Executive Compensation and the Cost of Debt

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Abstract

We examine how executive compensation affects the cost of debt financing. Analyzing CEO pay data from the UK, we find that debt-like and equity-like pay components have opposite effects on the cost of debt. An increase in defined benefit pensions is associated with lower bond yield spread, while an increase in executive stock options intensifies it. In addition, we find some evidence that cash bonus is negatively associated with the cost of borrowing. We do not observe any relation between restricted stock grants and the cost of debt financing. Our results suggest that bondholders are fully aware of both risk-taking and risk-avoiding incentives created by various executive pay components.

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JEL-codes: G31, G34

Executive Compensation and the Cost of Debt

Are creditors concerned with executive compensation? In their seminal paper, Jensen and Meckling (1976) argue that if executive compensation only aligns the interests of shareholders and managers (leading to a high pay-performance sensitivity), then there is a strong incentive for the managers to expropriate creditors' wealth by undertaking risky investments. Shareholders can award specific compensation to motivate managers towards accepting high risk investment projects. This happens primarily due to the convex payoff structure of equity incentives. Creditors can benefit from higher executive compensation as long as increased managerial effort reduces the probability of firm default. But, they are also more likely to suffer when the additional risky investments amplify the firm's default probability.

John and John (1993) argue that creditors rationally anticipate the risk-shifting incentive coming from executive compensation, and therefore, require a corresponding increase in risk premium. Hence, firms that use executive compensation to closely align interests of managers and shareholders, are more likely to face a higher borrowing cost. Since the higher cost of borrowing is damaging for firms, especially for those requiring additional debt financing, there is pressure for a reduction in executive compensation. This means executive compensation should be designed to optimize the trade-off between the benefits from risk-shifting and the losses from increased borrowing cost. Ortiz-Molina (2007) argues that less incentive compensation for managers is deliberately introduced in order to lower the borrowing cost when the conflict between shareholders and debtholders is more severe (for example, in highly levered firms).

In this paper, we empirically study the impact of chief executive officer (CEO) compensation on a firm's borrowing cost. A few studies have previously examined various aspects of the relation between executive pay and cost of debt. Duru, Mansi and Reeb (2005)

analyzed the impact of cash bonus, while Ertugrul and Hegde (2008), Devos, Prevost and Rao (2008) and Brockman, Martin and Unlu (2010) focused on equity compensation. These studies focus on a single pay component and relate it to a firm's cost of debt. However, if lenders rationally use executive compensation to assess the impact of agency problems on a firm's credit risk, they should consider not only the size of each pay component separately, but also the overall structure of a CEO's compensation package. The relative proportions of various compensation elements may convey additional information about the direction and magnitude of risk-taking incentives. Therefore, we examine the effects of all the main components of an executive's pay on the cost of debt.

We make three key contributions to the extant literature. First, we investigate whether a firm's cost of debt is affected by not only cash-based performance-related pay (bonus) and equity-based incentives (stock and option grants), but also by the debt-like pay (defined benefit pensions). Although the latter form of executive compensation is ubiquitous and has the potential to align the interests of the managers with those of the debtholders, empirical studies rarely consider it. To the best of our knowledge, our paper is the first empirical study to investigate the impact of pensions pay component on the cost of debt[1].

Second, by splitting executive stock options into two categories (traditional and performance-vested stock options), we for the first time empirically examine whether credit markets take into account the distinct contractual features of and incentives provided by these two types of options. Although most of the literature treats executive stock options as a homogeneous variable, there exist, in fact, two distinct categories of stock options: traditional

[1] Wei and Yermack (2009) study the reaction of the bondholders and shareholders to the disclosure of CEO's pensions and deferred compensation. While they provide interesting evidence using the event study methodology for a limited sample of firms that disclosed their detailed compensation data, we focus on the market-wide cross-sectional effects of the pension compensation on the cost of debt. Therefore, our methodology does not depend on the assumption that the capital market is unaware of the existence and extent of inside debt prior to the disclosure.

stock options and performance-vested stock options (Johnson and Tian, 2000). The former type has no specific performance target attached, while the latter requires managers to achieve a performance target prior to vesting. Johnson and Tian (2000) find that performance-vested stock options (hereafter called PVSO) provide stronger incentives to increase risk as well as stock price compared with traditional stock options (hereafter called TSO). We study whether creditors consider the award of TSO and PVSO compensation differently and charge a differential risk premium.

Finally, our analysis is a first study that examines the link between CEO pay and the cost of debt financing for the UK firms. This provides out-of-sample evidence in addition to the very few existing studies that focus only on the United States, and enables us to test whether the existing evidence holds for a market with historically different managerial pay structure.

Our results show that firms awarding their CEOs with higher proportions of defined benefit pensions – a liability of the firm that can be viewed as debt-based compensation – experience a significant reduction in the cost of debt. On the other hand, we observe that equity-based compensation, such as stock options, is positively related to corporate bond yield spread. Further analysis shows that holdings of performance-vested stock options outweigh traditional stock options in terms of increasing the cost of debt. The finding indicates that bondholders see performance-vested stock option awarded to managers as a stronger incentive to expropriate their wealth by means of risk-shifting. We also find that cash bonus payments to CEOs are weakly associated with lower borrowing costs. However, there is no relation between restricted stock grants and the cost of debt. Overall, we find that bondholders rationally anticipate risk-taking or risk-avoiding incentives of managers by observing different types of compensation awards.

Hence, a proper adjustment in the structure of executive compensation is an effective way to reduce a firm's cost of borrowing, especially when it relies heavily on external debt financing.

The remainder of the paper is organized as follows. Section I briefly reviews the relevant literature. The hypotheses of the study are developed in Section II. The methodology and data are described in Sections III and IV, respectively. The empirical results are presented in Section V. The final section provides a summary and the conclusions of the study.

I. Literature review

Executive compensation has mostly been investigated from the viewpoint of firm's shareholders. The idea originates from the agency theory whereby managers are provided incentives to work for the creation of more shareholder wealth. In this regard, risk-averse managers, who are also interested in job security and their own reputations, will be reluctant to take on value-increasing, but risky investment projects. Therefore, by providing appropriate equity incentives, managers are expected to be motivated to engage in risky investments.

Several studies provide empirical support for this theory. Coles, Daniel and Naveen (2006) find that managerial equity-based pay is linked with several observable risk-taking activities, such as investments in research and development, higher leverage and less corporate diversification. Chen, Steiner and Whyte (2006) show that the increased use of option-based compensation in the banking industry induces managerial risk-taking. Wu and Tu (2008) provide evidence that stock option compensation encourages higher R&D investments by firms. Similarly, Sanders and Hambrick (2007) find that the more option compensation CEOs receive the more aggressive investments they undertake. In a recent paper, Low (2009) further confirms

that higher sensitivity of CEO portfolio value to stock return volatility (vega), associated with the equity-based compensation, directly contributes to the managerial risk-taking behavior.

But, while the shareholders' interest is being served and agency costs of equity decline because of incentive compensation, there can be a corresponding increase in the agency costs of debt (John and John, 1993). The reason is that managers might be inclined to choose risky investments that will be beneficial to shareholders at the expense of creditors. This phenomenon is widely known as the shareholder – debtholder conflict. Obviously, bondholders will anticipate this increased risk-taking tendency of managers arising out of incentive pay, and therefore they will charge a higher borrowing rate to compensate for any future loss.

While incentive compensation can hurt bondholders, there exist other types of executive compensation that can bring managerial interests in line with those of the firm's creditors. A common but less investigated form of such compensation is executive pensions. Edmans and Liu (2010) argue that pension payments to executives can discourage risk-taking activities. By aligning managerial interests with those of debtholders, pensions can mitigate shareholder – bondholder conflict.

