PAY ME NOW (AND LATER): BONUS BOOSTS BEFORE PENSION FREEZES AND EXECUTIVE DEPARTURES

Irina Stefanescu

Federal Reserve Board

Kangzhen Xie

University of Arkansas

Jun Yang*

Indiana University

December 1, 2014

*Corresponding author, phone number: 812-855-3395. Irina Stefanescu is at the Federal Reserve Board. Email: irina.stefanescu@frb.gov. Kangzhen Xie is at the University of Arkansas. Email: kxie@walton.uark.edu. Jun Yang is at Indiana University. Email: jy4@indiana.edu. We thank Alex Borisov, Phil Dybvig, Andrew Ellul, Michael Faulkender, Yufeng Han, Craig Holden, Stacey Jacobsen, Jun Liu, Ron Masulis, Adam Usman, Fei Xie, and Jin Xu; seminar participants at Indiana University, Nangjing University, Southwest University of Economic and Finance, and Southwest Finance Symposium (Tulsa) for their useful comments; and Nicholas Huisman and Zhenzi Zhao for their excellent research assistance. We thank Hannah Bolte and Kurt von Tish for their editorial help. The views expressed in this paper are those of the authors and do not reflect the views of the Board of Governors of the Federal Reserve System or its staff members.

PAY ME NOW (AND LATER): BONUS BOOSTS BEFORE PENSION FREEZES AND EXECUTIVE DEPARTURES

ABSTRACT

We show that large public companies in the United States change the assumptions of the pension benefit formulas for their top executives in anticipation of defined benefit plan freezes and before executive retirements. In particular, top executives receive larger annual bonuses (an input of the pension benefit formula) before these events. Our findings are not driven by performance or other known determinants of annual bonuses and are not mirrored by increases in equity awards (which do not affect pension benefits). We document yet another mechanism through which top executives capture wealth at the expense of shareholders and regular employees.

JEL classification: G31; G32; G34; M40

Key Words: Defined benefit pension plans; SERP; Pension freeze; Executive bonuses

1. INTRODUCTION

The observed levels of executive compensation at large public companies in the United States, and especially the generous bonuses awarded to top executives before and during the Great Recession, have caused a heated debate in the media and among scholars and policy makers.[1] As a result, starting in January of 2011, non-binding shareholders' votes on executive compensation have been mandated for all public companies listed in the United States. Shareholders are given more "say on pay." For such monitoring to work, it is crucial for shareholders to be fully informed about the dimensions of executive pay packages. Most of the literature on executive compensation has focused on the components of annual direct compensation, such as restricted stock and stock options (Jensen and Murphy, 1990; Yermack, 1995). Recently, however, scholars have begun to examine less visible components of executive pay packages, such as executive pensions (Sundaram and Yermack, 2007).[2]

Because pension benefit payments only start at retirement, executive pensions had been mostly hidden from investors before December, 2006, when the Securities Exchange Commission (SEC) required U.S. public companies to disclose changes in the value of pension benefits for named executive officers (NEOs) in their proxy filings.[3] The new disclosures revealed that executive compensation in the form of accumulated pension benefits is comparable

[1] For example, Murphy (2002), Murphy and Zabojnik (2004); Oyer (2004); Gabaix and Landier (2008); Edmans, Gabaix, and Landier (2009); Core and Guay (2010); Kaplan and Rauh (2010); Baranchuk, MacDonald, and Yang (2011); and Subramanian (2013) argue that the scarcity of managerial talent and increasing importance of managerial skills largely explain observed changes in the level and dispersion of CEO pay. On the other hand, Bertrand and Mullainathan (2001); Bebchuk and Fried (2004); and Morse, Nanda, and Seru (2011) argue that CEO entrenchment and ineffective board monitoring are the causes of increased CEO pay.

[2] See, for example, Rau and Xu (2013) and Goldman and Huang (2014) on severance agreements and Xu and Yang (2014) on signing bonuses.

[3] Sundaram and Yermack (2007) were the first to estimate the actuarial value of CEO pensions and showed that pensions constituted a significant part of the CEO compensation packages. As of 2013 the change in pension value was still not included in the calculation of total direct compensation (*TDC1*), even though Execucomp lists it as a component in the definition of total direct compensation.

to base salary, and it is often substantially larger for long-tenured executives.[4] This paper examines the feedback effect of pension-related decisions on the awards of annual bonuses, a determinant of the pension benefit calculation. In particular, it provides evidence that firms award bigger annual bonuses to top executives to increase the value of their pension benefits in anticipation of a pension freeze and executive retirement.

In a defined benefit (DB) pension plan, the sponsoring company pays its executive a fixed amount of annual pension benefit starting at the executive's retirement.[5] The amount of the annual benefit of a DB plan is calculated as the product of three factors based on services and pay: the number of service years, covered compensation (i.e., base salary and, almost always, annual bonuses, averaged over the final three or five years of the employee's tenure), and a benefit factor (typically between 1.5% and 2%) that may jump at critical service years. Suppose, for example, the benefit factor is 2%, the executive has accumulated 25 years of services, and the covered compensation is $1 million. The executive's annual pension benefit is $0.5 million (= 0.02*25*1). The number of service years increases with an executive's tenure, as does the covered compensation in general. By construction, then, the rate of pension growth accelerates with executive tenure.

DB plans for top executives typically consist of two parts: regular qualified plans that are tax deductible but can only cover annual benefits up to the limit imposed by the IRS (e.g., $195,000 in 2011), and supplemental executive retirement plans (SERPs) that cover the

[4] Execucomp includes total pension value (*PENSION_VALUE_TOT*) starting in December, 2006. We calculate the ratio of the change in total pension value to base salary for NEOs of S&P 500 firms that had DB plans at some point between 1999 and 2010. The restricted sample covers the period of 2006–2010. Out of 5,692 non-missing observations of increases in pension value, 19.99% are zero (likely due to pension freezes) and 7.1% are negative (one third of which are due to a lump sum payment at retirement, and the remaining are due to an increased discount rate or reduced compensation). Leaving out zero and negative observations (winsorized at the 1st and 99th percentiles), the mean and median values of the pension change to salary ratio are 1.067 and 0.664, respectively, for all NEOs and 1.44 and 1.132, respectively, for CEOs. Keeping all observations, the mean and median values of the ratio are 0.666 and 0.317, respectively, for all NEOs and 1.036 and 0.581, respectively, for CEOs.

[5] Some firms give their executives an option to take a lump sum payment at retirement.

remaining pension benefits.[6] For top executives of large U.S. companies, pension benefits under SERPs are typically multiples of those under the regular qualified plans. For many years, firms have expressed concerns about both the volatility of pension assets and liabilities in their DB plans, and the pressure exerted on firm earnings by mandatory contributions to DB plans. Many sponsors have recently frozen their DB plans. When a firm freezes its regular pension plan, the SERPs are often frozen at the same time. When this happens, the number of service years and the level of covered compensation stop growing (the so-called *hard freeze*). As a result, earned pension benefits stay at the frozen level for the remaining tenure of the executive, as do those of rank-and-file employees. When considering a pension freeze, top executives may therefore have an incentive to inflate the determinants of their pension benefits in order to offset the loss of the expected benefit growth.

There are three ways to boost pension benefits: crediting multiple years of service, increasing base salary, and boosting annual bonuses prior to the freeze. For example, Goodyear Tire & Rubber Company awarded its CEO, Mr. Keegan, and an annual bonus of $12.3 million in 2007, the year before the company froze its DB plans. Mr. Keegan also received a service credit of 2.5 years for pension purposes for each year he was employed.[7] Leapfrogging the number of service years prior to a pension freeze is easily detectable, and increasing base salary by more

[6] Contributions made to SERPs are not tax deductible. As a result, SERPs are typically unfunded and, in most cases, do not need to comply with the requirements of the Employee Retirement Income Security Act (ERISA). Nevertheless, pension disbursements are deductible for the sponsor when these benefits are paid.

[7] Robert Keegan joined Goodyear in October, 2000 and had credited 23.8 years of services as of fiscal year 2007. Mr. Keegan received annual bonuses of $10.44 million in 2006, $12.3 million in 2007, and $4.6 million in 2008. "Retirement benefits, including those provided through a SERP, are a critical component of an executive's overall compensation program and are essential to attracting, motivating and retaining talented executives with a history of leadership. Also, retirement benefits are an important factor in an executive's decision to accept or reject a new position. For example, when an executive is recruited to Goodyear, he or she is not able to apply their years of service at their former employer to the Company's Salaried Pension Plan." Source: the proxy statement of Goodyear filed in 2007 at http://www.sec.gov/Archives/edgar/data/42582/000095015207001972/l23581adef14a.htm#126.

than inflation is difficult to justify.[8] Thus, boosting annual bonuses remains the most useful way to inflate the level of to-be-frozen pension benefits. This study examines whether the practice of boosting annual bonuses before important pension-related events, such as anticipated pension freezes, is pervasive.

Detecting surges in executive annual bonuses that are intended to increase pension benefits is not an easy task. Bigger executive bonuses awarded prior to pension freezes do not necessarily imply strategic bonus awards, because annual bonus payouts are influenced by many other factors, including performance. Thus, even though firms that freeze their DB plans are rarely strong performers, we need to control for various factors that are shown to be informative in determining the level of annual bonuses. Specifically, we include in our bonus regressions various performance measures, complexity and risk measures, salary payment (because target bonuses are often expressed as multiples of base salary), a CEO indicator, and year-fixed effects. We further include industry- and firm-fixed effects in alternate specifications. We find that on average top executives received boosts in annual bonuses of 20–27% in the year before a DB plan freeze.

Because it takes time and effort to enact pension freezes (e.g., to negotiate with unions), and also because cash compensation in the final three or five years affects pension benefits, annual bonuses may have been increased starting a few years prior to the freeze. We next examine the level of bonuses over a period of six years around a pension freeze: three years prior to, the year of, and two years after the freeze event. Under a horse-race specification with six indicators for timing, we find boosts in annual bonuses of 16–27% two years prior to, 29–46%

[8] The CEO of Delta Air Lines Inc., Leo Mullin, received an additional 22 years of service credit in 2002, when he had been employed by the company for only five years and eight months. The company replaced its DB plans with a cash balance plan later that year. Source: Janice Ravell, http://www.globalaging.org/pension/us/private/deltapension.htm.

one year prior to, and 31–45% in the year of the pension freeze. We do not find bonus boosts in three years before, one year after, or two years after the freeze event.

One may be concerned that omitted variables affecting both the bonus award and the pension freeze decision are not adequately captured by our control variables in the bonus regression. However, note that the main reason given by firms for freezing their DB plans is to alleviate the pressure on earnings caused by contributions to DB plans. As poorly performing firms are freezing their pension plans, executives at those firms are expected to receive smaller rather than larger annual bonuses. Thus, omitted performance-related variables are biased against us finding a positive correlation between bonus awards and the upcoming pension freezes.

Moreover, our results are obtained after controlling for firm-fixed effects that take into account time-invariant, firm-specific factors that may affect both the level of annual bonuses and the pension freeze decision itself. Furthermore, our results retain in executive-fixed effects specifications (Graham, Li, and Qiu, 2012).[9] Recognizing that firm- and executive-fixed effects may be insufficient to address the concern of omitted variables if those factors vary over time, we conduct two sets of additional tests and find similar results for both.

First, we use the propensity score matching (PSM) approach to construct a matched sample based on the likelihood of a pension freeze. Using this restricted sample, we examine the effect of an actual pension freeze on the level of annual bonuses prior to the freeze event. To create the matched sample, we first predict the probability of a pension freeze using firm size, performance, leverage, growth, cash flow volatility, an indicator for the underfunded status of pension plans, and pension liabilities as a fraction of the firm's total assets, all measured during the year prior to the freeze. All variables have been shown to be important drivers in the decision

[9] For the subsample of firms that froze their DB plans between 1999 and 2010, the coefficient estimate of the freeze dummy is 0.238 and statistically significant at the 5% level in a specification including executive-fixed effects.

to freeze DB plans.[10] We also include year- and industry-fixed effects. In the second stage, we use the matched sample to examine whether there are differences in executive bonuses between firms with and without pension freezes that cannot be attributed to other economic determinants of bonuses. We find on average a boost in annual bonuses of 21.8% in the year prior to the pension freeze.

