Inside Debt and the Design of Corporate Debt Contracts

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Abstract

Theory posits that inside debt (such as defined-benefit pensions and other deferred compensation) aligns managerial incentives more closely with those of debtholders and reduces the agency cost of debt. Consistent with debtholders perceiving an incentive-alignment effect of inside debt, we find that a higher CEO relative leverage, defined as the ratio of the CEO's inside leverage (inside debt holding over inside equity holding) to corporate leverage, is associated with lower promised yield and fewer covenants, for a sample of private loans originated during 2006-2008. These findings persist after accounting for endogeneity and are more pronounced for firms with higher default risk. Furthermore, the perceived incentive-alignment effect is higher when the payoffs from inside debt resemble the payoffs to risky corporate debt, i.e., when inside debt is held in the form of unsecured and unfunded supplemental executive pension plans, as opposed to funded pension plans guaranteed by the PBGC or other deferred compensation plans. Additional analysis on a sample of new public bond issues also shows a negative relation between CEO relative leverage and bond yield spread. Overall, the evidence supports the notion that debtholders recognize the incentive-alignment effect of inside debt and adjust the terms of corporate debt contracts accordingly.

JEL classifications: G32; G34; J33; M12

Keywords: Executive Compensation; Inside Debt; Debt Contracting

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We are indebted to Alex Edmans for detailed comments and suggestions, to Justin Murfin for sharing a program to calculate loan contract strictness, and to Michael R. Roberts for sharing the DealScan-Compustat link data. We thank Ting Chen, Ted Christensen, Peter Demerjian, Valentin Dimitrov, Aloke Ghosh, Wayne Guay, Suresh Govindaraj, Mingyi Hung, Bjorn Jorgensen, Carolyn Levine, Carol Marquardt, Thomas Noe, Bharat Sarath, Xuan Tian, Sheri Tice, Xue Wang (discussant), Jieying Zhang and workshop participants at Baruch College, Rutgers Business School, Syracuse University, University of Southern California, and the Utah Winter Accounting Conference 2011 for useful comments and suggestions. All errors and omissions are ours alone.
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1. Introduction

Defined-benefit pensions and other deferred compensation arrangements are an important feature of contemporary executive compensation in the United States (Bebchuk and Jackson 2005, Sundaram and Yermack 2007). The accumulated pension and deferred compensation benefits of S&P 1500 CEOs averaged 25% (43%) of the value of their inside equity holdings in 2007 (2008). [1] Despite the prevalence of pensions and other deferred compensation in executive pay, research on the economic consequences of these arrangements remains limited (Sundaram and Yermack 2007).

In pensions and other deferred compensation arrangements, a firm promises to pay executives fixed amounts at or after retirement. These promised future payments are often not required to be funded or secured, and hence resemble risky debt claims against the firm. They are, therefore, potentially sensitive not only to the risk of the firm's insolvency but also to liquidation value in insolvency. Agency theory posits that such debt-like compensation ("inside debt") can weaken managerial incentives to transfer wealth from debtholders to stockholders (Jensen and Meckling 1976, Sundaram and Yermack 2007, Edmans and Liu 2010). When an executive's compensation consists of both debt-like claims and equity claims on the firm, her incentives vary with the relative importance of debt- versus equity-based compensation in her pay structure (her "inside leverage"). The higher an executive's inside leverage relative to firm leverage (hereafter, the higher her "relative leverage"), the more closely her incentives are aligned with debtholders vis-à-vis stockholders and the lesser the degree to which she engages in risk-

[1] Anecdotal evidence shows that the importance of pensions and other deferred compensation is on the rise—the *Wall Street Journal* reported that pension benefits for top executives at S&P 500 firms rose an average of 19% in 2008 (Ellen E. Shultz and Tom McGinty, "Pensions for executives on the rise", *The Wall Street Journal*, November 3, 2009).

taking to the detriment of firm debtholders (Sundaram and Yermack 2007, Edmans and Liu 2010). If debtholders recognize the incentive-alignment effect of inside debt, firms providing their executives with higher relative leverage should bear a lower cost of borrowing and fewer covenants limiting their investing, financing, and payout decisions after debt issuance.

The incentive-alignment effect of inside debt hinges, however, on the premise that inside debt claims of top executives are treated similarly to the claims of general unsecured debtholders. This premise may not hold true in practice, as many firms set up special arrangements to shield executive pension and deferred compensation balances from general debtholders in bankruptcy (Bebchuk and Jackson 2005, Clark Consulting 2009). If inside debt claims are effectively senior to the claims of outside debtholders, then debt-like compensation may not truly align the incentives of top executives with outside debtholders. Furthermore, outside debtholders may even perceive a potential threat of claim dilution from large inside debt holdings, and demand a higher yield or impose more covenants for such firms. Therefore, while the theoretical implications of inside debt are unambiguous, whether the forms of inside debt seen in practice are effective at resolving stockholder-debtholder conflicts, becomes an empirical question.

In this study, we investigate the effect of inside debt on the design of private loan contracts—in particular, the promised yield and the usage of covenants. The private loan market offers a unique and powerful setting to test the incentive-alignment effect of inside debt for several reasons. First, private lenders, being sophisticated monitors with superior access to inside information and management, may perceive the true seniority of inside debt claims more accurately than other stakeholders, particularly since many special arrangements are opaque and not subject to detailed public disclosure requirements (Gerakos 2007). Examining how informed private lenders perceive inside debt claims, therefore, provides insight into whether debt-like compensation in practice truly aligns managerial interests with outside debtholders. Second, stockholder-debtholder conflicts are likely to be most relevant for the smaller and riskier firms that often resort to the private debt market as opposed to the public bond market (Denis and Mihov 2003, Bradley and Roberts 2004). Finally, private lending dominates the market for corporate debt in the U.S., allowing us to examine the economic consequences of inside debt for a broad, representative sample of firms.[2]

For a sample of 1,462 private loans originated in 2006-2008, we find that firms with higher CEO relative leverage receive lower yield and face fewer covenants, after controlling for CEO tenure, CEO cash compensation (salary and bonus), CEO incentives derived from equity-based compensation (delta and vega), and related loan features and firm characteristics. In terms of economic significance, increasing CEO relative leverage by one standard deviation reduces the all-in-drawn spread by seven cents for every $100 drawn down from a loan. For comparison, decreasing corporate leverage by one standard deviation reduces the all-in-drawn spread by 17 cents for every $100 drawn.

The analysis above treats CEO compensation as exogenous. One potential concern is that CEO compensation contracts and corporate debt contracts are endogenously determined by unobservable factors that relate to firms' credit risk (Himmelberg, Hubbard and Palia 1999, Palia 2000). To account for endogeneity, we use state individual tax rates as an instrument for CEO relative leverage. We argue that, *ceteris paribus*,

[2] Houston and James (1996) estimate that only 17% of outstanding corporate debt is public, with the rest being private, intermediated debt. Dichev and Skinner (2002) report that private debt makes up 80% of corporate debt for their sample of large firms in the Compustat database.

CEOs subject to higher state income tax rates have stronger incentives to defer income and associated tax burdens to a later period through pension plans and other deferred compensation arrangements, as the benefit of tax deferral (i.e., the present value of deferred tax payments) increases with the marginal tax rate. Therefore, we expect CEO relative leverage to be positively associated with state individual tax rates. CEO individual tax rates are, however, unlikely to directly affect firm-level yield spreads and covenant usage, making it a valid instrument for examining the relationship between relative leverage and corporate debt contracting. We also use industry median CEO relative leverage as an additional instrument for firm-level CEO relative leverage, following Hanlon, Rajagopal and Shevlin (2003). We find that the negative relation between CEO relative leverage and both promised yield and covenant usage is robust to instrumental variables estimation.

In cross-sectional tests, we find that the effect of inside debt on debt contracting (i.e., lower promised yield and fewer covenants) is particularly strong in firms with low Altman's Z-score and below-investment-grade credit rating. These findings are consistent with the notion that the risk-reducing incentives created by CEO debt-like compensation are most relevant for firms with high default risk, as debtholders are especially likely to be concerned about risk-shifting in such firms. Our primary findings, therefore, indicate that private lenders perceive inside debt as aligning managers' interests closer to their own, particularly in firms closer to default, notwithstanding the special arrangements that may be written into CEO pension and deferred compensation contracts.

Next, we take a closer look at the composition of inside debt. The two forms of inside debt observed in top executive compensation contracts in the U.S. are defined-benefit pension plans and other deferred compensation plans (DC plans). Defined-benefit pension plans offer the employee a guaranteed life pension starting at retirement. DC plans allow top executives to voluntarily defer the receipt of current compensation to plan for retirement. While the payoffs to both pensions and DC plans resemble payoffs to corporate debt, DC plans offer flexible withdrawal options and often permit executives to invest balances in the firm's own equity, making these claims less debt-like in their payoffs compared to pension claims. Further, executive pension claims can consist of balances in broad-based, tax-qualified plans ("rank-and-file" plans) as well as balances in Supplemental Executive Retirement Plans ("SERPs"). For U.S. firms, rank-and-file plans are required to be funded, secured, and are insured by the Pension Benefit Guaranty Corporation (PBGC), making these claims riskless to an extent.[3] SERPs, on the other hand, are typically unfunded, unsecured, and not guaranteed by the PBGC. Therefore, we expect SERP balances to generate a stronger incentive-alignment effect. Consistently, the negative relation between CEO relative leverage and both promised yield and covenant usage is driven by SERP balances. Private lenders do not appear to perceive rank-and-file pension plans or DC plans as aligning managerial incentives with their own, suggesting that the institutional form of inside debt does matter to private lenders.[4]

Having established that certain forms of inside debt are less effective than others at aligning managers' interests with debtholders, we further examine whether inside debt claims, by virtue of their potential to be made senior to outside debt, may even create

[3] In the U.S., rank-and-file plans are subject to caps on eligible compensation and benefit levels, which severely limit postretirement benefits for top executives. As a result, a considerable proportion of top executive pensions come from SERPs.
[4] These findings provide empirical support for the Edmans and Liu (2010) conclusion that "the payoff of a pension has to be very similar to debt for it to be effective; small departures may lead to pensions either not affecting or exacerbating the issue."

countervailing effects for outside debtholders. We use the magnitude of inside debt to capture the maximum potential for claim dilution faced by outside debtholders. We find some evidence in firms with high default risk that covenant usage increases when the magnitude of inside debt, relative to total corporate debt, is substantial. This adverse effect of inside debt is, however, apparent only for a very small subsample of firms.

We perform two additional tests to extend the scope of our inferences. First, in the tests above, we measure covenant strictness by counting the number of covenants present in a loan package, as in prior literature (e.g., Bradley and Roberts 2004; Nikolaev 2010). However, the initial slack allowed for each covenant and the covariance between covenants also affect the overall strictness of the contract (Murfin 2009). Using a novel measure of loan contract strictness proposed by Murfin (2009) that captures the ex-ante probability of violating covenants, we show that CEO relative leverage is negatively associated with the overall strictness of covenants in new loan contracts.

Finally, we examine the implications of CEO relative leverage for contracting with public bondholders, who may lack the ability and incentives to monitor borrowers effectively, especially compared to private lenders. Using a sample of newly issued public bonds in 2006-2008, we find that firms with higher CEO relative leverage face lower bond yield spreads. We do not find a significant association between CEO relative leverage and covenant usage.[5] This finding is consistent with public bondholders being less effective than private lenders at monitoring covenants, and with covenants being more valuable in private vis-à-vis public debt issues (Rajan and Winton 1995, Bradley and Roberts 2004).

[5] This lack of association stands in contrast to Chava, Kumar and Warga (2010) who find that firms providing their CEOs with larger pension compensation (relative to their total pay) are less likely to have covenants in public bond contracts, for a small sample of firms.

This study makes two contributions to the literature. First, we contribute to the literature on executive compensation and in particular its implications for debt contracting. Existing research has focused largely on the proposition that equity-based compensation exacerbates stockholder-debtholder conflicts, and shows that equity-based compensation leads to higher agency costs of debt (John and John 1993), more frequent use of covenants in debt contracts (Begley and Feltham 1999, Chava, Kumar and Warga 2010), and shorter debt maturities (Brockman, Martin and Unlu 2010).

This literature till date has, however, "overlooked almost entirely the widespread practice of compensating CEOs with debt" (Sundaram and Yermack 2007). Two studies address this issue: Wei and Yermack (2011) document a significant increase in bond prices for firms disclosing sizeable debt-like compensation immediately following the SEC's expanded disclosure regulations on executive compensation. Chava, Kumar and Warga (2010) find that public bond contracts are less likely to include covenants when CEOs receive large pension benefits. We complement prior studies by showing that *private* lenders also value the incentive-alignment effect of debt-like compensation. Furthermore, in contrast to prior studies that treat executive debt-like compensation as being homogeneous, we show that the incentive-alignment effect is mainly attributable to balances in SERP plans as opposed to balances in rank-and-file pension plans or in other deferred compensation contracts.

Second, we extend the emerging literature on economic consequences of executive debt-like compensation. Recent studies show that firms providing their CEOs with larger inside debt have lower likelihood of default (Sundaram and Yermack 2007, Tung and Wang 2010), engage in less risk-taking (Tung and Wang 2010), and receive better credit ratings (Gerakos 2007). We show that certain forms of inside debt play an important role in the private loan contracting process, particularly for firms closer to default.

Section 2 reviews related literature and develops hypotheses. Section 3 describes the sample and variable measurement. Section 4 presents empirical results on the relationship between CEO relative leverage and the design of private loan contracts. Section 5 discusses additional analyses, and Section 6 concludes.