The empirical examination covering the effect of executive compensation on the cost of debt is quite limited. Daniel, Martin and Naveen (2004) observe that the credit spreads of corporate bonds increase with both the sensitivity of CEO wealth to stock volatility and the sensitivity of CEO wealth to stock prices. However, Ertugrul and Hegde (2008) analyze the effect of options granted to *outside* directors of US firms and find that an increase in option compensation decreases yield spreads. Duru, Mansi and Reeb (2005) argue that earnings-based bonus can reduce the cost of debt because it motivates managers to seek stable cash flows to achieve the earnings target and thereby lower the risk of default. Their results show that the level

of CEO cash bonus is indeed negatively related with the bond yield spread. In addition, Gerakos (2007) documents a positive relation between bond ratings and CEO pensions pay.

A few studies provide indirect evidence. Ortiz-Molina (2007) finds that the pay – performance sensitivity, defined as the relation between changes in a CEO's firm-specific wealth and the shareholder returns, is lower for firms that issue straight debt whereas it is higher for those issuing convertible debts. The finding indicates that firms adopt incentive compensation in such way that the shareholder – bondholder conflict can be mitigated. He also finds that option-based compensation is less attractive for firms suffering from severe shareholder – bondholder conflict. Similarly, Bryan, Nash and Patel (2006) show that firms with higher amount of convertible debt offer more options-based compensation to their CEOs.

If higher incentive compensation aligning shareholder interests with those of managers can be detrimental to bondholders, then it should also be reflected in lower bond prices. Therefore, instead of directly examining the effect on the cost of debt, several studies investigate how bond values are affected by equity-based compensation. Empirical evidence is first provided by DeFusco, Johnston and Zorn (1990) who analyze the effect on bond returns when firms announce executive stock option plans. They find that stock returns increase while bond returns decline with these announcements. Billett, Mauer and Zhang (2010) also document an adverse bond price reaction when CEOs receive new equity-based compensation. Wei and Yermack (2009) examine how bondholders (and shareholders) react at the disclosure of CEO's pensions and deferred compensation. They find that bond prices rise (and equity prices decline) for firms whose CEOs have relatively high pensions. All these studies analyze US data and show that the announcement or disclosure of equity-based pay and pensions to CEOs is associated with a wealth transfer between shareholders and bondholders.

II. Hypotheses development

The literature review in the previous section illustrates that executive compensation can affect the risk-taking behavior of managers, and subsequently, firm's cost of debt financing. Since each compensation component has its own distinctive feature, their effect on the cost of debt capital can be unique too. Therefore, we develop hypotheses on the impact of each pay component separately.

A. Bonus

Cash bonus is the first compensation element we consider. It is usually related to an accounting performance target. An outcome of such a target is that managers are inclined to decrease certain investments in order to lower short-term expenditures and thereby increase the reported profit. Since bonus can only be received as long as the firm remains solvent, managers are also motivated to generate positive and stable cash flows to be able to meet the financial targets. Therefore, it is argued that relatively higher proportion of cash bonus compensation would provide more risk-avoiding incentives to CEOs, which may benefit debtholders (Duru, Mansi and Reeb, 2005). CEOs with high bonus may therefore face a lower cost of borrowing. Our first hypothesis is:

H1: Firms providing more cash bonus to their CEOs face a *lower* cost of debt.

B. Pensions

Pensions are a special form of compensation because it is deferred and can only be accessed upon retirement. In the UK, there are three basic types of pension arrangements: the

public social security system, occupational pension and private pension plans. In the occupational pension plan, defined benefit pension scheme and defined contribution pension scheme are the two basic forms. We focus on the defined benefit pension scheme for top managers, because this is the only form of pension that represents a liability of the company to a CEO.

In the defined benefit (DB) pension scheme, the amount of money an employee is expected to receive upon retirement is often "defined" in advance. This amount of money is based on the number of years of the employee's service and the final salary when he or she retires. Firms are required to regularly contribute certain amount of money into the pension trust which is separate from the firm (sponsor) assets. Hence the assets already in the pension trust are independent and will not be affected in the event of sponsor's bankruptcy. The Pension Act of 2004 introduced further protection for the UK pension scheme. Under this Act, a statutory fund, Pension Protection Fund (PPF), was established by the UK government. The PPF is set to pay the compensation to the employees if the employer (scheme sponsor) becomes insolvent and the pension trust is unfunded (has a deficit). In this case, 100% (90%) of pension compensation, up to a certain limit, are guaranteed for the member who is above (under) the normal retirement age.

However, defined benefit pension plan still presents considerable risk-avoiding incentives for executives. As a consequence of the falling equity market, lower interest rates and improvements in life expectancy, the DB pension deficit has become increasingly severe among the UK blue chip companies. According to the Watson Wyatt pension risk indicators database, the average UK FTSE 350 firm had a DB pension deficit of £254 million and funding ratio of only 79% in 2004 (Gupta, 2006). In the latest report by Pension Capital Strategies in association with JP Morgan, only five of FTSE 100 firms had DB pension surplus during the period of 2007-

2009 (*The Guardian*, 19 May 2010). In short, the forces from the pension regulator along with the pressure from the huge defined benefit pension deficits may discourage companies from pumping the "excess" cash flows into risky investments.

Secondly, executive managers with defined benefit pension scheme are still the victims in the event of bankruptcy. As mentioned before, the Pension Protection Fund guarantees 100% (90%) of pension for a member who is above (under) the normal retirement age in the event of insolvency. Executives with DB pension plans are not the exceptions. However, there is a cap for such compensation. Based on the latest figures from the PPF, in 2010 the maximum compensation is £29,748.68 per year, which is negligible compared to the average DB pension benefit for top managers of UK firms. In other words, only a tiny fraction of DB pension loss can be guaranteed by PPF for executives in the event of insolvency. Compared with normal employees, senior managers will suffer much more from the DB pension loss in the event of bankruptcy. Therefore, executives with a large amount of DB pensions have strong incentives to avoid bankruptcy, even in the presence of a pension protection scheme.

As a result, a CEO with a defined benefit pension scheme effectively becomes a firm's debt holder. Sundaram and Yermack (2007) and Edmans and Liu (2010) argue that by aligning the interests of managers with other debtholders, pensions can reduce manager's incentive for risk-shifting and lead to the reduction of overall riskiness of the firm and subsequently its cost of debt. Therefore, CEOs will be discouraged from taking risky actions which may increase the probability of bankruptcy and lower the recovery value. Consequently, we formulate the next hypothesis as follows:

H2: Firms providing more pensions to their CEOs face a *lower* cost of debt.

C. Stock options

A well-established view is that compensation by means of stock options will generate strong incentives for risk-increasing investments (Jensen and Meckling, 1976; Guay, 1999). It relies on the fact that options have convex payoff structure: the expected payoff will be zero as long as the share price is below the exercise price, but it can be quite high if the options are in-the-money. In addition, the value of options increases when stock return volatility goes up. By undertaking risky investment projects, the expected payoff from managerial option holdings increases. At the same time, increase in the firm risk will lead to the higher probability of bankruptcy and, therefore, lower value of the firm's debt. Therefore, our hypothesis is that by providing a stronger incentive for managers to take more risks, stock option awards will lead to a higher cost of borrowing.

H3: Firms providing more stock options to their CEOs face a *higher* cost of debt.

D. Performance-vested versus traditional stock options

Two types of executive stock options are frequently used as compensation to managers: performance-vested stock options (PVSOs) and traditional stock options (TSOs) (Johnson and Tian, 2000). These two categories have distinctive features: PVSOs have performance targets as vesting condition, while TSOs have no such targets. This difference in vesting conditions may provide different incentives for managers. First, PVSOs may generate more risk-taking behavior. Because managers cannot exercise options without achieving the performance benchmarks, they will be highly motivated to undertake risky investments. Anticipating such risky investment tendency, bondholders will require a higher risk premium.

Second, earnings are usually used as the main performance benchmarks of PVSOs. The use of earnings as a benchmark can motivate managers to engage in opportunistic behavior. Kuang (2008) documents that firms providing PVSO-type of compensation to CEOs exhibit stronger incentive for earnings management compared with TSO. Prevost, Rao and Skousen (2008) link earnings management to the cost of debt and find that earnings management distort the quality of earnings that is vital for creditors to assess firm's default risk. Therefore, by observing a higher level of PVSO awards to managers, creditors already anticipate a stronger incentive for earnings management and will therefore charge a higher borrowing rate. We therefore formulate our next hypothesis as follows:

H4: Firms providing their CEOs more PVSOs relative to TSOs face a *higher* cost of debt.

