $\boldsymbol{\theta_k}$ and provide their corresponding t-statistics in figure 5.2. I find that repeal companies issue significantly more debt in the first three years after they remove ATPs. That is θ_0, θ_1 and θ_2 are positive and significant at 1% or 5% levels.

[Figure 5.2 goes here]

5.5 Changes in inside debt-equity ratios after ATP removals

5.5.1 Changes in inside debt-equity ratios

In the main analysis, I focus on the change in CEO inside debt-equity ratio, Δ *Inside_DE*, which equals the ratio in current year subtracts its lagged value:

$$\Delta Inside\_DE = Ln\left(\frac{d}{e}\right) - Ln\left(\frac{L.d}{L.e}\right) \tag{5.4}$$

d and *e* are inside debt and inside equity respectively. *L.x* denotes the lagged value of any variable x. *Ln (x)* denotes the natural logarithm transformation of any variable x. A positive (negative) value of this measure means the ratio has increased (decreased) over the lagged value.

I compare the changes in CEO inside debt-equity ratios between repeal companies and their matched firms, from three years before to three years after the repeal firms remove ATPs, by using the following regression:

$$\begin{aligned}\Delta Inside\_DE_{i,t} = \alpha + \theta * Repeal\_firm_i * After\_repeal_{i,t} + \beta * Repeal\_firm_i \\ + \gamma * After\_repeal_{i,t} + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}\end{aligned} \tag{5.5}$$

Repeal_firm equals one for a repeal firm, and zero for a matched firms. *After_repeal* equals one if the observation belongs to a year after ATPs are removed, and zero if otherwise. *After_repeal* indicator of a matched firm is similar to that of the repeal firm assigned to this matched firm.[27] I also include year fixed effects (*Year*) and industry fixed effects (*Ind*) to capture any changes in the ratios due to time and industry variances.

Control variables (X) include the explanatory variables that are often used in the inside debt literature. Companies with many assets benefit from paying their CEOs more in inside debt, whereas those with many investment opportunities should pay their CEOs more in inside equity (Edmans and Liu [2011], Cassell et al. [2012], Freund et al. [2018]). I use natural logarithm of book value of total assets *Ln(Assets)* and net PP&E over total assets (*Tangible_assets*) to proxy for large asset value. To capture firms with large growth opportunities, I use Market-to-book ratio (*Market-to-Book*) and R&D expenditures over total sales (*R&D_expenditures*). Companies with more risks should pay their CEOs more inside debt to mitigate the agency problem of debt, hence allowing companies to raise debt at lower cost (Jensen and Meckling [1976], Edmans and Liu [2011]). I use book leverage (*Leverage*), idiosyncratic risks (*Idiosyncratic_risks*), and indicator of investment graded firm (*1_(Investment graded)*) to capture risk levels. Prior research includes indicator of liquidity constraint (*1_(Liquidity constraint)*) and indicator of tax-loss-carry-forward (*1_(Tax status)*) as determinants of inside debt-equity ratios, although there is no theoretical explanation for their impacts (Sundaram and Yermack [2007], Cen [2010], Liu et al. [2014], Campbell et al. [2016]). Details about how to construct these variables are provided in Appendix 5.A2. I also include CEO age (*CEO_age*) and CEO tenure (*CEO_tenure*) in the regression. Note that continuous variables are changed values.

[Table 5.4 goes here]

The result of regression (5.5) is reported in Table 5.4. The coefficient of the interaction term, $\boldsymbol{\theta}$, is the coefficient of interest. $\boldsymbol{\theta}$ is positive (negative) if the effect under the "optimal contracting hypothesis" ("complementary monitoring hypothesis") domi-

[27] In case where one firm is matched to two repeal firms, *After_repeal* indicators of the matched firm are similar to those of the repeal firm with the closest propensity score.

nates. In column 1, I run regression (5.5) without control variables and fixed effects. $\boldsymbol{\theta}$ equals 0.1309 and is significant at 1% level. $\boldsymbol{\theta}$ becomes 0.1251 and is still significant at 1% level when I include control variables and fixed effects in the regression (column 2). If a company grows its CEO inside debt-equity ratio at the sample-average rate of 0.0516 before ATP removal, $\boldsymbol{\theta}$ being 0.1251 implies a three-fold increase after this company removes ATPs. The results suggest that the compensation adjustments under the "optimal contracting hypothesis" dominate those under the "complementary monitoring hypothesis".

5.5.2 Changes in inside debt and inside equity

Since companies use significantly more debt financing after removing ATPs, a compensation adjustment in accordance with the "optimal contracting hypothesis" involves increased use of inside debt. On the other hand, removing ATPs enhances shareholders' rights, which can create a "complementary monitoring" effect on CEO compensation and increase the use of inside equity. The finding that CEO inside debt-equity ratios significantly rises after companies remove ATPs suggests that the changes under the "optimal contracting hypothesis" (i.e. increasing inside debt) dominate those under the "complementary monitoring hypothesis" (i.e. increasing inside equity). However, increasing inside debt-equity ratios can also result from insignificant change in inside debt accompanied by significant decrease in inside equity. Such changes are not consistent with either the "optimal contracting hypothesis" or the "complementary monitoring hypothesis". Therefore, I separately examine the changes in inside debt and inside equity after ATPs are removed.

I split the change in the inside debt-equity ratio into two components corresponding to the change in inside debt (Δ *Inside_Debt*) and negative of the change in inside equity

($-\Delta Inside\_Equity$):

$$\begin{aligned}\Delta Inside\_DE &= Ln\left(\frac{d}{e}\right) - Ln\left(\frac{L.d}{L.e}\right) \\ &= \underbrace{[Ln(d) - Ln(L.d)]}_{\Delta\text{Inside\_Debt}} + \underbrace{[-Ln(e) + Ln(L.e)]}_{-\Delta\text{Inside\_Equity}}\end{aligned} \tag{5.6}$$

Similar to equation (5.4), d and e are inside debt and inside equity respectively. $L.x$ denotes the lagged value of any variable x. *Ln (x)* denotes the natural logarithm transformation of any variable x.[28]

Next, I re-run regression (5.5), replacing the dependent variable by Δ *Inside_Debt* and $-\Delta$ *Inside_Equity*. The estimates are reported in Table 5.4, columns 3 to 6.

When the dependent variable is the change in inside debt ($\Delta Inside\_Debt$), $\boldsymbol{\theta}$ equals 0.0975 if control variables and fixed effects are excluded (column 3); and equals 0.0887 if these controls are included (column 4). Both estimates are significant at 5% level. This result implies that 70% (= 0.0887 / 0.1251) of the increases in CEO inside debt-equity ratios result from increase in inside debt. The significant rise in inside debt after ATPs are removed is consistent with the "optimal contracting hypothesis".

When the dependent variable is negative of the change in inside equity ($-\Delta Inside\_Equity$), $\boldsymbol{\theta}$ equals 0.0387 if control variables and fixed effects are excluded (column 5); and equals 0.0329 if these controls are included (column 6). Both estimates are at least significant at 5% level. The dependent variable is negative of the change in inside equity, so a positive coefficient indicates a decline in inside equity. In contrast to the prediction under the "complementary monitoring hypothesis", inside equity significantly declines after companies remove ATPs.

The decrease in inside equity might result from falling stock prices or from reduced use of stock and option awards in CEO compensation. I examine how CEOs' stock and option awards change after companies remove ATPs. I measure the changes in CEO's

[28] For firm-year without Inside debt holdings, I replace the observation by the smallest value of inside debt in the sample (US$ 400,000).

outstanding stock awards and option awards, scaled by total outstanding shares as follows:

$$-\Delta Stock\_award = -Ln\left(\frac{N\_shares}{Shrout}\right) + Ln\left(\frac{L.N\_shares}{L.Shrout}\right) \tag{5.7}$$

$$\begin{aligned} -\Delta Option\_award = & - Ln\left(\frac{\sum_{j=1}^{J} N\_options_j * Option\_delta_j}{Shrout}\right) \\ & + Ln\left(\frac{L.\sum_{j=1}^{J} N\_options_j * Option\_delta_j}{L.Shrout}\right) \end{aligned} \tag{5.8}$$

N_shares and *N_options* are the number of outstanding stock and option awards that a CEO holds at fiscal year end, respectively.[29] *Option_delta* is calculated by using the Black-Scholes formula and captures how much option value changes for 1$ variation in the underlying stock price. Option deltas are aggregated across "J" tranches of option awards that a CEO is holding. *Shrout* is total number of outstanding equities at fiscal year end. *L.x* denotes the lagged value of any variable x. *Ln (x)* denotes the natural logarithm transformation of any variable x.

Next, I re-run regression (5.5), replacing the dependent variable by $-\Delta$ *Stock_award* and $-\Delta$ *Option_award*. The estimates are reported in Table 5.4, columns 7 to 10. $\boldsymbol{\theta}$ equals 0.0322 (0.0213) and is significant at 10% (5%) level when the dependent variable is $-\Delta$ *Stock_award* ($-\Delta$ *Option_award*). The positive coefficients both indicate that companies reduce using stock and options to compensate their CEOs after these companies remove ATPs.

5.5.3 Changes in inside debt-equity ratios by years

In this section, I examine detailed differential changes in inside debt-equity ratios between repeal firms and their matches, from three years before to three years after

[29] *N_shares* is the sum of vested shares (*shrown_excl_opts*) and unvested shares (*stock_unvest_num*) in CEO's holdings. *N_options* is the sum of unexercised exercisable options (*opts_unex_exer*) and unexercised unexercisable options (*opts_unex_unexer*) across all different tranches of options that a CEO holds.

ATPs are removed:

$$\begin{aligned}\Delta Inside\_DE_{i,t} = &\sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i \\ &+ \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}\end{aligned} \tag{5.9}$$

b[t + k] is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k ∈ {-3, ..., 3}; and equals zero if otherwise. I repress the constant in this regression. Hence, the coefficients of interest in this regression, $\boldsymbol{\theta_k}$, only capture the year-by-year differences between repeal firms and their matches, but not how the differences after ATP removals distinguish from those before the events.

[Figure 5.3 goes here]

In Figure 5.3, I plot the estimates of $\boldsymbol{\theta_k}$ and their t-statistics when the dependent variable is Δ*Inside_DE*. $\boldsymbol{\theta_k}$ are insignificant for k ∈ {-1, -2, -3}. Before repeal companies remove ATPs, their adjustments of CEO inside debt-equity ratios do not differ significantly from those of their matches. However, $\boldsymbol{\theta_k}$ become positive and significant for k ∈ {0, 1, 2}. $\boldsymbol{\theta_0}$ equals 0.1144, and is significant at 1% level. Right after repeal companies lower their takeover protections, they triple the increases of their CEO inside debt-equity ratios, if I assume that the increases before ATP removals equal the sample-average rate of 0.0516. $\boldsymbol{\theta_1}$ equals 0.0854, and is significant at 1% level. $\boldsymbol{\theta_2}$ equals 0.1431, and is significant at 5% level. The significant increases in inside debt-equity ratios do not disappear until the fourth year after companies remove ATPs, as $\boldsymbol{\theta_3}$ equals 0.0449, but is insignificant.

The spike in inside debt-equity ratios among repeal firms coincides with the significant increase in debt financing (as plotted in Figure 5.2). Hence, it is very likely that repeal firms compensate their CEOs with more inside debt after removing ATPs because these companies use more debt financing.

5.5.4 Changes in inside debt and inside equity by years

I also examine separate changes in inside debt and inside equity by years. I re-run regression (5.9) and replace the dependent variable accordingly. Figure 5.4 plots the estimates of $\boldsymbol{\theta_k}$ and their t-statistics when the dependent variable is Δ*Inside_Debt*. $\boldsymbol{\theta_k}$ are insignificant for k $\in$ {-1, -2, -3}. $\boldsymbol{\theta_0}$ equals 0.0885 and $\boldsymbol{\theta_1}$ equals 0.0776; both estimates are significant at 5% level. $\boldsymbol{\theta_2}$ and $\boldsymbol{\theta_3}$ are positive but insignificant.

[Figure 5.4 goes here]

Figure 5.5 plots the estimates of $\boldsymbol{\theta_k}$ and their t-statistics when the dependent variable is $-\Delta$*Inside_Equity*. In this case, only $\boldsymbol{\theta_2}$ which equals 0.1116 is significant at 5% level; the other $\boldsymbol{\theta_k}$ are positive but insignificant.

[Figure 5.5 goes here]

The results of these two tests demonstrate that roughly 80% of the changes in inside debt-equity ratios in the first two years after ATP removals come from increasing inside debt. During these two years, the value of inside equity remains unchanged. In the third year, the changes in the overall ratios mainly come from decreasing inside equity. However, the largest increase in inside debt-equity ratio occurs in this third year, so the effect from decreasing inside equity is not trivial. The decline in inside equity value probably results from the decline in CEOs' outstanding stock and option awards, which also start from the third year after companies repeal ATPs (Figures 5.6 and 5.7). This observation suggests that repeal companies reduce using equity-like payments in their CEO compensation after they remove ATPs.

[Figure 5.6 goes here]

[Figure 5.7 goes here]

5.6 Changes in inside debt-equity ratios and the cost of debt

The findings in the previous two sections suggest that repeal companies significantly increase their CEO inside debt after removing ATPs because they use more debt financing. This conclusion is consistent with the "optimal contracting hypothesis". When a company finances by using more leverage, the value of debtholders in that company increases and the risk-shifting problem gets worse. In this case, the "optimal contracting hypothesis" argues that the company should encourage its CEO to protect debtholders' value by granting him more inside debt (Jensen and Meckling [1976], Edmans and Liu [2011]). By doing so, the company can reduce the cost of debt financing (Wei and Yermack [2011], Han [2011], Anantharaman et al. [2013], Dang and Phan [2016] Freund et al. [2018]).

In this section, I directly test the implication the "optimal contracting hypothesis" that increasing inside debt helps reduce the cost of debt by examining how the cost of debt responds to increases in CEO inside equity ratios after companies remove ATPs. The test includes the new bonds and bank loans that are issued during the second to fourth years after ATP removals. The regression controls for firm characteristics and debt characteristics. I generally use the control variables from prior papers which also study takeover defenses and cost of debts. I run two separate tests for bond issues and for bank loan issues because the control variables for the two types debt are quite different. However, the primary specifications are the same for two samples:

$$Yield\_spread_{j,i,t} = \alpha + \theta * Repeal\_firm_i * \Delta Inside\_DE_{i,t-1} + \beta * Repeal\_firm_i + \gamma * \Delta Inside\_DE_{i,t-1} + \delta * X_{j,i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{j,i,t} \tag{5.10}$$

$Yield\_spread_{j,i,t}$ is the offering yield spread of debt issue *"j"* offered by company *"i"* in fiscal year *"t"*. To ensure that prior year's compensation and financial data are publicly available when the debt issues are offered, offering dates are counted between proxy statement filing dates. For example, a company has fiscal year 2009 (2010) ended in May 2010 (2011). The proxy statement which contains information for fiscal year 2009 (2010) is released in July 2010 (2011). Debt issues for fiscal year 2010 are then counted between August 2010 and July 2011. *Repeal_firm* is a dummy variable which equals one if the borrowing company is a repeal firm, and zero if a matched firm. $\Delta Inside\_DE$ is the change in inside debt-equity ratio over its prior-year value. Control variables (X) include borrowing firm characteristics (measured for prior fiscal year) and debt issue characteristics. I also include industry and year fixed effects to account for any market-wise and industry-wise variations in yield spreads. Since one company can issue more than one new debt, standard errors are clustered at issuing firm level.

[Table 5.5 goes here]

5.6.1 Bond issues

The first set of regressions is conducted in the sample of new bond issues. This sample contains 1230 bond issues. I collect data on corporate bond issues from Mergent FISD and calculate the Macaulay duration of each bond on its offering date. I then obtain the data on U.S Treasury bonds from CRSP TREASURIES. I subtract the yield to maturity of a benchmark Treasury bond from each corporate bond's offering yield to obtain the offering yield spread. The benchmark Treasury bond has the most similar duration to that of the corporate bond on the offering date.

Panel C of table 5.2 compares some bond characteristics between repeal firms and their matches. Repeal companies offer an average yield spread of 158.86 bps to issue new bonds, while their matches only need to offer 145.28 bps. The difference of 14 bps is significant at 1% level. The average offering amount of repeal companies is US$161,400 larger than that of matched companies, and the difference is significant at 1% level. Other bond characteristics such as maturity, seniority, secured status, and callability are not significantly different between repeal firms and their matches.

Control variables include : total assets (*Ln (Assets)*), book leverage (*Leverage*), EBIT over total assets (*ROA*), par value of bond scaled by firm total assets (*Bond_size*), time to maturity in years (*Bond_age*), numerical bond ratings (*Rating*), indicator of senior bond (*Senior_indicator*), indicator of senior and secured bond (*Senior_secured_indicator*), and indicator of callable bond (*Callable_indicator*). These control variables are commonly used in studiesof bond financing (Klock et al. [2005], Cremers et al. [2007], Francis et al. [2010], Freund et al. [2018]). Bonds issued by firms with many assets, low leverage, or high profitability should have lower yield spreads. Bonds issued in large amounts, with short maturity, or with good ratings (i.e. low numerical ratings) should also have lower spreads. Finally, senior bonds and secured bonds should have lower yield spreads, whereas callable bonds should have higher yield spreads.

The result of regression (5.10) for new bond issues is reported in Table 5.5, columns 1. The coefficient of the interaction term, $\boldsymbol{\theta}$, equals -9.0705 and is significant at 1% level. When I replace Δ*Inside_DE* by Δ*Inside_Debt*, $\boldsymbol{\theta}$ becomes -10.6441 and is significant at 10% level (Table 5.5, column 2). $\boldsymbol{\theta}$ becomes insignificant when I use $-\Delta$*Inside_Equity* as the main explanatory variable (Table 5.5, column 3). The impact of increasing inside debt-equity ratios comes from increasing inside debt rather than from decreasing inside equity. Consistent with the prediction of the "optimal contracting hypothesis", increasing CEO inside debt-equity ratios, especially increasing inside debt, helps repeal companies reduce the cost of debt.

The coefficient of *Repeal_firm*, $\boldsymbol{\beta}$, equals 18.3632, and is significant at 5% level. On average, repeal companies pay an excess cost of 18 bps to raise new bond, when compared with their matched firms. The excess cost of new bond financing decreases if repeal companies adjust their CEO inside debt-equity ratios upwards. Using the regression result from section 5.5, increasing CEO inside debt-equity ratio, on average, helps a repeal firm reduce its excess cost of debt by 9% (= (0.0516 + 0.1251) * 9.0705 / 18.3632).

Repeal companies can totally offset the effect of removing ATPs on bond yield spreads if they can double their CEOs inside debt-equity ratios. However, such a huge increase is extremely rare, and normally happens only when a company initiates inside debt payment to its CEO. Reducing the number of ATPs is still associated with more expensive bond financing, as found in Klock et al. [2005].

5.6.2 Syndicated loans

The second set of regressions is conducted in the sample of new syndicated bank loans. This sample contains 1771 loan facilities. I obtain the data on bank loan facilities from Reuters DealScan and use the linking table based on Chava and Roberts [2008] to match the loan facilities with their issuing companies. I estimate loan offering yield spreads by using *All-in-drawn* which equals "amount the borrower pays in basis points over LIBOR for each dollar drawn down".

Panel D of table 5.2 compares some loan characteristics between repeal firms and their matches. Repeal companies offer higher yield spreads than their matches do to raise new bank loans. The average yield spreads for repeal firms and matched firms are 173.32 bps and 165.99 bps, respectively. The difference of 7 bps is significant at 5% level. The average offering amount of bank loans is also larger for repeal firms than for matched firms, and the difference is significant at 10% level. 41.46% of new bank loans issued by repeal firms are secured, while this proportion is only 32.01% for matched firms. The difference is significant at 1%.

Control variables include: total assets (*Ln (Assets)*), book leverage (*Leverage*), EBIT over total assets (*ROA*), modified Alman's Z score (*Mzscore*)[30], log of loan maturity in months (*Ln(Loan_age)*), number of syndicates (*Nsynd*), difference between BBB bond yields and AAA bond yields (*Cspread*), difference between yields of 30-year and one-year Treasury Notes (*Tspread*), indicators of performance pricing clauses (*Perprc_indicator*), term loans (*Term_loan_indicator*). I also include primary loan purpose fixed effects[31]. The use of these variables is motivated from prior study on the cost of syndicated loans (Han [2011], Chava and Roberts [2008], Chava et al. [2009], Anantharaman et al. [2013]).

The result of regression (5.10) for syndicated loans is reported in Table 5.5, column 4. The coefficient of interest, $\boldsymbol{\theta}$, equals -3.7931, and is significant at 5% level. $\boldsymbol{\theta}$ becomes -7.2024 and is significant at 5% level when I use Δ*Inside_Debt* as the main explanatory

[30] Modified Alman's Z score is constructed based on Graham et al. [1998].

[31] I follow Chava et al. [2009] and divide primary loan purposes into four groups: debt repayment, general corporate activities, acquisition activities (including IPOs, LBOs, MBOs,SBOs, share repurchases, mergers), and commercial paper backup.

variable. When the main explanatory variable is $-\Delta Inside\_Equity$, $\boldsymbol{\theta}$ becomes insignificant. Increasing CEO inside debt-equity ratios helps reduce the cost to borrow from banks for repeal companies, and the effect mainly comes from increasing inside debt.

The coefficient of *Repeal_firm*, $\boldsymbol{\beta}$, equals 6.5339, and is significant at 5% level. Repeal companies pay an excess cost of 6.5 bps to raise new debt from bank loans, when compared with their matched firms. The excess cost of new bank loans decreases if repeal companies adjust their CEO inside debt-equity ratios upwards. Using the regression result from section 5.5, increasing CEO inside debt-equity ratio can help a repeal firm reduce its excess cost of debt by 10% (= (0.0516 + 0.1251) * 3.7931 / 6.5339). Again, this result displays that it becomes costlier to raise debt from bank loans after companies remove ATPs, which is consistent with the finding in Chava et al. [2009].

5.6.3 The inclusion of restrictive covenants

Prior papers show that including restrictive covenants with the debt issues can produce the same effect as increasing CEO inside debt-equity ratios in reducing the offering yield spreads (Cremers et al. [2007], Farre-Mensa [2010]). It is possible that repeal companies are more inclined to include restrictive covenants with new debt issues because their CEOs become more aligned to debtholders' interests due to increasing inside debt payments. In other words, increasing inside debt-equity ratios indirectly affect yield spreads via affecting the presence of restrictive covenants.

For the bond sample, I follow Cremers et al. [2007] to construct an indicator, *Covenant*, which equals one if a bond issue includes any of "poison put" covenant, debt-restriction covenants, or net-worth covenants. The indicator equals zero if a bond issue include none of these covenants. For the bank loan sample, *Covenant* equals one if a loan facility contains any of the debt-restriction covenants, net-worth covenants or covenants that require using more than 75% of proceeds of excess debt issuance to pay down the loan (Farre-Mensa [2010], Chava and Roberts [2008]). Next, I modify regression (5.10) to incorporate the effect of covenants as follows:

$$
\begin{aligned}
Yield\_spread_{j,i,t} = \alpha &+ \theta_1 * Repeal\_firm_i * \Delta Inside\_DE_{i,t-1} \\
&+ \theta_2 * Repeal\_firm_i * \Delta Inside\_DE_{i,t-1} * Covenant_{j,i,t} \\
&+ \beta * Repeal\_firm_i + \gamma * \Delta Inside\_DE_{i,t-1} + \delta * X_{j,i,t} \\
&+ \eta * Year_t + \mu * Ind_i + \epsilon_{j,i,t}
\end{aligned} \tag{5.11}
$$

If the impact of increasing inside debt-equity ratios on yield spreads mainly goes through the inclusion of covenants, $\boldsymbol{\theta_2}$ should be negative and significant.

The results are reported in Table 5.6. $\boldsymbol{\theta_1}$ remains negative and significant at 1% (5%) level for the sample of new bond (bank loan) issues. $\boldsymbol{\theta_2}$ is negative but is insignificant. The results do not change when I use Δ*Inside_Debt* as main explanatory variable. As repeal companies increase their CEO inside debt after they remove ATPs, they can raise new debt at a lower cost without having to include restrictive covenants. This finding is consistent with Anantharaman et al. [2013]'s conclusion that higher debt-like compensation can substitute for the use of covenants.

[Table 5.6 goes here]

5.7 Changes in CEOs' risk-taking incentives after ATP removals

Optimal contracting papers argue that the CEOs who have higher inside debt payments act more like debtholders, thus running their companies more conservatively. As a result, debtholders favor companies whose CEOs have high inside debt (Wei and Yermack [2011], Anantharaman et al. [2013], Freund et al. [2018]). In contrast, debtholders charge a higher cost to lend to the companies whose CEOs have high inside equity because inside equity encourages the risk-taking incentives among CEOs, thus motivating these managers to increase shareholders' value at debtholders' expenses. Ortiz-Molina [2006] shows that offering debt yield-spreads increase with managerial equity ownership, especially option ownership. Billett et al. [2010] find negative bond price reactions when borrowing companies initiate equity-like payments to their CEOs.

