Distinguished Lecture Series
School of Accountancy
W. P. Carey School of Business
Arizona State University

Sandra Chamberlain
of
Sauder School of Business
will present

"CEO Incentives and the Health of Defined Benefit Pension Plans"

on

February 14, 2014

1:30pm in MCRD170

CEO Incentives and the Health of Defined Benefit Pension Plans

Joy Begley*
Sandra Chamberlain*
Shuo Yang*
Jenny Li Zhang*

February 8, 2014

ABSTRACT: This paper examines how the composition of a CEO's pay package affects the funding levels of a firm's tax-qualified defined benefit pension plans (QDB plans) that are used to compensate a firm's broader workforce. We draw on the contracting view of firm behavior, predicting that the CEO will balance the interests of shareholders, bondholders and employees, depending on the degree to which their CEO compensation-contract represents these various parties. We expect CEO's with a larger financial interest in supplemental pension plans (SERP) or equity, relative to his or her interest in the rank and file qualified defined benefit plan, to be associated with greater pension plan funding deficits. We find support for the hypothesis that the greater is the CEO's interest in SERP relative to his or her interest in the QDB plans, the greater is underfunding; but, we find no evidence that underfunding is greater if the CEO holds a relatively large share of equity. The implication that CEO-employee incentive alignment is worse when the CEO has large SERPs is verified in additional tests that compare the funding status as a function of SERP interests relative to Equity interests.

JEL Classification:
Keywords: Defined Benefit Plans, Earnings Management, Pension Plan Governance,

Data Availability: All data used in the study are available from public sources.

* Sauder School of Business, University of British Columbia Joy Begley is the Ronald Cliff Professor in Accounting and Sandra Chamberlain is the Deloitte and Touche Professor in Accounting. We are most grateful to the Canadian Academic Accounting Association who provided grant support for this project and the Social Sciences and Research Council SSHRC for support of Li (Jenny) Zhang and Joy Begley. We also thank the KPMG Research Bureau. This paper reflects comments received from participants at the UBCOW conference and the HKUST Accounting Consortium. We thank Rashad Abdel-Khalik for detailed comments at the HKUST conference.

CEO Incentives and the Health of Defined Benefit Plans

1. Introduction

This paper explores how the composition of CEO wealth influences the management of the employees defined benefit plans. This issue is important to employees because the management of the plan affects the security of the employees' retirement. An organization's workforce can comprise a critical, intangible asset for the enterprise. Despite the potential importance of this intangible asset, prior research exploring top management incentive alignment with employees is relatively sparse. We use the funding status of the employees' pension plan, which is constructed from GAAP-reported numbers, to capture a portion of the unobserved, implicit obligation to the employees, and we relate this variable to the CEO's wealth in equities, pension obligations, and other deferred obligations.

Our work is related to prior research such as Begley and Feltham [1999] or Sundarem and Yermack [2007]. These prior papers explore whether CEOs' incentive packages, which contain both debt-like claims (e.g., salary, pension, and other deferred compensation) and equity claims (e.g., restricted stock or options) influence the magnitude of agency costs arising from conflicts of interest between shareholders and debt-holders. This paper exploits 2006 changes in SEC reporting requirements for executive compensation which allows users of SEC filings to observe the fraction of CEO wealth that is tied directly to non-management employee's pension claims. Since 2006 corporate proxy statements have reported the present value of pension benefits that are owed to top executives, and, these disclosures break down the portion of these benefits that have accrued in the tax-qualified defined benefit plan that is available to non-management employees (QDB plans), as well as, the portion that resides in so-called

supplemental plans or SERP.[1] We conjecture that CEO's with more interest in SERP and equities, and less in the QDB plan will tolerate lower funding of the employees' QDB plans. In addition, because the incentives of debt and equity differ, we explore whether funding levels of QDB plans vary cross-sectionally based on a CEO's relative interest in SERP versus equity.

The distinction between the CEO's direct interest in the QDB plans and SERP is a key feature of our study. If a firm decides to give an executive a full pension, a tax-efficient method of achieving this is to make the CEO a member of the tax qualified plan. This action also has the effect of making the CEO internalize the financial risk associated with plan funding decisions that the CEO controls. However, as mentioned tax laws limit the amount of pre-tax dollars that can be expensed in a tax-qualified plan. Both QDB plans and SERP promise annuity-like payments in the years following the CEO retirement date, and hence, both are similar to debt. The main contrast between SERP and QDB is that the QDB plan is like secured debt to the extent there are assets set aside in the pension trust to meet the obligation. Cash contributions to the QDB plan are invested in securities that provide for the eventual re-payment of QDB claims. However, if some of the QDB obligation is not funded with assets, then the unfunded portion is treated as an unsecured creditor in bankruptcy.[2] In contrast, SERPs rely wholly on the general assets of the corporate sponsor for repayment.

As the ultimate decision maker of the corporate sponsor of the QDB plan, the CEO can influence the level of cash contributions that flow to the QDB plan. If a firm is cash constrained, contributions to a QDB plan will directly reduce the resources that are available for positive net

[1] CEO's with an interest in the QDB plan usually have a much larger pension plan in a non-qualified "Supplementary" retirement plan (SERP). While the QDB plan is partially insured and minimum funding levels are regulated, firms do not set aside funds to cover their SERP obligations. This is because any effort to fund the obligations would not be protected from the claims of other creditors, and is also not tax deductible to the firm before the funds are paid out in retirement. SERP obligations are therefore typically unfunded and remain as an unsecured liability of the firm.

[2] In bankruptcy, some of this unfunded obligation may be protected by the Pension Benefit Guaranty Corporation (PBGC), a self-funded insurance plan for defined benefit participants. But the upper limits on this protection are modest.

present value investing (Rauh [2006]). Hence, while the CEO financial interest in the QDB plan potentially aligns their interest with non-management employees to encourage higher funding of the QDB obligation, CEOs can face a countervailing desire to assure the payment of his or her own SERP which is junior to the QDB obligation. This conflict between SERP and the QDB will change with the likelihood that the corporate sponsor faces financial distress, with cash constraints, and with the characteristics of the workforce. For example, if the workforce is close to retirement age, and the plan is grossly underfunded, non-management employees will want more assets in the QDB plan.[3] The CEO, responding to the financial risk attached to their own unfunded SERP, can personally prefer to limit voluntary contributions to the QDB plan, to divert cash to positive net present value operating assets, or to simply store cash to repay SERP. Similar arguments can be made with respect to shareholder-employee conflicts of interest. That is when the firm is cash constrained and (or) as it approaches bankruptcy, employees will prefer more assets set aside in the QDB plan, while shareholders and a CEO whose interests are aligned with shareholders, prefer to either invest in positive net present value projects, or to receive dividends.

Our results suggest that firms with CEOs that have greater SERP interests (relative to the QDB interests) exhibit more QDB plan underfunding. In contrast, there is no detectable variation in QDB funding levels associated with equity interests relative to QDB interest. Further, greater underfunding is associated with CEO's that have more SERP relative to their equity interest (EQUITY). These results are robust to the inclusion of industry and year effects, along with control variables intended to capture other determinants of funding levels, such as bankruptcy risk, growth, performance, and leverage among others. These results are also robust to the inclusion of alternative proxies for employee incentive alignment, including CEO lifetime

[3] A younger workforce will be interested maintaining their on-going salary, plus what they will receive in retirement, while older workers are more focused on retirement income.

tenure with the firm and social responsibility ratings produced by MCSI's Environment, Social and Governance (ESG) database (formerly produced by KLD Ltd.)

Notably, the largest underfunding we document is associated with SERP claims, rather than equity holdings. The finding that SERP claims are associated with greater underfunding of the QDB plan provides some side-support to the conjecture made in Munnell et al. [2007] regarding the trend in freezing DB plans. Munnell et al. suspect that the increased propensity of firms to freeze DB plan accruals is due to the growing percentage of CEO's wealth that comprises largely-unfunded SERP obligations.

This paper contributes to an increased awareness of the full set of mechanisms by which a firm can balance the conflicting interests of its claimants through CEO pay. Our work is similar to two recent papers,--Anatharaman, Fang and Gong [2014] and Anatharaman and Lee [2014]-- that also use the new disclosures available since 2006 to identify the top executive's QDB interest. Anatharaman and Lee [2014] explore the relation between CEO equity interests and QDB funding and asset mix choices. Our results are consistent with that study which finds that CEO s equity-based wealth has no association with QDB funding.[4] However, that study does not examine the relation between CEO SERP claims and QDB health, since SERP and the remaining component of CEO wealth is omitted from their regressions. Our study shows that it is SERP wealth, not equity, which is associated with greatest underfunding.

In a companion paper, Anatharman, Fang and Gong [2014] consider how a more comprehensive CEO wealth decomposition affects the terms of private debt contracts. This latter paper is similar to the current manuscript in that the research design looks at all components of CEO wealth. However, these components are related to private debt contracts, while our paper is focused on QDB plan health. That paper finds that SERP interests appear to align executive

[4] Anatharaman and Lee [2014] do find that CFO equity-based incentives are negatively associated with QDB plan funding. We have not extended our sample to include CFO's at this time.

incentives with debt holders thereby lowering the cost of private debt and decreasing the number of debt covenants. The current manuscript shows that SERP claims are associated with lower funding of QDB plans. Our finding result is consistent with Anatharman, Fang and Gong as it suggests that SERP is associated with the retention of assets within the firm as opposed to being set aside for the purpose of securing a more senior claim, the QDB plan. Overall, our paper is complimentary to these two recent papers.

Similar to Anatharaman and Lee [2014], our paper is timely given the current state of DB plans following the 2008 debt crisis that left many DB plans substantially under-funded. According to the U.S. Department of Labor, approximately 20% of privately-employed U.S. individuals expect to receive pension benefits from a defined benefit (DB) pension plan. In a recent study of 451 North American pension plans by credit rater DBRS [2012] they report that at the end of 2011 more than half of the plans examined were underfunded and they estimate the total funding deficit of those plans to be $389 billion. The health of these plans is of critical importance to the millions of employee participants that count on these payments in retirement. For example, the 2002 bankruptcy of United Airlines saw some workers lose up to 50% of the pension benefits they had been promised (Maynard [2005]).

Prior studies in accounting and finance have tended to focus on the adverse consequences associated with managements' use of discretion to manipulate DB pension liability and pension expense measurement and resource requirements. For example, public firms are found to successfully manage reported pension expense and pension obligations to reduce payments to tax-authorities, to influence stock price in the short run (e.g., to increase earnings by reducing reported pension expense), and to influence labor’s perception of the condition of the

plan to achieve management objectives, such as freezing the DB plan.[5] Other research shows that accounting measurement and disclosure of pension expense and obligations adversely influence real decisions regarding pension asset allocations.[6] Our research focuses mainly on the consequence of CEO incentive alignment on real decisions for QDB plans. We offer a contrasting view from these prior studies. We recognize that pension plans form an important aspect of the contract between valuable firm employees and other firm constituents whose interests come into conflict. We highlight that CEO incentive-alignment can mitigate or exacerbate the agency conflicts that arise in this setting.

2. Motivation and Hypotheses Development

2.1 Background

Pension plans are a relatively common feature of employee compensation arrangements. These plans allow employers to set aside some portion of pay that is tax deductible to the employer but is tax deferred to the employee. Employers that offer pension benefits either offer a defined contribution plan or a defined benefit plan. Under a defined contribution plan (DC plan), the employer commits to a yearly cash infusion which is deposited directly into a trust account each period. It is up to the employee to determine how the funds are allocated between available investment options. The contributions are tax-deductible for the employer and along with any accrued gains and losses they are tax-deferred for the employee. DC plans put the performance risk of the investments into the hands of the employee and do not comprise an

[5] Relatively recent papers that document opportunism include Asthana [1999], Bergstresser, Desai and Rauh [2006], and Comprix and Muller [2011].

[6] For example, Bergstresser, Desai and Rauh [2006] suggest that firms' selection of the assumed return on plan assets leads to changes in the asset allocation mix of QDB plans. Chuk [2012] finds similar evidence in the United States following changes in accounting standards that make the assumption regarding asset returns more visible. Amir, Guan and Oswald [2010] find that UK pension plans shift their asset mixes toward more debt securities following a change in accounting standard that highlighted the volatility of equity investments.

obligation of the firm.

Under a defined benefit plan, the employer promises to deliver a future set of cash flows to the employee, from retirement until death, typically based on the employee's years of service and salary earned. Because a QDB plan generally is not transportable from one organization to another, it serves as a horizon-extending, bonding mechanism for the employee. An agency theoretic view of a DB plan would predict that these plans emerge in organizations where turnover is costly to the organization.

A QDB plan contract is similar to secured debt; the employee provides services today in exchange for promised annuity-like payments from retirement until death. To achieve these payments, the employer sets aside cash which is invested in assets and held in trust for the employees. The employer takes on the risk of assuring the future payments, and so, a DB plan is an obligation to the sponsoring firm with the assets in the trust forming the security. If the assets exceed the obligation, then the pension holders can expect to receive full payment. If not, a portion of their claim will rely on the assets of the firm to cover any shortfall. If there are insufficient assets to cover the shortfall, then the pensioner's wealth in retirement is lower than s/he originally had planned for. For this reason pension funding is important to pension holders and, to other stakeholders in the pension holder's welfare (e.g., government).

In North America, defined benefit plans were once the rule, rather than the exception. In 1975, over 70% of employees with employer sponsored retirement plans held positions in QDB plans, while approximately 30% held defined contribution plans; by 2005, these fractions had fully reversed (Perun and Valenti [2008]). The decline in the number of plans has been attributed to both regulatory and macro or sector-specific influences (Butrica et al [2009].) For example, the popularity of DB plans increased following the 1978 Revenue Act which allowed employers tax deductible contributions to DB plans. However, subsequent laws increased the

size of insurance payments into the Pension Benefit Guaranty Corporation (PBGC)[7] and placed limits on the tax deductibility of payments into the plans. These steps along with other legislation have reduced the popularity of DB plans (Munnell et al. [2007]).

The popularity of defined benefit plans is also affected by market movements that affect the returns to the assets that support defined benefit obligations. Perun and Valenti [2008] point to booming stock markets in the 1980's through to late 1999 as being associated with contribution holidays for DB firms, and the subsequent downturn in markets in 2000 generating demand for increased contributions. The combination of flagging pension funding levels and a deficit in the PBGC contributed to demand for new legislation in the form of the *Pension Protection Act of 2006* (PPA). This Act aims to require 100% funding of all pension liabilities and stipulates the period of time that deficits are to be recovered. Using an event study, Campbell, Dhaliwal and Schwartz [2010] document key events leading up to the PPA are associated with negative returns to equity holders of firms with DB plans, and that this effect was more negative for more underfunded plans. This suggests the Act transferred wealth from shareholders to other claimants. Butricia et al. [2009] conjecture that this Act will further contribute to declines in the number of DB plans.

Though the number of DB plans has been in decline over several decades, Cadman and Vincent [2010] estimate that approximately 70% of S&P 500 firms sponsor DB plans for some fraction of their employees. Our Table 2 Panel B shows we are able to track between 539 and 687 firms per year between 2006 and 2012 with QDB plans[8]. During this period (Figure 1), the excess of plan assets over fund liabilities peaked in 2007, and fell dramatically in 2008.