2. Related literature and hypothesis development

2.1 Stockholder-debtholder conflicts and inside debt

Stockholder-debtholder conflicts arise from the fundamentally different structure of the payoffs from stock versus debt—debtholders are fixed claimants whereas stockholders are residual claimants to firm assets. Once debt has been issued, stockholders (or managers, acting on behalf of stockholders) can increase the value of their claims at the expense of debtholders in many ways, including claim dilution, underinvestment, and asset substitution or risk shifting (Jensen and Meckling 1976, Myers 1977, Smith and Warner 1979).[6] Stockholders' incentives to undertake these wealth-expropriating actions intensify as the firm approaches distress.

Agency theory posits that an optimal compensation contract needs to include inside debt to mitigate stockholder-debtholder conflicts (Jensen and Meckling 1976, Edmans and Gabaix 2009, Edmans and Liu 2010).[7] When an executive is compensated only with

[6] *Claim dilution* refers to stockholders disgorging firm assets through large dividend payouts or issue additional debt of the same or senior priority. *Underinvestment* refers to stockholders rejecting projects with positive net present value if project returns accrue largely to debtholders. *Asset substitution* refers to stockholders replacing low-risk projects with high-risk projects.

[7] A handful of theoretical papers predict that fixed compensation should be part of the optimal compensation contract (e.g., Nachman and Noe 1995, Noe 2009) but do not provide empirical predictions on the difference between inside debt and other forms of fixed compensation such as salary and bonus. Edmans and Liu (2010) argue that inside debt is a superior solution to salary and solvency-contingent bonus in reducing agency costs of debt because the value of inside debt is sensitive not only to the

equity, she has incentives to increase firm risk beyond a level that debtholders prefer, and to take actions that transfer wealth from debtholders to stockholders (John and John 1993). However, if an executive is compensated with both debt and equity, her wealth-transfer incentives weaken. When an executive's personal debt-to-equity ratio grows larger than the corporate debt-to-equity ratio, she may even have incentives to increase the value of debt at the expense of equity by, for example, engaging in risk-reducing activities (Sundaram and Yermack 2007, Edmans and Liu 2010).

Recent empirical studies confirm that inside debt aligns managerial decision-making more closely with debtholders' preferences. Sundaram and Yermack (2007) find that CEOs with inside leverage that is high relative to corporate leverage manage their firms in such a way that they have lower distance-to-default. In the banking industry, Tung and Wang (2010) find that high CEO relative leverage corresponds to lower stock return volatility and fewer high-risk investments such as mortgage-backed securities. Gerakos (2007) finds a positive association between CEO pension benefits and firm debt ratings, suggesting that inside debt also improves credit agencies' perceived credit quality of the firm. Similarly, for a small sample of 151 firms, Chava, Kumar and Warga (2010) find that public bond contracts are less likely to include covenants when CEOs receive large pension benefits. For a sample of public bonds traded on the secondary market, Wei and Yermack (2011) document an increase in bond prices following more transparent compensation disclosures in 2007, for firms whose CEOs hold substantial pension and deferred compensation. These findings support the notion that debt-based compensation reduces agency costs borne by corporate debtholders.

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incidence of bankruptcy but also to the firm's liquidation value in bankruptcy, while salaries or solvency-contingent bonuses are affected only by the incidence of bankruptcy.

2.2 The design of debt contracts

If debtholders anticipate opportunistic behavior by stockholders and managers, they will demand a higher return for providing debt financing. However, raising the promised yield on debt does not prevent debtholders from being expropriated by stockholders after debt issuance. Since the firm's investing and financing strategy cannot be completely contracted on ex ante, stockholders and managers still retain the discretion to take actions that transfer wealth from debtholders ex post (Leland 1998).

Thus, debtholders may include provisions in debt contracts ("covenants") that restrict the actions managers can take after debt issuance. Covenants may restrict certain actions (e.g. paying dividends, disposing assets, issuing additional debt), endorse other actions (e.g. maintaining the firm's properties), or require the maintenance of certain financial ratios (e.g., minimum net worth or interest coverage).[8] Upon violation of covenants, control rights are transferred to lenders, granting them the opportunity to intervene in the firm's investing and financing decisions (Chava and Roberts 2008). Raising the promised yield on debt and imposing covenants represent two primary mechanisms that debtholders rely on to protect their interests. The greater the potential for stockholders (or managers) to expropriate from debtholders, the higher will be the promised yield, and the greater the use of covenants in debt contracts.

[8] For example, covenants restricting the sale of firm assets can constrain asset substitution, by making it more costly for stockholders to substitute variance-increasing assets for the ones currently owned (Smith and Warner 1979). Covenants restricting sale-and-leaseback arrangements prevent stockholders from taking on lease obligations which dilute debtholders' claims, since leases and rental agreements are usually senior obligations. Covenants restricting dividend payouts not only prevent stockholders from disgorging assets, but also force reinvestment of internally generated cash flows, mitigating underinvestment.

2.3 Hypothesis development

As discussed in Section 2.1, inside debt is expected to align managerial incentives closer with those of debtholders, and reduce the likelihood of managers taking actions to transfer wealth from debtholders to stockholders. If debtholders recognize these incentive effects, they would accept lower promised yield from firms with high CEO relative leverage. They would also place fewer covenants restricting managerial actions for these firms. This leads to the first set of hypotheses:

> *Hypothesis 1a: Higher CEO relative leverage is associated with lower promised yield in debt contracts.*

> *Hypothesis 1b: Higher CEO relative leverage is associated with fewer restrictive covenants in debt contracts.*

Stockholders' incentives to engage in wealth-expropriating activities intensify as the firm approaches default. For example, debtholders face higher risk of excessive dividend payouts when default risk is high, since stockholders fear that they will not be able to extract any cash from the firm once it declares bankruptcy (Chava, Kumar and Warga 2010). Similarly, firms approaching default usually have low intrinsic value as ongoing entities and limited growth opportunities; such firms face lower costs to taking on high-risk, negative-NPV projects and hence are more likely to engage in risk-shifting activities. Given that debtholders' concerns of being expropriated from are more relevant in firms with high default risk, the role played by inside debt in mitigating these concerns would be more prominent in such firms. This leads to the second set of hypotheses:

> *Hypothesis 2a: The negative association between CEO relative leverage and promised yield is stronger for firms with high default risk.*

> *Hypothesis 2b: The negative association between CEO relative leverage and covenant restrictions is stronger for firms with high default risk.*

Both hypotheses build on the theoretical proposition that inside debt mitigates stockholder-debtholder conflicts. However, in practice, the payoffs to inside debt may not resemble the payoffs to outside debtholders. For example, CEOs often have discretion over the timing and vesting option of their pension plans and deferred compensation plans (e.g., Lee and Tang 2010, Clark Consulting 2009). Unlike general creditors, CEOs may be able to secure their debt-like compensation when facing the risk of insolvency (Bebchuk and Jackson 2005). Therefore, whether and how CEO debt-like compensation affects debt contracting becomes an empirical issue.[9]

3. Sample, variable measurement, and descriptive statistics

3.1 Sample selection

We retrieve data on CEO equity compensation, pensions and other deferred compensation from the ExecuComp database for fiscal years 2006-2008. On August 29, 2006, the SEC issued a new rule on proxy disclosure of executive compensation, requiring tabular disclosure of the present value of benefits accrued under pension plans and other deferred compensation plans. These recently available disclosures allow us to provide large-sample evidence on the role of executive debt-like compensation in debt contracting, albeit only for 2006 and after.[10]

We collect the promised yield, covenant, and other loan information for private loans issued between January 1, 2006 and May 31, 2009 from the Loan Pricing Corporation's DealScan database. DealScan provides comprehensive coverage of commercial loans made to U.S. firms (Bradley and Roberts 2004). Financial statement data for control

[9] We provide additional analysis on potential countervailing effects of inside debt in Section 4.5.
[10] Prior to 2006, firms are required to disclose *annual* pension benefits and deferred compensation payable at retirement classified by specified compensation levels and years of service. Firms do not disclose the actuarial present value of *accumulated* pension benefits and deferred compensation.

variables are collected from Compustat Industrial Annual Files.[11] Similar to Bradley and Roberts (2004) and Chava and Roberts (2008), we exclude financial firms (SIC codes 6000-6999). These sample selection criteria, summarized in Table 1, yield a sample of 1,462 facilities and 1,267 packages. A "facility" is a loan (the basic unit in DealScan), and a "package" may contain several facilities. While loan pricing is at the facility level, covenants are written at the package level. Thus, in multivariate analyses we examine the promised yield at the facility level and covenant usage at the package level.

3.2 Variable measurement

We now discuss the motivation and construction of the variables used in our analyses. Appendix A provides detailed variable definitions.

3.2.1 Measuring relative leverage

As shown by Sundaram and Yermack (2007) and Edmans and Liu (2010), the CEO's personal debt-to-equity ratio *relative to* her firm's debt-to-equity ratio is the relevant metric for measuring the CEO's incentive alignment with debtholders versus stockholders. As the CEO's personal debt-to-equity ratio increases relative to the firm's debt-to-equity ratio, the CEO has greater incentives to decrease firm risk, and *vice versa*. Therefore, we define CEO relative leverage as the CEO's debt-to-equity ratio divided by the firm's debt-to-equity ratio (*RLEV*).[12]

We measure the CEO's debt-to-equity ratio as the CEO's debt holding divided by her equity holding. The CEO's debt holding is the sum of the actuarial present value of accumulated benefits under defined-benefit pension plans and her total balance in any

[11] Matching borrowers from DealScan to Compustat is challenging due to lack of a common identifier. To implement matching, we rely on the link file established and maintained by Michael Roberts and WRDS. We are indebted to Michael Roberts for sharing the link file.
[12] Our results are similar if we measure relative leverage based on debt- and equity-based compensation aggregated for top 5 executives.

deferred compensation plans at the fiscal year-end. The CEO's equity holding is the fair value of the CEO's equity holdings including stock, restricted stock, and option holdings. The firm's debt-to-equity ratio is defined as the sum of long-term debt and debt in current liabilities divided by the market value of equity at the fiscal year end.

3.2.2 Measuring promised yield and covenant usage

We follow Bradley and Roberts (2004) and measure the promised yield (*SPREAD*) using "All-in-drawn Spread" (expressed in basis points scaled by 100) promised at the inception of the loan. The all-in-drawn spread consists of the coupon spread, the upfront fee, the utilization fee, as well as any recurring annual fees. As such, it is essentially the return promised to the lender for each dollar drawn down from the loan.

To measure covenant usage, we follow Chava and Roberts (2008) and identify 16 distinct financial covenants and one investment covenant found in the lending agreements in our sample. We then count the number of covenants present in a package to measure the extent of covenant restrictions (*COVENANT*). Appendix A provides a complete list of the covenants used in constructing *COVENANT*.

3.2.3 Measuring control variables

We use three groups of control variables to capture cross-sectional variation in compensation structure as well as in debt contracting: CEO characteristics and compensation structure, loan characteristics, and borrowing firm characteristics. Appendix B presents detailed definitions of the control variables.

In the first group, we control for CEO tenure, as CEOs who have been with the firm longer accrue more pension benefits and other deferred compensation (Sundaram and Yermack 2007). We also control for the risk-taking incentives created by other components of compensation. Fixed payments such as salary may mitigate CEO risk-taking incentives since payouts are contingent on solvency.[13] Begley and Feltham (1999) provide evidence that cash compensation is associated with fewer covenant restrictions in loan contracts. In addition, Duru, Mansi and Reeb (2005) argue that earnings-based bonus plans motivate managers to seek stable cash flows, and document that high bonus compensation is associated with lower cost of debt. Therefore, we control for CEO cash compensation including salary and bonus. Furthermore, Coles, Daniel and Naveen (2006) find that CEO incentives derived from equity-based compensation affect the riskiness of investment policy choices. Accordingly, we control for the change in CEO wealth for a 1% change in stock price (the CEO's portfolio delta) and for a 1% change in stock return volatility (the CEO's option vega). Since portfolio delta varies with firm size, we follow Edmans, Gabaix and Landier (2009) and scale delta by annual total compensation, resulting in a theoretically correct measure of incentives that is independent of size.

The second group is loan characteristics. Bradley and Roberts (2004) show that larger and longer-maturity loans are more likely to include covenants, consistent with covenants and short-maturity debt being substitutes in solving agency problems (Myers 1977). Accordingly, we control for the loan amount and the loan maturity in months. We also control for characteristics of the lending banks. Bradley and Roberts (2004) show that larger lending syndicates tend to administer riskier loans, and Denis and Mihov (2003) show that riskier firms are more likely to obtain debt from investment banks. Accordingly, we control for the size of the lending syndicate and the identity of the lead arranger as investment bank, U.S. bank, or foreign bank.

[13] In alternative model specifications, we include salary and bonus as part of CEO debt holdings instead of treating them as control variables and the results are qualitatively similar.

The third group is firm characteristics that relate to the intensity of stockholder-debtholder conflicts. Smaller firms, firms with fewer tangible assets in place, and firms in poor financial health are more likely to have debt covenants (Bradley and Roberts 2004). Leveraged firms with high growth opportunities are more likely to suffer from high agency costs of debt, since there is a greater likelihood of managers passing on high-NPV opportunities (Myers 1977). However, these firms may also be less likely to have certain types of covenants, since reduced operational flexibility is likely to be particularly costly for them (Nash, Netter and Poulsen 2003). Therefore, we control for firm size, profitability, growth opportunities, leverage, asset tangibility, cash flow volatility, and default risk measured by the Altman's (1968) Z-score.[14]

Finally, we include year fixed effects and industry fixed effects using the Fama and French (1997) 12-industry classification as additional controls for inter-temporal and industry variation in CEO compensation and debt contracting.

3.3 Descriptive statistics and correlations

Table 2, Panel A displays summary statistics of the variables. To minimize the effect of outliers, we winsorize continuous variables (except for loan amount and loan maturity) at the one-percentile level. On average, borrowers pay $1.25 for every $100 drawn down from the loan, and the median package carries one covenant. Similar to Wei and Yermack (2011), the distribution of relative leverage (*RLEV*) is right-skewed with mean and median of 1.29 and 0.33 respectively.

