

Institutional Investor Legal Type and the Use of CEO Equity-based Incentives*

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Abstract

In this paper, I re-examine the relation between legal type of institutions and CEO equity-based incentives and extend prior research by providing evidence to examine assertions in the business press that some conflicting institutional incentives compromise the role of institutional investors in firms' corporate governance. The results question the assumption of previous literature that public pension funds, mutual funds, and endowments and foundations are relatively *pressure-resistant* to firms' management because these investors are less likely to have a business relationship with firms (Brickley et al. 1988). Consistent with recent assertions in the business press that mutual funds' desire to sell 401(k) management and other financial services to the same companies can compromise their monitoring capabilities, I find that institutions generally do not appear to influence their portfolio firms to design CEO compensation packages that are more sensitive to firm performance. This paper contributes to recent debates regarding whether institutions such as mutual funds are truly *pressure-resistant* monitors of executive pay practice.

Key Words: institutional investors, legal type, CEO compensation

Data Availability: All data are available from public databases identified in the paper

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At the end of the day, most asset managers are reluctant to pick fights with management because these big corporations are the ones who can write big checks to money-management firms for business.

– Don Phillips, Morningstar Inc., *The Wall Street Journal*, March 28, 2006.

1. Introduction

The purpose of this paper is to examine whether the legal form of a firm's institutional investors is associated with firms' use of CEO equity-based incentives. Institutional investors have become increasingly important as equity holders in the U.S. financial market. Stock ownership of pension funds, investment companies, bank-trusts, and insurance companies dramatically increased during the 1980s. The changing pattern of U.S. equity ownership from individuals to institutions suggests that institutions have strong incentives to closely monitor their investee firms' management. Prior research supports this contention by documenting that institutional investors began to abandon their traditional passive role and become more active participants in the governance of their corporate holdings (Holmstrom and Kaplan 2001; Gillan and Starks 2000). One important factor in firms' corporate governance that institutional investors can actively monitor is the process of evaluating and rewarding managerial performance (e.g., Hartzell and Starks 2003).

Critics of U.S. executive pay have raised a concern that CEO contracts do not provide strong enough incentives to increase value (that is, there is too little relationship between pay and performance). For example, Bebchuk and Fried (2004) argue that executives' large compensation packages have been much less sensitive to their own performance than has been commonly recognized. They suggest that pressure-resistant

institutional investors could be potential forces that monitor and curb CEO's alleged rent extraction (Bebchuk and Fried 2003).¹

Because a potential business relationship with the firm could constrain institutions' ability to monitor executive pay, prior research on the relation between institutional ownership and executive compensation employs the framework proposed by Brickley et al. (1988), classifying institutional ownership in terms of the extent to which business relationship can reduce ownership power. Brickley et al. (1988) label banks, insurance companies, and nonbank trusts as *pressure-sensitive* since these investors are susceptible to influence due to their business relationships with firms.² They label public pension funds, mutual funds, and endowments and foundations as *pressure-resistant* because these investors are less likely to have a business relationship with firms. Using the Brickley et al. (1988) taxonomy to capture differences among institutions, David et al. (1998) and Almazan et al. (2005) find that the percentage holdings or ownership concentration by *pressure-resistant* institutional investors is positively associated with pay-for-performance sensitivities and negatively associated with the level of executive pay, whereas stock ownership by *pressure-sensitive* institutional ownership is not significantly related.³

Recent evidence, however, casts doubts on the validity of the Brickley et al. (1988) classification of pressure-sensitive versus pressure-resistant institutions. For example, using

¹ In response to these public concerns on executive pay practice, some activist institutional investors, such as CalPERS, launched a broad campaign intended to curb soaring executive pay and increase the linkage between executive pay and performance (Chan 2004).

² Brickley et al. (1988) find that pressure-resistant institutions are more likely to oppose firm managers than pressure-sensitive institutions when they vote on anti-takeover amendments.

³ The sample period of both David et al. (1998) and Almazan et al. (2005) is from the early 1990s to mid 1990s. David et al. (1998) use the percentage holdings held by pressure-resistant versus pressure-sensitive institutions as their main explanatory variables and Almazan et al. (2005) use the degree of concentrated ownership held by pressure-resistant versus pressure-sensitive institutions as their main explanatory variables.

the 2004 proxy voting data by large mutual fund families that became publicly available in accordance with the SEC's new regulation, Davis and Kim (2005) provide evidence that mutual funds with business ties are more likely vote with management, consistent with compromised fiduciary responsibility through management of employee benefit plans. Proxy voting records also reveal that mutual funds, in general, do not appear to use their voting power to constrain executive pay or tie it more closely to firm performance (Levitz, 2006; Corporate Library 2006).⁴

Motivated by recent claims that institutions are unwilling to use their considerable voting power to enact executive compensation reform, I re-examine the relation between the legal type of institutions and CEO compensation and challenge the previous findings by David et al. (1998) and Almazan et al. (2005). I use the CDA Spectrum classifications, that is, banks, insurance companies, investment companies and other. I further decompose the "other" group into corporate or private pensions, public pensions, and university and foundation endowments. Using the sensitivity of annual options and restricted stocks and total CEO equity portfolio incentives in response to a change in stock price as a proxy for pay-for-performance sensitivity, I test the association between institutional investor classifications based on legal form and CEO equity incentives. Specifically, after controlling for concentrated institutional ownership with the fraction of institutional ownership held by the top five largest institutional investors in the firm (Hartzell and Starks 2003), I investigate whether the percentage of holdings by different legal types of

⁴ A study by Corporate Library (2006) examines 18 large fund groups' votes on matters regarding executive pay. The study reveals that the funds agreed 75.6% of the time when firms asked for shareholder approval of a new stock option plan or other compensation package, whereas they agreed just 27.6% of the time when shareholder advocates submitted proposals to restrict executive pay (Corporate Library 2006).

institutional investors are associated with the extent to which CEO equity portfolios are sensitive to a change in stock price.

I find that the percentage holdings and ownership concentration by banks are significantly negatively related to pay-for-performance sensitivity from new options and stocks and from total CEO equity holdings. In contrast to conventional wisdom that public pensions are active and vocal monitors of executive pay, I do not find evidence that the percentage holdings and ownership concentration by public pensions are significantly positively associated with pay-for-performance sensitivity for CEOs of companies in their portfolios. Surprisingly, in the case of pay-for-performance sensitivity from new options and stocks, I find that the percentage holdings by public pensions are significantly negatively related to pay-for-performance sensitivity. Finally, I find very weak evidence that the ownership concentration by investment advisors is positively related to the pay-for-performance sensitivity from new options and stocks but it is not related to total CEO equity incentives. I also find little or no evidence that percentage holdings by investment advisors are positively related to pay-for-performance sensitivity.

Taken together, these results question the assumptions of previous literature that public pension funds, mutual funds, and endowments and foundations are relatively *pressure-resistant* to firms' management. Consistent with recent assertions in the business press that institutions' desire to sell 401(k) management and other financial services to the same companies can compromise their monitoring capabilities, these institutions may not influence the design of CEO compensation packages to be more sensitive to firm performance.

One interesting finding is that the percentage holdings and ownership concentration by banks are significantly negatively related to the pay-for-performance sensitivity. This is consistent with bank trusts discouraging equity incentives in investee companies or not showing preference for firms with strong link between CEO wealth and firm performance because of their strong incentive to avoid imprudent and risky investments. These findings are especially striking given that prior research generally assumes that banks are susceptible to influence exercised by management due to potential business relationships. Banks' monitoring of executive pay appears to stem from strong fiduciary responsibilities that motivate them to avoid stocks that courts would view as imprudent. Coupled with recent findings that banks appear to constrain their portfolio firms' aggressive financial reporting practices (Ashbaugh-Skaife et al. 2004), my findings suggest that more research needs to be done with respect to the role of banks in firms' corporate governance.