[7] The PBGC, established in 1974, is self-funded by corporations with DB plans. It provides insurance for pension benefits up to a specified maximum monthly pension payment in the event of corporate default on the pension obligation. In 2013, the maximum is set at $4,790 per month for employees retiring at age 65.
[8] Our sample is based on companies on Compustat with DB pension obligations that are also covered by EXECUCOMP. Therefore, we do not cover all firms with DB plans.

2.2 Hypothesis Development

QDB plan firms implicitly agree to set aside sufficient assets to sustain promised cash payments for plan participants in their retirement years. Employees accept a compensation contract with a DB plan attached, potentially accepting lower current wages in exchange for the promise of a secure retirement. However, depending on executive discretion, the promise to make payments into the plan could become time-inconsistent. For example, CEO's operating under the influence of a desire to maximize the value of soon-to-vest options and restricted stock, could facilitate the expropriation of wealth from pensioners by failing to set aside assets in a timely manner.[9] The potential agency conflict between employees and equity holders which can arise due to CEO's being compensated via restricted stock and options, is the impetus behind the work of Anatharaman and Lee [2014].

But, CEO compensation plans contain incentive-related instruments beyond equity. These other components arguably lead the CEO to identify with a variety of stakeholders in firm assets. The amounts the CEO holds in restricted stock and options create an incentive for the CEO to take actions that increase the market's expectation of future free-cash flows, and an increased taste for the volatility of future cash flows, relative to debt-holders. Yet, compensation the CEO expects to receive from a pension plan in retirement, makes the CEO more like a debt-holder. In fact, Sundaram and Yermack [2007] provide evidence that CEO's with more pensions (both SERP and QDB) and other deferred compensation, relative to the value of equity they hold in the firm, are more attuned to bondholders' interests. Finally, as noted by Anatharaman and Lee [2014], the CEO's financial interest in the QDB plan, can serve to intensify the CEO's

[9] Conceptually, the decision about how much cash a firm should set aside in a defined benefit plan would be influenced by the scarcity of financial resources and alternative uses of those funds. For example, Rauh [2006] finds that capital expenditures are lower for firms who are forced to make contributions to underfunded plans. This tension between investing in the firm or contributing scarce resources to the fund the employee pension plan is reason that pension legislation exists setting minimum required contribution levels. However, given these minimums, executives, representing corporate plan sponsors, are faced with tradeoffs when deciding what discretionary contributions to make to the pension plan trust.

identification with employees' reliance on fund assets to finance future pension pay-outs.

Imagine a CEO with future wealth tied up in the QDB plan, in a SERP, and in equity. Three additional factors that will influence decisions that affect bondholder, shareholders and employees are 1) the proximity of the firm to bankruptcy and 2) the importance of the CEO's undiversifiable human capital and 3) the distance of the CEO to retirement age.

First, when there are no financial constraints, the decision to fund the defined benefit plan is influenced by the tax efficiency of contributions, and presumably investing can be facilitated through borrowing. However, when financial constraints and financing costs are introduced, incentives to contribute are less certain. If a CEO with firm-specific capital faces a long horizon until retirement, job-retention can become more important than security in retirement. To the extent that contributions to the QDB plan threaten positive net present value investing, a CEO with large equity wealth and a small interest in the QDB can rationally prefer positive net present value investing over DB plan contributions. On the other hand, if the CEO has a short horizon to retirement, and relatively large SERP, the CEO is prefers safer investments (relative to shareholders) that help to secure the retirement plan, and will resist diverting assets to the QDB plan.[10] Varying the scenario yet again, if the CEO's interest in the QDB is particularly large and there is little or no SERP, under financial distress and short tenure to retirement, the CEO will have an incentive to generously fund the QDB plan.

Like the CEO, the tastes of *non-management* employees for funding of the defined benefit plan also vary with the specificity of their human capital and proximity of the firm to financial distress. For example, during and following the debt crisis of 2008 defined benefit plans became dramatically less well funded due to the fall in the fair value of plan assets. This

[10] In fact, this is the motivation for negative covenants in public debt that prevent the payment of dividends when financial statement ratios are triggered. Public debt holders want to avoid the diversion of assets to other claimants if financial conditions threaten repayment of the debt obligation.

period also corresponded to financial distress for the firm as a whole. In such a period of time, younger employees of the firm will prefer positive net present value investing, rather than diverting cash flows to the defined benefit plan, because this will help to preserve jobs and wages, while older employees, nearing retirement, will prefer to secure the defined benefit plan.

Clearly decision making by CEO's that are subject to various stakeholder incentives is complex, and depends on many factors. However, despite the complexity of this setting, one prediction seems straightforward, and that is, that, all else held constant, CEO's are on average more likely to set aside assets in the QDB plan, if the CEO holds a stake in the QDB plan. Accordingly, our first hypothesis is as follows:

> *H1*: Managers with a stronger interest in their company's qualified DB pension plan, relative to their other fixed claims and equity, will make decisions that keep the plan more highly funded.

While the hypothesis seems straightforward, some tension is created through the regulatory setting that defined benefit plans inhabit which intend to limit firm discretion over funding choices. The Employment Retirement Security Act (ERISA) of 1974 and other updating legislation specify minimum funding requirements[11] for DB plans to help insure the health of these compensation arrangements. These laws establish that DB firms must set aside minimum funds periodically to increase the likelihood promised payouts will be achieved. Note however that while contributions are regulated, mores so, over time, firms can achieve greater fund status through other decisions. For example, a CEO can facilitate a plan freeze, which stops further growth in the DB obligation.

Relatedly, tax laws limit the extent to which a firm link the executive incentives to

[11] Specific funding rules have varied over time. Following ERISA, updated legislation governing minimum funding levels is contained in the Pension Protection Act (PPA) of 1987 and 2006, the Retirement Protection Act of 1994 and the Worker, Retiree and Employer Recovery Act of 2008 (Chen et al. (2013))

employees by putting the executive in the QDB plan. In our sample of executives, the average fraction of CEO wealth in the QDB plan is just 3% of their total claims. Hence, even if the board of directors wanted to increase the incentive alignment of CEO's with other plan participants, tax law constraints limit the wealth the CEO has in the QDB plan.

Similar to Anatharaman and Lee [2014], then, we are interested in whether the CEO's discretion over DB plan funding will be guided in part by the relatively small fraction of the CEO's wealth that is in the firms QDB plan. A key difference in our paper, though, is that we consider not just the tension created by EQUITY versus QDB interests, but also, the tension between SERP and the QDB interest.[12] Munnell, et al. [2007] conjectures that the small fraction of CEO wealth held in traditional qualified DB plans versus the large amount held in SERPs is likely a contributing factor to the general trend of freezing pension plans benefits. That paper provides no empirical examination of this claim; our research design can provide some evidence about this conjecture.

Further building on Anatharaman and Lee [2014] we explore if DB funding health differs based on the executives' relative wealth in EQUITY versus SERP. Depending on the specific context, the incentive supplied by SERP need not correspond to the incentive provided by equities. For example, excessive compensation in SERP as the executive nears retirement can make the CEO avoid transferring assets to the QDB plan. This occurs because the maturity of the SERP is not directly tied to the maturity of firm debt. To some extent, EQUITY for the CEO forces him or her to internalize a horizon that differs from the average shareholder, due, to vesting restrictions and lack of diversification. However, the correspondence between equity holders and the EQUITY interests of CEO appears to be greater than the correspondence between SERP and firm leverage. We examine the following conjecture:

[12] In our sample 81% of CEO pension entitlements are in SERPs with only 19% in QDB plans.

Conjecture 1: The relation between funding status and SERP will differ from the relation between funding status and EQUITY.

In line with Anatharaman and Lee [2104], we also examine whether CEO wealth allocations affect the riskiness of assets that support the QDB obligation.[13] We assume that part of the fiduciary responsibility of the firm that sponsors the pension plan extends to overseeing the plan's investment policy[14]. If the CEO is personally concerned about the survival and financial health of the pension plan they are expected to be less willing to invest in high-risk, high-expected-return asset classes that expose the plan's asset portfolio to excessive risk. If these managers tend to be more conservative in managing their firms pension assets this leads to the following second conjecture:

Conjecture 2A: Managers with a stronger interest in their company's qualified DB pension plan relative to other fixed claims and relative to equity, will cause their company's pension plan to invest more in bonds and less in equity.

Firms report the percentage of their pension assets that are invested in bonds, equities and other asset classes. While we observe allocations to bonds versus equities, we cannot directly observe the nature of their investments in other assets and the associated risk of these investments. The other assets category of pension plan investments can include investments such as real estate, infrastructure, hedge-funds, and private equity. Real estate and infrastructure investments provide more of a fixed income stream while hedge-fund and private equity investments will tend to be more risky and will likely earn a higher expected return. In general, investment risk and expected return should be positively correlated. Therefore we use the expected return on

[13] It may seem that a natural decision to analyse are contributions to the DB plan. In fact, the regulations that determine minimum required contributions are extremely complex, particularly during our time period. For this reason, we do not believe it is feasible to take this route.

[14] Rauh (2006) indicates that the pension plan's asset allocation choice is under the control of the plan sponsor.

pension plan assets reported by the firm adjusted for their investment in bonds and equities as an indicator of the riskiness of the firm's invest in other assets. This leads to the following second investment hypothesis:

> *Conjecture 2B:* Managers with a stronger interest in the company's qualified DB plan relative to other fixed claims and relative to equity will report a lower expected return on plan assets after controlling for their investments in bonds and equities.

Bergstresser et al. (2006) find evidence that some firms use their expected return on plan assets to manage earnings. Therefore we control for earnings management sensitivity when testing this hypothesis.

3. Research Method, Measurement, and Descriptive Statistics.

3.1 Research Method H1

To examine the hypothesis that funding status varies in the cross-section with the allocation of the CEO's wealth to the firms QDB plan relative to SERP and EQUITY, we estimate three different regression models, for two different measures of funding status (i.e., 6 models in total.) In the first model captured by equation (1), the CEO's QDB plan allocation is measured relative to their total pension entitlement (QDB+SERP) and EQUITY is controlled for through the inclusion *CEO_EQUITY* which captures the CEO's ratio of equity claims to his total stake in firm assets.

$$\begin{aligned} FUNDING\_STATUS\ TO\ \text{SCALER}_{i,t} = {} & \alpha_0 + \alpha_1 QDB\_TO\_PENSION_{i,t} + \alpha_2 CEO\_\text{EQUITY}_{i,t} \\ & + \alpha_4 L\_TOBINQ_{i,t} + \alpha_5 L\_GROWTH_{i,t} + \alpha_6 L\_SIZE_{i,t} \\ & + \alpha_7 L\_LEVERAGE_{i,t} + \alpha_8 ROA_{i,t} + \alpha_9 L\_ROA_{i,t} + \alpha_{10} ARR_{i,t} \\ & + \alpha_{11} L\_ARR_{i,t} + \alpha_{12} CHG1 + \alpha_{13} CHG2 + \alpha_{14} CHG3 \\ & + \alpha_{15} ASP\_DISCRATE_i + \sum_{h=1}^{99} \beta_h Industry_h + \sum_{n=1}^{7} \varphi_n Year_n + \varepsilon_i \end{aligned} \quad (1)$$

Under H1, the coefficient on *QDB_TO_PENSION* is expected to be positive, indicating that

when CEO's have relatively more of their pension plans in QDB, the funding status of the QDB plan is more positive, while, the coefficient on CEO_EQUITY shows whether funding is greater for EQUITY interests relative to PENSION interests.[15]

An alternate way to control for all components of CEO wealth is to let them take separate weights in the econometric specification. Accordingly in Equations 2 and 3 we break CEO wealth into four components, including three out of the four in the model. The four components are the CEO QDB interest, *CEO_QDB*, the SERP interest, *CEO_SERP*, equity interests, *CEO_EQUITY*, and "other deferred compensation" or *CEO_DEFER*.[16]

$$FUNDING\_STATUS\ TO\ \text{SCALAR}_{i,t} = \alpha_0 + \alpha_1 CEO\_QDB_{i,t} + \alpha_2 CEO\_SERP_{i,t} + \alpha_3 CEO\_EQUITY_{i,t} + ControlsEquation1 \quad (2)$$

Note that Equation 2 omits "other deferred" compensation. This will give exactly the same explanatory power as Equation 3 which omits CEO_QDB:

$$FUNDING\_STATUS\ TO\ \text{SCALAR}_{i,t} = \alpha_0 + \alpha_1 CEO\_QDB_{i,t} + \alpha_2 CEO\_SERP_{i,t} + \alpha_3 CEO\_EQUITY_{i,t} + ControlsEquation1 \quad (3)$$

The only advantage to specifying Equation 3 is that it allows for a direct test of H1, that the funding status is greater for CEO's with larger QDB interests relative to SERP or EQUITY through the significance of *t-statistics* on CEO_SERP and CEO_EQUITY. This same test is accomplished via F-tests in Equation 2. Specifically, we predict negative coefficients on *CEO_SERP* and *CEO_EQUITY*.

We vary the dependent variable through the use of two different scalars. In some of our regressions we scale funding status (fair value of plan assets minus the projected benefit

[15] It is easy to show that CEO_EQUITY is one minus CEO_LEV, the fraction of total wealth held in deffered compensation and pensions. Hence, a positive coefficient on CEO_LEV indicates a negative coefficient on CEO_LEV.

[16] Some corporations allow CEO's to set aside some of compensation that is earned in the current period and to defer the pay-out until later in life. The deferred compensation becomes an obligation to the firm, similar to SERP, except that the amount set aside is at the discretion of the executive. By deferring the payout of the compensation, the CEO can also defer the tax consequences.

obligation) by the total assets of the firm (*FUNDING_STATUS TO TA*). In this specification, the extreme cases are those in which the implicit obligation to the firm is a large share of firm assets. A second dependent variable in both equations is FUNDING_STATUS TO PBO which measures the fair value of plan assets minus plan obligations (using the projected benefit obligation) scaled by plan obligations (See Table 1 Panel D for full definitions of variables).

We would like the coefficients on the incentive variables to reflect the CEO's taste for making more than the minimum contributions to the DB plan over time, controlling for firm specific and economy-wide effects that drive this variable. Therefore, both equations (1) and (2) contain controls for other determinants of funding status related to the firm's ability to finance the qualified plan and the alternative uses of scarce capital. These controls include proxies for growth opportunities, captured by lags of Tobin's Q (L_TOBINQ) and sales growth (L_GROWTH); firm size (L_SIZE); leverage (L_LEVERAGE); firm profitability, measured by both current ROA and lagged ROA (L_ROA); and industry and time dummy variables. It is not clear whether growth firms will be more or less willing to make voluntary contributions to their DB pension plans as capital investments create an alternative demand for limited cash reserves (Rauh 2006).

Larger firms, more profitable firms and firms with less leverage are expected to be in better financial health and more able to make contributions to their DB plans if they were to decide to do so. Because funding status will move up and down with the investment performance of the pension plan's assets, we include both current and lagged actual return on plan assets (ARR and L_ARR) as control variables in the regressions. Similarly, the DB plan obligation requires a present value calculation; therefore the discount rate used by the firm to value the obligation (ASP_DISC RATE) to control for changes in the discount rate. We assume that the management do not have discretion over the choice of discount rate.

