Journal of Corporate Finance 30 (2015) 257–277

Contents lists available at ScienceDirect

Journal of Corporate Finance

journal homepage: www.elsevier.com/locate/jcorpfin

Do corporate managers skimp on shareholders' dividends to protect their own retirement funds?☆

Assaf Eisdorfer [a], Carmelo Giaccotto [a], Reilly White [b,*]

[a] University of Connecticut, United States
[b] University of New Mexico, United States

ARTICLE INFO

Article history:
Received 18 April 2014
Received in revised form 15 December 2014
Accepted 17 December 2014
Available online 23 December 2014

JEL classification:
G35
J33

Keywords:
Executive compensation
Dividend policy
Agency theory

ABSTRACT

What is the impact of long-term executive compensation, particularly large pension payouts, on the firm's current dividend policy? We argue that managers with high pension holdings are less likely to adopt a high dividend policy that can risk their future pension payouts. Using a hand-collected actuarial pension dataset we show that (i) dividend payments are significantly lower when manager compensation relies more heavily on pension payouts; (ii) higher compensation leverage and inside debt have a significant negative effect on dividend payments net of stock repurchases; and (iii) the negative effect of pension on dividend is significantly weaker when pensions are protected in a pre-funding rabbi trust. We show further that this agency behavior reduces firm performance.

1. Introduction

Corporate managers are assumed to represent the interests of shareholders, and thus should take actions that maximize the value of equity. Yet, managers often have their own incentives that may not be perfectly aligned with shareholders' interests. These include reputation concerns (Narayanan (1985)), empire-building interests (Jensen's (1986)) and risk-aversion due to undiversified wealth and human capital invested in the firm (Jensen and Meckling (1976); Treynor and Black (1976); Parrino et al. (2005)). There exist also compensation-based incentives: meeting short-term bonus targets (Waegelein (1988)), risk-taking incentives due to large stock-option holdings (Coles et al. (2006)), and lowering the likelihood of default that risks pension payouts (Sundaram and Yermack, 2007).

We investigate how compensation-based considerations, particularly the size of pension plans, affect the firm's current dividend policy. In general, the literature suggests that managers who are heavily compensated with debt-based instruments, such as pensions, tend to manage the firm more conservatively because they are exposed to default risk (Sundaram and Yermack, 2007; Cassell et al., 2012). While these studies focus on the default risk as a tool to protect future pension payouts, we analyze the cash flow policy effects. We argue that firm executives with high pension holdings will be reluctant to adopt a high dividend policy because this essentially commits the firm to a constant or growing level of dividends for the foreseeable future. Managers know, and the literature confirms, that once a firm starts paying dividends, cutting or omitting those dividends will have negative consequences in terms of both the

☆ We thank Leslie Boni, Hsuan-Chi Chen, Chinmoy Ghosh, John Harding, Po-Hsuan Hsu, Thomas O'Brien, Jim Sfiridis, participants at the finance seminar series at the University of Connecticut, the University of New Mexico, Loyola University of New Orleans, and the audience at the FMA 2012 annual meeting for valuable comments.
* Corresponding author at: University of New Mexico, Anderson School of Business, 1 University of New Mexico, Albuquerque, NM 87131, United States. Tel.: +1 860 990 1663.
E-mail addresses: Assaf.Eisdorfer@business.uconn.edu (A. Eisdorfer), Carmelo.Giaccotto@business.uconn.edu (C. Giaccotto), reillywhite@unm.edu (R. White).

http://dx.doi.org/10.1016/j.jcorpfin.2014.12.005
0929-1199/

stock price and the reputation of the managers (see, e.g., Michaely et al. (1995)). Thus, executives may be hesitant to commit the firm to large cash distributions that might leave fewer funds available for future pension payouts. Instead managers can elect to either keep funds in the firm or distribute cash to shareholders in the form of stock buybacks. The benefits of these options are clear as they do not commit the firm to permanent future cash payouts.

To estimate the present value of pensions we manually collected data on pension plans for 272 of the largest firms listed on the U.S. stock exchanges over a ten-year period between 2000 and 2009. Instead of a CEO-only database used in previous studies, we collect data on all firm executives (typically five per firm-year). We measure the importance of pension in two ways. The first is the present value of the manager's pension divided by the sum of this present value and the values of stocks and stock-options held by the manager (this ratio is typically referred to as 'compensation leverage'). The second is the pension's present value divided by the book value of the firm's total assets. The first measure is designed to capture the relative importance of pensions in the manager's long-term compensation package, while the second captures the magnitude of the firm's inside debt. We also apply two measures for the level of dividends. First is the dividend yield, defined as the annual dividend per share divided by the stock price at the end of the year. The second measure is the dividend payout ratio, defined as dividends paid during a given year divided by the income available to shareholders in the same year.

Regression results support our theory: high levels of compensation leverage and inside debt are associated with consistently lower dividend yield and dividend payout ratio. This association remains significant when we examine the compensation of CEO-only and all top executives; the results are robust to the estimation procedure and various subsamples. We further show that the observed effect of executive pensions on dividend policy is not driven by endogeneity — i.e., by the possibility that firms that typically maintain a lower level of dividends can direct more funds into pension plans.

The results above capture the effect of pension plans on the managers' decision to pay dividends against all other possible uses of the firm's cash, including re-investment or keeping funds in the company. We further explore the relationship between pension values and the form of cash payouts. That is, after deciding the optimal level of cash to distribute to shareholders, the manager must choose the form of the payout: cash dividend or stock repurchase. We predict that managers with higher future pension claims will prefer cash distributions in the form of a stock repurchase because it is perceived as a one-time payout, while dividends are viewed as a long-term commitment. We find that the main results hold when adjusting the dividend payments for net stock repurchases.

Another interesting finding of our study is related to the level of protection of the executives' pensions. We examine the details of the individual pension contracts and find that a sizeable proportion of our sample firms (24%) offer pre-funded pensions via a rabbi trust. Funding a pension prior to the executive's retirement appears to weaken the cash-preserving incentive of the manager because the risk of losing her pension is significantly neutralized. Alternatively stated, the negative effect of pension plans on dividend policy is significantly stronger when pensions are unfunded.

Last, we examine the costs associated with pension-dividend agency behavior. We argue that in making payout decisions, managers who have pension-based considerations will be less committed to maximizing firm value. Specifically, managers who are reluctant to initiate or increase dividend payments, because they want to protect their future pension payouts, will be more likely to direct the firm's funds into less-than-optimal investment channels. To test this proposition, we look at common proxies of operating performance (ROA, ROE, and ROI) in the subsequent years as a reflection of the quality of current investments. We find that when a change in dividend policy is associated with larger pension plans, it is more likely to reduce the firm's operating performance. This finding provides further support for the existence of the agency problem analyzed in this study.

Our paper contributes to the literature by highlighting an aspect of agency theory that has not been analyzed: saving shareholders' dividends for managers' retirement. Prior studies have shown that managers can deviate from value-maximizing corporate decisions in order to serve their own interests, such as reputation concern, empire-building incentives, and short-term compensation targets. Along this line, we find that managers who are entitled to high, and especially unprotected, pension payments typically prefer low cash dividend distributions to safeguard their future pensions.

The paper proceeds as follows. The next section reviews the related literature. Section 3 states our hypotheses, Section 4 outlines the estimation procedures, Section 5 describes the data, Section 6 tests the hypotheses, Section 7 explores the costs of the agency behavior, and Section 8 concludes.

2. Related literature

The theory on the separation of ownership and control for the modern corporation appears to have originated with Berle and Means (1932). This early analysis has evolved into the modern concept of agency theory as a result of the influential work of Jensen and Meckling (1976). The basic premise is that non-owner managers can adopt corporate decisions that serve their interests at the expense of the owners. Building on this concept, the theoretical literature has identified a variety of incentives that can lead managers to deviate from policies that maximize shareholder value.

For example, undiversified wealth and human capital invested in the firm may lead risk-averse managers to make sub-optimal decisions to reduce firm risk (see, e.g., Jensen and Meckling (1976), Treynor and Black (1976), and Parrino et al. (2005)). Another example is known as the empire-building hypothesis (see Jensen, 1986): executives of bigger firms appear to have more prestigious jobs. Thus, managers have a built-in incentive to increase the size of their company to achieve more prestige in society; this incentive can lead to over-investment that, in turn, reduces shareholder value. Similarly, reputation considerations can lead managers to make decisions that yield short-term gains at the expense of the long-term interests of the shareholders (see Jensen and Meckling (1976),

Fama (1980), Amihud and Lev (1981), Narayanan (1985), Eisenhardt (1989), Schliefer and Vishny (1990), Lane et al. (1998), and Reichelstein (2000)).

In addition to the managerial incentives discussed above, executives can deviate from an optimal policy if by doing so they can increase the value of their compensation package. For example, Guay (1999) and Coles et al. (2006) demonstrate that managers will prefer highly risky investments if the value of their compensation package, particularly stock-option holdings, is positively related to firm risk. Jensen's (1986) empire-building hypothesis discussed above suggests that managers tend to engage in wasteful investments that increase firm size (e.g., takeovers and acquisitions) to enjoy the higher compensation that comes with managing a larger firm. Sundaram and Yermack (2007) show that managers holding large pensions tend to pursue strategies that reduce overall firm risk in order to lower the likelihood of default that risk pension payouts.

Agency theory has been linked also to a firm's dividend policy. Since Black (1976), many researchers have tried to solve two aspects of the "dividend puzzle": why do only some firms pay dividends, and what determines the level of payout? This literature is vast, so we omit discussions related to signaling, taxes, and behavioral arguments, and concentrate on aspects related to agency theory. Easterbrook (1984) suggests that persistent dividend payouts require managers to raise external funds more often, and thus managers are better monitored by the capital markets. Jensen (1986) argues that paying dividends reduces the firm's discretionary free cash flow that could otherwise be deployed by firm managers for their benefits. Rozeff (1982) develops a model showing that an optimal dividend payout ratio minimizes the sum of agency costs and transaction costs. Fluck (1998) and Myers (2000) present agency-theoretic models of dividend behavior where managers pay dividends in order to avoid disciplining actions by outside shareholders.

Other studies show that compensation considerations are present in the dividend policies chosen by managers. Lewellen et al. (1987) provide evidence that the dividend payout ratio is positively related to the fraction of salary and bonus in the manager's total compensation, and is negatively related to the fraction of equity-based compensation. Lambert et al. (1989) predict and find that the introduction of executive stock-option plans induces managers to reduce the dividend relative to the expected level. This is because the payment of dividend reduces the value of the options. White (1996) and Fenn and Liang (2001) also find a negative association between stock-options and dividends. And similarly, Brown et al. (2007) find that firms with large executive stock ownership initiated or increased dividends in response to the 2003 dividend tax cut, while firms with large executive stock-option holdings did not do so.

As in Lewellen et al. (1987) and Lambert et al. (1989), our study links executive compensation structure to dividend policy. We address an agency theory aspect that has not been explored in the literature: the effect of long-term executive compensation, particularly pension payouts, on the firm's current dividend policy. Our paper is also related to the work of Sundaram and Yermack (2007) and Cassell et al. (2012). These studies show that managers prefer to keep default risk and equity risk low in order to protect their future pension payouts. Another related study is provided by Edmans and Liu (2011), who suggest that executive pensions can mitigate agency problems by incentivizing managers to preserve firm value in distress situations. Our study shows how large pension plans can generate agency behavior incentives, and demonstrates how managers may manipulate cash flow distributions to protect their pension.

3. Hypotheses

Manager compensation contains components that are more equity-like (stocks and stock-options) and components that are more debt-like (pension and deferred compensation). Thus high levels of equity-based (debt-based) compensation align managers' interests with those of the shareholders (bondholders). One important conflict between shareholders and bondholders concerns the firm's divided policy. When shareholders pay themselves dividends, the future claims of the bondholders become less secure (i.e., lower asset coverage); thus, bondholders have a natural aversion to dividends (see Smith and Warner (1979)).

We argue that the pension plan size provides a similar conflict of interests between managers and shareholders. A persistent distribution of the firm's earnings to shareholders will lower the firm's internal funds; but to secure future pension payouts, it would be in the best interest of managers to keep funds internally. This conflict of interest is even more significant, because the manager holds "inside debt" (Jensen and Meckling, 1976) and at the same time controls the firm's dividend policy.

The decision to pay a dividend in a certain year has two important implications. First, the cash outflow reduces the level of funds available to the firm, and second, the dividend payment signals an unwritten commitment that the firm will maintain at least the same level in the coming years. Managers know that reducing or omitting future dividends will have negative consequences such as a significant decline in stock price and damaging the reputation of the firm's managers (see, e.g., Michaely et al. (1995)). The alternative options for using the firm's cash flow – keeping funds in the firm, open market stock repurchase, or even reinvestment – do not signal a continuous payout commitment. We therefore expect a negative relationship between the level of pension-based compensation in the form of Supplemental Executive Retirement Plans (SERPs)[1] and dividend payments. Our first hypothesis is as follows.