This paper makes contributions to the institutional ownership and executive compensation literature in the following ways. First, this study provides evidence consistent with assertions in the business press that conflicting incentives that institutions face are likely to compromise the role of institutional investors in firms' corporate governance. Unlike previous studies that rely on early through mid-1990s data, this study does not find evidence that institutions that appear to be more independent, such as mutual funds and public pension funds, effectively monitor executive pay. Second, this study highlights the role of banks in influencing firms' executive pay decisions. Banks' strong fiduciary responsibilities could motivate them to avoid the stocks of firms with more CEO wealth tied to change in stock price since higher CEO wealth sensitivity to stock price could

provide managers with perverse incentives to engage in earnings manipulations (Cheng and Warfield 2005; Bergstresser and Philippon 2005; Burns and Kedia 2005). Third, this study uses a more powerful measure of the pay-for-performance sensitivity from total CEO equity portfolio incentives rather than the percentage of annual CEO compensation that is equity-based (David et al. 1998) or the pay-for-performance sensitivity from new options and stocks (Almazan et al. 2005) used by prior research. It also employs a more refined classification of pensions and endowments.

The remainder of the paper is organized as follows. I review prior literature and develop my hypotheses in Section 2. Section 3 describes my sample and variables, and presents descriptive statistics. Section 4 presents my estimation models and results and concluding remarks are offered in Section 5.

2. Hypotheses Development

2.1. Institutional Investors' Activism

Ryan and Schneider (2002) define investor activism as “the use of power by an investor either to influence the processes or outcomes of a given portfolio firm or to evoke large-scale change in processes or outcomes across multiple firms through the symbolic targeting of one or more portfolio firms”. Evidence suggests that some U.S. institutional investors have become active in monitoring corporate governance in recent years (Gillian and Starks 2003; Del Guercio and Hawkins 1999; Parrino et al. 2003). It is well documented that in particular, public pension funds and union pension funds have become more active participants in the governance of their portfolio firms. Empirical studies have documented institutional shareholder activism using a particular institutional investor such

as California Public Employees Retirement Systems (CalPERS) or College Retirement Equities Fund (TIAA-CREF) (Nesbitt 1994; Smith 1996; Carleton et al. 1998). Institutional shareholder activism is manifested through negotiations with corporate management, publicly targeting corporations through the media, and presenting shareholder proposals at corporate annual shareholders' meeting.

Thus, it is posited that if institutions generally consider liquidity to be more important than monitoring and trading costs are low enough, institutions will simply sell shares of firms that have "bad" governance (Coffee 1991). Although this liquidity versus control issue may make the role of institutional investors in influencing firms' governance questionable and they could actually abandon their holdings in underperforming companies, often the holdings are so large that the shares cannot be sold without driving the price down and suffering further losses (Gillan and Starks 2000). Furthermore, the fact that pension funds index a large portion of their portfolios precludes them from selling underperforming stocks.⁵ This suggests that even though rational institutional investors are likely to weigh costs and benefits associated with engaging in activism with companies in their portfolios, high costs involved with selling their holdings may force them to be "reluctantly" involved with monitoring of firms' governance (Ryan and Schneider 2002).

2.2. Use of Equity-based Incentives for CEOs

Hall and Murphy (2003) argue that a renewed emphasis on shareholder value, favorable tax rules and accounting treatment of stock options, and the 1990s bull market collectively resulted in a huge escalation of stock option grants in the 1990s. Stock-based

⁵ Parrino et al. (2003) reports that in 1997, the largest public pension funds in California, Texas, New York, and Florida had more than half of their stock portfolio indexed.

compensation that explicitly ties executive pay to firm stock performance can align executives' incentives more directly with shareholders' interest in firm value, as compared to cash compensation tied to short-term accounting performance, and results in higher pay-for-performance (Hall and Liebman 1998).

Nevertheless, a growing body of research provides evidence that questions the net benefit of using stock-based pay.⁶ Bebchuk and Fried (2003) argue that the CEO's influence over the board, and specifically, over re-nominations to the board, creates pressure for directors to acquiesce to the CEO's desired compensation, suggesting that stock options may be used as an invisible way for CEOs to extract rents. Furthermore, recent empirical and anecdotal evidence suggests that heavy use of stock-based compensation provides managers with perverse incentives to maximize their wealth with stock prices boosted by accounting earnings, sometimes fraudulently (Cheng and Warfield 2005; Bergstresser and Philippon 2005; Burns and Kedia 2005). Cheng and Warfield (2005) and Bergstresser and Philippon (2005), for example, find a significantly higher incidence of meeting or just beating analysts' forecasts for managers with high stock-based compensation, and the finding seems driven by income-increasing abnormal accruals. Burns and Kedia (2005) show that the sensitivity of the CEO's option portfolio to stock price is significantly positively related to earnings restatements.

2.3. Institutional Legal Type and the Use of Equity-based Incentives

2.3.1. Banks

⁶ For more complete discussion of two opposing views on stock options, see Hanlon et al. (2003).

I expect the legal form of institutional investor to influence a company's use of equity-based incentives. Because there is significant variation among different types of institutions in their exposure to liability under prudent-man laws (Del Guercio 1996), fiduciary restrictions that institutional investors face significantly differ by their legal forms (Bushee 2001; Bushee et al. 2004). For example, bank trusts face strong fiduciary responsibilities (e.g., state trust law) to motivate them to avoid stocks that courts would view as imprudent (Bushee 2001). Del Guercio (1996) finds that bank managers significantly tilt the composition of their portfolios towards stocks that are viewed by the courts as prudent while mutual fund managers do not. Shang (2003) provides evidence that institutions that are subject to strong fiduciary standards (such as banks) significantly decrease their ownership in firms with high levels of earnings management than mutual funds and brokerage firms.

This suggests that to the extent that equity-based incentives are associated with the likelihood of firms' managing earnings, banks may reduce their investment in firms with higher stock-based CEO compensation or discourage the board from using equity-based incentives for rewarding CEOs.⁷ Recent evidence collectively suggests that stock options generate incentives for earnings management (Cheng and Warfield 2005; Bergstresser and Philippon 2005; Burns and Kedia 2005). Erickson et al. (2003) study 46 firms accused of fraud by the SEC and find that the probability of accounting fraud increases with the percent of total executive compensation that is equity-based. A negative association

⁷ Brickley et al. (1988) label banks, insurance companies, and non-bank trusts as *pressure-sensitive* because these investors are susceptible to influence from firms' executives due to their potential business relationship with firms. If this is the case, to the extent executives prefer fixed cash compensation, which imposes less risk than equity incentives, the holdings by bank trusts will be negatively related to the use of equity incentives.

between bank ownership and CEO equity-based incentives also would be consistent with the findings by Ashbaugh-Skaife et al. (2004) that the percentage of holdings by bank trusts is negatively associated with the magnitude of discretionary accruals, suggesting that banks prefer to invest in prudent stocks.

Taken together, I expect bank trusts to discourage equity incentives in investee companies or not to show preference for firms with a strong link between CEO wealth and performance because of their strong incentive to avoid imprudent and risky investments. Therefore, I predict that the board of a company with more shares held by bank trusts may tilt the structure of CEO compensation away from using equity-based incentives, leading to the following hypothesis:

H1: The percentage of holdings by bank trusts is negatively associated with the pay-for-performance sensitivity of options and restricted stock newly granted and the level of total CEO equity portfolio incentives.