We also include three indicator variables, collected from proxy statements and 10k's,that track major modifications to the operation of the firm's DB plan over time. These changes can directly impact the funding status of QDB plans by reducing (or eliminating) the rate at which employees accrue additional benefits under the QDB plan. The first pension modification indicator variable, CHG1, is set to equal one if a firm has stopped offering its traditional DB pension plan to new employees and replaced it with a cash balance DB pension plan. Under a cash balance plan the benefits to be paid to employees on retirement vary with the performance of the plan's assets, therefore the sponsoring firm does not underwrite the risks associated with asset performance and the gap between the pension assets and obligations is expected to be less.

CHG2 indicates firms that have frozen all of their DB pension plans (both foreign and domestic) so that all employees no longer earn additional pension benefits from further service. Firms that have undertaken such a change are able to limit the further growth of their obligation and concentrate on making pension plan contributions to rectify any existing shortfall in their plan's funding status. Therefore, we anticipate that these firms may be in a better funding position than firms that have not frozen their pension plans, suggesting that CHG2 will be positively related to funding status. However, it is possible that firms freeze their pension plan when underfunding becomes particularly severe. If this is the case then underfunding may be negatively related to CHG2. CHG3 is similar to CHG2 except it applies when all domestic plans are frozen but at least one foreign DB plan remains unfrozen.[17]

3.2 Alternative measures of employee-management incentive alignment

The numerators of *QDB_TO_PENSION*, and *CEO_QDB* are naturally constrained on the

[17] A decision to switch to a cash balance plan, or to freeze existing DB plans are alternative ways of managing the funding status of DB plans, and these choices themselves may be partially determined by the incentive alignment of the CEO with firm employees. Our current formulation implicitly assumes that these decisions are pre-determined and are not simultaneously occurring.

upside due to limits on the amount of pre-tax dollars that can be paid into the tax-qualified plan. CEO's and other highly paid executives have sufficiently large salaries that these limits are reached. From a tax perspective, corporations with a QDB plan that intend to provide a DB pension benefit to the CEO, should set aside the maximum allowable for their highly paid executives in the QDB plan, with the remaining pension obligations ear-marked in a non-qualified (supplementary) plan. (The total amount of the supplementary plans plus the QDB plan is the denominator in CEO_QDB1). However, 24% of our sample does not follow this standard approach. These firm years have CEO's with zero interest in the QDB plan.

Taking this information into account, one might suppose that CEO's who have relatively large shares in the QDB plan have contributed to the plan over many years, and are a reflection of tax decisions by compensation committees. CEO_QDB will be especially large for CEO's that have been promoted through the rank and file. If this is true, we can find a positive relation between funding status and CEO_QDB because such CEO's are whetted to a firm culture that values employees. Accordingly, in some our regressions we measure and include lifetime tenure with the firm (as opposed to CEO tenure) to understand if lifetime tenure and CEO_QDB are alternative measures of an employee-centric firm culture.

We also consider whether employee-CEO alignment is reflected in corporate policies that are likely to be the outcome of high level strategic decisions on the value to employees. KLD Ltd (now owned by MSCI) collects Economic, Social, and Governance (ESG) data for a large number of firms since 2003, including indicators for a firm's employee relations.[18] Among firms that show a greater (lesser) number of strengths (weaknesses) in ESG employee relations indices, we expect to find the stronger (weaker) is management's assessment of the marginal productivity

[18] In fact, some of the components of the ESG scores focus directly on the funding of QDB plans. One must be aware of potential circularity in regressing funding status on ESG employee relations scores. Accordingly, we will separate the pension component of the ESG measures from other aspects of employee relations.

of the work force. Some regressions include ESG ratings to explain funding status.

3.3 Research Method Conjecture 2A and H2B

We conjecture that a CEO's incentive alignment with employees will influence their management of the QDB plan to weight investments more heavily toward bonds rather than equity, H2A, and will lead them to select other plan assets that are of lower risk, H2B. To investigate whether CEO_QDB interest leads to more (less) weighting of plan assets in bonds (equities) we estimate regression models (3) and (4):

$$\begin{aligned} \%BOND_{i,t} \text{ or } \%EQUITY_{i,t} = {} & \alpha_0 + \alpha_1 QDB\_TO\_\text{PENSION}_{i,t} + \alpha_2 CEO\_\text{EQUITY}_{i,t} \\ & + \alpha_4 FUNDING\_SATATUS_{i,t} + \alpha_5 FUNDING\_SATATUS_{i,t}^2 + \alpha_6 HORIZON_{i,t} \\ & + \alpha_7 SIZE_{i,t} + \alpha_8 LEVERAGE_{i,t} + \alpha_9 ARR_{i,t} + \alpha_{10} L\_ARR_{i,t} \\ & + \sum_{h=1}^{99} \beta_h Industry_h + \sum_{n=1}^{7} \varphi_n Year_n + \varepsilon_i \end{aligned} \quad (3)$$

$$\begin{aligned} \%BOND_{i,t} \text{ or } \%EQUITY_{i,t} = {} & \alpha_0 + \alpha_1 CEO\_\text{DEFER}_{i,t} + \alpha_2 CEO\_SERP_{i,t} + \alpha_3 CEO\_EQUITY_{i,t} \\ & + ControlsEquation3 \end{aligned} \quad (4)$$

In particular, we hypothesize that the fraction of plan assets in bonds (equity) receives IS positively (negatively) related to *QDB_TO*_PENSION in equation (3) and that coefficients on *CEO_SERP* and *CEO_EQUITY*, are negative (positively) for bonds verusus equities in equation (4). We include controls for non-employee incentives in a manner parallel to Equations (1) and (2). Different control variables appear in Equations (3) and (4) because the economics of the model differ. The control variables we include roughly follows Amir et al. [2010] who examine the relation between a shift the recognition of funding status on UK balance sheets, and asset allocations within these plans. Among the control variables are FUNDING STATUS (measured relative to total assets) and FUNDING STATUS^2; these allow for a shifting of asset mix into equities as a plan becomes more and more underfunded, or, more and more over-funded, as funding levels move into the tails of the distribution. The regression equation also controls for the age of the workforce by including HORIZON (the log (PBO/current service costs). We

predict this variable gets bigger as the average age of employees increases, and, accordingly we would expect larger a shifting of investments into bonds as this variable gets bigger.[19] Our sample period includes the years surrounding 2008, and because of the concern that extremely poor returns on assets might lead mechanical changes in asset mix, we include the contemporaneous average return and the lagged return on plan assets.[20] Leverage is included because funding status can influence debt contracting covenants, and firms that wish to avoid covenant violations will reduce volatility in the QDB plan by moving allocations towards bonds.

QDB plans invest in securities and other vehicles in addition to bonds or equities. This third class of assets will help to determine the risk profile of the QDB plan. To examine the implied return, and implicit riskiness, of these other investments, we regress the *expected* return on plan assets ASP_RET ON ASSETS on the fraction of pension assets invested in bonds and equities, as well as on other determinants of the plan asset expected return.[21]

$$\begin{aligned} ASP\_RET\ ON\ ASSETS_{i,t} = {} & \alpha_0 + \alpha_1 CEO\_QDB1_{i,t} + \alpha_2 CEO\_LEV_{i,t} \\ & + \alpha_4 SENSITIVITY_{i,t} + \alpha_5 SENSITIVITY_{i,t} \times CEO\_QDB1_{i,t} \\ & + \alpha_8 \%EQUITY_{i,t} + \alpha_9 \%BONDS_{i,t} + \alpha_{10} ARR_{i,t} \\ & + \alpha_{11} L\_ARR_{i,t} + \sum_{h=1}^{99} \beta_h Industry_h + \sum_{n=1}^{7} \phi_n Year_n + \varepsilon_i \end{aligned} \quad (5)$$

$$\begin{aligned} ASP\_RET\ ON\ ASSETS_{i,t} = {} & \alpha_0 + \alpha_1 CEO\_\mathrm{DEFER}_{i,t} + \alpha_2 CEO\_SERP_{i,t} + \alpha_2 CEO\_EQUITY_{i,t} \\ & + ControlsEquation5 \end{aligned} \quad (6)$$

The idea in this regression is to use control variables to capture the variation in expected return on plan assets due to the percent of pension plan assets invested in equity and debt (%EQUITY and %DEBT), as well as, any variation that is due to incentives to manage earnings

[19] Amir et al. [2010] predict that age of the workforce decreases in this measure. We cannot see the logic in this prediction.

[20] Rauh [2009] also investigates the allocation of fund assets between equities and debt. Rauh includes lagged realized returns on plan assets based on similar reasoning.

[21] Note that this regression looks at the expected return on plan assets. This is an assumption about future returns which affects the amortization of pension expense in the income statement. In contrast, actual average return and actual lagged return ARR, and L_ARR are not estimated, but are based on the returns that are realized on QDB plans.

(captured by SENSITIVITY, which measures the log of pension assets to the log of earnings). Bergstresser et al. explore management discretion over expected asset returns, which can be used to manage the earnings of a QDB firm. SENSITIVITY is intended to reflect the percentage increase in earnings that can be achieved by manipulating the expected return on plan assets. We also control for the average historical return on plan assets. We anticipate that the remaining variation in expected return on plan assets will be due to investments in non-traditional vehicles. If these investments tend to be less risky when the CEO is invested in the QDB plan, then we expect CEO_EQUITY and CEO_SERP to exhibit a positive weight in determining the remaining portion of the expected return.

3.4 Sample

Our sample selection approach is shown in Table 1, Panel A. We identify 8,221 firms-years on Compustat with defined benefit pension obligations and positive pension plan assets between 2006 and 2012. We match these firm-years to EXECUCOMP CEO level pension data, requiring that the CEO's total pension size is non-missing. In addition, in the EXECUCOMP pension detail file the CEOs interest in the qualified DB plan must be non-missing (i.e., their interest in the QDB plan can be zero, but it cannot be missing.)[22] Firms that only have DB plans in foreign countries are eliminated, and we also eliminate observations where the CEO is in the last year of their tenure, if their interest in the DB plan was positive in the prior year, but fell to zero for the year that they left the firm.[23] We also delete firms with missing control variables, leaving us with a final sample of 4,050 firm year observations. The number of firms included in

[22] The sample begins in late 2006 because from December 15, 2006 onwards the SEC has required companies to disclose in their proxy statements the retirement plans and deferred compensation of their CEO, CFO and three other highest paid executives. Therefore granular detail on the CEO's separate pension plans is available from EXECUCOMP's pension benefit data file beginning in fiscal year 2006.

[23] In the final year of the CEO's tenure, this measure falls to zero if the CEO is paid out upon retirement, even though during the year, up until their retirement, the CEO may have had wealth in the firm's pension plans.

our sample in a given year is declining over time, with the exception of 2006 . In 2006 the sample is smaller because firms with a fiscal year end prior to December 15, 2006 were not required to follow the new pension reporting rules. In recent years the sample size has declined relative to 2007, presumably due to companies moving away from DB pension plans.

Table 1, Panel C reports the industry distribution compared to the COMPUSTAT population. The consumer non-durables, manufacturing, chemicals and utilities industries are a larger percentage of our pension plan sample than they are amongst general COMPUSTAT firms, indicating that defined benefit pension plans are more popular in these traditional industries. Firms in newer industries, such as the business equipment, healthcare and finance, appear to make less use of defined benefit pension plans as shown by their underrepresentation in our pension sample relative to the COMPUSTAT firm-population.

3.3 Descriptive Statistics

Table 2, Panel A reports descriptive statistics for the sample. Two measures of pension obligation are reported: ABO and PBO. PBO (projected benefit obligation) is the present value of expected future pension payments, incorporating the impact of expected future salary increases. ABO (accumulated benefit obligation) measures the same thing, except that it assumes future salary increases will not change future pension payments. This assumption holds for pension plans that are frozen or terminated. Therefore, PBO will equal ABO when a firm has frozen all of its DB plans. The average (median) PBO pension obligation for our sample firms is $2.8 Bill ($495 mill) and the obligation is 7% smaller, when measured using ABO. Half of the sample have less than $0.5 Bill of pension obligations. However, some obligations are very large, leading to a mean PBO that is more than five times the median. The mean (median) present value of assets in the plan is $2.36 Bill ($379 mill) reflecting the fact that, during the period of our study, defined benefit pension plans are underfunded on average. We measure

funding status as the fair value of pension assets minus PBO and standardize funding status either by the pension obligation (PBO) or by total assets. The first measure captures the employees' view of the security of their pension plan[24], while the second measure reflects the significance to the pension underfunding to the firm assets that could be called upon to make up a shortfall. Median pension funding status to PBO (total assets) is -21%, (- 2%).

The assumptions the firm uses to account for the defined benefit pension plan obligation and expense are also reported in Table 2 along with the allocation of pension assets. The median expected return on assets (ASP_RET ON ASSETS) is 8%, while median allocations to equity and bonds is 60% and 34% respectively. A bigger expected return on pension assets reduces pension expense, therefore people have questioned whether firms tend to over-estimate the expected return. An expected return of 8% seems rather optimistic given that the average portfolio is invested 35% in bonds. The median discount rate used to present value the pension obligation (ASP_DISC RATE) is 5.75%. The higher the discount rate the lower the ABO and PBO, therefore the lower the degree of underfunding. The impact of discount rate on pension expense is ambiguous as a higher discount rate reduces current service cost (i.e., part of pension expense due to employee services provided in the current year), but it also increases interest on the obligation. As a firm's pension obligation is considered to be relatively low risk for its beneficiaries, academics argue that it should be discounted at a relatively low risk market interest rate, either equal to the government bond rate or the interest rate on high quality corporate bonds. Therefore, a median discount rate of 5.75% is pretty high given that five out of seven sample years are post the financial crisis when the government was been keeping interest rates low.

There are three indicator variables that designate major revisions to the DB contract terms with employees. CHG1 indicates that 23% of sample observations had a cash balance

[24] Prior research typically measures funding status in a similar manner, standardizing the degree of underfunding by the size of the obligation[Anantharaman et. al. (2014)].

defined benefit pension plan for new hires. CHG2 indicates when a firm has frozen all of its DB plans. A further 23% of sample firm years fall into this category. When all of the DB plans are frozen pension obligations no longer grow as employees provide their services to the firm. CHG3 is similar to CHG2 in that it indicates when a firm has frozen all of its domestic plans, but their foreign plans continue to accrue benefits for current employees. This is the case for 3% of our sample.

Inspection of the fraction of total wealth that the CEO holds in the QDB plan (CEO_QDB), in SERPs (CEO_SERP), in other deferred compensation (CEO_DEFER) and in equity (CEO_EQUITY), demonstrates how their relative incentives are divided. On average, equity comprises 73% of CEO wealth, while SERP and QDB interests are 16% and 3% respectively. The remaining 8% of wealth is in "Other Deferred" compensation and comprises pay such as that associated with deferred bonuses. These statistics show that the average CEO interest in the QDB plan is small, and possibly of little economic significance.