H1. Firms with larger executive pension plans will pay lower dividends.

Note that the first hypothesis captures the effect of pension plans on the managers' decision to pay dividends against all other possible uses of the firm's cash, including reinvestment or keeping funds in the company for future liquidity needs. Because the manager's

[1] Supplemental Executive Retirement Plans are aimed at providing compensation above and beyond those typically provided by a corporation, such as 401(k) plans or non-qualified deferred compensation. The IRS also specifies maximum dollar limitations on benefits and contributions from qualified plans: effective January 1, 2014, defined benefit plans are 'capped' at $210,000 annually; SERPs have no such benefit limitations.

decision to pay dividends is driven also by a set of advantages/disadvantages of dividends versus other possible uses of the firm's cash flows (e.g., available investments, tax effects), we focus next on the form of the payout. In particular, after deciding the optimal level of cash that should be distributed to shareholders, the manager can still choose a preferred form of the payout: cash dividend or stock repurchase. As discussed above, dividends are a long-term commitment, and changes to dividend policy can substantially alter the market perception of the firm. In contrast, stock repurchases are typically viewed as a one-time payout. We expect therefore that high pension-based compensation will result in lower level of dividends, relative to stock repurchases. Our second hypothesis is as follows.

H2. Firms with larger executive pension plans will pay lower dividends net of stock repurchases.

The ultimate question for any manager is whether the firm will be willing and able to pay her pension entitlement upon retirement. To reduce anxiety related to the firm's ability to pay future pension benefits, firms may choose to pre-fund the executive pension entitlements via a rabbi trust. Firms with pre-funded pensions (about 24% of our sample firms) may establish a rabbi trust to hold the pension assets of each executive. We argue that a funded pension plan reduces the manager's cash-preserving incentives.

Bachelder (2002) reports that a firm choosing to fund a SERP for an executive has a number of regulatory hurdles to overcome. Rabbi trusts are instruments that were developed to help defer the taxability of a corporation or individual, and are natural vehicles for funding SERPs.[2] A company can transfer financial assets to a rabbi trust for the exclusive benefit of the executive under the condition that the assets remain liable to the company's creditors in a default. Despite the absence of creditor protection, we argue that the presence of funded pension neutralizes the cash-preserving incentive. This is especially true given that most managers are entitled to an actuarial lump-sum pension value on reaching retirement age, thus leaving concerns related only to losing their pension in the years leading up to their retirement.[3] Our third hypothesis is therefore as follows.

H3. The negative association between pension size and dividend payments will be weaker when pensions are pre-funded.

4. Variable estimation

We measure the level of a firm's annual dividend payment by both the dividend yield (dividend paid during the year divided by share price at the end of the year) and the dividend payout ratio (dividend paid divided by available income). We measure the dividend net of stock repurchase by the dividend minus the difference between stock repurchase and stock issuance in the same year, scaled by book value of total assets at the end of the year. We adjust all measures to industry averages, as individual industries have substantially different demands and expectations for dividend policy (we provide details in Table 2).

We consider two measures of the extent of pension value. The first measure captures the relative importance of pensions in the manager's long-term compensation. We divide the present value of the manager's pension by the sum of this present value and the values of stocks and stock-options held by the manager. This ratio is typically referred to as 'compensation leverage'. We do not take into account current components of compensation (i.e., current salary and bonus) as our objective is to assess the long-term incentives of managers to save firm funds. The second measure captures the magnitude of the firm's inside debt; it is given by the present value of the pension divided by the book value of the firm's total assets. Both compensation leverage and inside debt measures are used at the CEO level and also for all top executives; all are adjusted to industry averages. We provide below a detail description of the compensation estimation procedures.

4.1. Pension value

Pensions, as defined here, refer to SERPs (Supplemental Executive Retirement Plans). SERPs allow executives to receive retirement benefits far greater than they would be normally entitled to under federal insurance guidelines. These pension benefits represent unfunded and unsecured debt claims against the firm, and in the event of insolvency, have equal standing with other unsecured creditors. Further, SERP is a form of compensation separate from the related Long-Term Incentive Plans (LTIPs).[4]

Sundaram and Yermack (2007) explain the calculation of pension data in great detail. Using a database of 237 Fortune 500 CEO's over a 7-year period (1996–2002), they demonstrate the significant role of pensions as a form of debt-based compensation. Our database extends Sundaram and Yermack's sample by using hand-collected data for 272 firms drawn from the 700 largest companies by market capitalization over a 10-year period (2000–2009). Instead of a CEO-only database, we use data on all firm executives (typically five per firm-year). The resulting sample includes three additional years and approximately six times more firm-year data points than the original Sundaram and Yermack's sample.

[2] Rabbi trusts, in turn, have been used more recently (in conjunction with SERPs) to allow firms to 'set aside' funding for executives. The IRS's private letter ruling in Dec. 1980 (PLR 8113107) established that these assets would not count as income as long as they were accessible to creditors.

[3] The lump-sum option is used by roughly 69% of our sample firms. This option offers executives the ability to cash out the actuarial value of their pension entitlement upon retirement rather than in annual installments. Managers who have this option may be less concerned with long-range firm viability, as they can 'cash out' at retirement. While not reported here, we test how the presence of lump-sum payment affects dividend payments. Managers offer mildly lower dividend yields when the lump-sum payment is unavailable.

[4] The effect of LTIPs on our pension valuation should be fairly minimal. For example, restoration plans, common LTIPs, are typically covered to high earning employees (in one company for instance, those earning above $130,000), but SERPs are offered to an even smaller, more elite groups of executives. If an executive qualifies for a SERP and the company offers restoration benefits, they are typically deducted from the SERP benefit. Restoration plans are difficult (or impossible) to calculate given their very limited disclosure; further, they are much smaller than SERPs.

Table 1
Descriptive statistics. The table presents descriptive statistics on the sample firms. P25, P50, and P75 indicate the 25th, 50th, and 75th percentiles of each variable. Dividend yield is the annual dividend per share divided by the stock price at the end of the year. Dividend payout ratio is the dividend paid during a year divided by the income available to shareholders in the same year. Firm size (in log terms) is the end of year firm stock price multiplied by the number of shares outstanding (presented in billions of dollars). Book-to-market ratio is the book value of equity divided by market value of equity. Debt/equity is the book value of long-term debt divided by book value of equity. Capital expenditures and cash flow from operations are scaled by total assets. Income (in log terms) is the annual net income (in millions of dollars). Market beta is the monthly fundamental beta reported by Compustat. Cash dividend refers to the amount of cash dividends declared during the year (in millions of dollars). ROA (return on assets) is net income divided by book value of total assets. ROE (return on equity) is net income divided by book value of equity. ROI (return on investment) is net income divided by total investment. Distance-to-default is calculated via the Merton–KMV framework. Firm age refers to the age of the firm as reported in Compustat. Past stock return is the cumulative return during the past twelve months. Liquidity constraint is a binary variable equal to one if a negative operating income was posted for the year. Tax loss is a binary variable equal to one if the firm reported a net tax loss carry forward during the year. Compensation leverage is the present value of the pension of the firm's top managers divided by the present value of pension and the values of the stocks and stock-options held by the managers. Inside debt is the pension value divided by book value of total assets. Actuarial pension value is based on the estimation procedure outlined in Section 4.1 (in millions of dollars). Salary and bonus refer to the annual terms in a given year scaled by total assets. Stock-option refers to the value of the unexercised stock-options held by the manager (as estimated in Section 4.2), scaled by total assets. Executive age refers to the age of the executive during the particular firm-year; and 'M' is a multiplier value roughly equivalent to the per-dollar percentage of pension contribution for each dollar earned. The table also reports the percentage of CEOs, CFOs, and other top executives in the sample, and the percentage of firm-years according to annual change in dividend policy; growing dividend yield/payout ratio is where the annual change is greater than 5%; declining dividend yield/payout ratio is where the change is lower than −5%; and steady dividend yield is where the changes is between −5% and 5%. Data represent 272 firms over the period 2000–2009. The far right column shows the median values of S&P 500 firms over the same period with respective frequencies for liquidity constraints and tax losses.

	N	Mean	Std. dev.	0.25	Median	0.75	S&P 500 median
Firm-level variables							
Dividend yield	2097	0.022	0.030	0.010	0.019	0.030	0.013
Dividend payout ratio	1981	0.329	0.445	0.093	0.274	0.470	0.185
Log(size)	2098	4.185	0.692	3.721	4.193	4.557	3.967
Book-to-market ratio	1976	0.331	1.182	0.160	0.247	0.395	0.366
Debt/equity	1929	0.854	9.446	0.315	0.600	1.122	1.653
Capital expenditures/assets	2016	0.064	1.801	0.012	0.041	0.116	0.034
Cash flow from operations/assets	1817	0.097	0.065	0.052	0.093	0.134	0.093
Log(income)	2098	6.573	1.268	5.842	6.529	7.289	2.745
Market beta	1935	1.026	0.513	0.688	0.948	1.286	0.987
Cash dividend	2098	489.9	1056.0	57.1	182.5	471.0	113.0
ROA	1900	0.056	0.062	0.020	0.050	0.087	0.049
ROE	1900	0.122	0.543	0.093	0.150	0.221	0.142
ROI	1900	0.089	1.254	0.050	0.089	0.146	0.082
Distance-to-default	2097	2.534	1.251	1.640	2.320	3.226	2.261
Firm age	2098	91.99	47.74	57.00	95.00	120.00	59.00
Past stock return	1980	7.70%	11.32%	−16.02%	5.15%	23.77%	1.49%
Liquidity constraint (dummy)	2121	0.016					0.139
Tax loss (dummy)	2121	0.756					0.351
Executive compensation values							
Compensation leverage, CEO[a]	2104	0.184	0.042	0.129	0.181	0.271	
Compensation leverage, all executives[a]	1929	0.207	0.182	0.066	0.164	0.295	
Inside debt, CEO (×1000)[a]	1908	0.702	1.350	0.092	0.308	0.760	
Inside debt, all executives (×1000)[a]	1908	1.468	3.182	0.215	0.689	1.623	
Actuarial pension value	8399	3.712	5.949	0.720	1.817	4.139	
Salary and bonus/assets	8708	0.926	2.726	0.064	0.232	0.691	
Stock-option value/assets	8708	0.342	1.007	0.017	0.079	0.301	
Executive age (instrumental variable)	6667	53.814	6.022	50.000	54.000	58.000	
M (instrumental variable)	6311	0.023	0.039	0.015	0.017	0.020	

Executives by position	Total N	Number	Proportion
CEO	8955	2104	0.235
CFO	8955	931	0.103
Other Executive positions[b]	8955	5920	0.662

Dividend characteristics	Total N	Number	Proportion
Firm issued dividend	2105	1723	0.887
Growing dividend yield (>5% change)	2105	767	0.395
Steady dividend yield (change +/− 5%)	2105	442	0.228
Declining dividend yield (<−5% change)	2105	733	0.377
Growing payout ratio (>5% change)	2105	665	0.353
Steady payout ratio (change +/−5%)	2105	468	0.248
Declining payout ratio (<−5% change)	2105	752	0.399

[a] Aggregated at the firm level.
[b] CEOs and CFOs were identified by hand from data. Additional executive titles include: executive vice-president, senior vice-president, divisional president, chief consul, and many others.

Table 2
Dividend and pension by industry. The table reports the averages of dividend yield, dividend payout ratio, compensation leverage, and inside debt, by 2-digit SIC industry codes.

Industry	SIC	N	% of total	Dividend yield	Dividend payout ratio	Compensation leverage		Inside debt (×1000)	
						CEO	All execs	CEO	All execs
Agriculture, Forestry, & Fishing	01–09	1	0.37%	0.007	0.742	0.060	0.092	0.264	0.878
Construction	15–17	1	0.37%	0.010	0.130	0.105	0.113	0.158	0.287
Finance, Insurance, and Real Estate	60–67	47	17.28%	0.010	0.390	0.156	0.153	0.149	0.260
Manufacturing	20–39	130	47.79%	0.020	0.286	0.196	0.217	0.926	1.866
Mining	10–14	15	5.51%	0.029	0.173	0.114	0.140	0.674	1.470
Nonclassifiable establishments	99	2	0.74%	0.014	0.339	0.156	0.185	0.045	0.116
Retail trade	52–59	13	4.78%	0.010	0.150	0.138	0.171	0.820	2.299
Services	70–89	12	4.41%	0.025	0.131	0.159	0.184	1.640	3.654
Transportation & Public Utilities	40–49	46	16.91%	0.006	0.464	0.248	0.271	0.321	0.704
Wholesale trade	50–51	5	1.84%	0.018	0.152	0.127	0.142	0.550	1.280
Total firms		272	100.00%						

SEC statements, as a rule, require the summary compensation information for the CEO, CFO, and three other executives. Frequently, more than five executives have information available due to changes in management, or as a function of corporate reporting policy. The disclosure of pension valuation became significantly more transparent in 2006. Prior to July 2006, the SEC required that pension values be expressed in a tabled matrix of the form given in Table A1. There was no requirement to provide the actual present value of the benefit, but this value could be inferred and estimated by an investor using the procedure outlined in the next paragraphs. Firms with fiscal years on or after December 15, 2006 were required to adopt a new presentation that includes a formal computation of the present value of the pension benefit.