2.3.2. Investment Advisors

Unlike bank trusts, investment advisors (including mutual funds) are subject to fewer fiduciary standards. Furthermore, prior research documents that the percentage holdings or ownership concentration by investment advisors is positively associated with pay-for-performance sensitivities, suggesting that they are likely to better monitor executive pay due to lower incidence of business relationships with investees (David et al. 1998; Almazan et al. 2005). However, recent studies question the role of mutual funds as watchdogs of executive pay (Davis and Kim 2005; Levitz, 2006; Corporate Library 2006).⁸

⁸ Ashbaugh-Skaife et al. (2004) also find that the holdings of mutual funds and independent investment advisors are positively associated with proxies for managers' opportunistic financial reporting.

Because of the opposite predictions from the competing arguments, I test the following non-directional hypothesis, stated in null form:

H2: The percentage of holdings by investment advisors is not associated with the pay-for-performance sensitivity of options and restricted stock newly granted and the level of total CEO equity portfolio incentives.

2.3.3. Public Pensions

It is well publicized that public pension funds and union pension funds are more active in governance of investees. To the extent that high pay-for-performance sensitivity captures the dimension of “good” governance that public pension funds desire, pension funds and endowments likely exhibit preferences for firms with more stock-based pay that explicitly ties executive pay to firm performance.⁹ Ryan and Schneider (2002) propose a model that predicts the extent of activism from different types of institutions and conclude that public pension funds should be among the most activist of institutional investors. I expect public pension funds to encourage their portfolio firms to use equity incentives or show preference for investees with strong links between CEO pay and firm performance. Taken together, I predict that the board of a company with more shares held by public pension funds may tilt the structure of CEO compensation towards more equity-based, leading to the following hypothesis:

H3: The percentage of holdings by public pension funds is positively associated with the pay-for-performance sensitivity of options and restricted stock newly granted and the level of total CEO equity portfolio incentives.

⁹ For example, CalPERS has twice sponsored proposals at Novell's annual shareholder meeting that asked the firm to tie its executive stock awards to specific performance criteria. After two years of dialogue with CalPERS, the company decided to change its executive stock options from traditional options to performance-based options that become vested only if the stock appreciates by a certain percentage (Palmeri 2005).

3. Methods

3.1. Sample Selection

My sample starts from the intersection of ExecuComp, CDA/Spectrum, CRSP, and COMPUSTAT during years 1998-2002. I obtain CEO compensation data from ExecuComp, which covers companies from the S&P 500, S&P 400 mid-cap, and S&P 600 small-cap indices starting from 1992. Stock returns and accounting variables are drawn from CRSP and COMPUSTAT, respectively. I obtain quarterly institutional ownership data from the CDA/Spectrum database of 13F filings. All investors with at least \$100 million in equity holdings are required to file 13F forms to the SEC. For all subsequent analyses, I use institutional ownership data of the quarter that is closest to firms' fiscal year end.

Key governance variables are drawn from the IRRC database. The IRRC database on board practice and pay covers companies from the S&P 500, S&P 400 mid-cap, and S&P 600 small-cap indices from 1998 to 2002. I winsorize the top and bottom 1 percent of the distributions of the sensitivity of new options and restricted stocks to stock price, and the level of total CEO equity portfolio incentives in order to reduce the effects of extreme observations. My final sample consists of 3,986 firm-year observations from 1,112 distinct firms.

3.2. Dependent Variables

3.2.1. "Flow" Measure of Equity Incentives

To test my hypotheses, I use the pay-for-performance sensitivity of options and restricted stock newly granted (*Incen_ratio*) as my dependent variable. Following Yermack (1995) and Core and Guay (1999), I define the sensitivity of annually granted options and

restricted stocks in response to the stock price as the dollar change of the CEO's new stock and options grants for a 1% change in the stock price. I estimate the sensitivity of an option's dollar value (in thousands) to the stock price as the partial derivative of the option value with respect to a 1% change in stock price (option "delta"). Using detailed options and restricted stock grant data such as strike price, stock price, grant date, and time to maturity from the ExecuComp database, *Incen_ratio* is the value obtained by the following formula scaled by the sum of CEO salary and bonus.¹⁰

$$\left(\frac{\text{Stock price}}{100} \right) \times \text{New Shares Granted} + \left(\frac{\text{Stock price}}{100} \right) \times \text{Option Delta} \times \text{New Options Granted}$$

Where:

$$\text{Option delta} = \frac{\partial(\text{Option Value})}{\partial(\text{price})} = e^{-d\tau} N(z)$$

$$z = \frac{\ln(P / X) + (r - d + \sigma^2 / 2)T}{\sigma \sqrt{T}}$$

$N(z)$ = the cumulative normal distribution function of z

P = market price of the stock at grant date

X = exercise price

r = risk-free rate

d = dividend yield

σ = stock return volatility

T = time to maturity of the option (in years)

3.2.2. "Stock" Measure of Equity Incentives

Core and Guay (1999) and Core et al. (2003) demonstrate that a *flow* measure of equity incentives is imperfect for testing agency theory-based predictions because it merely measures the incentives provided by "new" awards without considering equity incentives provided by prior options and stocks held by CEOs. In this spirit, the *stock* measure of CEO

¹⁰ For a detailed calculation of option portfolio sensitivities, see Core and Guay (1999, 2002).

equity incentives (*Equity_incen*) intends to capture the dollar changes (in thousands) in CEO wealth for a 1% change in stock price. To estimate the sensitivity of previously granted options, I employ Core and Guay (2002)'s "one-year approximation method" that requires only the current year's proxy statement data.¹¹ *Equity_incen* is measured as follows:

$$Equity_incen = \ln \left[\left(\frac{Stock\ price}{100} \right) \times Shares\ held + \left(\frac{Stock\ price}{100} \right) \times Option\ Delta \times Option\ held \right]$$

3.3. Explanatory Variables

To measure institutional ownership for a firm conditional on legal type, I use the CDA Spectrum classification that divides institutional investors into five types: bank trusts (type 1), insurance companies (type 2), investment companies (type 3), independent investment advisors (type 4), and others (type 5). The other category consists of corporate and private pension funds, public pension funds, and university and foundation endowments. I combine type 3 and type 4 institutions into investment advisors (*Ia*) category.

However, due to a mapping error in the CDA spectrum data, their type classifications are not accurate beyond 1998. Many type 3 and type 4 institutions are improperly classified as type 5 institutions. Since my sample years start from 1998, this mapping error could cloud a proper identification of ownership by the legal type of institutions. To correct for a mapping error in type classification, I rely on the pre-1998 CDA spectrum classification of each particular institution and apply it to the institutional

¹¹ For a detailed computation of approximate sensitivity of previously granted options, see Core and Guay (2002). The appendix provides a brief description of this methodology.

holdings in year 1998 and after (Chen et al. 2005). In addition, I use the Bushee et al. (2004) classification that goes through the “type 5” codes and assign them based on the name of the fund. They break down type 5 institutions into corporate or private pensions, public pensions, and university and foundation endowments. Although I rely on the pre-1998 CDA spectrum classification of each particular institution and apply it to the institutional holdings during my sample periods, I am unable to rule out the possibility that new type 3 or 4 institutions that enter the CDA Spectrum after 1998 are erroneously misclassified into type 5 institutions. Therefore, I take a conservative approach and categorize the remainder of type 5 institutional holdings after the deduction of holdings by corporate or private pensions, public pensions, and university and foundation endowments based on Bushee et al. (2004) as holdings by investment advisors. Then, percentage holdings by bank trusts (*Bank*), insurance companies (*Ins*), investment advisors (*Ia*), corporate or private pensions (*Cps*), public pensions (*Pps*), and university and foundation endowments (*Ufe*) are used as my main explanatory variables of interest.¹²

Almazan et al. (2005) divide institutions into *active* versus *passive* monitors and categorize investment advisors as active and other types such as banks and insurance companies as passive institutions. They also measure the *concentration* of each group’s ownership using the fraction of total institutional ownership held by any of the firms’ five largest institutions that come from each group rather than relative percentage ownership.