However, the regression results in section 5.6 show that repeal firms have higher cost of borrowing than their matches. This observation suggests that creditors still expect that CEOs have stronger risk-taking incentives after their companies remove ATPs, despite their increasing inside debt and declining inside equity. It is possible that lowering takeover defenses can substitute for inside equity in providing CEO with more risk-taking incentives to increase equity value. This conjecture is supported by some existing evidence. ATPs can prevent shareholders from replacing entrenched CEOs via market of corporate control, which reduces the CEOs' risk-taking incentive (Chen [2012]) and allows CEOs to "enjoy the quiet life" (Borokhovich et al. [1997]). When some ATPs are removed, CEOs face stronger discipline from market of corporate control. CEOs of target firms encounter serious career losses when their companies are acquired. Agrawal and Walkling [1994] suggest that control fights send a negative signal about the CEOs of target firms to the labor market. These CEOs are more likely to be fired after the acquisition deals succeed. The fired CEOs cannot get high-level positions in other public companies within three years after their old firms are taken. The retained CEOs also face compensation cut following the acquisitions. Hartzell et al. [2004] find that these retained CEOs continue to experience high turnover rates for several years after their old firms are acquired. Jenter and Lewellen [2015] argue that CEOs close to retirement age accept takeover bids more easily than the younger ones because younger CEOs face more reputation losses if their firms are acquired than the near-retirement-age CEOs do.

I test the implication that lowering takeover defenses can substitute for the use of inside equity by comparing the changes in investment policies between repeal firms and their matches, before and after ATP removals. I use four measures to capture the investment policies. Total risks (*Total_risks*) equals log of the variance of daily stock returns over the current fiscal year. Innovation (*R&D_investment*) equals R&D expenditures divided by lagged assets. Fixed-assets investment (*CAPEX_investment*) equals capital expenditures divided by lagged assets. Cash accumulation (*Cash_holdings*) equals cash and short-term investment divided by lagged assets. Since the repeal firms significantly increase their CEO inside debt after removing ATPs, these companies might reduce total risks (Sundaram and Yermack [2007], Phan [2014]), refrain from making risky investments (Cassell et al. [2012]), and hold more unnecessary cash (Liu et al. [2014]). On the other hand, lowering takeover defenses might motivate the CEOs to increase equity value by taking more risks and using the cash to make more investments (Bertrand and Mullainathan [2003], Atanassov [2013]).

I compare the changes in the investment policies between the repeal firms and matched firms, before and after ATP removals, by using the following regression:

$$\begin{aligned} Investment\_change_{i,t} = \alpha + \theta * Repeal\_firm_i * After\_repeal_{i,t} + \beta * Repeal\_firm_i \\ + \gamma * After\_repeal_{i,t} + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t} \end{aligned} \tag{5.12}$$

Investment_change is the change in one of the four measures of investment policies. *Repeal_firm* is a dummy variable which equals one for a repeal firm, and zero for a matched firm. *After_repeal* equals one if the observation belongs to a year after ATPs are removed, and zero if otherwise. Control variables (X), as lagged values, includes firm size, asset tangibility, book leverage, and indicator of negative net income. I also control for the lagged changes in CEO inside debt-equity ratios. The regression includes fixed effects for years and two-digit SIC code industries.

[Table 5.7 goes here]

The results of regression (5.12) are reported in Table 5.7. $\boldsymbol{\theta}$ is the variable in interest. $\boldsymbol{\theta}$ equals 0.0467 and is significant at 5% level when dependent variable is *Total_risks* (column 1). CEOs of repeal companies take significantly more risks than their counterparts in the matched firms do after ATP removals. These CEOs also make more investment in both tangible and intangible assets as $\boldsymbol{\theta}$ equals 0.0130 (0.0359) for *R&D_investment* (*CAPEX_investment*) (columns 2 and 3). Both estimates are significant at 1% level. $\boldsymbol{\theta}$ equals -0.0488 and is significant at 1% level for *Cash_holdings*. Repeal companies accumulate less cash after removing ATPs, possibly because they spend the money on investment. However, I do find a significant negative correlation between lagged increase in CEO inside-debt and CEOs' risk-takings, which is consistent with Cassell et al. [2012]. In short, the results support the explanation that lowering takeover defenses can substitute for increasing inside equity in providing the CEOs with more risk-taking incentives. As a result, CEOs of repeal companies take more risks and make more investments even though these companies increase their CEO inside debt more than their matched firms do.

The risky investments do not seem to harm firm value. I re-run regression (5.12) but replace the dependent variable by the changes in Tobin's Q or in returns-on-asset (ROA). I find that repeal firms have significantly higher Tobin's Q and ROA after ATP removals than those of their matches. $\boldsymbol{\theta}$ equals 0.0153 for Q changes, and equals 0.0025 for ROA changes; both coefficients are significant at 1% level. Prior papers find low Tobin's Q and low ROA among companies with high G-Index (Core et al. [2006], Cremers and Ferrell [2014]), which suggests that these ratios should increase if some ATPs are removed. Overall, the results in this section are consistent with the explanation that takeover threat disciplines the entrenched CEOs. To avoid being replaced by market of corporate control, these CEOs work harder to increase equity value and firm value.

5.8 Robustness check

5.8.1 Number of removed ATPs

The main analysis uses an indicator of companies that remove ATPs, *Repeal_firm*, as the main explanatory variable. This indicator captures the average differences in CEO compensation changes between repeal firms and their matches. However, it cannot reflect the differences across repeal firms which remove a different numbers of ATPs. Since a larger number of present ATPs might represent a stronger protection against takeovers (Karpoff et al. [2017]), removing more ATPs should expose a company more to takeover risk. In addition, CEOs tend to use more debt financing when their companies are more vulnerable to takeovers (Israel [1991], Morellec [2004]).[32] Under the "optimal contracting hypothesis", a company that removes more ATPs should also increase its CEO inside debt-equity ratio more.

To examine the relation between number of removed ATPs and changes in CEO inside debt-equity ratios, I run the following regression for the years after ATPs are removed:[33]

$$\Delta Inside\_DE_{i,t} = \alpha + \theta * N\_removed\_ATP_i + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t} \quad (5.13)$$

For a repeal firm, *N_removed_ATP* equals log number of ATPs before the removal minus log number after this event. For a matched firm, *N_removed_ATP* equals zero. Other model specifications are similar to those in the main regression (5.5).

[Table 5.8 goes here]

The result of regression (5.13) is reported in Table 5.8. $\boldsymbol{\theta}$ equals 1.4257 and is significant at 1% level (column 1). The more ATPs are removed, the more do companies increase their CEO inside debt-equity ratios. In column 2, I separate the impact of *N_removed_ATP* based on how many years ago that the removals happened. Similar to the main regression, I split the overall increases into effects due to increasing inside debt or decreasing inside equity. $\boldsymbol{\theta}$ equals 0.8660 and is significant at 5% level for increasing inside debt (column 3); $\boldsymbol{\theta}$ equals 0.4062 but is insignificant for decreasing inside equity (column 5). I also separate the impact of *N_removed_ATP* on changes in inside debt (column 4) and in inside equity (column 6) based on how many years ago that the removal happened. In short, the findings in this robustness check is consistent with the "optimal contracting hypothesis" and with the findings in the main analysis.

5.8.2 Matching sample

The matching sample in the main analysis depends on the propensity scores obtained from a Probit regression which relates the likelihood to remove ATPs with different

[32] In an untabulated analysis, I find a positive correlation between the (log) number of removed ATPs and the net change in leverage. The coefficient equals 0.4193 and is significant at 5% level.

[33] It is not relevant to run this regression for the years before ATPs are removed because the number of removed ATPs is not known in those years.

firm-level governance characteristics. If this Probit regression is not well-specified as I implicitly assume, choosing the matched firms based on this regression may bias the results. For robustness check, I use all the S&P 1500 firms that do not remove ATPs during 2009 - 2017 as the matching sample. The disadvantage of this method is that I cannot assign "pseudo" event years to the matched firms, and thus cannot conduct a diff-in-diff-in-diff regression like how I do in the main analysis. More specifically, I can only run a diff-in-diff regression in which I compare the changes in compensation among repeal firms before and after they remove ATPs:

$$\begin{aligned}\Delta Inside\_DE_{i,t} = \alpha + \theta * Repeal\_firm_i * After\_repeal_{i,t} + \beta * Repeal\_firm_i \\ + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}\end{aligned} \tag{5.14}$$

Except for a larger sample, all model specifications are similar to those in the main regression (5.5). $\boldsymbol{\theta}$ in this regression captures how much the compensation adjustments (in excess of the matched firms' adjustments) after companies remove ATPs differ from those before the events.

[Table 5.9 goes here]

The result of regression (5.14) is reported in Table 5.9, column 1. Consistent with the main analysis, $\boldsymbol{\theta}$ equals 0.1103 and is significant at 1% level. After removing ATPs, repeal companies significantly increase their CEO inside debt-equity ratios. Such increases come mainly from increasing inside debt (column 2) and slightly from decreasing inside equity (column 3).

5.8.3 Which ATPs matter to inside debt-equity ratio changes?

In the main test, I treat all ATPs equally. However, Bebchuk et al. [2009] argue that only six of these provisions, which they refer to as the "Entrenchment Index" (the "E-Index"), really matter to corporate governance. Six provisions in the E-Index include: classified/staggered board, bylaws, poison pills, golden parachutes, supermajority, and charter. I modify regression (5.14) to examine how the removals of provisions belonging to the E-Index are correlated with changes in CEO inside debt-equity ratios. Specifically, I change *Repeal_firm* into *Repeal_Eindex* which equals one if a company reduces its E-Index measure, and equals zero if otherwise. *After_repeal*, as constructed before, equals one if the observed year occurs after the E-Index decreases, and equals zero if otherwise. For this new regression, $\boldsymbol{\theta}$ equals 0.0807 and is still significant at 1% level (Table 5.9, column 4). The estimate of $\boldsymbol{\theta}$ when E-Index provisions are removed (0.0807) is quite close to the same estimate when any provisions are removed (0.1108). This finding is consistent with the conclusion in Bebchuk et al. [2009] that the majority of the G-Index's impact comes from the six provisions in the E-Index.

I also follow Gompers et al. [2003] and divide the 17 ATPs into different groups based on the main "techniques" that the provisions utilize to deter takeovers. *Delay* provisions increase the amount of time that the bidder needs to replace the target's current board. These provisions include: blank check, classified/staggered board, special meeting limitations, and written consents. *Voting* provisions increase the voting rights of the target's board. These provisions include: bylaws, charter, cumulative voting, secret ballot, supermajority, and unequal voting. *Protection* provisions provide abnormally large compensation packages to the top executives of the target firms if these companies are acquired. Because fewer ATPs are reported by the ISS, this sample covers only one *Protection* provision which is golden parachutes. *State law* provisions include : business combination law, cash-out law, control-share acquisition, director's duties, fair price, and poison pills. These provisions are present because a company's state of incorporation has passed the related anti-takeover laws and this company does not choose (where allowed) to opt out.

Further analysis shows that companies significantly increase their CEO inside debt-equity ratios after removing *Delay* or *State law* provisions (Table 5.9, columns 6 and 16). Both estimates are significant at 1% level. Companies increase their inside debt-equity ratios after removing golden parachute provision (the *Protection* provision), but the estimate is only significant at 15% level (Table 5.9, column 10). Companies barely change their inside debt-equity ratios after removing *Voting* provisions (Table 5.9, column 13). Surprisingly, three out six E-Index provisions, namely bylaw, supermajority, and charter, belong to the *Voting* group. This result suggests that the removals of the three remaining E-Index provisions, namely classified/staggered board, poison pills, and golden parachutes, really matter the most to the changes in CEO inside debt-equity ratios.

5.9 Conclusion

Strengthened shareholder governance is normally associated with increased use of inside equity to mitigate the shareholder-manager agency conflict. However, enhanced shareholder governance might also exacerbate the shareholder-debtholder agency conflict which can be remedied by granting CEOs more inside debt. One typical example of such a governance mechanism is the removal of firm-level anti-takeover provisions ("ATPs"). On the one hand, removing ATPs makes it easier for shareholders to replace entrenched CEOs via market of corporate control. On the other hand, removing ATPs triggers increased use debt financing, which worsens the agency problem of debt. Hence, how CEO inside debt-equity ratios change after companies remove ATPs is an interesting empirical question. The net changes depend on the extent to which these better-governed companies are willing to use CEO inside debt to address the heightened agency problem of debt.

For the main test, I conduct a diff-in-diff-in-diff analysis which compares changes in CEO inside debt-equity ratios between the companies removing ATPs and their matches, before and after ATP removals. I find that repeal companies significantly increase their CEO inside debt-equity ratios more than their peers do after ATPs are removed. These increases result from strong increases in inside debt, and somehow weaker decreases in inside equity. The decreases in inside equity are probably caused by declined use of stock and option awards in CEO compensation. Further analysis shows that repeal companies significantly increase their inside debt-equity ratios during the first three years after ATP removals, which coincides with the significant rises in debt financing.

According to optimal contracting studies, firm leverage is one of the most important determinants of CEO inside debt. In companies with high leverage, debtholders' value accounts a large part of the total firm value. Hence, these companies should offer their CEOs more inside debt so that these executives have incentives to protect debtholders' value. Otherwise, rational debtholders would increase the cost of debt to account for greater expected losses due to increasing CEOs' risk-shifting incentives. Consistent with this prediction, I find that increasing CEO inside debt-equity ratios helps repeal firms reduce the cost of borrowing after they remove ATPs, without having to include restrictive covenants. The effect mainly comes from increasing inside debt rather than from decreasing inside equity.

However, I find that increasing inside debt cannot totally offset the impact of removing ATPs on the cost of debt. Repeal companies, despite increasing their CEO inside debt and decreasing inside equity, still pay larger yield spreads for new debt offerings than their matches do. Therefore, I predict that removing ATPs can substitute for the use of inside equity in encouraging CEOs to increase equity value. To test this prediction, I compare changes in investment policies between repeal firms and their matches after ATP removals. I find that CEOs of repeal firms take more risks, make more investments, and hold less cash after their companies remove ATPs, even though these companies increase their CEO inside debt. These findings confirm the substitutive relation between removing ATPs and CEO inside equity. In addition, it does not seem that these risky investments harm the firm value because Tobin's Q and returns on assets of the repeal firms also significantly increase after ATP removals.

Overall, this study reveals interesting findings about the dynamics between external governance (i.e. takeover risk) and internal governance (i.e. CEO compensation). CEO inside debt increases to support a necessary change in the financing policy which is triggered by the increased takeover risk. The increased takeover risk, in turn, serves as a governance mechanism to motivate CEOs to improve shareholders' value, hence making it unnecessary to use inside equity for CEO compensation.

5.10 Figures and Tables

Figure 5.1: **Inside debt-equity ratios of repeal firms and matched firms**

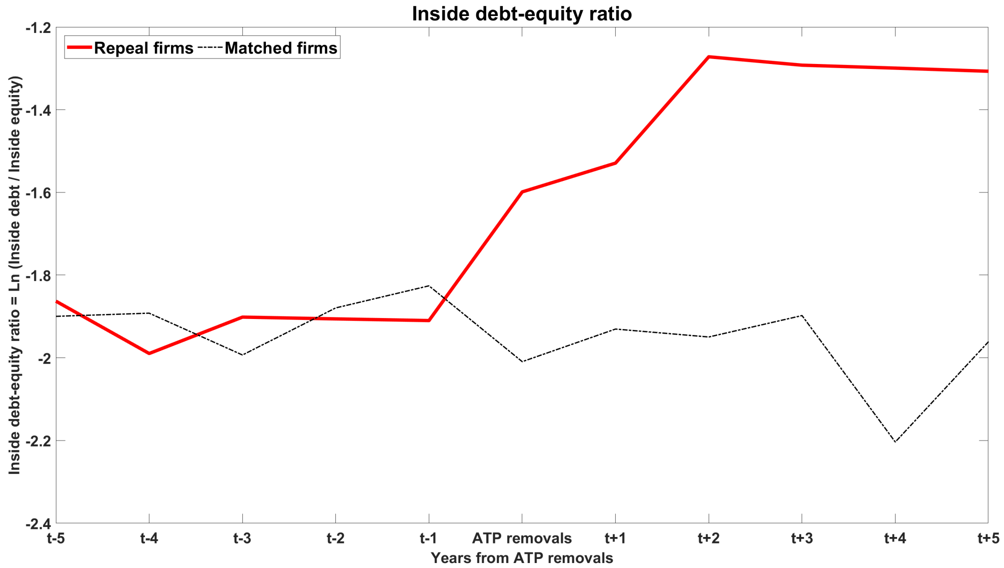


Figure 5.2: **Estimates of θ_k, Dependent variable = Net_leverage_change**

This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in financing policies after ATP removals:

$$\boldsymbol{Net\_leverage\_change_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \epsilon_{i,t}}$$

Net_leverage_change equals sum of lagged long-term debt and net debt issuance divided by sum of lagged assets, net debt issuance, and net equity issuance, then subtract the ratio of lagged debt over lagged assets (see Garvey and Hanka [1999] for more detail). *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k ∈ {-3, ..., 3}.

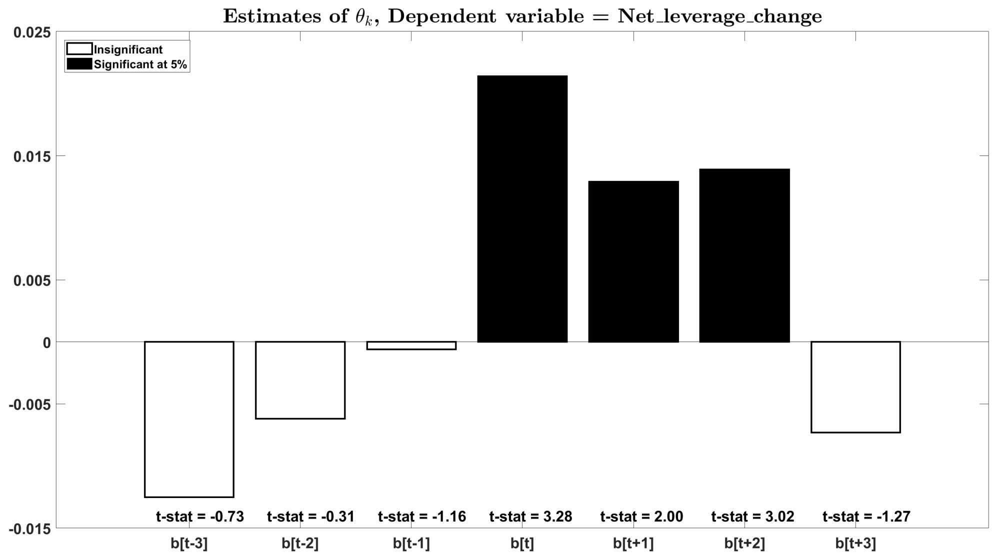


Figure 5.3: **Estimates of θ_k, Dependent variable = ΔInside_DE**

This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in CEO inside debt-equity ratios:

$$\boldsymbol{\Delta Inside\_DE_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}}$$

Δ*Inside_DE* equals the change in CEO inside debt-equity ratio over the lagged ratio. *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k ∈ {-3, ..., 3}. Control variables (X) include the set of main explanatory variables often used in the inside debt papers. Year fixed effects (*Year*) and industry fixed effects (*Ind*) are included to capture any time variances and industry norms in the ratios.

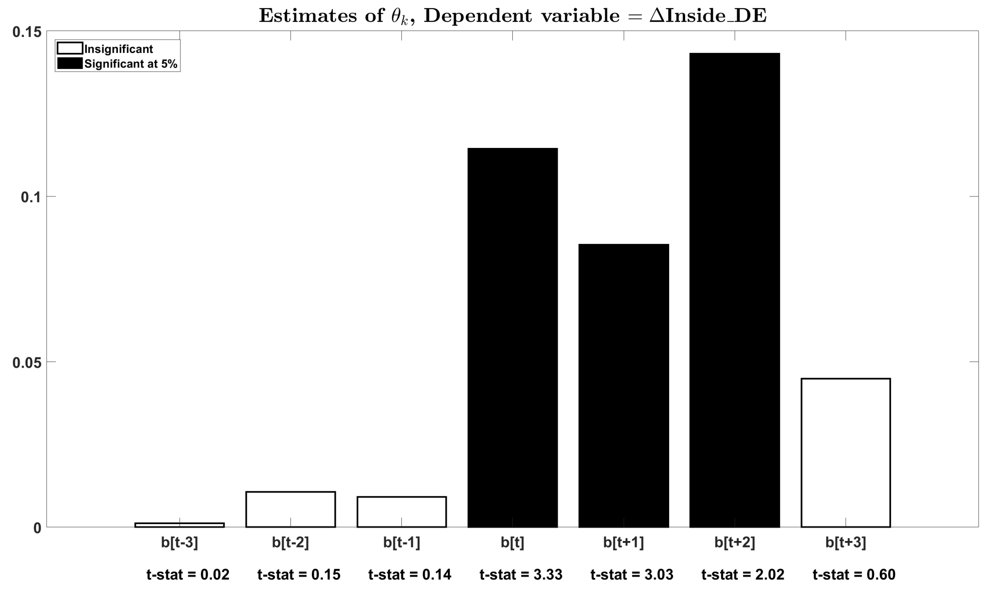


Figure 5.4: **Estimates of θ_k, Dependent variable = ΔInside_Debt**

This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in CEO inside debt:

$$\boldsymbol{\Delta Inside\_Debt_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}}$$

Δ*Inside_Debt* equals the change in (log of) CEO inside debt over the lagged value. *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k $\in$ {-3, ..., 3}. Control variables (X) include the set of main explanatory variables often used in the inside debt papers. Year fixed effects (*Year*) and industry fixed effects (*Ind*) are also included.

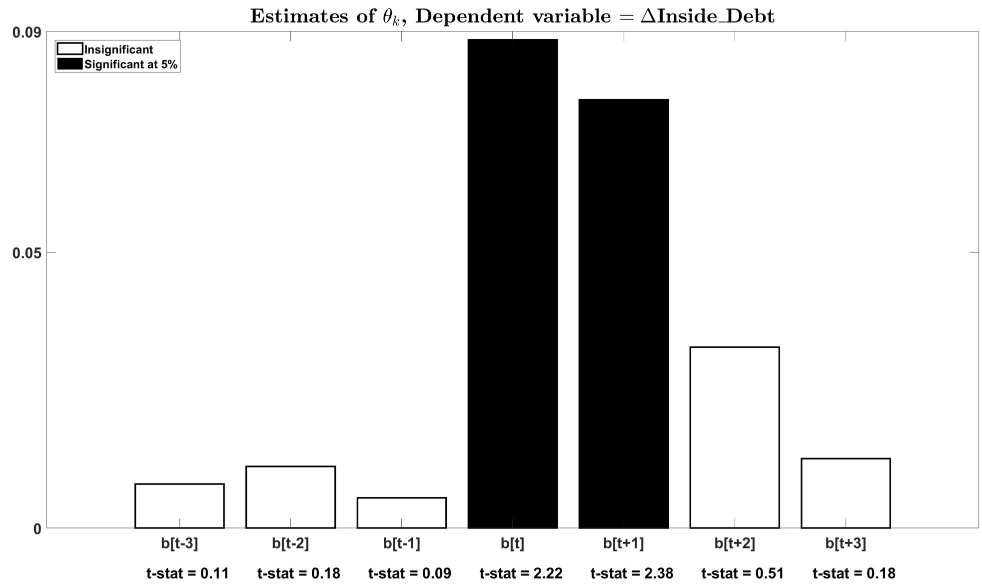


Figure 5.5: **Estimates of θ_k, Dependent variable = $-\Delta$Inside_Equity**

This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in CEO inside equity:

$$-\Delta Inside\_Equity_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}$$

$-\Delta$*Inside_Equity* equals negative of the change in (log of) CEO inside equity over the lagged value. *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k $\in$ {-3, ..., 3}. Control variables (X) include the set of main explanatory variables often used in the inside debt papers. Year fixed effects (*Year*) and industry fixed effects (*Ind*) are also included.

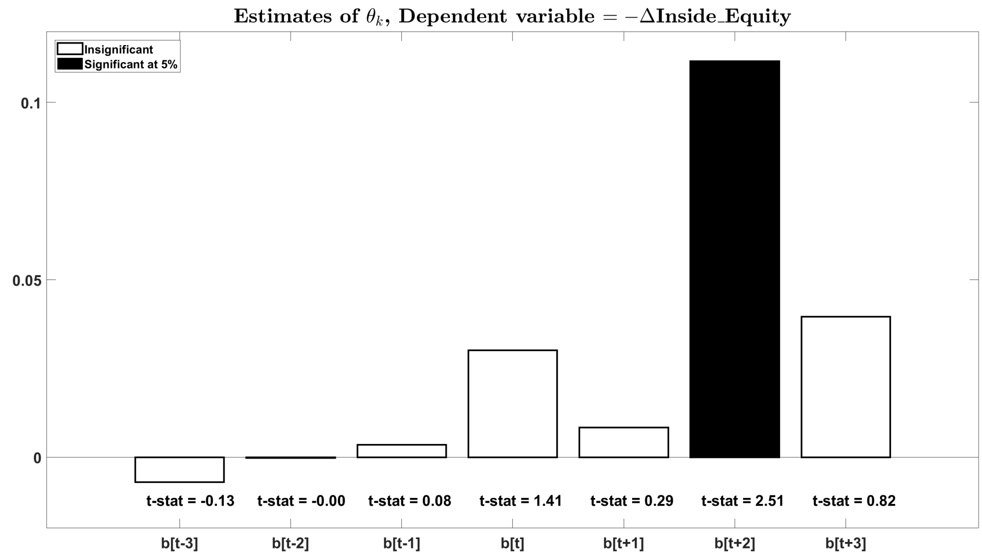


Figure 5.6: **Estimates of θ_k, Dependent variable = $-\Delta$Stock_award**

This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in CEOs' outstanding stock awards:

$$-\Delta Stock\_award_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}$$

$-\Delta$*Stock_award* equals negative of the changes in log of CEOs' outstanding stock awards divided by firms' outstanding equities. *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k ∈ {-3, ..., 3}. Control variables (X) include the set of main explanatory variables often used in the inside debt papers. Year fixed effects (*Year*) and industry fixed effects (*Ind*) are also included.