Our second CEO incentive variable (QDB_TO_PENSION) is based on the size of the CEO's qualified DB pension entitlement (QDB_VALUE) to their total pension entitlement (PENSION_VALUE_TOT). For firms with zero denominators the ratio is set to zero as they have no interest in the employee qualified DB plan. The CEO's mean (median) qualified DB pension entitlement is 19% (7%) of their total pension entitlement. However, these amounts are higher if we exclude cases where the CEO has no interest in the qualified DB plan (the untabulated mean is 25% and the median is 12%). For those CEOs with a positive interest in the employee qualified DB plan (QDB_VALUE_A) their average dollar entitlement is $605,000 and their median entitlement is $448,000 . This is not a large dollar amount relative to the size of most managers' total pensions ($2.7 Million median).

The median number of years the CEO has been with the firm is 16 years indicating that most CEOs have been with the firm for a large part of their careers. However 25% of managers have been with the firm for less than 7.5 years, suggesting some CEOs moved to the firm as senior executives. The KLD descriptive statistics are also reported in Table 2 Panel A. The KLD pension strength and concern variables (EMP_STR_PENSION and EMP_CON_PENSION) indicate that approximately 14% of cases are reported to have a strong pension plan while 38% have weaknesses. This imbalance in weaknesses relative to strengths could be related to the 2007-2008 financial crisis. With respect to aggregate concerns and strengths (EMP_STR_ NUM and EMP_CON_NUM) more than 50% of firms have at least one concern while more than 50% do not have any strengths. Therefore, KLD strengths are less common than weaknesses.

Panel B reports mean and median funding status and pension assumptions by year. (See also figures 1-3). This shows a marked decline in median funding status from -6% of PBO in 2007 to -29% in 2008, at the start of the financial crisis. Somewhat surprisingly, funding status does not improve much during the years that follow, with median funding status, as a percentage of PBO, remaining 25% underfunded by the end of 2012. A contributing factor to this trend is the declining median discount rate used to calculate the obligation declined from 6.25% in 2007 to 4.0% in 2012. The reduction in the discount rate would cause the obligation to grow through the effect of discounting; this would offset gains that occurred as asset values increased following 2008. Median expected return on pension assets has not declined as much, moving from 8.25% in 2007 to 7.69% in 2012.

Correlations are reported in Table 1, Panels C and D. The fraction of CEO wealth in the employee QDB plan (CEO_QDB) is positively related to funding status measured relative to PBO, but negatively related to funding status relative to total assets. Their wealth in SERP is negatively related to funding status to total assets, while wealth in equity is positively related.

But these two measures are not significantly correlated with funding status to PBO. As the majority of a CEO's wealth in the firm is either in SERP or in equity the correlation between these two fractions of CEO wealth is significantly negative at -0.81.

4. Results

4.1 Results for Hypothesis 1: Funding Status

Table 4, contains our main results examining the relation between the funding status of employee DB pension plans and the CEO's incentive alignment with various constituencies: employees, unsecured creditors and equity. The dependent variable in the first three columns is the funding status of U.S. employee pension plans (the market value of pension plan assets less the present value of qualified pension plan obligations, measured using PBO[25]), as a fraction of total assets that form the basis for payments to all of the firm's claimants. While in the last three columns funding status of U.S. employee pension plans is measured relative to adjusted PBO. Columns 1 and 4 use the base model in equation 1, where CEO-employee incentive alignment is measured by the fraction of the CEO's total pension that is in the tax-qualified DB plan (QDB_TO_PENSION)[26]. In these columns we also include a control for the CEO's interest in equity relative to their total wealth in the firm (CEO_EQUITY) to control for the CEO's own leverage (this variable is one minus the CEO's inside debt). In columns 2 and 3 (and columns 5 and 6) we present regression based on equation 2, where each component of CEO wealth (CEO_QDB, CEO_SERP, CEO_DEFER and CEO_EQUITY) is examined separately. As the four components add to one, one component is left in the intercept. In Columns 2 and 5 other

[25] PBO from COMPUSTAT includes all of the company's DB plans, tax-qualified plans, SERP and foreign plans. We are interested in the funding status of U.S. tax-qualified plans, therefore if the information is available, we adjust PBO to remove SERP and foreign plans. If the 10-K pension footnote reports tax-qualified and SERP obligations separately we remove SERP from PBO. If the footnote does not provide this breakdown, then the CEO's SERP, obtained from EXECUCOMP, is removed. As already mentioned, SERP is paid from the firm's general assets, therefore no adjustment to pension plan assets is required. When the assets and obligations of foreign DB plans are reported separately these are also removed from PBO and plan assets.

[26] Recall that when total pension is zero QDB_TO_PENSION is set equal to zero.

deferred compensation is in the intercept, so the other three coefficients and their t-statistics are measured relative to the coefficient on CEO_DEFER. In columns 3 and 6 CEO_QDB is in the intercept and so the t-statistics for these regressions measure the influence of the other components of wealth relative to the CEO's QDB. We also investigate the extent to which CEOs who have been with the firm longer tend to oversee better funded defined benefit pension plans (YRS_FIRM), which is positively correlated with QDB[27]. For all of the regressions in Tables 4 to 7 we include year and industry fixed effects and we use clustered standard errors. F-tests are reported at the bottom of each table to test for difference between the coefficients on individual components of CEO wealth.

The results in Table 4 differ depending on which measure of funding status we is used, however, some results are consistent for both measures. In columns 1 and 4, where CEO incentives are measured by the fraction of the CEO's pension in the QDB plan, both measures of funding status are significantly positively related to the CEO's alignment with the QDB plan. Funding status is also positively related to the fraction of CEO wealth in equity (negatively related to inside debt) in column 1, but not when funding status is measure relative to PBO in column 4. In all of the regressions that decompose CEO wealth, columns 2, 3, 5 and 6, the f-tests show that CEO_SERP is associated with significantly lower funding than CEO_EQUITY. CEO_SERP is also associated with significantly lower funding status than other deferred in columns 2, 3, 5 and 6 and with lower funding status than CEO_QDB in columns 2 and 3, but not 5 and 6[28].

The weight attached to CEO_DEFER is not significantly different from the weight on CEO_QDB or from the weight on CEO_EQUITY and the weight on CEO_EQUITY is not

[27] When we exclude YRS_FIRM from our regressions the results are similar, but the significance of CEO_QDB is increased.

[28] If years with the firm is omitted from the regression in column 5 (untabulated), then the F-test indicates significantly better funding status associated with CEO_QDB than with CEO_SERP using a one-tailed test.

significantly different from the weight on CEO_QDB (models 2, 3, 5 and 6). In summary QDB, equity and other deferred compensation all have similar funding status, but, consistent with hypothesis 1 a CEO with more SERP is associated with weaker DB plan funding than an CEO with a similar amount of QDB, deferred compensation or equity.

With respect to control variables, funding status, measured relative to total assets is positively related to the length of time the CEO has been with the firm, suggesting more careful management of the employee pension plan. But, years with the firm is not significantly related to funding status to PBO. Larger firms (Size), firms with recent profitability (either ROA or L_ROA) and firms with stronger pension plan asset performance (ARR and L_ARR) are generally better funded using both measures of funding status. Funding status relative to PBO is higher when the obligation is being discounted using a larger rate as expected and it is lower when firms are more highly levered. The negative relation with leverage may reflect competition of scarce resources as firms become financially stressed. Funding status to total assets is worse for firms that have frozen their plans (CHG2), probably because plan freezes are more likely for underfunded plans[29], while the relation with growth is mixed. It is positively related to recent growth captured by growth in sales, but it is negatively related to expected future growth captured by Tobin's Q.

4.2 Corporate culture and funding status

In Table 5, Panels A and B we report the results of regressing funding status on the employee measures of ESG supplied by KLD as proxies for corporate culture. Panel A reports results when funding status is measured relative to total assets and Panel B is relative to PBO.

[29] In subsequent research we intend to examine the decision to freeze plans using CEO_QDB and other incentives as explanatory variables. The current specification treats this as an exogenous decision, which is not likely to be a good assumption.

CEO incentive variables are also included in the regressions, either QDB_TO_PENSION or the components of CEO total wealth.

In both panels, Columns 1 and 3 include the total number of strengths and total number of weaknesses reported by KLD, while columns 2 and 4 show pension strengths and weaknesses separate from other KLD strengths and weaknesses (available only until 2010).

As shown, in columns 1 and 3, when strengths and weaknesses include pension strengths and weaknesses, firms with more KLD weaknesses have DB pension plans that are more underfunded in both Panel A and B, while KLD strengths are only positively related to funding status in Panel B, when funding is measured relative to PBO. In columns 2 and 4, when pension strengths and weaknesses are included as separate variables, pension concerns are significantly related to pension underfunding suggesting the pension underfunding may be a major part of what leads to a pension concern, but pension strengths are not significantly related to funding. While other KLD non-pension concerns are significantly related to pension underfunding measured relative to total assets, they are not statistically significant in Panel B.

While the results for the KLD concerns and strengths can be considered mixed, the results for the CEO incentive variables are all similar to the results in Table 4, suggesting the CEO incentive variables are capturing something different than the KLD strengths and weaknesses. Specifically, QDB_TO_PENSION continues to be positively related to funding status after including KLD strengths and weaknesses in three of the four regressions. SERP is significantly more underfunded that QDB, other deferred compensation and equity.

4.3 The effect of financial distress on funding status

Rauh (2006) argues that the existence of financing constraints are likely to intensify the tension that exists between funding capital projects versus contributing cash to the corporate DB pension plan. Table 6, Panels A and B add distress to the funding status regressions. Funding

status to total assets is in Panel A and funding status to PBO is in Panel B.[30] In column 1 we include distress without including the CEO incentive variables and find distress is significantly related to pension underfunding measured relative to total assets, but not when funding status is measured relative to PBO.

When the components of CEO wealth are added along with distress in column 2 distress remains significant in Panel A, and again is not significant in Panel B. Model 3 interacts the distress dummy variable with the CEO incentive variables and in Model 4 it is interacted with all of the variables in the model. In general the F tests are significant, as before, CEO_SERP is more underfunded than other deferred compensation and equity. However, evidence on the significance of CEO_QDB relative to CEO_SERP is weaker and is only significant based on one-tailed tests.

4.4 Results--Asset Allocation and Expected Return

Table 7 investigates the prediction that CEO's with more SERP are willing to take on more investment risk as they oversee pension plan asset investments. Consistent with Anantharaman et al. (2014) distress is included as a control variable in the regression. The 2008 year is excluded from the sample as substantial declines in equity values during the period tended to reduce equity weights and increase the weight on bonds amongst pension plans that did not rebalance. Observations are also dropped from the sample when performing the asset allocation regressions in columns 1 - 4 of the table if they have zero service cost as the Horizon variable is based on the ratio of PBO to current service cost. This will mean that fully frozen plans that are not accruing new benefits are excluded from this analysis. The control variables behave as we might expect, distressed firms hold more bonds and less equities, consistent with a risk management strategy as evidenced in Rauh (2009). The Horizon variable, is intended to

[30] As the two measures used to indicate distress, O-Score and estimated default probability cannot be estimated for all firms the sample size is reduced by 16% when distress is included.

indicate when the work force is older. This variable is associated with less investment in equities as we might expect, however investment in bonds is not significantly different. As most of the frozen plans are excluded from these regressions due to missing service cost, CHG2 is probably capturing the year the freeze first came into effect and service costs were still positive for part of the year. CHG3, the indicator variable for when domestic plans are frozen and only foreign plans are still accruing new benefits, indicates that these firms allocate significantly more of their assets to bonds and less to equity. This will occur for two reasons, one because some foreign plans require investment in bonds to fund the pension plan the other is that when firms freeze their plan they may tend to move more assets into bonds to reduce overall risks associated with their DB pension plans. CEO's who have been with the firm for longer are associated with significantly more pension plan investment risk, with larger asset allocations to equity and less to bonds.

The CEO incentive variables do not in general indicate any significant difference in allocations to bonds and to equity between CEO's with more or less QDB relative to SERP, therefore our prediction is not supported by the data. However the F-test indicates that CEO's with a larger fraction of their wealth in SERP allocate less pension assets to bonds than do CEO's who have more of their wealth in the company's own equity. The last two columns of Table 7 attempt to use the assumed return on pension plan assets to infer the risk associated with other pension plan assets outside of investments in bonds or equities. Investments in bonds and equities are included in the regression as control variables and, as expected, more equities are associated with higher expected returns and more bonds are associated with lower expected returns. It has been suggested that firms may use the assumed expected return on assets to manage their earnings, therefore we include an earnings sensitivity variable in the regression to control for earnings management incentives. This variable has a positive sign, as predicted by

earnings management studies. In model 6 the evidence supports the prediction that CEO's with a large SERP are associated with corporate pension plans that invest in higher risk non-traditional asset classes, (i.e., asset classes other than bonds and equities), as the expected return on these other assets is higher for CEOs with more SERP relative to QDB and for CEO's with more SERP relative to equity. These higher returns suggest more risky asset allocations.

5. Conclusion

In this paper we examine a contracting mechanism that can help to alleviate potential conflicts of interest regarding the funding of employee defined benefit pension plans. Defined benefit pensions are typically offered to employees as a means of bonding valuable workers to the firm. However, firms facing competing demands for cash have an incentive to underfund their pension trust, contributing funds at the minimum allowable rate. This leaves the employees exposed if the firm were to fail, as the unfunded pension obligation becomes an unsecured liability of the firm. Therefore, underfunding the pension plan and investing the pension assets in more risky investments place additional risk on the employees who rely on the pension assets for a secure retirement. Placing more risk on the employees works against the original rationale for introducing a defined benefit pension in the first place, reducing employees' commitment to the firm. We find that when the firm's CEO has less of their own pension entitlement invested along with employees in the employee qualified defined benefit pension plan and more in SERP, the pension plan is exhibits lower funding in the sense that its assets are a smaller fraction of the pension obligation. This result is stronger if we measure funding health relative to overall firm assets, as opposed to relative to the obligation. We further show that this relation holds, independent of a CEO’s lifetime tenure with a firm, and is not a substitute for firm culture, as captured by KLD measures of employee commitment.

Dividing the CEO's wealth held within the firm into the portions that are in equity, in qualified DB pensions (QDB), in non-qualified DB pensions (SERP), and in other deferred compensation allows us to compare the relative incentives coming from each form of compensation. Prior research by Munnell et al. [2007] conjectures that CEO interests in non-qualified SERP plans is leading to a schism between employee interest and CEO interests whose retirement wealth is increasingly tied to the firms operating assets. Our results are consistent with this view. We show that CEO's with more of their company invested wealth held in the company's employee DB plan are associated with better funded employee pension plans, while CEO's with greater amounts of wealth held in SERPs are associated with more underfunded employee pension plans. An intriguing result of our analysis is the suggestion that greatest underfunding occurs when CEO's hold large SERP, as opposed to large EQUITY.

Bibliographical Notices

Amir, E., Y. Guan and D. Oswald [2010] "The Effect of Pension Accounting on Corporate Pension Asset Allocation" *Review of Accounting Studies* 15: 345-366.