Table 3
Regressions of firm dividend yield on compensation leverage and inside debt. The table shows pooled OLS regressions of a firm's dividend yield on compensation leverage, inside debt, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend yield			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	−3.1244***		−3.2055***	
	(−7.28)		(−8.70)	
Inside debt		−0.0492*		−0.0466
		(−2.09)		(−1.74)
Salary and bonus/assets	0.0011	0.0073***	0.0005	0.0063**
	(1.47)	(4.02)	(0.40)	(2.54)
Stock-options/assets	0.0143*	0.0190**	0.0115	0.01701**
	(2.23)	(2.72)	(1.70)	(2.48)
Log(size)	0.0592	0.0703	−0.1326	−0.0444
	(0.01)	(0.02)	(−0.79)	(−0.22)
Book-to-market ratio	0.0006	−0.0002	−0.0001	−0.0003
	(0.29)	(−0.55)	(−0.03)	(−1.02)
Debt/equity	−0.0224***	−0.0022**	−0.2310	−0.5281**
	(−4.23)	(−2.51)	(−1.56)	(−2.88)
Capital expenditures/assets	−0.0008*	−0.0006*	−0.0005	−0.0004
	(−1.89)	(−1.84)	(−1.39)	(−1.65)
Cash flow operations/assets	0.0002*	0.0007	0.0001	−0.0009
	(1.87)	(0.78)	(0.77)	(−0.07)
Distance-to-default	−0.2635***	−0.2643***	−0.2668***	−0.2888***
	(−5.86)	(−4.93)	(−8.00)	(−7.88)
Firm age	−0.0021	−0.0027	−0.0018*	−0.0021*
	(−1.75)	(−1.81)	(−2.07)	(−1.94)
Past stock return	0.5143*	0.7136*	0.5696***	0.7694***
	(1.98)	(1.92)	(3.81)	(4.00)
Liquidity constraint	0.8210***	−0.4531**	0.8040	0.2639
	(3.71)	(3.05)	(1.79)	(0.51)
Tax loss	0.0201	0.0006	0.1799**	0.2066**
	(0.53)	(0.01)	(2.30)	(2.54)
R-square	0.2168	0.1284	0.2540	0.1649
Observations	1611	1518	1535	1448

Table 4
2SLS regressions of firm dividend yield on compensation leverage and inside debt. The table replicates the results in Table 3 using a 2SLS procedure. In the first stage we run a regression of compensation leverage and inside debt on two instrumental variables: the executive age during the sample firm year, and a multiplier factor ('M') equivalent to the percentage of pension benefit for each dollar of compensation earned. The first-stage regression results are summarized in Table B1. In the second stage we run a regression of dividend yield on the fitted values of compensation leverage and inside debt from the first-stage regression, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents the second-stage regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993) with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend yield			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	−3.3797***		−3.8465***	
	(−3.53)		(−4.40)	
Inside debt		−0.3466***		−1.1143***
		(−3.12)		(−3.99)
Salary and bonus/assets	−0.0019	0.0146***	−0.0472***	0.0367**
	(−1.31)	(4.53)	(−2.80)	(2.20)
Stock-options/assets	0.0153**	0.0285*	0.01536**	0.03314
	(2.07)	(1.80)	(2.32)	(1.26)
Book-to-market ratio	0.0006	−0.0002	−0.0001	−0.0003
	(0.29)	(−0.55)	(−0.03)	(−1.02)
Debt/equity	−0.0329	−0.0466	−0.22617	−0.2784
	(−1.33)	(−1.38)	(−0.97)	(−1.03)
Capital expenditures/assets	−0.0006*	−0.0006**	0.0003	−0.0006
	(−1.69)	(−2.54)	(0.10)	(−0.23)
Cash flow operations/assets	0.0002*	−0.0004	−0.0001	−0.0002*
	(1.67)	(−0.58)	(−0.48)	(−1.74)
Distance-to-default	−0.2252***	−0.2068**	−0.1975***	−0.1746***
	(−3.96)	(−2.36)	(−4.40)	(−2.73)
Firm age	−0.0017	−0.0024	−0.00226	0.0057
	(−0.45)	(−0.91)	(−0.14)	(0.46)
Past stock return	0.6343**	0.7797*	0.8471***	0.8021***
	(1.97)	(1.67)	(3.67)	(4.35)
Liquidity constraint	0.9894***	0.7886***	1.00457	0.2981
	(2.81)	(3.47)	(1.41)	(0.40)
Tax loss	−0.0035	−0.1408	0.13158	−0.0656
	(−0.51)	(−0.13)	(0.86)	(−0.62)
Instrumental variables	Executive age; M	Executive age; M	Executive age; M	Executive age; M
Observations	1062	1062	995	991

The sample period encompasses both systems; prior to 2006, hand-calculation was used; after 2006, present values were used where available. Since both calculations are identical (or nearly identical),[5] the sample years are considered directly comparable and contiguous. The established method for computing pension values is the actuarial present value method, detailed and explained in the two equations below. A guided example using ExxonMobil data is provided in Appendix A to clarify the calculation procedure.

The present value of a pension annuity is expressed as:

$$PV = \sum_{n=\max(0,R-A)}^{K-A} \frac{p(n)X}{(1+d)^n} \tag{1}$$

where X is the amount of the annual pension, A is the current age of the executive, R is the minimum retirement age to achieve full benefits, K is the final year of the pension, and $p(n)$ is the probability that the executive will be alive in n years. Using the 'Period Life Table', an actuarial life table available from the Social Security administration, the mortality probabilities for an executive of age A can be projected. While it is hypothetically possible for an executive to receive pension benefits indefinitely, the mortality projections of the Social Security administration end at 119 years, so K is for practical purposes set at 120 (Sundaram and Yermack (2007) assume the same value for K).

The discount rate, d, is the annualized Moody's Seasoned Aaa-rated bond yield for a given year, taken from the Federal Reserve Board's H.15 release.[6] Sample firms maintaining pensions tend to be larger and older than average, and many have established a comparable bond rating. Furthermore, firms that volunteered to provide present value data on pensions prior to 2006 used the yield of either the 10-year Treasury bond or the Aaa-rated corporate bond for that year.

[5] Where differences exist, they are in the assumption of the discount rate: while firms typically use Aaa-rated bond yield as their equivalent discount factor, some firms employed a 10-year Treasury rate or (rarely) a discount rate based on an alternative corporate bond yield. Since we examined each SEC disclosure by hand, we recalculated the actuarial pension values using a consistent rate (the Aaa-rated bond yield) if a different rate was used.

[6] Information is taken directly from the FRB archive of historical interest rate data, available at http://www.federalreserve.gov/releases/h15/data.htm.

Table 5
Regressions of firm dividend payout ratio on compensation leverage and inside debt. The table shows pooled Tobit regressions of a firm's dividend payout ratio on compensation leverage, inside debt, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend payout ratio			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	−3.7420***		−2.3947***	
	(−8.37)		(−7.91)	
Inside debt		−0.2878***		−0.2804***
		(−6.20)		(−4.32)
Salary and bonus/assets	−0.0129***	−0.0058*	−0.0027*	−0.0026
	(−8.06)	(−1.87)	(−1.75)	(−0.82)
Stock-options/assets	0.0254***	0.0260***	0.0102	0.0222**
	(3.61)	(3.77)	(1.52)	(2.37)
Log(income)	−3.4808***	−3.4485***	−3.0938***	−3.1824***
	(−16.76)	(−16.02)	(−16.83)	(−16.66)
Cash dividend	0.0007***	0.0007***	0.0007***	0.0007***
	(5.05)	(4.90)	(5.49)	(5.12)
Log(size)	4.2470***	4.0052***	3.8689***	3.8129***
	(12.62)	(10.22)	(13.16)	(11.83)
Book-to-market ratio	0.0002***	0.0002***	0.0193*	0.0186*
	(−4.40)	(−3.37)	(1.81)	(1.68)
Debt/equity	−0.0010	−0.0016	−0.0296*	−0.0289*
	(−0.66)	(−1.34)	(−1.82)	(−1.74)
Capital expenditures/assets	0.0001	0.0002	0.0009	0.0008
	(1.64)	(1.59)	(1.23)	(1.11)
Cash flow operations/assets	0.0004	0.0005*	0.0003	−0.0004
	(1.47)	(1.71)	(1.39)	(1.64)
Market beta	0.4132	0.4168	−0.1553	−0.2168
	(1.53)	(1.62)	(−0.99)	(−1.36)
Past stock return	−0.8916**	−0.7652**	−0.0708***	−0.0621***
	(−2.61)	(−2.16)	(−5.29)	(−8.26)
Observations	1502	1430	1644	1544

The most difficult portion of this calculation involves the computation of *X*, the annual pension benefit. Companies offering executive pensions will typically report defined pension annuities in the form of a generic table relating final average earnings with years of credit service. Final average earnings reflect the executives' highest annual average salary and bonus over a specified number of years. We assume that executive compensations in the most recent years are also the highest.

We compute the annual pension benefit as:

$$Pension\ Benefit = \sum_{k=1}^{P} \frac{C_{t-k}}{P} \times M \times S \tag{2}$$

where C_t refers to the cash salary and bonus compensation to each executive for year *t*, *P* refers to the number of prior years whose compensation is averaged together, and *S* refers to the executives' years of service. The years of service figure may relate to date of first hire, years of total work experience, or a number of methodologies employed by the firm. This information is provided with the pension plan table (see Appendix A). *M* refers to the multiplicative factor that describes the pension plan table, and is best interpreted as the amount (in percent) of pension benefit earned per year of service. For most firms, this figure is between 1.5 and 2.0% of average compensation per year of service. The net combination of Eqs. (1) and (2) produces the actuarial present value for the executive pension for a given year.[7]

4.2. Stock and stock-option value

The market value of common equity of a manager is estimated by the number of shares held by the manager multiplied by the share price. To estimate the value of the unexercised stock-options held by the manager we employ the procedure developed by Core and Guay (2002) (also used by Sundaram and Yermack (2007)). The options' value is estimated by the Black and Scholes (1973) model, with the following inputs' estimates.

[7] Some firms will deduct anticipated social security benefits from the annual pension award; since these are far smaller than the annual benefits entitled to most executives, no deduction is made here.

Table 6
2SLS regressions of firm dividend payout ratio on compensation leverage and inside debt. The table replicates the results in Table 5 using a 2SLS procedure. In the first stage we run a regression of compensation leverage and inside debt on two instrumental variables: the executive age during the sample firm year, and a multiplier factor ('M') equivalent to the percentage of pension benefit for each dollar of compensation earned. In the second stage we run a Tobit regression of dividend payout ratio on the fitted values of compensation leverage and inside debt from the first-stage regression, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents the second-stage regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993) with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend payout ratio			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	−5.5174***		−7.1505	
	(−3.24)		(−1.08)	
Inside debt		−0.5817*		−0.4870
		(−1.77)		(−1.18)
Salary and bonus/assets	−0.2533***	−0.0538	−0.0963	0.1003
	(−4.70)	(0.97)	(-1.13)	(1.11)
Stock-options/assets	0.1209***	0.1917	−0.0436	0.1038
	(3.20)	(1.21)	(−0.40)	(0.87)
Log(income)	−7.1791**	−5.4134**	−6.3727	−5.3005
	(−2.48)	(−2.42)	(−1.61)	(−1.56)
Cash dividend	0.0025***	0.0016*	0.0033	0.0014
	(2.98)	(1.73)	(1.34)	(1.43)
Log(size)	6.5197*	2.7233**	0.8021*	3.8984*
	(1.79)	(2.54)	(1.82)	(1.74)
Book-to-market ratio	−0.0004***	0.0002**	−0.0001	−0.0002
	(−3.68)	(2.07)	(−0.24)	(−0.09)
Debt/equity	−0.0638**	−0.2788***	−0.0079	−0.3295
	(−2.20)	(−8.55)	(−0.32)	(−1.38)
Capital expenditures/assets	0.0007**	0.0003***	0.0008	0.0002**
	(2.02)	(9.19)	(1.25)	(2.19)
Cash flow operations/assets	−0.0002	0.0004	−0.0003	0.0005
	(−1.45)	(1.18)	(−0.81)	(0.86)
Market beta	0.7769***	1.8321**	−0.4702	−0.2741
	(4.16)	(2.26)	(0.63)	(−0.60)
Past stock return	−4.3354***	−1.6092	−0.3201	−1.0830**
	(−3.77)	(−1.53)	(−1.25)	(−2.46)
Instrumental variables	Executive age; M	Executive age; M	Executive age; M	Executive age; M
Observations	913	913	1067	1062

The exercise price of the unexercised stock-options is measured in two steps. Using ExecuComp data we first compute the ratio of the realizable value of in-the-money exercisable options to the number of unexercised exercisable options; we then estimate the exercise price by subtracting this ratio from the firm's stock price at the end of its fiscal year. Following Sundaram and Yermack (2007) the maturity of all outstanding stock-options is set to six years. Stock price volatility is measured by the standard deviation of the stock return in the previous 60 months. The dividend yield, taken over a three-year period, is estimated by the Fama and French (1988) procedure. The risk-free rate is set equal to the one-year T-bill yield.