Next, we contrast equity awards with bonus awards prior to a pension freeze. For determining the level of pension benefits of DB plans, covered earnings always include base salary and almost always include annual bonuses (94% of DB plans). In contrast, restricted stock awards are relevant for only 4% of the DB plans, as are long-term incentive plans (Sundaram and Yermack, 2007). This institutional difference enables us to contrast the incentive to boost bonus awards with the lack of incentive to boost equity awards prior to a pension freeze. Even though firms may have other reasons to increase equity awards, since equity awards are typically much bigger than bonus awards (50–70% vs. 15–20% of total annual pay), we do not expect to and do not find any boosts in equity awards before pension freezes.

An alternative hypothesis for the observed bonus boosts prior to pension freezes is that struggling firms award bigger annual bonuses to their top executives to provide them with strong incentives to improve performance. For this argument to be meaningful, the incentive effect has to differ across firms that boost their executives' bonuses prior to pension freezes and firms that do not, *ceteris paribus* (i.e., among poorly performing firms). More directly, we test the effect of bonus boosts prior to pension freezes on future accounting and stock performance. Using the empirical specifications of Core, Holthausen, and Larcker (1999), we find no evidence that firms that award excessive bonuses prior to pension freezes experience better subsequent return on

[10] See, for example, Petersen (1994); Munnell and Soto (2007); Beaudoin, Chandar, and Werner (2014); and Choy, Lin, and Officer (2014).

assets (ROA) or stock returns than firms that do not. Overall, we interpret the observed boosts in executive annual bonuses before pension freezes as a symptom of an agency problem that is prevalent in many firms.

Moreover, we examine potential channels of bonus boosts in anticipation of pension freezes and executive departures. Firms could set higher target amounts of bonus payouts *ex ante* or manipulate performance outcomes *ex post* to award bigger bonuses (Kim and Yang, 2014). We find greater target payout amounts before pension freezes, but no greater discretionary accruals, calculated using the Jones Model or modified Jones Model.

As amply documented in the media, anticipated pension freezes are not the only type of events triggering opportunistic awards of annual bonuses to top executives. Executive departures, especially planned retirements, also motivate executives to boost their annual bonuses.[11] An increase in annual bonuses not only provides an executive with more cash that year, but also increases the pension benefits that the executive will receive each year after retirement (or equivalently, as a lump sum payment). We next examine whether firms increase annual bonuses before executive departures. We find greater bonus payouts in the year prior to the departure for those executives who are approaching or exceeding the typical retirement ages (60, 62, 64, and 64–66). Moreover, among departing CEOs (departure reasons are categorized by Execucomp as *retired*, *resigned*, *unknown*, and *deceased*) only *retired* ones, who have the opportunity and power to influence their pay setting, receive boosts in annual bonuses prior to their departures. In contrast, we do not find increases of equity awards prior to CEO retirements.

[11] "One of Exxon Mobil's two supplemental pension plans for executives uses the three highest bonuses in the five years prior to retirement to calculate the executive's pension. As a result, a $US4m bonus to chief executive Rex Tillerson in 2008 helped push the total value of his pension to $US31m from $US23m." Source: Ellen E. Schultz and Tom McGinty, "Pensions for Executives on Rise." WSJ, November 3, 2009.

Our paper is the first to provide empirical evidence that a significant number of firms give favorable treatment to the bonus awards and pension benefits of top executives prior to pension freezes and executive departures. Strategic bonus boosts before pension-related events suggest self-dealing behavior by managers and a potential violation of fiduciary duty by the boards of directors. Large annual bonuses can have a multiplicative effect on executive pension value, reduce firm earnings, and ultimately decrease shareholders' wealth. Regular employees do not receive such favorable treatments, as Rauh, Stefanescu, and Zeldes (2014) show that pension freezes generate significant cost savings for the sponsoring firm—about 2.5% of total payroll per year. Our study is therefore connected to the literature on problematic compensation practices such as stock option backdating (Lie, 2005; Lie and Heron, 2007), large special cash payments to target CEOs in mergers and acquisitions (Hartzell, Ofek, and Yermack, 2004), and biased selection of compensation peer groups (Faulkender and Yang, 2010; Bizjak, Lemmon, and Ngyuen, 2011). Much like how backdating is "cheating the corporation in order to give the CEO more money than was authorized," boosting pension benefits prior to pension freezes transfers wealth from shareholders and regular employees to top executives.[12]

Our paper contributes to the literature of executive compensation by documenting the inter-relationship between executive pensions and annual bonuses, two compensation components that have largely been examined separately. While the literature on annual bonuses has been developing for 30 years (Murphy 1985; Gaver and Gaver, 1998; Jensen and Murphy, 2011; Kim and Yang, 2012), examinations of executive pensions are only a recent phenomenon. Sundaram and Yermack (2007) were the first to point out the link between the cash component

[12] Source: Coffee (2006), "Is Backdating the New Corporate Scandal?" Associated Press, June 2006.

of compensation and the pension value.[13] While Sundaram and Yermack focus on the effect of CEO pensions on risk-taking and retirement decisions, we examine the feedback effect of pension freezes on executive bonuses.[14]

The remainder of the paper is organized as follows. Section 2 presents the empirical strategy of our tests. Section 3 describes data and summary statistics. Section 4 presents empirical results on bonus boosts prior to pension freezes. Section 5 examines the effect of corporate governance and alternative explanations for the observed bonus boosts. Section 6 looks at potential channels of bonus enhancement. Section 7 presents the results on bonus boosts prior to executive departures. Section 8 concludes.

2. EMPIRICAL STRATEGY

Our main tests focus on the relationship between executive bonus payouts and impending pension freezes or executive departures. Sundaram and Yermack (2007) show that the annual pension entitlement depends on three factors: the executive's number of years of service, base salary and cash bonuses for the final three or five years, and a benefit factor. While a change in the benefit factor or the number of service years can be easily spotted and difficult to justify, detecting manipulations of annual bonuses is more challenging because bonuses are affected by various other factors, such as size, accounting and stock performance, growth, leverage, and volatility.

[13] While Cadman and Vincent (2014) show a positive correlation between DB pension benefits and excess annual compensation for CEOs, Gerakos (2010b) finds that an additional dollar of pension benefits is associated with a 48 cent decrease in pay. Gerakos (2010a) argues that the variation in pension levels is more likely due to optimal contracting than rent seeking.

[14] Our research also contributes to the literature examining the impact of DB plans on corporate decisions. For example, Bergstresser, Desai, and Rauh (2006) show that management can manipulate pension assumptions before large and anticipated corporate events (e.g., mergers and acquisitions and earnings' announcements). Rauh (2006) shows pensions affect investment decisions. Shivdasani and Stefanescu (2010) show that pension liabilities have an impact on balance sheet leverage.

We first use pension freeze events to test whether firms increase annual bonuses prior to such events in order to elevate executive pension benefits. Most firms freeze their DB plans to save on costs.[15] While outsiders do not fully anticipate such freeze events, the management team prepares and works on them well in advance, as this particular corporate resolution is often negotiated with the employees, retirees, and their unions. It is precisely the anticipation of a successful implementation that motivates executives to change pension assumptions right before the freeze event takes place.

Our baseline specification focuses on executive annual bonuses before a pension freeze:

$$Bonus_{ijt} = \alpha + \beta \times Pre\ Freeze(1)_i + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}, \quad (1)$$

where subscript *i* refers to the firm, subscript *j* refers to the executive, and subscript *t* refers to the time in years. We use the (anticipated) freeze event occurring one year ahead, *Pre Freeze(1)*, as our main test event.

Our specification includes various control variables that are commonly known to have an impact on annual bonuses. For instance, we include *Salary*, because target bonuses are typically expressed as multiples of base salaries (Kim and Yang, 2012). Following the literature on executive compensation (Core, Holthausen, and Larcker, 1999), we control for firm size (lagged *Sales*) and performance (lagged and current *ROA* and stock *Return*), which are expected to be positively correlated with executive annual bonuses. We then add two dummy variables related to recent income levels: *Negative Income* and *Income Increase* (Gaver and Gaver, 1998; Jackson, Lopez, and Reitenga, 2008). Furthermore, we include the market-to-book ratio of equity (*M/B*), *Leverage*, and stock *Return Volatility* as control variables. We also include an indicator for the

[15] Rauh, Stefanescu, and Zeldes (2014) show that freezing the DB plan generates considerable savings for the firm even after accounting for contribution increases put into defined contribution plans. In addition, Munnell and Soto (2007) find that DB plans are more likely to be frozen when credit balances are high relative to income, legacy costs are substantial, and funding ratios are low.

CEO, because CEOs have greater responsibility and receive bigger bonuses than other NEOs in general. All our specifications include year-fixed effects, as firms are more likely to grant bigger bonuses during economic booms. We further include industry- and firm-fixed effects in alternate specifications to control for unobserved industry and firm characteristics, respectively, that may affect executive bonuses.

3. DATA AND SUMMARY STATISTICS

3.1 Data

We retrieve financial data from Compustat, stock return data from the Center for Research in Security Prices (CRSP), and executive compensation data from the Standard & Poor's Execucomp database. Execucomp contains various compensation components for the NEOs of all current and past S&P 1500 index component firms. The annual compensation table includes detailed information on base salary, annual bonuses, restricted stock, stock options, and other incentive payments. Following the enhanced disclosure requirements of the SEC (Final rules 33-8732a, enacted on August 29, 2006), firms have reported the target amount of the annual bonus in the Grants of Plan-Based Awards Table and the pension benefit earned that year in the Pension Benefits Table starting in 2006.

We identify DB plan freezes from IRS Form 5500, which are filed by all sponsors at the plan level. The form includes detailed financial information about the plan and its funding status. In particular, the form identifies all plans that are frozen in any given year. The check box in the filling refers to *hard freezes* only and does not allow us to identify more subtle plan-level freezes, such as *soft* (i.e., *partial*) freezes. Hard freezes entail a complete stop of pension accruals. In contrast, soft freezes typically involve a slowdown in the growth of plan level liabilities or the closure of the plan to new participants. Reporting hard freezes became

mandatory in 2002. We then search Factiva and find 14 pension freeze cases between 1999 and 2002. Our data collection ends in 2010. The relatively small number of freezes in the later years of our sample does not necessarily reflect a slowdown in the freeze activity. It could be (at least partially) driven by the sluggishness with which the freeze event was reported in Form 5500, as we find that in many instances a freeze was reported several years later.

3.2 Summary Statistics

For the period of 1999–2010, the annual compensation table covers 2,771 unique firms, of which 1,301 offer DB plans to their employees. We require non-missing data for the variables used in our regression analysis, including base salary, annual bonuses, equity awards, sales, return on assets, stock return, net income, market-to-book ratio, leverage, return volatility, and a CEO indictor. This reduces our sample to 1,224 firms with 15,116 executives and 65,314 observations. During the period of 1999–2010, 213 of these firms froze their DB plans. Figure 1 depicts the annual distribution of these freeze events.

Table 1 reports the summary statistics on key variables for firms that reported DB plan assets and liabilities at least once over our sample period. We compare executive annual bonuses, equity, base salary, and various firm characteristics of those firms that froze their pension plans in the year prior to the freeze with those of other firm-years. In the year prior to a pension freeze, firms tend to have lower ROA, stock returns, and market-to-book ratio; negative net income and no income increases; and more volatile stock returns. This suggests that firms that freeze their pension plans have difficulties in meeting their pension funding requirements. Given the observed poor performance, top executives at those firms are not expected to receive high compensation. However, we find that bonus payouts, equity awards, and salary payments are all significantly higher in the year before a pension freeze. For example, the t-test shows that

executives receive on average 27.2% more pay in annual bonuses before a pension freeze. To tell whether those firms pay annual bonuses excessively in anticipation of a pension freeze, we need to control for firm characteristics (e.g., size) because firms that freeze their DB plans are typically larger and tend to pay their talented managers more.