For firms in our sample, CEO tenure is 6.5 years on average. The mean annual salary and cash bonus for the CEOs are $892,000 and $243,000, respectively. The average delta

[14] We calculate Altman's Z-score for manufacturing firms using updated coefficients from Hillegeist, Keating, Cram and Lunstedt (2004). We calculate Z-score for non-manufacturing firms using coefficients suggested by Altman (2000). Lower values of Z-score correspond to higher default risk.

(i.e., change in the CEO's portfolio value for a 1% change in stock price, scaled by annual total compensation) for our sample is 0.12, and average vega (i.e., change in the CEO's option portfolio value for 1% change in stock-return volatility) is $252,000. As for loan characteristics, the mean (median) loan facility amount is approximately $787 million ($350 million), while loan maturity is on average 4.4 years. The median facility has eight lenders in the syndicate. We identify lead arrangers being investment banks (7.2% of facilities), U.S. banks (85.9% of facilities), and foreign banks (20% of facilities). Turning to firm characteristics, our sample consists mostly of large firms with mean (median) market capitalization of $12 billion ($3 billion).

Table 2, Panel B displays Pearson and Spearman correlations among debt contracting variables and CEO relative leverage. Our primary interest is whether debtholders incorporate relative leverage into debt contracting decisions. Both *SPREAD* and *COVENANT* have significantly negative correlations with *RLEV*. We turn next to multivariate regression analyses to further investigate these associations.

4. Empirical Results

4.1 Baseline specification

We test *Hypothesis 1a* and *Hypothesis 1b* with the following model specification (subscript *i* indexes firm and *t* indexes time):

$$\begin{aligned}
&SPREAD_{i,t}(COVENANT_{i,t}) = \alpha_0 + \alpha_1 RLEV_{i,t} \\
&+ \alpha_2 \ln(TENURE)_{i,t} + \alpha_3 \ln(SALARY)_{i,t} + \alpha_4 \ln(BONUS)_{i,t} + \alpha_5 DELTA_{i,t} + \alpha_6 VEGA_{i,t} \\
&+ \alpha_7 \ln(AMOUNT)_{i,t} + \alpha_8 \ln(MATURITY)_{i,t} + \alpha_9 N_BANK_{i,t} + \alpha_{10} IB_{i,t} + \alpha_{11} USBANK_{i,t} \\
&+ \alpha_{12} FRBANK_{i,t} + \alpha_{13} \ln(MVE)_{i,t-1} + \alpha_{14} ROA_{i,t-1} + \alpha_{15} BM_{i,t-1} + \alpha_{16} LEV_{i,t-1} \\
&+ \alpha_{17} TANGIBILITY_{i,t-1} + \alpha_{18} SIGMAOCF_{i,t-1} + \alpha_{19} ALTMANZ_{i,t-1} \\
&+ \text{Year fixed effects} + \text{Industry fixed effects} + \varepsilon_{i,t} \qquad (1)
\end{aligned}$$

The dependent variable is the all-in-drawn spread (*SPREAD*) or the number of financial covenants (*COVENANT*). The key variable of interest is CEO relative leverage

(*RLEV*). *Hypothesis 1a* and *Hypothesis 1b* both predict a negative coefficient on *RLEV*. All regression variables are defined in Section 3.2. Since relative leverage can be reasonably anticipated at the beginning of the year given the terms of pension and other deferred compensation plans, we examine the impact of relative leverage on contemporaneous debt contracting.

We first examine the effect of CEO relative leverage on the promised yield spread. Since the all-in-drawn spread (*SPREAD*) is specified by facility, we perform the *SPREAD* analyses at the facility level. Ordinary least squares results are presented in column (1) of Table 3. Consistent with *Hypothesis 1a*, the coefficient on *RLEV* is negative and significant at 1% level based on a two-tailed t-test, indicating that higher relative leverage is associated with lower promised yield. The effect of relative leverage on the loan yield is also economically significant—increasing *RLEV* by one standard deviation (3.452) reduces all-in-drawn spread by seven cents for every $100 drawn down from a loan. For comparison, the effect of one standard deviation change in corporate leverage (*LEV*) is about 17 cents for every $100 drawn.

Next, we examine the effect of CEO relative leverage (*RLEV*) on covenant usage (*COVENANT*). Covenants are usually contracted at the package level, and each package can contain several facilities. To avoid artificially boosting statistical power, we keep the largest facility in a package for the *COVENANT* analyses.[15] Table 3, column (2) reports the results of estimating equation (1) using ordinary least squares (OLS) when *COVENANT* is used as the dependent variable. The coefficient on *RLEV* is negative and significant at 5% based on a two-tailed t-test, which confirms *Hypothesis 1b* that higher

[15] We re-run our tests with all facilities in a package, and weight average control variables related to facility characteristics whenever appropriate. The results (untabulated) are virtually the same.

relative leverage is associated with fewer covenants. Given the discrete nature of *COVENANT*, we repeat the analysis using ordered probit analysis. The ordered-probit results are reported in column (3) of Table 3. As shown, the coefficient on *RLEV* remains significantly negative.[16,17]

Turning to control variables, we find that the annual bonus (ln(*BONUS*)) is significantly negatively associated with covenant usage, consistent with Begley and Feltham (1999) and Duru, Mansi and Reeb (2005). Consistent with Bradley and Roberts (2004), we find that larger syndicates (*N_BANK*) write more covenants. Smaller loans (ln(*AMOUNT*)) and loans with investment banks (*IB*) as lead arrangers tend to have higher yield spread, consistent with Denis and Mihov (2003). Larger firms (ln(*MVE*)) tend to have lower yield spread and fewer covenants, possibly due to lower credit risk. We also find that firms with high growth opportunities (lower *BM*) are subject to lower yield spread but more covenants.[18] Finally, firms with higher financial leverage (*LEV*) and more volatile operating cash flows (*SIGMAOCF*) have higher yield spread.

Given that our key variable of interest, *RLEV*, is the ratio of inside leverage to corporate leverage, it is unclear whether our results are attributable to the numerator or the denominator. There are two potential "denominator" effects—a denominator effect from inside equity ownership, and a denominator effect from corporate leverage. In

[16] For brevity, in subsequent tests we mostly report ordinary least squares results when *COVENANT* is used as the dependent variable, but the results are similar, if not stronger, when ordered-probit analysis is used.

[17] Many of our observations with zero covenants may represent incomplete collection of information or misclassification by Dealscan (Drucker and Puri 2009). In robustness checks, we restrict our sample to only those packages with non-zero covenants. The results are virtually unchanged.

[18] The negative relation between *BM* and covenant usage appears inconsistent with Nash, Netter and Poulsen (2003), which shows that growth opportunities are associated with fewer covenants restricting dividends and additional debt issuances. They do not find such a negative relation between growth opportunities and the use of other types of covenants. Since we do not distinguish between different types of covenants in our dependent variable, our results could reflect the fact that high-growth firms in general tend to have greater potential for stockholder-debtholder conflicts due to greater managerial discretion in these firms, as predicted by the contracting literature.

untabulated results, we first decompose *RLEV* into the inside debt-to-firm debt ratio and inside equity-to-firm equity ratio, and find a significantly negative coefficient on the inside debt-to-firm debt ratio when estimating equation (1). We also replace *RLEV* with inside leverage, and find a significantly negative coefficient on inside leverage in regressions of equation (1). These tests confirm that our results are not driven by a "denominator" effect either from inside equity or from corporate leverage.[19]

Overall, we document a negative relationship between CEO relative leverage and both yield on debt and covenant usage, after controlling for related factors known to affect debt contracting.[20] Given the theoretical prediction that the CEO's interests are better aligned with debtholders vis-à-vis stockholders when her personal debt-to-equity ratio is high relative to the firm's debt-to-equity ratio, our results are consistent with debtholders recognizing this incentive alignment and writing debt contracts accordingly.

4.2 Identification

The analyses above assume CEO relative leverage to be exogenous. This assumption is reasonable since contracting terms in *new* private loans are unlikely to be fully anticipated when designing CEO compensation structure.[21] Nevertheless, we face the concern that compensation contracts and corporate debt contracts are endogenously

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[19] A limitation of the relative leverage measure is that it only captures levels but not changes in the values of debt and equity. Therefore, we construct the CEO's "relative incentive ratio" as in Wei and Yermack (2011). The relative incentive ratio captures the marginal change in CEO inside debt over the marginal change in his equity holdings, given a unit change in overall firm value, scaled by the marginal change in firm outside debt over the marginal change in firm outside equity, for the same unit change in overall firm value. The inferences are robust to this measure.

[20] Our baseline specification, while controlling for a wide range of CEO, firm, and loan characteristics, may not be exhaustive. In additional tests, we control for CEO age in addition to CEO tenure. We add an indicator variable to identify family firms, following Anderson, Mansi and Reeb (2003). We also re-estimate our results excluding firm-years with CEO turnover. Our results are robust to these checks.

[21] Brockman, Martin and Unlu (2010) adopts a similar setting (i.e. examining new debt issues) to address the reverse causality concern that the term structure of corporate debt can affect equity incentives provided to the CEO.

determined by certain unobservable firm characteristics (e.g., factors relating to firms' credit risk), which would bias estimated coefficients in Table 3.

To alleviate this endogeneity concern, we adopt an instrumental variable approach. Anecdotal evidence suggests that providing tax planning options to executives is an important consideration for compensation committees, especially when awarding deferred compensation.[22] We exploit the fact that pensions and other deferred compensation arrangements allow executives to defer income and the associated tax burden to a later period (usually upon retirement) and that the benefit from deferring tax payments increases with the marginal tax rate faced by the CEO (Scholes et al. 2002).[23] Accordingly, we use the individual tax rates of the state in which the firm is headquartered as an instrument for CEO relative leverage. State individual tax rates satisfy the conditions for a valid instrument. First, CEOs facing a higher marginal tax rate on current income should have stronger incentives to defer compensation, predicting a positive association between the CEO's individual state tax rates and relative leverage, *ceteris paribus*.[24] Second, state individual tax rates are unlikely to directly affect corporate debt contracting.

We specify the two-stage instrumental variable (IV) model as follows:

First-Stage:

[22] For instance, Ford Motor Co states in its 2007 proxy statement: "Under our Deferred Compensation plan, certain salaried employees may defer up to 50% of base salary and up to 100% of awards under the Incentive Bonus plan. This unfunded plan provides the opportunity to save for the future, while postponing payment of income taxes on the deferred compensation."

[23] An exception arises if SERP benefits are funded in a secular trust arrangement (i.e. the assets in the trust are protected from the firm's creditors in the event of bankruptcy). In such an arrangement, the CEO incurs an immediate tax liability upon funding. In practice, however, secular trusts are very rare not only because they do not offer tax benefits to CEOs, but also since they are controversial with creditors and other employees (Sundaram and Yermack 2007).

[24] The underlying assumption is that the state in which a CEO's firm is headquartered either adopts residence tax jurisdiction if a CEO resides in the state, or adopts source tax jurisdiction if a CEO resides in another state.

$$RLEV_{i,t} = \alpha_0 + \alpha_1\, IV_t + \sum_{q=2}^{m} a_q (q^{th} ControlVariables) + \varepsilon_{i,t} \quad (2)$$

Second-Stage:

$$SPREAD_{i,t}\ (COVENANT_{i,t}) = \alpha_0 + \alpha_1 FIT\_RLEV_{i,t} + \sum_{q=2}^{m} a_q (q^{th} ControlVariables) + \varepsilon_{i,t} \quad (3)$$

We estimate the above equations using two-stage least squares, with the same set of control variables specified in equation (1). In the first-stage regression, the instrumental variable (*IV*) includes the maximum tax rate for wages (*TAXRATE_WAGE*), the maximum tax rate for long-term capital gains (*TAXRATE_GAIN*), and the maximum mortgage subsidy rate (*TAXRATE_MORT*) faced by a CEO in the state where her firm is headquartered.[25] We expect CEO relative leverage to be positively associated with *TAXRATE_WAGE* and *TAXRATE_GAIN*, and negatively associated with *TAXRATE_MORT*, since the mortgage subsidy reduces the CEO's overall tax burden.

Table 4, Panel A reports the two-stage least squares results. In the first-stage regressions, relative leverage (*RLEV*) is significantly positively related to the state income tax rate (*TAXRATE_WAGE*) and negatively related to the mortgage subsidy rate (*TAXRATE_MORT*), consistent with the intuition that CEOs facing higher effective tax rates prefer a larger amount of debt-like compensation and have higher relative leverage. In the second-stage regressions, the coefficients on fitted relative leverage (*FIT_RLEV*) are negative and significant, confirming that results from our baseline specification in Table 3 are robust to correcting for potential endogeneity.

[25] These rates are calculated using TAXSIM model (See http://www.nber.org/~taxsim/state-rates/ and Feenberg and Coutts (1993) for a complete description).

In Table 4, Panel B, we use an alternative instrument for *RLEV*—the median relative leverage in the firm's industry in the same fiscal year (*IND_RLEV*).[26] This approach follows prior literature that has used industry-level compensation as an instrument for firm-level compensation (Hanlon, Rajagopal and Shevlin 2003), assuming that industry-level compensation practices affect firm-level compensation practices but have little direct impact on firm-level debt contracting. As expected, firm-level relative leverage is significantly positively correlated with industry-level relative leverage. We find again that *FIT_RLEV* is negative and significant in the second-stage regressions. Overall, the two-stage least square results suggest that the negative association between CEO relative leverage and loan yield (or covenant usage) is unlikely to be driven by unobservable firm-specific characteristics.