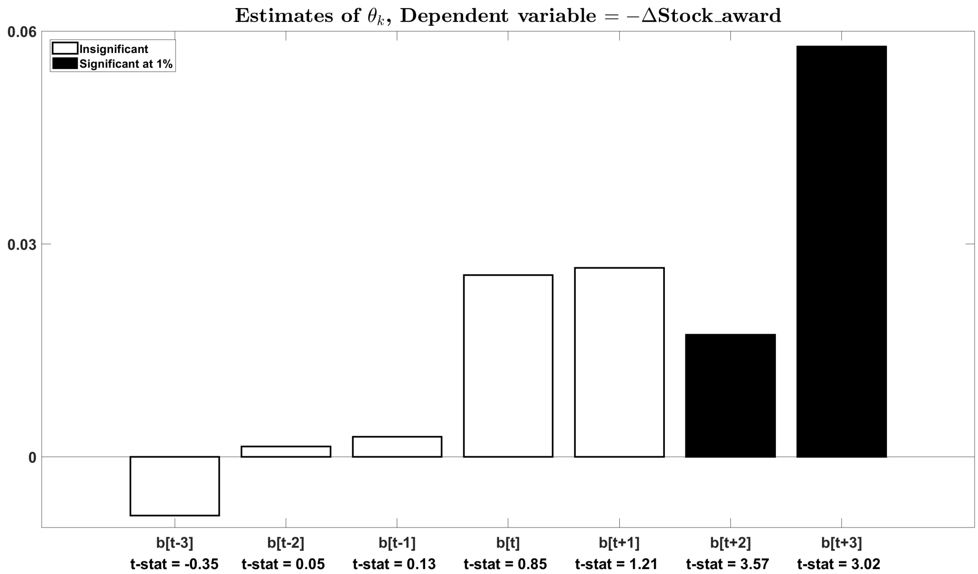


Figure 5.7: **Estimates of θ_k, Dependent variable = $-\Delta$Option_award**
This figure plots the estimates of θ_k and provides their t-statistics from the regression that studies the changes in CEOs' outstanding option awards:

$$-\Delta Option\_award_{i,t} = \sum_{k=-3}^{3} \theta_k * Repeal\_firm_i * b_{i,t}[t+k] + \beta * Repeal\_firm_i + \sum_{k=-3}^{3} \gamma_k * b_{i,t}[t+k] + \delta * X_{i,t} + \eta * Year_t + \mu * Ind_i + \epsilon_{i,t}$$

$-\Delta$*Option_award* equals negative of the changes in log of CEOs' outstanding option delta divided by firms' outstanding equities. *Repeal_firm* equals one for a repeal firm, and zero for a matched firm. *b[t + k]* is a dummy variable which equals one if the corresponding observation is *"k"* years after the event year, where k ∈ {-3, ..., 3}. Control variables (X) include the set of main explanatory variables often used in the inside debt papers. Year fixed effects (*Year*) and industry fixed effects (*Ind*) are also included.

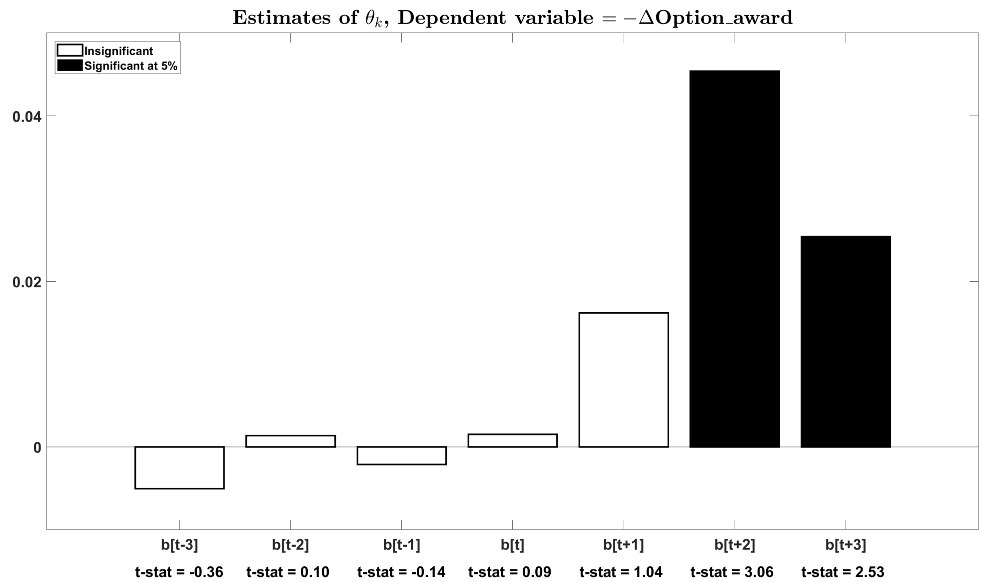


Table 5.1: **Descriptive statistics**

This table provides descriptive statistics of variables used in the main regression. S&P 1500 sample contains all S&P 1500 firms with non-missing data. Restricted sample contains only repeal firms and their matched firms. Details on how to construct ATP measure and other variables are given in Appendix 5.A1 and 5.A2. Continuous variables are winsorized at 1% and 99% levels.

	S&P 1500 sample		Restricted sample				
	Mean	**SD**	**Mean**	**SD**	**q25**	**q50**	**q75**
Panel A: Anti-takeover Provisions							
Delay takeover provisions							
• Blank check	0.9321	0.2515	0.9408	0.2359	1	1	1
• Classified/Staggered board	0.4503	0.4975	0.4050	0.4909	0	0	1
• Special meeting limitations	0.4934	0.5000	0.5110	0.4999	0	1	1
• Written consent	0.3795	0.4853	0.4127	0.4923	0	0	1
Executive protection provision							
• Golden parachutes	0.7448	0.4360	0.7775	0.4159	1	1	1
Voting restriction provisions							
• Bylaw amendments limitations	0.8918	0.3107	0.9074	0.2899	1	1	1
• Charter amendments limitations	0.9264	0.2611	0.9311	0.2534	1	1	1
• Cumulative voting	0.9246	0.2641	0.9344	0.2476	1	1	1
• Confidential voting	0.8633	0.3435	0.8688	0.3376	1	1	1
• Supermajority	0.2699	0.4439	0.2417	0.4282	0	0	0
• Unequal voting	0.0277	0.1642	0.0331	0.1788	0	0	0
State law provisions							
• Business combination laws	0.9384	0.2404	0.9442	0.2296	1	1	1
• Cash-out laws	0.0279	0.1699	0.0337	0.1835	0	0	0
• Control-share acquisition	0.2764	0.4473	0.2744	0.4462	0	0	1
• Directors' duties	0.3413	0.4744	0.3348	0.4719	0	0	1
• Fair-price	0.1453	0.3524	0.1245	0.3302	0	0	0
• Poison pills	0.1948	0.3960	0.1608	0.3673	0	0	0
GIM17	8.8280	1.9625	8.8359	1.8922	7	9	10
Panel B: CEO characteristics							
Inside debt (US$ million)	6.1822	11.309	6.4677	11.765	0	1.2818	7.2253
Inside equity (US$ million)	54.249	107.34	53.430	104.03	9.5995	21.800	50.903
Inside debt÷ Inside equity	0.2432	0.4454	0.2480	0.4445	0.0000	0.0548	0.2998
Inside_DE = Ln (Inside debt/Inside equity)	-4.8523	3.9903	-4.1901	3.8636	-8.2563	-2.6682	-1.1264
ΔInside_DE	0.0577	2.1317	0.0516	2.1204	-0.2735	0.0448	0.3558
CEO age	56.330	6.6489	56.442	6.5309	52	56	61
CEO tenure	7.6407	6.8662	7.7692	7.0309	3	6	11
Panel C: Firm characteristics							
Ln(Assets)	7.9337	1.7284	8.3878	1.6696	7.2316	8.3195	9.4749
Market-to-Book	1.8216	1.0332	1.8038	1.0014	1.1275	1.4904	2.0925
Leverage	0.1948	0.1776	0.2019	0.1628	0.0618	0.1855	0.3007
Tangible_assets	0.2206	0.2279	0.2295	0.2366	0.0434	0.1457	0.3397
R&D_expenditures	0.0417	0.0830	0.0331	0.0703	0.0000	0.0000	0.0279
Idiosyncratic_risks	-3.2256	0.8330	-3.2367	0.8088	-3.6252	-3.1486	-2.6986
ΔLn(Assets)	0.0613	0.1797	0.0624	0.1790	-0.0119	0.0450	0.1170
ΔMarket-to-Book	-0.0222	0.5848	-0.0054	0.5408	-0.1475	0.0095	0.1743
ΔLeverage	0.0074	0.0738	0.0086	0.0745	-0.0161	0	0.0196
ΔTangible_assets	0.0003	0.0316	0.0004	0.0309	-0.0080	-0.0002	0.0071
ΔR&D_expenditures	-0.0002	0.1963	-0.0004	0.2183	0	0	0
ΔIdiosyncratic_risks	0.0320	0.7870	0.0284	0.7404	-0.3479	-0.0192	0.3722
1_(Liquidity constraint)	0.0897	0.2858	0.0924	0.2895	0	0	0
1_(Tax status)	0.5264	0.4993	0.5196	0.4996	0	1	1
1_(Investment graded)	0.1063	0.3082	0.1039	0.3051	0	0	0
N	9,416		7,426				

Table 5.2: **Descriptive statistics: Repeal firms vs Matched firms**

This table compares main variables of repeal firms and their matched firms. CEO compensation and firm characteristics are measured before the repeal firms lower their takeover defenses. Bond and bank loans are issued within three years after repeal firms lower their takeover defenses. Continuous variables are winsorized at 1% and 99% levels. *, **, *** denote significance at 10%, 5%, 1% levels respectively.

	Repeal firms		**Matched firms**		**Difference**	
	Mean	**SD**	**Mean**	**SD**	**Diff**	**t-stat**
Panel A: Firm characteristics (three years before ATP removals)						
GIM17	8.9076	2.0237	8.6985	1.9897	0.2090**	2.5871
ΔLn(Assets)	0.0668	0.1715	0.0772	0.1907	-0.0104	-1.4758
ΔMarket-to-Book	-0.0214	0.5689	-0.0236	0.4925	0.0022	0.1069
ΔLeverage	0.0060	0.0741	0.0065	0.0658	-0.0005	-0.1871
ΔTangible_assets	-0.0001	0.0308	0.0018	0.0329	-0.0019	-1.6213
ΔR&D_expenditures	-0.0018	0.1507	-0.0004	0.0417	-0.0014	-0.3342
1_(Liquidity constraint)	0.0776	0.2677	0.0953	0.2938	-0.0177	-1.6166
1_(Tax status)	0.5026	0.5002	0.4791	0.4997	0.0235	1.2727
1_(Investment graded)	0.1005	0.3008	0.0880	0.2835	0.0125	1.0482
Panel B: CEO compensation characteristics (three years before ATP removals)						
ΔInside_DE	0.0270	2.1467	0.0732	2.0347	-0.0462	-1.0605
ΔInside_Debt	0.0396	1.2680	0.0519	1.1810	-0.0123	-0.2579
−ΔInside_Equity	-0.0102	0.6466	0.0305	0.7077	-0.0407	-1.0468
Panel C: Bond characteristics (three years after ATP removals)						
Yield_spread (bps)	158.86	106.98	145.28	68.418	13.577***	2.6894
Offering_amount ($ million)	0.6350	0.9008	0.4736	0.5171	0.1614***	4.1815
Bond_age (years)	11.384	9.1234	11.618	9.7461	-0.234	-0.4755
Senior	0.9775	0.1484	0.9706	0.1691	0.0069	0.8359
Senior_Secured	0.0040	0.0629	0.0042	0.0647	-0.0002	-0.0701
Callable	0.7249	0.4469	0.7199	0.4494	0.0050	0.2130
Panel D: Bank loan characteristics (three years after ATP removals)						
Yield_spread (bps)	173.32	52.090	165.99	54.501	7.3303**	2.2035
Loan_amount ($ million)	536.14	264.07	446.20	336.25	89.941*	1.6477
Loan_age (years)	3.9172	0.498	3.8979	0.5558	0.0193	0.5802
Senior_Secured	0.4146	0.4932	0.3201	0.4669	0.0945***	3.1803

Table 5.3: **Changes in financing policies after ATP removals**

This table reports estimates of the regression that examines changes in capital structures, due to the change in financing choice, after the companies remove ATPs. This analysis replicates the main test in Garvey and Hanka [1999] (Table III, page 529). The observations are made at firm-year level. Continuous variables are winsorized at 1% and 99% levels. *, **, *** denote significance at 10%, 5%, 1% levels.

	Before repeal (1)	After repeal (2)	Full sample (3)
Dependent variable: Net_leverage_change			
Repeal_firm × After_repeal			**0.0153****
			(2.3011)
Repeal_firm	0.0031	0.0139**	0.0014
	(0.1558)	(2.1345)	(0.4761)
After_repeal			-0.0060
			(-1.5278)
Control variables:			
Industry mean of dependent variable	0.0213	0.0240	0.0227**
	(1.5509)	(1.5979)	(2.2060)
Lagged Debt/Assets	-0.1787***	-0.1054***	-0.1490***
	(-15.3242)	(-6.6093)	(-15.5375)
Lagged ROA	-0.0075	0.1033***	0.0337*
	(-0.3448)	(3.4929)	(1.9081)
Change in ROA	-0.2016***	-0.2137***	-0.2040***
	(-6.8377)	(-4.1702)	(-7.8340)
Loss = 1 if negative lagged income;	-0.0075	0.0009	-0.0028
0 if otherwise	(-1.4117)	(0.1665)	(-0.7459)
Lagged stock returns	-0.3912***	-0.3869***	-0.4001***
	(-6.3275)	(-3.5846)	(-7.3707)
Lagged Ln(Assets)	0.0061***	0.0052***	0.0058***
	(5.6111)	(3.6673)	(6.6677)
Lagged Assets * 10^{12}	-0.1415***	-0.1204***	-0.1399***
	(-5.0128)	(-4.8413)	(-7.5154)
Change in Ln(Assets)	0.0509***	0.0527***	0.0514***
	(6.3011)	(4.2460)	(7.5849)
N	3,182	4,244	7,426
Adj. R^2	0.191	0.102	0.152

Table 5.4: **Changes in CEO inside debt-equity ratios after ATP removals**

This table reports estimates of the regression that compares changes in inside debt-equity ratios of repeal companies with those of their peers. ***Repeal_firm*** equals one for repeal firms, and equal zero for matched firms. **After_repeal** equals one if the observation belongs to a year after ATPs are removed, and zero if otherwise. Δ***Inside_DE*** and Δ***Inside_Debt*** are the changes of inside debt-equity ratios and inside debt over their lagged values. $-\Delta$***Inside_Equity*** is negative of the change in inside equity over its lagged value. $-\Delta$***Stock_award*** and $-\Delta$***Option_award*** equal negative of the changes in CEO's share and option holdings (as fractions of firms' outstanding equities). Standard errors are robust. Industry fixed effects are based on two-digit SIC code. Continuous variables are winsorized at 1% and 99% levels. *, **, *** indicate significance at 10%, 5%, and 1% levels, respectively.

Dependent	**ΔInside_DE**		**ΔInside_Debt**		**−ΔInside_Equity**		**−ΔStock_award**		**−ΔOption_award**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Repeal_firm	-0.0270	-0.0270	-0.0021	0.0066	-0.0261	-0.0190	0.0390	0.0287	0.0280	0.0222
	(-0.4313)	(-0.3900)	(-0.0889)	(0.0874)	(-1.2792)	(-0.8534)	(1.3063)	(1.1518)	(0.9028)	(1.1472)
After_repeal	0.0335	0.0308	0.0198	0.0111	0.0159	0.0124	-0.0188	-0.0162	0.0010	-0.0003
	(1.1520)	(0.3733)	(0.2488)	(0.9935)	(1.2567)	(0.3152)	(-0.7523)	(-0.6191)	(0.0684)	(-0.0378)
Repeal_firm	**0.1309*** **	**0.1251*** **	**0.0975** **	**0.0887** **	**0.0387** **	**0.0329*** **	**0.0334** **	**0.0322***	**0.0222** **	**0.0213** **
x After_repeal	**(2.9699)**	**(3.4539)**	**(2.0043)**	**(2.5272)**	**(2.4102)**	**(3.2451)**	**(1.9811)**	**(1.6514)**	**(1.9886)**	**(2.1524)**
Δ Ln (Assets)		0.0217		0.9286***		-0.8513***		-0.1299*		0.1308***
		(0.1239)		(4.6158)		(-5.1588)		(-1.7131)		(3.2571)
Δ Market-to-Book		-0.6421***		0.1258		-0.6394***		0.0018		-0.1343***
		(-5.0201)		(1.5991)		(-3.2312)		(0.0623)		(-5.2886)
Δ Leverage		0.1617		0.0921		0.9101***		0.0285		0.0215
		(0.4347)		(0.2261)		(6.9916)		(0.1679)		(0.2594)
Δ Tangible_assets		2.0606***		0.4363		0.7365**		0.2361		1.0747***
		(2.6145)		(0.4537)		(2.5727)		(0.6466)		(5.2476)
Δ R&D_expenditures		5.8248*		3.1488		0.2902		0.8636		-0.4358
		(1.9099)		(1.0618)		(0.6908)		(0.8727)		(-0.8345)
Δ Idiosyncratic_risks		-2.2180**		-1.1291		-1.0361***		-0.2527		0.9130***
		(-2.5710)		(-1.2701)		(-4.4449)		(-0.9700)		(-5.4355)
1_(Liquidity constraint)		-0.0876		-0.1396		-0.0013		-0.0661		0.1457***
		(-1.1882)		(-1.4700)		(-0.0436)		(-1.4610)		(5.9448)
1_(Tax status)		-0.0300		-0.1108*		0.0078		0.0045		-0.0098
		(-0.5504)		(-1.7717)		(0.4394)		(0.1815)		(-0.8807)
1_(Investment graded)		-0.0252		0.0272		-0.0131		-0.0271		-0.0399**
		(-0.4397)		(0.3861)		(-0.5346)		(-0.7860)		(-2.4995)
CEO_age		0.0050		-0.0035		-0.0028		0.0044*		-0.0006
		(1.0655)		(-0.5561)		(-1.6432)		(1.9187)		(-0.6723)
CEO_tenure		0.0107**		0.0252***		-0.0029**		-0.0072***		0.0001
		(2.5270)		(5.0863)		(-2.1937)		(-4.1340)		(0.0683)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Ind FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	7,426	7,426	7,426	7,426	7,426	7,426	7,426	7,426	7,426	7,426
Adj. R^2	0.025	0.222	0.021	0.224	0.006	0.238	0.015	0.209	0.016	0.213

Table 5.5: **Changes in CEO inside debt-equity ratios and the cost of debt after ATP removals**
This table reports estimates of the regression that relates the cost of debt after ATP removals with changes in CEO inside debt-equity ratios. The bonds and bank loans are issued within three year after the repeal firms lower their takeover defenses. ***Bond yield spread*** equals offering bond yield minus yield of a Treasury bond with same duration. ***Loan yield spread*** is the sum of the spread of the facility over LIBOR and any annual fees paid to the lender group (All-in-drawn measure from DealScan). ***Repeal_firm*** is a dummy variable which equals one for repeal firms, and zero for matched firms. Δ***Inside_DE*** and Δ***Inside_Debt*** are the changes of inside debt-equity ratio and inside debt over their lagged values. $-\Delta$***Inside_Equity*** is negative of the change in inside equity over its lagged value. Standard errors are clustered at issuing firm level. Industry fixed effects are based on two-digit SIC code. Continuous variables are winsorized at 1% and 99% levels. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Panel A: Cost of new bond issues			**Panel B: Cost of new bank loans**		
	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: Bond yield spread (in bps)			**Dependent variable: Loan yield spread (in bps)**		
Repeal_firm	**-9.0705*****			**-3.7931****		
× ΔInside_DE	**(-3.4832)**			**(-1.9660)**		
Repeal_firm		**-10.6441***			**-7.2024****	
× ΔInside_Debt		**(-1.8133)**			**(-2.2487)**	
Repeal_firm			**-9.1889**			**-1.7515**
× (−ΔInside_Equity)			**(-0.7978)**			**(-0.1687)**
Repeal_firm	**18.3632****	**18.6476****	**15.7827****	**6.5339****	**6.6146****	**6.2224*****
	(2.5505)	**(2.5163)**	**(2.1645)**	**(2.5736)**	**(2.2903)**	**(2.9266)**
ΔInside_DE	-4.0793			-0.4265		
	(-0.5787)			(-0.2278)		
ΔInside_Debt		-2.0780			-1.4033	
		(-0.5578)			(-0.4660)	
−ΔInside_Equity			-2.3697			-3.0742
			(-0.4229)			(-0.5470)
ROA	-3.6980***	-3.6953***	-3.6310***	-1.6472***	-1.6098***	-1.6318***
	(-5.3518)	(-5.3619)	(-5.1671)	(-2.8749)	(-2.7930)	(-2.9031)
Ln(Assets)	-2.2833	-2.9129	-3.8669	1.6420	1.7423	1.7489
	(-0.5457)	(-0.6986)	(-0.8859)	(0.4320)	(0.4611)	(0.4605)
Leverage	27.0129	23.3330	26.2436	20.4501	21.3797	20.1692
	(1.0925)	(0.9174)	(1.0279)	(0.6721)	(0.7063)	(0.6603)
Bond_size	-37.9532***	-37.9506***	-38.8730***			
	(-5.2800)	(-5.3229)	(-5.6755)			
Bond_age	3.0848***	3.0388***	3.0085***			
	(10.5536)	(10.2670)	(10.2134)			
Rating	17.7392***	17.6509***	16.9583***			
	(6.9023)	(6.6486)	(6.5803)			
1_(Senior)	-14.0496	-12.7877	-13.0808			
	(-0.7756)	(-0.7079)	(-0.7309)			
1_(Senior & Secured)	0.6249	-0.3780	1.4520			
	(0.0252)	(-0.0151)	(0.0572)			
1_(Callable)	23.5686***	23.1965***	26.9955***			
	(5.4079)	(5.4056)	(5.5642)			
Modified Alman's Zscore				-30.5111**	-30.5938**	-31.3813**
				(-1.9793)	(-1.9959)	(-2.0638)
Ln(Loan_age)				22.6675***	22.7222***	22.8617***
				(2.6583)	(2.6640)	(2.6752)
Number of syndicates				-37.4604***	-37.4600***	-37.4792***
				(-6.2565)	(-6.2874)	(-6.2414)
1_(Performance Price Clauses)				-29.1700***	-29.1831***	-28.7274***
				(-4.3719)	(-4.3669)	(-4.3422)
1_(Term loans)				43.9254***	44.1666***	43.9468***
				(6.4257)	(6.4555)	(6.4059)
Credit_spread				-4.0680	-4.1732	-4.4177
				(-0.6482)	(-0.6661)	(-0.7024)
Term_spread				0.0433	0.0429	0.0418
				(0.4844)	(0.4813)	(0.4661)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan purposes FE	N/A	N/A	N/A	Yes	Yes	Yes
N	1,230	1,230	1,230	1,771	1,771	1,771
Adj. R^2	0.549	0.546	0.535	0.455	0.456	0.454

Table 5.6: **Changes in CEO inside debt-equity ratios and the cost of debt after ATP removals - Covenants included**

This table compares the cost of new debts issued by repeal firms and those issued by their peers, accounting for the inclusion of protective covenants. The bonds and bank loans are issued within three year after the repeal firms lower their takeover defenses. ***Bond yield spread*** equals offering bond yield minus yield of a Treasury bond with same duration. ***Loan yield spread*** is the sum of the spread of the facility over LIBOR and any annual fees paid to the lender group (All-in-drawn measure from DealScan). ***Repeal_firm*** is a dummy variable which equals one for repeal firms, and zero for matched firms. Δ***Inside_DE*** and Δ***Inside_Debt*** are the changes of inside debt-equity ratio and inside debt over their lagged values. $-\Delta$***Inside_Equity*** is negative of the change in inside equity over its lagged value. ***Covenant*** equals one if the issue includes any poison put covenant, debt-restriction covenants, or net-worth covenants. The estimates of control variables are not reported. Standard errors are clustered at issuing firm level. Industry fixed effects are based on two-digit SIC code. Continuous variables are winsorized at 1% and 99% levels. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Panel A: Cost of new bond issues			**Panel B: Cost of new loan loan**		
	(6)	(2)	(4)	(6)	(2)	(4)
	Dependent variable: Bond yield spread (in bps)			**Dependent variable: Loan yield spread (in bps)**		
Repeal_firm × ΔInside_DE	**-10.0617*** (-3.8478)**			**-3.2781** (-1.9805)**		
Repeal_firm × ΔInside_Debt		**-12.1588** (-2.0196)**			**-6.9079*** (-7.6586)**	
Repeal_firm × (−ΔInside_Equity)			**-8.8771 (-0.7689)**			**-5.2538 (-0.2894)**
Repeal_firm × Covenant × ΔInside_DE	**-2.3223 (-0.0542)**			**-0.7948 (-0.1672)**		
Repeal_firm × Covenant × ΔInside_Debt		**-2.3471 (-0.6446)**			**-0.4073 (-0.0574)**	
Repeal_firm × Covenant × (−ΔInside_Equity)			**-6.8292 (-0.1371)**			**-0.4170 (-0.3421)**
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Bond/Loan characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan purposes FE	N/A	N/A	N/A	Yes	Yes	Yes
N	1,230	1,230	1,230	1,771	1,771	1,771
Adj. R^2	0.550	0.547	0.535	0.455	0.455	0.454

Table 5.7: **Changes in investment policies and firm performance after ATP removals**

This table reports estimates of the regressions that compare changes in investment policies and firm performance after ATP removals between repeal firms and their matches. ***Repeal_firm*** is a dummy variable which equals one for a repeal firm, and zero for a matched firm. ***After_repeal*** equals one if the observation belongs to a year after ATPs are removed, and zero if otherwise. *Total_risks* equals log of the variance of daily stock returns over the current fiscal year. ***R&D_investment*** equals R&D expenditures over lagged assets. ***CAPEX_investment*** equals capital expenditures over lagged assets. ***Cash_holdings*** equals cash and short-term investment over lagged assets. ***Tobin'sQ*** equals market value of equity plus book value of debt, divided by book value of total assets. ***ROA*** equals operating income before depreciation divided by lagged total assets. t-statistics are given in the parenthesis. Standard errors are robust. Industry fixed effects are based on two-digit SIC code. Continuous variables are winsorized at 1% and 99% levels. *, **, *** indicate significance at 10%, 5%, and 1% levels.