Regarding pension characteristics, Table 1 reveals that 51.2% of the firms that froze their DB plans have overall underfunded plans in the year before the freeze, in contrast to 42.6% for the remaining firm-years. We code the *Underfunded* dummy variable as 1 if the ratio of overall pension assets to pension liabilities of a firm's DB plans is below 80% and 0 otherwise. With few exceptions, this threshold identifies severely underfunded DB plans that trigger mandatory pension contributions (Rauh, 2006). We also note that freeze firms have significantly larger pension plans and thus greater anticipated savings, with pension liabilities equal to 21% of the firm's total assets in the year before the freeze, on average, compared with 15.1% for the remaining firm-years.[16]

Table 2 includes the correlation matrix among key variables used in our regression analyses. *Pre Freeze(1)* is a dummy variable that equals 1 when the firm freezes its pension plan(s) the following year and 0 otherwise. The pension freeze indicator, *Pre Freeze(1)*, is positively correlated with executive annual bonuses, base salary, firm sales, negative net income, and return volatility; and is negatively correlated with ROA and lagged ROA, stock returns, net income increase, and market-to-book ratio. In addition, we find that the pension freeze dummy is positively correlated with the underfunded status of the pension plan and the relative size of pension obligations. Note that the correlation between the pension freeze dummy and equity awards is not statistically significant.

[16] We also find that firms are less likely to freeze unionized pension plans (a unionization rate of 34.1% for frozen DB plans in the year before the freeze, in contrast to 38.1% for the remaining firm-years; not tabulated). This is consistent with findings in Rauh, Stefanescu, and Zeldes (2014).

4. EMPIRICAL RESULTS

4.1 Executive Annual Bonuses and Pension Freezes

In this section, we investigate potential manipulation of annual bonuses prior to a pension freeze. Using the empirical specification of Equation (1), we run panel regressions with ln (1 + bonus) in thousands of dollars as the dependent variable. Our main variable of interest is the anticipated pension freeze, *Pre Freeze(1)*. Essentially, we are testing whether the level of executive annual bonuses is abnormally high in the year prior to a pension freeze. Year-fixed effects are included to address the issue of pension freeze waves caused by general economic and political conditions.

We report the results of the estimation in Table 3. Columns 1 and 2 include all Execucomp firms offering DB plans, while columns 3 and 4 include only those firms that froze their DB plans over our sample period, 1999–2010. Examining the sub-sample of firms that froze their DB plans ensures that our results are not driven by the differences in firm characteristics that affect the decision to freeze pension plans. We further address potential endogeneity problems in Sections 4.2 and 4.3. Columns 1 and 3 show our baseline specification with industry-fixed effects. Columns 2 and 4 use firm-fixed effects instead to capture the effect of unobserved time-invariant, firm-specific characteristics on executive annual bonuses. The adjusted R-squared increases from 0.345 to 0.426 for the freeze subsample when we replace industry- with firm-fixed effects.

The coefficient estimate of *Pre Freeze(1)* is positive and statistically significant in all regressions. The results are stronger for the sub-sample of firms that froze their pension plans between 1999 and 2010. For example, under model (4), which includes firm-fixed effects, we find that firms on average award their top executives 26.6% more in annual bonuses in the year

prior to a pension freeze after controlling for other determinants of annual bonuses. The coefficient estimate is statistically significant at the 1% level.

To estimate the economic impact of boosted bonuses on the annual pension benefit and its present value, we make the following assumptions. The benefit factor is 0.02, covered compensation is averaged over the final three years, and executives retire at age 65 (for the vast majority of DB plans, 65 is the retirement age at which an executive receives 100% of earned pension benefits) and lives until 80.[17] Assume a CEO is 56 years old (sample median for CEOs), has 24 years of services (sample median), and his annual bonus increases from of 6.717 (sample median) to 6.983. The boost in annual bonuses is $251,813 (= (exp(6.983) – exp(6.717))*1,000). This in turn increases annual pension benefit by $40,290 (= 0.02*24*251,813/3). Using a real discount rate of 3% (Sundaram and Yermack, 2007), we convert this increase in annual pension benefits into an increase of $368,632 in the present value of all pension benefits. Thus, the total amount of compensation increase for a typical CEO is $620,445 (= 251,813 + 368,632).[18]

The remaining control variables have the expected signs. For example, executive bonuses are highly and positively correlated with salaries because annual bonuses are often expressed as a percentage of base salary. Economically, for an increase of 1% in base salary, annual bonuses increase by 0.792% after controlling for other determinants of bonus payout. Bonuses increase with current-year *ROA*, *Income Increase*, and current- and previous-year stock *Return*, and they decrease with *Negative Income* and *Return Volatility*. Moreover, CEOs receive more bonuses than other NEOs on average.

[17] This simplified approach leaves out mortality probabilities by age and variations of discount rate by firm, and slightly overestimates the present value of increased pension benefits (Sundaram and Yermack, 2007). However, as we will show in Table 4, firms boost executive bonuses in three years around the pension freeze: two years prior to, one year prior to, and during the freeze year. Thus, these values substantially underestimate the effects of bonus boosts on pension values.

[18] For all NEOs, the median number of service years is 19, the median age is 53, and the median value of ln (1+bonus) is 5.76 (in thousands of dollars). The total compensation increase in the year before a pension freeze is $199,263 (a $96,707 increase in annual bonuses and a $102,556 increase in pension value).

It is possible that greater bonus awards are not limited to the year prior to the pension freeze. If pension benefits are calculated based on the values of base salary and annual bonuses over the final three or five years, top executives have incentives to boost their bonuses in years leading up to the pension freeze. To investigate this possibility, we create three dummy variables: *Pre Freeze(3)*, *Pre Freeze(2)*, and *Pre Freeze(1)* equal 1 if the pension freeze occurs in three years, two years, and one year, respectively, and 0 otherwise. We expect to find larger coefficients in the years immediately before pension freezes. Cash compensation during the freeze year may also affect pension values, depending on the effective date of the freeze. We create a dummy variable, *Freeze*, that equals 1 if the pension freeze occurs during the year and 0 otherwise.

In contrast, a boost of bonuses after a pension freeze does not help elevate the pension value. Thus, we do not expect to find bonus boosts after the freeze. We create two dummy variables to test this possibility: *Post Freeze(1)* and *Post Freeze(2)* equal 1 if a pension freeze occurred one and two years before, respectively, and 0 otherwise. We run regressions separately for all firms with DB pensions and for firms that froze their pensions during the sample period. We report the regression results in Table 4.

The coefficients for all pre-freeze dummies are positive. *Pre Freeze(2)* is economically meaningful and statistically significant for the freeze subsample (shown in columns 3 and 4). Coefficient estimates of *Pre Freeze(1)* and *Freeze* are much larger and are statistically significant at the 1% level in all specifications (except that of *Freeze* in model (2) is statistically significant at 5%). This pattern is consistent with the timeline of the freeze decision—it takes a few years to deliberate on whether to freeze DB plans, and the bonus level in those years directly affects the value of pension benefits. Coefficients on other three freeze dummies are

insignificant. These results indicate that firms increase executive annual bonuses when they anticipate a pension freeze within two years, and that such boosts increase the value of executive pension benefits.

Regarding economic significance, we find that for a typical CEO the increase in annual bonuses before a pension freeze and the resulting increased pension value collectively cover 86.8% of the pension value of their original DB plan had the freeze not occurred.[19] Note that our calculation leaves out alternative pensions awarded to top executives after the freeze of DB plans (e.g., 401 (K) plans). We thus conclude that top executives are about making whole after a pension freeze, while regular employees lose much of their pensions.

One may be concerned that the pension freeze and bonus award decisions can be endogenously determined; that is, firms that choose to freeze their pension plans may differ systematically from those that choose not to do so, and these differences may lead to the observed difference in bonus awards. Note that our results hold in specifications with firm-fixed effects (models (2) and (4)), so time-invariant, firm-specific characteristics that may affect annual bonus awards have already been taken into account. In unreported tests using specifications with executive-fixed effects, we find very similar results.

To further address the endogeneity concern, we use the propensity score matching approach to identify control firms that had a similar propensity to freeze their DB plans but did not do so that year. We then examine the effect of pension freezes on bonus awards among freeze firms and their comparable counterparts.

[19] Assume the benefit factor is 0.02, covered pay is averaged over the final three years including the freeze year, and real discount rate is 3%. Assume a CEO is 56 years old in the year before a pension freeze *(t-1)*; works for another four years at the firm (median duration – current CEO tenure = 8 – 4); retires at 65; and lives until 80. We normalize salary and annual bonuses to 1 in year *t-3*. Suppose both salary and bonuses grow at 7% annually (sample median) without manipulation. Bonuses increase by 31.2% (= 0.242 + 0.07), 51.8%, and 51.3% in years *t-2*, *t-1*, and *t*, respectively; see model (4) of Table 4. The freeze would have reduced the pension value by 30% had the manipulation of bonuses not occurred. The extra bonuses awarded and the resulting increases in pension values cover 56% of the 30% to-be-lost pension value due to the freeze.

4.2 Propensity Score Matching Model

To predict the likelihood of a pension freeze, we add cash flow volatility to size, accounting and stock performance, market-to-book ratio, and leverage because Petersen (1994) shows that firms with more volatile cash flows are less likely to retain DB plans. Cash flow volatility is calculated using annual data over the past ten years. We use the median level of firms in the same industry (two-digit SIC code) in the year prior to the freeze. As the previous literature shows that the underfunding level is an important determinant of the freeze decision, we further include a dummy variable, called *Underfunded* that equals 1 if the funding ratio (the ratio of overall pension assets to the pension obligations) is lower than 80% and 0 otherwise.[20] Lastly, we include *Relative Pension Size*, calculated as the ratio of total pension obligations to the firm's total assets, as a predictor of the freeze because firms with large pension plans are more likely to see a bigger effect of a pension freeze on cash flows (Munnell and Soto, 2007).

The left panel of Table 5 reports the regression result of the first-stage probit model. The dependent variable is 1 if a firm will freeze its DB plan next year and 0 otherwise. Both cash flow volatility and the underfunded status have the expected positive sign, but their coefficient estimates are not statistically significant. The coefficient of the *Relative Pension Size* is positive and statistically significant at the 1% level. All other variables have the predicted signs; for example, poorly-performing firms and large firms are more likely to freeze their DB plans.

For each freeze event, we find a non-freeze firm-year that has the nearest propensity score within a caliper of 0.5%. We do not allow replacement in the matching process. We are able to generate 202 matched pairs for the 213 freeze events, corresponding to 1,236 executive-years for the treated (freeze) group and 1,181 executive-years for the control group. Both the t-

[20] The 80% funding ratio corresponds roughly to the funding threshold that triggers additional mandatory contributions. It was imposed by the Retirement Protect Act (RPA) in 1994. While the RPA (2006) changed the DB plans funding rules, this threshold was preserved to delimitate plans facing funding difficulties.

test and median test show that executive bonuses prior to pension freezes are larger than those of matched control firms, and the differences are statistically significantly at the 1% level (untabulated). In addition, using this matched sample, we run a multivariate regression of annual bonuses on the pension freeze indicator, *Pre Freeze(1),* and all control variables used in Table 3. As shown in the right panel of Table 5, the coefficient of *Pre Freeze(1)* is 0.218, with a p-value of 0.010021. These results confirm our findings under the OLS specifications that firms tend to boost executive bonuses prior to pension freezes.