Anantharaman, D, V.W. Fang and G. Gong [2011] "Are Executive Pensions and Deferred Compensation Inside Debt? Evidence from Corporate Private Loan Contracts" Working Paper Rutgers and Pennsylvania State (a recent CV indicates this is forthcoming in *Management Science*)

Anantharaman, D. and Y G Lee [2014] "Managerial risk taking incentives and corporate pension policy" *Journal of Financial Economics* 111 pp 328-351.

Asthana, S. [1999] "Determinants of Funding Strategies and Actuarial choices for Defined-Benefit Pension Plans" *Contemporary Accounting Research* Vol 16 No. 1 Spring pp 39-74

Asthana, S. C. [2009] "Participant Mix and Management of Qualified Pension Plans" *Accounting and the Public Interest* vol. 9.

Black, F. and M. Scholes [1973] "The pricing of options and corporate liabilities", *Journal of Political Economy* , Vol. 81, No. 3 , pp. 637-654

Begley, J and G A Feltham [1999] “An empirical examination of the relation between debt contracts and management incentives” *Journal of Accounting and Economics* vol.27 No 2 pp 229-259.

Bergstresser, D. M. Desai, and J. Rauh [2006] “Earnings Manipulations, Pension Assumptions and Managerial Investment Decisions.” *The Quarterly Journal of Economics* (Feb): 157-195.

Butrica, B. A, M. Iams, K E. Smith and E.J. Toder [2009] “The Disappearing Defined Benefit Pension and Its Potential Impact on Retirement Incomes of Baby Boomers” *Social Security Bulletin* Vol 69, No 3 pp 1-27.

Cadman, Brian and Linda Vincent [2010] “The Role of Defined Benefit Pension Plans in Executive Compensation” Working Paper University of Utah and Northwestern University

Campbell J, D Dhaliwal and W. Schwartz [2010] “Equity Valuation Effects of the Pension Protection Act of 2006" *Contemporary Accounting Research* Vol. 27 No 2, pp 469-536.

Chen, X., T. Yu and T Zhang [2013] "What Drives Corporate Pension Plan Contributions: Moral Hazard or Tax Benefits?" *Financial Analysts Journal* Vol. 69 No 4, pp58-72.

Chuk, E. [2012] “Economic Consequences of Mandated Accounting Disclosures: Evidence from Pension Accounting Standards” Working Paper. University of Southern California.

Cocco & Volpin [2007] "Corporate Governance of Pension Plans: The U.K. Evidence", *Financial Analysts Journal*, Vol. 63 No 1, pp. 70-83.

Compirx, J. and K Muller III [2011] “Pension Plan Accounting Estimates and the Freezing of Defined Benefit Pension Plans.” *Journal of Accounting and Economics* 51.

DBRS “Industry Study: Pension Plans: Discounting into the Danger Zone” August 2012 http://www.dbrs.com/industries/bucket/id/0/name/industry+studies/page/2

Jones, D. [2013] “Changes in the Funded Status of Retirement Plans after the Adoption of

SFAS No. 158: Economic Improvement or Balance Sheet Management? *Contemporary Accounting Research* Vol 30 No. 3 (Fall 2013) pp 1099-1132.

Lo, K and G. Fisher [2012] *Intermediate Accounting Vol 2.* Person Canad, Toronto, On.

Maynard, Micheline [2005] "United Airlines Wins right to Default on Its Employee Pension Plans" *New York Times* May 11.

Maines, L. A. [2008] "Spotlight on Pensions" *Business Horizons* 51 pp 105-111

Merton, Robert C. [1974] "On the pricing of corporate debt: the risk structure of interest rates", *Journal of Finance*, Vol 29, Issue 2, pp.449-470.

Munnell, A. H., F. Golub-Sass, M. Soto and F. Vitagliano [2007] "Why are Healthy Employers Freezing Their Pensions?" *Journal of Pension Benefits* Summer vol 14 no 4 pp 3-14.

Ohlson, J. [1980] "Financial Ratios and the Probabilistic Prediction of Bankruptcy" *Journal of Accounting Research* 18, 109-131.

Perun, P and JJ Valenti [2008] "Defined Benefit Plans: Going going gone?" Thirtieth Annual APPAM Conference, planetnow.com/metaPage/lib/Perun-ValentiFinalAppam.pdf

Purcell, Patrick [2006] "Summary of the Pension Protection Act of 2006" *CRS Report for Congress* Library of Congress. http://www.worldatwork.org/waw/adimLink?id=15322

Rauh, J [2006] "Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans" *The Journal of Finance* February pp33-71.

Rauh, J [2009] "Risk Shifting Versus Risk Management: Investment Policy in Corporate Pension Plans" *Review of Financial Studies* Vol 22 No 7, pp2688-2733.

Sundaram, R., and D. Yermack [2007] :Pay Me Later: Inside Debt and Its Role in Managerial Compensation" *Journal of Finance*, Vol. 62 No 4 pp. 1551-1588.

Waring, M. B [2012] *Pension Finance: Putting the Risks and Costs of Defined Benefit Plans Back under your Control.* John Wiley and Sons, Inc Hoboken, New Jersey.

Waring, M B and L B Siegel [2007] "Perspectives Don't Kill the Golden Goose! Saving Pension Plans" *Financial Analysts Journal* Vol 63 No 1 pp 31-45

Wei, C and D Yermack [2011] "Investor's reactions to CEO's Inside Debt Incentives" *Review*

of Accounting Studies April pp 3813-3840

Wiedman, C and D. Henderson [2011] “The transition to IFRS: Erasing Pension Losses *Ivey Business Journal*, November/December 2011

Table 1: Sample selection

Panel A: Sample of firms with defined benefit pension plans

	Sample
Number of firm-years from Compustat Pension Annual data with positive PLAN ASSETS and ABO from 2006 to 2012	8,221
Require Execucomp CEO total pension to be non-missing	(3,254)
Require CEO level defined benefit pension value from Compustat Executive Compensation Pension Benefits data from 2006 to 2012[31]	(10)
Delete firm-years with DB plan in foreign country only	(553)
Delete firm-years where the CEO's DB pension plan was previously positive, but it fell to zero in their last year of tenure	(71)
Delete firm-years with missing control variables	(283)
Final CEO_QDB Sample (759 unique firms)	4,050

[31] From Compustat Executive Compensation Pension Benefit data, we first identify the CEO for each firm year by merging with Execucomp annual data (CEOann='CEO'). CEOs have multiple pension plans. If a CEO-firm-year has total pension value non-missing (i.e., it is covered by execucomp) but defined benefit pension value is missing, we coded the CEO's defined benefit pension value as zero. In order to identify the qualified defined benefit plan, we manually read the description of each plan in the proxy statements and/or 10-K.

Panel B: Frequency of sample firms by year

Year	Number of firms	Percentage of Sample
2006	535	13.21%
2007	623	15.38%
2008	611	15.09%
2009	612	15.11%
2010	594	14.67%
2011	565	13.95%
2012	510	12.39%
Total	4,050	100%

Panel C: Frequency of the sample firms by Fama-French 12 industries

Industry	Number of firm-year observation	Percentage of total sample	Compustat Population
Consumer NonDurables	351	8.67%	4.42%
Consumer Durables	120	2.96%	2.09%
Manufacturing	794	19.60%	8.38%
Energy	171	4.22%	4.88%
Chemicals	252	6.22%	1.90%
Business Equipment	300	7.41%	15.73%
Telecom	130	3.21%	3.41%
Utilities	478	11.80%	2.97%
Wholesale, Retail, and Some Services	283	6.99%	8.09%
Health	168	4.15%	8.54%
Finance	634	15.65%	24.82%
Other	369	9.11%	14.77%
Total	4,050	100%	100%

Panel D: Variable definitions

Variable	Definition
Pension plan funding status	
ABO	accumulated benefit obligation (ABO) for employee defined benefit pension plan (we do not use this variable in any of the analysis) (Compustat: *PBACO)*
PBO	projected benefit obligation (PBO) for employee defined benefit pension plan (Compustat: *PBPRO)*
PLAN ASSETS	fair value of pension plan assets for the employee defined benefit pension plan. (Compustat: *PPLAO)*
FUNDING_STATUS TO PBO	the difference between pension plan assets and projected benefit obligation (*PBO*), deflated by PBO: (Compustat: *(PPLAO-PBPRO)/PBPRO)*
FUNDING_STATUS TO TA	the difference between pension plan assets and projected benefit obligation (*PBO*), deflated by the firm's total assets: (Compustat: *(PPLAO-PBPRO)/AT)*
Pension assumptions	
ASP_RET ON ASSETS	assumed return on pension assets (%) (Compustat: *PPROR)*
ASP_DISC RATE	pension benefits discount rate – assumed rate of return (%) (Compustat: *PBARR)*
Pension asset allocation	
%EQUITY	percentage of pension assets that is allocated to equity
%BOND	percentage of pension assets that is allocated to bonds
CEO Incentive variables	
QDB_VALUE	the present value of the CEO's accumulated benefit under the qualified defined benefit plan
QDB_VALUE_A	the present value of the CEO's accumulated benefit under the qualified defined benefit plan, excluding all firms with *QDB_VALUE = 0*
SERP_VALUE	the present value of the CEO's accumulated benefit under the supplemental executive retirement plan (SERP)
DEFER_VALUE	the CEO's year-end balance in non-pension deferred compensation plans
EQUITY_VALUE	the estimated present value of the CEO's equity ownership and stock options
WEALTH_VALUE_TOT	CEO total wealth in the firm at fiscal year end, it is equal to the present value of the CEO's qualified defined benefit pension, SERP, non-pension deferred compensation, and the present value of the CEO's equity claims
PENSION_VALUE_TOT	the CEO's present value of accumulated pension benefits from all pension plans in the firm (i.e., *QDB_VALUE + SERP_VALUE)*
CEO_QDB	the present value of the CEO's accumulated benefit under the qualified defined benefit plan, deflated by the CEO's total wealth (*QDB_VALUE/WEALTH_VALUE*)
CEO_SERP	the present value of the CEO's accumulated benefit under the supplemental executive retirement plan, deflated by the CEO's total wealth: (*SERP_VALUE/WEALTH_VALUE*)
CEO_DEFER	the CEO's non-pension deferred compensation, deflated by the CEO's total wealth: (*DEFER_VALUE/WEALTH_VALUE*)
CEO_EQUITY	the CEO's total equity claims deflated by the CEO's total wealth
QDB_TO_PENSION	the present value of the CEO's accumulated benefit under the qualified defined benefit plan, deflated by the CEO's accumulated pension benefits from all pension plans in the firm, calculated as: *QDB_VALUE/PENSION_VALUE_TOT*) when *PENSION_VALUE_TOT* is greater than zero, and zero otherwise

YRS_FIRM	logarithm of years the CEO has been with the firm, at any position, calculated as (datadate- joined_co)/365, where joined_co is the date when the CEO started to work for the company at any position
Employee relation variables (from KLD)	
EMP_STR_PENSION	retirement benefits strength, equals one if the company has a notably strong retirement benefits program, zero otherwise
EMP_CON_ PENSION	retirement benefits concern, equals one if the company has either a substantially under-funded defined benefit pension plan, or an inadequate retirement benefits program, zero otherwise
EMP_STR_NUM	total number of employee relations strengths
EMP_CON_NUM	total number of employee relations concerns
EMP_STR_NUM_O	total number of employee relations strengths other than pension strength
EMP_CON_NUM_O	total number of employee relations concerns other than pension concern
Earning Sensitivity to pension return assumptions	
SENSITIVITY	log ratio of pension assets to operating income (only available for firms with operating income greater than 0)
Control variables	
CHG1	indicator variable for changes in traditional DB pension plan, equals one for the firm-years whose traditional DB pension plan has been changed to a cash balance plan, and zero otherwise
CHG2	indicator variable for changes in traditional DB pension plan, equals one for the firm-years where all the traditional DB pension plans (both foreign and domestic) have been frozen, and zero otherwise.
CHG3	indicator variable for changes in traditional DB pension plan, equals one for the firm-years where all the *domestic* traditional DB pension plans have been frozen but foreign plans continue to operate, and zero otherwise
NEW_CEO	indicator variable that is set to one if the CEO has been CEO for 24 months or less at the end of the fiscal year, and zero otherwise.
OUTSIDER	indicator variable that is set to one during the first five years of a new outsider CEO, and zero otherwise.
NEW_OUTSIDER	indicator variable that is set to one if the CEO has been CEO for 24 months or less at the end of the fiscal year and the CEO was hired from outside of the firm, and zero otherwise.
L_TOBINQ	Tobin's *q* is the ratio of the market value of assets to book value of total assets. The market value of assets is obtained as total assets – common equity – deferred taxes + market value of equity: (Compustat: *PRCC_F×CSHO+AT-CEQ-TXDB)/AT*). This variable is lagged.
L_GROWTH	lagged percentage sales growth (Compustat: *(SALE-LagSALE)/LagSALE*) all lagged
L_SIZE	lagged logarithm of the total assets at the end of the fiscal year (Compustat: *log(AT)*)
L_LEVERAGE	lagged leverage ratio, measured as total debt (the sum of debt in current liabilities and long-term debt) to total assets (Compustat: *(DLC+DLTT)/AT*) all lagged
ROA	return on assets, defined as the ratio of income before extraordinary items to beginning total assets: (Compustat: *IB/LAG(AT)*)
L_ROA	lagged return on assets
ARR	actual return on plan assets
L_ARR	lagged actual return on plan assets
HORIZON	the investment horizon for pension assets, measured as log(PBO/Service Cost)

OSCORE	the likelihood of bankruptcy, calculated using Ohlson's (1980) model: $OSCORE = -1.32 - 0.407 \log(total\ assets) + 6.03\left(\frac{total\ liabil.}{total\ assets}\right)$ $- 1.43\left(\frac{working\ capital}{total\ assets}\right) + 0.076\left(\frac{current\ liabil.}{total\ assets}\right)$ $- 1.72(1\ if\ total\ liabilities > total\ assets, 0\ if\ otherwise)$ $- 2.37\left(\frac{net\ income}{total\ assets}\right)-1.83\left(\frac{funds\ from\ operations}{total\ liabil.}\right)$ $+ 0.285\ (1\ if\ a\ net\ loss\ for\ the\ last\ two\ years, 0\ otherwise)$ $- 0.521\ \left(\frac{net\ income_t - net\ income_{t-1}}{|net\ income_t| + |net\ income_{t-1}|}\right)$
EDF	estimated default probability for the firm within a year, obtained directly from a commercial dataset – MKMV. This measure is constructed from the market-traded stock prices based on the Vasicek-Kealhofer model (Kealhofer 2003a,b), which adapts the Black-Scholes (1973) and Merton (1974) framework
DISTRESS	indicator variable for financial distress. This variable is set equal to one if a firm is in the 5% most likely of sample firms to go bankrupt based on OSCORE or EDF, and zero otherwise