4.3. Compensation leverage and inside debt

Given the values of pension, stocks, and stock-options of the individual manager, the compensation leverage of the CEO is given by her pension value divided by the sum of her pension value and her stock and stock-option values. The compensation leverage for all top executives is defined as:

$$CL = \frac{\frac{1}{J}\sum_{j=1}^{J} Pension_j}{\frac{1}{J}\sum_{j=1}^{J}\left(Pension_j + Stocks_j + Options_j\right)} \tag{3}$$

where *J* is the number of top managers (typically five) in each firm in each year. This measure of compensation leverage weighs the compensation leverage ratios of the firm's top executives according to the values of their compensation components. The inside debt at the CEO level is given by the value of the CEO's pension divided by the book value of total assets, and for all executives by the sum of the values of pensions of all top executives divided by total assets.

Table 7
Regressions of dividend net of stock repurchase on compensation leverage and inside debt. The table shows pooled OLS regressions. The dependent variable is the dividend paid in a given year minus the difference between stock repurchase and stock issuance in that year, scaled by book value of total assets. The independent variables are compensation leverage, inside debt, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: [Dividends − (Repurchases − Issuances)] / Assets			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	0.0449*		−0.2240**	
	(−2.02)		(−2.31)	
Inside debt		−0.0960**		−0.0825**
		(−2.94)		(−2.34)
Salary and bonus/assets	0.0006	0.0012**	0.0001*	0.0017*
	(1.51)	(2.59)	(1.94)	(2.17)
Stock-options/assets	−0.0150***	−0.0050***	−0.0015***	−0.0213***
	(−5.73)	(−5.75)	(−5.89)	(−6.50)
Log(size)	0.0088	−0.0519	0.0065	0.0324
	(1.61)	(−0.01)	(1.28)	(1.11)
Book-to-market ratio	−0.0003	−0.0001	−0.0008	−0.0002
	(−0.16)	(−0.38)	(−0.46)	(−0.96)
Debt/equity	−0.0305	−0.0374	−0.0019	−0.0220
	(−1.43)	(−1.05)	(−1.07)	(−1.20)
Capital expenditures/assets	0.0008	0.0008*	0.0001	0.0007**
	(0.96)	(2.07)	(1.51)	(2.68)
Cash flow operations/assets	−0.0006*	−0.0009**	−0.0006***	−0.0003***
	(−2.21)	(−2.98)	(−2.34)	(−3.41)
Distance-to-default	−0.0038	−0.0246	−0.0002	0.0099
	(−0.21)	(0.92)	(−0.08)	(1.20)
Firm age	0.0004	0.0001*	0.0001	0.0006*
	(0.08)	(2.16)	(0.32)	(2.08)
Past stock return	0.1182	0.0931	0.0906	0.0565
	(1.12)	(0.65)	(0.96)	(1.04)
Liquidity constraint	−0.1957**	0.1240	0.1030	0.0803
	(−2.39)	(0.86)	(1.41)	(1.65)
Tax loss	0.1702***	0.2717**	0.1651**	0.1577**
	(3.01)	(3.09)	(2.90)	(3.09)
R-square	0.1370	0.1464	0.1302	0.1542
Observations	1193	1210	1272	1264

5. Data

To build our database we consider the 700 largest firms by US market capitalization as of December 31, 2009.[8] Out of these firms, 300 offer executive pensions (42%), while 290 (41%) provide information that allows us to calculate pensions using the methodology outlined in Section 4.1. The sample size is slightly reduced when merging with data from CRSP and Compustat. The resulting dataset includes 272 firms and 8955 executive-year data points, consisting of 2104 CEO-years (23.5%) and 6851 Non-CEO executive-years (76.4%) over the period 2000–2009.

Table 1 provides descriptive statistics of the main variables. The average actuarial pension value across all executive firm-years is $3.712 million, equating to roughly 28% of total executive annual compensation in any given period. The mean compensation leverage is 0.18 at the CEO level and 0.21 for all top executives. These ratios are slightly higher than the estimates reported in Sundaram and Yermack (2007). This small difference might reflect the substantial increase in compensation leverage ratios during the 2008 financial crisis; leverage ratios have doubled on average as a result of the decline in the values of executive stocks and stock-options.

The last part of Table 1 displays a number of dividend and payout characteristics. We observe that the mean dividend yield and dividend payout ratios are 0.022 and 0.329, respectively; these averages are comparable to values reported in prior studies. The table further shows that firms change their dividend level quite frequently. In about 75% of the firm-years in our sample the annual change in dividend yield/payout ratio is at least 5% in absolute value. This dynamic pattern of dividend payments provides a solid ground to test our hypotheses. The table also suggests that our sample firms are similar in many respects to the S&P500 index firms, yet the median firm in our sample is slightly larger than the median S&P500 firm, has fewer growth opportunities, and pays more dividends.

Table 2 shows the dividend and pension variables for the 10 individual 2-digit SIC industries in our sample. Manufacturing firms dominated the overall sample with 130 (48%) firms, followed by 47 firms (17.3%) in the Financial sector, 46 (16.9%) in the Utility sector, and 15 (5.5%) in the Mining sector. As expected, there is significant variation in the dividend policy across industries; for example,

[8] We focus on the largest 700 companies due to ease of data hand-collection and data availability. Collecting data for this project began in earnest in 2010, and took approximately one year to complete. The size of our final sample exceeds those in typical studies on executive pension.

Table 8
2SLS regressions of dividend net of stock repurchase on compensation leverage and inside debt. The table replicates the results in Table 7 using a 2SLS procedure. In the first stage we run a regression of compensation leverage and inside debt on two instrumental variables: the executive age during the sample firm year, and a multiplier factor ('M') equivalent to the percentage of pension benefit for each dollar of compensation earned. In the second stage we run a regression of dividend net of stock repurchase on the fitted values of compensation leverage and inside debt from the first-stage regression, and a set of control variables (as defined in Table 1). All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents the second-stage regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993) with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: [Dividends − (Repurchases − Issuances)] / Assets			
	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Compensation leverage	−3.1300**		−3.0730***	
	(−2.13)		(−3.34)	
Inside debt		0.0136		0.0070
		(0.97)		(0.58)
Salary and bonus/assets	0.0002**	−0.0001	0.0001	−0.0017
	(2.38)	(−0.56)	(0.37)	(−0.59)
Stock-options/assets	−0.0015**	−0.0032***	0.0011	−0.0016***
	(−2.08)	(−3.14)	(0.11)	(−3.71)
Log(size)	0.0147*	0.0144	0.0092***	0.0050**
	(1.78)	(1.38)	(2.71)	(2.19)
Book-to-market ratio	−0.0005**	−0.0001	−0.0006	−0.0007
	(−1.98)	(−1.26)	(−1.61)	(−1.15)
Debt/equity	−0.0607***	−0.0052**	−0.0067***	−0.0061***
	(−3.62)	(−2.42)	(−4.16)	(−3.32)
Capital expenditures/assets	0.0001	0.0001	−0.0001	0.0001**
	(−0.88)	(1.20)	(−0.95)	(2.08)
Cash flow operations/assets	−0.0004*	−0.0008**	0.0009	−0.0005*
	(−1.93)	(−2.01)	(−0.32)	(−1.88)
Distance-to-default	−0.0072**	0.0017	−0.0076***	0.0008
	(−1.96)	(0.73)	(−3.78)	(0.66)
Firm age	0.0003	0.0004	−0.0001	0.0005
	(−0.90)	(1.46)	(−1.17)	(1.61)
Past stock return	0.0296	0.0183	0.0283**	0.0094*
	(1.36)	(1.14)	(2.04)	(1.66)
Liquidity constraint	0.0348**	0.0069	0.0283***	0.0010
	(2.06)	(1.12)	(2.86)	(0.21)
Tax loss	0.0155**	0.0127***	0.0103***	0.0077***
	(2.21)	(2.64)	(3.79)	(3.31)
Instrumental variables	Executive age; M	Executive age; M	Executive age; M	Executive age; M
Observations	901	901	867	867

the mean dividend payout ratio varies from 0.13 (Construction) to 0.74 (Agriculture, Forestry, & Fishing). Similarly, the pension-based measures also vary considerably across industries; for example, the compensation leverage at the CEO level is 0.06 in the Agriculture, Forestry, & Fishing sector and 0.248 in the Transportation & Public Utilities sector. These differences provide a satisfactory basis for the use of industry-adjustment values of the dividend and pension variables in the empirical tests.

6. Empirical test results

6.1. Hypothesis 1

We begin our analysis by regressing a firm's dividend yield on the extent of pensions, as measured by compensation leverage and inside debt of the CEO only and for all top executives. All dividend and pension measures are adjusted to industry averages. We control for compensation components that can affect dividend payment incentives: salary and bonus and stock-option value, and for additional variables that are found in prior studies to affect dividend policy. These include size, book-to-market ratio, leverage ratio, prior year capital expenditures, cash flow from operations, distance-to-default (calculated via the Merton–KMV framework; see Crosbie and Bohn (2002)), firm age, past stock return, liquidity constraint (measured by a binary variable that equals 1 if a negative operating income was posted for that year), and tax loss (a binary variable that equals 1 if the firm reported a net tax loss carry forward during that firm-year). As the regressions rely on pooled time-series firm-level data, we also control for year fixed effects, and use Rogers' (1993) robust standard errors clustered by firm to correct for heteroskedasticity and serial correlation.

The regression results in Table 3 strongly support our hypothesis. All four models indicate that the extent of pension is associated with lower dividend payments. The results are especially strong when compensation leverage is used, for both CEO only (second column) and all top executives (fourth column); the *t*-statistics are −7.28 and −8.70, respectively. While not as strong, results are also significant for inside debt (*t*-statistics of −2.09 and −1.74). This difference may emphasize the importance of pensions in the

Table 9
Regressions of firm dividend yield by pension funding status at the CEO level. The table shows pooled OLS regressions of a firm's dividend yield on compensation leverage and inside debt at the CEO level, and a set of control variables (as defined in Table 1), separately for cases where the pensions are funded and unfunded by a rabbi trust. All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend yield			
	Compensation leverage		Inside debt	
	Funded pension	Unfunded pension	Funded pension	Unfunded pension
Compensation leverage	−2.0881***	−3.2801***		
	(−3.62)	(−7.46)		
Inside debt			0.0297	−0.1234***
			(0.80)	(−3.17)
Salary and bonus/assets	0.0040	0.0003	−0.0040	0.0081**
	(0.99)	(0.10)	(0.96)	(2.33)
Stock-options/assets	0.0199*	0.0110	0.0226*	0.0180
	(2.16)	(1.41)	(2.18)	(1.64)
Log(size)	−0.1631	−0.0689	−0.2843	−0.0642
	(−0.69)	(−0.66)	(−1.03)	(−0.31)
Book-to-market ratio	−0.0001	0.0001	−0.0007	0.0001
	(−0.58)	(0.37)	(−0.23)	(1.18)
Debt/equity	−0.0226	−0.0290**	0.0132	−0.0339
	(−0.39)	(−2.77)	(−0.03)	(−1.06)
Capital expenditures/assets	−0.0006	−0.0010*	−0.0006	−0.0007
	−(0.14)	(−1.98)	(−0.12)	(−1.57)
Cash flow operations/assets	−0.0006	0.0003	−0.0003	0.0001
	(−0.04)	(1.56)	(−0.66)	(0.79)
Distance-to-default	−0.2976***	−0.2525***	−0.3447***	−0.2318***
	(−5.79)	(−5.26)	(−7.94)	(−3.72)
Firm age	−0.0084***	−0.0011	−0.0087***	−0.0015
	(−6.72)	(−0.74)	(−6.74)	(−0.94)
Past stock return	0.0263	0.6814***	0.2306	0.9183***
	(0.25)	(5.80)	(1.29)	(4.97)
Liquidity constraint	0.7865*	0.8296	1.089**	0.1987
	(1.90)	(1.54)	(2.55)	(0.48)
Tax loss	0.3447**	−0.1442	0.4238***	−0.2127
	(2.50)	(−0.84)	(3.66)	(−1.16)
R-square	0.2969	0.2248	0.2983	0.1217
Observations	379	1225	354	1157

manager's compensation package, which is captured by the compensation leverage. The results in the table thus provide a first indication that managers with large pension plans appear less likely to commit to high dividend distributions.