One may argue that perhaps executives always want to increase their own compensation, and that the observed boosts in annual bonuses prior to a pension freeze could be driven by some unobservable factors that are not captured by the fixed-effect models and the propensity score matching model. In the next subsection we test whether the anticipation of a pension freeze is associated with more generous awards of stock and options.

4.3 Equity Awards and Pension Freezes

For determining the level of pension benefits, 94% of the DB plans include annual bonuses in the definition of covered earnings, while fewer than 8% of DB plans include equity awards (Sundaram and Yermack, 2007). Even though firms may have other reasons to increase equity awards, we do not expect to observe boosts in equity awards prior to a pension freeze, because such boosts do not help increase executive pension benefits.

Our research design is the same as the one used for examining bonus awards prior to a pension freeze (Table 3). The regression results are presented in Table 6. Columns 1 and 2 include the sample of all firms with DB plans at some point between 1999 and 2010, while columns 3 and 4 focus on firms that froze their DB plans during this period. In contrast to our findings of boosts in annual bonuses, we do not find any evidence that firms boost equity awards

to their top executives in the year before a pension freeze. In unreported tests, we do not observe boosts in equity awards in the freeze year or two years prior to the freeze.

5. CORPORATE GOVERNANCE AND FUTURE PERFORMANCE

The increases in executive bonuses and the resulting boost of pension value impose costs on firms and are not mirrored by similar benefits offered to regular employees. It is suggestive of an agency problem. However, increases in executive bonuses prior to pension freezes could potentially serve as an incentive device that motivates executives to improve firm performance in the future. In this section, we test how corporate governance affects bonus boosts before pension freezes and how such boosts affect subsequent firm performance.

5.1 Corporate Governance

We first compare bonus boosts before pension freezes across different job titles of top executives. In unreported results, we find that bonus boosts before pension freezes exist for CEOs, CFOs, and all other top executives. Moreover, this phenomenon is prevalent not only at firms with weak corporate governance (as measured by CEO/board chair duality, busy board, large board, captured board, less independent board, low block ownership, low CEO ownership, and low institutional ownership), but also at firms with strong corporate governance.[21] It appears that bonus enhancement is a company-wide decision that affects all top executives, and many firms engage in such activities.

5.2 Future Performance

If bonus boosts before pension freezes work as an incentive device, as one may argue, we would expect to observe better subsequent performance at firms that grant more generous bonuses to top executives prior to a pension freeze than at other firms. To test this hypothesis, we

[21] See, for example, Yermack (1996); Fich and Shivdasani (2006); Coles, Daniel, and Naveen (2008, 2014); and Core, Holthausen, and Larcker (1999).

first predict the bonus level using model (2) of Table 3, leaving out *Pre Freeze(1)*. We then subtract the predicted value from the actual payout of the annual bonus to obtain *Excess Bonus*. *Excess Bonus* indicates the abnormal level of executive annual bonuses that are related to the pension freeze event. We create an interaction term for *Excess Bonus* and the *Pension Freeze* dummy. We next examine whether there is a positive relationship between firm performance in the year after the freeze and the level of *Excess Bonus* in the year prior to the freeze (lagged by two years relative to performance). We also examine the relationship between firm performance during the freeze year and excess bonus in the year before and obtain very similar results.

Our performance measures are *ROA* and stock *Return*. Following Core, Holthausen, and Larcker (1999), we include the logarithmic transformation of *Sales*, and *Cash Flow Volatility* in the *ROA* regression. In the *Return* regression, we include *Market Capitalization* and *Return Volatility*. We use both the OLS model and PSM model. Year-fixed effects are included in all regression. Firm-fixed effects are included in the OLS model and industry-fixed effects in the PSM model. The first stage regression of the PSM model is the same as the left panel of Table 5. As shown in Table 7, the coefficient estimate of *Post Freeze(1)* × *Lag2 Excess Bonus* is not significant in any regression. Hence, our findings do not support the hypothesis that bigger executive bonuses prior to pension freezes improve future performance.

6. CHANNELS OF BONUS ENHANCEMENT

A natural question arises: how do firms boost their executives' annual bonuses when needed? A firm can boost the annual bonus piece that is an input of the pension benefit formula in two ways: setting a greater target amount of the bonus payout *ex ante* and manipulating the performance outcome *ex post*. First, we examine whether there is a boost in the target bonus payout prior to a pension freeze. Target bonus payout is typically determined in the first quarter

of the fiscal year and is not subject to the influence of *ex-post* earnings management. Some firms use the target amount of annual bonuses as an input for calculating pension benefits.[22] These firms can set a greater target amount of bonus payout even though the performance target may be missed *ex post* and the actual bonus payout may be lower than the target.

In the vast majority of DB plans, the actual bonus payout is an input for pension benefit calculation. For these plans, the target bonus payout is still relevant because the actual bonus payout is highly correlated with the target amount, especially if the firm does not fully adjust the corresponding performance goals according to the level of the target payout. In addition, firms can manipulate outcomes of earnings, revenue, and other performance measures used for determining the payouts of annual bonuses. Kim and Yang (2014) show that some boards exercise discretion in modifying performance results simply for the purpose of increasing bonus payouts for the CEO.

The target amount of the bonus payout has been disclosed in firms' proxy statements since December 15, 2006, when the SEC's enhanced disclosure rules were enacted. Therefore, we conduct this analysis using the subsample from 2006 to 2010. This reduces the number of observations to 24,935, of which 21,998 provide information on the target amount of bonus payout. We use the specification given in (1) to determine the target bonus payout, similar to the one used for model (2) of Table 3. The determinants include *Pre Freeze(1)*, base salary, firm size, accounting and stock performance, volatility, growth, leverage, negative income, income increase, year-fixed effects, and industry- or firm-fixed effects. Our variable of interest is the indicator of pension freeze in the coming year, *Pre Freeze(1)*, and we expect to find a positive

[22] For recognizing bonuses, 23% of the SERPs provided by large Canadian firms refer to target bonuses, according to the Towers Watson's 2012 SERP survey. According to the Towers Watson's 2013 SERP survey for U.S. firms, "Annual incentive compensation (either target opportunity or actual payment) is typically included in earnings definition for both NQDB and NQDC plans," but it does not provide the fraction of U.S. DB plans that use target bonuses instead of actual payments in the calculation of pension benefits.

coefficient estimate if a firm boosts target bonuses in anticipation of a pension freeze. For comparison, we report the results on actual bonus payouts in columns 1 and 2 and those on target bonus payouts in columns 3 and 4 of Table 8.

For the period from 2006 to 2010, we find boosts in annual bonuses of 17–18.5% prior to pension freezes, but the coefficient estimates are not statistically significant. The reduction in economic and statistical significance could be driven by the change in the sample, because we lose two-thirds of the observations. On the other hand, firms might have become more cautious in handling pension-related issues after it became mandatory to disclose annual changes in pension values for all NEOs. Comparing the result reported in column 4 with that reported in column 2, for example, we find that boosts in target bonuses prior to pension freezes are larger than those in actual bonus payouts (0.224 vs 0.17), and the coefficient estimate of the pension freeze dummy is statistically significant (at the 10% level) only in the target bonus regressions.

Regarding ex-post performance management, we examine the level of discretionary accruals in the year prior to a pension freeze relative to that in other firm-years. We use the Jones Model and Modified Jones Model, with and without ROA as a control variable (Dechow, Sloan, and Sweeney, 1995). We do not find abnormal levels of discretionary accruals in the year leading to a pension freeze.

7. BONUS AWARDS BEFORE EXECUTIVE DEPARTURES

In this section, we examine whether firms increase annual bonuses prior to other pension-related events such as executive departures. An executive may, for instance, influence his annual bonuses prior to a planned retirement but not before a forced departure or sudden death. As a proxy for a planned executive departure, we first look at whether an executive is approaching or has exceeded retirement age. We follow the literature on CEO turnovers (Weisbach, 1988;

Parrino, 1997) and use the ages of 60, 62, 64, and 64–66 as proxies for retirement. When an executive anticipates his retirement in the near future (especially when 100% of pension benefits are vested), he has a strong incentive to increase his annual bonuses. We test this hypothesis on our full sample and contrast bonus awards with equity awards.

The results of our analysis are presented in Table 9. We find abnormal annual bonuses awarded to executives who are ready to retire, as reflected in the positive and significant coefficient estimates of the interactions of *Pre Depart(1)* with various proxies for retirement ages. Actually, we find increases in bonus payouts in the year prior to an executive's departure at every age above 56. The effect is stronger for ages above 59. The increase in annual bonuses for an executive who works beyond retirement age, at which point full pension benefits can be paid out, could potentially be compensating the executive for not drawing his pension that year (Sundaram and Yermack, 2007). We do not find any evidence of boosts in equity awards before departures as executives approach or exceed the retirement age.

Next, we take a closer look at the reported reason for an executive's departure. An executive who was forced out is unlikely to have much influence on setting his own pay. Execucomp provides four reasons for separation: *resigned*, *retired*, *unknown*, and *deceased*. Often, the "resigned" group, and sometimes, the "retired" group contain forced executive turnovers. For example, while "resigned" could be a planned departure for a non-CEO top executive (e.g., accepting a comparable or even better position in another firm), it often indicates a dismissal event for a CEO (Parrino, 1997; Jenter and Lewellen, 2013). To mitigate the influence of such noise in data classification, we focus on CEOs for whom the classification of "retired" is likely to be the only category of planned departures.[23] The regression results reported

[23] Some "retired" CEOs could be forced out. The potential misclassification biases us against finding a result of bonus boosts before CEO retirements because fired CEOs are unlikely to plan their departures or influence their pay.

in Table 10 show that the boost in annual bonuses only occurs prior to a planned CEO departure (labeled as "retired"). We do not find a boost in equity awards before a CEO retirement (see results reported in columns 5 to 8).

8. CONCLUSIONS

While pensions are an integral part of executive compensation contracts, until recently they had received little attention. Sundaram and Yermack (2007) are among the very few to estimate the actuarial value of CEO pensions, and they showed that pensions constitute a significant component of overall compensation for many CEOs. This paper echoes their intuition and provides evidence that managers boost annual bonuses to increase their pension benefits in anticipation of pension freezes and executive retirements. Applying double standards to the pensions of top executives and those of regular employees is suggestive of an agency problem.

REFERENCES:

Baranchuk, N., MacDonald, G., Yang, J., 2011. The Economics of Super Managers. *Review of Financial Studies* 24, 3321–3368.

Beaudoin, C., Chandar, N., Werner, E., 2010. Are Potential Effects of SFAS 158 Associated with Firms' Decisions to Freeze Their Defined Benefit Pension Plans? *Review of Accounting and Finance* 9, 424–451.

Bebchuk, L., Fried, J., 2004. *Pay Without Performance – the Unfulfilled Promise of Executive Compensation*, Harvard University Press.

Bergstresser, D., Desai, M., Rauh, J., 2006. Earnings Manipulation, Pension Assumptions, and Managerial Investment Decisions. *The Quarterly Journal of Economics* 121, 157–195.

Bertrand, M., Mullainathan, S., 2001. Are CEOs Rewarded for Luck? The Ones without Principals Are. *Quarterly Journal of Economics* 116, 901–932.

Bizjak, J., Lemmon, M., Ngyuen, T., 2011. Are all CEOs above Average? An Empirical Analysis of Compensation Peer Groups and Pay Design. *Journal of Financial Economics* 100, 538–555.

Cadman, B., Vincent, L., 2014. The Role of Defined Benefit Pension Plans in Executive Compensation. *European Accounting Review*, forthcoming.

Choy, H., Lin, j., Officer, M., 2014. Does Freezing A Defined Benefit Pension Plan Affect Firm Risk? *Journal of Accounting and Economics* 57, 1–21.

Coles, J., Daniel, N, Naveen, L., 2008. Boards: Does One Size Fit All? *Journal of Financial Economics* 87, 329–356.