¹² Holdings by corporate or private pensions (*Cps*), public pensions (*Pps*), and university and foundation endowments (*Ufe*) only represent internally-managed investments. Since investment advisors often serve as external managers for pension and endowments, those externally managed holdings are recorded as holdings by investment advisors.

To compare my findings with those of Almazan et al. (2005), I also measure the concentration of each type's ownership as the percentage of total institutional ownership held by any of the firms' five largest institutions that come from each type. The concentration measures are designated *Concen_Bank*, *Concen_Ins*, *Concen_Ia*, *Concen_Cps*, *Concen_Pps*, and *Concen_Ufe*, respectively.

3.4. Descriptive Statistics and Univariate Correlations

Table 1 presents descriptive statistics for the variables used in my analyses. The mean institutional ownership in the sample firms is 63.6%. This percentage is much higher than reported in previous studies (e.g., 35.8% in Bushee 2001) using a COMPUSTAT sample in years preceding the sample period of this study. This suggests that ExecuComp firms, on the average, are large and surviving firms with higher institutional ownership.

Consistent with prior research (e.g., Bushee 2001; Bushee et al. 2004), investment advisors (*Ia*) have the largest average holdings (46.7%). The mean percentage holdings by bank trusts (*Bank*), insurance companies (*Ins*), and corporate or private pensions (*Cps*), public pensions (*Pps*), and university and foundation endowments (*Ufe*) are 8.1%, 4.2%, 0.6%, 3.0%, and 0.2%, respectively. The fraction of all institutional ownership held by the top 5 largest institutions that are bank trusts (*Concen_Bank*), insurance companies (*Concen_Ins*), investment advisors (*Concen_Ia*), corporate or private pensions (*Concen_Cps*), public pensions (*Concen_Pps*), and university and foundation endowments (*Concen_Ufe*) is 3.4%, 2.6%, 34.5%, 0.2%, 0.6%, and 0.1%, respectively.

The mean and median dollar values of CEO total equity portfolio incentives are \$1,651,000 and \$289,000, respectively, suggesting that an average sample CEO is subject

to huge potential gains and losses in response to a change in stock price. On the average, CEOs of the sample firms own about 2.5% of total shares outstanding. The board, on the average, consists of nine directors and meets seven times per year. The average fraction of directors independent of firm's management is 65.8%.

Table 2 provides Pearson correlations among the institutional ownership variables and key dependent variables. Not surprisingly, the correlations among institutional ownership variables are mostly significant, suggesting the need to check for potential multicollinearity problems in multivariate analyses. Consistent with Bushee (2001), a majority of institutional holdings variables are positively correlated with one another.

4. Empirical Models and Results

4.1. Influence of Institutional Legal Types on Pay-for-Performance Sensitivity of Options and Restricted Stock Newly Granted

To test H1-H3, I estimate the following pooled cross-sectional time-series regression equation:

$$\begin{aligned}
 Incen_ratio_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Inst_type_{i,t} + \beta_7 Concen_Top5_{i,t} + \beta_8 Noise_roa_{i,t} + \\
 &\beta_9 Noise_ret_{i,t} + \beta_{10} High_tax_{i,t} + \beta_{11} Low_tax_{i,t} + \beta_{12} Lev_{i,t} + \beta_{13} Btm_{i,t} + \\
 &\beta_{14} Ownership_{i,t} + \beta_{15} Size_{i,t} + \beta_{16} New_{i,t} + \beta_{17} Fcf_{i,t} + \beta_{18} Bd_size_{i,t} + \\
 &\beta_{19} Num_mtg_{i,t} + \beta_{20} Dual_{i,t} + \beta_{21} Bd_ind_{i,t} + \beta_{22} Tenure_{i,t} + \beta_{23} Dirown_{i,t} + \\
 &\sum_{j=1}^4 \beta_{j+23} Year + \sum_{j=1}^{13} \beta_{j+27} Industry + \varepsilon_{i,t} \quad (1) \\
 &(t = 1998-2002)
 \end{aligned}$$

$$\begin{aligned}
 Incen_ratio_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Concen_Inst_type_{i,t} + \beta_7 Tih_{i,t} + \beta_3 Noise_roa_{i,t} + \beta_8 Noise_roa_{i,t} + \\
 &\beta_9 Noise_ret_{i,t} + \beta_{10} High_tax_{i,t} + \beta_{11} Low_tax_{i,t} + \beta_{12} Lev_{i,t} + \beta_{13} Btm_{i,t} + \\
 &\beta_{14} Ownership_{i,t} + \beta_{15} Size_{i,t} + \beta_{16} New_{i,t} + \beta_{17} Fcf_{i,t} + \beta_{18} Bd_size_{i,t} +
 \end{aligned}$$

$$\beta_{19}Num_mtg_{i,t} + \beta_{20}Dual_{i,t} + \beta_{21}Bd_ind_{i,t} + \beta_{22}Tenure_{i,t} + \beta_{23}Dirown_{i,t} + \sum_{j=1}^4 \beta_{j+23}Year + \sum_{j=1}^{13} \beta_{j+27}Industry + \varepsilon_{i,t} \quad (2)$$

(t = 1998-2002)

Where:

- Incen_ratio* = the change in the value of options and restricted stock newly granted to CEO at year *t* for a 1% change in a firm's stock price scaled by the sum of salary and bonus, where the sensitivity of an option's value to the stock price is calculated using the partial derivative of option value with respect to price (the option "delta")
- Inst_type* = percentage of institutional holdings by bank trusts, insurance companies, investment advisors, corporate or private pensions, public pensions, and university and foundation endowments
- Concen_Inst_type* = The fraction of all institutional ownership held by the top 5 largest institutions that are bank trusts, insurance companies, investment advisors, corporate or private pensions, public pensions, and university and foundation endowments.
- Concen_Top5* = fraction of all institutional ownership held by the top 5 largest institutions (= *Top5* / *Total Institutional Ownership*)
- Tih* = total institutional ownership
- Noise_roa* = time-series standard deviation of the firm's return on asset ratio over the prior five years at year *t*
- Noise_ret* = time-series standard deviation of the firm's annual stock return over the prior five years at year *t*
- High_tax* = 1 if the firm has a positive pretax book income and no net operating loss carry-forwards, and 0 otherwise
- Low_tax* = 1 if the firm has a negative pretax book income and net operating loss carry-forwards, and 0 otherwise
- Lev* = book value of liabilities divided by its book value of assets at year *t*
- Btm* = book to market ratio, defined as its book value of equity divided by market value of equity at year *t*
- Ownership* = percentage of common shares owned by the firm's CEO at year *t*
- Size* = the natural log of market value of equity defined as the firm's price per share at year *t*'s fiscal year end (Compustat data item 199) multiplied by the number of shares outstanding (Compustat data item 25)
- New* = 1 if the firm is a new-economy firm (new-economy firms are firms with SIC codes 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, and 7373), and 0 otherwise
- Fcf* = sum of the firm's net operating cash flow (Compustat data item 308) and net investing cash flow (Compustat data item 311) scaled by market value of equity
- Bd_size* = the natural log of the number of board of directors at year *t*
- Num_mtg* = the natural log of the number of the board meetings during year *t*
- Dual* = 1 if the CEO is the chairman of the Board and 0 otherwise
- Bd_ind* = percentage of independent directors on the board

Tenure = number of years the firm's CEO has held office at year t
Dirown = 1000* (the sum of number of stock options and number of shares granted to independent directors) divided by number of shares outstanding at year t

I expect that percentage holdings by bank trusts are negatively associated with annual grants of options and stocks' sensitivity to change in stock price, and percentage holdings by public pensions are positively associated with annual grants of options and stocks' sensitivity to change in stock price. An insignificant relation between percentage holdings by investment advisors and annual grants of options and stocks sensitivity to change in stock price would be consistent with mutual funds not using their voting power to tie CEO pay more closely to firm performance (Corporate Library 2006).