	Investment				**Firm performance**	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Δ Total_risks	Δ R&D_investment	Δ CAPEX_investment	Δ Cash_holdings	Δ Tobin's Q	Δ ROA
Repeal_firm x After_repeal	**0.0467****	**0.0130*****	**0.0359*****	**-0.0488*****	**0.0153*****	**0.0025*****
	(2.0600)	**(4.6104)**	**(3.4727)**	**(-3.6762)**	**(4.8393)**	**(6.8579)**
Repeal_firm	**0.0062**	**-0.0025**	**-0.0459**	**-0.0046**	**-0.0152**	**-0.0013**
	(0.3250)	**(-1.2159)**	**(-1.3482)**	**(-0.1988)**	**(-0.6961)**	**(-0.4246)**
After_repeal	**-0.0322**	**-0.0053**	**-0.0312**	**0.0494**	**0.0010**	**-0.0031**
	(-1.3443)	**(-1.4249)**	**(-1.3442)**	**(1.4525)**	**(0.0419)**	**(-0.9117)**
Control variable (lagged values):						
ΔInside_DE	-0.0074***	-0.0006***	0.0016**	0.0007	0.0007	0.0005
	(-4.2910)	(-3.0094)	(2.4842)	(0.7868)	(0.3844)	(0.9661)
Ln(Assets)	0.0117**	0.0013***	-0.0015	-0.0014	-0.0038	0.0004
	(2.1131)	(3.0928)	(-0.6128)	(-0.4340)	(-0.6129)	(0.5093)
Leverage	-0.0057	0.0254***	0.0361	0.0166	0.1667**	0.0185**
	(-0.0822)	(4.5031)	(1.2891)	(0.4563)	(2.4489)	(2.0465)
Tangible_assets	0.2999***	0.0001	-0.0168	0.0290	-0.0312	-0.0100
	(5.3403)	(0.0212)	(-0.8756)	(1.2131)	(-0.6232)	(-0.6636)
Loss = 1 if negative net income	0.0029	0.0029**	0.0107*	0.0161**	-0.0164	-0.0002
	(0.1781)	(2.4436)	(1.8418)	(2.0716)	(-0.9737)	(-0.0719)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7,426	7,426	7,426	7,426	7,426	7,426
Adj. R^2	0.484	0.114	0.238	0.220	0.113	0.083

Table 5.8: **Robustness check 1 - Number of removed ATPs and changes in CEO inside debt-equity ratios**

This table reports estimates of the regression that relates changes in CEO inside debt-equity ratios with the number of ATPs that have been removed. ***# removed ATP*** equals the change in log of one plus number of ATPs. ***# removed ATP_x year before*** equals the change in log of one plus number of ATPs if the removal happened "x" years before, and equals zero if otherwise.

Dependent variable	**ΔInside_DE** (1)	**ΔInside_DE** (2)	**ΔInside_Debt** (3)	**ΔInside_Debt** (4)	**−ΔInside_Equity** (5)	**−ΔInside_Equity** (6)
# removed ATP	**1.4257*** **		**0.8660** **		**0.4062**	
	(2.7048)		**(2.2570)**		**(1.6256)**	
# removed ATP_0 year before		**1.6165*** **		**1.1530** **		**0.3404**
		(2.7269)		**(2.3769)**		**(1.0707)**
# removed ATP_1 year before		**1.4386** **		**0.9752** **		**0.1863**
		(2.2942)		**(2.1047)**		**(0.6110)**
# removed ATP_2 years before		**1.7407** **		**0.6996**		**0.7740*** **
		(2.4535)		**(1.5410)**		**(2.6204)**
# removed ATP_3 years before		**1.2322** **		**0.6674**		**0.5167**
		(2.0339)		**(1.2040)**		**(1.4347)**
Control variables:						
ΔLn(Assets)	-0.3655**	-0.3646**	0.2694**	0.2722**	-0.4278***	-0.4227***
	(-2.1856)	(-2.1868)	(2.3846)	(2.4114)	(-4.9035)	(-4.8393)
ΔMarket-to-Book	-0.2309***	-0.2337***	0.0751**	0.0754**	-0.4294***	-0.4299***
	(-4.5359)	(-4.5812)	(2.1925)	(2.2133)	(-3.7469)	(-3.7708)
ΔLeverage	1.1844***	1.1710***	0.0608	0.0411	0.9511***	0.9462***
	(3.4708)	(3.4231)	(0.2228)	(0.1495)	(4.2970)	(4.2723)
ΔTangible_assets	0.1911	0.1468	0.1928	0.2029	6.0488***	5.9810***
	(0.1153)	(0.0888)	(0.1688)	(0.1773)	(6.0032)	(5.9156)
ΔR&D_expenditures	-0.7940	-0.7658	-1.0839*	-1.0447*	2.1824***	2.1888***
	(-0.8845)	(-0.8523)	(-1.7613)	(-1.6989)	(4.7866)	(4.7985)
1_(Liquidity constraint)	-0.0794	-0.0774	-0.1383**	-0.1377**	-0.0156	-0.0147
	(-1.0228)	(-0.9942)	(-2.1937)	(-2.1827)	(-0.3887)	(-0.3674)
1_(Tax status)	-0.0055	-0.0049	0.0125	0.0132	0.0360	0.0359
	(-0.0950)	(-0.0848)	(0.3527)	(0.3738)	(1.1395)	(1.1360)
1_(Investment graded)	0.1180*	0.1178*	0.0432	0.0434	-0.0159	-0.0151
	(1.7598)	(1.7594)	(0.9903)	(0.9933)	(-0.4369)	(-0.4158)
CEO_age	-0.0041	-0.0042	-0.0018	-0.0018	0.0012	0.0012
	(-1.0374)	(-1.0651)	(-0.7561)	(-0.7511)	(0.5239)	(0.4968)
CEO_tenure	0.0105***	0.0105***	0.0059**	0.0059**	0.0046*	0.0046*
	(2.6469)	(2.6546)	(2.3858)	(2.3851)	(1.8994)	(1.9075)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
N	4,244	4,244	4,244	4,244	4,244	4,244
Adj. R^2	0.194	0.195	0.168	0.098	0.174	0.173

Table 5.9: **Robustness check 2: Different matching sample and removals of certain ATPs**

This table reports estimates of the regressions that use any S&P 1500 firms that do not remove ATPs as matched firms. ***Repeal_any_ATPs*** is equals one for a company that removes any ATPs, and equals zero for a company that does not. ***Repeal_Eindex*** is equals one for a company that removes any ATPs that belong to Bebchuk et al. [2009]'s Entrenchment Index, and equals zero for a company that does not. ***Repeal_Delay_ATPs*** is equals one for a company that removes any ATPs that belong to the group of Delay provisions, and equals zero for a company that does not. ***Repeal_Protection_ATPs*** is equals one for a company that removes any ATPs that belong to the group of Protection provisions, and equals zero for a company that does not. ***Repeal_Voting_ATPs*** is equals one for a company that removes any ATPs that belong to the group of Voting provisions, and equals zero for a company that does not. ***Repeal_StLaw_ATPs*** is equals one for a company that removes any ATPs that belong to the group of State law provisions, and equals zero for a company that does not. The categories of Delay, Protection, Voting, and State law provisions are based on Gompers et al. [2003].

Dependent variable:	**ΔInside_DE** (1)	**ΔInside_Debt** (2)	**−ΔInside_Equity** (3)	**ΔInside_DE** (4)	**ΔInside_Debt** (5)	**−ΔInside_Equity** (6)	**ΔInside_DE** (7)	**ΔInside_Debt** (8)	**−ΔInside_Equity** (9)
Repeal_any_ATPs	-0.0562	-0.0200	-0.0077						
	(-0.9343)	(-0.5799)	(-0.5497)						
Repeal_any_ATPs x After_repeal	**0.1103*****	**0.0514*****	**0.0230***						
	(2.9522)	**(2.7245)**	**(1.8647)**						
Repeal_Eindex				-0.0298	-0.0410	-0.0246			
				(-0.5282)	(-0.6954)	(-1.1623)			
Repeal_Eindex x After_repeal				**0.0807*****	**0.0719*****	**0.0118**			
				(3.2453)	**(2.9325)**	**(1.0558)**			
Repeal_Delay_ATPs							-0.0941	0.0010	-0.0239
							(-0.9079)	(0.0316)	(-0.7410)
Repeal_Delay_ATPs x After_repeal							**0.1716*****	**0.1080*****	**0.0277****
							(3.6996)	**(2.9339)**	**(2.3878)**
Control variables:									
ΔLn(Assets)	-0.2715**	0.3549***	-0.5963***	-0.2723**	0.3553***	-0.5997***	-0.2745**	0.3554***	-0.5976***
	(-2.0323)	(4.7903)	(-7.6424)	(-2.0410)	(4.8008)	(-7.7331)	(-2.0556)	(4.8050)	(-7.6790)
ΔMarket-to-Book	-0.5036***	0.0152	0.0229**	-0.5043***	0.0150	0.0228**	-0.5042***	0.0150	0.0228**
	(-3.7066)	(0.8132)	(2.3202)	(-3.7350)	(0.8063)	(2.3095)	(-3.7362)	(0.8016)	(2.3144)
ΔLeverage	0.4223	-0.0989	1.0557***	0.4221	-0.1015	1.0578***	0.4200	-0.0998	1.0576***
	(1.4589)	(-0.6334)	(3.4074)	(1.4586)	(-0.6500)	(3.4424)	(1.4509)	(-0.6391)	(3.4357)
ΔTangible_assets	1.9503***	0.6342	0.1992	1.9457***	0.6383	0.1912	1.9498***	0.6350	0.1931
	(2.6544)	(1.4799)	(1.1807)	(2.6467)	(1.4904)	(1.1328)	(2.6535)	(1.4822)	(1.1456)
ΔR&D_expenditures	0.9987	-0.0571	0.5600**	0.9936	-0.0624	0.5635**	0.9907	-0.0628	0.5643**
	(1.0707)	(-0.1233)	(2.0608)	(1.0648)	(-0.1345)	(2.0746)	(1.0600)	(-0.1357)	(2.0764)
1_(Liquidity constraint)	-0.0672	-0.0500	0.0403***	-0.0660	-0.0482	0.0385***	-0.0656	-0.0485	0.0389***
	(-1.1290)	(-1.5417)	(2.8164)	(-1.1053)	(-1.4833)	(2.6927)	(-1.1012)	(-1.4934)	(2.7191)
1_(Tax status)	-0.0157	-0.0097	0.0032	-0.0160	-0.0106	0.0026	-0.0178	-0.0097	0.0032
	(-0.3916)	(-0.4288)	(0.3279)	(-0.3982)	(-0.4684)	(0.2667)	(-0.4423)	(-0.4278)	(0.3205)
1_(Investment graded)	-0.0086	0.0034	0.0210	-0.0078	0.0003	0.0262*	-0.0084	0.0026	0.0236
	(-0.1631)	(0.0999)	(1.4435)	(-0.1492)	(0.0082)	(1.7936)	(-0.1568)	(0.0762)	(1.6259)
CEO_age	-0.0027	0.0001	0.0003	-0.0027	-0.0000	0.0003	-0.0027	0.0000	0.0003
	(-0.8292)	(0.0336)	(0.3526)	(-0.8416)	(-0.0113)	(0.4415)	(-0.8442)	(0.0191)	(0.3836)
CEO_tenure	0.0120***	0.0101***	-0.0035***	0.0120***	0.0102***	-0.0035***	0.0120***	0.0101***	-0.0035***
	(3.7718)	(5.8046)	(-5.2921)	(3.7702)	(5.8267)	(-5.3138)	(3.7813)	(5.7953)	(-5.3016)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9,416	9,416	9,416	9,416	9,416	9,416	9,416	9,416	9,416
Adj. R^2	0.265	0.113	0.183	0.260	0.136	0.187	0.202	0.163	0.176

Table 5.9: **Robustness check 2 (continued)**

Dependent variable:	**ΔInside_DE** (10)	**ΔInside_Debt** (11)	**−ΔInside_Equity** (12)	**ΔInside_DE** (13)	**ΔInside_Debt** (14)	**−ΔInside_Equity** (15)	**ΔInside_DE** (16)	**ΔInside_Debt** (17)	**−ΔInside_Equity** (18)
Repeal_Protection_ATPs	-0.0752	-0.0044	-0.0128						
	(-0.5341)	(-0.0553)	(-0.3596)						
Repeal_Protection_ATPs x After_repeal	**0.0950**	**0.0001**	**0.0397*** **						
	(1.4878)	**(0.0036)**	**(3.2214)**						
Repeal_Voting_ATPs				0.0151	0.0205	-0.0035			
				(0.2076)	(0.4916)	(-0.2147)			
Repeal_Voting_ATPs x After_repeal				**0.0035**	**0.0099*** **	**-0.0002**			
				(0.7767)	**(2.8986)**	**(-0.1349)**			
Repeal_StLaw_ATPs							-0.1734	-0.1272	-0.0138
							(-0.8355)	(-1.3305)	(-0.6118)
Repeal_StLaw_ATPs x After_repeal							**0.1677*** **	**0.1197** **	**0.0253** **
							(3.7532)	**(2.0947)**	**(2.6077)**
Control variables:									
ΔLn(Assets)	-0.2774**	0.3521***	-0.5974***	-0.2751**	0.3545***	-0.5980***	-0.2719**	0.3551***	-0.5968***
	(-2.0780)	(4.7552)	(-7.6583)	(-2.0614)	(4.7924)	(-7.7138)	(-2.0304)	(4.7835)	(-7.6318)
ΔMarket-to-Book	-0.5043***	0.0150	0.0227**	-0.5045***	0.0148	0.0228**	-0.5036***	0.0155	0.0228**
	(-3.7401)	(0.8015)	(2.3040)	(-3.7553)	(0.7963)	(2.3125)	(-3.7171)	(0.8309)	(2.3165)
ΔLeverage	0.4228	-0.0985	1.0555***	0.4197	-0.1002	1.0563***	0.4196	-0.0996	1.0550***
	(1.4576)	(-0.6298)	(3.3984)	(1.4497)	(-0.6416)	(3.4151)	(1.4483)	(-0.6376)	(3.3945)
ΔTangible_assets	1.9371***	0.6281	0.1952	1.9427***	0.6339	0.1944	1.9330***	0.6223	0.1956
	(2.6333)	(1.4644)	(1.1571)	(2.6421)	(1.4793)	(1.1529)	(2.6288)	(1.4520)	(1.1584)
ΔR&D_expenditures	1.0014	-0.0569	0.5635**	0.9970	-0.0568	0.5623**	1.0269	-0.0339	0.5627**
	(1.0720)	(-0.1229)	(2.0739)	(1.0673)	(-0.1226)	(2.0698)	(1.1008)	(-0.0734)	(2.0717)
1_(Liquidity constraint)	-0.0674	-0.0504	0.0402***	-0.0660	-0.0492	0.0397***	-0.0683	-0.0518	0.0402***
	(-1.1318)	(-1.5542)	(2.8059)	(-1.1092)	(-1.5172)	(2.7734)	(-1.1515)	(-1.5967)	(2.8107)
1_(Tax status)	-0.0177	-0.0106	0.0030	-0.0175	-0.0107	0.0028	-0.0168	-0.0101	0.0028
	(-0.4406)	(-0.4689)	(0.3053)	(-0.4362)	(-0.4720)	(0.2875)	(-0.4178)	(-0.4435)	(0.2858)
1_(Investment graded)	-0.0041	0.0064	0.0220	-0.0059	0.0040	0.0232	-0.0066	0.0051	0.0220
	(-0.0774)	(0.1904)	(1.5066)	(-0.1124)	(0.1197)	(1.6007)	(-0.1226)	(0.1491)	(1.5075)
CEO_age	-0.0027	0.0001	0.0003	-0.0027	0.0001	0.0003	-0.0025	0.0002	0.0003
	(-0.8484)	(0.0277)	(0.4069)	(-0.8278)	(0.0435)	(0.3855)	(-0.7757)	(0.1115)	(0.3966)
CEO_tenure	0.0121***	0.0102***	-0.0035***	0.0121***	0.0101***	-0.0035***	0.0119***	0.0100***	-0.0035***
	(3.8102)	(5.8451)	(-5.3083)	(3.7984)	(5.8224)	(-5.2675)	(3.7477)	(5.7624)	(-5.2996)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9,416	9,416	9,416	9,416	9,416	9,416	9,416	9,416	9,416
Adj. R^2	0.102	0.136	0.183	0.209	0.199	0.130	0.279	0.146	0.208

5.11 Appendix

Appendix 5.A1: **How to measure presence of ATPs**

	Name of provision	Variable name in ISS	How to construct measure	Description of provision
1	Blank check	BLANKCHECK	Yes =1, otherwise = 0	preferred stock over which board has broad authority
2	Business combination laws	OO_BUSCOMP	No=1, otherwise=0	laws that prohibit certain type of transaction btw firm and large SH
3	Bylaw amendments limitations	LABYLW	Yes =1, otherwise = 0	limit SHs from amending governance documents
4	Charter amendments limitations	LACHTR	Yes =1, otherwise = 0	limit SHs from amending governance documents
5	Cash-out laws	OO_CASHOUT_PA	No=1, otherwise=0	allow SHs to sell stakes to a controlling SH at a high price
6	Classified board / Staggered board	CBOARD	Yes =1, otherwise = 0	directors are put in different overlapping terms =¿ only part can be replaced at a time
7	Control-share acquisition	OO_CSA	No=1, otherwise=0	a majority of disinterested SHs must vote to approve the merger
8	Cumulative voting	CUMVOTE	Yes =0, otherwise = 1	a SH can allocate his total votes in one manner
9	Directors' duties	OO_DUTIES	No=1, otherwise=0	allow directors to consider interests other than shareholders' value if merger
10	Fair-price	FAIRPRICE	Yes =1, otherwise = 0	limit range of prices that bidder can pay in a two-tier offers
11	Golden parachutes	GPARACHUTE	Yes =1, otherwise = 0	large compensation package to executives in case of merger
12	Poison pills	PPILL	Yes =1, otherwise = 0	special rights triggered by events, such as hostile takeover bid
13	Secret Ballot / Confidential voting	CONFVOTE	Yes =0, otherwise = 1	third party count proxy votes and management can choose to ignore individual proxy cards
14	Special meeting limitations	LSPMT	Yes =1, otherwise = 0	limit ability to call a special meeting by SHs
15	Supermajority	SUPERMAJOR_PCNT	1 if $>$ 66, otherwise = 0	approval of mergers must be given by a larger prorportion of SHs than state laws
16	Unequal voting	UNEQVOTE	Yes =1, otherwise = 0	limit voting rights of some SHs and expand those of others
17	Written consent	LWCNST	Yes =1, otherwise = 0	bidder must wait until regular meeting to replace board

Appendix 5.A2: **Variable construction**

Variable	**Variable construction**	**Data source**
Ln(Assets)	Ln (at) ; total assets (at)	Compustat
Tangible_assets	ppent / at ; net PP&E (ppent), total assets (at)	Compustat
Market-to-book	(prcc_f * csho + at - ceq) / at ; stock price (prcc_f), shares outstanding (csho), total assets (at), book value of shareholder equities (ceq)	Compustat
Leverage	(dlc + dltt) / at ; long-term debt (dlc), long-term component in short-term debt (dltt), total assets (at)	Compustat
R&D_expenditures	xrd / sale or 0 if missing xrd ; R&D expenditure (xrd), sales (sale)	Compustat
Idiosyncratic_risks	Ln (standard deviation of ϵ); residuals from regressing firm returns on CRSP value-weighted returns over 24 months before fiscal year end date (ϵ)	CRSP
1_(Liquidity constraint)	1 if operating income before depreciation (oibdp) is negative; 0 if otherwise	Compustat
1_(Tax status)	1 if tax loss carry forward (tlcf) is positive; 0 if otherwise	Compustat
1_(Investment graded)	1 if the firm has investment-grade bond; 0 if no investment-grade bond	FISD
ROA	oibdp / at ; operating income before depreciation (oibdp), total assets (at)	Compustat

Appendix 5.A3: **Which companies are more likely to remove ATPs? Probit regression**

This table presents the coefficients of a Probit regression which is used to predict the likelihood that companies remove ATPs. The observations are made at firm-year level. Industry fixed effects are based on two-digit SIC code. Continuous variables are winsorized at 1% and 99% levels. *, **, *** denote significance at 10%, 5%, 1% levels.

Dependent variable: Lower_defense = 1 if the number of ATPs decreases; 0 if otherwise	
Lagged_GIM17 = Lagged number of ATPs	2.8305***
	(16.6768)
Voting results over the last five years:	
Nproposals = Ln (1 + number of proposals to remove ATPs over last five years)	0.1053**
	(2.1733)
Vote_for = Average of percentage votes that support removing ATPs	0.1299**
	(1.9645)
Npassed = Ln (1 + number of passed proposals to remove ATPs)	0.0677***
	(3.2609)
ISS_sup = Ln (1 + number of proposals supported by ISS)	0.0458
	(0.5250)
SH_spon = Ln (1 + number of proposals sponsored by shareholders)	-0.2238**
	(-2.1688)
Ownership structure in prior year:	
13D_filer = 1 if any form 13D in prior year; 0 if otherwise	0.0196***
	(6.0716)
Nblocks = Ln (1 + number of blockholders)	-0.1980*
	(-1.9404)
Largest_five_own = sum to ownership percentages by five largest holders	0.5011***
	(3.6446)
Inst_HHI = Herfindahl index of institutional ownership	-0.1896
	(-0.0917)
Directorship in prior year:	
Dual = 1 if the CEO is also the chairman; 0 if otherwise	-0.0621
	(-0.2234)
Nindeps = Ln (1 + number of independent directors in board)	0.6331***
	(6.4007)
Indep_per = fraction of independent directors in the board	0.1679
	(0.4669)
CEO compensation in prior year:	
Inside_debt= Ln (Pensions + Deferred Compensation)	-0.0145
	(-0.4190)
Inside_equity = Ln (MV of CEO's stocks and options)	0.0001
	(0.0015)
Year FE	Yes
Industry FE	Yes
N	9347
pseudo R-sq	0.182

CHAPTER 6

Disclosures of CEO inside debt and the timing of bond issuances

6.1 Introduction

CEO debt-like compensation, also known as inside debt, can affect the cost of debt in a predictable way, as high inside debt reduces the cost of borrowing and vice versa.[1] Companies' insiders know the new level of CEO inside debt when the fiscal years end, but do not have to release this private information until they file the mandatory disclosures four months later.[2] Companies can exploit this information asymmetry to issue bonds when the market, based on publicly available information of inside debt, perceives these companies' debt agency problems as relatively insignificant. More specifically, companies can choose to issue bonds right after disclosing positive changes or before disclosing negative changes in their CEO inside debt.[3] Alternatively, companies might not adopt the above-described timing strategies because these strategies require them to issue bonds

[1] Wei and Yermack [2011] document increasing bond price when the issuing companies disclose a high level of CEO inside debt. Anantharaman et al. [2013] find that bank loan yield spreads and the number of required covenants both decrease with the borrowing firm's CEO inside debt. Dang and Phan [2016] and Freund et al. [2018] both show that companies with high CEO inside debt pay narrower yield spreads for new bond issues.

[2] On average, the proxy statements which disclose CEO compensation are released four months after the fiscal years end.

[3] The argument is quite similar to that in Myers and Majluf [1984] which explains the decision to issue new equities based on private information of deteriorating firm performance. Baker and Wurgler [2002] document empirical evidence that companies persistently issue securities when these securities are being under-valued by the market so as to reduce the cost of capital.

within narrow windows of time around compensation disclosures.[4] A more flexible strategy, for example, is to adjust the flow of voluntary disclosures around bond offerings, instead of changing the timing these issuances.[5] ***"Is the timing of bond issuances associated with the disclosures of CEO inside debt?"*** I find that bond offerings cluster either before disclosures of decreases or right after disclosures of increases in CEO inside debt. The finding is robust to different measures of bond offering concentration and sub-sample analyses. This evidence suggests that CEO inside debt, in addition to affecting the cost of capital as found in the existing literature, also influences the timing of bond issuances.