Coles, J., Daniel, N., Naveen, L., 2014. Co-Opted Boards. *Review of Financial Studies*, forthcoming.

Core, J., Guay, W., 2010. Is CEO Pay too High and Are Incentives too Low: A Wealth Based Contracting Framework. *Academy of Management Perspectives* 24, 5–19.

Core, J., Holthausen, R., Larcker, D., 1999. Corporate Governance, Chief Executive Officer Compensation, and Firm Performance. *Journal of Financial Economics* 51, 371–406.

Dechow, P., Sloan, R., Sweeney, A., 1995. Detecting Earnings Management. *Accounting Review* 70, 193–225.

Edmans, A., Gabaix, X., Landier, A., 2009. A Calibratable Model of Optimal CEO Incentives in Market Equilibrium. *Review of Financial Studies* 22, 4881–4917.

Faulkender, M., Yang, J., 2010. Inside the Black Box: The Role and Composition of Compensation Peer Groups. *Journal of Financial Economics* 96, 257–270.

Fich, E., Shivdasani, A., 2006. Are busy boards effective monitors? *Journal of Finance* 61, 689–724.

Gabaix, X., Landier, A., 2008. Why Has CEO Pay Increased So Much? *Quarterly Journal of Economics* 123, 49–100.

Gaver, J., Gaver, K., 1998. The Relation between Nonrecurring Accounting Transactions and CEO Cash Compensation. *The Accounting Review* 73, 235–253.

Gerakos, J., 2010. CEO Pensions: Disclosure, Managerial Power, and Optimal Contracting. Unpublished working paper. University of Chicago.

Gerakos, J., 2010. Chief Executive Officer and the Pay-Pension Tradeoff. *Journal of Pension Economics and Finance* 9, 303–319.

Goldman, E., Huang, P., 2014. Contractual Versus Actual Severance Pay Following CEO Departure. *Management Science*, forthcoming.

Graham, J., Li, S., Qiu, J., 2012. Managerial Attributes and Executive Compensation. *Review of Financial Studies* 25, 144–186.

Hartzell, J., Ofek, E., Yermack, D., 2004. What's in It For Me? Personal Benefits Obtained by CEOs whose Firms Are Acquired. *Review of Financial Studies* 17, 37–61.

Jackson, S., Lopez, T., Reitenga, A., 2008. Accounting Fundamentals and CEO Bonus Compensation. *Journal of Accounting and Public Policy* 27, 374–393.

Jensen, M., Murphy, K., 1990. Performance Pay and Top-Management Incentives. *Journal of Political Economy* 98, 225–264.

Jensen, M., Murphy, K., 2011. CEO Bonus Plans: and How to Fix Them. Unpublished working paper. Harvard University and University of Southern California.

Jenter, D., Lewellen, K., 2013. Performance-induced CEO Turnover. Unpublished working paper. Stanford University and Dartmouth College.

Kaplan, S., Rauh, J., 2010. Wall Street and Main Street: What Contributes to the Rise in the Highest Incomes? *Review of Financial Studies* 23, 1004–1050.

Kim, D., Yang, J., 2012. Behind the Scenes: Performance Target Setting of Annual Incentive Plans. Unpublished working paper. Peking University and Indiana University.

Kim, D., Yang, J., 2014. Beating the Target: Performance Management around the Annual Incentive Target. Unpublished working paper. Peking University and Indiana University.

Lie, E., 2005. On the Timing of CEO Stock Option Awards. *Management Science* 51, 802–812.

Lie, E., Heron, R., 2007. Does Backdating Explain the Stock Price Pattern around Executive Stock Option Grants? *Journal of Financial Economics* 83, 271–295.

Morse, A., Nanda, V., Seru, A., 2011. Are Incentive Contracts Rigged by Powerful CEOs? *Journal of Finance* 66, 1779–1821.

Munnell, A., Soto, M., 2007. Why Are Companies Freezing their Pensions? Center for Retirement Research at Boston College, working paper 2007–22.

Murphy, K., 1985. Corporate Performance and Managerial Remuneration: An Empirical Analysis. *Journal of Accounting and Economics* 7, 11–42.

Murphy, K., 2002. Explaining Executive Compensation: Managerial Power versus the Perceived Cost of Stock Options. *University of Chicago Law Review* 69, 847–69.

Murphy, K., Zabojnik, J., 2004. CEO Pay and Appointments: A Market-Based Explanation for Recent Trends. *American Economic Review Papers and Proceedings* 94, 192–96.

Oyer, P., 2004. Why Do Firms Use Incentives That Have No Incentive Effects? *Journal of Finance* 59, 1619–1649.

Parrino, R., 1997. CEO Turnover and Outside Succession: A Cross-Sectional Analysis. *Journal of Financial Economics* 46, 165–197.

Petersen, M., 1994. Cash Flow Variability and Firm's Pension Choice: A Role for Operating Leverage. *Journal of Financial Economics* 36, 361–383.

Rau, R., Xu, J., 2013. How Do Ex-Ante Severance Pay Contracts Fit into Optimal Executive Incentive Schemes? *Journal of Accounting Research* 51, 631–671.

Rauh, J., 2006. Investment and Financing Constraints: Evidence from the Funding of Corporate Pension Plans. *Journal of Finance* 61, 33–71.

Rauh, J., Stefanescu, I., Zeldes, S., 2014. Cost Shifting and the Freezing of Corporate Pension Plans. FEDs working paper.

Ravell, J., 2003. CEO Pensions: The Latest Way to Hide Millions Think CEO Pay is Out of Control? Wait till You See What these Guys Get when They Retire. *Fortune*, April 14.

Schultz, E., 2011. *Retirement Heist: How Companies Plunder and Profit from the Nest Eggs of American Workers*, Portfolio Hardcover.

Shivdasani, A., Stefanescu, I., 2010. How Do Pensions Affect Corporate Capital Structure Decisions? *Review of Financial Studies* 23, 1287–1323.

Subramanian, A., 2013. Product Market Competition, Managerial Compensation and Firm Size in Market Equilibrium. *Management Science* 59, 1612–1630.

Sundaram, R., Yermack, D., 2007. Pay Me Later: Inside Debt and its Role in Managerial Compensation. *Journal of Finance* 62, 1551–1588.

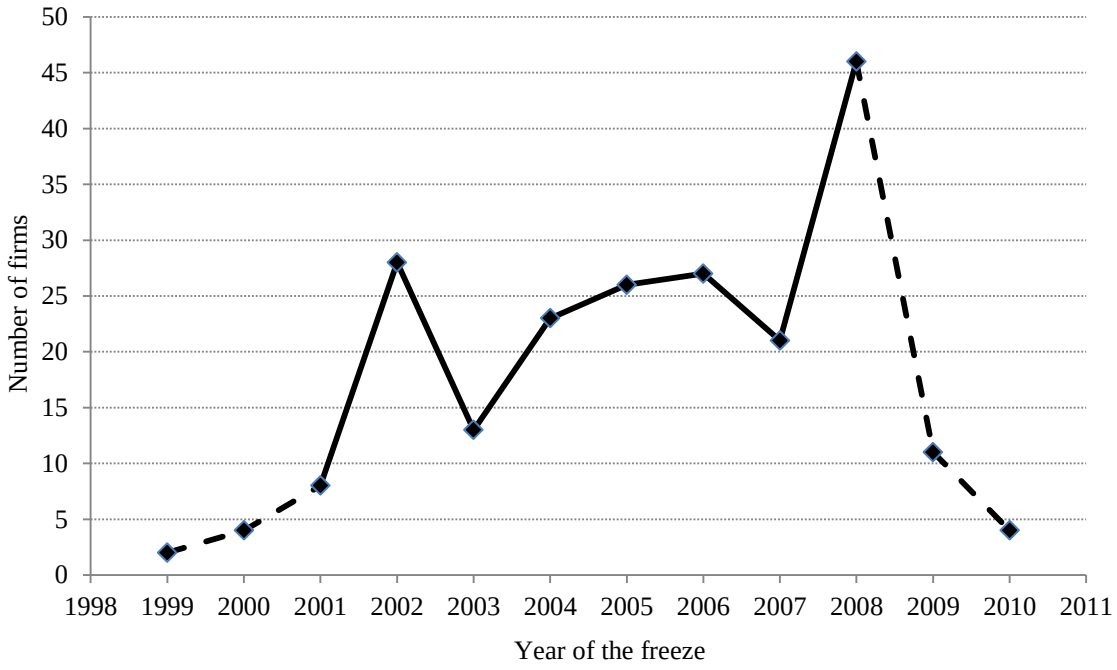
Weisbach, M., 1988. Outside Directors and CEO Turnover. *Journal of Financial Economics* 20, 431–460.

Xu, J., Yang, J., 2014. Golden Hellos: Signing Bonuses for New Top Executives. Unpublished working paper. Virginia Tech and Indiana University.

Yermack, D., 1995. Do Companies Award CEO Stock Options Effectively? *Journal of Financial Economics* 39, 237–269.

Yermack, D., 1996. Higher Market Valuation of Companies with a Small Board of Directors. *Journal of Financial Economics* 40, 185–212.

Figure 1: Distribution of Defined Benefit (DB) Plan Freezes



Note: the dashed lines reflect potentially incomplete data points. Freezes prior to 2002 were not required to be disclosed and some freezes in recent years may be reported with long delays.

Table 1: Summary Statistics

Pre Freeze(1) is a dummy variable equal to 1 if the firm freezes its defined benefit pension in the next fiscal year and 0 otherwise. *Bonus, Equity* and *Salary* are executive compensation variables (in thousands of dollars) extracted from Execucomp at the executive level. To handle cases when *Bonus, Equity* and *Salary* are equal to 0, we calculate and report the natural logarithmic transformation of (1+Bonus), (1+Equity), and (1+Salary), respectively. *Sales* are extracted from Compustat. *ROA* is the ratio of net income to total assets. *Negative Income* equals 1 if the firm's net income is negative and 0 otherwise. *Income Increase* equals 1 if the firm's net income increases from last year and 0 otherwise. *Return* is the stock return (including distribution and reinvestment) during the current fiscal year. *Return Volatility* is the volatility of monthly stock returns over the current fiscal year. *M/B* is the ratio of market value of common equity to book value of common equity. *Leverage* is the ratio of sum of long-term and short-term debt to total assets. *Industry CF Volatility* is the lagged median value of cash flow volatility for firms in the same two-digit SIC industry in the previous year, while cash flow volatility is the standard deviation of a firm's cash flow in the previous ten years. *Underfunded* is a dummy variable that equals 1 if the sponsor's ratio of pension assets to pension obligations is less than 80% and 0 otherwise. *Relative Pension Size* is the ratio of the projected pension benefit obligation to total assets.