We recognize that the relation between pension size and dividend policy, observed in Table 3, could involve endogeneity bias. That is, firms that typically maintain a lower level of dividends have larger internal funds available, and therefore can direct more cash into executive pension plans. To address the endogeneity concern, we employ a Two-Stage Least Squares (2SLS) regression.

We use two instrumental variables that are uniquely associated with compensation leverage and inside debt, and not with dividend policy. The first is executive age, which tends to rise with pension size. We use the CEO's age and the average age of all executives. The second is 'M', a multiplicative factor that describes the ratio of pension benefits earned per dollar of compensation. Firms with higher 'M' values allocate more money per dollar to pension benefits that those with lower 'M' values. 'M' is the same for the CEO and all executive measures, as all executives in a firm are usually under the same executive pension plan. We confirm the validity of these instruments by applying a set of tests (Kleibergen and Paap (2006) *LM*-statistic, Hansen et al. (1996) *J*-statistic, Cragg and Donald (1993) Wald *F*-statistic); and we find the instruments to be appropriate following the procedure outlined by Baum et al. (2003). The first-stage regression results, reported in Appendix B, show the strong relation between compensation leverage/inside debt and the instrumental variables.

Table 4 shows the results of the second-stage regression. The regression coefficients are generally consistent with our previous estimates. The effect of compensation leverage is statistically weaker than that observed in Table 3, but still significant (*t*-statistics of −3.53 and −4.40). Similarly, we find the effect of inside debt on dividend yield to be stronger with higher *t*-statistics of −3.12 and −3.99. These findings provide support for the proposition that there exists a negative relationship between pension values and dividend policy; furthermore the results in Table 4 suggest that the relationship is not driven by endogeneity.

We reexamine our hypothesis using the dividend payout ratio, instead of dividend yield, as the dependent variable. Although both dividend yield and dividend payout ratio represent a firm's dividend policy, they may be driven by different considerations. That is, while the dividend yield is more likely to be driven by investors' preferences, and represents a target level, the dividend payout ratio is more likely to reflect the availability of investment opportunities. Following prior studies (see, e.g., Bhattacharyya et al.

Table 10
Regressions of firm dividend yield by pension funding status for all top executives. The table shows pooled OLS regressions of a firm's dividend yield on compensation leverage and inside debt for all executives, and a set of control variables (as defined in Table 1), separately for cases where the pensions are funded and unfunded by a rabbi trust. All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend yield			
	Compensation leverage		Inside debt	
	Funded pension	Unfunded pension	Funded pension	Unfunded pension
Compensation leverage	−2.3541***	−3.4898***		
	(−3.74)	(−8.37)		
Inside debt			−0.1846	−0.0720
			(−1.04)	(−1.55)
Salary and bonus/assets	0.0012	−0.0006	0.0138	0.0070*
	(0.51)	(−0.24)	(1.33)	(1.87)
Stock-options/assets	0.0956***	0.0071	0.0987***	0.02026*
	(5.22)	(0.90)	(7.01)	(1.45)
Log(size)	−0.6540*	−0.0211	0.4936	0.00343
	(2.01)	(0.11)	(1.54)	(0.84)
Book-to-market ratio	0.0006***	0.0003	−0.0008***	0.0002
	(−4.77)	(0.05)	(−3.54)	(0.04)
Debt/equity	0.2191	−0.3491	−0.2847	−0.69642**
	(−0.93)	(−1.63)	(−0.63)	(−2.71)
Capital expenditures/assets	0.0002	−0.0007	0.0001	−0.0008*
	(1.41)	(−1.37)	(1.64)	(−2.11)
Cash flow operations/assets	0.0001**	0.0003*	−0.0006**	0.0008
	(−2.67)	(1.98)	(−2.79)	(1.15)
Distance-to-default	−0.2331***	−0.2140***	−0.2792***	−0.20983***
	(−4.38)	(−4.75)	(−4.58)	(−3.59)
Firm age	−0.0013	−0.0001	0.0027	−0.00155
	(0.47)	(−1.03)	(0.94)	(−1.82)
Past stock return	0.0034	0.7743***	0.2720	1.0630***
	(0.01)	(4.80)	(0.75)	(5.56)
Liquidity constraint	0.1546	0.8102	0.5787**	0.82177
	(0.94)	(1.04)	(2.83)	(0.69)
Tax loss	0.3891	−0.0379	0.3341	−0.0390
	(1.53)	(−0.31)	(1.14)	(−0.31)
R-square	0.3061	0.2748	0.2695	0.1831
Observations	185	887	177	828

(2008)), we include in the dividend payout ratio regressions the amount of cash dividends declared during the year, the income available to common shareholders, and the firm's market beta. Following Bhattacharyya et al. we also use a Tobit regression because it provides a better specification for the truncated distribution of the dividend payout ratio.[9]

The results reported in Table 5 are consistent with those in Table 3; again we find a negative effect of executive pensions on the dividend payment ratio (*t*-statistics between −4.32 and −8.37). Yet while the regressions in Table 3 are particularly strong when CEO-only pension is used, Table 5 shows much smaller differences between the models that use the pension of the CEO only and those that use the pension of all top executives. As in Table 4, to account for potential endogeneity effects, we reexamine the results in Table 5 using a 2SLS model with the same instrumental variables. The results of the second-stage regression reported in Table 6 are somewhat weaker, yet are mostly significant.

The results are also meaningful in economic terms. A one standard deviation increase in the CEO's compensation leverage reduces the industry-adjusted dividend yield by 0.13, and a one standard deviation increase in the CEO's inside debt reduces the dividend yield by 0.06. These effects are significant given a mean dividend yield of 0.022 and standard deviation of 0.030. Similarly, these standard increases in the CEO's compensation leverage and inside debt reduce the industry-adjusted dividend payout ratio by 0.58 and 0.15, respectively, compared to mean dividend payout ratio of 0.329 and standard deviation of 0.445. These effects are even more impressive when the compensation leverage and inside debt of all executives are used. Considering an average net income in our sample of around $1.5 billion, the average firm is expected to reduce the total amount of annual dividend payments by $850 million as a result of a standard deviation increase in compensation leverage, and by $220 million as a result of a standard deviation increase in inside debt.

We acknowledge that the results are based on a sample of large firms; thus, they may not apply to the general firm population. The question is whether the effect of pensions on dividends that we find is sample-specific and does not characterize most firms. We do not have pension data on all firms to examine this directly, but we believe that the pension-dividend relation is likely to be even stronger in small firms. First, small firms attract less attention in the stock market and thus receive less scrutiny by investors; the

[9] The pseudo R-square for Tobit regression is not very informative and is thus not reported.

Table 11
Regressions of firm dividend payout ratio by pension funding status at the CEO level. The table shows pooled Tobit regressions of a firm's dividend payout ratio on compensation leverage and inside debt at the CEO level, and a set of control variables (as defined in Table 1), separately for cases where the pensions are funded and unfunded by a rabbi trust. All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend payout ratio			
	Compensation leverage		Inside debt	
	Funded pension	Unfunded pension	Funded pension	Unfunded pension
Compensation leverage	0.1626**	−6.1427***		
	(2.02)	(−9.80)		
Inside debt			−0.0013	−0.8802***
			(−0.07)	(−3.70)
Salary and bonus/assets	−0.0018***	−0.0219***	−0.0021***	−0.0050
	(−4.19)	(−7.11)	(−3.97)	(−0.10)
Stock-options/assets	−0.0056***	0.0641***	−0.0062***	0.0969***
	(−2.98)	(3.86)	(−3.11)	(2.99)
Log(income)	−0.1517***	−4.7780***	−0.1696***	−4.6329***
	(−8.88)	(−15.73)	(−9.58)	(−14.45)
Cash dividend	0.0001***	0.0001***	0.0001***	0.0009***
	(6.44)	(4.03)	(6.07)	(3.84)
Log(size)	0.2761***	5.3788***	0.3090***	4.7953***
	(8.74)	(10.12)	(6.87)	(8.20)
Book-to-market ratio	−0.0004	−0.0005**	−0.0003	−0.0004
	(−0.54)	(−2.05)	(−0.39)	(−1.73)
Debt/equity	−0.0123***	−0.0028	−0.0077	−0.0105
	(−6.61)	(−0.41)	(−1.36)	(−1.44)
Capital expenditures/assets	0.0001	0.0001	0.0008	0.0001
	(0.37)	(0.79)	(1.06)	(0.84)
Cash flow operations/assets	−0.0002***	0.0005	−0.0002***	−0.0004
	(−7.72)	(0.99)	(−4.29)	(1.23)
Market beta	−0.0888**	−0.2356	−0.1251***	0.3106
	(−2.30)	(0.67)	(−2.72)	(0.90)
Past stock return	−0.1259***	−1.2977**	−0.1598***	−1.0282
	(−3.30)	(−2.01)	(−3.24)	(−1.43)
Observations	317	1031	291	996

lower degree of monitoring may make it easier for managers to engage in agency behavior. And second, small firms typically have more growth opportunities, thus their managers have more flexibility to change payout policies.

6.2. Hypothesis 2

The results of the previous section indicate that high levels of pension compensation lead managers to reduce dividend payments in general. Our second hypothesis focuses on the form of the payout to shareholders: dividends versus stock repurchases. After the managers have decided how to allocate the firm's cash between reinvestment and distributions to shareholders, the form of the payout will have important implications. This is because a dividend payment is viewed as a commitment to maintain a similar or rising level of payout in the coming years, while a current stock repurchase does not imply a commitment to buy back stocks in the future. To isolate the effect of pensions on the form of the payout we look at the effect of pension size on the difference between the dividend and net stock repurchases, scaled by firm assets.

Table 7 shows the regression results. Higher compensation leverage and inside debt have a significant negative effect on the dividend net of stock repurchases (*t*-statistics between −2.02 and −2.94). This suggests that managers who expect large pension payouts will prefer to distribute cash to shareholders via stock repurchases over dividends, as current repurchases do not "promise" similar payments in the following years. This result is consistent with our hypothesis. The 2SLS regressions in Table 8 show a similar effect: managers with high levels of compensation leverage prefer stock repurchases (*t*-statistics of −2.13 and −3.34). No similar effect, however, is found for the extent of inside debt.

6.3. Hypothesis 3

The association between pensions and dividends is consistent with our expectation that managers will try to avoid high dividend payments that might risk their future pension payouts. The identification of the pension plan funding status in our data provides a natural variable to further verify our hypothesis. If the theory holds, pre-funding executives' pensions before retirement should neutralize the risk of losing future pension payouts and thus weaken the managerial incentive to keep internal funds in the company.

We divide our sample into firm-years in which pension plans are funded via a rabbi trust (24% of our sample), and firm-years with unfunded pension plans. We regress dividend yield and dividend payout ratio on the extent of pensions, separately for the funded and unfunded pension plans. The results in Table 9 show that when the CEO pension is funded, the effect of compensation leverage on

dividend yield is weaker than when the pension is unfunded, but still significant (*t*-statistics of −3.62 and −7.46, respectively); the effect of CEO's inside debt is completely eliminated when the pension is funded (*t*-statistic of 0.80). Similar differences, albeit less significant for inside debt, are found when pension plans of all executives are considered (Table 10). We find even stronger results when using the dividend payout ratio. The negative effect of pensions on dividends is not significant in all regressions and is even often reversed. For the pension of the CEO (Table 11), the unfunded pension sample shows a significant negative effect of both compensation leverage and inside debt on dividend (*t*-statistics of −9.80 and −3.70), while this effect is eliminated or even reversed for funded pensions (*t*-statistics of 2.02 and −0.07). Table 12 shows similar pattern for the pension of all top executives (*t*-statistics of −7.49 and −4.70 for unfunded pension, and *t*-statistics of 1.96 and −1.41 for funded pensions).

The results in Tables 9 thru 12 have important implications. First, the mitigating effect of pension funding on the pension-dividend relation provides direct support for the premise of our study. Managers prefer lower cash flow distributions when their pension payouts are not protected. Second, funding pensions via a rabbi trust reduces the risk that managers will pay less than optimal dividends, and thus can serve as an effective tool to mitigate this manager–owner agency problem. Yet we should note that some of the results show that the negative effect of executive pensions on dividends is not completely eliminated. A reasonable explanation might be that a rabbi trust offers no actual protection from firm bankruptcy risk; although under rabbi trusts the actual likelihood of executives not receiving their pension is quite low (due to lump-sum provisions and the numerous contractual options provided to executives), creditors of a bankrupt firm can still go after the rabbi trusts' assets. Nevertheless, to the best of our knowledge this is the first study to show that pension funding status affects corporate decisions.