When percentage holdings held by each legal type of institution are used as explanatory variables, I control for the fraction of institutional ownership accounted for by the five largest institutions to control for large institutions' potential incentives to advocate pay-for-performance sensitivity in granting new options and stocks (Hartzell and Starks 2003). When concentrated ownership measures by each legal type of institution are used as explanatory variables, I include total institutional ownership as a control to capture a potential clientele effect (Hartzell and Starks 2003).

I also include a set of control variables known to influence firms' use of stock options for their CEOs. I control for book to market ratio (*Btm*) because prior research suggests that firms with growth opportunities are likely to rely heavily on stock-based compensation (Smith and Watts 1992; Yermack 1995; Bryan et al. 2000; Ittner et al. 2003). Agency theory suggests that the more "noise" a performance measure contains, the less weight firms will place on that measure in executive compensation packages. Following

prior literature, I measure the noise in earnings and stock returns as the time-series standard deviation of earnings (*Noise_roa*) and annual stock returns (*Noise_ret*), respectively (Lambert and Larcker 1987; Yermack 1995; Bryan et al. 2000; Ittner et al. 2003). I control for CEO stock ownership (*Ownership*) because prior research finds that executive ownership is negatively related to the use of stock options (Yermack 1995; Bryan et al. 2000; Anderson et al. 2000).

A firm's leverage (*Lev*) is included as a control variable because debtholders are likely to demand a premium for the potential increase in firm risk due to pursuing "too-risky projects" if incentive plans align the interests of managers and stockholders at the expense of debtholders (Yermack 1995; Bryan et al. 2000). Firms with short cash supply (*Fcf*) may prefer to grant stock-based compensation (Core and Guay 1999; Anderson et al. 2000; Ittner et al. 2003). Firms with higher marginal tax rates are likely to shift the compensation mix from stock-based to cash compensation. Following Ittner et al. (2003), I measure marginal tax rate using two indicator variables, *High_tax* and *Low_tax*. Larger firms are generally more difficult to monitor and thus there may be more need to provide executives with a more "direct" incentive mechanism such as stock options (Ittner et al. 2003). I use the natural logarithm of market value of the firm (*Size*) as a proxy for firm size. "New economy" firms are known to rely more heavily on the use of stock options as a key component of their executive compensation packages (Anderson et al. 2000; Ittner et al. 2003; Murphy 2003). I use Murphy (2003)'s classification to create a "new economy firm" indicator variable, *New*. Finally, I include CEO tenure (*Tenure*) to control for its possible impact on compensation mix (Bushman et al. 1996).

Prior research also documents that firms' governance plays a role in determining executive pay mix (Mehran 1995; Cyert et al. 2002; Hanlon et al. 2003) and institutions may influence CEO compensation indirectly through improved governance (Heard 1995). Based on prior literature, I use detailed governance variables drawn from the IRRC database¹³ during 1998-2002 to control for the effect of firms' governance on the use of stock options. I include board size (*Bd_size*), the number of board meetings (*Num_mtg*), the fraction of independent directors on board (*Bd_ind*), and CEO duality (*Dual*) (i.e., the CEO also serves as chairman of the board of directors).

4.2. Influence of Institutional Legal Types on Pay-for-Performance Sensitivity of Total CEO Equity Portfolio Incentives

I estimate the following pooled cross-sectional time-series regression equation, following Core and Guay (1999):¹⁴

$$\begin{aligned}
 Equity_incen_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Inst_type_{i,t} + \beta_7 Concen_Top5_{i,t} + \beta_8 Size_{i,t} + \beta_9 Btm_{i,t} + \beta_{10} Fcf_{i,t} \\
 &+ \beta_{11} Idiosyn_{i,t} + \beta_{12} Tenure_{i,t} + \beta_{13} Bd_size_{i,t} + \beta_{14} Num_mtg_{i,t} + \\
 &\beta_{15} Dual_{i,t} + \beta_{16} Bd_ind_{i,t} + \sum_{j=1}^4 \beta_{i+16} Year + \sum_{j=1}^{13} \beta_{j+20} Industry + \varepsilon_{i,t} \quad (3) \\
 &(t = 1998-2002)
 \end{aligned}$$

$$\begin{aligned}
 Equity_incen_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Concen_Inst_type_{i,t} + \beta_7 Tih_{i,t} + \beta_8 Size_{i,t} + \beta_9 Btm_{i,t} + \beta_{10} Fcf_{i,t} + \\
 &\beta_{11} Idiosyn_{i,t} + \beta_{12} Tenure_{i,t} + \beta_{13} Bd_size_{i,t} + \beta_{14} Num_mtg_{i,t} + \beta_{15} Dual_{i,t} + \\
 &\beta_{16} Bd_ind_{i,t} + \sum_{j=1}^4 \beta_{j+16} Year + \sum_{j=1}^{13} \beta_{j+20} Industry + \varepsilon_{i,t} \quad (4) \\
 &(t = 1998-2002)
 \end{aligned}$$

¹³ The IRRC database on board practice and pay covers companies from the S&P 500, S&P 400 mid-cap, and S&P 600 small-cap indices.

¹⁴ I also run a yearly regression using equation (3). Consistent with H1, the coefficient on *Bank* is significantly negative at the 1% level during my sample years, except for year 1998.

Equity_incen = natural log of the dollar change (in thousands) in the value of a CEO's total equity portfolio incentives for a 1% change in a firm's stock price.

Idiosyn = unsystematic risk, defined as the standard deviation of daily market model residuals over the prior year

The remaining variables are as defined in equation (1) and (2).

Like the case of annual grants of options and stocks' sensitivity to change in stock price, I expect that percentage holdings by bank trusts are negatively associated with the sensitivity of total CEO portfolio of equity to change in stock price and that percentage holdings by public pensions are positively associated with the sensitivity of total CEO portfolio of equity to change in stock price. Observing an insignificant relation between percentage holdings by investment advisors and the sensitivity of total CEO portfolio of equity to change in stock price would be consistent with mutual funds not using their voting power to tie CEO pay more closely to firm performance.

Following Core and Guay (1999), I include a set of control variables known to influence the level of a CEO's portfolio holdings of equity incentives. Prior research indicates that CEO equity incentives are related to firm size and monitoring difficulty (Demsetz and Lehn 1985; Baker and Hall 2004). Thus, I control for firm size and monitoring difficulty using the logarithm of the market value of equity (*Size*) and idiosyncratic risk (*Idiosyn*), respectively. I control for book to market ratio (*Btm*) because prior research documents a positive relation between firms' growth opportunities and the degree to which firms use equity incentives (Smith and Watts 1992). Core and Guay (1999) argues that managerial ownership is positively related to free cash flow and CEO tenure and thus I control for free cash flow (*Fcf*) and CEO tenure (*Tenure*). Finally, I include

board size (*Bd_size*), the number of board meetings (*Num_mtg*), the fraction of independent directors on board (*Bd_ind*), and CEO duality (*Dual*) to capture the effect of governance on CEO equity incentives.