	Pre Freeze(1) =1			Pre Freeze(1) = 0			Mean	t-test	Median	Median Test
	N	Mean	p50	N	Mean	p50	Difference	p-value	Difference	p-value
Bonus (ln)	1302	5.175	5.760	64,012	4.903	5.505	0.272	0.000	0.254	0.000
Equity (ln)	1302	5.238	6.188	64,002	5.081	6.038	0.157	0.030	0.150	0.020
Salary (ln)	1302	6.046	6.105	64,012	5.945	5.951	0.101	0.000	0.154	0.000
Sales (ln) lag	1302	8.203	8.163	64,012	7.834	7.727	0.369	0.000	0.436	0.000
ROA	1302	0.014	0.024	64,012	0.035	0.036	-0.020	0.000	-0.01 2	0.000
ROA lag	1302	0.033	0.031	64,012	0.036	0.037	-0.003	0.114	-0.006	0.001
Negative Income	1302	0.250	0.000	64,012	0.156	0.000	0.094	0.000	0.000	0.000
Income Increase	1302	0.561	1.000	64,012	0.601	1.000	-0.040	0.002	0.000	.
Return	1302	-0.006	-0.016	64,012	0.144	0.088	-0.150	0.000	-0.104	0.000
Return lag	1302	0.099	0.025	64,012	0.133	0.065	-0.035	0.011	-0.041	0.000
Return Volatility	1302	0.115	0.091	64,012	0.107	0.091	0.008	0.000	0.000	0.980
M/B	1302	2.028	1.730	64,012	2.749	1.970	-0.720	0.000	-0.239	0.000
Leverage	1302	0.252	0.228	64,012	0.260	0.249	-0.008	0.047	-0.021	0.001
Industry CF Volatility	1302	0.750	0.760	64,012	0.760	0.750	0.000	0.599	0.010	0.063
Underfunded	1253	0.512	1.000	57,873	0.426	0.000	0.085	0.000	1.000	0.000
Relative Pension Size	1253	0.210	0.107	57,873	0.151	0.091	0.059	0.000	0.016	0.001

Table 2: Correlation Matrix

Pre Freeze(1) equals 1 if the firm freezes its defined benefit pension in the next fiscal year and 0 otherwise. *Bonus*, *Equity* and *Salary* are executive compensation variables (in thousands of dollars) extracted from Execucomp at the executive level. To handle cases when *Bonus*, *Equity* and *Salary* are equal to 0, we use the natural logarithmic transformation of (1+Bonus), (1+Equity), and (1+Salary). *Sales* are extracted from Compustat. *ROA* is the ratio of net income to total assets. *Negative Income* equals 1 if the firm's net income is negative and 0 otherwise. *Income Increase* equals 1 if the firm's net income increases from last year and 0 otherwise. *Return* is the stock return (including distribution and reinvestment) during the current fiscal year. *Return Volatility* is the volatility of monthly stock returns over the current fiscal year. *M/B* is the ratio of market value of common equity to book value of common equity. *Leverage* is the ratio of sum of long-term and short-term debt to total assets. *Industry CF Volatility* is the lagged value of the (two-digit SIC) industry median of the cash flow volatility, where cash flow volatility is the standard deviation of a firm's cash flow in the last ten years. *Underfunded* is a dummy variable that equals 1 if the sponsor's ratio of pension assets to pension obligations is less than 80% and 0 otherwise. *Relative Pension Size* is the ratio of the projected pension benefit obligation to total assets. Correlations with statistical significance better than 5% are printed in times new roman, and the remaining in *italic*.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Pre Freeze(1)	1.000																
(2) Equity (ln)	*0.005*	1.000															
(3) Bonus (ln)	0.013	0.294	1.000														
(4) Salary (ln)	0.017	0.392	0.384	1.000													
(5) Sales (ln) lag	0.026	0.318	0.314	0.437	1.000												
(6) ROA	-0.039	0.088	0.233	0.053	0.024	1.000											
(7) ROA lag	-0.011	0.076	0.089	0.041	0.045	0.411	1.000										
(8) Negative Income	0.041	-0.064	-0.257	-0.052	-0.036	-0.574	-0.280	1.000									
(9) Income Increase	-0.011	0.036	0.239	0.034	-0.009	0.308	-0.158	-0.321	1.000								
(10) Return	-0.044	*0.004*	0.156	*-0.006*	-0.062	0.169	-0.115	-0.138	0.250	1.000							
(11) Return lag	*-0.004*	0.030	0.130	0.020	-0.026	0.198	0.155	-0.174	0.137	-0.079	1.000						
(12) Return Volatility	0.026	-0.078	-0.232	-0.087	-0.102	-0.321	-0.223	0.403	-0.163	-0.049	-0.098	1.000					
(13) M/B	-0.028	0.088	0.108	0.064	0.058	0.269	0.209	-0.134	0.103	0.127	0.073	-0.106	1.000				
(14) Leverage	*-0.007*	-0.023	-0.032	*-0.004*	0.097	-0.171	-0.129	0.124	-0.075	-0.073	-0.066	0.064	-0.011	1.000			
(15) Industry CF Volatility	*0.008*	0.067	0.020	0.010	-0.072	0.032	0.017	0.085	*-0.002*	0.058	0.017	0.206	0.061	-0.170	1.000		
(16) Underfunded	0.025	-0.012	-0.049	0.008	-0.079	-0.067	-0.069	0.108	-0.027	-0.014	-0.014	0.120	-0.044	-0.047	0.128	1.000	
(17) Relative Pension Size	0.044	*0.007*	*0.000*	0.017	0.053	*0.003*	-0.014	0.074	-0.023	0.024	*-0.008*	0.046	0.053	-0.034	0.115	-0.058	1.000

Table 3: Executive Annual Bonuses before Pension Freezes

This table reports the results of regressing executive bonuses on a forthcoming pension freeze and other firm and executive characteristics. We estimate the following OLS regression:

$Bonus_{ijt} = \alpha + \beta_1 \times Pre\ Freeze(1)_i + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}$.

Pre Freeze(1) is 1 if the firm is freezing its pension plans in the next fiscal year and 0 otherwise. Because of the cases of zero bonus and salary, we add 1 to the raw data (in thousands of dollars) and take the natural logarithmic transformation of (1+ Bonus) and (1 + Salary). The remaining variables are defined in the Appendix. Columns 1 and 2 report the regression results for all firms with DB pensions while columns 3 and 4 restrict the sample to firms that implemented pension freezes during our sample period. We control for industry-fixed effects in columns 1 and 3, and firm-fixed effects in columns 2 and 4. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	All Firms with Defined Benefit Pension Plans		Firms that Froze Defined Benefit Pension Plans	
	(1)	(2)	(3)	(4)
	Bonus	Bonus	Bonus	Bonus
Pre Freeze(1)	0.213**	0.195**	0.260***	0.266***
	(0.097)	(0.092)	(0.099)	(0.096)
Salary (ln)	0.832***	0.755***	0.930***	0.792***
	(0.045)	(0.038)	(0.075)	(0.054)
Sales (ln) lag	0.324***	0.050	0.323***	-0.086
	(0.024)	(0.070)	(0.047)	(0.114)
ROA	0.535**	0.512*	1.308**	1.186*
	(0.267)	(0.302)	(0.635)	(0.629)
ROA lag	0.677***	0.660**	0.639	0.480
	(0.240)	(0.286)	(0.535)	(0.541)
Negative Income	-0.613***	-0.545***	-0.536***	-0.637***
	(0.077)	(0.076)	(0.151)	(0.154)
Income Increase	0.634***	0.618***	0.573***	0.557***
	(0.040)	(0.039)	(0.084)	(0.086)
Return	0.584***	0.567***	0.616***	0.545***
	(0.040)	(0.040)	(0.078)	(0.081)
Return lag	0.340***	0.311***	0.373***	0.297***
	(0.033)	(0.037)	(0.071)	(0.074)
M/B	0.004	-0.012***	0.005	-0.012
	(0.005)	(0.004)	(0.011)	(0.008)
Leverage	0.281	-0.447*	0.729*	-0.497
	(0.176)	(0.248)	(0.373)	(0.547)
Return Volatility	-3.692***	-3.927***	-5.677***	-5.617***
	(0.430)	(0.428)	(0.914)	(1.011)
CEO Dummy	0.222***	0.278***	0.018	0.131**
	(0.042)	(0.037)	(0.073)	(0.059)
Constant	-2.828***	-0.036	-3.158***	1.332
	(0.263)	(0.578)	(0.454)	(0.978)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	No	Yes	No
Firm-fixed effects	No	Yes	No	Yes
Observations	65,314	65,314	14,284	14,284
Adjusted R-Squared	0.315	0.434	0.345	0.426

Table 4: Executive Annual Bonuses in Years around Pension Freezes

This table reports the results of regressing executive bonuses on pension freeze decisions and other firm and executive characteristics. We estimate the following OLS regression:

$$Bonus_{ijt} = \alpha + \beta_1 \times Pre\ Freeze(3)_i + \beta_2 \times Pre\ Freeze(2)_i + \beta_3 \times Pre\ Freeze(1)_i + \beta_4 \times Freeze_i + \beta_5 \times Post\ Freeze(1)_i + \beta_6 \times Post\ Freeze(2)_i + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}.$$

Pre Freeze(n), n = 1, 2, 3, equal 1 if a freeze occurs n years into the future and 0 otherwise. For instance, *Pre Freeze(1)* is 1 if the freeze is implemented next year. *Freeze* equals 1 if the freeze occurs that year. *Post Freeze(n)*, n = 1, 2, are dummy variables that equal 1 if the freeze occurred n years ago and 0 otherwise. For instance, *Post Freeze(1)* is the year following the implementation of the freeze. The remaining variables are defined in the Appendix. Columns 1 and 2 report the regression results for all firms with DB pensions, while columns 3 and 4 restrict the sample to firms that implemented pension freezes during our sample. We control for industry-fixed effects in columns 1 and 3 and firm-fixed effects in columns 2 and 4. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4 (continued)

	All Firms with Defined Benefit Pension Plans		Firms that Froze Defined Benefit Pension Plans	
	(1)	(2)	(3)	(4)
	Bonus	Bonus	Bonus	Bonus
Pre Freeze(3)	0.038	0.050	0.066	0.077
	(0.110)	(0.121)	(0.120)	(0.124)
Pre Freeze(2)	0.185	0.157	0.268**	0.242*
	(0.113)	(0.126)	(0.127)	(0.127)
Pre Freeze(1)	0.325***	0.294***	0.462***	0.448***
	(0.101)	(0.110)	(0.121)	(0.121)
Freeze	0.350***	0.311**	0.451***	0.432***
	(0.126)	(0.138)	(0.140)	(0.145)
Post Freeze(1)	0.080	0.089	0.259	0.272
	(0.151)	(0.161)	(0.164)	(0.172)
Post Freeze(2)	-0.086	-0.118	0.068	0.049
	(0.177)	(0.190)	(0.195)	(0.204)
Salary (ln)	0.805***	0.732***	0.931***	0.822***
	(0.049)	(0.042)	(0.071)	(0.054)
Sales (ln) lag	0.328***	0.003	0.322***	-0.069
	(0.027)	(0.076)	(0.049)	(0.132)
ROA	0.449	0.359	0.864	0.581
	(0.311)	(0.349)	(0.671)	(0.643)
ROA lag	1.019***	0.872**	1.081*	0.519
	(0.288)	(0.359)	(0.625)	(0.670)
Negative Income	-0.456***	-0.367***	-0.365**	-0.455***
	(0.086)	(0.085)	(0.162)	(0.167)
Income Increase	0.689***	0.674***	0.676***	0.654***
	(0.045)	(0.045)	(0.096)	(0.097)
Return	0.641***	0.624***	0.675***	0.619***
	(0.044)	(0.044)	(0.086)	(0.095)
Return lag	0.366***	0.328***	0.371***	0.318***
	(0.037)	(0.041)	(0.081)	(0.088)
M/B	0.002	-0.017***	0.002	-0.016*
	(0.006)	(0.005)	(0.012)	(0.009)
Leverage	0.234	-0.775***	0.565	-1.051*
	(0.196)	(0.270)	(0.413)	(0.578)
Return Volatility	-3.643***	-3.864***	-5.878***	-6.092***
	(0.495)	(0.496)	(1.033)	(1.180)
CEO Dummy	0.223***	0.277***	-0.001	0.095
	(0.046)	(0.041)	(0.076)	(0.067)
Constant	-2.774***	0.494	-3.158***	1.214
	(0.290)	(0.615)	(0.466)	(1.097)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	No	Yes	No
Firm-fixed effects	No	Yes	No	Yes
Observations	50,934	50,934	11,607	11,607
Adjusted R-Squared	0.317	0.449	0.349	0.437

Table 5: Propensity Score Matching Model

This table reports the results of a propensity score matching model for firms that choose to freeze pensions versus that do not. In the first stage we run a probit model that estimates the propensity to freeze a DB plan based on various firm and plan level characteristics. In the second stage, once we extract a control group of firms that choose not freeze we run again our baseline specification. All variables are described in the Appendix. Standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