6.4. Robustness tests

We examine the robustness of the pension effect on dividend policy with respect to five aspects, and summarize the results in Table 13. The first aspect is the estimation procedure. We replicate the regressions reported in Tables 3 and 5 using three alternative procedures. The first is including firm-specific fixed effects with robust standard errors to control for unobserved firm heterogeneity that could affect both dividend policy and pension size. The second is Fama and MacBeth (1973) regression that controls for cross-sectional correlation. And third, as an alternative to Rogers' clustered standard errors, we apply the Newey and West's (1987) procedure modified to panel data to correct for heteroskedasticity and serial correlation.

The regression results in Panel B are very similar to the results in Table 3. The effect of compensation leverage on dividend yield is negative and significant under all three procedures (*t*-statistics between −5.31 and −7.92). The effect of inside debt on dividend

Table 12
Regressions of firm dividend payout ratio by pension funding status for all top executives. The table shows pooled Tobit regressions of a firm's dividend payout ratio on compensation leverage and inside debt for all executives, and a set of control variables (as defined in Table 1), separately for cases where the pensions are funded and unfunded by a rabbi trust. All dividend and pension measures are adjusted to industry averages. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Independent variable	Dependent variable: dividend payout ratio			
	Compensation leverage		Inside debt	
	Funded pension	Unfunded pension	Funded pension	Unfunded pension
Compensation leverage	0.1599*	−3.3608***		
	(1.96)	(−7.49)		
Inside debt			−0.2495	−0.1341***
			(−1.41)	(−4.70)
Salary and bonus/assets	0.0002**	−0.0031	0.0026	−0.0026***
	(2.34)	(−1.41)	(0.30)	(−3.25)
Stock-options/assets	−0.0042***	0.0098	0.0696**	0.0075***
	(−4.60)	(1.10)	(2.52)	(3.73)
Log(income)	−0.0405	−3.8623***	−1.1169***	−1.1797***
	(−1.34)	(−22.51)	(−8.75)	(−20.41)
Cash dividend	0.0001***	0.0009***	0.0022***	0.0003***
	(5.58)	(4.33)	(3.80)	(4.24)
Log(size)	0.0949*	4.6164***	1.6531***	1.4351***
	(1.69)	(10.68)	(8.23)	(9.49)
Book-to-market ratio	−0.0063**	0.0165	0.6773**	0.0041
	(2.39)	(1.46)	(2.43)	(1.22)
Debt/equity	−0.0086**	−0.0273	−1.0250**	−0.0075
	(−2.14)	(−1.44)	(−2.42)	(−1.55)
Capital expenditures/assets	0.0001*	0.0004	0.0009**	0.0005**
	(1.85)	(0.29)	(2.01)	(0.28)
Cash flow operations/assets	−0.0002***	0.0003	0.0001	−0.0004
	(−5.05)	(0.02)	(0.38)	(1.30)
Market beta	−0.1872***	0.0001	−1.9725	0.4143
	(−8.15)	(0.00)	(−1.56)	(0.30)
Past stock return	−0.0633**	−0.0866***	−1.8489	−0.0376***
	(−2.06)	(−6.84)	(−0.96)	(−8.78)
Observations	379	1249	354	1184

Table 13
Robustness tests. Panel A shows the coefficients of compensation leverage and inside debt from the original regression results in Tables 3 and 5. Panel B replicates these regressions using different estimation procedures: firm-specific fixed effects model with robust standard errors; Fama and MacBeth (1973) regressions with 10 annual cross-sections; and the same models with Newey–West standard errors. Panel C splits the sample into growing/steady/declining dividend yield and payout ratios. Growing dividend yield/payout ratio is where the annual change is greater than 5%; declining dividend yield/payout ratio is where the change is lower than −5%; and steady dividend yield/payout ratio is where the changes is between −5% and 5%. In Panel D we divide the sample by managerial power and governance; 'High managerial power' CEOs include those who still hold the position even though the performances of their firms in the previous five years were in the lowest quartile of their industries; and 'Low managerial power' CEOs include all others (see Cheng (2005)). 'High (Low) managerial governance' firms include those who fall into the top (bottom) quartile for both GIM and BCF governance indices that year (see Gompers et al. (2003) and Bebchuk et al. (2004)). Panel E splits the sample by CEO tenure and time until departure: CEOs in the top (bottom) quartile of tenure are 'High (Low) CEO tenure' firms. CEOs 'not near departure' have at least five years before leaving the position; 'near departure' CEOs leave the position within two years. Panel F recalculates the pension values for all executives using the applicable 10-year Treasury rate instead of the Aaa-rated bond yield. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

CEO only		All executives		
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Panel A: Original results				
	Dependent variable: dividend yield			
	−3.1244***	−0.0492*	−3.2055***	−0.0466
	(−7.28)	(−2.09)	(−8.70)	(−1.74)
	Dependent variable: dividend payout ratio			
	−3.7420***	−0.2878***	−2.3947***	−0.2804***
	(−8.37)	(−6.20)	(−7.91)	(−4.32)
Panel B. Estimation procedures				
	Dependent variable: dividend yield			
Robust fixed effects	−1.3062***	−0.0592*	−1.2690***	−0.0501*
	(−5.67)	(−1.80)	(−5.31)	(−1.63)
Fama–MacBeth	−3.2213***	−0.0670**	−3.2950***	−0.0622*
	(−6.70)	(−2.35)	(−7.28)	(−2.20)
Newey–West	−3.1240***	−0.0492	−3.0301***	−0.0474
	(−7.35)	(−1.33)	(−7.92)	(−1.26)
	Dependent variable: dividend payout ratio			
Robust fixed effects	−4.0103**	0.3331	−2.5852**	−0.2920*
	(−2.02)	(0.69)	(−2.11)	(−1.76)
Fama–MacBeth	−1.8572	−0.7823	−0.8392	−0.2670
	(−1.01)	(−1.02)	(−1.02)	(−1.24)
Newey–West	−5.1332	−0.5980	−2.5360	−0.2923
	(−1.24)	(−1.16)	(−1.04)	(−1.04)
Panel C: changes in dividend yield/payout ratio				
	Dependent variable: dividend yield			
Growing dividend yield	−2.9253***	−0.3678	−2.9249***	−0.4798***
	(−5.41)	(−1.89)*	(−6.42)	(−2.62)
Steady dividend yield	−2.5088***	−0.3980	−2.0208***	−0.5825*
	(−7.65)	(−1.56)	(−5.76)	(−2.22)
Declining dividend yield	−2.6544***	−0.3943**	−2.2238***	−0.5068***
	(−4.20)	(−2.60)	(−3.49)	(−3.40)
	Dependent variable: dividend payout ratio			
Growing payout ratio	−0.9201***	−0.0805**	−0.5850**	−0.0687**
	(−3.19)	(−2.92)	(−2.83)	(−2.78)
Steady payout ratio	−0.5657***	−0.0488**	−1.1664**	−0.0446
	(−5.60)	(−2.61)	(−3.13)	(−1.75)
Declining payout ratio	−0.3636***	−0.0331	−0.4142**	−0.0447**
	(−2.07)	(−1.70)	(−2.32)	(−2.77)
Panel D: managerial power and governance				
	Dependent variable: dividend yield			
High managerial power	−3.7463***	−0.0318	−5.0093**	−0.0273
	(−3.74)	(−0.34)	(−2.80)	(−1.16)
Low managerial power	−2.9882***	−0.0833	−2.9566***	−0.0337
	(−6.38)	(−1.61)	(−6.23)	(−1.18)
High governance	−3.6031***	−0.0222	−2.7357***	−0.0426
	(−5.85)	(−0.55)	(−9.20)	(−0.86)
Low governance	−1.7678	0.0121	−2.9583***	−0.0409***
	(−1.25)	(1.68)	(−5.79)	(−7.33)
	Dependent variable: dividend payout ratio			
High managerial power	−4.0306***	−0.0368	−7.0752***	−0.0060*
	(−5.15)	(−1.03)	(−5.60)	(−1.97)
Low managerial power	−3.2790***	−0.0089	−2.9099***	−0.0070**
	(−7.36)	(−1.32)	(−5.52)	(−2.89)
High governance	−2.9780***	−0.0045	−3.0139***	−0.0011
	(−7.25)	(−0.51)	(−7.48)	(−1.67)
Low governance	−3.2101***	−0.0232	−3.2332***	−0.0041***
	(−5.47)	(−0.58)	(−7.14)	(−7.33)

Table 13 *(continued)*

CEO only		All executives		
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Panel E: CEO tenure and departure				
	Dependent variable: dividend yield			
High CEO tenure	−3.0687***	−0.0551	−3.5210***	−0.0559
	(−6.36)	(−1.80)	(−6.23)	(−1.32)
Low CEO tenure	−2.4903***	−0.0362	−2.5959***	−0.0203**
	(−6.90)	(−0.48)	(−3.47)	(−2.66)
CEO not near departure	−3.2415***	−0.0886**	−3.2762***	−0.0138
	(−9.30)	(−3.04)	(−4.41)	(−0.48)
CEO near departure	−2.6349***	−0.0170	−4.5946***	−0.0104
	(−3.72)	(−1.49)	(−5.25)	(−1.33)
	Dependent variable: dividend payout ratio			
High CEO tenure	−3.5528***	−0.0028	−4.0670***	−0.0023***
	(−6.38)	(0.83)	(−8.57)	(−4.96)
Low CEO tenure	−3.0022***	−0.0266***	−2.5911**	−0.0930
	(−6.79)	(−3.38)	(−2.55)	(−1.39)
CEO not near departure	−3.3928***	−0.0179	−3.6042**	−0.0012*
	(−8.60)	(−1.18)	(−3.03)	(−2.13)
CEO near departure	−3.7986***	0.0030	−4.8281***	−0.0016**
	(−4.91)	(0.12)	(−4.61)	(−2.51)
Panel F: Using 10-year treasury rate in pension calculation				
	Dependent variable: dividend yield			
	−3.2164***	−0.0124***	−3.0653***	−0.0433
	(−7.78)	(−4.22)	(−9.19)	(−1.21)
	Dependent variable: dividend payout ratio			
	−3.3618***	−0.0854**	−3.2005***	−0.0989***
	(−8.00)	(−2.35)	(−8.71)	(−3.27)

yield is somewhat weaker, but mostly significant (*t*-statistics between −1.26 and −2.35). The results also indicate a negative effect of pensions on the dividend payout ratio, but are generally weaker than the results in Table 5, especially when the inside debt of the CEO is used. Overall, the results in Panel B suggest that the main findings of this study are not sensitive to the choice of the estimation procedure.

The second aspect for robustness check is regime shifting in dividend policy. To confirm that our results are not affected by firm-specific trends in dividend policy, we split the sample into three categories of changes in dividend policy: Growing dividend yield/payout ratio is where the annual change is greater than 5%; declining dividend yield/payout ratio is where the change is lower than −5%; and steady dividend yield/payout ratio is where the changes is between −5% and 5%. The results in Panel C indicate that the negative effect of pensions on dividend policy remains significant across all dividend growth rates.

The third aspect is the ability of managers to execute a desired dividend policy. We assess this ability by managerial power and corporate governance. We follow Cheng (2005) and classify high managerial power CEOs as those who still hold their position even though firm performance was in the bottom quartile of the respective industry in the past five years. We classify all others as low managerial power COEs. For corporate governance, we employ both the Gompers et al. (2003) and the Bebchuk et al. (2004) indices. We classify firms as high (low) managerial governance if they fall into the top (bottom) quartile of both GIM and BCF indices that year.

The regression results (Panel D) remain robust for the most part, although they are often stronger for CEOs with low power and high governance —and this is counterintuitive. One reason for this finding might be that high managerial power is typically correlated with large equity ownership: company founders and long-term executives tend to be proportionately larger shareholders than less powerful, more recently hired executives. Therefore, compensation derived from pensions is not as significant as equity appreciation for these executives.

With respect to corporate governance, it is not necessarily clear that higher governance standards would lead to lower pension compensation. For instance, the theoretical work of Edmans and Liu (2011) considers pensions to be an effective method of preserving firm value when close to bankruptcy. Firms with good governance might be inclined to give pension benefits as a means to preserve firm value in bad times. Our paper's analysis of how firms with high executive pension compensation tend to avoid paying dividends is a negative characteristic of successful firms in good times, but might also be construed as necessary cash-preservation during risky periods. For this reason, our results should be somewhat varied.

We also look at the tenure and departure of CEOs as they should affect their incentives to save dividends for future pension payouts. We look separately at high and low CEO tenure firms, classified by inclusion in the top and bottom quartiles of tenure. We also look separately at CEOs who have at least five years before leaving the position ('not near departure') and CEOs who leave the position within two years ('near departure'). The results reported in Panel E indicate that CEOs who are not near departure are more likely to use dividend policy to protect their future payments. This finding is expected as setting up dividend policy at an early stage generates larger amounts of cumulative savings for pension payouts. Executive tenure effects are more difficult to differentiate, yet remain significant for most samples.

Finally, Panel F shows the regression results where the calculation of the pension value uses the applicable 10-year Treasury rate instead of the Aaa-rated bond yield. The results remain very similar. The results in Table 13 suggest therefore that the main findings of this study are robust to the estimation procedure and to various subsamples representing the ability and incentives of managers to form a favorable dividend policy.