4.3 The effect of firm default risk

If the incentive-alignment effect of CEO relative leverage is incorporated into debt contracting, we expect the associations documented to be stronger when borrowing firms are closer to default (*Hypothesis 2a* and *Hypothesis 2b*). We use two alternative proxies for default risk: Altman's Z-score and S&P credit rating. We first estimate equation (1) separately for firms with below industry median Altman's Z-score (high default risk) and firms with above industry median Altman's Z-score (low default risk). Table 5, Panel A presents results. For regressions with *SPREAD* as the dependent variable, the negative relationship between *RLEV* and *SPREAD* is more pronounced for firms with low Altman's Z-score. Likewise, for regressions with *COVENANT* as the dependent variable,

[26] We use Fama French 49-industry classification to obtain a refined instrumental variable for firm-level relative leverage and require each industry-year to have at least five observations. We use median (instead of mean) industry relative leverage to mitigate the effect of outliers as relative leverage is highly skewed.

the negative relationship between *RLEV* and *COVENANT* is statistically significant only in the subsample of firms with low Altman's Z-score.

We also partition the sample conditional on whether firms receive investment-grade rating (at or above BBB- based on S&P credit rating). Table 5, Panel B presents regression results. We find that the negative relationship between *RLEV* and *SPREAD* exists within both partitions, but is substantially stronger within the subsample of below-investment-grade-rating firms. On the other hand, the negative relationship between *RLEV* and *COVENANT* exists only in the subsample of firms with below investment-grade-rating. Overall, results reported in Table 5 support the notion that relative leverage plays a more important role in debt pricing and covenant design when borrowing firms have high default risk.

4.4 Institutional features of inside debt

The empirical results so far support the idea that private lenders perceive inside debt as aligning managerial interests closer with their own. This incentive-alignment effect, however, may only exist when the payoffs to inside debt resemble the payoffs to unsecured corporate debt (Edmans and Liu 2010). In practice, inside debt arrangements have many institutional features that could make the payoffs to inside debt different from payoffs to risky debt. We turn next to examining these features.

The two forms of debt-like compensation seen in practice, defined-benefit pensions and other deferred compensation plans (DC plans), share some debt-like features: they both offer a fixed payoff in solvency, and are often not required to be secured or funded, and therefore offer proportionately lower payoffs in insolvency. They differ, however, in payment form and vesting flexibility. First, pension benefits are usually distributed in the form of cash (either a life annuity or a single lump sum), but DC plans often allow executives to invest in the firm's own equity (e.g., Wei and Yermack 2011, Clark Consulting 2009). Second, although pension benefits and DC balances are generally paid out at retirement, DC plans allow more flexible withdrawals, sometimes starting even before retirement (Lee and Tang 2010, Clark Consulting 2009).

The ability to invest DC balances in firm equity and withdraw balances relatively freely makes the payoffs from DC plans less debt-like, compared to the payoffs from defined-benefit pension plans. Therefore, we conjecture that pensions lead to a stronger incentive-alignment effect than DC plans. We test this conjecture by re-estimating equation (1) after disaggregating CEO relative leverage (*RLEV*) into two components, pension-based relative leverage (*RLEV_PEN*) and DC-based relative leverage (*RLEV_DC*). Table 6, Panel A reports the results. Using *SPREAD* as the dependent variable, the coefficient on *RLEV_PEN* is significantly negative, but the coefficient on *RLEV_DC* is insignificant. Similarly, when *COVENANT* is the dependent variable, we find a negative and significant coefficient on *RLEV_PEN* but insignificant coefficient on *RLEV_DC*. These results show that deferred compensation plans are not perceived to bring significant incentive-alignment benefits.

In the same vein, we recognize that CEO pensions come from two kinds of plans: tax-qualified pension plans that cover substantially all firm employees (the "rank-and-file" plans), and non-tax-qualified Supplemental Executive Retirement Plans (SERPs) created to provide additional pensions to highly compensated executives. Rank-and-file pension plans in the U.S. are regulated by the Employee Retirement Income Security Act 1974, which requires these plans to be funded and secured. In addition, if any firm goes bankrupt with an underfunded pension plan, the Pension Benefit Guaranty Corporation (PBGC) funds the deficit, up to a maximum limit reset by law annually. Therefore, CEO pension balances in rank-and-file plans are largely shielded from the firm's insolvency risk. In contrast, Supplemental Executive Retirement Plans (SERPs) are typically unfunded and unsecured, exposing executives to the risk of loss in insolvency. Therefore, pension benefits covered by rank-and-file plans should have a weaker incentive-alignment effect compared to pension benefits covered by SERPs.

To test this conjecture, we collect pension benefits accrued under rank-and-file plans and SERP plans from reading proxy statements and decompose pension-based relative leverage (*RLEV_PEN*) into rank-and-file-based relative leverage (*RLEV_RAF*) and SERP-based relative leverage (*RLEV_SERP*). As shown in Table 6, Panel B, we find an insignificant coefficient on rank-and-file-based relative leverage (*RLEV_RAF*) with either *SPREAD* or *COVENANT* as the dependent variable. We continue to find significantly negative coefficients on SERP-based relative leverage (*RLEV_SERP*).

Hence, the incentive-alignment effect of inside debt is driven largely by SERP balances which most closely resemble unsecured corporate debt in payoffs. This suggests not only that institutional features affect the extent to which inside debt generates incentive alignment between managers and debtholders, but also that private lenders are sensitive to the differential implications of each form of inside debt.

4.5 Potential countervailing effect of inside debt: claim dilution

While our primary empirical findings are consistent with the theoretical prediction that inside debt mitigates agency costs of debt, the analyses in Table 6 show that deviations from debt-like payoffs could offset incentive alignment. Furthermore, the actual design of pension and deferred compensation arrangements may even create countervailing effects for outside debtholders (e.g., Bebchuk and Jackson 2005; Lee and Tang 2010; Clark Consulting 2009).

For instance, many firms allow CEOs to take a lump-sum pension payout at retirement and/or to withdraw pension benefits prior to the normal retirement age, effectively allowing the CEO to demand payment of her debt earlier than contracted. Firms may also set up special arrangements to shield executive pension assets from the firm's general debtholders (Bebchuk and Jackson 2005). Bebchuk and Jackson (2005) provide some anecdotal evidence that firms going through Chapter 11 reorganization often assume in full their executive pension obligations, even when outside debtholders receive only a part of their claims. Therefore, CEO pension benefits may effectively be more senior than the claims held by general debtholders.[27]

The presence of such senior inside debt could dilute outside debtholders' claims, leading to a lower likelihood of outside debtholders recovering capital in insolvency. If outside debtholders perceive inside debt as potential claim dilution, they may respond by increasing the promised yield or including more restrictive covenants when contracting with firms, contrary to our hypotheses and our earlier findings.

The average (median) ratio of CEO inside debt to total corporate debt in our sample is only 0.65% (0.18%). Hence, even if the entire amount of inside debt is senior to outside debt, potential claim dilution may be inconsequential and hence may not impact outside debtholders. Nevertheless, the claim dilution effect may be economically meaningful for firms with CEOs who have accumulated a large amount of inside debt relative to

[27] These features could reflect optimal contracting by firms to attract and retain talented CEOs, or rent extraction by entrenched CEOs in poorly-governed firms (Bebchuk and Fried 2004; Bebchuk and Jackson 2005). Disentangling the optimal contracting and rent extraction views is beyond the scope of this study.

corporate debt. To test this proposition, we augment equation (1) with an indicator variable *HIGHDEBTPCT*, which is set to one if the ratio of inside to outside debt is above the 95th percentile of the annual in-sample distribution.[28] The modified specification is as follows:

$$SPREAD_{i,t}\ (COVENANT_{i,t}) = \alpha_0 + \alpha_1 RLEV_{i,t} + \alpha_2 HIGHDEBTPCT_{i,t} + \sum_{q=3}^{m} a_q (q^{th} ControlVariables) + \varepsilon_{i,t} \quad (4)$$

If debtholders believe that a large amount of inside debt creates claim dilution, we expect to observe a positive coefficient on α_2. We partition our sample into low- versus high-default risk firms, since stockholder-debtholder conflicts may be economically relevant only to firms with high default risk.

Table 7 displays the results of estimating equation (4) for subsamples with above- versus below-industry median level of Altman's Z-score.[29] When *SPREAD* is the dependent variable, the coefficients on *HIGHDEBTPCT* are not statistically significant in either subsample. However, when *COVENANT* is the dependent variable, we observe an interesting contrast in the coefficients on *HIGHDEBTPCT* across the subsamples. When the possibility of default is low (high Altman's Z-score), the coefficient on *HIGHDEBTPCT* is significantly negative, consistent with inside debt lowering lenders' concern of ex post expropriation as predicted in *Hypothesis 1b*. In contrast, when the possibility of default is high (low Altman's Z-score), *HIGHDEBTPCT* is positively associated with covenant usage, suggesting that are concerned about dilution of their claims when inside debt is substantial, in borrowers with poor credit quality.

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[28] This corresponds to a ratio of inside debt to corporate debt of 2.52% in 2006, 2.68% in 2007, and 2.73% in 2008.

[29] For brevity, we do not tabulate the results conditional on below-investment-grade S&P credit rating, which are qualitatively similar to those reported in Table 7 conditional on Altman's Z-score.

We note that the claim dilution effect seems to exist only for a very small subsample within firms with high default risk. Moreover, the indicator variable *HIGHDEBTPCT* is a noisy proxy for the claim dilution potential of inside debt, since the features of deferred compensation contracts vary across firms. Given the lack of data to accurately capture the seniority of inside debt, our results should be interpreted with caution. Overall, our preliminary evidence suggests that inside debt may not always serve the interests of outside debtholders, and that debtholders recognize this effect in designing covenants.

5. Additional Analyses

5.1 Alternative measure of loan contract strictness

In previous analyses, we measure covenant strictness by counting the number of covenants placed in a loan contract. This count index is commonly used in the literature as a measure of contract strictness (e.g., Bradley and Roberts 2004; Nikolaev 2010) since a contract with more covenants is likely to give the lender more contingent control. In addition to the prevalence of covenants, the initial slack for each covenant and the covariance between covenants also affect the extent to which the contract restricts the borrower's actions and the resulting possibility of covenant violation. Following the procedure developed by Murfin (2009), we construct a measure of loan contract strictness that incorporates the initial slack allowed for each covenant as well as the covariance between the covenants included in a contract.

We first estimate for each fiscal year the variance-covariance matrix of quarterly changes in financial ratios commonly contracted upon for all leveraged Compustat firms during the past ten years. To maintain sample size and avoid inducing non-positive definite matrices, we focus on five major covenants—Min. EBITDA to Debt, Min.

Interest Coverage, Max. Capex, Min. Net Worth, and Min. Current Ratio.[30] Second, for each covenant in our sample loan packages, we calculate initial slack as the difference between the natural logarithm of the observed ratio in the first quarter of the contract and the natural logarithm of the minimum allowable ratio (or the negative of the difference in case of a maximum ratio). Finally, we estimate the probability of a covenant violation (*COVENANT_PROB*) by combining the initial slack of all covenants in a sample loan package using a multivariate normal cumulative distribution function, based on the estimated variance-covariance matrices. *COVENANT_PROB* is highly skewed as 38% of our sample loan packages have no covenants; therefore we convert *COVENANT_PROB* to a tercile rank variable *COVENANT_STRICT* in multivariate analyses.

For the 1,061 new loan packages with available data, we estimate equation (1) with the dependent variable *COVENANT_STRICT*. Table 8 shows that the coefficient on *RLEV* is significantly negative, indicating that higher CEO relative leverage is associated with lower overall strictness in contracts. This association is again more pronounced for firms with higher default risk, measured by Altman's Z-score.[31] This shows that private lenders impound the incentive effect of CEO relative leverage when determining the overall strictness of the loan contract at the very inception of the loan.

5.2 The effect of relative leverage on the design of public bond contracts

Finally, we examine the effect of CEO relative leverage on contracting with public bondholders. Similar to our analyses with private loan contracts, we expect a negative

[30] When calculating the quarterly changes in financial ratios, all balance sheet items are measured at the end of the current quarter while income statement or cash flow statement items are calculated on a rolling four-quarter basis. Specifically, based on Compustat quarterly data items, for each fiscal quarter t, EBITDA-to-Debt = $\ln(\sum_{i=0}^{3} OIBDPQ_{t-i}/(DLTTQ_t+DLCQ_t))$; CAPEX = $\ln(\sum_{i=0}^{3} CAPEXQ_{t-i})$ where quarterly *CAPEXQ* is inferred from *CAPXY*; Interest_Coverage = $\ln(\sum_{i=0}^{3} OIBDPQ_{t-i}/\sum_{i=0}^{3} XINTQ_{t-i})$; Net_Worth = $\ln(ATQ_t-LTQ_t)$; and Current Ratio = $\ln(ACTQ_t/LCTQ_t)$.

[31] Results are qualitatively similar if we partition the sample based on investment-grade credit rating, and are hence not reported for brevity.

association between CEO relative leverage and the yield spread on public debt. However, the prediction on the effect of CEO relative leverage on covenant usage in public bonds is not as clear. Since public bondholders face considerable costs to monitoring covenants, public bond contracts typically do not include covenants to the same extent as private loan contracts (Bradley and Roberts 2004). Therefore, the effect of CEO relative leverage on covenant usage in public bonds could be weaker than that in private loans.