First Stage: Probit Model

Dependent : Pre Freeze(1)	(1)
ROA	-0.476*
	(0.290)
ROA lag	-0.032
	(0.318)
Total Assets lag	0.050**
	(0.021)
Return	-0.039
	(0.108)
Return lag	-0.042
	(0.081)
M/B	-0.020**
	(0.008)
Leverage	-0.079
	(0.191)
Industry Cash Flow Volatility	0.163
	(0.230)
Underfunded	0.079
	(0.067)
Relative Pension Size	0.554***
	(0.108)
Constant	-2.815***
	(0.399)
Year-fixed effects	Yes
Industry-fixed effects	Yes
Observations	8,992
Adjusted R-Squared	0.098

Second Stage: OLS Regression for Treated and Control Groups

Dependent : Bonus	(2)
Pre Freeze(1)	0.218**
	(0.085)
Salary (ln)	1.018***
	(0.070)
Sales (ln) lag	0.242***
	(0.034)
ROA	-0.715
	(0.613)
ROA lag	0.487
	(0.846)
Negative Income	-0.887***
	(0.142)
Income Increase	0.771***
	(0.105)
Return	0.977***
	(0.124)
Return lag	0.451***
	(0.116)
M/B	-0.002
	(0.017)
Leverage	-0.472
	(0.289)
Return Volatility	-4.741***
	(0.791)
CEO Dummy	-0.034
	(0.119)
Constant	-2.631***
	(0.943)
Year-fixed effects	Yes
Industry-fixed effects	Yes
Observations	2,417
Adjusted R-Squared	0.385

Table 6: Equity Awards and Pension Freezes

This table reports the results of regressing executive equity awards on a forthcoming pension freeze and other firm and executive characteristics. We estimate the following OLS regression:

$$Equity_{ijt} = \alpha + \beta_1 \times Pre\ Freeze(1)_i + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}$$

The variable *Pre Freeze(1)* is 1 in current year if the firm is freezing its pension plans in the next fiscal year and 0 otherwise. The remaining variables are defined in the Appendix. Columns 1 and 2 report the regression results for all firms with DB pensions while columns 3 and 4 restrict the sample to firms that implemented pension freezes during our sample. We control for industry-fixed effects in columns 1 and 3, and firm-fixed effects in columns 2 and 4. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	All Firms with Defined Benefit Pension Plans		Firms that Froze Defined Benefit Pension Plans	
	(1)	(2)	(3)	(4)
	Equity	Equity	Equity	Equity
Pre Freeze (1)	-0.093	-0.093	-0.054	-0.073
	(0.135)	(0.131)	(0.133)	(0.132)
Salary (ln)	0.438***	0.216***	0.506***	0.027
	(0.031)	(0.075)	(0.062)	(0.160)
Sales (ln) lag	0.957***	0.983***	0.799***	0.806***
	(0.078)	(0.076)	(0.140)	(0.130)
ROA	0.472	0.513*	0.878	0.360
	(0.318)	(0.311)	(1.044)	(0.967)
ROA lag	0.765***	0.683***	1.286*	0.732
	(0.264)	(0.256)	(0.655)	(0.750)
Negative Income	0.008	-0.004	0.162	0.066
	(0.073)	(0.069)	(0.158)	(0.141)
Income Increase	0.094**	0.032	0.176**	0.119
	(0.043)	(0.038)	(0.082)	(0.080)
Return	0.051	0.072	0.001	-0.011
	(0.046)	(0.045)	(0.109)	(0.104)
Return lag	0.104**	0.098**	0.129	0.125
	(0.044)	(0.041)	(0.108)	(0.092)
M/B	0.033***	0.019***	0.042**	0.024
	(0.008)	(0.007)	(0.019)	(0.015)
Leverage	-0.104	-0.312	-0.735	-0.907
	(0.222)	(0.286)	(0.450)	(0.624)
Return Volatility	-1.046**	-1.329***	-1.268	-2.510**
	(0.460)	(0.446)	(1.000)	(0.971)
CEO Dummy	0.939***	0.894***	1.050***	1.041***
	(0.072)	(0.070)	(0.136)	(0.128)
Constant	-4.509***	-2.840***	-4.063***	-0.008
	(0.384)	(0.678)	(0.701)	(1.428)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	No	Yes	No
Firm-fixed effects	No	Yes	No	Yes
Observations	65,304	65,304	14,279	14,279
Adjusted R-Squared	0.194	0.340	0.185	0.347

Table 7: Post Freeze Performance

This table reports the results of examining the relationship between firm performance subsequent to a pension freeze and excess bonus payout prior to the freeze. *Post Freeze(1)* equals 1 if the firm froze its regular pension plan in previous fiscal year and 0 otherwise. We first run a regression using model (2) of Table 3, leaving out *Pre Freeze(1)*, to predict the level of executive bonus. *Excess Bonus* is the difference between the actual bonus payout and the predicted payout amount. We regress *ROA* and stock *Return* on *Post Freeze(1)*, *Lag2 Excess Bonus*, *Post Freeze(1) × Lag2 Excess Bonus*, and year-fixed effects. Columns 1 and 3 include firm-fixed effects in the OLS model, while columns 2 and 4 include industry-fixed effects in the PSM model. For the *ROA* regression, we further include *Sales* and *Cash Flow Volatility*. For the *Return* regression, we further include *Market Capitalization* and *Return Volatility*. We use the sample of all firms with DB pensions. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	ROA		Return	
	(1)	(2)	(3)	(4)
Regression Specification	OLS	PSM	OLS	PSM
Post Freeze(1)	0.001	0.003	0.069**	0.025
	(0.005)	(0.006)	(0.032)	(0.040)
Post Freeze(1) × Lag2 Excess Bonus	0.002	0.008	-0.002	0.002
	(0.002)	(0.005)	(0.013)	(0.022)
Lag2 Excess Bonus	0.001	-0.003	-0.005**	-0.007
	(0.000)	(0.002)	(0.003)	(0.020)
Sales (ln)	0.019***	0.001		
	(0.005)	(0.003)		
Cash Flow Volatility	-0.003***	-0.004***		
	(0.001)	(0.001)		
Market Capitalization (ln)			0.269***	0.014
			(0.014)	(0.016)
Return Volatility			0.509**	0.152
			(0.233)	(0.671)
Constant	-0.095**	0.054	-2.061***	-0.594
	(0.038)	(0.053)	(0.123)	(0.359)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	No	Yes	No	Yes
Firm-fixed effects	Yes	No	Yes	No
Observations	10,883	368	10,924	368
Adjusted R-Squared	0.337	0.284	0.214	0.238

Table 8: Target Bonuses and Pension Freezes

This table reports the results of regressing actual bonus payout and the target amount of bonus payout on a forthcoming pension freeze and other firm and executive characteristics. *Pre Freeze(1)* equals 1 if the firm freezes its DB plan next year and 0 otherwise. *Target Bonus* is the estimated future payout under non-equity incentive plan (in thousands of dollars). We use the natural logarithmic transformation of (1 + Bonus) and (1 + Target Bonus). We obtain *Target Bonus* from the Grants of Plan-Based Awards Table of Execucomp, *NON_EQ_TARG*. It is only available for executives at firms with fiscal years ending after December 15, 2006. We use the sample of all firms with DB pensions. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Bonus	(2) Bonus	(3) Target Bonus	(4) Target Bonus
Pre Freeze(1)	0.185	0.170	0.322*	0.224*
	(0.137)	(0.149)	(0.180)	(0.126)
Salary (ln)	1.105***	1.002***	0.961***	1.001***
	(0.061)	(0.063)	(0.101)	(0.064)
Sales (ln) lag	0.239***	0.039	0.180***	0.370*
	(0.030)	(0.159)	(0.057)	(0.192)
ROA	0.853*	0.627	0.126	-0.483
	(0.465)	(0.524)	(0.630)	(0.576)
ROA lag	-0.032	-0.051	0.037	-0.843*
	(0.422)	(0.545)	(0.535)	(0.506)
Negative Income	-0.818***	-0.749***	-0.312**	-0.222**
	(0.121)	(0.131)	(0.147)	(0.112)
Income Increase	0.536***	0.534***	-0.084	0.001
	(0.062)	(0.064)	(0.075)	(0.058)
Return	0.456***	0.449***	-0.021	-0.007
	(0.076)	(0.083)	(0.086)	(0.077)
Return lag	0.314***	0.281***	0.088	0.150***
	(0.059)	(0.067)	(0.073)	(0.058)
M/B	-0.003	-0.011	0.006	-0.011
	(0.008)	(0.007)	(0.012)	(0.008)
Leverage	0.379	-0.166	0.299	0.175
	(0.238)	(0.508)	(0.394)	(0.496)
Return Volatility	-3.742***	-3.561***	-0.331	-1.204
	(0.610)	(0.703)	(0.855)	(0.733)
CEO Dummy	0.147***	0.211***	0.346***	0.327***
	(0.054)	(0.054)	(0.074)	(0.050)
Constant	-3.360***	-0.986	-2.545***	-4.279***
	(0.362)	(1.351)	(0.592)	(1.595)
Year-fixed effects	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	No	Yes	No
Firm-fixed effects	No	Yes	No	Yes
Observations	24,935	24,935	21,998	21,998
Adjusted R-Squared	0.327	0.479	0.168	0.663

Table 9: Executive Annual Bonuses and Retirement Ages

This table reports the results of regressing executive bonuses on a forthcoming pension freeze, retirement age, and other firm and executive characteristics. We estimate the following OLS regression:

$$Bonus_{ijt} = \alpha + \beta_1 \times Pre\ Depart(1)_{ij} + \beta_2 \times RetirementAge_{ij} + \beta_3 \times Pre\ Depart(1)_{ij} \times RetirementAge_{ij} + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}.$$

Pre Depart(1) is 1 if the executive is departing next year and 0 otherwise. *RetirementAge* is 1 if the executive is approaching or exceeding the retirement age in the next fiscal year and 0 otherwise. We use 60, 62, 64, and 64-66 as the proxies for retirement ages. All control variables are the same as in Table 3. We use the sample of all firms with DB pensions. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1) Bonus	(2) Bonus	(3) Bonus	(4) Bonus	(5) Equity	(6) Equity	(7) Equity	(8) Equity
Pre Depart(1)	-0.329***	-0.289***	-0.259***	-0.245***	-0.058	-0.077	-0.055	-0.082
	(0.088)	(0.077)	(0.072)	(0.070)	(0.096)	(0.090)	(0.085)	(0.084)
Age 59+	-0.138***				-0.330***			
	(0.036)				(0.049)			
Pre Depart(1) × Age59+	0.391***				-0.070			
	(0.133)				(0.146)			
Age61+		-0.162***				-0.427***		
		(0.043)				(0.063)		
Pre Depart(1) × Age61+		0.411***				-0.030		
		(0.141)				(0.162)		
Age63+			-0.195***				-0.612***	
			(0.058)				(0.083)	
Pre Depart(1) × Age63+			0.433***				-0.113	
			(0.166)				(0.199)	
Age63-65				-0.103				-0.259***
				(0.064)				(0.084)
Pre Depart(1) × Age63–65				0.437**				-0.297
				(0.184)				(0.220)
Salary (ln)	0.751***	0.751***	0.749***	0.748***	0.569***	0.566***	0.563***	0.561***
	(0.047)	(0.048)	(0.048)	(0.048)	(0.068)	(0.068)	(0.068)	(0.067)

Continued (next page)

Continued (from previous page)