Inside debt has the same payment priority as unfunded unsecured debt so this type of compensation helps align CEOs' incentives with debtholders' interests. As a result, prospective debtholders are willing to lower the cost of borrowing for the companies that have high CEO inside debt (Jensen and Meckling [1976], Edmans and Liu [2011]). Prior empirical papers have focused on the level of CEO inside debt, arguing that the cost of borrowing is lower for the companies with high inside debt than for those with low inside debt (Wei and Yermack [2011], Anantharaman et al. [2013], Freund et al. [2018]). However, my study focuses on the changes in CEO inside debt, arguing that the cost of borrowing decreases after companies increase their inside debt and vice versa. I am interested in the change variable instead of the level variable because changes in inside debt are more likely to be surprises to the market. Campbell et al. [2016] show that bond prices react to the adjustments in inside debt that are consistent with the optimal contracting theory. This finding suggests that changes in inside debt, even though such changes can be predicted by a theory, might still surprise the market when they are disclosed. On the other hand, the level of inside debt should not be totally new information unless companies disclose their inside debt for the first time as is the case in Wei and Yermack [2011]. There are certain firm and CEO characteristics that determine

[4] Most proxy statements are released in the second quarter of a fiscal year. Hence, the timing strategies based on these disclosures require companies to issue bonds within the first two quarters of a fiscal year.

[5] There is evidence that companies deliberately change the flows of voluntary news releases around corporate events, such as equity offerings (Lang and Lundholm [2000]), share repurchases (Brockman et al. [2008]), or acquisitions (Ahern and Sosyura [2014]).

the level of CEO inside debt, such as firm size (Cassell et al. [2012]), firm leverage (Sundaram and Yermack [2007], Cen [2010]), corporate governance quality (Liu et al. [2014]), or CEO age and tenure (Freund et al. [2018]). Hence, the companies with high inside debt in the prior year are unlikely to have low inside debt this year (and vice versa) unless some significant changes have happened to these companies.

I collect the proxy statements of U.S. public firms from SEC EDGAR and extract the data on CEO compensation and proxy filing dates. The sample period spans from the fiscal years of 2006 to 2017 because the disclosures of executive inside debt only became mandatory after 2006. Following the literature, I scale CEO inside debt, which equals the present value of defined benefit pensions plus non-qualified deferred compensations, by inside equity, which equals the market value of a CEO's stock and option awards.[6] I take the logarithm transformation for this ratio to obtain the CEO inside debt-equity ratio because the unlogged ratio is heavily right-skewed. Next, I calculate the change in CEO inside debt-equity ratio by subtracting the lagged ratio from the current year's ratio. The final sample contains only the firm-year observations with non-zero changes in CEO inside debt-equity ratios.[7] Henceforth, I will refer to any changes in CEO inside debt-equity ratios as changes in CEO inside debt for brevity.

Before examining the main research question, I validate the argument that the cost of debt decreases (increases) after issuing companies disclose positive (negative) changes in their CEO inside debt. Following Wei and Yermack [2011], I examine how the existing bond yield spreads change after issuing companies disclose changes in their CEO inside debt.[8] Existing bond yield spreads fall by 55 bps when the issuing companies disclose increases in their inside debt. In contrast, yield spreads rise by 53 bps upon disclosures of decreases in inside debt.

For the main analysis, I compare the concentration of bond offerings in the immediate

[6]For example, see Wei and Yermack [2011], Cassell et al. [2012], Liu et al. [2014], Phan [2014], Campbell et al. [2016]

[7]If a CEO has no inside debt, I follow Campbell et al. [2016] and use the logarithm of the minimal non-zero inside-debt-over-inside-equity as the CEO inside debt-equity ratio. Requiring the final sample to include only observations with non-zero changes in the ratios will filter out any companies whose CEO inside debt remains zero for two consecutive years.

[8]The outstanding corporate bonds must be issued at least one year before the examined disclosure dates to avoid an overlap with the sample in the main test.

quarters before or after disclosures with that in the second quarters after disclosures, which are the control quarters. This test only includes the companies that issue new bonds in a given fiscal year. I construct three dependent variables that capture the incidence of bond offerings, number of new bond issues, and total size of the offerings for each firm in each quarter. In the final sample, 54% (46%) of the new bonds are offered in the years when CEO inside debt increases (decreases). Hence, it does not seem that the borrowing companies deliberately increase their CEO inside debt when they plan to issue bonds. I find that the concentration of bond offerings is significantly higher in the immediate quarters after (before) disclosures of increases (decreases) in CEO inside debt than that in the control quarters. The conclusion is consistent across all three measures of bond offerings. On average, companies issue 40% (30%) more bonds in the immediate quarters after (before) the positive (negative) compensation information is disclosed. I also find that companies avoid offering bonds right after they disclose decreases in inside debt. The evidence all suggests that the timing of bond issuances is correlated with the disclosures of inside debt changes.

I explore the possibility that the timing of new bond issuances depends not only on the signs of the changes in CEO inside debt but also on the magnitudes of these changes. The more that inside debt has increased, the more might the cost of debt fall. Hence, issuing companies might have stronger incentives to issue new bonds right after disclosing large increases in inside debt. I find evidence that is consistent with this prediction. Companies with positive inside debt changes concentrate their bond offerings in the immediate quarters after disclosures; and the effects increase with the magnitudes of the disclosed changes. The result for the subsample of negative change disclosures is slightly different. On average, companies with negative inside debt changes do *not* concentrate their bond offerings in the quarters before disclosures as found in the previous test. However, the tendencies to adopt this timing strategy significantly increase with the magnitudes of the disclosed changes. I argue that it might not be easy for companies to issue bonds before releasing the proxy statements, because that means issuing bonds in the first quarters of the fiscal years. Therefore, companies only adopt such a timing strategy if their CEO inside debt has significantly decreased and it would be very costly for them to issue bonds afterwards.

Next, I investigate the firm and bond characteristics that are associated with the timing strategies based on disclosures of CEO inside debt.

First, I expect that the companies that often issue bonds are more likely to utilize the timing strategies based on disclosures of inside debt changes. Regular issuers often have shelf registration and established relations with the underwriters, which allows them to promptly issue new bonds with less preparation (Kidwell et al. [1987], Kadapakkam and Kon [1989], Yasuda [2005]). I determine that a company is a regular bond issuer if that company has issued bonds every year for the last five years. I find that regular issuers have higher tendencies to time their bond offerings based on disclosures of CEO inside debt than irregular issuers.

Second, companies might want to time their bond issuances if the new issues are long-term bonds (i.e. bonds with more than five years of maturity). Holders of long-term bonds are subject to more risks from changes either in macro economic conditions or in borrowing firms' performance. The offering yield spreads of long-term bonds are often higher than those of short-term bonds (Klock et al. [2005], Cremers et al. [2007]). Therefore, issuers of long-term bonds should have stronger incentives to offer bonds at favorable times. I find that issuers of long-term bonds have slightly stronger tendencies to adopt these timing strategies than those of short-term bonds. However, the difference between these two groups of issuers is not significant. The difference in issuing cost between long-term bonds and short-term bonds might not come from the difference in the alignments between CEOs and debtholders, possibly because the bond issuers generally have high credit quality (Chemmanur and Fulghieri [1994], Denis and Mihov [2003]). Therefore, the benefits of the timing strategies are not substantially different between the two groups of bond issuers.

Third, companies might time their bond issuances based on disclosures of CEO inside debt if they do not include restrictive covenants with the issues. CEO inside debt and covenants have the same effect in reducing the offering yield spreads because both instruments protect the rights of debtholders (Han [2011], Anantharaman et al. [2013]). Therefore, issuers can substitute for the missing covenants by offering bonds when market perception of CEO inside debt is relatively more favorable. Indeed, I find that the tendencies to time bond offerings based on inside debt disclosures are significantly stronger when the new issues do not include any covenants. I also examine the effects of some specific types of covenants. Cremers et al. [2007] argue that net-worth covenants, poison put covenants, and debt-restriction covenants are of particular importance to bondholders. I find that the exclusion of debt-restriction covenants is associated with the strongest tendencies to adopt the timing strategies. This finding is consistent with the evidence that borrowers' increasing leverage is the main agency problem that worries the prospective debtholders. (Chava and Roberts [2008], Farre-Mensa [2010]).

Finally, I show evidence that timing bond issuances based on disclosures of changes in CEO inside debt can reduce the cost of borrowing. The bonds issued at favorable times, i.e. right after positive changes or before negative changes are disclosed, have lower offering yield spreads than those issued at non-favorable times. More specifically, offering yield spreads are about 46 bps lower when the borrowing companies time their bond issuances based on their CEO inside debt disclosures.

This study belongs to the literature that examines the relation between CEO inside debt and the financing policies. Prior research shows that CEO inside debt can affect the cost of capital (Han [2011], Anantharaman et al. [2013], Shen and Zhang [2020]), the maturity structures of debt (Dang and Phan [2016]), and the preference for debt over equity in financing (Freund et al. [2018]). My study complements this literature by showing that the mandatory disclosures of CEO inside debt can also affect the timing of bond issuances.

This study also contributes to the literature that relates the timing of corporate events with information releases. Similar to prior studies, I show that corporate events (i.e. the bond offerings) often occur after (before) favorable (unfavorable) information for such events is released (Lang and Lundholm [2000], Brockman et al. [2008], Ahern and Sosyura [2014]). However, I focus on mandatory disclosures whose timing is not likely to be controlled by the companies, and argue that the disclosures affect the timing of bond issuances. Prior papers mainly study voluntary disclosures and conclude that the occurrence of corporate events triggers these discretionary disclosures.

Furthermore, my study suggests that there might be an unexpected effect of the 2006 revised rules, which require mandatory disclosures of inside debt. The SEC expected that the revised disclosure rules would "provide investors with a clearer and more complete picture" of the compensation practices in public companies. However, my study shows that companies can take advantage of the predictable reactions to the disclosures to issue bonds at more favorable terms. I abstract from commenting whether timing the bond issuances based on inside debt disclosures is good or bad for the prospective bondholders. However, I want to draw from the conclusion in Hermalin and Weisbach [2012] that "disclosure, as well as other governance reforms, should be viewed as a two-edged sword". On the one hand, increased disclosure can improve corporate governance practices. On the other hand, more disclosure can also "create additional or exacerbate existing agency problems".

6.2 Literature review

6.2.1 Inside-debt equity ratio

Jensen and Meckling [1976] suggest that CEO compensation should contain a component that has the same payment priority as that of firm's debt, in addition to the component that resembles equity's payment priority. Such debt-like compensation aligns a CEO's incentives with debtholders' interests and prevents the CEO from taking extra sub-optimal risks at debtholders' expense. As a result, the company can raise debt at a lower cost. Jensen and Meckling refer to debt-like and equity-like compensations as "inside debt" and "inside equity", respectively.

Edmans and Liu [2011] argue that compensation structure can affect a CEO's choice of efforts, in addition to the choice of risks. Especially, they suggest that inside debt and inside equity encourage efforts in two different states. Inside debt encourages efforts to protect the liquidation value in the bankruptcy state. The more liquidation value the CEO can protect, the more from inside debt can he retain for his own benefits. On the other hand, inside equity encourages the efforts to increase equity value in solvency state. The more equity value the CEO can increase, the more from inside equity he can earn for himself. Overall, a CEO paid in relatively more inside debt (inside equity) often chooses safe (risky) projects and works harder during bankruptcy (solvency) state.

Starting 2006, the U.S. Securities Exchange and Commission (the "SEC") requires that all public companies must disclose the supplemental retirement benefits that they offer exclusively to their top executives. These retirement benefits match what Jensen and Meckling describe as inside debt. Companies start paying fixed retirement benefits after their executives retire. These benefits are generally unfunded and unsecured so they are not insured by the Pension Benefit Guaranty Corporation like those offered to all salaried employee. If companies go bankrupt, the top executives become junior debtholders and how much they can retrieve from these supplemental retirement benefits strongly depend on the companies' liquidation values. Empirical papers use the present value of defined benefit pensions and non-qualified deferred compensations as a proxy for inside debt. These empirical studies confirm Jensen and Meckling's prediction. When holding more inside debt, CEOs act more like debtholders and run their companies in more conservative manners. For example, CEOs refrain from taking risks (Sundaram and Yermack [2007], Cassell et al. [2012], Brisker and Wang [2017]), accumulate more unused cash (Liu et al. [2014]), and tend to make diversified acquisitions (Phan [2014]). As a result, the companies whose CEOs have high inside debt can raise new debt at a lower cost, either by offering lower yield spreads (Han [2011], Dang and Phan [2016], Freund et al. [2018]) or by including fewer covenants (Anantharaman et al. [2013]). In a recent paper, Shen and Zhang [2020] show that even the cost of equity decreases when the CEOs have high inside debt.

6.2.2 The relevance of inside debt disclosures to timing of bond issuances

Beginning 2006, the the SEC requires public U.S. public companies to report the value of their inside debt in the annual proxy statements, also known as form DEF 14A (Definitive Proxy Statement). The values of inside debt are recorded at the fiscal year end and the proxy statements are often released four months after that. During these four months, the new levels of inside debt, and their changes over the lagged values, are private information to the companies' insiders. According to the existing empirical studies, the changes in CEO inside debt can affect bond prices in a predictable way. Bond prices react positively to the disclosures of high inside debt level or to announcements of corporate decisions motivated by high inside debt holdings. Wei and Yermack [2011] find positive bond returns when companies disclose for the first time that inside debt accounts for a large proportion in their CEOs' compensation. Phan [2014] report positive abnormal bond returns when companies announce diversified mergers which result from their CEOs' high inside debt holdings. Bondholders also pay higher prices, hence requiring lower yield spreads, for the new bonds that are issued by the companies with high CEO inside debt (Dang and Phan [2016], Freund et al. [2018]). Therefore, companies might take advantage of this private information to issue bonds when the cost is relatively low. More specifically, companies can choose to issue new bonds right after disclosing the increases in CEO inside debt because releasing such good information will decrease the cost of borrowing. In contrast, companies can decide to issue new bonds before disclosing decreases CEO inside debt because releasing such bad information will increase the cost of borrowing.

The above-described timing strategies are based on information asymmetry between a company's insiders and its outside investors. The argument is quite similar to that in Myers and Majluf [1984], which explains the decision to issue new equities based on private information of deteriorating firm performance. Baker and Wurgler [2002] document empirical evidence that companies persistently issue securities when these securities are being under-valued by the market so as to reduce the cost of capital. Even when there are no information asymmetries, companies can reduce their cost of debt by timing their bond issuances in response to changes in the macroeconomic conditions (Baker et al. [2003], Faulkender [2005]).

Hypothesis H10: *Companies issue more bonds right after disclosing increases in their CEO inside debt-equity ratios.*

Hypothesis H20: *Companies issue more bonds before disclosing decreases in their CEO inside debt-equity ratios.*

6.2.3 The irrelevance of inside debt disclosures to timing of bond issuances

Alternatively, companies might not adopt the above-described timing strategies because these strategies require issuing bonds within a narrow window of time around compensation disclosures. Most of the proxy statements are released in the second quarters of the fiscal years. Hence, the timing strategies based on these disclosures require companies to issue bonds within the first two quarters of the fiscal years. A more flexible strategy is to adjust the flow of voluntary disclosures around bond offerings, instead of adjusting the timing of bond issuances.

There is evidence that companies deliberately change the flows of voluntary news releases around corporate events. Lang and Lundholm [2000] find that companies release more optimistic information and less pessimistic information during the six months leading to seasoned equity offerings. This trend flips for the next 18 months following the offerings. The findings are opposite in Brockman et al. [2008] who study news releases around share repurchases. Since companies would want lower stock prices for the repurchases, they release more bad news before announcing these corporate events, and delay releasing the good news until after the announcements. However, the logic is still the same that companies release discretionary news to bend the security prices to the directions that are favorable for their corporate events. Ahern and Sosyura [2014] study word usage in the news released by the bidders who offer to pay for the acquisitions by exchanging their own stocks for the targets' stocks in a fixed ratio. The authors find that these bidders release more news and refrain from using "understated" words while they are negotiating the exchange ratios with the targets. In short, there might be no significant relation between disclosures of CEO inside debt and the timing of bond issuances.

Hypothesis H1A: *Companies* <u>*do not*</u> *issue more bonds right after disclosing increases in their CEO inside debt-equity ratios.*

Hypothesis H2A: *Companies* <u>*do not*</u> *issue more bonds before disclosing decreases in their CEO inside debt-equity ratios.*

6.3 Data description

6.3.1 Disclosures of CEO compensation

I search on SEC EDGAR for all the proxy statements that are filed during the calendar years from 2006 to 2018, and collect the data on CEOs' compensation packages. I merge the compensation data collected from SEC EDGAR with the financial data in Compustat using the GVKEY-CIK linking table provided by Wharton Research Data Services ("WRDS"). The companies in the final sample must have non-missing financial data for at least three consecutive years. For each firm-year observation, the company must also have trading stock prices (from CRSP) over the last two years.

I follow the existing literature and measure CEO inside by using the present value of defined-benefit pensions (*Pension_value*) and total balances of non-qualified deferred compensations (*Defer_balance*):

$$\text{Inside debt} = \text{Pension\_value} + \text{Defer\_balance}$$

I obtain these two values from the "Pension Benefits" and "Non-Qualified Deferred Compensations" tables, respectively. Where a company separates the qualified pension benefits from the supplemental non-qualified ones, I only include the non-qualified benefits in the inside debt measure. Unlike the qualified component, supplemental non-qualified pension benefits are unfunded unsecured like a firm's junior debt, so only the non-qualified pensions, but not the qualified component, should match the theoretical criteria of inside debt (Edmans and Liu [2011], Anantharaman et al. [2013]).

I measure CEO inside equity by using the market value of stock and option awards that a CEO holds at the end of the fiscal year:

$$\text{Inside equity} = N\_shares * prcc\_f + \sum_{j=1}^{J} N\_options_j * Option\_value_j$$

I collect the number of shares (N_shares), and the number of unexercised options (N_options) with their corresponding exercise prices and expiration dates from the "Outstanding Equity Awards" table. I multiply the number of shares with the closing stock price at fiscal year end (prcc_f) to obtain the market value of stock holdings. I calculate the value for each tranche of options by using the Black-Scholes formula (Option_value), and sum over "J" tranches to obtain the market value of a CEO's option holdings.[9]

Following the literature, I scale inside debt by inside equity and apply the natural logarithm transformation to obtain the inside debt-equity ratio (*Inside_DE*):

$$Inside\_DE = Ln\left[\frac{\text{Inside debt}}{\text{Inside equity}}\right]$$

According to existing literature on inside debt, the logarithm transformation is necessary because the unlogged ratio is heavily right skewed. When a company has no inside debt, I follow Campbell et al. [2016] and replace the inside debt-equity ratio by the logarithm of the minimum non-zero ratio in the sample (0.0000312). Next, I calculate the change in CEO inside debt-equity ratio over the lagged ratio that was disclosed in the prior year's disclosure:

$$\Delta Inside\_DE_t = Inside\_DE_t - Inside\_DE_{t-1}$$

I split the full sample into two subsamples based on the signs the changes CEO inside

[9]Risk-free rate is one-month Treasury Bill rate. Dividend yield equals cash dividend (including dividend on preferred stocks) divided by total equity value (including value of preferred stocks). Stock volatility is the standard deviation of daily stock returns over the year before fiscal year end date.

debt-equity ratios. The subsample with **positive compensation changes** contains the firm-year observations in which the newly disclosed CEO inside debt-equity ratios exceed their lagged values: $\boldsymbol{\Delta Inside\_DE > 0}$. The subsample with **negative compensation changes** contains the firm-year observations in which the newly disclosed CEO inside debt-equity ratios are smaller than their lagged values: $\boldsymbol{\Delta Inside\_DE < 0}$. I require that each company must have at least two consecutive years of data. In addition, I exclude any observation with zero change in the compensation ratio so a company with two consecutive years of no inside debt will not appear in the final sample.

6.3.2 New bond offerings

I obtain a sample of bond issues whose offering dates lie in the calendar years between 2007 and 2018 from Mergent FISD. Next, I merge the bond data with stock data and financial data of the issuing firms by using the Linking Suite provided by WRDS. I exclude any bonds that are offered in the same months that issuing firms release proxy statements. There are 1,904 firm-years in which new bonds are offered from the fiscal years from 2007 to 2017. The final sample contains 10,028 new bond issues. There are 5,483 bonds that are issued in 1.024 firm-years with positive inside debt changes; and 4,545 bonds in 880 firm-years with negative changes.

Table 6.1 summarizes the bonds' and their issuing firms' characteristics. Firm characteristics are measured at the most recent Compustat-quarters that end before the bonds' offering months. I report the descriptive statistics for the two separate subsamples of positive and negative inside debt changes. For the rest of this section, I refer to the subsample of positive inside debt changes as the "good" years, and the on of negative changes as the "bad" years for brevity.

[Table 6.1 goes here]

The bonds issued in the fiscal years with positive changes (the "good" years) have lower yield spreads and longer maturity than those issued in the years with negative changes (the "bad" years). The average (median) yield spreads for bonds issued in "good" years is 0.0208 (0.0152), while the figures for "bad" years are 0.0241 (0.0154). The average bond age is roughly the same for both subsamples, 10.579 for "good" years and 10.178 for "bad" years. However, the median bond age is 10 in "good" years, but is only 8.25 in "bad" years. The average offering size (in million dollars) is slightly higher in "good" years (0.4531) than in "bad" years (0.4475).

The companies that issue bonds in the years with positive compensation changes are smaller in assets size, have higher leverage ratio, lower sales growth rate, and lower stock volatility than those in the years with negative changes. The average (median) assets value in "good" years is US$ 405 (69) billion, as compared with US$ 582 (93) billion in"bad" years. Debt on average (median) accounts for 36% (33%) of total assets in "good" years, but only for 33% (31%) in "bad" years. On average (median), sales grow by 1.2 % (0.9%) per year in "good" years, but by 1.5% (1.3%) in "bad" years. Finally, the mean (median) stock volatility measure in "good" years is -4.14 (-4.21), while this value is -4.22 (-4.26) in "bad" years.

It is also noticeable that the magnitudes of increases in CEO inside debt-equity ratios exceed those of decreases. The average (median) magnitude of positive changes is 2.3 (0.72), while the average (median) magnitude of negative changes is only 1.18 (0.46). The larger magnitudes of increases in CEO inside debt-equity ratios might explain why companies in "good" years, despite having some disadvantaged characteristics, can still issue bonds at lower costs than companies in "bad" years. Other characteristics, such as asset tangibility, market-to-book ratio, and industry competitiveness, are comparable between two subsamples.

6.4 Disclosures of inside debt changes and existing bond yield spreads

The main argument for the timing strategies based on inside debt disclosures is that the cost of borrowing reacts to disclosed changes in CEO inside debt. Therefore, I validate this argument before conducting the main test. I examine how the yield spreads of *existing* bonds change after issuing companies disclose changes in their CEO inside debt-equity ratios. Following Wei and Yermack [2011], I run the following regression at bond(j) - month(m) level:

$$Spread_{j,m} = \sum_{k=-4}^{7} \beta_k * b_{j,m}[m+k] + \gamma * X_{j,m} + \epsilon_{j,m} \tag{6.1}$$

The regression (6.1) uses monthly corporate bond data from WRDS Bond Database from the fiscal years 2007 to 2017. *Spread* equals the end-of-month yield-to-maturity of a bond minus the yield of a U.S. Treasury Bond of comparable maturity. The set of dummy variables, *b[m-4],..., b[m+7]*, correspond to bond-month observations from four months before to seven months after the proxy release month of a given fiscal year. *b[t+k]* equals one if the transaction month is "k" months from proxy releases, and equals zero if otherwise. Note that each transaction month is only considered in the fiscal year to which it belongs.[10] Control variables at bond level include dummies for six groups of S&P ratings (AAA to AA-, A+ to A-, BBB+ to BBB-, BB+ to BB-, B+ to B-, and below CCC+), and dummies for three groups of maturity (below five years, five to ten years, above ten years). Control variables at issuing firm level include: firm size, market-to-book ratio, book leverage, and dummies for industry and year fixed effects. Firm-level control variables are measured at two quarters before the observed month to ensure that the information is publicly available. The constant is repressed so $\boldsymbol{\beta_k}$ capture the average monthly yield spreads.

[Figure 6.1 goes here]

I run regression (6.1) on two separate subsamples. One subsample contains disclosures of increasing CEO inside debt-equity ratios and the other contains disclosures of decreasing ratios. The estimates of $\boldsymbol{\beta_k}$ capture the average yield spreads in the months around the releases of proxy statements. Figure 6.1 plots the estimates of $\boldsymbol{\beta_k}$ and their

[10]For example, a company's fiscal year 2012 ends on December 31, 2012. This company always releases its proxy statements in April. Suppose that this company has an outstanding bond in December 2012. For this transaction month, b[m+7] equals one, while b[m-4] equals zero because the month belongs to fiscal year 2012.

95% confidence intervals for these two sets of regressions: increasing inside debt (Figure 6.1a) and decreasing inside debt (Figure 6.1b). The figure shows that existing bond yield spreads fall (rise) after issuing companies disclose increases (decreases) in their CEO inside debt-equity ratios.