4.3. Results

Table 3 reports the estimation results for equations (1) and (2),¹⁵ where I test my hypotheses using the sensitivity of new options and stock to a 1% change in stock price scaled by cash compensation (*Incen_ratio*) as the dependent variable. Columns (1) and (3) report the results from TOBIT estimation¹⁶ and columns (2) and (4) report results from OLS estimation.¹⁷ In all OLS regression specifications in this chapter, I use Huber-White robust standard errors clustered by firm. These standard errors are robust to both serial correlation and heteroskedasticity (Rogers 1993). Consistent with prior research, the sensitivity of new options and stock grant is positively correlated with firm size and the new economy indicator variable, but negatively correlated with prior stock ownership (Bryan et al. 2000; Murphy 2003).

When the percentage holdings by each legal type of institution are used as the explanatory variables (columns (1) and (2)), the percentage holdings by bank (*Bank*) are significantly negatively related to the sensitivity of new options and stock to stock price (p

¹⁵ I examine potential multicollinearity concerns using the variance inflation factors (VIF). None of the VIFs of the independent variables is greater than two, mitigating this concern.

¹⁶ The TOBIT model is used when a dependent variable is one that is roughly continuous over strictly positive values but zero for a non-trivial fraction of the population. Yermack (1995) discusses this methodology in detail and he estimates the TOBIT model to examine the determinants of firms' use of stock options. Because not every firm grants stock options to its CEO every year, 18.1% of *Incen_ratio* takes on the value of zero in my sample, suggesting the need to estimate the TOBIT model.

¹⁷ Following Himmelberg et al. (1999), I also estimate a firm fixed effects model to control for the effect of unobserved firm heterogeneity on CEO pay-for-performance sensitivity. The results are very similar to those obtained by TOBIT and the industry fixed effects model.

< 0.01, two-tailed). In contrast to my prediction, surprisingly, the coefficient on public pensions (*Pps*) is significantly negatively related to the sensitivity of new options and stock to stock price ($p < 0.10$, for TOBIT and $p < 0.05$ for OLS, two-tailed).¹⁸ None of the percentage holdings by insurance companies, investment advisors, corporate or private pensions, and university and foundation endowments are statistically significant at conventional levels.

When the degrees of concentration by each legal type of institutions are used as the explanatory variables (columns (3) and (4)), the ownership concentration by bank trusts (*Concen_Bank*) is significantly negatively related to the sensitivity of new options and stock to change in stock price in column (3) ($p < 0.10$, two-tailed) but not significant in column (4). None of the concentration measures for other types of institutions are statistically significant at conventional levels except for *Concen_Ia* in column (4).

To gain more insight into the relation between the pay-for-performance sensitivity from CEO equity holdings and the percentage ownership by each type of institutions, Table 4 reports the estimation results for equations (3) and (4). Column (1) reports the results when I estimate equation (3), and column (2) reports the results when I estimate equation

¹⁸ For an alternative measure of public pension ownership, I include the ownership held by activist institutions as identified by Cremers and Nair (2005). They classify the following institutions as activists (spectrum manager number in parentheses): California Public Employees Retirement System (12000), California State Teachers Retirement (12100 and 12120), Colorado Public Employees Retirement Association (18740), Florida State Board of Administration (38330), Illinois State Universities Retirement System (81590), Kentucky Teachers Retirement Systems (49050), Maryland State Retirement and Pension System (54360), Michigan State Treasury (57500), Montana Board of Investment (58650), Education Retirement Board of New Mexico (63600), New York State Common Retirement Fund (63850), New York State Teachers Retirement System (63895), Ohio School Employees Retirement System (66550), Ohio School Employees Retirement System (66610), Ohio State Teachers Retirement System (66635), Texas Teachers Retirement System (82895, 83360), Virginia Retirement System (90803), State of Wisconsin Investment Board (93405). However, the coefficient is not statistically significant.

(4). Consistent with prior research, CEO equity incentives are positively correlated with firm size, noisier operating environment, and tenure, but negatively correlated with book-to-market ratio (Core and Guay 1999). As seen in the table, using total CEO equity portfolio incentives (*Equity_incen*), which also considers the pay-for-performance sensitivities from previously granted and new options and stocks, does not change my inferences obtained in Table 3.

When the percentage holdings by each legal type of institution are used as explanatory variables, the percentage holdings by bank (*Bank*) are significantly negatively related to the pay-for-performance sensitivities from total CEO equity portfolio ($p < 0.01$, two-tailed). The coefficients on corporate or private pensions (*Cps*), and university and foundation endowments (*Ufe*) are significantly negatively related to the pay-for-performance sensitivities from total CEO equity portfolio ($p < 0.05$ and $p < 0.10$, two-tailed, respectively). The percentage holdings by insurance companies, investment advisors, and public pensions are not statistically significant at conventional levels.

When the degrees of concentration by each legal type of institution are used as explanatory variables, the ownership concentration by banks (*Concen_Bank*) is significantly negatively related to the pay-for-performance sensitivities from total CEO equity portfolio ($p < 0.05$, two-tailed). None of the concentration measures for the other types of institutions are statistically significant at conventional levels.

Taken together, these results question the assumptions of previous literature that public pension funds, mutual funds, and endowments and foundations are relatively *pressure-resistant* to firms' management. Consistent with recent assertions in the business

press that institutions' desire to sell 401(k) management and other financial services to the same companies can compromise their monitoring capabilities, institutions do not appear to influence their portfolio firms to design CEO compensation packages that are more sensitive to firm performance.

The negative association between the percentage holdings and ownership concentration by banks and the pay-for-performance sensitivity is especially interesting given that prior research generally assumes that banks are susceptible to influence exercised by management due to their potential business relationships with firms. This is consistent with bank trusts discouraging their firms from using equity incentives or not showing preference for investees with a strong link between CEO wealth and firm performance. This role of banks as a monitor of executive pay, coupled with recent findings that banks appear to constrain their portfolio firms' aggressive financial reporting practices (Ashbaugh-Skaife et al. 2004), suggests that more research needs to be done with respect to the role of banks in firms' corporate governance.

4.4. Additional Analyses

4.4.1. Use of Lagged Institutional Holdings

In previous analyses, I assume and examine the contemporaneous relation between institutional ownership and firms' use of CEO equity-based incentives. To circumvent potential problems associated with examining the contemporaneous relation and to examine the sensitivity of my results, I repeat all previous analyses using institutional ownership type with a one-year lag ($Inst_type_{t-1}$). A relation between lagged institutional ownership ($Inst_type_{t-1}$) and firms' current pay-for-performance sensitivity (e.g., $Incen_ratio_t$) that is

consistent with my previous findings will lend support to the robustness of the findings. The results summarized in Tables 5 and 6 suggest that all of my previous findings regarding H1, H2, and H3 are unchanged and robust to using institutional ownership with a one-year lag as an explanatory variable.

4.4.2. Controlling for Institutional Investment Horizons

Prior research suggests that the extent to which institutions are willing to monitor managers is different across institutional investment horizons (Gaspar et al. 2005). Thus, I additionally control for the percentage holdings by transient, quasi-indexers, and dedicated institutions (Bushee 1998). As seen from Tables 5 and 6, all my previous findings are unchanged and robust to adding investment horizons of institutions as a control.

5. Conclusion

Motivated by recent claims that institutions are unwilling to use their considerable voting power to enact executive compensation reform, this paper re-examines the relation between the legal type of institutions and CEO compensation and challenges previous findings by David et al. (1998) and Almazan et al. (2005).