We collect new bond issues by U.S. non-financial firms from the intersection of Compustat, FISD, and ExecuComp databases during 2006–2008. This yields a sample of 511 new bond issues. We estimate the following equation using ordinary least squares:

$$SPREAD\_BOND_{i,t}\,(COVENANT\_BOND_{i,t}) = \alpha_0 + \alpha_1 RLEV_{i,t} + \sum_{q=2}^{m} a_q\,(q^{th}\,ControlVariables) + \varepsilon_{i,t} \quad (5)$$

SPREAD_BOND is the yield spread on newly issued bonds, measured as the issue's offering yield minus the yield of the benchmark treasury issue (i.e., treasury spread), expressed in basis points scaled by 100. *COVENANT_BOND* measures covenant usage, defined as the total number of covenants in a bond contract[32]. *RLEV* and control variables are as defined in equation (1). The mean (median) treasury spread is 2.23% (1.80%), while the mean (median) issue has 4.94 (5) covenants.[33]

Table 9, column (1) shows that the coefficient on *RLEV* is significantly negative when regressed on yield spread (*SPREAD_BOND*), indicating that higher relative

[32] We are unable to develop a contract strictness measure for public bonds following Murfin (2009) as the FISD database does not provide information on the allowable ratio for each covenant in bond agreements.
[33] Although the number of covenants in public bonds appears higher than the number of covenants in private loans in our reported summary statistics, the actual use of covenants is much more prevalent in private loans than public bonds. One reason for this discrepancy is that DealScan database only collects financial-related covenants (and one investment-related covenant) on private loans, while FISD database provides a much more comprehensive list of covenants including investment-related, payout-related, financing-related, and accounting-related restrictions.

leverage is associated with a lower cost of issuing new corporate bonds. These results complement the findings in the Wei and Yermack (2011) event study, by documenting a association between CEO relative leverage and the yield spread at the inception of the bond issue. Combined with our earlier findings, high CEO relative leverage appears to decrease the yield on debt in general, i.e., for both private loans and public bonds.

In Table 9, column (2), we find an insignificant coefficient on *RLEV* when regressed on the number of covenant restrictions (*COVENANT_BOND*).[34] While this stands in contrast to our findings on private loans, it is consistent with public bondholders lacking the incentive and ability to effectively monitor borrowers through covenants (Rajan and Winton 1995, Bradley and Roberts 2004). These results also stand in contrast to Chava, Kumar and Warga (2010), who show that large pensions, relative to CEO total pay, are associated with more covenants in bond contracts. Our use of a larger and more recent sample, a more general definition of debt-like compensation that includes both pensions and other deferred compensation, and a focus on CEO relative leverage as opposed to the level of CEO pensions could account for the difference in results. Collectively, the results reported in Table 9 suggest that public bondholders take into account CEO relative leverage when determining the pricing of bonds, but not necessarily while determining the usage of covenants.

6. Conclusion

Top executives in the United States are commonly compensated with both equity and debt. While prior research examines the incentive effects of equity-based compensation

[34] In additional analyses, we follow Nikolaev (2010) to construct narrower covenant indices by grouping covenants into investment-related, payout-related, financing-related, and accounting-related restrictions, respectively. Results based on each category of covenant restrictions are qualitatively similar as those reported under Column (2), and hence omitted for brevity.

extensively, most academic work ignores the incentive effects of debt-like compensation. The greater the ratio of CEO debt-to-equity compensation to corporate leverage, the more aligned the CEO's interests should be with debtholders vis-à-vis stockholders. If debtholders recognize these implications, we expect firms with higher CEO relative leverage to have lower promised yield and fewer covenants restricting managers' activities after debt issuance.

Using a sample of 1,462 new private loans issued during 2006-2008, we find that as CEO relative leverage increases, lenders charge lower loan spreads and reduce the usage of covenants in loan contracts, especially in firms with high default risk. These results are consistent with CEO debt-like compensation reducing stockholder-debtholder conflicts, and with debtholders recognizing this alignment. Further analyses reveal that this incentive-alignment effect is primarily driven by CEOs' pension benefits accrued under SERP plans, as opposed to pension benefits accrued under tax-qualified rank-and-file plans or balances in other deferred compensation plans. We also find that the negative relationship between CEO relative leverage and the yield spread also holds with a sample of new public bond issues. However, CEO relative leverage does not seem to affect covenant usage in bond contracts, probably due to covenants being less valuable as a monitoring tool in public bond issues, compared to private loans.

Our study confirms that debt-like compensation is an important tool in the resolution of agency conflicts between stockholders and debtholders, and that debtholders incorporate incentive alignment effects into debt contracting. Future research may explore the effect of other institutional features of debt-like compensation in mitigating stockholder-debtholder agency conflicts.

References

Altman, Edward I. "Financial ratios, discriminant analysis and the prediction of corporate bankruptcy." *The Journal of Finance*, 1968: 589-609.

Altman, Edward I. "Predicting the financial distress of companies: Revisiting the Z-score and Zeta models." *Working paper*, 2000.

Anderson, Ronald C., Sattar A. Mansi and David M. Reeb. 2003. "Founding family ownership and the agency cost of debt" *Journal of Financial Economics* 68 (2003): 263-285.

Bebchuk, Lucian A., and Jesse M. Fried. "Stealth compensation via retirement benefits." *Berkeley Business Law Journal* 291 (2004).

Bebchuk, Lucian A., and Robert J. Jackson. "Executive pensions." *Journal of Corporation Law* 30 (2005): 823-855.

Begley, Joy, and Gerald A. Feltham. "An empirical examination of the relation between debt contracts and management incentives." *Journal of Accounting and Economics* 27 (1999): 229-259.

Bradley, Michael, and Michael R. Roberts. "The structure and pricing of corporate debt covenants." *Working paper,* 2004.

Brockman, Paul, Xiumin Martin, and Emre Unlu. "Executive compensation and the maturity structure of corporate debt." *The Journal of Finance* 65, no. 3 (2010): 1123-1161.

Chava, Sudheer, and Michael R. Roberts. "How does financing impact investment? The role of debt covenants." *The Journal of Finance* 63, no. 5 (2008): 2085-2118.

Chava, Sudheer, Praveen Kumar, and Arthur Warga. "Managerial agency and bond covenants." *Review of Financial Studies* no 23 (2010):1120-1148.

Clark Consulting. "A Survey of Current Trends." *Executive Benefits Surveys* 14th Ed. (2009).

Coles, Jeffrey L., Naveen D. Daniel, and Lalitha Naveen. "Managerial incentives and risk-taking." *Journal of Financial Economics* 79 (2006): 431-468.

Core, John and Wayne Guay. "Estimating the value of employee stock option portfolios and their sensitivities to price and volatility." *Journal of Accounting Research* 40, no. 3 (2002: 613-630.

Denis, David J., and Vasil T. Mihov. "The choice among bank debt, non-bank private debt, and public debt: Evidence from new corporate borrowings." *Journal of Financial Economics* 70 (2003): 3-28.

Dichev, Ilia D., and Douglas J. Skinner. “Large-sample evidence on the debt covenant hypothesis.” *Journal of Accounting Research* 40, no. 4 (2002): 1091-1123.

Drucker, Steven, and Manju Puri. “On Loan Sales, Loan Contracting, and Lending Relationships.” *Review of Financial Studies* 22 (2009): 2835-2872.

Duru, Augustine, Sattar A. Mansi, and David M. Reeb. “Earnings-based bonus plans and the agency costs of debt.” *Journal of Accounting and Public Policy* 24 (2005): 431-447.

Edmans, Alex A., and Xavier Gabaix. “Is CEO pay really inefficient? A survey of new optimal contracting theories.” *European Financial Management* 15, no. 3 (2009): 486-496.

Edmans, Alex A., Xavier Gabaix and Augustin Landier. “A multiplicative model of optimal CEO incentives in market equilibrium.” *Review of Financial Studies* 22, no 12 (2009): 4881-4917.

Edmans, Alex A., and Qi Liu. “Inside debt.” *Review of Finance*, 2010.

Fama, Eugene, and Kenneth R. French. “Industry costs of equity.” *Journal of Financial Economics* 43 (1997): 153-193.

Feenberg, Daniel Richard, and Elizabeth Coutts. “An Introduction to the TAXSIM Model.” *Journal of Policy Analysis and Management* 12, no. 1 (1993): 189-194.

Gerakos, Joseph. “CEO Pensions: Disclosure, managerial power and optimal contracting.” *Working paper*, 2007.

Hanlon, Michelle, Shivaram Rajagopal, and Terrence J. Shevlin. “Are executive stock options associated with future earnings.” *Journal of Accounting and Economics* 36 (2003): 3-43.

Hillegeist, Stephen A., Elizabeth K. Keating, P. Donald Cram, and Kyle G. Lunstedt. “Assessing the probability of bankruptcy.” *Review of Accounting Studies* 9 (2004): 5-34.

Himmelberg, Charles P., M. Glenn Hubbard and Darius Palia. “Understanding the determinants of managerial ownership and the link between ownership and performance.” *Journal of Financial Economics* 53 (1999): 353-384.

Houston, Joel, and Christopher James. “Bank information monopolies and the mix of private and public debt claims.” *The Journal of Finance* 51, no. 5 (1996): 1863-1889.

Hribar, Paul, and Daniel Collins. “Errors in estimating accruals: implications for empirical research.” *Journal of Accounting Research* 40, no. 1 (2002): 105-134.

Jensen, Michael C., and William H. Meckling. “Theory of the firm: managerial behavior, agency costs and ownership structure.” *The Journal of Financial Economics* 3, no. 4 (1976): 305-360.

John, Kose, and Teresa John. “Top management compensation and capital structure.” *The Journal of Finance* 48, no. 3 (1993): 949-974.

Lee, Gemma, and Hongfei Tang. "CEO pension and deferred compensation." *Working paper*, 2010.

Leland, Hayne E. "Agency costs, risk management and capital structure." *The Journal of Finance* 53, no. 4 (1998): 1213-1243.

Murfin, Justin. "The supply-side determinants of loan contract strictness." *Working paper*, 2009.

Myers, Stewart C. "Determinants of corporate borrowing." *Journal of Financial Economics* 5 (1977).

Nachman, David C., and Thomas H. Noe. "Operating efficiency and output insensitive employment contracts for capital management." *Economic Theory* 5 (1995): 315-335.

Nash, Robert C., Jeffry M. Netter, and Annette B. Poulsen. "Determinants of contractual relations between shareholders and bondholders: investment opportunities and restrictive covenants." *Journal of Corporate Finance* 9 (2003): 201-232.

Nikolaev, Valeri V. "Debt covenants and accounting conservatism ." *Journal of Accounting Research*, 2010: 137-175.

Noe, Thomas H. "Tunnel-proofing the executive suite: transparency, temptation and the design of executive compensation." *Review of Financial Studies* 22, no. 12 (2009): 4849-4880.

Palia, Darius. "The endogeneity of managerial compensation in firm valuation: A solution." *Review of Financial Studies* 14, no. 3 (2000): 735-764.

Rajan, Raghuram, and Andrew Winton. "Covenants and collateral as incentives to monitor." *The Journal of Finance* 50, no. 4 (1995): 1113-1146.

Scholes, Myron S., Mark A. Wolfson, Merle Erickson, Edward L. Maydew and Terry Shevlin. "Taxes and Business Strategy" Prentice-Hall, Inc (2002): Upper Saddle River, NJ.

Schultz, Ellen, and Tom McGinty. "Pensions for executives on the rise." *Wall Street Journal*, 2009.

Smith, Clifford W., and Jerold B. Warner. "On financial contracting: An analysis of bond covenants." *Journal of Financial Economics* 7 (1979): 117-161.

Sundaram, Rangarajan K., and David L. Yermack. "Pay me later: Inside debt and its role in managerial compensation." *The Journal of Finance* 62, no. 4 (2007): 1551-1587.

Tung, Frederick, and Xue Wang. "Bank CEOs, inside debt compensation and the financial crisis." *Working paper*, 2010.

Wei, Chenyang, and David Yermack. "Investors' reactions to CEOs' inside debt incentives" *Working paper*, 2011.

Appendix A. Types of covenant restrictions in private loan contracts

This panel lists the type and distribution of covenants in the sample of private loans.

Type of Covenant	Number (Percentage) of packages that contain the covenant
Max. Debt to EBITDA	501 (39.5%)
Min. Interest Coverage	355 (28.0%)
Min. Fixed Charge Coverage	194 (15.3%)
Max. Leverage ratio	169 (13.3%)
Max. Capex	102 (8.05%)
Min. Net Worth	76 (6.00%)
Max. Senior Debt to EBITDA	64 (5.05%)
Min. Current Ratio	28 (2.21%)
Min. EBITDA	27 (2.13%)
Min. Tangible Net Worth	25 (1.97%)
Max. Debt to Tangible Net Worth	14 (1.10%)
Min. Cash Interest Coverage	6 (0.47%)
Min. Debt Service Coverage	5 (0.39%)
Max. Debt to Equity	3 (0.24%)
Max. Senior Leverage	3 (0.24%)
Min. Quick Ratio	3 (0.24%)
Max. Loan to Value	0 (0.00%)

Appendix B. Variable Definitions

Variable	Definition
SPREAD	All-in-drawn spread expressed in basis points scaled by 100. All-in-drawn spread is the sum of upfront fee, spread over *LIBOR*, utilization fee, annual fee specified in a facility at the inception of the facility.
COVENANT	The sum of 17 restrictive covenants, with each covenant coded as 1 if it is present in a package and 0 otherwise, at the inception of the package.
RLEV	The ratio of CEO's inside leverage to firm leverage. Inside leverage is calculated as the sum of actuarial present value of pension and other deferred compensation divided by the sum of stock value, restricted stock value, and value of stock option holdings. Firm leverage is defined as the sum of long-term debt and debt in current liabilities divided by market value of equity.
RLEV_PEN	The ratio of CEO's pension-to-equity ratio to firm leverage. Pension-to-equity ratio is calculated as the value of pension divided by the sum of stock value, restricted stock value, and value of stock option holdings.
RLEV_DC	The ratio of CEO's deferred compensation-to-equity ratio to firm leverage. Deferred compensation-to-equity ratio is calculated as the value of deferred compensation (other than pension) divided by the sum of stock value, restricted stock value, and value of stock option holdings.
RLEV_RAF	The ratio of CEO's RAF-to-equity ratio to firm leverage. RAF-to-equity ratio is calculated as the value of tax-qualified Rank-and-File plans divided by the sum of stock value, restricted stock value, and value of stock option holdings.
RLEV_SERP	The ratio of CEO's RAF-to-equity ratio to firm leverage. RAF-to-equity ratio is calculated as the value of nonqualified SERP plans divided by the sum of stock value, restricted stock value, and value of stock option holdings.
DELTA	Change in stock and option value for a 1% change in stock price, scaled by annual total compensation (TDC1), with the numerator calculated following Core and Guay (2002).
VEGA	Change in option value for a 0.01 change in stock-return volatility, for the CEO's portfolio of options, calculated following Core and Guay (2002).
ln(*AMOUNT*)	Natural logarithm of a facility's amount.
ln(*MATURITY*)	Natural logarithm of a facility's maturity in months.
N_BANK	Number of lenders for a facility.
IB	Dummy variable that equals 1 if at least one of the lead lenders is investment bank for a facility and 0 otherwise.
USBANK	A dummy variable that equals 1 if at least one of the lead lenders is a U.S. bank for a facility and 0 otherwise.
FRBANK	A dummy variable that equals 1 if at least one of the lead lenders is a foreign bank for a facility and 0 otherwise.
ln(*MVE*)	Natural logarithm of borrowing firm's market value of equity.
ROA	Borrowing firm's return-on-assets ratio, calculated as income before extraordinary items scaled by the lagged total assets.