Appendix 6.A1 reports and tests the differences between $\boldsymbol{\beta_{k,k\neq 0}}$ and $\boldsymbol{\beta_0}$. Any comparisons concluded from this table are made with respect to the yield spreads in the months when proxy statements are released. The results in this table show that *existing* bond yield spreads significantly fall (rise) after issuing companies disclose positive (negative) changes in their CEO inside debt-equity ratios.

One month before issuing companies disclose increases in their CEO inside debt-equity ratios, the average *existing* yield spreads are 305 bps (= $\boldsymbol{\beta_{-1}}$). The yield spreads fall by 18% (55 bps) to 250 bps (= $\boldsymbol{\beta_0}$) in the months that increases in inside debt are disclosed. The difference between $\boldsymbol{\beta_{-1}}$ and $\boldsymbol{\beta_0}$ is significant at 1% level. Overall, the yield spreads are high before the increases in CEO inside debt are disclosed, but fall after this positive information is released. The yield spreads remain 33 to 65 bps lower for the next three months after issuing firms disclose the positive compensation changes. The differences are significant at 5% or 1% levels.

In contrast, the *existing* yield spreads rise by 33% (53 bps) in the months that issuing companies disclose decreases in their CEO inside debt-equity ratios, as $\boldsymbol{\beta_{-1}}$ and $\boldsymbol{\beta_0}$ equal 150 and 203, respectively. The difference is significant at 1% level. The yield spreads are 53 to 79 bps lower before issuing firms disclose the negative compensation changes. These differences are significant at 1% level. The yield spreads fluctuate but do not significantly fall after the disclosures of falling inside debt.

These results confirm that the increases (decreases) in CEO inside debt-equity ratios are positive (negative) information to bondholders, as *existing* bond yield spreads fall (rise) after the issuing companies disclose these compensation changes. If companies plan to issue new bonds, they might prefer to do so before releasing the negative compensation changes or right after releasing the positive changes because the yield spreads are likely to be the lowest in these periods.

6.5 Disclosures of inside debt changes and the timing of new bond issuances

In this section, I investigate whether companies base on their disclosures of changes in CEO inside debt to determine the time for bond offerings. For each fiscal year in which a company issues new bonds, I aggregate the data of an issuing firm into three "quarters". The first quarter includes (up to) three months before the proxy release month. The second quarter includes the immediate three months after the proxy release month. The third quarter includes the fourth (up) to the sixth month after the proxy release month. By construction, the start and end dates of these constructed quarters differ from those used in Compustat quarterly data. Henceforth, I will refer to the "constructed quarters" as "quarters" for brevity. When using the Compustat quarterly data, I will clearly state that the data is measured at Compustat-quarter.

I construct three dependent variables to capture the bond issuances in each constructed quarter. ***NewBond*** is a dummy variable that equals one if the firm issues any new bond in a given quarter, and equals zero if otherwise. ***BondNumber*** equals the natural logarithm of one plus the number of new bonds issued in the quarter. ***BondAmount*** equals the sum of par value of new bonds issued in the quarter, scaled by book value of total assets at the most recent Compustat-quarters that end before the given (constructed) quarter.

I construct two explanatory variables. ***Quarter_BeforeProxy*** is an indicatory that equals one if the quarter precedes the proxy release month, and equals zero if otherwise. ***Quarter_AfterProxy*** is an indicator that equals one if the quarter immediately follows the proxy release month, and equals zero if otherwise. By construction, both dummies equal zero for the third quarter which spans from the fourth to sixth months after the proxy release month. Hence, the offering activity in the third quarter is the control group. I refer to these third quarters as the "control quarters". An example of how to construct the dependent and explanatory variables is illustrated in Figure 6.2.

[Figure 6.2 goes here]

I split the full sample into two subsamples based on the signs the changes in CEO inside debt-equity ratios. The subsample of *Positive changes* (*Negative changes*) contains the observations in the years when issuing companies disclose increases (decreases) in their CEO inside debt-equity ratios. For each subsample, I run the following regression at firm(i)-quarter(q) level:

$$BondOfferings_{i,q} = \alpha + \beta * Quarter\_BeforeProxy_{i,q} + \gamma * Quarter\_AfterProxy_{i,q} \\ + \theta * X_{i,q} + \delta * Year_q + \eta * Ind_i + \epsilon_{i,q} \tag{6.2}$$

Note that quarter (q) level is the quarter constructed based on compensation disclosures as described above, but not the Compustat-quarter. The dependent variable, *BondOfferings*, is measured by either one of the three variables: ***NewBond***, ***BondNumber***, or ***BondAmount***. Control variables (X) are measured at the most recent Compustat-quarter that precedes the constructed quarter in question. These control variables are commonly used in prior studies to explain the capital structure decisions (Baker and Wurgler [2002], Leary and Roberts [2005], Flannery and Rangan [2006]). *Size* equals the logarithm of total assets. *Tangibility* equals net PP&E divided by book value of assets. *Market-to-book* ratio equals market value of equities plus book value of assets minus book value of equity, scaled by book value of assets. *Book leverage* equals book value of long-term debt divided by book value of total assets. *Sales growth* equals sales minus lagged sales, divided by lagged sales. *Stock volatility* equals the logarithm of standard deviation of daily stock returns over the last 12 months before the (constructed) quarter starts. The regression also include fixed effects for fiscal years and two-digit-SIC-code industries. Standard errors are robust. The results of regression (6.2) are reported in Table 6.2.

[Table 6.2 goes here]

6.5.1 Disclosures of increasing inside debt and bond offerings

I run regression (6.2) in the subsample of *Positive changes* to test hypothesis H10 against H1A. The coefficient of *Quarter_AfterProxy*, $\boldsymbol{\gamma}$, is the coefficient of interests. If hypothesis H10 holds, $\boldsymbol{\gamma}$ is positive and significant. Otherwise, the alternative hypothesis H1A holds.

Hypothesis H10: *Companies issue more bonds right after disclosing an increase in their CEO inside debt-equity ratio.*

Hypothesis H1A: *Companies <u>do not</u> issue more bonds right after disclosing an increase in their CEO inside debt-equity ratio.*

The results are reported in the first four columns in Table 6.2. The estimated coefficients confirm hypothesis H10, and reject hypothesis H1A. $\boldsymbol{\gamma}$ is positive and significant at 1% level for all three dependent variables, while the coefficient of *Quarter_BeforeProxy*, $\boldsymbol{\beta}$, is insignificant. Companies issue significantly more bonds in the first quarters after they disclose positive inside debt changes, as compared with the offering activities in the control quarters. Bond offerings in the quarters before disclosures do not significantly differ from those in the control quarters.

When *NewBond* is the dependent variable, $\boldsymbol{\gamma}$ equals 0.1730 and is significant at 1% level (column 1). This indicates that the probability of new bond issuances in the first quarters after disclosures is 17.3 percentage points higher than that in the control quarters. $\boldsymbol{\gamma}$ becomes 0.4591 and is still significant at 1% level when I run a Probit regression (column 2) instead of an OLS regression.

$\boldsymbol{\gamma}$ equals 0.1750 and is significant at 1% level for *BondNumber* (column 3). The number of bonds issued in the first quarters after positive change disclosures is 40% higher than that in the control quarters, if I assume that each company issues one bond in the control quarters.[11]

Finally, $\boldsymbol{\gamma}$ equals 0.0012 and is significant at 1% level for *BondAmount* (column 4). I assume that the size of bond offerings in the control quarters equals the subsample median, which is 0.0071. The size of bond offerings in the first quarters following the

[11] *BondNumber* equals the natural logarithm of one plus the number of new bonds issued in the quarter.

positive change disclosures is 17% larger than that in the control quarters.

6.5.2 Disclosures of decreasing inside debt and bond offerings

I run regression (6.2) in the subsample of *Negative changes* to test hypothesis H20 against H2A. The coefficient of *Quarter_BeforeProxy*, $\boldsymbol{\beta}$, is the main coefficient of interest. If $\boldsymbol{\beta}$ is positive and significant, hypothesis H20 holds. Otherwise, the alternative hypothesis H2A holds.

Hypothesis H20: *Companies issue more bonds before disclosing a decrease in their CEO inside debt-equity ratio.*

Hypothesis H2A: *Companies <u>do not</u> issue more bonds before disclosing a decrease in their CEO inside debt-equity ratio.*

The results are reported in the last four columns in Table 6.2. $\boldsymbol{\beta}$ is positive and significant at 5% level; whereas the coefficient of *Quarter_AfterProxy*, $\boldsymbol{\gamma}$, is negative and significant at 1% level. These results confirm hypotheses H20 and reject the alternative hypothesis H2A. When companies are about to disclose declines in their CEO inside debt-equity ratios, they issue more bonds before releasing the negative information (positive $\boldsymbol{\beta}$), and avoid offering bonds right after the disclosures (negative $\boldsymbol{\gamma}$).

If the dependent variable is *NewBond*, $\boldsymbol{\beta}$ equals 0.0553 and is significant at 5% level. $\boldsymbol{\gamma}$ equals -0.0842 and is significant at 1% level (column 5). The probability of of new bond issuances is 5.53 (8.42) percentage points higher (lower) in the quarters before (after) disclosures of negative inside debt changes, as compared with the control quarters. The signs and significance levels do not change if I use a Probit regression (column 6) instead of an OLS regression.

When *BondNumber* is the dependent variable, $\boldsymbol{\beta}$ ($\boldsymbol{\gamma}$) equals 0.0679 (-0.0837) and is significant at 5% (1%) level (column 7). The number of new bond issuances is 30% (47%) higher (lower) in the quarter before (after) the negative change disclosures than that in the control quarters.

When the dependent variable is *BondAmount*, $\boldsymbol{\beta}$ equals 0.0004 but is insignificant. $\boldsymbol{\gamma}$ equals -0.0012 and is significant at 1% level (column 8). Even though companies issue more bonds before disclosing the negative compensation changes, they do not offer bonds with significantly larger sizes in this period. However, companies refrain from issuing large bonds right after they disclose negative inside debt changes. The size of bond offerings in the first quarter after disclosures is 21% smaller than that in the control quarters. I assume here that the size of the bond offerings in the control quarters equals the subsample median, which is 0.0058.

6.6 Magnitudes of inside debt changes and the timing of bond issuances

The timing of bond issuances might depend on not only the signs of CEO inside debt changes but also the magnitudes of these changes. According to prior studies, the cost of borrowing is negatively associated not only with an indicator of high inside debt (Wei and Yermack [2011]) but also with the level of inside debt (Anantharaman et al. [2013], Dang and Phan [2016], Freund et al. [2018]). Therefore, the cost of borrowing might also vary with how much CEO inside debt has changed. The more that CEO inside debt has increased (decreased), the more (less) aligned to bondholders' interests have the CEOs become, hence the more would the cost of borrowing rise (fall). Disclosing larger increases in CEO inside debt can lower the cost of borrowing even more, so companies have stronger incentives to delay issuing bonds until this very good information has been disclosed. Similarly, companies have stronger incentives to issue bonds before disclosing larger declines in their CEO inside debt because extremely negative information makes borrowing even costlier.

I use the absolute value of the changes in CEO inside debt-equity ratios to measure the magnitudes of these changes (***Abs(***Δ ***Inside_DE***). To examine if the magnitudes of the disclosed compensation changes also affect the timing of bond issuances, I re-run model (6.2) and allow for the interaction between the quarter indicators and the change magnitudes:

$$
\begin{aligned}
BondOfferings_{i,q} = \alpha &+ \beta_1 * Quarter\_BeforeProxy_{i,q} \\
&+ \beta_2 * Quarter\_BeforeProxy_{i,q} * Abs(\Delta Inside\_DE_{i,q}) \\
&+ \gamma_1 * Quarter\_AfterProxy_{i,q} \\
&+ \gamma_2 * Quarter\_AfterProxy_{i,q} * Abs(\Delta Inside\_DE_{i,q}) \\
&+ \theta * X_{i,q} + \delta * Year_q + \eta * Ind_i + \epsilon_{i,q}
\end{aligned}
\tag{6.3}
$$

Except for the interaction terms, other specifications of model (6.3) are similar to those in model (6.2). I run model (6.3) separately on two sub-samples: *Postive change* and *Negative change* disclosures. The main interest in this section is the coefficients of the interaction terms $\boldsymbol{\beta_2}$ and $\boldsymbol{\gamma_2}$. These two coefficients capture whether tendencies to adopt the timing strategies also vary with the magnitudes of disclosed inside debt changes. I expect that $\boldsymbol{\gamma_2}$ is positive and significant in the *Positive changes* subsample. In the *Negative changes* subsample, I expect $\boldsymbol{\beta_2}$ to be positive and significant.

[Table 6.3 goes here]

The results of regression (6.3) are reported in Table 6.3. Overall, the results suggest that the tendencies to time bond offerings based on inside debt disclosures increase with the magnitudes of the changes that are revealed in those disclosures.

For *Positive changes* subsample (columns 1 to 3), $\boldsymbol{\gamma_1}$ remains positive and significant at 1% level for all three dependent variables. $\boldsymbol{\gamma_2}$ is positive and significant at 1% level for *NewBond* and *BondNumber*; $\boldsymbol{\gamma_2}$ is positive but insignificant for *BondAmount*. Companies concentrate their bond offerings in the immediate quarters after releasing the positive inside debt changes, and the tendencies to adopt this strategy increase with the magnitudes of these positive changes.

For *Negative changes* subsample (columns 4 to 6), $\boldsymbol{\beta_1}$ becomes insignificant while $\boldsymbol{\beta_2}$ is positive and significant at 5% level for all three dependent variables. Companies issue more bonds before disclosing the declines in their CEO inside debt only when the magnitudes of these declines are sufficiently large. In contrast, $\boldsymbol{\gamma_1}$ remains positive and significant at 1% level, but $\boldsymbol{\gamma_2}$ is insignificant. Companies just avoid issuing bonds immediately after disclosing the declines in inside debt, regardless of the magnitudes of the disclosed changes.

Issuing bonds within the narrow time frame of three months before the mandatory disclosures can be difficult for many companies. If the decline in inside debt is not very large, companies might just avoid the immediate quarters after these negative changes are disclosed. These companies then issue bonds in the control quarters (i.e. the second quarters after disclosures) when the negative impacts of compensation disclosures have been diluted by other information releases.[12] Only when the declines in inside debt are so large that the cost of borrowing will rise significantly, do companies need to hurry up and issue bonds before disclosing these extremely negative compensation changes.

6.7 Which companies employ the timing strategies?

I re-run regression (6.2), using *BondNumber* as the dependent variable, on different subsamples of firms. The subsamples are first split based on whether *Positive changes* or *Negative changes* will be disclosed. Each large subsample is then split into smaller subsamples based on the frequency of bond issuances at firm level, the maturity of the bond issues, and the types of covenants included with the issues. The results for the *Positive changes* subsamples are reported in Table 6.4, and those for the *Negative changes* subsamples are reported in Table 6.5. In panel B of each table, I test whether the coefficients in the sub-subsample pairs are significantly different.

[Table 6.4 goes here]

[Table 6.5 goes here]

6.7.1 Regular bond issuers

Companies that have been issuing bonds in recent years are more capable of utilizing the timing strategies because their familiarities with the offering process enable them to

[12] The regression results in section 6.5 also show that the increased bond offerings in the quarter before negative change disclosures are not as large as the decreased offerings in the first after the disclosures.

issue new bonds in any months whose market conditions are favorable. First, regular bond issuers often have shelf registered issues under SEC 415 rule, which allows them to promptly issue bonds within a short notice (Kidwell et al. [1987], Kadapakkam and Kon [1989]). Second, regular issuers have already established partnerships with the underwriters, which reduces the time spent on due-diligence and even the underwriting fees because of fewer information asymmetries (Fox [1984], Yasuda [2005]). In addition, there are also fewer information asymmetries between regular bond issuers and outside investors, either because regular issuers are more transparent firms (according to the pecking-order theory) or because these firms have disclosed plenty of news during the previous offerings (Covitz and Harrison [2004]). Therefore, the security prices might react more strongly to the new information, i.e. the changes in the CEO inside debt-equity ratios, that is disclosed by regular bond issuers.

I consider that a company is a regular bond issuer if it has been issuing new bonds every year for the last five years. The tendencies to time bond offerings based on the disclosures of *positive* inside debt changes is stronger among regular issuers ($\boldsymbol{\gamma} = 0.2703$) than among non-regular issuers ($\boldsymbol{\gamma} = 0.1519$). The difference between these two coefficients is significant at 5% level (Table 6.4). I also find a similar conclusion when examining the timing strategy based on the disclosures of *negative* inside debt changes. Regular issuers manage to issue more bonds before the disclosures ($\boldsymbol{\beta} = 0.1811$, significant at 1%) while non-regular issuers cannot ($\boldsymbol{\beta} = 0.0127$, insignificant). The difference between these two coefficients is significant at 1% level (Table 6.5).

6.7.2 Long-term bonds

Long-term bondholders are subject to more agency problem of debt than the short-term holders because the long-term debt cannot be renegotiated easily. The increases (decreases) in the CEO inside debt-equity ratios reflect more (less) aligned managerial incentives to debtholders' interests. Therefore, the cost of long-term debt should be more sensitive to any changes the CEO inside debt-equity ratios, which gives the issuing companies stronger incentives to time the long-term bond issuances based on disclosed information about compensation changes.

I define long-term bonds as those with maturity longer than five years. I find that tendencies to adopt the timing strategies do not differ significantly between the long-term and the short-term bonds for both types of disclosures. Companies tend to issue more long-term bonds ($\gamma = 0.1652$, significant at 1% level) than short-term bonds ($\gamma = 0.1355$, significant at 5%) in the first quarter after they disclose *positive* inside debt changes. However, the difference between two estimates of γ is not significant (Table 6.4).

Companies do not issue significantly more long-term bonds ($\beta = 0.0355$, insignificant) than short-term bonds ($\beta = 0.0603$, insignificant) before disclosing *negative* inside debt changes. The difference between two estimates of β is not significant either. However, companies avoid issuing long-term bonds ($\gamma = -0.0908$, significant at 1%) more than short-term bonds ($\gamma = -0.0745$, insignificant) right after disclosing the declines in CEO inside debt. The difference between two estimated γ is significant at 10% (Table 6.5)

6.7.3 Covenant exclusion

Companies might time their bond issuances if they do not include restrictive covenants with the new issues. I implicitly assume here that the inclusion (or exclusion) of covenants is determined endogenously when companies decide to issue new bonds. High CEO inside debt-equity ratios can substitute for covenants, allowing companies to raise new debt at a lower cost (Han [2011], Anantharaman et al. [2013]). Therefore, issuers can substitute for the effect of missing covenants by offering bonds when the market's perception of CEO inside debt is relatively favorable.

Any covenants

I determine that a company does not include any covenants with the new bond issue if Mergent FISD reports no covenants for that issue. I find that companies have stronger tendencies to time bond offerings based on inside debt disclosures when they do not include any covenants with the new bond issues. In the *Positive changes* subsample, γ equals 0.2657 (0.1747) when the issues exclude (include) any restrictive covenants. The difference between these two estimates is significant at 10% level (Table 6.4). In the *Negative changes* subsample, $\boldsymbol{\beta}$ equals 0.1616 (-0.0951) when the issues exclude (include) any restrictive covenants. The difference between these two estimates is also significant at 10% level (Table 6.5).

Net-worth covenants

Net-worth covenants either (i) require the issuing company to maintain a minimum specified net worth (*Maintenance_net_worth*); or (ii) trigger certain bond provisions if this net worth falls below a minimum level (*Declining_net_worth*). I do not observe that companies issues more bonds without the net-worth covenants after (before) the disclosures of increases (decreases) in CEO inside debt. The difference between two estimates of $\boldsymbol{\gamma}$ ($\boldsymbol{\beta}$) is not significant for the disclosures of positive (negative) changes in CEO inside debt. However, I find that companies significantly avoid offering bonds right after disclosing the negative compensation changes when the bonds do not include the net-worth covenants. The difference between two estimates of $\boldsymbol{\gamma}$ in the *Negative changes* subsample is significant at 1% level.

Poison put covenant

Poison put covenant (*Change_control_put_provisions*) gives bondholders the option to sell the bond back to the issuing company upon a change of control. The exclusion of the poison put covenant does not cause a significant difference in the tendencies to adopt the timing strategies. Shortly after companies disclose *positive* compensation changes, they issue bonds which exclude the poison put covenant ($\boldsymbol{\gamma} = 0.1904$, significant at 1%) as often as they do with the bonds which include this covenant ($\boldsymbol{\gamma} = 0.1800$, significant at 1%). The difference between these two estimates is insignificant (Table 6.4). It appears that companies concentrate their offerings in the quarter before disclosing the *negative* compensation changes when the bonds do not have the poison put covenant ($\boldsymbol{\beta} = 0.0749$, significant at 10%), but not when the bonds include this covenant ($\boldsymbol{\beta} = 0.0161$, insignificant). However, the difference between these two estimates is insignificant (Table 6.5).

Debt-restriction covenants

Debt-restriction covenants either (i) restrict the issuer from issuing secured debt unless it secures the current issue (*Negative_pledge_covenant*); or (ii) restrict the amount of senior debt that the issuer can issue in the future (*Senior_debt_issuance*); or (iii) restrict the issuer and its subsidiaries from issuing additional funded debt (*Funded_debt_is*, *Funded_debt_sub*); or (iv) restrict the issuer and its subsidiaries from incurring additional debt (*Indebtedness_is*, *Indebtedness_sub*). Companies tend to adopt the timing strategies more when the new bond issues do not contain any debt-restriction covenants. Tendencies to time bond issuances after disclosures of *positive* inside debt changes are stronger when the bonds have no debt-restriction covenants ($\boldsymbol{\gamma}$ = 0.2815, significant at 1%) than when the bonds have these covenants ($\boldsymbol{\gamma}$ = 0.0998, significant at 1%). The difference is significant at 1% level (Table 6.4). When *negative* compensation changes will be disclosed, companies significantly increase their offerings in the quarters before disclosures when the issues exclude debt-restriction covenants ($\boldsymbol{\beta}$ = 0.0924, significant at 5%) than when the bonds include these covenants ($\boldsymbol{\beta}$ = 0.0274, insignificant). The difference is significant at 5% level (Table 6.5).

6.8 Timing strategies and offering yield spreads

The main argument for why companies utilize the timing strategies based on disclosures of changes in CEO inside debt-equity ratios is that doing so allows them to offer bonds at a lower cost. In this section, I test the direct implication of this argument that the timing of bond issuances is associated with differential offering bond yield spreads.

I run the following regression at bond (j) level:

$$\begin{aligned} Spreads_j = \alpha + \beta * Issued\_BeforeProxy_j \\ + \gamma * Issued\_AfterProxy_j + \theta * X_j + \epsilon_j \end{aligned} \tag{6.4}$$

Spreads equal a bond's offering yield minus the yield of a U.S. Treasury Bill with similar maturity. ***Issued_BeforeProxy*** equals one if the bond is issued within three months before the disclosure of CEO compensation, and equals zero if otherwise. ***Issued_AfterProxy*** equals one if the bond is issued within three months after the disclosure of CEO compensation, and equals zero if otherwise. By construction, these two indicators both equal zero for any bonds that are issued in the control quarters. The disclosures must occur in the same fiscal year with the offerings. Control variables (X) include bond characteristics and issuing firm characteristics. Bond characteristics include: number of years to maturity (*Ln (Bond age)*), offering size (*Ln (Offering amount)*), indicator for a callable bond (*Callable*), indicator for a senior and secured bond (*Senior Secured*), and indicator for a non-senior secured bond (*Secured*). Issuing firm characteristics are measured at the most recent Compustat-quarters at least three months before the bonds' offering months. to ensure that the information is publicly available. *Size* equals the logarithm of total assets. *Returns-on-Assets* equals EBIT divided by lagged total assets. Book leverage (*Book leverage*) equals long-term debt divided by total assets. Stock volatility (*Stock volatility*) equals the logarithm of the standard deviation of daily stock returns over the last 12 months before the bonds' offering months. The regression also includes fixed effects for six groups of S&P ratings (AAA to AA-, A+ to A-, BBB+ to BBB-, BB+ to BB-, B+ to B-, and below CCC+), issuing years, and two-digit-SIC-code industries of the issuing firms.

Two coefficients of interests are $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$. For the *Positive changes* subsample, I expect $\boldsymbol{\gamma}$ to be negative. Companies can raise debt at a lower cost if they issue bonds right after disclosing positive changes in their CEO inside debt-equity ratios. I expect $\boldsymbol{\beta}$ to be negative and $\boldsymbol{\gamma}$ to be positive for the *Negative changes* subsample. It is costlier for companies to raise debt when they have recently disclosed decreases in their CEO inside debt-equity ratios. Such costly debt financing can be avoided if companies manage to issue bonds before disclosing the bad news. Table 6.6 reports the estimated coefficients of regression (6.4).

[Table 6.6 goes here]

When I run regression (6.4) on the *Positive changes* subsample and do not include any control variables, $\boldsymbol{\gamma}$ equals -0.0048 and is significant at 1% level; $\boldsymbol{\beta}$ equals 0.0005 and is insignificant (Table 6.6, column 1). γ becomes -0.0046 and is still significant at 1% level after I include control variables and fixed effects (column 2). Issuing bonds right after disclosures of increased inside debt can reduce the yield spreads by 46 bps, compared with issuing bonds in the control quarters. Given the subsample average spreads of 208 bps, this effect is equivalent to a 22% decrease in the cost of debt.