E. Stock options versus ownership

Ownership directly links CEO's personal wealth to the stock price. Compared to stock options, the relation between CEO's wealth invested in firm shares is a linear function of stock price rather than a convex one. Hence, the wealth of a CEO with more ownership might be more sensitive to the decrease of share price compared to the wealth of a CEO with large stock options holdings. As high risk investment may lead to higher return volatility and high possibility of price collapse, a CEO with high level of ownership may reduce the risk-taking behavior as his or her wealth exposure increases. Analyzing US data, Ortiz-Molina (2006) provides the empirical evidence that the cost of debt soars when ownership increase, while such relation disappears when ownership reaches very high level. Because of the differences in payoff structures between stock options and ownership, we expect that stock option will create stronger incentives for risk-taking compared to ownership. If the rational debtholders perceive the difference between ownership and stock options in terms of risk-taking, they will require a higher risk premium for

companies granting their CEOs large number of stock options than for firms with high managerial ownership. This leads to our fifth hypothesis:

H5: Stock options held by CEOs increase the cost of debt *more* than ownership.

F. Restricted shares

The last compensation component we consider is restricted shares. In the UK, most CEOs must meet certain prescribed performance target (e.g. total shareholders return) before vesting of restricted shares occurs. Hence, CEOs are expected to be motivated to increase the stock return in order to guarantee the vesting of restricted stocks. The anticipation of subsequent alignment of the interests of shareholders and executives will lead rational debtholders to require a corresponding higher risk premium. Therefore, our hypothesis is:

H6: Firms providing more restricted shares to their CEOs face a *higher* cost of debt.

III. Methodology

We consider both the annual compensation and the cumulative compensation of CEOs. It is common knowledge that CEOs receive their compensation in a variety of forms. Each pay component received by the CEO during a particular year is taken into account. We construct pay variables as a proportion of total CEO compensation, which is the sum of annual salary, bonus, the estimated values of stock options and restricted shares, and the pension increment. In addition, as a robustness check, we also employ an alternative proxy for annual compensation, which is the value of each pay component scaled by total sales of the firm. Previous studies on executive compensation did not consider pension element of pay because the information was not easily available. However, the disclosure of the pension data is now mandatory, which allows

us to collect the full compensation data to accurately estimate each pay component and to analyze the impact of pensions. We focus on the defined benefit (DB) pension, as only DB pension entitlements are a liability of the firm and therefore represent insider debt. We hand collect the actuarial value of the defined benefit pensions as reported in company annual reports. Since DB pension value is often reported as an accumulated number, we estimate the amount of new pension awarded in a particular year as a year-to-year change in accumulated pension.

In addition to the annual monetary amounts of compensation, we look at the total amount of equity- and debt-like securities accumulated by a CEO during the service. This has potentially even stronger implications for company policies, since CEOs are much more likely to be motivated by the changes in their total wealth rather than by changes in the value of their annual compensation. For stocks and options, we conduct this analysis using the number of equity-based grants because the monetary values can vary based on the valuation assumptions. We therefore define new compensation variables by considering the number of un-exercisable options, and unrestricted (ownership) and restricted stocks held by the CEO as a proportion of total number of shares outstanding. These new definitions are also useful to check the robustness of the findings.

The yield spread of a corporate bond is used to measure the cost of debt. Following prior literature (e.g. Anderson, Mansi and Reeb, 2003; Ertugrul and Hegde, 2008), it is estimated as the difference in yield to maturity between a firm's bond and a UK government bond with a comparable maturity. The spread is expressed in basis points.[2] When a firm has multiple bonds outstanding in a year, we use the market value weighted average yield spread. This procedure allows us to use a single representative bond yield per firm.

[2] For a few corporate bonds with a maturity longer the longest maturity of government bonds, the yield spread is compared with the longest available maturity of the latter.

We perform ordinary least squares regressions to measure the effect of pay on the cost of debt. The yield spread of corporate bond is used as the dependent variable and the CEO compensation components are used as the explanatory variables. Following prior studies examining yield spread (e.g. Ortiz-Molina, 2006; Ertugrul and Hegde, 2008; and Devos, Prevost and Rao, 2008), the estimated regression model is written as follows:

$$Spread_{i,t} = \alpha_0 + \beta\, Compensation_{i,t-1} + \sum \lambda\, Bond\ Characteristics_{i,t} +$$

$$+ \sum \delta\, Firm\ Characteristics_{i,t} + \sum \zeta\, Industry\ dummies_{i,t} + \sum \upsilon\, Year\ dummies_{i,t} + \varepsilon_{i,t}.$$

The regression specification considers a lagged relationship because bondholders adjust the bond price once the information on compensation becomes publicly available. All bond-specific information is therefore collected three months after the end of a fiscal year.[3]

Prior literature suggests several bond and firm characteristics that can also influence the cost of debt (see, for example, Ortiz-Molina, 2006; Ertugrul and Hegde, 2008; and Devos, Prevost and Rao, 2008). These factors are included as control variables in the regressions. The bond characteristics are bond rating, duration and bond size. For bond rating variable, we convert each rating category into a numerical scale. We assign the lowest rating D a value of 1 and then as the bond rating increases the numerical rating changes by an increment of 1 to the value of 22 for the highest rating Aaa. We further convert this rating into a rating residual to control for all information other than compensation that can affect bond rating (spread) and that are not captured by other control variables used in the regression. The residual is estimated from the regression where the dependent variable is bond rating and the independent variables are the

[3] Most UK firms publish their annual reports within three months after the end of fiscal year. Therefore, all compensation information is assumed to be publicly available by this date.

various compensation components. The duration of bond is used to control for differences in bond maturity and the coupon rate. Bond size is used to control the impact of liquidity on yield spread. Large bond size suggests higher liquidity and therefore a lower cost of debt. Following Ortiz-Molina (2007), we use the relative bond size instead of absolute bond size.

The firm characteristics that can affect yield spread include firm size, debt ratio, profitability, market-to-book ratio and firm risk. These firm characteristics are found to be informative in explaining the cost of debt (e.g. Ortiz-Molina (2007) and Ertugrul and Hegde (2008)). The exact definitions of all these variables are presented in the Appendix. The regression model also incorporates industry and time factors.

IV. Sample selection and data description

The sample is selected from non-financial and non-utility UK firms that are covered by the Financial Times Stock Exchange All Share Index. To be included in the sample, a firm must have a straight bond outstanding. Since the benchmark for calculating corporate bond yield spread is corresponding UK government bond yield, we exclude firms with bond issues in currencies other than Pound Sterling. The sample firm has on average two bonds outstanding. Information on yield spread and other bond characteristics is collected from DataStream.

CEO compensation data is mainly collected from BoardEx. This database provides information on the estimated value of each compensation component. Company annual reports are used to collect data on CEO pensions. The sample period of the study is 2003-2006. It starts from 2003 because this is the year when firms were first required to publish in their annual reports detailed information about CEO pensions. All firm characteristics data are also collected from DataStream.

The total number of firm-year observations in the sample is 150.[4] The distribution of the sample over years and different industries is presented in Table I. Firm-years steadily increase from 31 in 2003 to 44 in 2006. Sample firms are distributed over five main industries as identified by the UK SIC code. Manufacturing sector has the highest number of observations (39%). It is followed by the wholesale and retail industry (21%).

(Insert Table I here)

Table II presents descriptive statistics of major variables used in the empirical analysis. All data is winsorized at 5% level to limit the impact of extreme values. Panel A provides information on bond characteristics. The average (median) spread for traded bonds is 148.37 (109.56) basis points (over the maturity equivalent government bonds) with a standard deviation of 134.65 basis points. The average bond in our sample has duration of about 6.15 years. The mean and (median) bond rating is 13.82 (14), which means about half of bonds in our sample belongs to the investment grade category (Moody's rating Baa2).