BM	Borrowing firm's book-to-market ratio, calculated as book value of equity divided by market value of equity.
LEV	Borrowing firm's leverage ratio, calculated as the sum of [long-term debt and debt in current liabilities] divided by total assets.
TANGIBILITY	Borrowing firm's tangibility, measured as net property, plant, and equipment divided by total assets.
SIGMAOCF	Standard deviation of borrowing firm's operating cash flows scaled by lagged total assets over the past five years (including the current year). Operating cash flow is defined as net operating cash flow minus extraordinary items and discontinued operations (adjusted following Hribar and Collins (2002)).
ALTMANZ	Borrower's Altman's Z-score, calculated as [4.34 + 0.08×working capital /total assets - 0.04×retained earnings/total assets + 0.1×earnings before interest and taxes/total assets + 0.22×market value of equity/book value of total liabilities - 0.06×Sales/total assets] for manufacturing firms following Hillegeist, Keating, Cram and Lundstedt (2004), and [6.56×working capital/total assets + 3.26×retained earnings/total assets + 6.72×earnings before interest and taxes /total assets + 1.05×book value of equity/book value of total liabilities] for non-manufacturing firms following Altman(2000).
TAXRATE_WAGE *TAXRATE_GAIN* *TAXRATE_MORT*	Maximum tax rates for wage, maximum tax rate for long term capital gains, and maximum mortgage subsidy rate faced by a CEO in the state where her firm is headquartered, respectively. These rates are calculated using TAXSIM model (See http://www.nber.org/~taxsim/state-rates/ and Feenberg and Coutts (1993) for a complete description).
IND_RLEV	Median value of *RLEV* calculated for each year-industry with at least 5 observations, with industry defined using Fama-French 49 industry classification.
COVENANT_STRICT	A measure of loan contract strictness, calculated for five major covenants (Min. EBITDA to Debt, Min. Interest Coverage, Max. Capex, Min. Net Worth, and Min. Current Ratio) following Murfin (2009).
SPREAD_BOND	The difference between the offering yield on the issue and the yield on the benchmark treasury issue, expressed in basis points scaled by 100.
COVENANT_BOND	The number of covenant restrictions in the bond contract (payout-, investment-, financing-, accounting-related and other restrictions). See Nikolaev (2010) for a complete description.

Table 1: Sample selection

Facilities retrieved from DealScan issued between January 1, 2006 and May 31, 2009	51,456
(-) Facilities of borrowing firms in DealScan that cannot be linked to Compustat	(32,072)
(-)Facilities of borrowing firms missing data in Compustat to compute control variables	(15,126)
(-) Facilities missing CEO compensation information, i.e., tenure, inside leverage, delta, vega	(2,528)
(-) Facilities missing loan characteristics, i.e., loan amount, maturity, number of lenders, lead lender type	(41)
(-) Facilities missing debt contracting variables, i.e., all-in-drawn spread and covenants	(182)
(-) Facilities of borrowing firms in financial industry (SIC 6000-6999)	(45)
Number of facilities used in Table 3 to examine the relation between relative leverage and all-in-drawn spread	**1,462**
Number of packages used in Table 3 to examine the relation between relative leverage and the strictness of debt covenants	**1,267**

Table 2: Descriptive statistics and correlations

Panel A: Descriptive statistics

Variable definitions are in Appendix B. To remove outliers, the distributions of *SPREAD*, *RLEV*, ln(*SALARY*), ln(*BONUS*), *DELTA*, *VEGA*, ln(*MVE*), *ROA*, *BM*, *LEV*, *TANGIBILITY*, *SIGMAOCF*, and *ALTMANZ* are winsorized at the 1% and 99% level.

Variable	N	Mean	Std Dev	5%	25%	Median	75%	95%
SPREAD	1,462	1.246	1.082	0.200	0.450	0.875	1.750	3.250
COVENANT	1,267	1.243	1.184	0.000	0.000	1.000	2.000	3.000
RLEV	1,462	1.287	3.452	0.000	0.019	0.331	1.090	5.014
RLEV_PEN	1,462	0.679	2.163	0.000	0.000	0.028	0.531	2.739
RLEV_DC	1,462	0.608	2.145	0.000	0.000	0.067	0.396	2.534
RLEV_RAF	777	0.192	1.233	0.000	0.005	0.025	0.091	0.617
RLEV_SERP	777	1.064	2.250	0.000	0.099	0.432	0.994	4.315
ln(*TENURE)*	1,462	1.692	0.842	0.000	1.099	1.792	2.303	3.091
ln(*SALARY*)	1,462	6.717	0.402	5.994	6.465	6.746	6.999	7.322
ln(*BONUS*)	1,462	1.530	2.714	0.000	0.000	0.000	2.446	7.340
DELTA	1,462	0.122	0.209	0.009	0.026	0.054	0.122	0.513
VEGA	1,462	252.4	361.1	4.491	38.62	105.6	304.9	1,134
ln(*AMOUNT*)	1,462	10.64	1.331	17.37	18.83	19.67	20.62	21.68
ln(*MATURITY*)	1,462	3.813	0.654	2.485	3.871	4.094	4.094	4.382
N_BANK	1,462	10.10	8.162	1.000	5.000	8.000	14.00	25.00
IB	1,462	0.072	0.258	0.000	0.000	0.000	0.000	1.000
USBANK	1,462	0.859	0.348	0.000	1.000	1.000	1.000	1.000
FRBANK	1,462	0.200	0.400	0.000	0.000	0.000	0.000	1.000
ln(*MVE*)	1,462	8.163	1.516	5.860	7.099	8.022	9.237	10.95
ROA	1,462	0.072	0.063	-0.022	0.036	0.065	0.107	0.179
BM	1,462	0.424	0.230	0.123	0.256	0.381	0.557	0.842
LEV	1,462	0.244	0.150	0.003	0.129	0.234	0.343	0.524
TANGIBILITY	1,462	0.319	0.234	0.049	0.130	0.250	0.492	0.799
SIGMAOCF	1,462	0.043	0.033	0.010	0.020	0.034	0.056	0.111
ALTMANZ	1,462	3.735	2.114	0.513	2.093	3.935	4.968	7.155

Table 2: Descriptive statistics and correlations (Cont'd)

Panel B: Correlation matrix of debt contracting variables and relative leverage

Variable definitions are provided in Appendix B. Pearson correlations are reported above the main diagonal and Spearman correlations are reported below the diagonal. *** (**) (*) indicates significance at 1% (5%) (10%) two-tailed level.

	SPREAD	*COVENANT*	*RLEV*
SPREAD		0.29***	-0.19***
COVENANT	0.18***		-0.13***
RLEV	-0.42***	-0.20***	

Table 3: Does CEO relative leverage affect all-in-drawn spread and covenant usage?

This table reports regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants). Column (1) presents the ordinary least squares (OLS) regression results with all-in-drawn spread (*SPREAD*) as the dependent variable. Column (2) and column (3) present the ordinary least squares (OLS) regression results and ordered-probit regression results with number of restrictive covenants (*COVENANT*) as the dependent variable. Intercept terms in column (3) are not presented for parsimony. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)
	OLS	***OLS***	***Ordered-Probit***
Dependent Variable	*SPREAD*	*COVENANT*	*COVENANT*
RLEV	**-0.019*** **	**-0.018** **	**-0.029** **
	(0.007)	(0.008)	(0.012)
ln(*TENURE*)	**-0.029**	**0.062**	**0.068**
	(0.038)	(0.044)	(0.047)
ln(*SALARY*)	**0.162**	**-0.091**	**-0.060**
	(0.157)	(0.125)	(0.141)
ln(*BONUS*)	**0.002**	**-0.019* **	**-0.028** **
	(0.011)	(0.011)	(0.013)
DELTA	**-0.023**	**0.002**	**0.034**
	(0.112)	(0.156)	(0.171)
VEGA×1000	**0.014**	**-0.044**	**-0.129**
	(0.119)	(0.105)	(0.146)
ln(*AMOUNT*)	**-0.158*** **	**0.026**	**0.038**
	(0.037)	(0.037)	(0.048)
ln(*MATURITY*)	**0.040**	**-0.039**	**-0.062**
	(0.051)	(0.050)	(0.060)
N_BANK	**-0.003**	**0.039*** **	**0.046*** **
	(0.004)	(0.004)	(0.005)
IB	**0.712*** **	**0.199**	**0.227**
	(0.158)	(0.159)	(0.167)
USBANK	**-0.581*** **	**-0.023**	**-0.012**
	(0.135)	(0.106)	(0.123)
FRBANK	**-0.023**	**-0.048**	**-0.072**
	(0.093)	(0.081)	(0.094)
ln(*MVE*)	**-0.151*** **	**-0.378*** **	**-0.451*** **
	(0.051)	(0.046)	(0.059)
ROA	**-1.507* **	**-0.801**	**-0.765**
	(0.780)	(0.727)	(0.741)
BM	**0.364** **	**-0.425** **	**-0.508*** **

	(0.170)	(0.180)	(0.195)
LEV	**1.153*** **	**-0.300**	**-0.392**
	(0.280)	(0.298)	(0.317)
TANGIBILITY	**0.153**	**-0.139**	**-0.182**
	(0.222)	(0.197)	(0.212)
SIGMAOCF	**3.507*** **	**-0.195**	**0.074**
	(1.187)	(1.311)	(1.414)
ALTMANZ	**-0.020**	**0.030**	**0.026**
	(0.020)	(0.025)	(0.026)
Intercept	**4.058*** **	**4.436*** **	
	(1.027)	(0.930)	
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Number of observations	1,462	1,267	1,267
Adjusted R^2	0.402	0.290	0.127(Pseudo)

Table 4: Does CEO relative leverage affect all-in-drawn spread and covenant usage? Two-stage least squares estimation

Panel A: Using state individual tax rates as instrumental variable

This table reports regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants). Columns (1.1) and (1.2) present the two-stage least squares (2SLS) regression results with all-in-drawn spread (*SPREAD*) as the dependent variable in the second-stage regression. Columns (2.1) and (2.2) present the two-stage least squares (2SLS) regression results with number of restrictive covenants (*COVENANT*) as the dependent variable in the second-stage regression. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1.1)	(1.2)	(2.1)	(2.2)
	First-stage	***Second-stage***	***First-stage***	***Second-stage***
Dependent Variable	*RLEV*	*SPREAD*	*RLEV*	*COVENANT*
TAXRATE_WAGE	**0.285****		**0.316****	
	(0.128)		(0.147)	
TAXRATE_GAIN	**-0.073**		**-0.064**	
	(0.119)		(0.129)	
TAXRATE_MORT	**-0.219*****		**-0.281*****	
	(0.058)		(0.073)	
FIT_ RLEV		**-0.158*****		**-0.134****
		(0.063)		(0.060)
ln(*TENURE*)	**-0.011**	**-0.032**	**-0.047**	**0.057**
	(0.085)	(0.029)	(0.100)	(0.044)
ln(*SALARY*)	**-0.540***	**0.105**	**-0.603***	**-0.138**
	(0.281)	(0.108)	(0.346)	(0.127)
ln(*BONUS*)	**-0.071****	**-0.006**	**-0.083****	**-0.028****
	(0.030)	(0.009)	(0.036)	(0.012)
DELTA	**-2.081*****	**-0.307****	**-2.341*****	**-0.274**
	(0.310)	(0.151)	(0.360)	(0.204)
VEGA×1000	**0.463**	**0.079**	**0.443**	**0.010**
	(0.501)	(0.114)	(0.536)	(0.110)
ln(*AMOUNT*)	**-0.050**	**-0.165*****	**-0.008**	**0.024**
	(0.072)	(0.031)	(0.112)	(0.037)
ln(*MATURITY*)	**0.026**	**0.045**	**0.002**	**-0.035**
	(0.154)	(0.051)	(0.176)	(0.049)
N_BANK	**-0.020**	**-0.006**	**-0.014**	**0.038*****
	(0.012)	(0.004)	(0.017)	(0.005)
IB	**-0.555*****	**0.641*****	**-0.441**	**0.154**
	(0.214)	(0.127)	(0.293)	(0.154)
USBANK	**0.368****	**-0.528*****	**0.342**	**0.019**