In the *Negative changes* subsample, $\boldsymbol{\beta}$ equals -0.0052 and γ equals 0.0059 when I do run regression (6.4) without control variables (column 3). Both estimates are significant at 1% level. $\boldsymbol{\beta}$ (γ) becomes -0.0047 (0.0056) and both estimates are significant at 1% level after I add control variables and fixed effects (column 4). The cost of debt is 47 bps lower when companies issue bond before disclosing the negative compensation changes than when they delay the issuance to the second quarters after the disclosures (i.e. the control quarters). The effect is equivalent to a 20% decrease in the cost of debt, if I assume the cost of debt in the control quarters equals the subsample average spreads of 241 bps. In contrast, issuing bonds right after disclosing the negative inside debt changes, instead of postponing to the control quarters, increases yield spreads by 56 bps, which corresponds to an increase of 23.2% in the cost of debt.

6.9 Conclusion

According to existing literature, inside debt (inside equity) aligns CEOs' incentives with bondholders' (shareholders') interests. Therefore, increases in CEO inside debt-equity ratios are positive news to bondholders as the existing bond yield spreads decrease after disclosures of such compensation changes. In contrast, decreases in these compensation ratios are negative news to bondholders. During the months between prior fiscal-year ends and proxy releases, which are usually four months, changes in CEO inside debt-equity ratios are private information to companies' insiders. If companies plan to issue new bonds and they know that the information they are about to disclose might affect the cost of borrowing, they might time the bond issuances to take advantage of the low cost of debt resulting from the positive change disclosures or to avoid the high cost of debt triggered by the negative change disclosures.

I find evidence that companies do utilize the above-described timing strategies. Bond offerings cluster in the immediate quarters after (before) disclosures of positive (negative) changes in CEO inside debt-equity ratios. The estimated results are significant when either of the following measures of bond offerings is used: (i) the probability of issuing new bonds, (ii) the number of new issues, and (iii) the offering size as a fraction of total assets. Tendencies to adopt these timing strategies also increase with the magnitudes of the disclosed changes. The more that CEO inside debt-equity ratios have increased (decreased), the more (less) aligned to bondholders' interests CEOs have become, hence the more that the cost of borrowing would rise (fall). Therefore, the tendencies to issue bonds in the quarters after (before) disclosures of positive (negative) inside debt changes rise with the magnitudes of the changes that issuing companies are about to disclose.

However, I show that only certain issuing companies or companies issuing certain types of bonds utilize the timing strategies based on disclosures of CEO inside debt. More specifically, the adoption of these timing strategies is more observable when issuing firms offer bonds regularly, or when the bonds do not include any restrictive covenants, especially the deb-restriction covenants.

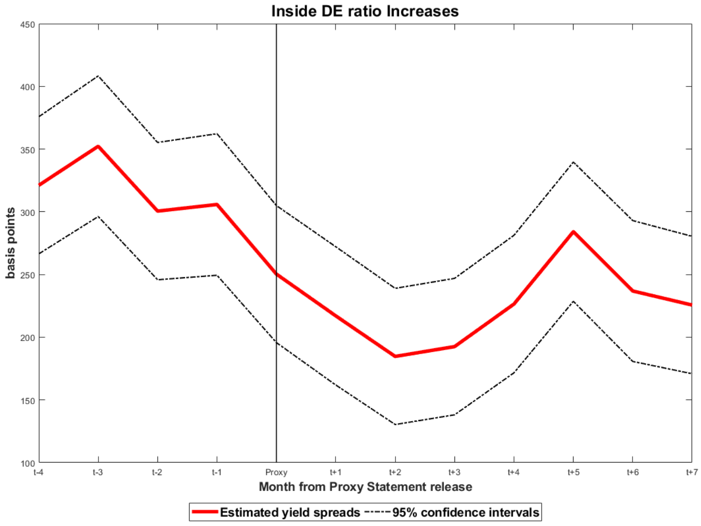
Finally, I show evidence that timing the bond issuances based on disclosures of changes in CEO inside debt-equity ratios is associated with reduced cost of debt. The bonds issued at favorable times, i.e. right after good news disclosures or before bad news disclosures, have lower offering yield spreads than those issued at non-favorable times.

6.10 Figures and Tables

Figure 6.1: **Existing bond yield spreads around proxy statement releases**

This figure plots the estimated coefficients β_{t+k} and their 95% percentiles intervals from the regression that examines yield spreads of existing bonds around CEO compensation disclosures: $Spread_{j,m} = \sum_{k=-4}^{7} \beta_{t+k} * b_{j,m}[t+k] + \gamma * Controls + \epsilon_{j,m}$

(a) **Proxy statements disclose increases in inside debt-equity ratios**



(b) **Proxy statements disclose decreases in inside debt-equity ratios**

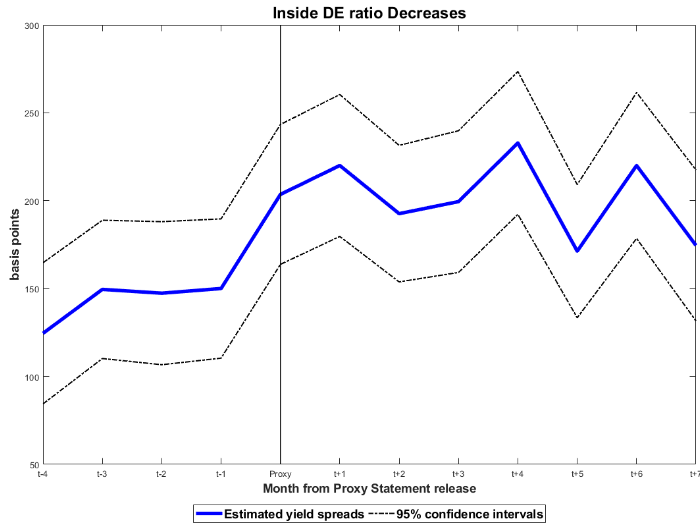


Figure 6.2: **Example of variable construction**

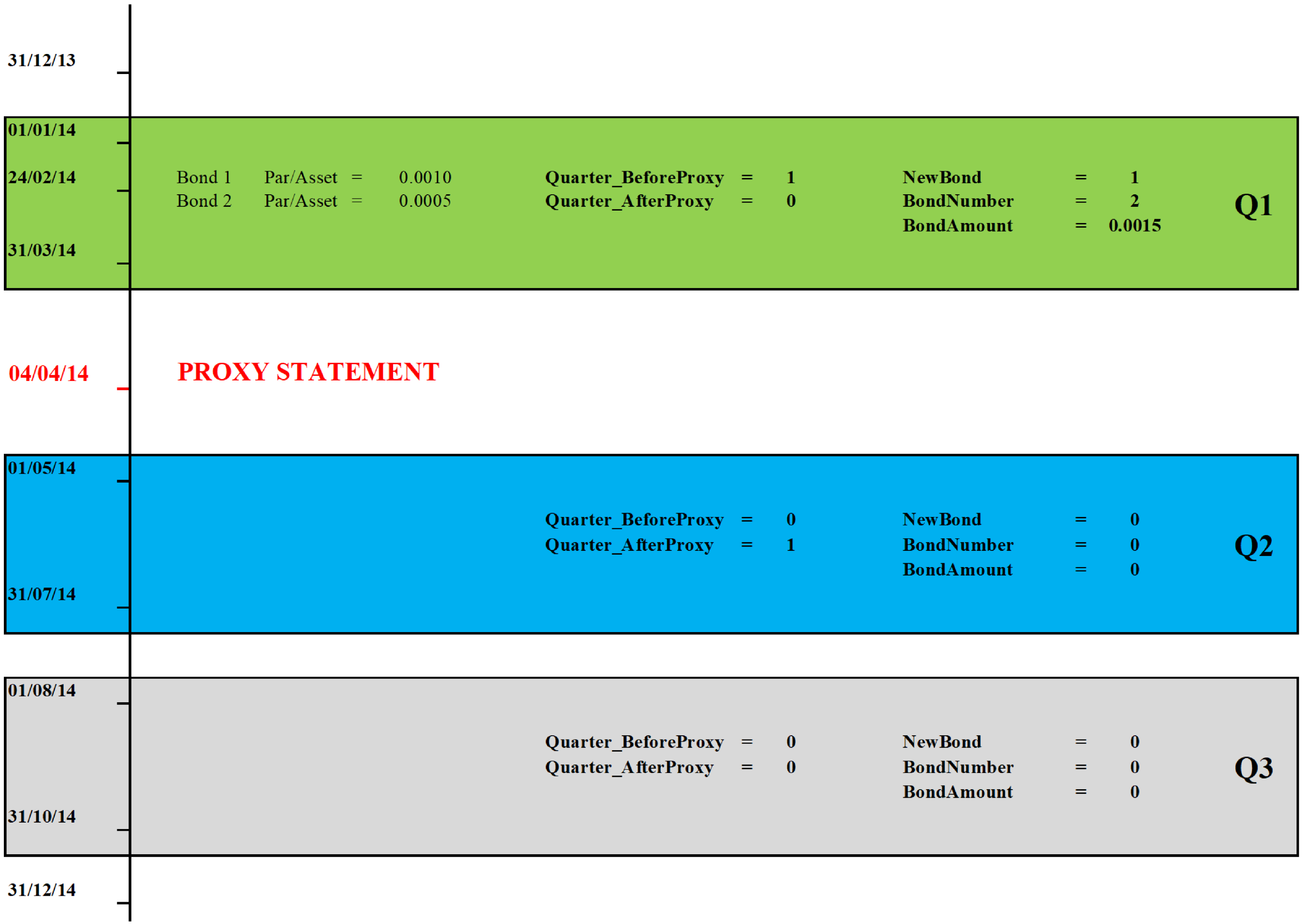


Table 6.1: **Descriptive statistics**

This table present descriptive statistics for two samples of bond issues. In Panel A (Panel B), the bonds are offered in the years that issuing firms disclose increases (decreases) in CEO inside debt-equity ratios.

Panel A: Issuing firms disclose positive compensation changes (Δ Inside_DE > 0)						
Variables	**N**	**Mean**	**STD**	**Q25**	**Q50**	**Q75**
Bond characteristics						
Spreads	5483	0.0208	0.0182	0.0105	0.0152	0.0230
Bond age (years)	5483	10.579	8.2970	5.0000	10.000	10.333
Offering amount (US$ million)	5483	0.4531	0.5887	0.0079	0.3000	0.6000
Offering amount (% of Assets)	5483	0.0274	0.0541	< 0.0001	0.0071	0.0305
Callable	5483	0.6653	0.4719	0	1	1
Senior Secured	5483	0.9867	0.1146	1	1	1
Secured	5483	0.0381	0.1915	0	0	0
Firm chracteristics:						
Abs (Δ Inside_DE)	5483	2.3051	3.0489	0.2562	0.7150	3.2851
Assets (US$ billion)	5483	405.17	665.04	15.098	69.189	685.33
Ln (Assets)	5483	10.6518	1.5942	9.6223	11.145	12.0458
PPE/Assets	5483	0.2097	0.2524	0.0091	0.0960	0.3007
Market-to-Book	5483	1.5023	0.7729	1.0160	1.1703	1.6685
Book leverage	5483	0.3590	0.1923	0.2163	0.3328	0.5512
Sales growth	5483	0.0116	0.1483	-0.0490	0.0090	0.0697
Industry_HHI	5483	0.0917	0.1001	0.0358	0.0581	0.1073
Stock volatility	5483	-4.1493	0.4880	-4.5145	-4.2112	-3.8809

Panel B: Issuing firms disclose negative compensation changes (Δ Inside_DE < 0)						
Variables	**N**	**Mean**	**STD**	**Q25**	**Q50**	**Q75**
Bond characteristics						
Spreads	4545	0.0241	0.0229	0.0104	0.0154	0.0266
Bond age (years)	4545	10.178	8.5972	5.0000	8.2500	10.083
Offering amount (US$ million)	4545	0.4475	0.5770	0.0056	0.3000	0.6000
Offering amount (% of Assets)	4545	0.0271	0.0575	< 0.0001	0.0058	0.0274
Callable	4545	0.6862	0.4641	0	1	1
Senior Secured	4545	0.9831	0.1291	1	1	1
Secured	4545	0.0453	0.2080	0	0	0
Firm chracteristics:						
Abs (Δ Inside_DE)	4545	1.1796	2.0399	0.1208	0.4552	0.9945
Assets (US$ billion)	4545	582.22	846.56	19.672	93.757	856.24
Ln (Assets)	4545	10.819	1.482	9.887	11.448	12.046
PPE/Assets	4545	0.2078	0.2655	0.0069	0.0614	0.3401
Market-to-Book	4545	1.4878	0.8003	1.0020	1.1587	1.6568
Book leverage	4545	0.3358	0.1654	0.2180	0.3125	0.4646
Sales growth	4545	0.0150	0.1204	-0.0439	0.0125	0.0630
Industry_HHI	4545	0.0769	0.0902	0.0356	0.0542	0.0675
Stock volatility	4545	-4.2150	0.4255	-4.4998	-4.2579	-3.9682

Table 6.2: **Disclosures of changes in inside debt-equity ratios and the timing bond issuance**

This table reports estimates of the regression that examines bond offerings in different quarters relative to disclosures of CEO compensation. Δ *Inside_DE* is the change in CEO inside debt-equity ratio over its lagged value. ***NewBond*** is a dummy variable equal to one if the firm issues any new bond in the quarter. ***BondNumber*** equals the natural logarithm of one plus the number of new bonds issued in the quarter. ***BondAmount*** equals the sum of par value of new bonds issued in the quarter, scaled by Compustat-lagged-quarter book value of total assets. ***Quarter_BeforeProxy*** equals one if the quarter precedes the proxy release month, and equals zero if otherwise. ***Quarter_AfterProxy*** equals one if the quarter immediately follows the proxy release month, and equals zero if otherwise. Industries are based on two-digit SIC code. Standard errors are robust. t-stats are given in the parentheses. *, **, *** denotes significance at 10%, 5%, and 1% levels, respectively.

	Positive changes (Δ Inside_DE > 0)				**Negative changes (Δ Inside_DE < 0)**			
Dependent variable:	**NewBond** OLS (1)	**NewBond** Probit (2)	**BondNumber** OLS (3)	**BondAmount** OLS (4)	**NewBond** OLS (5)	**NewBond** Probit (6)	**BondNumber** OLS (7)	**BondAmount** OLS (8)
Quarter_BeforeProxy	**0.0067**	**0.0127**	**0.0177**	**-0.0001**	**0.0553****	**0.1473****	**0.0679****	**0.0004**
	(0.3078)	**(0.2126)**	**(0.8101)**	**(-0.3040)**	**(2.2325)**	**(2.2728)**	**(2.5066)**	**(1.0705)**
Quarter_AfterProxy	**0.1730*****	**0.4591*****	**0.1750*****	**0.0012*****	**-0.0842*****	**-0.2340*****	**-0.0837*****	**-0.0012*****
	(7.6505)	**(7.6323)**	**(7.4396)**	**(4.7331)**	**(-3.4878)**	**(-3.5948)**	**(-3.1915)**	**(-4.1229)**
Control variables (lag one quarter):								
Size	0.0512***	0.1393***	0.0837***	-0.0010***	0.0534***	0.1466***	0.0946***	-0.0011***
	(5.2587)	(5.1841)	(8.6290)	(-7.2563)	(5.3343)	(5.3193)	(9.1373)	(-6.9215)
Book leverage	0.1090	0.2914	0.1522**	-0.0015	-0.0122	-0.0463	0.1781**	-0.0027**
	(1.6117)	(1.5821)	(2.2086)	(-1.4740)	(-0.1747)	(-0.2404)	(2.2621)	(-2.0617)
Market-to-Book	0.0056	0.0150	0.0148	0.0010***	0.0109	0.0310	0.0224	0.0011***
	(0.4025)	(0.3895)	(1.0497)	(3.2818)	(0.7579)	(0.7840)	(1.5012)	(3.2219)
Tangibility	0.1073	0.3124	0.0002	0.0002	0.1564**	0.4356**	0.0868	0.0013
	(1.4225)	(1.5233)	(0.0032)	(0.2325)	(2.0056)	(2.0619)	(1.1838)	(1.1125)
Sales growth	-0.0932	-0.2636	-0.0692	-0.0009	0.0243	0.0726	0.0572	0.0005
	(-1.5247)	(-1.5877)	(-1.1458)	(-1.3082)	(0.3715)	(0.4069)	(0.8428)	(0.5689)
Sales_HHI	0.0063	0.0235	0.0486	0.0007	0.0036	0.0076	0.0464	-0.0013
	(0.0488)	(0.0665)	(0.3956)	(0.4819)	(0.0256)	(0.0197)	(0.3567)	(-0.9579)
Stock volatility	0.0289	0.0815	0.0367	0.0011***	0.0701**	0.1900**	0.0613**	0.0016***
	(1.1569)	(1.1991)	(1.4684)	(3.3473)	(2.4871)	(2.5045)	(2.1088)	(3.8262)
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,072	3,072	3,072	3,072	2,640	2,640	2,640	2,640
Adj. (Pseudo) R^2	0.051	0.057	0.086	0.112	0.042	0.052	0.113	0.131

Table 6.3: **Magnitudes of disclosed inside debt-equity ratio changes and the timing of bond issuances**

This tables reports the results of the regression that relates news intensity with the timings of the new bond offerings. Δ *Inside_DE* is the change in CEO inside debt-equity ratio over its lagged value. ***NewBond*** is a dummy variable equal to one if the firm issues any new bond in the quarter. ***BondNumber*** equals the natural logarithm of one plus the number of new bonds issued in the quarter. ***BondAmount*** equals the sum of par value of new bonds issued in the quarter, scaled by Compustat-lagged-quarter book value of total assets. ***Quarter_BeforeProxy*** equals one if the quarter precedes the proxy release month, and equals zero if otherwise. ***Quarter_AfterProxy*** equals one if the quarter immediately follows the proxy release month, and equals zero if otherwise. *Abs(Δ Inside_DE)* equals the absolute value the change in CEO inside debt equity ratio. Industries are based on two-digit SIC code. Standard errors are robust. t-stats are given in the parentheses. *, **, *** denotes significance at 10%, 5%, and 1% levels, respectively.

	Positive changes (Δ Inside_DE > 0)			**Negative changes (Δ Inside_DE < 0)**		
Dependent variable:	**NewBond** (1)	**BondNumber** (2)	**BondAmount** (3)	**NewBond** (4)	**BondNumber** (5)	**BondAmount** (6)
Quarter_BeforeProxy	**-0.0024**	**0.0045**	**0.0000**	**-0.0187**	**0.0158**	**-0.0005**
	(-0.0954)	**(0.1765)**	**(0.1485)**	**(-0.5290)**	**(0.3925)**	**(-1.0336)**
Quarter_BeforeProxy $\times$ Abs(Δ Inside_DE)	**0.0089**	**0.0157**	**-0.0001**	**0.1590*****	**0.1229****	**0.0016****
	(0.7458)	**(1.2336)**	**(-0.9049)**	**(2.9137)**	**(2.0913)**	**(2.2271)**
Quarter_AfterProxy	**0.1288*****	**0.1280*****	**0.0010*****	**-0.0937*****	**-0.0792*****	**-0.0013*****
	(4.9501)	**(4.7015)**	**(3.4695)**	**(-3.5234)**	**(-2.7198)**	**(-4.3818)**
Quarter_AfterProxy $\times$ Abs(Δ Inside_DE)	**0.0352*****	**0.0408*****	**0.0002**	**0.0089**	**0.0019**	**0.0001**
	(2.8948)	**(2.9605)**	**(1.0774)**	**(0.8083)**	**(0.1788)**	**(0.9338)**
Abs(Δ Inside_DE)	-0.0076	-0.0106	0.0001	-0.0062	-0.0085	-0.0001
	(-0.8302)	(-1.1124)	(0.8796)	(-0.8956)	(-1.1402)	(-1.2167)
Control variables (lag one quarter):						
Size	0.0540***	0.0939***	-0.0010***	0.0619***	0.1160***	-0.0011***
	(6.2613)	(10.6409)	(-7.8706)	(7.0584)	(12.2268)	(-7.9180)
Book leverage	0.1033	0.1430**	-0.0016	-0.0155	0.1791**	-0.0027**
	(1.5374)	(2.0895)	(-1.5351)	(-0.2238)	(2.2549)	(-2.0302)
Market-to-Book	0.0070	0.0200	0.0010***	0.0131	0.0282*	0.0011***
	(0.5139)	(1.4519)	(3.4561)	(0.9314)	(1.9279)	(3.2268)
Tangibility	0.1123	0.0065	0.0003	0.1583**	0.0872	0.0013
	(1.4952)	(0.0920)	(0.3153)	(2.0455)	(1.1996)	(1.1082)
Sales growth	-0.1022*	-0.0782	-0.0009	0.0178	0.0492	0.0004
	(-1.6753)	(-1.2939)	(-1.3496)	(0.2725)	(0.7231)	(0.5045)
Sales_HHI	-0.0691	-0.0483	0.0007	-0.0106	-0.0615	-0.0006
	(-0.6114)	(-0.4305)	(0.6192)	(-0.0879)	(-0.5493)	(-0.5350)
Stock volatility	0.0292	0.0343	0.0011***	0.0629**	0.0529*	0.0015***
	(1.1720)	(1.3747)	(3.3134)	(2.2398)	(1.8205)	(3.7076)
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3,072	3,072	3,072	2,640	2,640	2,640
Adj. R^2	0.054	0.088	0.113	0.044	0.110	0.132

Table 6.4: **Sub-sample analyses - Disclosures of increases in inside debt-equity ratios**

Panel A reports estimates of regression 6.2 that is conducted on different sub-samples. The issuing companies in this table disclose increases in their CEO inside debt-equity ratios (Δ *Inside_DE* > 0). **Regular issuers** are the companies that have been issuing new bonds every year for the last five years. **Long-term bonds** are any bonds with above five years of maturity. A bond issue has **any covenants** if the bond is included in Mergent FISD Covenant Table. **Net-worth covenants** require the issuing company to maintain a minimum specified net worth. **Poison put covenant** gives the bondholders the option to sell the bond back to the issuing company upon a change of control in the this company. **Debt-restriction covenants** restrict the issuer from issuing secured debt unless it secures the current issue. *BondNumber* equals the natural logarithm of one plus the number of new bonds issued in the quarter. ***Quarter_BeforeProxy*** equals one if the quarter precedes the proxy release month, and equals zero if otherwise. ***Quarter_AfterProxy*** equals one if the quarter immediately follows the proxy release month, and equals zero if otherwise. Industries are based on two-digit SIC code. Standard errors are robust. t-stats are given in the parentheses for Panel A. Panel B compares the main coefficients of the sub-sample analyses in each category. p-values are given in the parentheses for Panel B. *, **, *** denotes significance at 10%, 5%, and 1% levels for both panels.