Table 2: Sample Summary Statistics

Panel A: Descriptive statistics

Variables	N	Min	Q1	Mean	Median	Q3	Max	Std dev
ABO($Mill)	4,050	1.00	156.50	2,616	461	1,758	133,599	8,239
PBO($Mill)	4,050	1.05	168.03	2,790	495	1,885	134,327	8,584
PLAN_ASSETS($Mill)	4,050	0.81	123.72	2,358	379	1,560	117,378	7,577
FUNDING_STATUS TO PBO	4,050	-0.83	-0.31	-0.19	-0.21	-0.09	1.36	0.19
FUNDING_ STATUS TO TA	4,050	-0.98	-0.05	-0.03	-0.02	0.00	0.19	0.06
ASP_RET ON ASSETS (%)	4,050	1.10	7.51	7.90	8.00	8.50	10.00	0.79
ASP_DISC RATE (%)	4,050	1.25	5.00	5.54	5.75	6.10	12.00	0.90
%EQUITY	3,226	0.00	50	57	60	66	100	15
%BOND	3,226	0.00	28	36	34	41	100	14
QDB_VALUE($000)	4,050	0.00	25	470	263	760	4,579	549
QDB_VALUE_A($000)	3,147	1.51	159	605	448	909	4,579	553
SERP_VALUE($000)	4,050	0.00	0	5,801	2,194	7,663	101,890	9,150
DEFER_VALUE($000)	4,050	0.00	0	3,492	780	3,103	245,493	9,968
EQUITY_VALUE($000)	4,050	0.00	6,716	218,748	17,072	40,023	412,673,000	7,442,850
WEALTH_VALUE_TOT ($000)	4,050	5.80	10,517	228,510	24,898	54,021	412,673,000	7,442,692
PENSION_VALUE_TOT ($000)	4,050	0.00	214	6,271	2,741	8,345	101,891	9,381
CEO_QDB	4,050	0.00	0.00	0.03	0.01	0.03	1.00	0.06
CEO_SERP	4,050	0.00	0.00	0.16	0.10	0.26	0.99	0.18
CEO_EQUITY	4,050	0.00	0.59	0.73	0.78	0.93	1.00	0.23
CEO_DEFER	4,050	0.00	0.00	0.08	0.03	0.11	1.00	0.12
QDB_TO_PENSION	4,050	0.00	0.01	0.19	0.07	0.21	1.00	0.29
YRS_FIRM (unlogged)	4,050	0.24	7.34	18.06	15.97	28.51	63.04	12.03
EMP_STR_NUM	3,892	-1	0	0.54	0	1	7	1.00
EMP_CON_NUM	3,892	-1	0	0.68	1	1	4	0.83
EMP_STR_PENSION	2,281	0	0	0.14	0	0	1	0.35
EMP_CON_ PENSION	2,281	0	0	0.38	0	1	1	0.49
SENSITIVITY	3,226	-3.95	-0.93	-0.27	-0.18	0.50	2.60	1.19
CHG1	4,050	0	0	0.23	0	0	1	0.42
CHG2	4,050	0	0	0.23	0	0	1	0.42
CHG3	4,050	0	0	0.03	0	0	1	0.18
NEW_CEO	4,050	0	0	0.20	0	0	1	0.40
OUTSIDER	4,050	0	0	0.13	0	0	1	0.34
NEW_OUTSIDER	4,050	0	0	0.05	0	0	1	0.22
L_TOBINQ	4,050	0.76	1.05	1.52	1.27	1.74	4.69	0.71
L_GROWTH	4,050	-0.42	-0.02	0.06	0.06	0.14	0.76	0.17
L_SIZE	4,050	5.10	7.54	8.71	8.56	9.75	13.56	1.67
L_TOTAL ASSETS($Mill)	4,050	165	1,886	30,582	5,193	17,078	771,462	97,502
L_LEVERAGE	4,050	0.00	0.14	0.26	0.24	0.35	0.83	0.16
ROA	4,050	-0.21	0.01	0.05	0.04	0.08	0.27	0.07
ARR	4,050	-31.50	2.45	6.02	10.17	13.54	30.10	13.51
HORIZON	2,617	2.18	3.46	4.00	3.85	4.35	7.58	0.91
OSCORE	3,379	-7.84	-2.50	-1.62	-1.58	-0.75	7.73	1.49
EDF	1,896	0.00	0.00	0.04	0.00	0.00	1.00	0.16
DISTRESS	3,414	0.00	0.00	0.07	0.00	0.00	1.00	0.25

All the variables are defined in Table 1, Panel D. All continuous variables used in regressions are winsorized at 1 percent and 99 percent to mitigate outliers. The above descriptive statistics are before winsorizing.

Panel B: Descriptive statistics by fiscal year

Variables	*FUNDING_STATUS TO TA*			*FUNDING_STATUS TO PBO*			*ASP_RET ON ASSETS*			*ASP_DISC RATE*		
	N	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
2006	535	-0.02	-0.01	535	-0.10	-0.12	535	8.19	8.25	535	5.82	5.85
2007	623	0.00	0.00	623	-0.04	-0.06	623	8.11	8.25	623	6.24	6.25
2008	611	-0.04	-0.02	611	-0.27	-0.29	611	8.06	8.23	611	6.45	6.29
2009	612	-0.04	-0.02	612	-0.23	-0.24	612	7.93	8.00	612	5.88	5.90
2010	594	-0.04	-0.02	594	-0.19	-0.21	594	7.85	8.00	594	5.40	5.42
2011	565	-0.05	-0.03	565	-0.25	-0.26	565	7.68	7.85	565	4.71	4.70
2012	510	-0.05	-0.03	510	-0.24	-0.25	510	7.44	7.69	510	3.99	4.00

Variables	*%BOND*			*%EQUITY*			*CHG1*			*CHG2*			*CHG3*		
	N	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*	*N*	*Mean*	*Median*
2006	419	29.41	29.00	419	64.99	66.00	535	0.19	0.00	535	0.17	0.00	535	0.01	0.00
2007	490	31.60	30.00	490	62.46	64.00	623	0.20	0.00	623	0.19	0.00	623	0.02	0.00
2008	469	38.39	37.00	469	54.30	56.00	611	0.21	0.00	611	0.20	0.00	611	0.03	0.00
2009	466	36.49	34.05	466	56.22	59.48	612	0.23	0.00	612	0.24	0.00	612	0.03	0.00
2010	447	36.48	35.00	447	56.18	59.00	594	0.25	0.00	594	0.27	0.00	594	0.04	0.00
2011	422	40.33	38.62	422	51.55	54.95	565	0.25	0.00	565	0.28	0.00	565	0.05	0.00
2012	373	40.13	38.00	373	51.67	54.00	510	0.26	0.00	510	0.31	0.00	510	0.06	0.00

All the variables are defined in Table 1, Panel D. All continuous variables used in regressions are winsorized at 1 percent and 99 percent to mitigate outliers.

Panel C: Pearson (above) / Spearman (below) Correlations

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
FUNDING_STATUS TO AT	1	**0.43**	**-0.12**	-0.02	**0.05**	**0.08**	-0.02	**-0.14**	**0.11**	**0.09**	0.01	**-0.08**	**-0.10**	0.01	**-0.05**	-0.02	**-0.27**	**0.15**
FUNDING_STATUS TO PBO	**0.60**	1	**0.07**	**-0.05**	**0.03**	**0.10**	-0.01	**-0.06**	**0.04**	**0.08**	**0.08**	**-0.06**	**-0.03**	0.02	**-0.04**	-0.01	**-0.10**	**0.18**
ASP_RET ON ASSETS	**-0.10**	**0.09**	1	**-0.41**	**0.35**	**-0.03**	0.02	**0.14**	**-0.11**	-0.02	0.02	**-0.10**	**-0.04**	0.00	**-0.03**	-0.02	0.02	**0.36**
%BOND	**-0.08**	**-0.10**	**-0.35**	1	**-0.75**	**-0.03**	0.02	-0.02	0.00	**-0.08**	**0.03**	**0.08**	**0.11**	0.00	**0.06**	0.02	**0.03**	**-0.13**
%EQUITY	**0.11**	**0.07**	**0.30**	**-0.70**	1	**0.05**	-0.02	**-0.04**	**0.08**	0.02	**-0.04**	**-0.03**	**-0.11**	0.01	**-0.03**	0.00	-0.03	**0.14**
QDB_TO_PENSION	**0.05**	**0.15**	**0.07**	**-0.09**	**0.07**	1	**0.36**	**-0.29**	**0.09**	**0.08**	**0.04**	**0.16**	0.00	0.00	**-0.05**	**-0.04**	**-0.04**	0.01
CEO_QDB	**-0.09**	**0.06**	**0.16**	**-0.06**	0.02	**0.72**	1	**0.17**	**-0.40**	**0.17**	0.00	**0.03**	-0.02	**0.04**	**-0.08**	**-0.04**	**0.07**	-0.01
CEO_SERP	**-0.15**	-0.01	**0.20**	**-0.03**	**-0.04**	**0.03**	**0.54**	1	**-0.81**	**0.24**	**0.04**	**-0.19**	0.01	**-0.07**	**-0.20**	**-0.14**	**0.08**	0.02
CEO_EQUITY	**0.13**	0.01	**-0.14**	0.01	**0.08**	**-0.13**	**-0.59**	**-0.78**	1	**-0.24**	**-0.07**	**0.11**	-0.01	**0.06**	**0.23**	**0.16**	**-0.09**	0.00
YRS_FIRM	**0.08**	**0.07**	-0.01	**-0.08**	0.02	**0.23**	**0.40**	**0.31**	**-0.30**	1	**-0.03**	**-0.08**	-0.02	**-0.19**	**-0.50**	**-0.31**	**-0.10**	-0.02
CHG1	**0.05**	**0.07**	0.00	**0.04**	**-0.06**	**0.11**	**0.05**	**0.07**	**-0.07**	**-0.03**	1	**0.10**	-0.01	-0.02	0.01	-0.01	**0.05**	**-0.07**
CHG2	0.00	**-0.07**	**-0.12**	**0.08**	-0.02	**0.04**	**-0.08**	**-0.26**	**0.14**	**-0.08**	**0.10**	1	**-0.07**	**-0.04**	0.02	-0.01	**0.13**	**-0.11**
CHG3	**-0.09**	-0.02	-0.02	**0.12**	**-0.09**	**-0.03**	**-0.04**	0.00	0.00	-0.02	-0.01	**-0.07**	1	0.01	0.00	0.01	0.00	**-0.07**
NEW_CEO	0.02	**0.03**	0.02	**-0.03**	0.03	-0.01	-0.01	**-0.08**	**0.07**	**-0.21**	-0.02	**-0.04**	0.01	1	**0.18**	**0.46**	**0.04**	**0.04**
OUTSIDER	**-0.05**	**-0.03**	-0.02	**0.06**	-0.02	**-0.15**	**-0.27**	**-0.25**	**0.28**	**-0.59**	0.01	0.02	0.00	**0.18**	1	**0.58**	**0.07**	0.02
NEW_OUTSIDER	-0.02	-0.01	0.00	0.02	0.01	**-0.11**	**-0.17**	**-0.17**	**0.20**	**-0.37**	-0.01	-0.01	0.01	**0.46**	**0.58**	1	**0.09**	**0.03**
DISTRESS	**-0.15**	**-0.12**	0.02	**0.04**	-0.02	**-0.10**	**-0.04**	-0.01	**-0.03**	**-0.10**	**0.05**	**0.13**	0.00	**0.04**	**0.07**	**0.09**	1	**0.07**
ASP_DISC_RATE	**0.18**	**0.20**	**0.38**	**-0.15**	**0.16**	**0.05**	**0.04**	**0.05**	-0.01	-0.02	**-0.07**	**-0.11**	**-0.07**	**0.05**	**0.03**	**0.03**	**0.08**	1

Panel C (continued): Pearson (above) / Spearman (below) Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
FUNDING_STATUS TO AT	*1*	***0.43***	***-0.12***	*-0.02*	***0.05***	***-0.05***	***-0.11***	*-0.02*	***-0.11***	***-0.40***	***-0.03***	***0.08***	***0.16***	***-0.04***	***0.06***	***0.08***	***-0.31***	***-0.27***
FUNDING_STATUS TO PBO	***0.60***	*1*	***0.07***	***-0.05***	***0.03***	***0.03***	***-0.06***	*0.00*	***-0.24***	***0.18***	***0.03***	*0.02*	***0.17***	***-0.07***	***0.05***	***0.22***	***-0.11***	***-0.10***
ASP_RET ON ASSETS	***-0.10***	***0.09***	*1*	***-0.41***	***0.35***	*0.00*	***0.17***	*0.01*	*-0.02*	***0.29***	*-0.02*	*0.00*	***0.05***	***0.07***	*0.00*	***-0.06***	***-0.06***	*0.02*
%BOND	***-0.08***	***-0.10***	***-0.35***	*1*	***-0.75***	***0.05***	***-0.04***	*0.03*	*0.02*	***-0.04***	*-0.03*	*0.00*	*0.00*	*-0.02*	*-0.02*	***-0.04***	***0.14***	***0.03***
%EQUITY	***0.11***	***0.07***	***0.30***	***-0.70***	*1*	***-0.07***	*0.01*	*0.00*	***0.06***	***-0.07***	***0.05***	*0.02*	***-0.08***	*0.01*	***0.03***	***0.06***	***-0.16***	*-0.03*
EMP_STR_NUM	***-0.05***	***0.05***	***0.06***	*0.01*	***-0.03***	*1*	***0.13***	***0.49***	***-0.07***	***0.09***	***0.03***	***0.05***	***0.33***	***0.03***	***0.04***	*0.00*	*-0.02*	*-0.01*
EMP_CON_NUM	***-0.14***	***-0.03***	***0.21***	***-0.05***	*0.01*	***0.18***	*1*	*0.02*	***0.57***	***0.09***	*-0.01*	***0.04***	***0.16***	***0.13***	***-0.03***	***-0.05***	*-0.01*	***0.06***
EMP_STR_ PENSION	*0.01*	*-0.01*	*-0.01*	*0.03*	*0.00*	***0.52***	*0.02*	*1*	***-0.07***	***-0.05***	*0.00*	*0.01*	***0.16***	*0.00*	*-0.01*	***-0.04***	***-0.05***	***0.05***
EMP_CON_PENSION	***-0.17***	***-0.26***	*-0.03*	*0.03*	***0.05***	***-0.07***	***0.61***	***-0.07***	*1*	***-0.11***	***-0.05***	***0.04***	***-0.14***	***0.05***	*-0.01*	***0.05***	*0.00*	***0.04***
SENSITIVITY	***-0.44***	***0.17***	***0.28***	***-0.04***	***-0.06***	***0.11***	***0.09***	***-0.05***	***-0.11***	*1*	***-0.13***	***-0.19***	***-0.07***	*-0.01*	***-0.20***	***0.08***	***0.30***	***0.11***
L_TOBINQ	***-0.13***	***0.06***	***0.07***	***-0.06***	***0.07***	***0.04***	***0.08***	*-0.02*	*-0.02*	***-0.08***	*1*	***0.10***	***-0.21***	***-0.05***	***0.66***	***-0.10***	***-0.12***	***-0.03***
L_GROWTH	***0.08***	*0.02*	***0.03***	*-0.03*	***0.04***	***0.06***	***0.05***	*0.03*	*0.03*	***-0.18***	***0.19***	*1*	***0.04***	*-0.02*	***0.12***	***-0.07***	***-0.11***	***-0.04***
L_SIZE	***0.22***	***0.17***	***0.04***	*-0.01*	***-0.10***	***0.34***	***0.17***	***0.15***	***-0.14***	***-0.05***	***-0.23***	*0.01*	*1*	***0.07***	***-0.13***	*0.02*	***-0.14***	***-0.11***
L_LEVERAGE	***-0.13***	***-0.08***	***0.12***	***-0.06***	*0.02*	***0.06***	***0.15***	*-0.01*	***0.07***	***0.05***	***-0.06***	***-0.04***	***0.06***	*1*	***-0.11***	*0.01*	***0.03***	***0.26***
ROA	***-0.11***	***0.05***	*0.02*	***-0.05***	***0.05***	***0.04***	***0.05***	*-0.01*	*0.00*	***-0.16***	***0.71***	***0.18***	***-0.18***	***-0.11***	*1*	***0.08***	***-0.08***	***-0.33***
ARR	***0.06***	***0.18***	*0.00*	***-0.11***	***0.13***	***0.03***	*-0.01*	*0.00*	*0.03*	***0.09***	***-0.14***	***-0.11***	***0.04***	***0.03***	*0.02*	*1*	***0.07***	***-0.17***
HORIZON	***-0.35***	***-0.10***	***-0.04***	***0.19***	***-0.21***	*-0.01*	*0.00*	***-0.06***	*0.00*	***0.36***	***-0.09***	***-0.15***	***-0.11***	***0.08***	***-0.06***	***0.06***	*1*	***0.14***
DISTRESS	***-0.15***	***-0.12***	*0.02*	***0.04***	*-0.02*	*0.01*	***0.05***	***0.05***	***0.04***	***0.10***	***-0.05***	***-0.07***	***-0.11***	***0.21***	***-0.26***	***-0.14***	***0.11***	*1*

Panel C of Table 2 reports pair-wise correlations between the variables; bolded correlations are significant at the 10% level based on two-tailed critical values. All the variables are defined in Table 1, Panel D. All continuous variables used in regressions are winsorized at 1 percent and 99 percent to mitigate outliers.