	(0.174)	(0.109)	(0.254)	(0.106)
FRBANK	**-0.377****	**-0.072**	**-0.291**	**-0.080**
	(0.190)	(0.073)	(0.247)	(0.084)
ln(*MVE*)	**0.532*****	**-0.080**	**0.557*****	**-0.317*****
	(0.155)	(0.049)	(0.183)	(0.053)
ROA	**-0.178**	**-1.587****	**-1.756**	**-1.026**
	(1.920)	(0.620)	(2.445)	(0.725)
BM	**-0.189**	**0.309****	**-0.161**	**-0.470****
	(0.429)	(0.140)	(0.524)	(0.182)
LEV	**-2.950*****	**0.722****	**-3.957*****	**-0.785****
	(0.761)	(0.282)	(0.971)	(0.387)
TANGIBILITY	**0.982****	**0.213**	**0.797**	**-0.125**
	(0.426)	(0.156)	(0.583)	(0.202)
SIGMAOCF	**-1.260**	**3.355*****	**-0.261**	**-0.244**
	(3.456)	(0.986)	(4.125)	(1.261)
ALTMANZ	**0.164***	**0.001**	**0.274****	**0.059****
	(0.086)	(0.023)	(0.110)	(0.028)
Intercept	**1.805**	**4.304*****	**1.451**	**4.568*****
	(2.440)	(0.799)	(3.150)	(0.907)
Year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Number of observations	1,460	1,460	1,265	1,265
Adjusted R^2	0.139	0.231	0.149	0.160

Table 4: Does CEO relative leverage affect all-in-drawn spread and covenant usage? Two-stage least squares estimation (Cont'd)

Panel B: Using industry median relative leverage as instrumental variable

This table reports regression results on the relationship between CEO relative leverage and the design of private loan contracts (including cost of debt and number of restrictive covenants). Columns (1.1) and (1.2) present the two-stage least squares (2SLS) regression results with all-in-drawn spread (*SPREAD*) as the dependent variable in the second-stage regression. Columns (2.1) and (2.2) present the two-stage least squares (2SLS) regression results with number of restrictive covenants (*COVENANT*) as the dependent variable in the second-stage regression. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1.1)	(1.2)	(2.1)	(2.2)
	First-stage	***Second-stage***	***First-stage***	***Second-stage***
Dependent Variable	*RLEV*	*SPREAD*	*RLEV*	*COVENANT*
IND_RLEV	**1.255*****		**1.023*****	
	(0.254)		(0.255)	
FIT_ RLEV		**-0.221*****		**-0.269****
		(0.083)		(0.132)
ln(*TENURE*)	**0.033**	**-0.004**	**-0.014**	**0.073**
	(0.065)	(0.032)	(0.070)	(0.049)
ln(*SALARY*)	**0.075**	**0.140**	**0.048**	**-0.118**
	(0.157)	(0.116)	(0.196)	(0.134)
ln(*BONUS*)	**-0.054*****	**-0.008**	**-0.050****	**-0.031****
	(0.016)	(0.011)	(0.020)	(0.014)
DELTA	**-1.387*****	**-0.280***	**-1.448*****	**-0.282**
	(0.186)	(0.163)	(0.198)	(0.256)
VEGA×1000	**0.195**	**-0.085**	**-0.092**	**-0.097**
	(0.234)	(0.101)	(0.257)	(0.110)
ln(*AMOUNT*)	**-0.003**	**-0.155*****	**-0.019**	**0.005**
	(0.041)	(0.033)	(0.061)	(0.040)
ln(*MATURITY*)	**0.046**	**0.069**	**0.069**	**-0.009**
	(0.072)	(0.053)	(0.082)	(0.055)
N_BANK	**-0.014****	**-0.010*****	**-0.009**	**0.038*****
	(0.007)	(0.004)	(0.009)	(0.005)
IB	**-0.315**	**0.738*****	**-0.046**	**0.200**
	(0.192)	(0.144)	(0.260)	(0.175)
USBANK	**0.229**	**-0.520*****	**0.322****	**0.100**
	(0.140)	(0.117)	(0.161)	(0.123)
FRBANK	**-0.020**	**-0.031**	**-0.038**	**-0.046**
	(0.141)	(0.079)	(0.165)	(0.095)
ln(*MVE*)	**0.182****	**-0.090****	**0.275*****	**-0.282*****

	(0.075)	(0.040)	(0.088)	(0.058)
ROA	**1.802***	**-1.544****	**1.279**	**-0.444**
	(1.077)	(0.650)	(1.316)	(0.777)
BM	**-0.074**	**0.337****	**-0.079**	**-0.317**
	(0.218)	(0.144)	(0.239)	(0.198)
LEV	**-1.485*****	**0.867*****	**-1.505*****	**-0.566**
	(0.363)	(0.251)	(0.423)	(0.385)
TANGIBILITY	**0.624****	**0.302**	**0.470**	**-0.132**
	(0.306)	(0.189)	(0.366)	(0.231)
SIGMAOCF	**1.049**	**3.502*****	**1.293**	**-0.121**
	(2.143)	(1.101)	(2.612)	(1.439)
ALTMANZ	**0.073***	**-0.017**	**0.110****	**0.053***
	(0.040)	(0.019)	(0.045)	(0.032)
Intercept	**-1.877***	**3.822*****	**-1.999**	**4.283*****
	(1.068)	(0.818)	(1.493)	(0.989)
Year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Number of observations	1,239	1,239	1,073	1,073
Adjusted R^2	0.168	0.368	0.160	0.172

Table 5: CEO relative leverage and debt contracting: the effect of firm default risk

Panel A: Subsample tests partitioned by Altman's Z-score

This table reports the ordinary least squares (OLS) regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants), conditional on the level of Altman's Z-score. Median Altman's Z-scores are calculated separately for manufacturing and non-manufacturing firms in the sample. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)	(4)
	Altman's Z-Score below Median (Closer to default)		*Altman's Z-score at or above Median (further from default)*	
Dependent Variable	*SPREAD*	*COVENANT*	*SPREAD*	*COVENANT*
RLEV	**-0.036***	**-0.040**	**-0.013**	**-0.009**
	(0.014)	(0.017)	(0.006)	(0.008)
ln(*TENURE*)	**-0.036**	**0.162***	**0.010**	**-0.036**
	(0.042)	(0.061)	(0.053)	(0.063)
ln(*SALARY*)	**0.272**	**-0.165**	**-0.103**	**-0.063**
	(0.120)	(0.160)	(0.199)	(0.185)
ln(*BONUS*)	**0.000**	**-0.018**	**-0.002**	**-0.014**
	(0.011)	(0.016)	(0.016)	(0.016)
DELTA	**-0.106**	**-0.190**	**-0.060**	**0.304**
	(0.178)	(0.200)	(0.157)	(0.229)
VEGA×1000	**-0.197**	**0.033**	**0.170**	**-0.000**
	(0.122)	(0.151)	(0.174)	(0.140)
ln(*AMOUNT*)	**-0.141***	**-0.040**	**-0.155**	**0.082**
	(0.032)	(0.052)	(0.062)	(0.056)
ln(*MATURITY*)	**0.016**	**-0.062**	**0.004**	**-0.021**
	(0.052)	(0.072)	(0.069)	(0.063)
N_BANK	**-0.008**	**0.037***	**0.007**	**0.046***
	(0.004)	(0.005)	(0.008)	(0.008)
IB	**0.651***	**-0.071**	**0.721**	**0.425***
	(0.121)	(0.218)	(0.282)	(0.242)
USBANK	**-0.634***	**0.079**	**-0.488**	**-0.169**
	(0.103)	(0.161)	(0.189)	(0.148)
FRBANK	**-0.061**	**0.056**	**-0.082**	**-0.196**
	(0.081)	(0.098)	(0.166)	(0.140)
ln(*MVE*)	**-0.123***	**-0.315***	**-0.147**	**-0.469***
	(0.043)	(0.055)	(0.068)	(0.073)
ROA	**-2.098***	**-0.514**	**-0.389**	**-1.817***
	(0.689)	(0.977)	(1.240)	(1.087)

BM	**0.286***	**-0.179**	**0.525**	**-0.901*****
	(0.150)	(0.233)	(0.333)	(0.294)
LEV	**1.336*****	**-0.077**	**0.647**	**-0.556**
	(0.263)	(0.434)	(0.507)	(0.460)
TANGIBILITY	**0.283**	**-0.215**	**-0.347**	**-0.058**
	(0.188)	(0.285)	(0.278)	(0.276)
SIGMAOCF	**0.545**	**-0.293**	**5.724*****	**-0.155**
	(1.118)	(2.114)	(1.638)	(1.628)
ALTMANZ	**-0.070***	**0.001**	**-0.065***	**0.048**
	(0.040)	(0.058)	(0.034)	(0.039)
Intercept	**3.148*****	**5.589*****	**5.854*****	**4.169*****
	(0.867)	(1.260)	(1.405)	(1.423)
Year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Number of observations	733	632	729	635
Adjusted R^2	0.474	0.284	0.386	0.330

Table 5: CEO relative leverage and debt contracting: the effect of firm default risk (Cont'd)

Panel B: Subsample tests partitioned by firm credit rating

This table reports the ordinary least squares (OLS) regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants), conditional on S&P credit ratings. Investment grade rating is defined as S&P credit ratings at or above BBB-. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)	(4)
	Below Investment Grade (Closer to default)		*At or Above Investment Grade (further from default)*	
Dependent Variable	*SPREAD*	*COVENANT*	*SPREAD*	*COVENANT*
RLEV	**-0.114****	**-0.055****	**-0.007***	**-0.006**
	(0.054)	(0.024)	(0.004)	(0.009)
ln(*TENURE*)	**-0.062**	**0.154**	**-0.023**	**-0.016**
	(0.063)	(0.103)	(0.034)	(0.047)
ln(*SALARY*)	**0.090**	**-0.015**	**0.283****	**-0.002**
	(0.177)	(0.287)	(0.118)	(0.120)
ln(*BONUS*)	**-0.023**	**-0.028**	**0.006**	**-0.012**
	(0.019)	(0.031)	(0.013)	(0.012)
DELTA	**-0.461***	**-0.328**	**0.112**	**0.188**
	(0.245)	(0.301)	(0.086)	(0.159)
VEGA×1000	**0.650****	**0.215**	**-0.009**	**0.103**
	(0.322)	(0.483)	(0.097)	(0.114)
ln(*AMOUNT*)	**-0.075**	**0.032**	**-0.234*****	**0.027**
	(0.051)	(0.106)	(0.048)	(0.039)
ln(*MATURITY*)	**-0.223****	**0.139**	**0.008**	**-0.049**
	(0.091)	(0.138)	(0.042)	(0.046)
N_BANK	**-0.010***	**0.035*****	**0.003**	**0.040*****
	(0.006)	(0.010)	(0.004)	(0.004)
IB	**0.579*****	**-0.060**	**0.901***	**-0.342**
	(0.156)	(0.247)	(0.459)	(0.222)
USBANK	**-0.437*****	**0.261**	**-0.489*****	**-0.256***
	(0.145)	(0.218)	(0.184)	(0.147)
FRBANK	**-0.155**	**0.065**	**-0.005**	**-0.214*****
	(0.128)	(0.197)	(0.090)	(0.077)
ln(*MVE*)	**-0.261*****	**-0.357*****	**0.009**	**-0.386*****
	(0.083)	(0.126)	(0.045)	(0.044)
ROA	**-2.558*****	**-0.696**	**-0.406**	**-0.206**
	(0.935)	(1.211)	(0.869)	(1.029)

BM	**-0.164**	**-0.063**	**0.734*****	**-0.164**
	(0.247)	(0.386)	(0.252)	(0.232)
LEV	**0.305**	**-0.417**	**1.213*****	**-0.185**
	(0.420)	(0.595)	(0.388)	(0.450)
TANGIBILITY	**0.260**	**-0.162**	**0.155**	**-0.143**
	(0.284)	(0.415)	(0.195)	(0.232)
SIGMAOCF	**-0.525**	**0.425**	**0.659**	**1.030**
	(1.664)	(2.599)	(1.439)	(1.699)
ALTMANZ	**0.008**	**0.118***	**0.019**	**-0.052**
	(0.044)	(0.065)	(0.021)	(0.034)
Intercept	**6.035*****	**2.246**	**2.623*****	**4.155*****
	(1.445)	(2.420)	(1.010)	(1.045)
Year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Number of observations	434	313	575	566
Adjusted R^2	0.321	0.207	0.420	0.390

Table 6: CEO relative leverage and debt contracting: the effect of inside debt composition

Panel A: Decomposing inside debt into pension and deferred compensation

This table reports regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants). Column (1) presents the ordinary least squares (OLS) regression results with all-in-drawn spread (*SPREAD*) as the dependent variable. Column (2) and column (3) present the ordinary least squares (OLS) regression results and ordered-probit regression results with number of restrictive covenants (*COVENANT*) as the dependent variable. Intercept terms in column (3) are not presented for parsimony. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)
	OLS	***OLS***	***Ordered-Probit***
Dependent Variable	*SPREAD*	*COVENANT*	*COVENANT*
RLEV_PEN	**-0.026*****	**-0.025****	**-0.040*****
	(0.009)	(0.012)	(0.015)
RLEV_DC	**-0.011**	**-0.009**	**-0.017**
	(0.009)	(0.014)	(0.020)
ln(*TENURE*)	**-0.030**	**0.060**	**0.066**
	(0.038)	(0.044)	(0.047)
ln(*SALARY*)	**0.165**	**-0.086**	**-0.055**
	(0.157)	(0.125)	(0.141)
ln(*BONUS*)	**0.002**	**-0.019***	**-0.028****
	(0.011)	(0.011)	(0.013)
DELTA	**-0.021**	**0.003**	**0.035**
	(0.112)	(0.156)	(0.171)
VEGA×1000	**0.010**	**-0.050**	**-0.133**
	(0.120)	(0.106)	(0.146)
ln(*AMOUNT*)	**-0.157*****	**0.026**	**0.039**
	(0.037)	(0.037)	(0.048)
ln(*MATURITY*)	**0.039**	**-0.039**	**-0.066**
	(0.051)	(0.050)	(0.059)
N_BANK	**-0.003**	**0.039*****	**0.047*****
	(0.004)	(0.004)	(0.005)
IB	**0.710*****	**0.200**	**0.228**
	(0.158)	(0.160)	(0.167)
USBANK	**-0.582*****	**-0.025**	**-0.013**
	(0.136)	(0.106)	(0.123)
FRBANK	**-0.024**	**-0.049**	**-0.073**
	(0.094)	(0.081)	(0.094)
ln(*MVE*)	**-0.152*****	**-0.379*****	**-0.454*****