7. The costs of the agency behavior

The evidence provided in the previous sections suggests that considerations of pension securitization are present in the firm's dividend policy. This means that managers are willing to deviate from optimal corporate decisions to serve their own interests. Due to their aversion to initiate or increase dividend payments, managers can direct the firm's funds into less-than-optimal investment channels. This agency behavior therefore is likely to have negative consequences for the performance of the firm in subsequent years, when the results of current investments are realized. We examine whether current low dividend payments — that are driven by pension considerations, affect the future operating performance of the firm.

We consider three measures of firm performance: return on assets (ROA), defined by net income scaled by book value of total assets; return on equity (ROE), defined by net income scaled by book value of equity; and return on investment (ROI), defined by net income scaled by total investments. All three measures are taken in the subsequent year, and as averages of the subsequent two and three years; all measures are adjusted to industry averages (as are the dividend and pension variables). We regress these measures on the interaction between the dividend yield and the pension size measures (compensation leverage and inside debt) at the CEO level. Our argument predicts a positive coefficient of the interaction term. That is, when a decline in dividend payments is driven by the presence of large pension plans, it is more likely to reduce the firm's operating performance.

The regression results reported in Table 14 show first a negative association between dividend yield and firm performance. This is expected because, ceteris paribus, managers will retain more earnings when they can invest in profitable projects. More importantly, the interaction term between dividend yield and compensation leverage is positive and significant, especially in the long-term

Table 14
Regressions of future firm performance on the interaction between dividend yield and CEO compensation leverage. The table shows results of pooled OLS regressions. The depended variable is the firm's performance measured by return on assets (ROA), return on equity (ROE), and return on investment (ROI). ROA is net income divided by book value of total assets; ROE is net income divided by book value of equity; ROI is net income divided by total investment. All three measures are taken in the subsequent year, and as averages of the subsequent two and three years, and all are adjusted to industry averages. The independent variables are industry-adjusted CEO compensation leverage, industry-adjusted dividend yield, an interaction term between these variables, and a set of control variables defined in Table 1. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Year 1			Years 1–2			Years 1–3		
	ROA	ROE	ROI	ROA	ROE	ROI	ROA	ROE	ROI
Comp. leverage	−0.0089	−0.0493	−0.0123	−0.0018	−0.0506	−0.0012	−0.0009	−0.0119	0.0019
	(−1.14)	(−1.29)	(−0.77)	(−0.24)	(−1.17)	(−0.08)	(−0.13)	(−0.26)	(0.13)
Dividend yield	−0.139	−1.279**	−0.131	−0.0964	−1.825*	−0.0856	−0.0967	−1.410**	−0.0986
	(−1.48)	(−2.48)	(−0.88)	(−1.06)	(−2.17)	(−0.65)	(−1.38)	(−2.59)	(−1.04)
Comp. leverage * dividend yield	0.843	3.974**	3.107**	1.123*	6.550**	3.542**	1.279**	6.656***	3.884***
	(1.49)	(2.47)	(3.35)	(1.97)	(3.13)	(3.33)	(2.47)	(4.58)	(3.73)
Salary and bonus/assets	−0.0001	−0.0002	−0.0001	−0.0001	−0.0001	−0.0001	−0.0001	−0.0001	0.0001
	(−0.56)	(−0.66)	(−0.56)	(−0.51)	(−0.55)	(−0.40)	(−0.05)	(−0.06)	(−0.09)
Stock-options/assets	0.0006*	0.0017*	0.0010**	0.0006**	0.0023***	0.0010**	0.0005***	0.0020***	0.0009***
	(2.08)	(2.14)	(2.32)	(3.20)	(3.91)	(3.35)	(4.68)	(4.42)	(4.01)
Log(size)	−0.0114***	−0.0137	−0.0039	−0.0114***	−0.0173	−0.0053	−0.0123***	−0.0177	−0.007
	(−3.77)	(−0.77)	(−0.57)	(−4.74)	(−1.04)	(−0.86)	(−7.10)	(−1.25)	(−1.41)
Book-to-market ratio	0.0001	−0.0002	0.0006**	−0.0003	−0.0003	0.0003	−0.0001	−0.0001	0.0001
	(1.03)	(−0.38)	(2.52)	(−0.48)	(−0.97)	(1.39)	(−1.75)	(−1.48)	(0.56)
Debt/equity	0.0001	0.0072**	−0.0004	0.0004	0.0074**	−0.0005	0.0001	0.0036	−0.0004
	(0.40)	(2.65)	(−0.51)	(0.16)	(3.35)	(−0.85)	(0.30)	(1.42)	(−0.50)
Capital exp./assets	−0.130**	−0.650***	−0.302***	−0.0994*	−0.472*	−0.245**	−0.125***	−0.502**	−0.285***
	(−2.44)	(−4.20)	(−3.55)	(−2.06)	(−1.99)	(−2.85)	(−3.51)	(−3.01)	(−4.40)
Cash flow oper./assets	0.409***	0.901***	0.618***	0.373***	0.631**	0.553***	0.374***	0.659***	0.559***
	(17.02)	(11.13)	(16.97)	(11.00)	(2.64)	(10.27)	(13.75)	(4.15)	(12.45)
Distance-to-default	0.0032	0.0092	0.0036	0.0041*	0.0162*	0.0055	0.0041*	0.0134*	0.0055
	(1.53)	(1.14)	(0.93)	(2.06)	(2.02)	(1.50)	(2.62)	(2.00)	(1.84)
Firm age	0.0001	0.0002	0.0001**	0.0001	0.0001	0.0001*	0.0001	0.0001	0.0001*
	(0.68)	(1.46)	(2.52)	(0.49)	(1.22)	(2.10)	(0.76)	(1.40)	(2.05)
Past stock return	0.0044**	0.0162	0.0091*	0.0040*	0.0182	0.0076*	0.0025	0.0123	0.0049
	(2.47)	(1.81)	(2.00)	(2.17)	(1.54)	(1.98)	(1.68)	(1.38)	(1.44)
Liquidity constraint	−0.0146	−0.0096	−0.0179	−0.0057	−0.0019	−0.009	−0.0054	−0.0126	−0.006
	(−0.95)	(−0.15)	(−0.73)	(−0.44)	(−0.05)	(−0.48)	(−0.45)	(−0.36)	(−0.36)
Tax loss	−0.0084***	−0.0046	−0.0101*	−0.0089***	−0.0136	−1.007***	−0.0083***	−0.0105	−0.0097***
	(−3.52)	(−0.48)	(−2.30)	(−4.67)	(−1.52)	(−4.06)	(−5.92)	(−1.82)	(−4.64)
R-square	0.3186	0.1209	0.2386	0.3776	0.1298	0.2754	0.4357	0.1577	0.3149
Observations	1425	1425	1425	1420	1420	1420	1410	1410	1410

Table 15
2SLS regressions of future firm performance on the interaction between dividend yield and CEO inside debt. The table shows results of pooled OLS regressions. The depended variable is the firm's performance measured by return on assets (ROA), return on equity (ROE), and return on investment (ROI). ROA is net income divided by book value of total assets; ROE is net income divided by book value of equity; ROI is net income divided by total investment. All three measures are taken in the subsequent year, and as averages of the subsequent two and three years, and all are adjusted to industry averages. The independent variables are industry-adjusted CEO inside debt, industry-adjusted dividend yield, an interaction term between these variables, and a set of control variables defined in Table 1. The sample represents data on 272 firms over the period 2000–2009. The table presents regression coefficients and *t*-statistics, based on standard errors adjusted for heteroskedasticity and autocorrelation following Rogers (1993), with year fixed effects. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

	Year 1			Years 1–2			Years 1–3		
	ROA	ROE	ROI	ROA	ROE	ROI	ROA	ROE	ROI
Inside debt	0.0021	0.0085**	0.0047**	0.0024***	0.0107**	0.0049**	0.0011**	0.0081***	0.0035***
	(1.69)	(2.48)	(2.36)	(3.82)	(3.11)	(3.05)	(2.72)	(3.48)	(4.41)
Dividend yield	−0.0284	−0.786	0.0474	−0.0363	−1.311	0.0191	−0.0508	−1.147*	−0.0039
	(−0.27)	(−1.52)	(0.31)	(−0.36)	(−1.58)	(0.12)	(−0.59)	(−2.17)	(−0.03)
Inside debt * dividend yield	0.278**	1.167*	0.692***	0.351*	2.144*	0.816**	0.268**	1.671**	0.742***
	(2.54)	(1.85)	(3.92)	(2.30)	(1.97)	(3.18)	(2.37)	(2.40)	(4.08)
Salary and bonus/assets	−0.0002	−0.0005	−0.0003	−0.0002	−0.0004	−0.0002	−0.0001	−0.0003	−0.0001
	(−0.76)	(−1.13)	(−1.01)	(−0.87)	(−1.70)	(−1.08)	(−0.43)	(−1.69)	(−0.74)
Stock-options/assets	0.0007	0.0019*	0.0011*	0.0007**	0.0025***	0.0010**	0.0005**	0.0020***	0.0008**
	(1.66)	(2.00)	(1.93)	(2.35)	(3.93)	(2.71)	(2.90)	(4.33)	(3.04)
Log(size)	−0.0108**	−0.0098	−0.0022	−0.0112***	−0.0153	−0.0042	−0.0128***	−0.0172	−0.0069
	(−3.20)	(−0.50)	(−0.27)	(−4.55)	(−0.85)	(−0.61)	(−7.51)	(−1.14)	(−1.25)
Book-to-market ratio	0.0001	0.0007	0.0007***	−0.0006	−0.0002	0.0004	−0.0002*	−0.0004	0.0002
	(−1.09)	(0.16)	(4.00)	(−0.60)	(−0.43)	(1.38)	(−1.91)	(−1.05)	(0.64)
Debt/equity	0.0001	0.0063	−0.0003	−0.0001	0.0081**	−0.0005	0.0001	0.0036	−0.0003
	(0.11)	(1.36)	(−0.39)	(−0.13)	(2.52)	(−0.67)	(0.14)	(1.10)	(−0.28)
Capital exp./assets	−0.127**	−0.623***	−0.294***	−0.0976**	−0.441*	−0.239**	−0.120***	−0.470**	−0.277***
	(−2.94)	(−4.06)	(−4.01)	(−2.36)	(−1.92)	(−3.15)	(−3.67)	(−2.81)	(−4.64)
Cash flow oper./assets	0.405***	0.933***	0.625***	0.362***	0.617**	0.549***	0.363***	0.648***	0.554***
	(14.78)	(10.61)	(14.57)	(9.77)	(2.46)	(9.35)	(11.82)	(3.90)	(11.04)
Distance-to-default	0.0033	0.0087	0.0041	0.0038	0.0151	0.0053	0.0041**	0.0132*	0.0058*
	(1.60)	(1.03)	(1.07)	(1.85)	(1.84)	(1.44)	(2.57)	(2.00)	(2.01)
Firm age	0.0002	0.0002	0.0001**	0.0002	0.0002	0.0001**	0.0002	0.0002	0.0001**
	(0.96)	(1.66)	(3.07)	(0.79)	(1.41)	(2.38)	(1.16)	(1.81)	(2.41)
Past stock return	0.0044**	0.0165	0.0087*	0.0043*	0.0195	0.0076*	0.0031*	0.015	0.0053
	(2.39)	(1.78)	(1.99)	(2.15)	(1.57)	(1.95)	(1.90)	(1.54)	(1.58)
Liquidity constraint	−0.0149	−0.0094	−0.0182	−0.0061	−0.0054	−0.0096	−0.0058	−0.014	−0.0063
	(−0.89)	(−0.14)	(−0.72)	(−0.45)	(−0.14)	(−0.52)	(−0.48)	(−0.41)	(−0.37)
Tax loss	−0.0083***	−0.0045	−0.0119**	−0.0092***	−0.0164	−0.0132***	−0.0088***	−0.0145**	−0.0127***
	(−3.57)	(−0.47)	(−2.65)	(−5.59)	(−1.70)	(−5.72)	(−7.84)	(−2.44)	(−7.38)
R-square	0.3159	0.1384	0.2423	0.3773	0.1427	0.2811	0.4379	0.1704	0.3205
Observations	1342	1342	1342	1338	1338	1338	1329	1329	1329

regressions (the *t*-statistics for the three-year averages are 2.47, 4.58, and 3.73). Table 15 shows similar effect of inside debt on the relation between dividend and future performance. That is, when a reduction in dividend payment is associated with an increase in pension size, it will have a weaker effect on firm performance. This finding is consistent with our prediction; in the presence of large pension plans, managers may reduce dividends to cover future pension payouts, even in the absence of good investment opportunities.