Sales (ln) lag	0.308***	0.307***	0.308***	0.307***	0.393***	0.393***	0.397***	0.391***
	(0.088)	(0.088)	(0.088)	(0.088)	(0.107)	(0.106)	(0.107)	(0.107)
ROA	0.258	0.260	0.260	0.258	-0.186	-0.184	-0.183	-0.196
	(0.345)	(0.344)	(0.344)	(0.344)	(0.409)	(0.410)	(0.409)	(0.408)
ROA lag	0.676*	0.675*	0.677*	0.673*	1.006***	0.998***	1.013***	1.002***
	(0.367)	(0.367)	(0.368)	(0.368)	(0.362)	(0.363)	(0.362)	(0.363)
Negative Income	-0.671***	-0.671***	-0.672***	-0.672***	0.042	0.043	0.042	0.041
	(0.094)	(0.094)	(0.094)	(0.094)	(0.089)	(0.089)	(0.089)	(0.089)
Income Increase	0.682***	0.683***	0.683***	0.683***	-0.004	-0.005	-0.004	-0.001
	(0.050)	(0.050)	(0.050)	(0.050)	(0.051)	(0.051)	(0.051)	(0.051)
Return	0.548***	0.548***	0.547***	0.548***	0.045	0.047	0.045	0.047
	(0.054)	(0.054)	(0.054)	(0.054)	(0.051)	(0.051)	(0.051)	(0.051)
Return lag	0.335***	0.335***	0.335***	0.335***	0.150***	0.153***	0.150***	0.151***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.048)	(0.048)	(0.048)	(0.048)
M/B	-0.010*	-0.010*	-0.010*	-0.010*	0.032***	0.032***	0.032***	0.032***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Leverage	-0.415	-0.417	-0.417	-0.419	-0.589	-0.595	-0.594	-0.601
	(0.315)	(0.315)	(0.315)	(0.316)	(0.369)	(0.369)	(0.369)	(0.371)
Return Volatility	-3.619***	-3.619***	-3.621***	-3.624***	-1.624***	-1.632***	-1.637***	-1.640***
	(0.538)	(0.539)	(0.539)	(0.539)	(0.602)	(0.601)	(0.603)	(0.604)
CEO Dummy	0.256***	0.253***	0.250***	0.241***	0.765***	0.764***	0.761***	0.730***
	(0.039)	(0.039)	(0.039)	(0.039)	(0.058)	(0.057)	(0.057)	(0.057)
Constant	-1.931***	-1.924***	-1.929***	-1.923***	-0.764	-0.746	-0.769	-0.751
	(0.732)	(0.732)	(0.732)	(0.731)	(0.832)	(0.830)	(0.833)	(0.831)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31,492	31,492	31,492	31,492	31,484	31,484	31,484	31,484
Adjusted R-Squared	0.444	0.444	0.444	0.444	0.398	0.399	0.399	0.397

Table 10: Executive Annual Bonuses and CEO Departures

This table reports the results of regressing CEOs bonuses on a forthcoming pension freeze, CEO departure reasons, and other firm characteristics. We estimate the following OLS regression:

$$Bonus_{ijt} = \alpha + \beta_1 \times Pre\ Depart(1)_{ij} + \beta_2 \times DepartReasons_{ij} + \beta_3 \times Pre\ Depart(1)_{ij} \times DepartReasons_{ij} + \gamma_1 \times Salary_{ijt} + \gamma_2 \times X_{i,t\ or\ t-1} + \eta_t + \mu_i + \varepsilon_{ijt}.$$

Pre Depart(1) is 1 if the executive is departing during the next fiscal year and 0 otherwise. Depart reasons include *Retired*, *Resigned*, *Unknown*, and *Deceased*. All control variables are the same as in Table 3. We use the sample of all firms with DB pensions. Robust standard errors in parentheses are clustered at two-digit SIC industry level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	CEO only				CEO only			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Bonus	Bonus	Bonus	Bonus	Equity	Equity	Equity	Equity
Pre Depart(1)	-0.689***	-0.254*	-0.351***	-0.358***	-0.369	-0.411***	-0.381***	-0.447***
	(0.224)	(0.135)	(0.126)	(0.123)	(0.225)	(0.155)	(0.146)	(0.141)
Retired	-0.299**				-0.387***			
	(0.130)				(0.145)			
Pre Depart(1) × Retired	0.651**				0.109			
	(0.282)				(0.280)			
Resigned		-0.402*				0.052		
		(0.207)				(0.226)		
Pre Depart(1) × Resigned		-0.232				0.007		
		(0.314)				(0.336)		
Unknown			-0.240				-0.185	
			(0.350)				(0.328)	
Pre Depart(1) × Unknown			0.011				-0.151	
			(0.530)				(0.522)	
Deceased				0.073				-1.159*
				(0.437)				(0.623)
Pre Depart(1) × Deceased				-0.110				2.040***
				(0.578)				(0.560)
Salary (ln)	0.595***	0.589***	0.588***	0.584***	0.220**	0.207*	0.211*	0.208*
	(0.095)	(0.095)	(0.096)	(0.095)	(0.110)	(0.109)	(0.109)	(0.109)

Continued (next page)

Continued (from previous page)

Sales (ln) lag	0.332***	0.330***	0.324***	0.323***	0.438***	0.421***	0.423***	0.419***
	(0.105)	(0.105)	(0.104)	(0.105)	(0.128)	(0.128)	(0.127)	(0.126)
ROA	0.836*	0.832*	0.837*	0.830*	0.074	0.085	0.092	0.092
	(0.444)	(0.446)	(0.444)	(0.444)	(0.569)	(0.560)	(0.559)	(0.560)
ROA lag	0.895**	0.879**	0.889**	0.899**	1.130**	1.141**	1.128**	1.134**
	(0.390)	(0.402)	(0.390)	(0.390)	(0.486)	(0.486)	(0.486)	(0.485)
Negative Income	-0.716***	-0.720***	-0.725***	-0.723***	-0.074	-0.074	-0.074	-0.076
	(0.118)	(0.118)	(0.118)	(0.118)	(0.114)	(0.114)	(0.113)	(0.113)
Income Increase	0.867***	0.868***	0.869***	0.872***	-0.038	-0.034	-0.037	-0.037
	(0.062)	(0.062)	(0.062)	(0.062)	(0.063)	(0.063)	(0.063)	(0.063)
Return	0.759***	0.759***	0.764***	0.764***	0.063	0.065	0.064	0.063
	(0.061)	(0.061)	(0.061)	(0.061)	(0.068)	(0.068)	(0.068)	(0.068)
Return lag	0.401***	0.401***	0.404***	0.405***	0.044	0.048	0.048	0.046
	(0.053)	(0.053)	(0.053)	(0.053)	(0.064)	(0.064)	(0.064)	(0.064)
M/B	-0.018**	-0.017**	-0.018**	-0.018**	0.038***	0.038***	0.038***	0.038***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)
Leverage	-0.805**	-0.827**	-0.827**	-0.820**	-0.771	-0.796*	-0.806*	-0.794*
	(0.358)	(0.362)	(0.359)	(0.360)	(0.475)	(0.475)	(0.475)	(0.474)
Return Volatility	-4.927***	-4.935***	-4.889***	-4.910***	-1.778**	-1.736**	-1.718**	-1.760**
	(0.635)	(0.634)	(0.637)	(0.637)	(0.720)	(0.720)	(0.723)	(0.721)
Constant	-0.786	-0.783	-0.770	-0.747	1.833*	1.912*	1.885*	1.950*
	(0.987)	(0.989)	(0.991)	(0.989)	(1.109)	(1.104)	(1.102)	(1.094)
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,279	10,279	10,279	10,279	10,279	10,279	10,279	10,279
Adjusted R-Squared	0.418	0.418	0.417	0.417	0.391	0.390	0.390	0.391

APPENDIX

Variable Name	Variable Definition
Age#+	Dummy variable that equals 1 if the executive age is greater than or equal to # in {59, 61, 63, 63–65}. For example, Age59+ equals 1 if the executive age is at least 59 and 0 otherwise.
Bonus	Ln (1+ bonus prior to 2006, Execucomp item: bonus; and 1+ bonus + non-equity incentive payout starting in December, 2006, Execucomp items: bonus + noneq_incent).We add 1 because bonuses are 0 in many cases. The unit is thousands of dollars.
Cash Flow Volatility	The standard deviation of cash flow in the past 12 quarters. Cash flow is the sum of income before extraordinary items (Compustat item: ibq) and depreciation and amortization (Compustat item: dpq)
CEO Dummy	Dummy variable that equals 1 if the executive is the CEO of the firm (Execucomp item: ceoann = 1) and 0 otherwise.
Deceased	Dummy variable that equals 1 if the executive leaves the firm because of death (Execucomp item: reason = "DECEASED") and 0 otherwise.
Equity	Ln (1+ dollar value of restricted stock and option awards calculated using the Black-Scholes model before 2006, Execucomp items: rstkgrnt + option_awards_blk_value; and 1+ grant-date fair values of stock and option awards starting in December, 2006, Execucomp items: stock_awards_fv + option_awards_fv).We add 1 because equity values are 0 in many cases. The unit is thousands of dollars.
Excess Bonus	The difference between actual bonus payout and the bonus level predicted by Eq. (1), leaving out Pre Freeze(1).
Income increase	Dummy variable that equals 1 if the firm's net income increases from last year and 0 otherwise.
Industry CF Volatility	The lagged value of the two-digit SIC industry median of cash flow volatility, which is the standard deviation of cash flow in the last ten years. Cash flow is the sum of income before extraordinary items (Compustat item: ib) and depreciation and amortization (Compustat item: dp).
Leverage	Ratio of sum of long-term and short-term debt (Compustat items: dltt and dlc) to total assets (Compustat item: at).
M/B	Ratio of market value of common equity (Compustat items: prcc_f*csho) to book value of common equity (Compustat item: ceq).
Market Capitalization	Ln (market value of equity). Market value of equity equals to the number of shares multiplied by the stock price at the end of the fiscal year (Compustat items: prcc_f*csho).
Negative Income	Dummy variable that equals 1 if the firm's net income is negative and 0 otherwise.
Relative Pension Size	Ratio of the projected pension benefit obligation (Compustat Item: pbpro) to total assets (Compustat item: at).

Continued (from previous page)

Post Freeze(1)	Dummy variable that equals 1 if the firm freezes its DB pension plan the previous year and 0 otherwise.
Post Freeze(2)	Dummy variable that equals 1 if the firm freezes its DB pension plan two years prior and 0 otherwise.
Pre Freeze(1)	Dummy variable that equals 1 if the firm freezes its DB pension plan in the next fiscal year and 0 otherwise.
Pre Freeze(2)	Dummy variable that equals 1 if the firm freezes its DB pension plan in two years and 0 otherwise.
Pre Freeze(3)	Dummy variable that equals 1 if the firm freezes its DB pension plan in three years and 0 otherwise.
Resigned	Dummy variable that equals 1 if the executive leaves the firm and the reason for departure is resigned (Execucomp item: reason = "RESIGNED") and 0 otherwise.
Retired	Dummy variable that equals 1 if the executive leaves the firm and the reason for departure is retired (Execucomp item: reason = "RETIRED") and 0 otherwise.
Return	Stock return (including distribution and reinvestment from CRSP) in the fiscal year (CRSP item: ret).
Return Volatility	Volatility of monthly stock return of the 12 months in the fiscal year.
ROA	Ratio of net income to total assets (Compustat items: ni/ta).
Salary	Ln (1 + salary) (Execucomp item: salary). We add 1 because of about 800 records of zero salary. The unit is thousands of dollars.
Sales	Ln (sales) (Compustat item: sale).
Target Bonus	The estimated future payout under Non-Equity Incentive Plan. We obtain the variable from the Grants of Plan-Based Awards Table (Execucomp item: non_eq_targ). It is only available after December 15, 2006, and is given in thousands of dollars. We use Ln (1+ target bonus) in our regression analysis.
Underfunded	Dummy variable that equals 1 if the ratio of the company's overall pension assets to pension obligations (Compustat items: pplao/pbpro) is less than 80% and 0 otherwise.
Unknown	Dummy variable that equals 1 if the executive leaves the firm for an unknown reason (Execucomp item: reason = "UNKNOWN") and 0 otherwise.