(Insert Table II here)

Descriptive statistics on annual compensation are provided in Panel B of Table II. Each type of compensation is expressed as a fraction of total CEO compensation and total sales. The mean (median) of total compensation is about £3.29 million (£2.45 million). On average, the total amount of pay received by CEO is about 0.13% of total sales. The absolute amounts are relatively high because the firms with publicly traded debt are usually the large ones. The CEO

[4] The relatively small sample size is mostly caused by the fact that firms with publicly traded bonds are relatively few.

of the median firm receives 25.43% of total compensation (about £623 thousands) as salary and 13.44% (about £329 thousands) as cash bonus. We observe that performance-vested stock option grants constitute the major portion of option compensation. Share grants also constitute a significant fraction of CEO compensation, which accounts for 28.02% of annual compensation on average. Finally, an interesting new finding is the amount of defined benefit pension received by the CEO. The annual pension increment is on average 12.43% of total compensation, which is equal to about £397 thousands.

Panel C of Table II provides the information on CEO accumulated compensation. On average, CEOs hold un-exercisable traditional stock options (TSO), performance-vested stock options (PVSO) and restricted shares for about 0.02%, 0.08% and 0.06% of total shares outstanding, respectively. PVSO holdings dominate the accumulated compensation. The ratio of CEO pensions to equity compensation is on average 0.37, which is slightly higher than 0.25 reported by Wei and Yermack (2009) for US firms. CEO's share ownership information is shown in panel D of Table II. We find that on average, CEOs in our sample hold just over half percent of firms' total common shares outstanding.

Panel E of Table II provides information on sample firm characteristics. The average (median) firm in the sample has total assets of £10 (£4) billion. The long-term debt, on average, amounts to about 27% of total assets. We find that sample firms have mean (median) profitability of 15% (13%) and market-to-book ratio of 1.35 (1.10).

The correlation matrix between key variables is presented in Table III. We observe that bond spread has significant positive correlation with PVSO grants and holding, and with debt ratio. It is negatively related with rating, duration, firm size and growth prospects, which is consistent with our expectations.

(Insert Table III here)

V. Empirical results

As discussed in Section III, multivariate regressions are estimated to investigate the impact of CEO compensation on the yield spread of firms. First, we estimate the full regression model with all the pay components included (except for the salary). Since each compensation component is scaled by the total compensation, and all the compensation components must add up to 1 by definition, we also investigate the robustness of our results by estimating a number of regressions dropping out different compensation components sequentially, and finally, estimating a regression for each individual pay component separately. OLS results using different components of CEO pay are presented in Tables IV to VI. In each table, the column besides variable names shows the predicted sign for each of the coefficient estimates. Table IV presents the results of our main regressions, estimating the relation between annual compensation components (measured as a percentage of the total compensation) and the cost of debt. Table V presents the same regressions, employing an alternative measure for the compensation variables (compensation as a percentage of sales). Finally, in Table VI we analyze the impact of the cumulative compensation (accumulated holdings of options, shares and deferred compensation) on the cost of debt. The results of these estimations, grouped by the compensation component, are discussed below.

(Insert Table IV here)

A. The relation between bonus and the cost of debt

In Table IV (columns 1 to 4), bonus is measured as the fraction of annual compensation. We find that the coefficients of bonus remain negative in all of these pooled regressions. When

we include all CEO pay components in a regression (column 1), the coefficient for bonus is -1.96 at the significance level of 10%. Sequentially dropping the option grants and share grants variables from the regression (columns 2 and 3) does not affect this result, with the coefficients for bonus becoming -1.48 and -1.63 respectively and remaining statistically significant. When we test the cash bonus component separately (column 4), the coefficient is still negative, at -1.23, with the *t*-statistics of -1.55. In Table V, we employ the fraction of bonus in total sales as an alternative proxy. The regression coefficients for cash bonus (columns 1, 2 and 4) are still negative -751.08, -461.06 and -498.13, respectively, although none of them are now statistically significant. This difference could be caused by the fact that scaling some pay components (such as bonus) by sales does not explicitly take into account their *relative* importance for a CEO, and therefore provides a weaker proxy for our analysis.

Overall, this analysis provides weak support to our first hypothesis that more cash bonus will lower the cost of debt. With more bonus compensation, risk-taking incentive for CEOs is reduced to certain extent. As bondholders price the risk-avoiding incentives, we find a negative relation between bonus and yield spread.

(Insert Table V here)

Regarding the control variables, we observe that most of the variables are related to yield spread in the expected direction in both Table IV and Table V. The regression coefficients of rating residual and firm size in all four regressions are negative and statistically significant at the 1% level, which means that higher-rated bonds are traded at lower credit spreads. Also as expected, the bond size is negatively related to spread, indicating a possible liquidity effect.

Larger firms and companies with lower debt ratio have lower cost of debt. Finally, duration, profitability, market-to-book ratio, and risk (as measured by the standard deviation of profitability) have little impact on the credit spread.

B. The relation between pensions and the cost of debt

The results of regression analysis of the effects of annual increases to the CEO pension benefit on the cost of debt are presented in Tables IV and V. In Table IV, pension is measured as the fraction of total compensation. The coefficients for pension pay range from -1.52 (column 2) to -1.90 (column 1), all highly statistically significant, in the pooled regressions (columns 1 to 3). In column 5, we examine pensions exclusively. The coefficient is -1.38 with the significance level of 1%. In other words, a CEO pension increase by 1% as the percentage of annual pay leads to a decrease in the cost of debt by 1.38 basis points.

In Table V, we scale the pension increment by total sales. Similar to the results in Table IV, the coefficients for pension (columns 1 to 3) remain negative and significant in all regressions. In a separate test (column 5), the coefficient is -634.64 with the significance level of 10%. It indicates that if the pension increment as the percentage of total sales increases by 1%, the bond yield will decrease by 634.64 basis points.

The evidence provided here strongly supports our hypothesis that deferred CEO compensation in the form of company pensions is effective in aligning the interests of CEOs and debtholders. The bond market appears to take into account the debt-like elements of CEO pay by requiring a lower risk premium if CEOs have more incentives to protect the interests of the debtholders.

C. The relation between stock options and the cost of debt

Both annual option grants (Table IV and V) and total CEO option holdings (Table VI) are considered in our study. In Table IV, we measure option grants as a percentage of total compensation. When other compensation components are present in a same regression, the coefficients for option grants are not significantly different from zero (columns 1 and 2). However, when we exclude all other pay components and conduct a separate test including option grants only (column 6), the coefficient estimate increases to 1.12, significant at the 5% level. This result supports our hypothesis and suggests that when option grants as the percentage of total pay increase by 1%, the bond yield will increase by 1.12 basis points. In column 8 of Table IV, we further split the total option grants into PVSO grants and TSO grants. Both of the coefficients of PVSO and TSO grants remain positive, while only that of PVSO grants reaches the significant level.

Our results from column 6 of Table IV are further corroborated by the estimates presented in Table V, where we employ an alternative proxy for option grants. The option grants here are measured as the fraction of total sales, and are therefore less likely to be affected by other compensation components. In all pooled regressions (columns 1, 2 and 3), the coefficients for option grants remain positive and highly significant. In a separate test (column 6), we further confirm that more option grants lead to a higher cost of debt. The coefficient is 1229.42 with the significance level at 5%. It suggests that if the option grants as the percentage of total sales increase by 1%, the bond yield goes up by 1229.42 basis points. The last regression in this table (column 8) shows that this result is largely driven by the performance-vested options. While the coefficients for both PVSO and TSO grants are positive, only the effect of PVSO grants on the cost of debt is statistically significant.