I find that the percentage holdings and ownership concentration by banks are significantly negatively related to pay-for-performance sensitivity from new options and stocks and from total CEO equity holdings. In contrast to conventional wisdom that public pensions are active and vocal monitors of executive pay, I do not find evidence that the percentage holdings and ownership concentration by public pensions are significantly positively associated with pay-for-performance sensitivity for CEOs of companies in their portfolios. Surprisingly, in the case of pay-for-performance sensitivity from new options

and stocks, I find that the percentage holdings by public pensions are significantly negatively related to pay-for-performance sensitivity. Finally, I find very weak evidence that the ownership concentration by investment advisors is positively related to the pay-for-performance sensitivity from new options and stocks but it is not related to total CEO equity incentives. I also find little or no evidence that percentage holdings by investment advisors are positively related to pay-for-performance sensitivity.

Taken together, these results question the assumptions of previous literature that public pension funds, mutual funds, and endowments and foundations are relatively *pressure-resistant* to firms' management. Consistent with recent assertions in the business press that mutual funds' desire to sell 401(k) management and other financial services to the same companies can compromise their monitoring capabilities, institutions with the exception of banks do not appear to influence their portfolio firms to design CEO compensation packages that are more sensitive to firm performance.

One interesting finding is that the percentage holdings and ownership concentration by banks are significantly negatively related to the pay-for-performance sensitivity. This is consistent with bank trusts discouraging equity incentives in investee companies or not showing preference for firms with a strong link between CEO wealth and firm performance, because of their strong incentive to avoid imprudent and risky investments. These findings are especially striking given that prior research generally assumes that banks are susceptible to influence exercised by management due to potential business relationships. Banks' monitoring of executive pay appears to stem from strong fiduciary responsibilities that motivate them to avoid stocks that courts would view as imprudent. Coupled with recent

findings that banks appear to constrain their portfolio firms' aggressive financial reporting practices (Ashbaugh-Skaife et al. 2004), my findings suggest that more research needs to be done with respect to the role of banks in firms' corporate governance.

A promising avenue for future research would be to investigate the effect on executive pay of business relationships between mutual funds and their client firms. This is important because any study that examines the relation between business ties and proxy voting records that become newly available would suffer from the possibility that mutual funds would cast their votes knowing that their voting records would be closely examined after mandated disclosure of their proxy voting (Davis and Kim 2005). Therefore, it would be fruitful to examine whether business relationship moderates the relation between mutual funds ownership and client firms' executive pay using the data before the new regulation that mandates the disclosure of proxy voting became publicly known.

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TABLE 1
Descriptive Statistics

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Q1</i>	<i>Median</i>	<i>Q3</i>
<i>Tih</i>	3986	0.636	0.172	0.523	0.654	0.764
<i>Bank</i>	3986	0.081	0.049	0.049	0.071	0.101
<i>Ins</i>	3986	0.042	0.037	0.018	0.032	0.053
<i>Ia</i>	3986	0.467	0.155	0.354	0.474	0.582
<i>Cps</i>	3986	0.006	0.010	0.002	0.003	0.006
<i>Pps</i>	3986	0.030	0.017	0.022	0.027	0.035
<i>Ufe</i>	3986	0.002	0.008	0.000	0.0007	0.001
<i>Concen_Top5</i>	3986	0.417	0.123	0.330	0.398	0.484
<i>Concen_Bank</i>	3986	0.034	0.068	0.000	0.000	0.049
<i>Concen_Ins</i>	3986	0.026	0.054	0.000	0.000	0.040
<i>Concen_Ia</i>	3986	0.345	0.134	0.253	0.332	0.421
<i>Concen_Cps</i>	3986	0.002	0.015	0.000	0.000	0.000
<i>Concen_Pps</i>	3986	0.006	0.035	0.000	0.000	0.000
<i>Concen_Ufe</i>	3986	0.001	0.012	0.000	0.000	0.000
<i>Btm</i>	3986	0.529	0.387	0.258	0.449	0.688
<i>Incen_ratio</i>	3986	0.085	0.214	0.006	0.025	0.064
<i>Equity_incen</i>	3979	5.695	1.673	4.678	5.672	6.751
<i>Noise_roa</i>	3986	0.046	0.085	0.014	0.026	0.052
<i>Noise_ret</i>	3986	0.493	0.460	0.239	0.360	0.562
<i>High_tax</i>	3986	0.326	0.469	0.000	0.000	1.000
<i>Low_tax</i>	3986	0.090	0.286	0.000	0.000	0.000
<i>Lev</i>	3986	0.249	0.170	0.105	0.258	0.369
<i>Ownership</i>	3986	0.025	0.062	0.001	0.003	0.014
<i>Size</i>	3986	7.407	1.613	6.255	7.216	8.463
<i>New</i>	3986	0.135	0.342	0.000	0.000	0.000
<i>Fcf</i>	3984	0.006	0.217	-0.035	0.018	0.068
<i>Bd_size</i>	3986	9.324	2.482	7.000	9.000	11.000
<i>Num_mtg</i>	3985	7.044	2.908	5.000	6.000	8.000
<i>Dual</i>	3986	0.705	0.456	0.000	1.000	1.000
<i>Bd_ind</i>	3986	0.658	0.170	0.556	0.667	0.800
<i>Tenure</i>	3986	7.058	7.412	2.000	5.000	10.000
<i>Dir_own</i>	3986	0.094	0.168	0.004	0.033	0.121

Variable definitions:

Tih = percentage of total institutional holdings;

Bank = percentage of institutional holdings by bank trusts;

Ins = percentage of institutional holdings by insurance companies;

Ia = percentage of institutional holdings by investment advisors and investment companies;

Cps = percentage of institutional holdings by corporate or private pension funds;

Pps = percentage of institutional holdings by public pension funds;

Ufe = percentage of institutional holdings by university and foundation endowments;

Concen_Top5 = fraction of all institutional ownership held by the top 5 largest institutions (= *Top5* / *Tih*);

Concen_Bank = fraction of all institutional ownership held by the top 5 largest institutions that are bank trusts;

Concen_Ins = fraction of all institutional ownership held by the top 5 largest institutions that are insurance companies;
Concen_Ia = fraction of all institutional ownership held by the top 5 largest institutions that are investment advisors and investment companies;
Concen_Cps = fraction of all institutional ownership held by the top 5 largest institutions that are corporate or private pensions;
Concen_Pps = fraction of all institutional ownership held by the top 5 largest institutions that are public pensions;
Concen_Ufe = fraction of all institutional ownership held by the top 5 largest institutions that are university and foundation endowments;
Btm = book to market ratio defined as its book value of equity divided by market value of equity;
Incen_ratio = the change in the value of options and restricted stock newly granted to CEO at year t for a 1% change in a firm's stock price scaled by the sum of salary and bonus, where the sensitivity of an option's value to the stock price is calculated using the partial derivative of option value with respect to price (the option "delta");
Equity_incen = natural log of the dollar change (in thousands) in the value of a CEO's total equity portfolio incentives for a 1% change in a firm's stock price;
Noise_roa = time-series standard deviation of the firm's return on asset ratio over the prior 5 years at year t ;
Noise_ret = time-series standard deviation of the firm's annual stock return over the prior 5 years at year t ;
High_tax = 1 if the firm has a positive pretax book income and no net operating loss carry-forwards, and 0 otherwise;
Low_tax = 1 if the firm has a negative pretax book income and net operating loss carry-forwards, and 0 otherwise;
Lev = book value of liabilities divided by its book value of assets at year t ;
Ownership = percentage of common shares owned by its CEO at year t ;
Size = the natural log of market value of equity defined as the firm's price per share at year t 's fiscal year end (Compustat data item 199) multiplied by the number of shares outstanding (Compustat data item 25);
New = 1 if the firm is a new-economy firm (new-economy firms are firms with SIC codes 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, 7373), and 0 otherwise;
Fcf = sum of the firm's net operating cash flow (Compustat data item 308) and net investing cash flow (Compustat data item 311) scaled by market value of equity;
Bd_size = the number of board of directors at year t ;
Num_mtg = the number of the board meetings during year t ;
Dual = 1 if the CEO is the chairman of the Board and 0 otherwise;
Bd_ind = percentage of independent directors on the board;
Tenure = number of years the firm's CEO has held office at year t ;
Dirown = (1000* the sum of number of stock options and number of shares granted to independent directors) divided by number of shares outstanding at year t .