Table 4: Regression of funding status on CEO incentives

Variables	Dependent Variable:					
	FUNDING_STATUS TO TA			***FUNDING_STATUS TO PBO***		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
QDB_TO_PENSION	**0.011** **(2.043)**			**0.063*** **(3.302)**		
CEO_QDB		**0.001** **(0.051)**			**0.017** **(0.168)**	
CEO_DEFER			**-0.001** **(-0.051)**			**-0.017** **(-0.168)**
CEO_SERP		**-0.047*** **(-2.971)**	**-0.049*** **(-1.782)**		**-0.109**** **(-2.364)**	**-0.126** **(-1.237)**
CEO_EQUITY	**0.032*** **(4.469)**	**0.005** **(0.368)**	**0.003** **(0.142)**	**0.009** **(0.406)**	**-0.045** **(-1.177)**	**-0.062** **(-0.658)**
YRS_FIRM	**0.004**** **(2.399)**	**0.005*** **(2.876)**	**0.005*** **(2.876)**	**0.002** **(0.369)**	**0.006** **(0.979)**	**0.006** **(0.979)**
L-TOBINQ	-0.009** (-2.337)	-0.009** (-2.371)	-0.009** (-2.371)	0.006 (0.811)	0.005 (0.667)	0.005 (0.667)
L_GROWTH	0.012** (2.552)	0.012** (2.502)	0.012** (2.502)	-0.022 (-1.235)	-0.021 (-1.161)	-0.021 (-1.161)
L_SIZE	0.002* (1.826)	0.002 (1.479)	0.002 (1.479)	0.016*** (4.075)	0.013*** (3.448)	0.013*** (3.448)
L_LEVERAGE	0.001 (0.108)	0.001 (0.071)	0.001 (0.071)	-0.063* (-1.730)	-0.067* (-1.797)	-0.067* (-1.797)
ROA	0.063** (2.055)	0.065** (2.103)	0.065** (2.103)	0.017 (0.345)	0.026 (0.516)	0.026 (0.516)
L_ROA	0.049* (1.678)	0.046 (1.607)	0.046 (1.607)	0.144*** (2.703)	0.138*** (2.592)	0.138*** (2.592)
ARR	0.001*** (7.384)	0.001*** (7.369)	0.001*** (7.369)	0.006*** (19.446)	0.006*** (19.072)	0.006*** (19.072)
L_ARR	0.001*** (5.175)	0.001*** (5.084)	0.001*** (5.084)	0.004*** (11.557)	0.004*** (11.255)	0.004*** (11.255)
CHG1	-0.002 (-0.524)	-0.002 (-0.390)	-0.002 (-0.390)	0.024* (1.869)	0.027** (2.113)	0.027** (2.113)
CHG2	-0.012** (-2.569)	-0.013*** (-2.807)	-0.013*** (-2.807)	-0.014 (-1.147)	-0.013 (-1.068)	-0.013 (-1.068)
CHG3	-0.011 (-1.130)	-0.011 (-1.119)	-0.011 (-1.119)	0.012 (0.559)	0.014 (0.629)	0.014 (0.629)
ASP_DISC RATE	-0.002 (-0.593)	-0.001 (-0.294)	-0.001 (-0.294)	0.045*** (4.331)	0.048*** (4.640)	0.048*** (4.640)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
# of Observation	4,050	4,050	4,050	4,050	4,050	4,050
Adjusted R-square	27.70%	28.14%	28.14%	35.16%	34.74%	34.74%

Table 4 (continued)
F tests

Variables	Dependent Variable:			
	FUNDING_STATUS TO TOTAL ASSETS		***FUNDING_STATUS TO PBO***	
	Model 2	Model 3	Model 5	Model 6
CEO_QDB=CEO_SERP				
F-statistics	3.18		1.53	
p-Value	0.075		0.217	
CEO_DEFER=CEO_SERP				
F-statistics		8.83		5.59
p-Value		0.003		0.018
CEO_QDB=CEO_EQUITY				
F-statistics	0.02		0.43	
p-Value	0.887		0.511	
CEO_DEFER=CEO_EQUITY				
F-statistics		0.14		1.38
p-Value		0.713		0.240
CEO_SERP=CEO_EQUITY				
F-statistics	33.42	33.42	5.13	5.13
p-Value	0.000	0.000	0.024	0.024

Table 4 reports the results of regressing funding status (measured relative to total assets and relative to PBO) on variables predicted to determine funding status, respectively. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Table 5: Regression of funding status on CEO incentives - including KLD data
Panel A: Funding status measured relative to total assets

Variables	Dependent Variable: ***FUNDING_STATUS TO TA***			
	Model 1	Model 2	Model 3	Model 4
QDB_TO_PENSION	**0.009***	**0.005**		
	(1.934)	**(1.117)**		
CEO_DEFER			**-0.006**	**-0.023**
			(-0.199)	**(-0.571)**
CEO_SERP			**-0.052***	**-0.072***
			(-1.816)	**(-1.693)**
CEO_EQUITY	**0.036*****	**0.042*****	**0.004**	**-0.009**
	(5.439)	**(5.333)**	**(0.169)**	**(-0.235)**
EMP_CON_NUM	**-0.010*****		**-0.010*****	
	(-5.934)		**(-6.137)**	
EMP_STR_NUM	**-0.000**		**-0.000**	
	(-0.140)		**(-0.201)**	
#EMP_CON_NON-PEN		**-0.010*****		**-0.010*****
		(-3.839)		**(-3.955)**
#EMP_STR_NON-PEN		**-0.000**		**-0.000**
		(-0.114)		**(-0.154)**
EMP_CON_PENSION		**-0.014*****		**-0.014*****
		(-4.970)		**(-5.020)**
EMP_STR_PENSION		**-0.001**		**-0.001**
		(-0.172)		**(-0.327)**
YRS_FIRM	**0.004****	**0.003****	**0.005*****	**0.003****
	(2.548)	**(2.037)**	**(2.956)**	**(2.237)**
L-TOBINQ	-0.008**	-0.005**	-0.008**	-0.005**
	(-2.482)	(-2.029)	(-2.496)	(-2.002)
L_GROWTH	0.014***	0.016***	0.013***	0.015***
	(3.078)	(2.856)	(3.004)	(2.766)
L_SIZE	0.002**	0.002*	0.002**	0.002*
	(2.285)	(1.939)	(2.008)	(1.902)
L_LEVERAGE	0.000	0.001	0.000	0.001
	(0.040)	(0.104)	(0.024)	(0.118)
ROA	0.063*	0.022	0.064*	0.024
	(1.893)	(0.965)	(1.902)	(1.020)
L_ROA	-0.007	0.001	-0.009	-0.001
	(-0.353)	(0.035)	(-0.460)	(-0.042)
ARR	0.001***	0.001***	0.001***	0.001***
	(7.977)	(9.025)	(7.924)	(8.882)
L_ARR	0.001***	0.001***	0.001***	0.001***
	(5.059)	(4.435)	(5.002)	(4.319)
CHG1	-0.002	-0.002	-0.001	-0.002
	(-0.502)	(-0.662)	(-0.362)	(-0.550)
CHG2	-0.012***	-0.008**	-0.013***	-0.010**
	(-2.718)	(-2.109)	(-2.990)	(-2.422)
CHG3	-0.012	-0.005	-0.011	-0.006
	(-1.173)	(-0.718)	(-1.153)	(-0.738)
ASP_DISC RATE	-0.001	0.003	-0.000	0.004
	(-0.362)	(1.273)	(-0.052)	(1.466)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
# of Observation	3,892	2,281	3,892	2,281
Adjusted R-square	29.39%	29.57%	29.93%	30.64%

Table 5
Panel A (continued)
F tests

Variables	Dependent Variable:	
	FUNDING_STATUS TO TA	
	Model 3	Model 4
CEO_DEFER=CEO_SERP		
F-statistics	9.29	9.02
p-Value	0.002	0.003
CEO_DEFER=CEO_EQUITY		
F-statistics	0.69	1.83
p-Value	0.406	0.177
CEO_SERP=CEO_EQUITY		
F-statistics	41.25	29.03
p-Value	0.000	0.000

Table 5 reports the results of regressing funding status (measured relative to total assets) on variables predicted to determine funding status, respectively. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Table 5: Regression of funding status on CEO incentives - including KLD data
Panel B: Funding status measured relative to PBO

Variables	Dependent Variable: ***FUNDING_STATUS TO PBO***			
	Model 1	Model 2	Model 3	Model 4
QDB_TO_PENSION	**0.063*** (3.141)**	**0.077*** (3.179)**		
CEO_DEFER			**-0.037 (-0.323)**	**-0.124 (-0.824)**
CEO_SERP			**-0.142 (-1.234)**	**-0.225 (-1.472)**
CEO_EQUITY	**0.011 (0.463)**	**0.003 (0.124)**	**-0.074 (-0.691)**	**-0.157 (-1.113)**
EMP_CON_NUM	**-0.025*** (-4.864)**		**-0.025*** (-4.776)**	
EMP_STR_NUM	**0.008* (1.718)**		**0.009* (1.808)**	
#EMP_CON_NON-PEN		**0.009 (1.156)**		**0.009 (1.142)**
#EMP_STR_NON-PEN		**0.010 (1.110)**		**0.011 (1.209)**
EMP_CON_PENSION		**-0.111*** (-10.120)**		**-0.110*** (-9.966)**
EMP_STR_PENSION		**0.023 (1.294)**		**0.022 (1.240)**
YRS_FIRM	**0.003 (0.445)**	**0.001 (0.090)**	**0.006 (1.041)**	**0.004 (0.573)**
L-TOBINQ	0.004 (0.539)	-0.010 (-1.108)	0.004 (0.452)	-0.011 (-1.125)
L_GROWTH	-0.020 (-1.142)	-0.028 (-1.150)	-0.019 (-1.086)	-0.028 (-1.167)
L_SIZE	0.017*** (3.671)	0.009 (1.626)	0.014*** (3.175)	0.006 (1.150)
L_LEVERAGE	-0.067* (-1.779)	-0.082** (-2.030)	-0.070* (-1.823)	-0.088** (-2.110)
ROA	0.011 (0.200)	0.037 (0.633)	0.012 (0.224)	0.044 (0.743)
L_ROA	0.102* (1.791)	0.211*** (2.660)	0.099* (1.757)	0.209*** (2.690)
ARR	0.007*** (18.902)	0.007*** (17.898)	0.006*** (18.549)	0.007*** (17.451)
L_ARR	0.004*** (10.966)	0.006*** (8.488)	0.004*** (10.774)	0.006*** (8.293)
CHG1	0.026** (1.992)	0.017 (1.239)	0.029** (2.267)	0.021 (1.523)
CHG2	-0.014 (-1.095)	-0.020 (-1.397)	-0.013 (-1.029)	-0.018 (-1.274)
CHG3	0.014 (0.623)	-0.003 (-0.106)	0.016 (0.715)	0.000 (0.008)
ASP_DISC RATE	0.048*** (4.566)	0.054*** (5.347)	0.052*** (4.879)	0.057*** (5.688)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
# of Observation	3,892	2,281	3,892	2,281
Adjusted R-square	36.02%	44.67%	35.60%	44.11%

Table 5
Panel B (continued)
F tests

Variables	Dependent Variable:	
	FUNDING_STATUS TO PBO	
	Model 3	Model 4
CEO_DEFER=CEO_SERP		
F-statistics	4.95	2.91
p-Value	0.026	0.089
CEO_DEFER=CEO_EQUITY		
F-statistics	0.90	0.42
p-Value	0.342	0.518
CEO_SERP=CEO_EQUITY		
F-statistics	5.30	4.29
p-Value	0.022	0.039

Table 5 reports the results of regressing funding status (measured relative to PBO) on variables predicted to determine funding status, respectively. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Table 6: Regression of funding status on CEO incentives - including Distress
Panel A: Funding status measured relative to total assets

Variables	Dependent Variable: ***FUNDING_STATUS TO TA***			
	Model 1	Model 2	Model 3	Model 4
CEO_DEFER		**0.000**	**-0.014**	**-0.005**
		(0.007)	**(-0.407)**	**(-0.136)**
CEO_SERP		**-0.052**	**-0.065***	**-0.051**
		(-1.565)	**(-1.844)**	**(-1.451)**
CEO_EQUITY		**0.003**	**-0.003**	**0.007**
		(0.112)	**(-0.090)**	**(0.221)**
YRS_FIRM	**0.002**	**0.005*****	**0.005*****	**0.005*****
	(1.048)	**(2.636)**	**(2.609)**	**(2.787)**
DISTRESS	**-0.054*****	**-0.050*****	**-0.074**	**-0.475*****
	(-4.226)	**(-3.784)**	**(-1.441)**	**(-4.379)**
L-TOBINQ	-0.005	-0.006	-0.006*	-0.004
	(-1.352)	(-1.641)	(-1.670)	(-1.646)
L_GROWTH	0.021***	0.020***	0.020***	0.014***
	(3.648)	(3.360)	(3.336)	(2.717)
L_SIZE	0.000	0.001	0.001	0.000
	(0.259)	(0.499)	(0.585)	(0.164)
L_LEVERAGE	0.022	0.022	0.024	0.004
	(1.222)	(1.253)	(1.304)	(0.361)
ROA	-0.001	-0.006	-0.000	-0.019
	(-0.028)	(-0.204)	(-0.016)	(-0.801)
L_ROA	0.049*	0.046	0.044	0.041**
	(1.663)	(1.586)	(1.534)	(2.100)
ARR	0.001***	0.001***	0.001***	0.001***
	(7.323)	(7.092)	(7.131)	(7.711)
L_ARR	0.001***	0.001***	0.001***	0.001***
	(5.308)	(4.999)	(4.998)	(4.293)
CHG1	-0.002	-0.000	-0.000	0.002
	(-0.400)	(-0.091)	(-0.041)	(0.708)
CHG2	-0.011**	-0.014**	-0.014**	-0.007*
	(-2.023)	(-2.551)	(-2.554)	(-1.770)
CHG3	-0.013	-0.012	-0.012	-0.009
	(-1.193)	(-1.143)	(-1.179)	(-1.078)
ASP_DISC RATE	-0.002	-0.001	-0.001	-0.004
	(-0.629)	(-0.273)	(-0.254)	(-1.544)