We analyze the impact of accumulated equity-like incentives (options and restricted shares) on the cost of debt and present the results in Table VI. For comparability of our results to the previous studies on the effects of managerial ownership, we also include an unrestricted ownership variable, which is not necessarily related to managerial compensation (for example, in the case of founder CEOs). As expected, and in line with the previous research, the coefficients for option holdings and ownership are positive and highly statistically significant both in pooled regressions (columns 1 and 2) and in separate regressions (columns 3 and 4). It further confirms that both option holdings and ownership lead to a higher cost of debt, likely by aligning the interests of the shareholders and managers. In column (2), we examine whether the increase in cost of debt is similar between option holdings and ownership. The coefficient of option holdings is 293.65, while that of ownership is only 25.97. The Wald test confirms that the difference between these coefficients is statistically significant. Although both ownership and option holdings have the same qualitative effects of increasing the cost of debt, the higher managerial option holdings are seen by the market as much stronger signal that a CEO will act in the interests of the shareholders to the detriment of the debtholders. In column 6 we disaggregate the options holdings into PVSO holdings and TSO holdings. Similar to the result in column 8 of Table V, both of the coefficients for PVSO and TSO holdings are positive, while only that of PVSO is statistically significant.

(Insert Table VI here)

Finally, we conduct the tests to examine how the performance-vested condition of stock options affects bondholders' risk perception. As mentioned in hypothesis development, we argue that PVSO will increase the cost of borrowing more than TSO. One of the reasons is that the

performance-vested conditions provide incentives for CEOs to manipulate performance targets (in other words, for earnings management) that will lower the true quality of earnings and make it more difficult for bondholders to assess firm's risks. Hence, we expect that bondholders may react to PVSO and TSO differently. In column 8 of Table IV, we test the difference between PVSO grants and TSO grants. The coefficients of both PVSO and TSO grants are positive and similar in magnitude, while only that of PVSO grants reaches statistically significant level. However, the Wald test fails to support the hypothesis that the difference between these coefficients is statistically significant. We conduct the same test using an alternative definition of PVSO and TSO grants in Table V. The results are very similar.

In Table VI, once again, we disaggregate options *holdings* into PVSO holdings and TSO holdings. Similar to the results in columns 8 of Table IV and Table V, the coefficients of PVSO and TSO holdings are positive, but only that of PVSO is statistically significant. The Wald test confirms that the difference is meaningful. PVSO holdings outweigh TSO holdings in terms of increasing costs of debt. Overall, we find that debtholders are more sensitive to the managerial holdings of performance vested stock options (PVSO) compared to the traditional stock options (TSO), and thereby require higher rate of return if a company uses more PVSO to compensate its managers. This is consistent with our fourth hypothesis, although the markets seem to treat annual performance-vested and traditional option grants in a similar way.

To conclude, the empirical results in this section support three of our hypotheses. Similar to the US findings (e.g. Ortiz-Molina, 2006), we find that if CEOs are granted or own more stock options, their firms face higher borrowing costs. Both ownership and options increase the cost of debt, but the debtholders require higher premiums for the options component of the pay compared to the ownership.

D. The relation between restricted shares and the cost of debt

The last pay component we analyze is restricted shares. The results are presented in Tables IV, V and VI. In hypothesis H6, we argue that restricted shares may increase borrowing costs. However, the relation between restricted shares and the cost of debt is not confirmed by our results. In all the regressions for equity-like compensation, both annual and accumulated, restricted share grants or holdings seem to have no effect on the yield spread. This result is consistent across different measures of compensation (Tables IV and V), and is supported by the estimates for restricted shareholdings in Table VI. A possible explanation for this finding is that the conditions attached to the vesting of such restricted shares explicitly align the interests of the managers and bondholders. Alternatively, due to the low likelihood of vesting restricted shares, the capital market discounts these as an incentive mechanism.

E. Comparison of the relative impact of the various compensation components on the cost of debt

Having different compensation components in the same regression allows us to compare their relative impact on the cost of debt by comparing their respective regression coefficients. We employ Wald test to conduct these comparisons across various pairs of pay components. These results are presented in the last rows of Tables IV, V, and VI. The test result presented in column 3 of Table IV indicates that while both bonus and pension exert certain debt-cost-reducing effects, the difference is not significant. Similarly, the test result of column 3, Table V shows that the magnitude of increased cost of debt from option grants is not statistically significantly different from that of decreased cost of debt from pension increment.

F. Firm risk and the effectiveness of debt-like compensation instruments

One of the main findings of our study so far has been the fact that, while equity-like compensation can lead to a higher cost of debt by exacerbating the conflict between the managers and debtholders, pensions appear to have the opposite effect, in mitigating this conflict. We further investigate the relation between the CEO pensions and the cost of debt by taking into account the riskiness of corporate debt. An incentive to reduce the riskiness of the debt, provided to a CEO, is most likely to be effective when this risk is sizable enough. For firms that already have very low credit risk, the additional incentives provided by executive compensation are likely to be less important than for the companies that pay a substantial premium to the debtholders to compensate for their credit risk. Therefore, if the negative relation that we observe in Tables IV and V between the amounts of debt-like executive compensation (pensions) and the yield spread is indeed driven by the incentive effects of executive pensions, we should expect that this relation will be stronger for the lower-rated bonds.

We test this hypothesis in Table VII. In columns 1 and 2, we consider the effects of total accumulated pension by employing the pension-to-equity ratio, similar to the measure used by Wei and Yermack (2009). As expected, both coefficients are negative and statistically significant. The more debt-like wealth (pension) a CEO has relative to his equity holding, the more are his interests aligned with those of the debtholders, and the less will be the costs of debt financing. In columns 3 to 8, we focus on the effectiveness of pension as a risk-avoiding incentive among the lower and higher rated bonds. If pension will provide CEO with risk-avoiding incentives, such incentives will be stronger when the default risk is high (low bond rating). We find that the coefficients for interaction variables of incremental pension and low bond rating (columns 3 and 4) and pension-to-equity ratio and low bond rating (columns 5 and 6)

are negative and highly significant. This suggests that the incentive effects of pensions, found in Tables IV, V and columns 1 and 2 of Table VII, are mostly concentrated among lower-rated, riskier bonds. To confirm this, we conduct an analysis on the subsample of 91 firm-years with the bond ratings below investment grade. The results are reported in columns 7 and 8 of Table VII. We find that both pension increment and pension-to-equity ratio have significant negative impact on the costs of debt among the lower rated bonds.

(Insert Table VII here)

Overall, this analysis strongly supports our second hypothesis that higher levels of defined benefit pensions lead to a lower cost of debt. This result is likely to be driven by the fact that pension aligns the interests of outside debtholders (bondholders, for example) and inside debtholders (CEOs).

VI. Conclusions

In this paper we examine whether and how different executive pay components affect firms' borrowing costs. We expect to observe a negative relation between pay components, which generate risk-avoiding incentives, and the cost of debt, and a positive relation between the borrowing cost and pay components, which motivate managers to seek risks.

We consider all four common pay components: bonus, pensions, stock options and restricted shares. We take advantage of the extensive compensation disclosure requirements in the UK by using the UK data for the period of 2003-2006. Our findings are in general consistent with our expectations.

First of all, we document that both CEO debt-like compensation (defined benefit pensions) and cash bonus reduce borrowing costs. The existence of defined benefit pensions makes CEOs the potential debtholders of companies. It naturally aligns the interests between CEOs and other debtholders. Therefore borrowing costs are lower for firms which provide more defined benefit pensions to CEOs. In addition, the most of this effect is concentrated among the lower-rated bonds, where the default risk is the highest and the risk-reducing incentives are the most valuable. In the case of cash bonus, its main goal is to motivate managers to focus on short-term profitability (such as annual earnings). Consequently, it may discourage managers to seek long-term risky investment projects. Hence, cash bonus provides certain level of risk-avoiding incentives, which we show to be priced by the debtholders.

Secondly, we find that the companies with high level of stock options granted to the CEOs are severely punished by debt markets. Theoretically, stock options and restricted shares are expected to link CEO wealth with that of shareholders. This may motivate managers to take excessive risks at the cost of debtholders. As a result, higher levels of options and restricted stock grants are expected to lead to a higher cost of debt. We find a strong positive relation between bond yield spread and CEO option holdings and option grants. Moreover, the effect of stock options on bond yields is found to be much stronger than that of managerial ownership. However, we do not find evidence that the cost of debt is positively related to restricted stock holdings of CEOs.