Panel A: Estimated coefficients

	Regular issuers		**Long-term bonds**		**Any covenants**		**Net-worth covenants**		**Poison put covenant**		**Debt-restriction covenants**	
	Yes (1)	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**
Dependent variable: BondNumber												
Quarter_BeforeProxy	**0.0358**	**-0.0214**	**-0.0152**	**0.0357**	**0.0154**	**0.0502**	**0.0398**	**0.0070**	**0.0050**	**0.0013**	**-0.0193**	**0.0359**
	(0.5577)	**(-0.9087)**	**(-0.6903)**	**(0.9200)**	**(0.6291)**	**(0.8998)**	**(0.3568)**	**(0.2933)**	**(0.1761)**	**(0.0389)**	**(-0.7331)**	**(0.9545)**
Quarter_AfterProxy	**0.2703*** **	**0.1519*** **	**0.1652*** **	**0.1355** **	**0.1747*** **	**0.2657*** **	**0.1320**	**0.1921*** **	**0.1800*** **	**0.1904*** **	**0.0998*** **	**0.2815*** **
	(4.2926)	**(6.0655)**	**(7.0738)**	**(2.6231)**	**(6.0015)**	**(4.3700)**	**(1.4683)**	**(7.5217)**	**(6.1010)**	**(5.3337)**	**(3.7089)**	**(7.0281)**
Control variables:												
Size	0.1521***	0.0712***	0.1034***	0.0588**	0.0620***	0.2104***	0.0309	0.1243***	0.0553***	0.1525***	0.0615***	0.1443***
	(3.6160)	(7.7803)	(11.0102)	(2.0449)	(6.8983)	(7.3196)	(0.4826)	(12.5188)	(3.7136)	(11.0957)	(5.0574)	(9.9326)
Book leverage	0.1786	0.0421	0.4898***	0.5316***	-0.0772	1.6254***	0.0303	0.5619***	-0.1989**	1.2012***	-0.1355	0.9011***
	(0.6049)	(0.5870)	(5.0718)	(2.8255)	(-1.0473)	(6.4326)	(0.0884)	(5.5749)	(-2.2469)	(7.6074)	(-1.4641)	(5.7886)
Market-to-book	0.0947	0.0237	0.0037	-0.0357	0.0349**	-0.0792	0.0441	0.0009	0.0373**	-0.0538*	0.0296*	-0.0282
	(1.4905)	(1.5723)	(0.2679)	(-0.9181)	(2.3338)	(-1.2721)	(0.5371)	(0.0603)	(2.0570)	(-1.9319)	(1.6459)	(-1.0044)
Tangibility	0.1635	-0.0161	-0.0434	0.7820***	0.0203	0.3369	0.0421	-0.0155	0.0771	0.1571	0.0103	0.0644
	(0.6026)	(-0.2252)	(-0.5522)	(2.6892)	(0.2801)	(0.7948)	(0.1124)	(-0.1777)	(0.9527)	(0.8535)	(0.1171)	(0.3749)
Sales growth	-0.0542	-0.1331**	-0.0275	0.0084	-0.1039*	0.1479	-0.2444	-0.0416	-0.1187	-0.0123	-0.1629**	0.1130
	(-0.2844)	(-2.1387)	(-0.3919)	(0.0575)	(-1.6929)	(0.7145)	(-0.9909)	(-0.5621)	(-1.5248)	(-0.1147)	(-2.2436)	(0.9440)
Industry_HHI	0.0273	0.0799	-0.0343	-0.0539	0.0247	-1.1957**	-4.5276	0.0071	0.1420	-0.2630	0.0253	-0.1492
	(0.0699)	(0.6415)	(-0.2895)	(-0.1539)	(0.2011)	(-2.4236)	(-0.8869)	(0.0584)	(1.0925)	(-0.9171)	(0.1641)	(-0.7144)
Stock volatility	0.0352	0.0417*	0.0273	0.0968	0.0383	-0.0314	-0.0810	0.0326	0.0495	0.0115	0.0330	0.0729*
	(0.3471)	(1.7218)	(1.1027)	(1.3497)	(1.5896)	(-0.3820)	(-0.5733)	(1.2110)	(1.4611)	(0.2913)	(1.0661)	(1.7738)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	924	2,148	2,415	750	2,940	693	153	3,021	1,560	1,251	1,992	1,629
Adj. R^2	0.117	0.051	0.134	0.097	0.057	0.233	0.021	0.151	0.035	0.208	0.033	0.221

Panel B: Difference in coefficients

	Regular issuers		**Long-term bonds**		**Any covenants**		**Net-worth covenants**		**Poison put covenant**		**Debt-restriction covenants**	
	Diff.	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2
Quarter_AfterProxy (1)	**0.1184** **	**4.5385**	0.0297	0.1903	**-0.0910***	**2.7626**	-0.0601	0.6287	-0.0104	0.0190	**-0.1817*** **	**15.1954**
- Quarter_AfterProxy (2)	**(0.0331)**		(0.6627)		**(0.0965)**		(0.4278)		(0.8905)		**(0.0001)**	

Table 6.5: **Sub-sample analyses - Disclosures of decreases in inside debt-equity ratios**

Panel A reports estimates of regression 6.2 that is conducted on different sub-samples. The issuing companies in this table disclose decreases in their CEO inside debt-equity ratios (Δ *Inside_DE* < 0). **Regular issuers** are the companies that have been issuing new bonds every year for the last five years. **Long-term bonds** are any bonds with above five years of maturity. A bond issue has **any covenants** if the bond is included in Mergent FISD Covenant Table. **Net-worth covenants** require the issuing company to maintain a minimum specified net worth. **Poison put covenant** gives the bondholders the option to sell the bond back to the issuing company upon a change of control in the this company. **Debt-restriction covenants** restrict the issuer from issuing secured debt unless it secures the current issue. *BondNumber* equals the natural logarithm of one plus the number of new bonds issued in the quarter. ***Quarter_BeforeProxy*** equals one if the quarter precedes the proxy release month, and equals zero if otherwise. ***Quarter_AfterProxy*** equals one if the quarter immediately follows the proxy release month, and equals zero if otherwise. Industries are based on two-digit SIC code. Standard errors are robust. t-stats are given in the parentheses for Panel A. Panel B compares the main coefficients of the sub-sample analyses in each category. p-values are given in the parentheses for Panel B. *, **, *** denotes significance at 10%, 5%, and 1% levels for both panels.

Panel A: Estimated coefficients

	Regular issuers		**Long-term bonds**		**Any covenants**		**Net-worth covenants**		**Poison put covenant**		**Debt-restriction covenants**	
	Yes (1)	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**	**Yes (1)**	**No (2)**
Dependent variable: BondNumber												
BeforeProxy	**0.1811*** **	**0.0127**	**0.0355**	**0.0603**	**0.0348**	**0.1616** **	**0.1485**	**0.0551** **	**0.0161**	**0.0749* **	**0.0274**	**0.0924** **
	(2.7329)	**(0.4480)**	**(1.3762)**	**(0.9443)**	**(1.2676)**	**(2.2998)**	**(1.5717)**	**(1.9720)**	**(0.4869)**	**(1.9382)**	**(0.9088)**	**(2.1586)**
AfterProxy	**0.0141**	**-0.1128*** **	**-0.0908*** **	**-0.0745**	**-0.0927*** **	**-0.0951* **	**0.0400**	**-0.1039*** **	**-0.1228*** **	**-0.0787** **	**-0.0739*** **	**-0.1099*** **
	(0.2205)	**(-4.0825)**	**(-3.4727)**	**(-1.2020)**	**(-3.5366)**	**(-1.8958)**	**(0.5013)**	**(-4.0034)**	**(-3.9563)**	**(-2.2034)**	**(-2.6069)**	**(-2.8223)**
Control variables:												
Size	0.1998***	0.0815***	0.1066***	0.0704***	0.0724***	0.1720***	-0.0157	0.1303***	0.0458***	0.1555***	0.0544***	0.1402***
	(5.1967)	(8.2854)	(11.3362)	(2.9201)	(7.6886)	(7.2422)	(-0.3055)	(13.0231)	(2.9553)	(12.0272)	(4.2985)	(10.3972)
Book leverage	-0.3486	-0.0630	0.2362***	0.6491***	-0.1614**	1.0183***	-0.5132	0.3392***	-0.1767*	0.8727***	-0.1415	0.5438***
	(-1.2957)	(-0.8388)	(2.7388)	(3.4827)	(-2.1024)	(4.4092)	(-0.7290)	(3.6893)	(-1.9558)	(5.9934)	(-1.4107)	(3.9588)
Market-to-book	0.1637***	0.0286**	0.0205	-0.0752**	0.0471***	-0.0632	0.2662	0.0139	0.0332*	-0.0227	0.0408*	0.0015
	(2.9575)	(1.9876)	(1.4845)	(-2.0071)	(3.1530)	(-1.3719)	(1.5179)	(0.9431)	(1.8106)	(-0.9086)	(1.9388)	(0.0717)
Tangibility	0.9177***	0.0581	-0.0102	0.1148	0.2025***	-0.4685**	1.9768	0.0205	0.0656	-0.0187	0.1270	-0.1292
	(3.3785)	(0.7734)	(-0.1442)	(0.6153)	(2.5847)	(-2.1008)	(0.8043)	(0.2782)	(0.7311)	(-0.1322)	(1.3893)	(-0.9903)
Sales growth	0.0709	0.0272	0.0599	0.2580	0.0774	0.2051	0.2358	0.0774	0.0866	0.0720	0.0974	0.1465
	(0.3407)	(0.4198)	(0.9441)	(1.5903)	(1.2078)	(1.0589)	(1.0108)	(1.1536)	(1.0839)	(0.7306)	(1.2892)	(1.3766)
Industry_HHI	1.2484	-0.0191	-0.1260	-0.3203	-0.0213	-0.8772***	3.2500	-0.1319	0.0552	-0.5273**	0.0381	-0.2962
	(1.6000)	(-0.1667)	(-1.0463)	(-1.0340)	(-0.1615)	(-2.6604)	(0.6892)	(-1.1297)	(0.4023)	(-2.0385)	(0.2416)	(-1.5679)
Stock volatility	0.0839	0.0373	0.0373	0.0288	0.0133	0.1193	-0.0984	0.0414	0.0324	0.0283	0.0210	0.0695
	(0.9121)	(1.3358)	(1.4312)	(0.3365)	(0.4847)	(1.4369)	(-0.7167)	(1.4610)	(0.8257)	(0.6970)	(0.6283)	(1.5051)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	546	2,094	2,223	522	2,472	675	144	2,463	1,362	1,692	1,539	1,827
Adj. R^2	0.129	0.050	0.122	0.110	0.052	0.235	0.081	0.143	0.056	0.206	0.051	0.201

Panel B: Difference in coefficients

	Regular issuers		**Long-term bonds**		**Any covenants**		**Net-worth covenants**		**Poison put covenant**		**Debt-restriction covenants**	
	Diff.	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2	**Diff.**	χ^2
Quarter_BeforeProxy (1) - Quarter_BeforeProxy (2)	**0.1684*** **	**9.9133**	-0.0248	0.8865	**-0.1268* **	**3.7208**	0.0934	0.8915	-0.0588	2.1662	**-0.0650** **	**4.1318**
	(0.0016)		(0.3464)		**(0.0537)**		(0.3451)		(0.1411)		**(0.0421)**	
Quarter_AfterProxy (1) - Quarter_AfterProxy (2)	**0.1269* **	**3.0785**	**-0.0163* **	**2.8087**	0.0024	0.2249	**0.1439*** **	**7.9946**	-0.0441	1.0427	0.036	0.5096
	(0.0793)		**(0.0938)**		(0.6353)		**(0.0047)**		(0.3072)		(0.4753)	

Table 6.6: **Timing strategies based on compensation disclosures and bond offering yield spreads**

This table reports estimates of the regression that relates offering yield spreads with the quarter, relative to the disclosures of CEO compensation, when the bonds are issued. ***Issued_BeforeProxy*** equals one if the bond is issued within three months before the disclosure of change in CEO compensation, and equals zero if otherwise. ***Issued_AfterProxy*** equals one if the bond is issued within three months after the disclosure of change in CEO compensation, and equals zero if otherwise. **Spreads** equal the bond's offering yield minus the yield of a U.S. Treasury Bill with similar maturity. Industries are based on two-digit SIC code. The standard errors are clustered at the issuing firm levels. t-stats are given in the parentheses. *, **, *** denotes significance at 10%, 5%, and 1% levels, respectively.

	Positive changes (Δ Inside_DE > 0)		**Negative changes (Δ Inside_DE < 0)**	
	(1)	(2)	(3)	(4)
Dependent variable:	**Yield spreads**			
Issued_BeforeProxy	**0.0005**	**0.0005**	**-0.0052*** **	**-0.0047*** **
	(0.5491)	**(0.1771)**	**(-3.5145)**	**(-6.6372)**
Issued_AfterProxy	**-0.0048*** **	**-0.0046*** **	**0.0059*** **	**0.0056** **
	(-4.1636)	**(-6.7798)**	**(2.6298)**	**(2.1840)**
Firm chracteristics (lag two quarters):				
Size		-0.0014***		-0.0025***
		(-5.1248)		(-7.9272)
ROA		-0.0534***		-0.0743***
		(-2.7358)		(-3.6021)
Book leverage		0.0081***		0.0059**
		(2.9170)		(2.0059)
Stock volatility		0.0053***		0.0027***
		(4.2800)		(2.6516)
Bond characteristics:				
Ln (Bond age)		-0.0002		-0.0029**
		(-0.1887)		(-2.1058)
Callable		0.0066***		-0.0009
		(4.6161)		(-0.7997)
Secured		0.0008		0.0014
		(0.4621)		(1.2510)
Senior Secured		-0.0050**		-0.0062***
		(-2.2398)		(-3.0920)
Ln (Offering amount)		-0.0002		-0.0008
		(-0.5217)		(-1.5744)
Ratings FE	No	Yes	No	Yes
Year FE	No	Yes	No	Yes
Ind FE	No	Yes	No	Yes
N	5,483	5,483	4,545	4,545
Adj. R^2	0.081	0.526	0.090	0.516

6.11 Appendix

Appendix 6.A1: **Compare estimated yield spreads of existing bonds**

This table tests the significance of the difference between $\beta_{k,k\neq 0}$ and β_0 from the regression that examines yield spreads of existing bonds around the months of CEO compensation disclosures: $Spread_{j,m} = \sum_{k=-4}^{7} \beta_k * b_{j,m}[m+k] + \gamma * Control_{j,m} + \epsilon_{j,m}$

	Positive changes (Δ Inside_DE > 0)				**Negative changes (Δ Inside_DE < 0)**			
	β_k	β_k **-** β_0	**|t-stat|**	**p-value**	β_k	β_k **-** β_0	**|t-stat|**	**p-value**
β_{-4}	321.14	70.794	4.3580	<0.0001	124.54	-79.034	4.3018	<0.0001
β_{-3}	352.27	101.92	5.9792	<0.0001	149.54	-54.034	2.9529	0.0016
β_{-2}	300.54	50.196	3.0929	<0.0001	147.37	-56.203	2.9999	0.0014
β_{-1}	305.82	55.480	3.2831	0.0005	150.03	-53.539	2.9492	0.0016
β_0	250.35	0	-	-	203.57	0	-	-
β_1	217.01	-33.339	2.0750	0.0190	220.03	16.456	0.8908	0.1865
β_2	184.68	-65.668	4.2845	<0.0001	192.63	-10.941	0.6103	0.2708
β_3	192.52	-57.824	3.7715	0.0001	199.48	-4.094	0.2238	0.4115
β_4	226.45	-23.894	1.5399	0.0618	232.84	29.268	1.5932	0.0556
β_5	284.13	33.782	2.1104	0.0174	171.29	-32.287	1.8361	0.0332
β_6	236.85	-13.499	0.8166	0.2071	220.03	16.454	0.8452	0.1990
β_7	225.66	-24.689	1.6132	0.0534	174.56	-29.014	1.4823	0.0691

Appendix 6.A2: **Variable construction**

Variable	**Variable construction**	**Data source**
Size	Ln (atq) ; quarterly total assets (atq)	Compustat
Tangibility	ppentq / atq ; quarterly net PP&E (ppentq),quarterly total assets (atq)	Compustat
Market-to-book ratio	(prccq * cshoq + atq - ceqq) / atq ; stock price at quarter end (prccq), quarterly shares outstanding (cshoq), quarterly total assets (atq), quarterly book value of shareholder equities (ceqq)	Compustat
Book leverage	(dlcq + dlttq) / atq ; quarterly long-term debt (dlcq), long-term component in short-term debt (dlttq), quarterly total assets (atq)	Compustat
Stock volatility	standard deviation of daily stock returns; over 12 months before quarter end date	CRSP
Sales growth	(saleq - lagged saleq) / (lagged saleq) ; quarterly sales (saleq)	Compustat
Sales_HHI	Herfindahl index of sales (saleq) in two-digit SIC code industry	Compustat

CHAPTER 7

Thesis Conclusion

7.1 Summary of thesis

This thesis examines how U.S. public companies adjust their uses of CEO inside debt when there are corporate events that affect the agency problem of debt. The findings of this thesis shed light on companies' purposes of compensating their CEO with inside debt. Despite the empirical evidence that high CEO inside debt is associated with conservative management and reduced agency cost of debt, it remains unclear whether U.S. companies use this debt-like compensation to address the agency problem of debt. The grant of supplemental retirement benefits (i.e. inside debt) might originate from rent extraction purposes, and happens to encourage risk aversions among CEOs. Overall, the results in this thesis support the conclusion that U.S. public companies use CEO inside debt as a mechanism to mitigate the agency problem of debt.

Unlike existing studies which relies on ExecuComp for data of only S&P 1500 firms, this thesis uses the compensation data that I manually collect from proxy statements of all U.S. public companies. Therefore, the analyses in this thesis apply universally to any U.S. public companies, and are not biased to compensation practices of large companies.

7.1.1 Summary of first essay

In the first essay (Chapter 4), I investigate whether new active blockholders incentivize CEOs to increase total firm value or to increase only equity value. This chapter serves to resolve the debate over how active blockholders create value for shareholders in the companies that they target. The "active monitoring hypothesis" suggests that active blockholders address existing agency problems and improve total firm value. In contrast, the "wealth extraction hypothesis" argues that active blockholders exacerbate the agency problem of debt and transfer value from debtholders to shareholders.

I show that new active blockholders adjust the ratios between CEO inside debt and inside equity in a way that benefits both shareholders and debtholders, thus increasing total firm value. These activist investors often arise and restructure compensation when the old structures over-align CEOs' incentives to either shareholders' or debtholders' interests. Such compensation adjustments are associated with positive stock and bond abnormal returns over the active block holding period. Even when active blockholders fix the pay structures that used to contain too much inside debt, stock returns significantly increase while bond returns do not fall. These findings suggest that active blockholders create value by addressing the agency problem of debt, not exacerbating it. Furthermore, I argue that superb stock-picking skill, a mean-reverting process of compensation changes, and co-founding firm characteristics cannot explain the large compensation adjustments in the active blockholders' presence. In addition, I demonstrate that appointing directors, especially into the compensation or governance committees, is an effective channel for active blockholders to restructure CEO compensation.

The findings of Chapter 4 are interesting given the common belief that shareholders gain by exacerbating the agency problem of debt. Instead, what I find suggests that shareholders can also gain by adjusting CEO compensation to mitigate the agency problem of debt.

7.1.2 Summary of second essay

In the second essay (Chapter 5), I examine how CEO inside debt-equity ratios change after companies remove firm-level anti-takeover provisions ("ATPs"). On the one hand, shareholder governance is enhanced when companies remove ATPs, which might reduce CEO inside debt-equity ratios due to increased use of inside equity to mitigate the shareholder-manager conflict. On the other hand, removing ATPs makes companies more vulnerable to takeover attempts, which triggers increased use of debt financing and worsens the shareholder-debtholder conflict. Companies might address this heightened agency problem to avoid costly debt financing by compensating their CEOs with more inside debt, thus increasing their inside debt-equity ratios.

I document significant increases in CEO inside debt-equity ratios after companies remove ATPs. Inside debt also rises significantly after ATP removals, which accounts for 70% of increases in the overall ratios. In contrast, inside equity significantly decreases after companies remove ATPs, as these companies also reduce the stocks and options awarded to their CEOs. These findings are robust to different explanatory variables, matching samples, and removals of certain ATPs. Further analysis displays that inside debt-equity ratios increase continually for the first three years after ATP removals. This trend coincides with the after-ATP-removal spike in leverage which is caused by increased debt issuances. I also find that increasing inside debt-equity ratios, especially increasing inside debt, helps companies reduce the cost of borrowing.

The findings of Chapter 5 suggest that U.S. public companies use inside debt to address the agency problem of debt that is exacerbated after companies remove ATPs. However, increasing inside debt can only address part of the issue. Removing ATPs can well substitute for the role of inside equity in providing CEOs with more risk-taking incentives to increase shareholders' value, hence making it unnecessary to increase inside equity.

7.1.3 Summary of third essay

In the third essay (Chapter 6), I explore possible timing strategies for bond issuances based on disclosures of CEO inside debt. During the months before proxy statements are released, the new changes in CEO inside debt are private information to companies' insiders. If companies plan to issue bonds and know that the information they are about to disclose can affect bond prices, they might take advantage of this information asymmetry to reduce the cost of borrowing. More specifically, companies can choose to issue bonds right after (before) they disclose increases (decreases) in their CEO inside debt, because the cost of borrowing is relatively low in these periods. However, these timing strategies require companies to issue bonds within narrow windows of time, so companies might be tempted to choose other more flexible methods to affect bond prices.

I demonstrate that U.S. public companies, on average, time their bond issuances based on their disclosures of CEO inside debt. Bond offerings cluster in the immediate quarters after (before) disclosures of positive (negative) changes in CEO inside debt. The tendencies to adopt these timing strategies rise with the magnitudes of the disclosed changes. These findings are robust to different measures of bond offering concentration. Furthermore, companies that can issue bonds quickly, like regular bond issuers, or those that have intense agency problem of debt, like issuers of bonds without restrictive covenants, are more likely to adopt these timing strategies. Finally, I verify that these timing strategies help reduce the cost of borrowing, as bonds issued at favorable times have lower offering yield spreads than those issued at non-favorable times.

The findings of Chapter 6 point out that not only companies but also outside investors consider inside debt as a mechanism to address the agency problem of debt. Companies exploit this belief and issue bonds when market's perception about their debt agency problems, which depend on publicly available information of inside debt, is relatively low. In other words, this chapter presents a situation in which companies indirectly "use" inside debt to signal reduced agency problem of debt.

7.2 Future research

7.2.1 How do CEOs treat their inside debt during financial distress?

Bankruptcy does not happen out of the blue. Most bankruptcies are preceded by several years of financial distress. *Can CEOs withdraw most of their retirement benefits during these financial distress years?* If they can, then only a small fraction of "inside debt" is left when companies actually go bankrupt. Such a small amount might not be sufficient to encourage CEOs' efforts to protect the companies' liquidation value. One anecdote example of such "questionable" withdrawals is that of Mesa Air Group Inc. This company filed for Chapter 11 bankruptcy on January 05, 2010. One year before this bankruptcy filing, Mr. Jonathan G. Ornstein - Mesa's CEO - withdrew nearly US$ 2.4 million from his non-qualified deferred compensation plans, leaving only US$ 392,392 in the account.[1]

The likelihood and magnitudes of withdrawals might vary across companies. In some companies like Mesa Inc, CEOs can withdraw any amount whenever they want. For example, Mesa's 2008 Proxy statement says:[2]

"The deferred compensation and the amount earned are generally assets, and the obligation to distribute the amounts according the participants' designation is a general obligation of the Company. There is no penalty on any scheduled withdrawals at any age."

In other companies, there might be stricter rules about when executives are allowed to withdraw and the penalties for early withdrawals. For example, the 2012 Proxy statement of Air Products and Chemicals, Inc. says:[3]

"A participant with at least five years of service may retire after attaining age 55 and receive a benefit reduced by 3% per year for the number of years prior to his attaining age 62. Participants who were age 50 on or before January 1, 2005 are eligible for early retirement at age 55 with no reduction in benefit if the sum of their age and credited service under the Plan equals 80 or more at the time of retirement."

In addition to the companies' policies, whether CEOs can withdraw their retirement benefits and how much they can withdraw during financial distress years might also depend on their powers and the depth of their relations with the companies.

The theoretical incentive effect of inside debt strongly depends on the assumption that this type of compensation can be lost in case of bankruptcy. Empirical studies, including this thesis, argue that supplemental retirement benefits generally satisfy this assumption,

[1] "*Proxy statement of Mesa Air Group Inc.*", SEC EDGAR filing database, accessed on July 2020, https://www.sec.gov/Archives/edgar/data/810332/000113626109000032/def14a.htm

[2] "*Proxy statement of Mesa Air Group Inc.*", SEC EDGAR filing database, accessed in July 2020, https://www.sec.gov/Archives/edgar/data/810332/000113626109000032/def14a.htm

[3] "*Proxy statement of Air Products and Chemicals, Inc.*", SEC EDGAR filing database, accessed in July 2020, https://www.sec.gov/Archives/edgar/data/2969/000119312511340294/d195834ddef14a.htm

so these benefits constitute a fair proxy for inside debt. The more retirement benefits that CEOs hold, the more will they lose in case of bankruptcy, thus the more will they try to protect debtholders' value. This argument might no longer hold if CEOs know that they can withdraw their retirement benefits before their companies actually go bankrupt. However, one might refute that this argument can still hold, at least ex-ante. CEOs might not think about early withdrawals ex-ante; but ex-post when their companies are financially distressed, they do withdraw early.

7.2.2 Does inside debt affect CEOs' choice of successors?

Inside debt payment for retired CEOs strongly depends on subsequent firm performance, of which these retired executives have no control. In most bankruptcies, old executives normally lose most of their inside debt, i.e. supplemental and non-qualified retirement benefits. PBGC, if this agency agrees to step out, only covers the qualified benefits, which typically account for less than 10% of the retired executives' total benefits. In a very recent bankruptcy filed by McClatchy Co., the news reveals:[4]

"It (McClatchy) has asked the federal government to take over its standard plan, known as qualified pensions.

The supplemental pensions are not covered by the government, so the pensioners are asking the bankruptcy judge to force McClatchy or its new owners to honor past promises. But the numbers show the weight of the special pensions on the company's bottom line."

Therefore, near-retirement-age CEOs who have large inside debt might choose or try to influence the searching committees to choose successors more carefully. The searching time might be longer than that of the industry norms. These old CEOs might prefer internal successors because they know the working styles and competencies of these candidates. If they have to choose external successors, they will ensure that overconfident candidates or those with "bad-risk" reputations are not selected.

The impact of inside debt on CEOs' choice of successors might also depend on how

[4] *"McClatchy reveals names of former executives with $118 million in special pension claims"*, by Kevin G. Hall, accessed in July 2020, https://www.mcclatchydc.com/news/nation-world/national/article243607507.html

these retirement benefits will be distributed. Depending on their companies' policies, retired CEOs can receive their inside debt in a lump sum payment or in annuities. A lump sum payment separates the retired CEOs' inside debt from subsequent firm performance, but incurs a huge amount of tax to pay at the time of distribution. If retired CEOs want to delay paying tax and receive annuities, they subject their inside debt to subsequent firm performance, of which they have no control. Therefore, near-retirement-age CEOs who have elected to receive their inside debt in annuities should be more selective about their successors than those who receive a lump sum payment.

7.2.3 The dynamic inside debt-equity structures

Existing studies on determinants of CEO inside debt-equity structures so far work on a one-period model. Firm characteristics at the beginning affect compensation structures at the end of the period (Jensen and Meckling [1976], Edmans and Liu [2011], Cen [2010], Campbell et al. [2016]). However, CEO inside debt-equity structures can also affect firms' policies and, thus firm characteristics (Cassell et al. [2012], Liu et al. [2014], Phan [2014], Brisker and Wang [2017], Freund et al. [2018]). Therefore, a dynamic model of how CEO inside debt-equity structures are determined might better explain the observed compensation practices. For example, this dynamic model might be able to explain why 40% of U.S. public companies do not pay inside debt, despite its effectiveness in reducing the cost of borrowing.

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