8. Conclusions

We address a manager–owner agency aspect that has not been analyzed in the literature. We argue that managers with relatively high pension plans will have a personal and natural aversion to distribute profits to shareholders. Firms that pay dividends have an unwritten commitment to maintain similar payouts in the following years; such distributions increase the risk that the firm will not be able to meet future pension obligations to retired executives. We therefore expect that the extent of executive pension plans will lead to lower current dividend policy.

Using hand-collected database on executive compensation, we find empirical support for our prediction. Consistent with agency theory, higher levels of executive pensions generate a more restrictive firm dividend policy. Particularly, we show that firms maintain a relatively low dividend yield and dividend payout ratio when the proportion of pension value in the executives' compensation package is high, and when the pension value represents a high fraction of the firm assets.

The results also indicate that given a desirable level of payout to shareholders, the firm's managers prefer cash distributions in the form of stock buyback over dividends in the presence of large pension plans. We find further that when pension plans are secured by pre-funded rabbi trusts, the negative effect of pension size on dividend payments is significantly weaker and often eliminated. Lastly, we explore the consequences of this pension-dividend agency behavior for future firm performance. We show that the presence of pension-based considerations in current payout policy results in a decline in the firm's profitability. These findings suggest that pension plans and their funding status play a significant role in the manager–owner agency theory.

Appendix A. An example of the pension value estimation procedure

Using ExxonMobil as an example firm, we can establish how the pension computation is performed for each executive. In this case, Lee R. Raymond, the Chief Executive Officer of ExxonMobil in 2004, provides the example representation.

In Table A1, we have produced the same pension table disclosure available to investors of ExxonMobil in fiscal year 2004. While investors may reference annual reports to access these tables, they are presented more conveniently in Definitive 14A statements. The table records years of service in five-year increments on the horizontal axis, and final average earnings in $500,000 increments on the vertical axis. Final average earnings are defined as the average of the three highest years of salary and bonus awards in the ten years prior to retirement. We assume the most recent three years of Mr. Raymond's compensation are his three highest years of compensation in the last ten years, yielding a three-year average of $6.582 million in earnings credited towards retirement.

For each executive firm-year, a sufficient historical salary and bonus level of each executive was computed. To begin the sample at 2000, firms requiring three years of historical compensation needed SEC data beginning in 1998, and for firms requiring five years, 1996 was the first year of hand-collection. For many executives, especially those requiring five or more years of averaged compensation to compute their earnings, historical data was unavailable for as much time as was needed. To compute average compensation for these executives, salaries and bonuses were 'downwardly weighted' to the oldest year. For example, if five years of data was required to average an executive's compensation and four years were available, the most recent three years were waited equally and the most distant year double-weighted to generate a five-year proxy.

Mr. Raymond's widely-available birth year of 1938 establishes his age at the end of 2004 at 66; for other executives, age information was obtained from 10-Ks (when available), and using a variety of other sources including old news articles, obituaries, and public records indexing services. Retirement age to achieve full benefit is 60.

The multiplicative factor M can be determined algebraically from Table A1: the addition of every $1,000,000 in final average earnings generates $480,000 of additional pension compensation for 30 years of service; this corresponds to 0.48 (48% of total average compensation) for 30 years, or 0.016 (1.6%) of final average earnings for each year of service. Raymond, as of 2004, has 42 years of service credit towards retirement.

Table A1
Pension Plan Disclosure for ExxonMobil Corp, FY 2004.
The pension benefit table is taken directly from the FY 2004 DEF-14A statement filed by ExxonMobil on April 13, 2005, p. 21.

Renumeration	Years of credited service at normal retirement			
	30	35	40	45
500,000	240,000	280,000	320,000	360,000
1,000,000	480,000	560,000	640,000	720,000
1,500,000	720,000	840,000	960,000	1,080,000
2,000,000	960,000	1,120,000	1,280,000	1,440,000
2,500,000	1,200,000	1,400,000	1,600,000	1,800,000
3,000,000	1,440,000	1,680,000	1,920,000	2,160,000
4,000,000	1,920,000	2,240,000	2,560,000	2,880,000
6,000,000	2,880,000	3,360,000	3,840,000	4,320,000
8,000,000	3,840,000	4,480,000	5,120,000	5,760,000
10,000,000	4,800,000	5,600,000	6,400,000	7,200,000
12,000,000	5,760,000	6,720,000	7,680,000	8,640,000
14,000,000	6,720,000	7,840,000	8,960,000	10,080,000

The Pension Plan Table section of the Definitive 14A provides the following information: "The qualified pension plan benefit is based on average annual salary over the highest paid consecutive 36-month period during the employee's last 10 years of employment."

For executives like Lee Raymond that are over the full-benefit retirement age, the annual calculated pension entitlement is based on the value if they retired this year. We can therefore assume that Raymond will work through his 66th year, at which point he will retire with 42 years of service. Following Eq. (2), we can calculate his annual pension entitlement credited upon retirement as $0.016 \times 42 \times \$6.582 = \$4.423$ million. For executives that are under retirement age, we calculate their anticipated years of total services upon reaching retirement age; for ExxonMobil, this is at age 60.

To complete Eq. (1), we require Raymond's age, A (66); R, the company's retirement age (60); d, the cost of long-term debt; and $P(n)$, the probability that Raymond will be alive and receiving pension disbursements n years into the future. The cost of long term debt, determined from the Federal Reserve Statistical Release H15 for Moody's Aaa rated bonds was $d = 0.0563$ for 2004. Using the statistical tables provided by the U.S. Social Security Administration, we can infer that Raymond has a 98.2% chance of being alive to receive a retirement payment at age 67, 96.2% chance of surviving until age 68, and so forth until age 120.[10]

The summation of each year's actuarial present value contribution establishes our present value of Raymond's pension benefit at the end of 2004: $52.420 million.

[10] The odds of Lee Raymond surviving even to age 111 are so minimal, that no additional present value is added beyond this age. Thus, the age 120 truncation is appropriate based on current longevity estimates.

Appendix B

Table B1
First-stage of 2SLS regression. The table presents the first stage of the 2SLS regressions provided in Table 4 (similar first-stage regression results are obtained for the regressions in Tables 6 and 8). We run a regression of compensation leverage and inside debt on two instrumental variables: the executive age during the sample firm year, and a multiplier factor ('M') equivalent to the percentage of pension benefit for each dollar of compensation earned. *, **, and *** indicate significance at the 0.1, 0.05, and 0.01 levels, respectively.

Instrumental variable	CEO only		All executives	
	Compensation leverage	Inside debt	Compensation leverage	Inside debt
Executive age	0.0029***	0.0511***	0.0026*	0.0165***
	(3.55)	(5.56)	(1.76)	(2.63)
'M' pension compensation factor	6.2007***	2.4789**	7.4399***	14.5484
	(5.96)	(2.19)	(4.45)	(1.60)

References

Amihud, Y., Lev, B., 1981. Risk reduction as a managerial motive for conglomerate mergers. Bell J. Econ. 12, 605–617.
Bachelder, J.E., 2002. Securing payouts of supplemental executive retirement plans. N. Y. Law J. 227 (53) (March 20, 2002).
Baum, C.F., Schaffer, M.E., Stillman, S., 2003. Instrumental variables and GMM: estimation and testing. Stata J. 3, 1–31.
Bebchuk, L., Cohen, A., Ferrell, A., 2004. What Matters in Corporate Governance? Discussion Paper No. 491, John M. Olin Center for Law, Economics, and Business. Harvard Law School.
Berle, A., Means, G., 1932. The Modern Corporation and Private Property. MacMillan, New York.
Bhattacharyya, N., Mawani, A., Morrill, C., 2008. Dividend payout and executive compensation: theory and evidence. Account. Finance 9, 47–62.
Black, F., 1976. The dividend puzzle. J. Portf. Manag. 2, 5–8.
Black, F., Scholes, M., 1973. The pricing of options and corporate liabilities. J. Polit. Econ. 81, 637–654.
Brown, J.R., Liang, N., Weisbrenner, S., 2007. Executive financial incentives and payout policy: firm responses to the 2003 dividend tax Cut. J. Financ. 62, 1935–1965.
Cassell, C., Huang, S., Sanchez, J.M., Stuart, M.D., 2012. Seeking safety: the relation between CEO inside debt holdings and the riskiness of firm investment and financial policies. J. Financ. Econ. 103, 588–610.
Cheng, S., 2005. Managerial entrenchment and loss-shielding in executive compensation. Working Paper. University of Michigan.
Coles, J.L., Daniel, N.D., Naveen, L., 2006. Managerial incentives and risk-taking. J. Financ. Econ. 79, 431–468.
Core, J., Guay, W., 2002. Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. J. Account. Res. 40, 613–630.
Cragg, J.G., Donald, S.G., 1993. Testing identifiability and specification in instrumental variables models. Econ. Theory 9, 222–240.
Crosbie, P.J., Bohn, J.R., 2002. Modeling Default Risk, KMV LLC.
Easterbrook, F., 1984. Two agency-cost explanations of dividends. Am. Econ. Rev. 74, 650–659.
Edmans, A., Liu, Q., 2011. Inside debt. Eur. Finan. Rev. 15, 75–102.
Eisenhardt, K.M., 1989. Agency theory: an assessment and review. Acad. Manag. Rev. 14, 57–74.
Fama, E.F., 1980. Agency problems and the theory of the firm. J. Polit. Econ. 88, 288–307.
Fama, E.F., French, K.R., 1988. Dividend yields and expected stock returns. J. Financ. Econ. 22, 3–26.
Fama, E.F., MacBeth, J.D., 1973. Risk, return and equilibrium: empirical tests. J. Polit. Econ. 81, 607–636.
Fenn, G.W., Liang, N., 2001. Corporate payout policy and managerial stock incentives. J. Financ. Econ. 60, 45–72.
Fluck, S., 1998. Optimal financial contracting: debt versus outside equity. Rev. Financ. Stud. 11, 383–418.
Gompers, P., Ishii, J., Metrick, A., 2003. Corporate governance and equity prices. Q. J. Econ. 118, 107–155.
Guay, W., 1999. The sensitivity of CEO wealth to equity risk: an analysis of the magnitude and determinants. J. Financ. Econ. 53, 43–71.
Hansen, L., Heaton, J., Yaron, A., 1996. Finite sample properties of some alternative GMM estimators. J. Bus. Econ. Stat. 14, 262–280.
Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. Am. Econ. Rev. 76, 323–329.
Jensen, M.C., Meckling, W.H., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. J. Financ. Econ. 3, 305–360.
Kleibergen, F., Paap, R., 2006. Generalized reduced rank tests using the singular value decomposition. J. Econ. 127, 97–126.
Lambert, R.A., Lanen, W.N., Larcker, D.F., 1989. Executive stock option plans and corporate dividend policy. J. Financ. Quant. Anal. 24, 409–425.
Lane, P.J., A.A., Cannella, J., Lubatkin, M.H., 1998. Agency problems as antecedents to unrelated mergers and diversification: Amihud and Lev reconsidered. Strateg. Manag. J. 19, 555–578.
Lewellen, W., Loderer, C., Martin, K., 1987. Executive compensation contracts and executive incentive problems: an empirical analysis. J. Account. Econ. 287–310 (December).
Michaely, R., Thaler, R., Womack, K., 1995. Price reactions to dividend initiations and omissions: overreaction and drift? J. Financ. 50, 573–608.
Myers, S., 2000. Outside equity. J. Financ. 55, 1005–1037.
Narayanan, M.P., 1985. Managerial incentives for short-term results. J. Financ. 40, 1469–1484.
Newey, W.K., West, K.D., 1987. A simple positive semidefinite heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica 55, 703–708.
Parrino, R., Poteshman, A.M., Weisbach, M.S., 2005. Measuring investment distortions when risk-averse managers decide whether to undertake risky projects. Financ. Manag. 34, 21–60.
Reichelstein, S., 2000. Providing managerial incentives: cash flows versus accrual accounting. J. Account. Res. 38, 243–269.
Rogers, W., 1993. Regression standard errors in clustered samples. Stata Tech. Bull. 13, 19–23.
Rozeff, M.S., 1982. Growth, beta and agency costs as determinants of dividend payout ratios. J. Financ. Res. 5, 249–259.
Schliefer, A., Vishny, R.W., 1990. Equilibrium short horizons of investors and firms. Am. Econ. Rev. 80, 148–153.
Smith, C.W., Warner, J.B., 1979. On financial contracting: an analysis of bond covenants. J. Financ. Econ. 7, 117–162.
Sundaram, R., Yermack, D., 2007. Pay me later: inside debt and its role in managerial compensation. J. Financ. 62, 1551–1588.
Treynor, J.L., Black, F., 1976. Corporate investment decisions. In: Myers, Stewart C. (Ed.), Modern Developments in Financial Management. Praeger, New York, pp. 310–327.
Waegelein, J.F., 1988. The association between the adoption of short-term bonus plans and corporate expenditures. J. Account. Public Policy 43–63 (March).
White, L., 1996. Executive compensation and dividend policy. J. Corp. Financ. 2, 335–358.