Finally, we split stock options into two categories: performance-vested stock options (PVSO) and traditional stock options (TSO). We argue that the performance-vested targets on stock options may further motivate managers to take excessive risk to meet these targets, which will further jeopardize bondholders' interests. Hence, PVSO should outweigh TSO in increasing

the cost of debt. We show that investors do react to performance-vested stock options and traditional stock options differently. CEOs with relatively more performance-vested stock options holdings face a higher cost of borrowing, which confirms our hypothesis.

Overall, our study shows that the capital market rationally considers the impact of various executive pay components on managerial risk-taking when pricing publicly traded bonds. Consequently, optimally adjusting executive compensation structure can be a useful tool in reducing the borrowing costs.

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Appendix

Variable definitions

Panel A: Bond characteristics

Variable Name	Definition
Spread	Bond yield spread expressed in basis points over UK Government securities (DS:SP). For multiple bonds, market value-weighted average is used.
Rating	Bond rating of Moody's (DS:MRT) converted to a numerical scale, in which the lowest rating is 1 and the highest (Aaa) is 22.
Low Rating	Dummy variable equals 1 if rating is no more than 14 (Moody's Rating Baa2), the benchmark for "investment grade bond", otherwise 0.
Rating Residual	Residual from the regression where the dependent variable is *Rating* and the independent variables are the relevant compensation components.
Bond Size	Relative size of bonds calculated as the market value of bonds (DS:MV) scaled by book value of total assets (WC 02999).
Duration	Duration of bonds (DS:DM). For multiple bonds, market value-weighted average is used.

Panel B: Firm characteristics

Variable Name	Definition
Firm Size	The natural logarithm of Book value of total assets (WC 02999).
Debt Ratio	Book value of long-term debt (WC 03251) scaled by book value of total assets (WC 02999).
Profitability	Operating income (WC 01250) before depreciation (WC 01151) scaled by book value of total assets (WC 02999).
Market-to-Book ratio	Market to book value ratio calculated as the book value of total debt (WC 03255) plus the market value of equity(DS:MV), scaled by book value of total assets (WC 02999).
Risk	Standard deviation of *Profitability* calculated using data of years t-6 to t-1.

Panel C: CEO compensation

Variable Name	Definition
Total Compensation	Sum of salary, bonus, the estimated values of stock options and restricted shares grants, and the pension increment in a particular year
Total compensation to Sales	Total Compensation scaled by total sales (WC 01001)
Salary	Salary scaled by total compensation
Salary to Sales	Salary scaled by total sales (WC 01001)
Bonus	Cash bonus scaled by *total compensation*.
Bonus to Sales	Cash bonus scaled by total sales (WC 01001)
Incremental Pension	Year-to-year change in the actuarial value of defined benefit pension scaled by *total compensation*.
Incremental Pension to Sales	Year-to-year change in the actuarial value of defined benefit pension scaled by total sales (WC 01001)
Pension to Equity	The total transfer value of defined benefit pension scaled by the estimated value of equity holdings (including ownership, restricted shares and options)
TSO Grants	Estimated value of traditional stock option grants scaled by *total compensation*.
TSO Grants to Sales	Estimated value of traditional stock option grants scaled by total sales (WC 01001).
PVSO Grants	Estimated value of performance-vested stock option grants scaled by *total compensation*.
PVSO Grants to Sales	Estimated value of performance-vested stock option grants scaled by total sales (WC 01001).
Option Grants	The sum of *TSO Grants* and *PVSO Grants*
Option Grants to Sales	The sum of *TSO Grants to Sales* and *PVSO Grants to Sales*
Share Grants	Estimated value for restricted share grants scaled by *total compensation*.
Share Grants to Sales	Estimated value for restricted share grants scaled by total sales (WC 01001)

TSO Holding	Number of un-exercisable traditional stock options scaled by total number of shares outstanding (DS:NOSH).
PVSO Holding	Number of un-exercisable performance-vested stock options scaled by total number of shares outstanding (DS:NOSH).
Option Holding	The sum of TSO Holding and PVSO Holding
Restricted Shareholding	Number of restricted shares held by the CEO scaled by total number of shares outstanding (DS:NOSH)
Ownership	Number of unrestricted shares held by the CEO scaled by total number of shares outstanding (DS:NOSH)

Table I. Time and industry distribution of sample firms

Year	**Number of observations**
2003	31
2004	35
2005	40
2006	44
Total	150
Industry	
Mining and Quarrying	12
Manufacturing	59
Wholesale and Retail	31
Hotel and Restaurant	8
Transport, Storage and Communication	20
Others	20
Total	150

Table II. Descriptive statistics

The sample consists of 150 firm-year FTSE ALL observations from 2003-2006. Only straight bonds issued in GBP sterling are included in the sample. All variables are winsorized at 5% level.

Variables	Mean	Median	St. Dev.	Quartile 1	Quartile 3
Panel A. Bond characteristics					
Spread (Basis Points)	148.37	109.56	134.65	81.70	144.79
Rating	13.82	14.00	2.41	13.00	15.50
Low Rating	0.61	1.00	0.49	0.00	1.00
Bond Size (%)	1.35	0.85	1.32	0.49	1.99
Duration (Years)	6.15	5.84	2.68	4.09	7.75
Panel B. Annual compensation					
Salary (%)	28.05	25.43	14.46	16.65	34.11
Bonus (%)	15.09	13.44	11.40	7.10	20.40
TSO Grants (%)	2.33	0.00	9.34	0.00	0.03
PVSO Grants (%)	14.08	8.91	16.25	0.00	23.72
Option Grants (%)	16.25	12.59	17.88	0.00	27.72
Share Grants (%)	28.02	30.00	22.83	0.00	44.72
Incremental Pension (%)	12.43	0.52	16.86	0.00	24.17
Total Compensation (£m)	3.29	2.45	2.78	1.38	4.47
Salary to Sales (%)	0.03	0.02	0.03	0.01	0.03
Bonus to Sales (%)	0.02	0.01	0.02	0.01	0.02
*TSO Grants to Sales (%)*10^2*	0.12	0.00	0.44	0.00	0.00
*PVSO Grants to Sales (%)*10^2*	1.21	0.45	1.84	1.84	1.71
*Option Grants to Sales (%)*10^2*	1.30	0.55	1.87	0.00	1.88
Share Grants to Sales (%)	0.03	0.01	0.06	0.00	0.05
Incremental Pension to Sales (%)	0.01	0.00	0.03	0.00	0.01
Total Compensation to Sales (%)	0.13	0.07	0.21	0.04	0.13
Panel C. Accumulated compensation					
TSO Holding (%)	0.02	0.00	0.07	0.00	0.00
PVSO Holding (%)	0.08	0.05	0.09	0.00	0.11
Option Holding (%)	0.09	0.05	0.13	0.00	0.12
Restricted Shareholding (%)	0.06	0.03	0.07	0.01	0.08
Pension to Equity	0.37	0.03	0.55	0.00	0.65
Panel D. Other equity incentives					
Ownership (%)	0.58	0.03	2.28	0.01	0.13
Panel E. Firm characteristics					
Firm Size (£bn)	10.42	3.99	1.87	1.92	8.88
Debt Ratio (%)	26.56	22.74	16.88	13.35	35.68
Profitability (%)	15.41	13.00	8.39	9.06	19.03
Market-to-Book ratio	1.35	1.10	0.95	0.75	1.58
Risk (%)	2.84	1.76	2.98	0.99	3.55