	(0.051)	(0.046)	(0.060)
ROA	**-1.539***	**-0.831**	**-0.810**
	(0.785)	(0.727)	(0.740)
BM	**0.365****	**-0.425****	**-0.507*****
	(0.170)	(0.180)	(0.195)
LEV	**1.148*****	**-0.308**	**-0.401**
	(0.281)	(0.298)	(0.316)
TANGIBILITY	**0.153**	**-0.142**	**-0.182**
	(0.222)	(0.197)	(0.213)
SIGMAOCF	**3.498*****	**-0.203**	**0.044**
	(1.189)	(1.309)	(1.412)
ALTMANZ	**-0.021**	**0.028**	**0.025**
	(0.020)	(0.026)	(0.026)
Intercept	**4.046*****	**4.421*****	
	(1.029)	(0.932)	
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Number of observations	1,462	1,267	1,267
Adjusted R^2	0.402	0.291	0.127 (Pseudo)

Table 6: CEO relative leverage and debt contracting: the effect of inside debt composition (Cont'd)

Panel B: Decomposing inside debt into Rank-and-File plans, SERP plans, and deferred compensation

This table reports regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants). Column (1) presents the ordinary least squares (OLS) regression results with all-in-drawn spread (*SPREAD*) as the dependent variable. Column (2) and column (3) present the ordinary least squares (OLS) regression results and ordered-probit regression results with number of restrictive covenants (*COVENANT*) as the dependent variable. Intercept terms in column (3) are not presented for parsimony. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)
	OLS	***OLS***	***Ordered-Probit***
Dependent Variable	*SPREAD*	*COVENANT*	*COVENANT*
RLEV_RAF	**-0.018**	**-0.013**	**-0.016**
	(0.014)	(0.017)	(0.017)
RLEV_SERP	**-0.024****	**-0.023***	**-0.043****
	(0.011)	(0.013)	(0.021)
RLEV_DC	**0.007**	**0.010**	**-0.016**
	(0.015)	(0.017)	(0.031)
ln(*TENURE*)	**-0.074**	**0.048**	**0.063**
	(0.053)	(0.061)	(0.073)
ln(*SALARY*)	**0.368**	**-0.056**	**-0.055**
	(0.226)	(0.180)	(0.232)
ln(*BONUS*)	**0.013**	**-0.026***	**-0.043****
	(0.014)	(0.014)	(0.019)
DELTA	**-0.056**	**0.045**	**0.030**
	(0.155)	(0.210)	(0.258)
VEGA×1000	**-0.048**	**-0.075**	**-0.169**
	(0.133)	(0.146)	(0.226)
ln(*AMOUNT*)	**-0.175*****	**0.031**	**0.048**
	(0.049)	(0.046)	(0.065)
ln(*MATURITY*)	**-0.000**	**-0.027**	**-0.060**
	(0.053)	(0.059)	(0.079)
N_BANK	**0.004**	**0.035*****	**0.046*****
	(0.004)	(0.006)	(0.008)
IB	**0.779*****	**-0.057**	**-0.020**
	(0.265)	(0.224)	(0.261)
USBANK	**-0.786*****	**-0.086**	**-0.109**
	(0.189)	(0.147)	(0.194)

FRBANK	**-0.089**	**-0.105**	**-0.160**
	(0.138)	(0.097)	(0.132)
ln(*MVE*)	**-0.140****	**-0.381*****	**-0.491*****
	(0.066)	(0.062)	(0.090)
ROA	**-2.064***	**0.958**	**1.015**
	(1.188)	(0.982)	(1.160)
BM	**0.388**	**-0.319**	**-0.424**
	(0.245)	(0.238)	(0.281)
LEV	**0.922****	**0.125**	**0.068**
	(0.371)	(0.405)	(0.486)
TANGIBILITY	**0.394**	**0.028**	**0.021**
	(0.273)	(0.279)	(0.325)
SIGMAOCF	**4.258*****	**1.014**	**1.548**
	(1.527)	(1.805)	(2.226)
ALTMANZ	**-0.028**	**-0.037**	**-0.047**
	(0.037)	(0.039)	(0.048)
Intercept	**3.268****	**4.029*****	
	(1.522)	(1.231)	
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Number of observations	777	712	712
Adjusted R^2	0.421	0.318	0.150

Table 7: Does inside debt create claim dilution?

This table reports the ordinary least squares (OLS) regression results on the relationship between CEO relative leverage and the design of private loan contracts (including all-in-drawn spread and number of restrictive covenants), conditional on the level of Altman's Z-score. Median Altman's Z-scores are calculated separately for manufacturing and non-manufacturing firms in the sample. *HIGHDEBTPCT* is an indicator variable that equals 1 if the inside debt-to-corporate debt ratio lies above the 95th percentile of the annual in-sample distribution and 0 otherwise. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)	(3)	(4)
	Altman's Z-score below Median (Closer to default)		*Altman's Z-score at or above Median (further from default)*	
Dependent Variable	*SPREAD*	*COVENANT*	*SPREAD*	*COVENANT*
RLEV	**-0.039****	**-0.065*****	**-0.007**	**0.004**
	(0.017)	(0.019)	(0.007)	(0.008)
HIGHDEBTPCT	**0.089**	**0.678****	**-0.195**	**-0.501*****
	(0.243)	(0.336)	(0.145)	(0.155)
ln(*TENURE*)	**-0.037**	**0.148****	**0.019**	**-0.025**
	(0.042)	(0.061)	(0.053)	(0.063)
ln(*SALARY*)	**0.271****	**-0.174**	**-0.080**	**-0.001**
	(0.120)	(0.158)	(0.199)	(0.186)
ln(*BONUS*)	**-0.000**	**-0.020**	**-0.002**	**-0.015**
	(0.011)	(0.016)	(0.016)	(0.016)
DELTA	**-0.108**	**-0.207**	**-0.058**	**0.325**
	(0.178)	(0.198)	(0.157)	(0.229)
VEGA×1000	**-0.197**	**0.025**	**0.168**	**0.005**
	(0.122)	(0.147)	(0.172)	(0.139)
ln(*AMOUNT*)	**-0.141*****	**-0.037**	**-0.155****	**0.077**
	(0.032)	(0.052)	(0.062)	(0.055)
ln(*MATURITY*)	**0.016**	**-0.064**	**0.005**	**-0.010**
	(0.052)	(0.072)	(0.069)	(0.062)
N_BANK	**-0.008****	**0.037*****	**0.007**	**0.047*****
	(0.004)	(0.005)	(0.008)	(0.007)
IB	**0.654*****	**-0.043**	**0.724****	**0.451***
	(0.121)	(0.218)	(0.281)	(0.243)
USBANK	**-0.634*****	**0.081**	**-0.489****	**-0.159**
	(0.103)	(0.161)	(0.191)	(0.149)
FRBANK	**-0.059**	**0.059**	**-0.081**	**-0.180**
	(0.082)	(0.100)	(0.166)	(0.141)
ln(*MVE*)	**-0.122*****	**-0.305*****	**-0.158****	**-0.499*****
	(0.043)	(0.055)	(0.070)	(0.075)

ROA	**-2.111*****	**-0.595**	**-0.390**	**-1.858***
	(0.690)	(0.980)	(1.237)	(1.071)
BM	**0.286***	**-0.184**	**0.537**	**-0.916*****
	(0.150)	(0.231)	(0.338)	(0.290)
LEV	**1.341*****	**-0.032**	**0.619**	**-0.610**
	(0.264)	(0.432)	(0.509)	(0.459)
TANGIBILITY	**0.289**	**-0.202**	**-0.339**	**-0.022**
	(0.188)	(0.289)	(0.279)	(0.273)
SIGMAOCF	**0.579**	**-0.138**	**5.632*****	**-0.246**
	(1.122)	(2.122)	(1.640)	(1.589)
ALTMANZ	**-0.068***	**0.011**	**-0.064***	**0.052**
	(0.040)	(0.058)	(0.034)	(0.039)
Intercept	**3.143*****	**5.506*****	**5.783*****	**4.021*****
	(0.868)	(1.252)	(1.402)	(1.410)
Year fixed effects	Included	Included	Included	Included
Industry fixed effects	Included	Included	Included	Included
Number of observations	733	632	729	635
Adjusted R^2	0.474	0.290	0.387	0.338

Table 8: Does CEO relative leverage affect loan contract strictness?

This table reports regression results on the relationship between CEO relative leverage and the loan contract strictness. Column (1) presents the ordinary least squares (OLS) regression results using pooling sample with *COVENANT_STRICT* as the dependent variable. Column (2) and column (3) present the ordinary least squares (OLS) regression results with *COVENANT_STRICT* as the dependent variable, conditional on the level of Altman's Z-score. Median Altman's Z-scores are calculated separately for manufacturing and non-manufacturing firms in the sample. *COVENANT_STRICT* is a measure of loan contract strictness, constructed following Murfin (2009). Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1) *Pooling Sample*	(2) *Altman's Z-Score below Median (Closer to default)*	(3) *Altman's Z-score at or above Median (further from default)*
Dependent Variable	*COVENANT_STRICT*	*COVENANT_STRICT*	*COVENANT_STRICT*
RLEV	**-0.005***	**-0.015****	**-0.001**
	(0.003)	(0.007)	(0.003)
ln(*TENURE*)	**-0.013**	**0.011**	**-0.040**
	(0.020)	(0.030)	(0.027)
ln(*SALARY*)	**0.025**	**-0.049**	**0.046**
	(0.050)	(0.076)	(0.067)
ln(*BONUS*)	**0.001**	**-0.002**	**0.001**
	(0.005)	(0.007)	(0.007)
DELTA	**0.057**	**0.031**	**0.052**
	(0.067)	(0.106)	(0.096)
VEGA×1000	**0.029**	**-0.003**	**-0.011**
	(0.052)	(0.080)	(0.057)
ln(*AMOUNT*)	**0.010**	**-0.011**	**0.017**
	(0.015)	(0.022)	(0.022)
ln(*MATURITY*)	**0.014**	**0.023**	**-0.001**
	(0.020)	(0.025)	(0.029)
N_BANK	**0.013*****	**0.012*****	**0.017*****
	(0.002)	(0.003)	(0.003)
IB	**0.010**	**0.020**	**0.004**
	(0.062)	(0.089)	(0.095)
USBANK	**0.100****	**0.140***	**0.044**
	(0.046)	(0.072)	(0.065)
FRBANK	**0.022**	**0.062**	**0.017**
	(0.039)	(0.053)	(0.060)
ln(*MVE*)	**-0.132*****	**-0.111*****	**-0.135*****
	(0.020)	(0.029)	(0.027)
ROA	**0.292**	**0.546**	**0.140**

	(0.338)	(0.572)	(0.473)
BM	**-0.258*****	**-0.273****	**-0.154**
	(0.085)	(0.113)	(0.137)
LEV	**0.180**	**-0.049**	**0.426****
	(0.134)	(0.199)	(0.200)
TANGIBILITY	**-0.284*****	**-0.016**	**-0.042**
	(0.081)	(0.145)	(0.145)
SIGMAOCF	**-0.941***	**-1.124**	**-0.871**
	(0.540)	(0.993)	(0.662)
ALTMANZ	**-0.014**	**-0.002**	**-0.032***
	(0.011)	(0.030)	(0.017)
Intercept	**2.056*****	**2.934*****	**1.664*****
	(0.381)	(0.590)	(0.550)
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Number of observations	1,061	531	530
Adjusted R^2	0.218	0.259	0.238

Table 9: Does CEO relative leverage affect all-in-drawn spread and covenant usage in public bonds?

Column (1) presents the ordinary least squares (OLS) regression results with bond yield spread (*SPREAD_BOND*) as the dependent variable. Column (2) presents the ordinary least squares (OLS) regression results with the number of restrictive covenants in bond contracts (*COVENANT_BOND*) as the dependent variable. Industry fixed effects are based on Fama-French 12 industry-dummy. Definitions of all other variables are listed in Appendix B. The coefficients on *VEGA* are multiplied by 1000 for ease of presentation. Robust standard errors are reported in parentheses below their coefficients, adjusted for heteroskedasticity and clustered by firm. *** (**) (*) indicates significance at 1% (5%) (10%) two tailed level, respectively.

	(1)	(2)
Dependent Variable	*SPREAD_BOND*	*COVENANT_BOND*
RLEV	**-0.069*****	**-0.029**
	(0.023)	(0.080)
ln(*TENURE*)	**-0.015**	**0.190**
	(0.101)	(0.249)
ln(*SALARY*)	**0.171***	**0.260**
	(0.093)	(0.258)
ln(*BONUS*)	**-0.049****	**-0.056**
	(0.019)	(0.071)
DELTA	**-0.132**	**-0.290**
	(0.082)	(0.271)
VEGA×1000	**-0.194**	**-0.486**
	(0.203)	(0.447)
ln(*AMOUNT*)	**0.651***	**-3.759****
	(0.365)	(1.682)
ln(*MATURITY*)	**-0.136**	**0.083**
	(0.0938)	(0.166)
ln(*MVE*)	**-0.214****	**0.097**
	(0.083)	(0.203)
ROA	**-2.367**	**5.556**
	(1.806)	(8.534)
BM	**-0.314**	**-0.929**
	(0.454)	(1.848)
LEV	**0.558**	**2.467**
	(0.713)	(2.198)
TANGIBILITY	**0.180**	**0.261**
	(0.3741)	(1.002)
SIGMAOCF	**4.679*****	**-13.465****
	(1.574)	(6.114)
ALTMANZ	**-0.026**	**0.027**
	(0.068)	(0.216)
Intercept	**-1.399**	**28.446**
	(2.689)	(14.158)

Year fixed effects	Included	Included
Industry fixed effects	Included	Included
Number of observations	502	502
Adjusted R^2	0.368	0.142