*DISTRESS*CEO_DEFER*			0.094	0.056
			(1.333)	(0.882)
*DISTRESS*CEO_SERP*			0.052	-0.003
			(0.870)	(-0.051)
*DISTRESS*CEO_EQUITY*			0.009	-0.040
			(0.148)	(-0.702)
*DISTRESS*YRS_FIRM*				-0.008
				(-1.031)
*DISTRESS*L-TOBINQ*				0.002
				(0.150)
*DISTRESS*L_GROWTH*				0.028
				(0.853)
*DISTRESS*L_SIZE*				0.018**
				(2.454)
*DISTRESS*L_LEVERAGE*				0.219***
				(2.805)
*DISTRESS*ROA*				0.000
				(0.003)
*DISTRESS*L_ROA*				0.035
				(0.309)
*DISTRESS*ARR*				0.000
				(0.697)
*DISTRESS*L_ARR*				-0.000
				(-0.225)
*DISTRESS*CHG1*				-0.048*
				(-1.922)
*DISTRESS*CHG2*				-0.065***
				(-2.732)
*DISTRESS*CHG3*				-0.047*
				(-1.683)
DISTRESS ASP_DISC RATE*				0.048***
				(3.836)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
# of Observation	3,414	3,414	3,414	3,414
Adjusted R-square	27.30%	29.21%	29.50%	37.78%

Table 6
Panel A (continued)
F tests

Variables	Dependent Variable:		
	FUNDING_STATUS TO TA		
	Model 2	Model 3	Model 4
CEO_DEFER=CEO_SERP			
F-statistics	8.59	8.31	7.14
p-Value	0.004	0.004	0.008
CEO_DEFER=CEO_EQUITY			
F-statistics	0.05	0.66	0.82
p-Value	0.831	0.419	0.366
CEO_SERP=CEO_EQUITY			
F-statistics	28.18	32.60	30.35
p-Value	0.000	0.000	0.000

Table 6 reports the results of regressing funding status (measured relative to total assets) on funding status determinants. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Table 6: Regression of funding status on CEO incentives - including Distress
Panel B: Funding status measured relative to PBO

Variables	Dependent Variable: ***FUNDING_STATUS TO PBO***			
	Model 1	Model 2	Model 3	Model 4
CEO_DEFER		**-0.052**	**-0.083**	**-0.080**
		(-0.448)	**(-0.662)**	**(-0.632)**
CEO_SERP		**-0.159**	**-0.191**	**-0.188**
		(-1.394)	**(-1.554)**	**(-1.509)**
CEO_EQUITY		**-0.092**	**-0.125**	**-0.120**
		(-0.859)	**(-1.075)**	**(-1.020)**
YRS_FIRM	**0.003**	**0.005**	**0.005**	**0.007**
	(0.519)	**(0.763)**	**(0.753)**	**(1.005)**
DISTRESS	**-0.016**	**-0.012**	**-0.143**	**-0.099**
	(-1.309)	**(-0.955)**	**(-1.030)**	**(-0.591)**
L-TOBINQ	0.005	0.004	0.004	0.005
	(0.589)	(0.458)	(0.513)	(0.634)
L_GROWTH	-0.033*	-0.035**	-0.034**	-0.031*
	(-1.944)	(-2.024)	(-1.987)	(-1.759)
L_SIZE	0.013***	0.014***	0.014***	0.014***
	(3.031)	(3.108)	(3.146)	(3.083)
L_LEVERAGE	-0.052	-0.051	-0.052	-0.056
	(-1.247)	(-1.242)	(-1.258)	(-1.319)
ROA	0.023	0.026	0.019	-0.011
	(0.461)	(0.504)	(0.370)	(-0.185)
L_ROA	0.142***	0.142***	0.142***	0.146**
	(2.602)	(2.662)	(2.650)	(2.455)
ARR	0.006***	0.006***	0.006***	0.006***
	(18.846)	(18.667)	(18.662)	(18.010)
L_ARR	0.004***	0.004***	0.004***	0.004***
	(11.866)	(11.671)	(11.779)	(11.682)
CHG1	0.023*	0.024*	0.024*	0.025*
	(1.692)	(1.727)	(1.747)	(1.779)
CHG2	-0.008	-0.013	-0.012	-0.011
	(-0.595)	(-0.950)	(-0.932)	(-0.827)
CHG3	0.011	0.012	0.012	0.010
	(0.453)	(0.494)	(0.502)	(0.390)
ASP_DISC RATE	0.041***	0.043***	0.043***	0.041***
	(3.869)	(4.003)	(4.004)	(3.807)

*DISTRESS*CEO_DEFER*			0.112	0.091
			(0.772)	(0.655)
*DISTRESS*CEO_SERP*			0.124	0.101
			(0.834)	(0.746)
*DISTRESS*CEO_EQUITY*			0.142	0.077
			(1.006)	(0.571)
*DISTRESS*YRS_FIRM*				-0.027**
				(-1.994)
*DISTRESS*L-TOBINQ*				-0.002
				(-0.104)
*DISTRESS*L_GROWTH*				-0.009
				(-0.190)
*DISTRESS*L_SIZE*				-0.005
				(-0.629)
*DISTRESS*L_LEVERAGE*				0.055
				(0.830)
*DISTRESS*ROA*				0.113
				(0.906)
*DISTRESS*L_ROA*				-0.002
				(-0.014)
*DISTRESS*ARR*				-0.000
				(-0.432)
*DISTRESS*L_ARR*				-0.001
				(-1.299)
*DISTRESS*CHG1*				-0.026
				(-0.957)
*DISTRESS*CHG2*				-0.009
				(-0.415)
*DISTRESS*CHG3*				0.022
				(0.578)
DISTRESS ASP_DISC RATE*				0.018*
				(1.717)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
# of Observation	3,414	3,414	3,414	3,414
Adjusted R-square	32.43%	32.85%	32.83%	32.81%

Table 6
Panel B (continued)
F tests

Variables	Dependent Variable:		
	FUNDING_STATUS TO PBO		
	Model 2	Model 3	Model 4
CEO_DEFER=CEO_SERP			
F-statistics	4.34	3.89	3.83
p-Value	0.038	0.049	0.051
CEO_DEFER=CEO_EQUITY			
F-statistics	0.90	0.93	0.84
p-Value	0.343	0.335	0.361
CEO_SERP=CEO_EQUITY			
F-statistics	4.62	3.77	3.86
p-Value	0.032	0.053	0.050

Table 6 reports the results of regressing funding status (measured relative to PBO) on funding status determinants. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Table 7: Pension Plan Asset Allocations to Bonds and Equity and Expected Return on Assets

Variables	Dependent Variable:					
	%BOND		***%EQUITY***		***ASP_RET ON ASSETS (%)***	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
QDB_TO_PENSION	**-1.638**		**1.480**		**-0.044**	
	(-0.793)		**(0.755)**		**(-0.580)**	
CEO_DEFER		**-5.545**		**0.455**		**0.375**
		(-0.444)		**(0.038)**		**(1.005)**
CEO_SERP		**-9.306**		**1.071**		**0.668***
		(-0.747)		**(0.089)**		**(1.920)**
CEO_EQUITY	**2.918**	**-4.543**	**1.483**	**2.493**	**-0.123**	**0.383**
	(1.253)	**(-0.387)**	**(0.630)**	**(0.223)**	**(-1.207)**	**(1.159)**
DISTRESS	**3.800****	**3.843****	**-4.273****	**-4.320****	**-0.059**	**-0.060**
	(2.132)	**(2.131)**	**(-2.184)**	**(-2.180)**	**(-1.037)**	**(-1.074)**
YRS_FIRM	**-1.318****	**-1.399*****	**1.063****	**1.133****	**-0.013**	**-0.015**
	(-2.482)	**(-2.634)**	**(1.992)**	**(2.094)**	**(-0.523)**	**(-0.618)**
ARR	-0.081	-0.077	0.115**	0.114*	-0.002	-0.002
	(-1.328)	(-1.270)	(1.971)	(1.957)	(-1.292)	(-1.326)
L_ARR	0.058	0.058	-0.070	-0.070	-0.002	-0.002
	(1.240)	(1.236)	(-1.486)	(-1.481)	(-1.249)	(-1.213)
FUNDING_STATUS TO TA	6.675	4.816	-1.900	-1.286		
	(0.497)	(0.372)	(-0.132)	(-0.090)		
FUNDING_STATUS TO TA^2	-20.002	-22.479	26.124	26.933		
	(-0.718)	(-0.831)	(0.928)	(0.961)		
HORIZON	0.563	0.591	-1.724***	-1.765***		
	(0.763)	(0.797)	(-2.613)	(-2.651)		
LEVERAGE	-2.533	-2.251	3.645	3.492		
	(-0.662)	(-0.580)	(0.944)	(0.896)		
SIZE	0.342	0.470	-1.421***	-1.493***		
	(0.798)	(1.147)	(-3.335)	(-3.589)		
CHG1	-0.086	-0.224	0.160	0.249	0.041	0.043
	(-0.079)	(-0.207)	(0.152)	(0.239)	(0.886)	(0.911)
CHG2	2.291	1.956	-0.684	-0.487	-0.031	-0.019
	(1.555)	(1.343)	(-0.477)	(-0.345)	(-0.646)	(-0.409)
CHG3	8.663***	8.662***	-7.288**	-7.257**	0.175	0.174
	(2.912)	(2.941)	(-2.364)	(-2.370)	(1.454)	(1.457)
SENSITIVITY					0.153***	0.150***
					(5.924)	(5.864)
%EQUITY					0.004*	0.004*
					(1.808)	(1.864)
%BOND					-0.016***	-0.016***
					(-7.084)	(-7.280)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
# of Observation	2,617	2,617	2,617	2,617	3,226	3,226
Adjusted R-square	14.99%	15.01%	20.83%	20.74%	37.65%	37.87%

Table 7 (continued)
F tests

Variables	Dependent Variable:		
	%EQUITY	***%BOND***	***ASP_RET ON ASSETS (%)***
	Model 2	Model 4	Model 6
CEO_DEFER=CEO_SERP			
F-statistics	0.79	0.02	2.16
p-Value	0.374	0.882	0.142
CEO_DEFER=CEO_EQUITY			
F-statistics	0.08	0.37	0.00
p-Value	0.772	0.546	0.964
CEO_SERP=CEO_EQUITY			
F-statistics	3.00	0.23	5.98
p-Value	0.084	0.633	0.015

Table 7 reports the results of regressing pension plan asset allocations to bonds and equity and the assumed expected return on pension plan assets on expected determinants. P-values , based on two-tailed tests, are reported in the brackets below the coefficient estimates. ***, **, * indicate statistical significance at the 1%, 5%, 10% level, respectively. All the variables are defined in Table 1, Panel D. All continuous variables are winsorized at 1% and 99% to mitigate outliers.

Figure 1: Mean funding status by year (from 2006 to 2012)

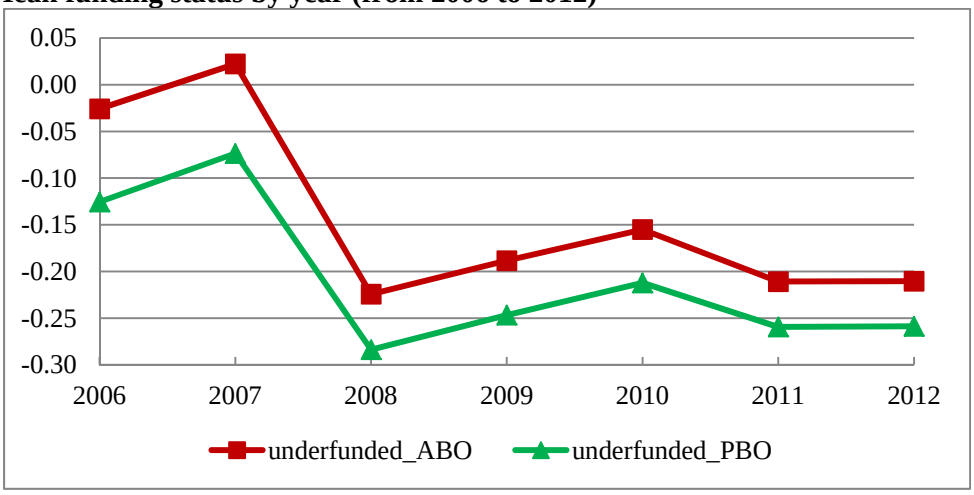

Figure 2: Median funding status by year (from 2006 to 2012)

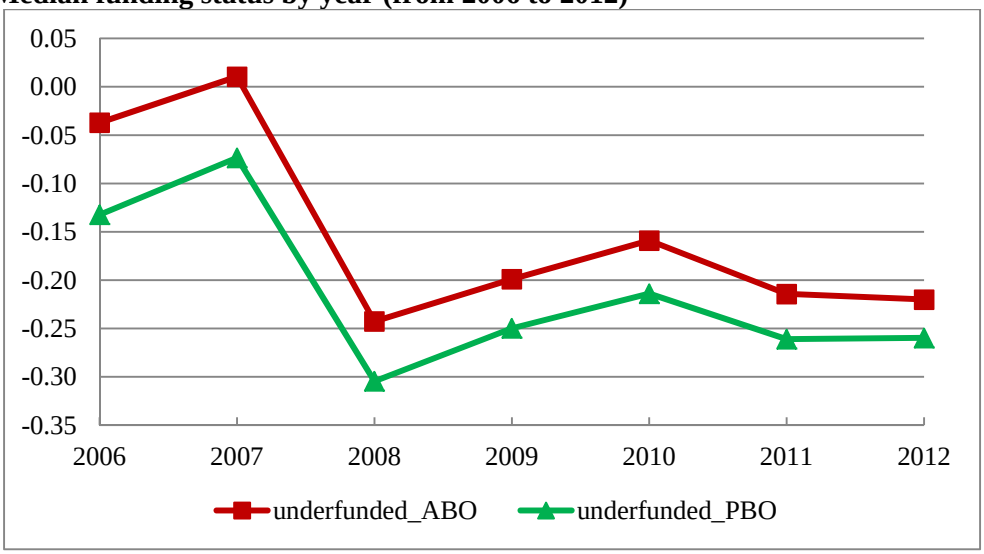

Figure 3: Percentage of underfunded firms by fiscal year (from 2006 to 2012)