Table III. Correlation matrix

Correlations between main variables for 150 observations. Bonus, Incremental Pension, Option Grants, Share Grants, TSO Grants and PVSO Grants are scaled by the total compensation. All variables are defined in the Appendix. The correlations, which are significant at 10% level, are in bold.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1)Spread	1																				
(2)Rating	**-0.56**	1																			
(3)Bond Size	-0.01	-0.04	1																		
(4)Duration	**-0.25**	**0.31**	**0.35**	1																	
(5)Bonus	-0.07	0.10	0.09	0.11	1																
(6) Incremental Pension	-0.11	-0.07	0.00	0.03	**-0.30**	1															
(7)Pension to Equity	-0.08	-0.07	-0.01	0.02	**-0.27**	**0.72**	1														
(8)TSO Grants	0.10	-0.11	-0.12	-0.01	**-0.21**	-0.09	-0.03	1													
(9)PVSO Grants	**0.17**	**-0.15**	0.02	**-0.15**	**-0.21**	-0.13	-0.10	-0.05	1												
(10)Option Grants	**0.19**	**-0.17**	-0.04	-0.13	**-0.29**	**-0.16**	-0.11	**0.43**	**0.88**	1											
(11)Share Grants	**-0.17**	**0.23**	**-0.18**	-0.06	-0.12	**-0.34**	**-0.28**	-0.08	**-0.46**	**-0.45**	1										
(12)Ownership	0.51	0.01	0.00	**-0.17**	0.07	**-0.14**	**-0.15**	-0.06	**0.17**	0.12	**-0.18**	1									
(13)TSO Holding	0.13	-0.02	**0.24**	0.09	0.00	-0.12	-0.11	**0.19**	**0.20**	**0.26**	-0.12	-0.05	1								
(14)PVSO Holding	**0.56**	**-0.47**	0.07	**-0.37**	-0.08	0.01	-0.05	0.06	**0.48**	**0.44**	**-0.34**	**0.28**	**0.21**	1							
(15)Option Holding	**0.43**	**-0.30**	**0.22**	**-0.19**	-0.04	-0.06	-0.10	0.09	**0.46**	**0.45**	**-0.31**	**0.18**	**0.72**	**0.80**	1						
(16)Restr Shareholding	-0.03	-0.07	**0.16**	0.10	0.13	-0.08	**-0.14**	**-0.17**	**-0.20**	**-0.26**	**0.29**	-0.10	**0.19**	-0.05	0.08	1					
(17)Firm Size	**-0.32**	**0.36**	**-0.51**	-0.07	**-0.24**	-0.09	-0.09	**0.24**	0.03	**0.17**	**0.32**	**-0.18**	-0.11	**-0.29**	**-0.26**	**-0.25**	1				
(18)Debt Ratio	**0.27**	**-0.24**	**-0.23**	0.11	**0.16**	**-0.15**	**-0.14**	0.00	0.04	0.02	-0.07	-0.09	**0.23**	0.11	**0.21**	-0.05	**-0.18**	1			
(19)Profitability	-0.11	0.04	**0.16**	-0.13	**0.18**	0.03	-0.11	-0.05	0.00	-0.03	-0.03	**-0.16**	-0.02	-0.04	-0.06	0.00	**-0.24**	0.06	1		
(20)Market-to-Book Ratio	**-0.31**	**0.25**	0.06	0.03	**0.29**	-0.04	**-0.15**	-0.12	-0.11	**-0.16**	0.12	**-0.17**	-0.09	**-0.32**	**-0.28**	-0.07	-0.01	**0.16**	**0.64**	1	
(21)Risk	-0.07	0.09	0.10	-0.13	**0.16**	-0.12	**-0.14**	0.08	-0.11	-0.05	0.06	-0.04	-0.11	**-0.14**	**-0.16**	-0.09	**-0.17**	-0.04	**0.48**	**0.45**	1

Table IV. Annual compensation and the cost of debt

Results of ordinary least squares regression of the bond yield spread on annual compensation components for 150 observations. Bonus, Incremental Pension, Option Grants, Share Grants, TSO Grants and PVSO Grants are scaled by the total compensation. All variables are defined in the Appendix. Coefficients for industry and year dummies are included, but not reported. The *t*-statistics are reported in parentheses. The asterisks *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Variables	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept		509.03***	500.04***	500.07***	389.08***	384.18***	365.28***	358.30***	369.21***
		(5.19)	(5.14)	(5.16)	(4.45)	(4.79)	(4.33)	(4.47)	(4.40)
Bonus	(-)	-1.96*	-1.48*	-1.63*	-1.23				
		(-1.79)	(-1.67)	(-1.98)	(-1.55)				
Incremental	(-)	-1.90**	-1.52***	-1.60***		-1.38***			
Pension		(-2.49)	(-2.70)	(-3.01)		(-2.74)			
Option	(+)	-0.13	0.29				1.12**		
Grants		(-0.15)	(0.48)				(2.04)		
Share Grants	(+)	-0.51						0.21	
		(-0.74)						(0.46)	
TSO Grants	(+)								1.34
									(1.34)
PVSO	(+)								1.12*
Grants									(1.91)
Rating	(-)	-17.55***	-16.47***	-16.41***	-22.30***	-24.72***	-21.59***	-24.02***	-21.35***
Residual		(-3.32)	(-3.24)	(-3.25)	(-4.75)	(-5.49)	(-4.59)	(-5.29)	(-4.52)
Bond Size	(-)	-16.07*	-16.03*	-15.76*	-19.48**	-19.12**	-20.04**	-18.45**	-20.04**
		(-1.94)	(-1.94)	(-1.92)	(-2.40)	(-2.42)	(-2.46)	(-2.29)	(-2.45)
Duration	(-)	-5.08	-5.36	-5.63					
		(-1.30)	(-1.38)	(-1.47)					
Firm Size	(-)	-38.62***	-41.48***	-41.00***	-36.44***	-37.51***	-36.89***	-38.50***	-37.37***
		(-3.91)	(-4.56)	(-4.55)	(-4.14)	(-4.49)	(-4.18)	(-4.37)	(-4.14)
Debt Ratio	(+)	1.81***	1.89***	1.90***	1.76***	1.48***	1.70***	1.73***	1.69***
		(3.06)	(3.25)	(3.27)	(3.05)	(2.63)	(2.97)	(3.04)	(2.93)
Profitability	(-)	0.09	-0.04	0.13					
		(0.06)	(-0.02)	(0.09)					
Market-to-Book Ratio	(-)	-17.53	-18.34	-18.81					
		(-1.27)	(-1.34)	(-1.38)					
Risk	(+)	-0.03	-0.06	-0.26					
		(-0.01)	(-0.02)	(-0.07)					
Adjusted R^2		0.47	0.47	0.48	0.43	0.46	0.43	0.44	0.42
Wald Tests		H_0: $\beta_{Bonus}=\beta_{Incremental\ Pension}$						H_0: $\beta_{TSO\ Grants}=\beta_{PVSO\ Grants}$	
Chi Square (p-value)		0.00 (0.97)						0.04 (0.84)	

Table V. Annual compensation and the cost of debt: Alternative measure

Results of ordinary least squares regression of the bond yield spread on annual compensation components for 150 observations. Bonus, Incremental Pension, Option Grants, Share Grants, TSO Grants and PVSO Grants are scaled by total sales. All variables are defined in the Appendix. Coefficients for industry and year dummies are included, but not reported. The *t*-statistics are reported in parentheses. The asterisks *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Variables	Exp.Sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept		486.18***	504.77***	460.00***	410.07***	411.50***	339.60***	321.87***	338.80***
		(4.27)	(4.43)	(4.07)	(3.93)	(4.72)	(4.21)	(3.70)	(4.16)
Bonus to Sales	(-)	-751.08	-461.06		-498.13				
		(-1.20)	(-0.77)		(-0.88)				
Incremental Pension to Sales	(-)	-625.76*	-663.66*	-687.25**		-634.64*			
		(-1.81)	(-1.92)	(-2.00)		(-1.86)			
Option Grants to Sales	(+)	1208.33**	1128.43**	1104.47**			1229.42**		
		(2.43)	(2.27)	(2.23)			(2.60)		
Share Grants to Sales	(+)	306.33						201.82	
		(1.51)						(1.09)	
TSO Grants to Sales	(+)								1272.93
									(0.64)
PVSO Grants to Sales	(+)								1243.06**
									(2.52)
Rating Residual	(-)	-16.83***	-16.58***	-17.20***	-22.22***	-22.77***	-23.35***	-23.92***	-23.16***
		(-3.13)	(-3.07)	(-3.22)	(-4.55)	(-4.87)	(-5.07)	(-5.06)	(-5.02)
Bond Size	(-)	-22.88**	-19.24**	-18.53**	-18.84**	-20.33**	-19.61**	-21.19**	-19.39**
		(-2.61)	(-2.27)	(-2.20)	(-2.30)	(-2.49)	(-2.44)	(-2.49)	(-2.42)
Duration	(-)	-3.38	-2.83	-3.79					
		(-0.80)	(-0.27)	(-0.94)					
Firm Size	(-)	-44.16***	-43.49***	-39.47***	-40.45***	-41.46***	-34.20***	-34.64***	-34.08***
		(-4.15)	(-4.07)	(-4.23)	(-4.03)	(-4.61)	(-4.08)	(-4.04)	(-4.01)
Debt Ratio	(+)	1.93***	1.85***	1.83***	1.80***	1.73***	1.53***	1.89***	1.50***
		(3.28)	(3.13)	(3.09)	(3.15)	(3.05)	(2.70)	(3.27)	(2.62)
Profitability	(-)	-0.25	-0.50	-0.38					
		(-0.16)	(-0.33)	(-0.25)					
Market-to-Book Ratio	(-)	-20.65	-23.28*	-22.02					
		(-1.50)	(-1.69)	(-1.61)					
Risk	(+)	0.56	1.57	0.85					
		(0.15)	(0.42)	(0.23)					
Adjusted R^2		0.47	0.46	0.47	0.42	0.43	0.45	0.42	0.45
Wald Tests		H_0: $\beta_{Option} = -\beta_{Incremental\ Pension}$					H_0: $\beta_{TSO\ grants} = \beta_{PVSO\ grants}$		
Chi Square (p-value)				0.55 (0.46)				0.00 (0.99)	

Table VI. Accumulated equity incentives, ownership and the cost of debt

Results of ordinary least squares regression of the bond yield spread on accumulated equity incentives and ownership for 150 observations. All variables are defined in the Appendix. Coefficients for industry and year dummies are included, but not reported. The *t*-statistics are reported in parentheses. The asterisks *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Variables	Exp.Sign	(1)	(2)	(3)	(4)	(5)	(6)
Intercept		123.66	125.97	270.10***	377.65***	472.11.***	339.15***
		(1.37)	(1.47)	(3.51)	(4.78)	(5.33)	(4.22)
Ownership	(+)	25.99***	25.97***	26.18***			
		(6.96)	(7.00)	(6.86)			
Option Holding	(+)	293.17***	293.65***		346.28***		
		(4.23)	(4.67)		(4.77)		
Restricted Shareholding	(+)	10.47				-40.49	
		(0.09)				(-0.28)	
TSO Holding	(+)						153.20
							(1.24)
PVSO Holding	(+)						460.57***
							(4.57)
Rating Residual	(-)	-24.05***	-24.04***	-20.80***	-15.86***	-13.09**	-11.05**
		(-5.02)	(-5.04)	(-4.27)	(-3.10)	(-2.38)	(-2.20)
Bond Size	(-)	-15.60**	-15.57**	-13.74*	-23.51***	-21.28**	-20.04**
		(-2.18)	(-2.18)	(-1.89)	(-3.05)	(-2.54)	(-2.60)
Duration	(-)	0.04	0.07				
		(0.01)	(0.02)				
Firm Size	(-)	-9.21	-9.29	-21.94***	-32.26***	-40.93***	-28.89***
		(-1.14)	(-1.16)	(-2.79)	(-3.98)	(-4.76)	(-3.55)
Debt Ratio	(+)	2.09***	2.09***	2.38***	1.75***	2.21***	1.89***
		(4.12)	(4.21)	(4.56)	(3.08)	(3.60)	(3.41)
Profitability	(-)	1.43	1.44				
		(1.09)	(1.11)				
Market-to-Book Ratio	(-)	-30.82***	-30.99***	-26.51***	-19.13*	-32.12***	-16.36
		(-2.63)	(-2.70)	(-2.94)	(-1.92)	(-3.99)	(-1.63)
Risk	(+)	4.95	4.91				
		(1.57)	(1.58)				
Adjusted R^2		0.62	0.63	0.55	0.48	0.39	0.50
Wald Tests		H_0: $\beta_{ownership}=\beta_{Option\ Holding}$				H_0: $\beta_{TSO\ Holding}=\beta_{PVSO\ Holding}$	
Chi Square (p-value)		15.02*** (0.00)					3.08*(0.08)

Table VII. Pensions, credit quality and the cost of debt

Results of ordinary least squares regression of the bond yield spread on annual compensation components. All variables are defined in the Appendix. The last two columns are estimated only for the observations with low bond ratings. Coefficients for industry and year dummies are included, but not reported. The *t*-statistics are reported in parentheses. The asterisks *, **, *** denote statistical significance at 10%, 5%, and 1% level, respectively.

Variables	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept		453.58***	425.00***	495.63***	440.59***	457.18***	346.18***	947.41***	955.89***
		(4.80)	(5.15)	(5.49)	(6.00)	(4.94)	(5.02)	(5.85)	(5.73)
Incremental Pension	(-)			1.92*	2.06**			-1.67***	
				(1.93)	(2.10)			(-2.77)	
Pension to Equity	(-)	-34.99**	-37.93*			33.06	46.46		-46.64**
		(-2.13)	(-2.34)			(1.05)	(1.50)		(-2.32)
Low Rating* Incremental Pension	(-)			-4.00***	-4.12***				
				(-3.66)	(-3.82)				
Low Rating*Pension to Equity	(-)					-88.61**	-106.6***		
						(-2.52)	(-3.10)		
Rating Residual	(-)	-17.62***	-21.43***	-20.24***	-20.86***	-20.22***	-25.84***	-25.90***	-26.72***
		(-3.13)	(-4.37)	(-3.79)	(-3.96)	(-3.60)	(-5.38)	(-3.52)	(-3.51)
Bond Size	(-)	-16.12*	-20.00**	-12.55		-12.72		-15.13	-14.82**
		(-1.94)	(-2.53)	(-1.59)		(-1.54)		(-1.25)	(-1.19)
Duration	(-)	-6.07		-1.67*	-8.24**	-5.19		-22.41***	-22.67***
		(-1.52)		(-1.70)	(-2.32)	(-1.32)		(-3.91)	(-3.86)
Firm Size	(-)	-36.39***	-37.07***	-43.16***	-36.95***	-39.56***	-32.32***	-85.62***	-86.40***
		(-4.09)	(-4.43)	(-5.01)	(-5.17)	(-4.49)	(-4.42)	(-5.49)	(-5.37)
Debt Ratio	(+)	1.83***	1.69***	2.06***	2.03***	2.01***	1.83***	3.40***	3.45***
		(3.05)	(2.87)	(3.64)	(3.64)	(3.39)	(3.12)	(4.30)	(4.21)
Profitability	(-)	-0.33		0.41		-0.04		-5.85**	-6.51**
		(-0.22)		(0.28)		(-0.02)		(-2.35)	(-2.53)
Market-to-Book Ratio	(-)	-22.70*	-21.25**	-27.29**	-27.25***	-23.89*	-22.52**	-16.99	-14.93
		(-1.64)	(-2.05)	(-2.07)	(-2.71)	(-1.76)	(-2.20)	(-0.72)	(-0.61)
Risk	(+)	0.62		-0.86		-0.01		-1.85	-1.40
		(0.17)		(-0.25)		(-0.02)		(-0.33)	(-0.25)
No. of obs.		150	150	150	150	150	150	91	91
Adjusted R^2		0.45	0.46	0.51	0.51	0.48	0.47	0.60	0.58