TABLE 2
Pearson Correlations among Key Variables

	<i>Tih</i>	<i>Bank</i>	<i>Ins</i>	<i>Ia</i>	<i>Cps</i>	<i>Pps</i>	<i>Ufe</i>	<i>Concen_Top5</i>	<i>Incen_ratio</i>	<i>Equity_incen</i>
<i>Tih</i>	1.000									
<i>Bank</i>	0.223	1.000								
<i>Ins</i>	0.325	0.096	1.000							
<i>Ia</i>	0.911	-0.099	0.087	1.000						
<i>Cps</i>	0.108	0.062	0.070	0.014 ^{NS}	1.000					
<i>Pps</i>	0.194	-0.064	-0.012 ^{NS}	0.127	-0.006 ^{NS}	1.000				
<i>Ufe</i>	0.034**	0.103	0.029*	-0.052	0.024 ^{NS}	-0.024 ^{NS}	1.000			
<i>Concen_Top5</i>	-0.261	-0.220	-0.122	-0.169	-0.107	-0.031**	-0.069	1.000		
<i>Incen_ratio</i>	0.047	0.026 ^{NS}	0.048	0.034**	0.018 ^{NS}	-0.041**	0.054	-0.123	1.000	
<i>Equity_incen</i>	0.125	0.164	0.128	0.046	0.038**	-0.063	0.086	-0.346	0.347	1.000

*, ** indicates that the correlation coefficient is significantly different from zero at the 10% and 5% level, respectively (two-tailed).

^{NS} indicates that the correlation coefficient is not significantly different from zero at the 10% level (two-tailed).

All other correlation coefficients are significantly different from zero at the 1% level (two-tailed).

Variable definitions: *Tih* = percentage of total institutional holdings. *Bank* = percentage of institutional holdings by bank trusts. *Ins* = percentage of institutional holdings by insurance companies. *Ia* = percentage of institutional holdings by investment advisors and investment companies. *Cps* = percentage of institutional holdings by corporate or private pension funds. *Pps* = percentage of institutional holdings by public pension funds. *Ufe* = percentage of institutional holdings by university and foundation endowments. *Concen_Top5* = fraction of all institutional ownership held by the top 5 largest institutions (= *Top5* / *Tih*). *Incen_ratio* = the change in the value of options and restricted stock newly granted to CEO at year t for a 1% change in a firm's stock price scaled by the sum of salary and bonus, where the sensitivity of an option's value to the stock price is calculated using the partial derivative of option value with respect to price (the option "delta"). *Equity_incen* = natural log of the change in the value of a CEO's total equity portfolio incentives for a 1% change in a firm's stock price.

TABLE 3
Influence of Institutional Legal Types on the Pay-for-Performance Sensitivity of New Grants of Stock Options and Restricted Stocks for CEO

$$\begin{aligned}
 Incen_ratio_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Inst_type_{i,j} + \beta_7 Concen_Top5_{i,t} + \beta_8 Noise_roa_{i,t} + \\
 &\quad \beta_9 Noise_ret_{i,t} + \beta_{10} High_tax_{i,t} + \beta_{11} Low_tax_{i,t} + \beta_{12} Lev_{i,t} + \beta_{13} Btm_{i,t} + \\
 &\quad \beta_{14} Ownership_{i,t} + \beta_{15} Size_{i,t} + \beta_{16} New_{i,t} + \beta_{17} Fcf_{i,t} + \beta_{18} Bd_size_{i,t} + \\
 &\quad \beta_{19} Num_mtg_{i,t} + \beta_{20} Dual_{i,t} + \beta_{21} Bd_ind_{i,t} + \beta_{22} Tenure_{i,t} + \beta_{23} Dirown_{i,t} + \\
 &\quad \sum_{i=1}^4 \beta_{i+23} Year + \sum_{i=1}^{13} \beta_{i+27} Industry + \varepsilon_{i,t} \\
 \\
 Incen_ratio_{i,t} &= \beta + \sum_{j=1}^6 \beta_j Concen_Inst_type_{i,j} + \beta_7 Tih_{i,t} + \beta_8 Noise_roa_{i,t} + \beta_9 Noise_roa_{i,t} + \\
 &\quad \beta_{10} High_tax_{i,t} + \beta_{11} Low_tax_{i,t} + \beta_{12} Lev_{i,t} + \beta_{13} Btm_{i,t} + \\
 &\quad \beta_{14} Ownership_{i,t} + \beta_{15} Size_{i,t} + \beta_{16} New_{i,t} + \beta_{17} Fcf_{i,t} + \beta_{18} Bd_size_{i,t} + \\
 &\quad \beta_{19} Num_mtg_{i,t} + \beta_{20} Dual_{i,t} + \beta_{21} Bd_ind_{i,t} + \beta_{22} Tenure_{i,t} + \beta_{23} Dirown_{i,t} + \\
 &\quad \sum_{i=1}^4 \beta_{i+23} Year + \sum_{i=1}^{13} \beta_{i+27} Industry + \varepsilon_{i,t} \\
 &\quad (t = 1998-2002)
 \end{aligned}$$

Variable	Predicted sign	Model 1		Predicted sign	Model 2	
		(1)	(2)		(3)	(4)
		<u>Tobit</u>	<u>OLS</u>		<u>Tobit</u>	<u>OLS</u>
		Coefficient (p-value)			Coefficient (p-value)	
<i>Constant</i>	?	-0.221 *** (0.00)	-0.094 (0.57)	?	-0.237*** (0.00)	-0.110 (0.51)
<i>Bank</i>	-	-0.227*** (0.01)	-0.236*** (0.00)			
<i>Ins</i>	?	-0.041 (0.70)	-0.088 (0.35)			
<i>Ia</i>	?	0.045 (0.11)	0.025 (0.36)			
<i>Cps</i>	?	-0.301 (0.41)	-0.254 (0.43)			
<i>Pps</i>	+	-0.379* (0.10)	-0.337** (0.02)			
<i>Ufe</i>	?	0.221 (0.62)	0.186 (0.55)			
<i>Concen_Top5</i>	+	0.006 (0.88)	0.039 (0.22)			
<i>Concen_Bank</i>				-	-0.108 * (0.08)	-0.082 (0.13)

TABLE 3 (continued)

Variable	Model 1			Model 2		
	Predicted sign	(1) Tobit Coefficient (p-value)	(2) OLS Coefficient (p-value)	Predicted sign	(3) Tobit Coefficient (p-value)	(4) OLS Coefficient (p-value)
<i>Concen_Ins</i>				?	0.021 (0.77)	0.028 (0.70)
<i>Concen_Ia</i>				?	0.047 (0.24)	0.081** (0.02)
<i>Concen_Cps</i>				?	-0.004 (0.99)	0.044 (0.83)
<i>Concen_Pps</i>				+	-0.023 (0.84)	-0.0003 (0.99)
<i>Concen_Ufe</i>				?	0.145 (0.65)	0.143 (0.56)
<i>Tih</i>					0.002 (0.93)	-0.018 (0.49)
<i>Noise_roa</i>	+	0.016 (0.75)	0.014 (0.79)		0.011 (0.83)	0.011 (0.85)
<i>Noise_ret</i>	+	0.035*** (0.00)	0.030** (0.02)		0.038*** (0.00)	0.032** (0.02)
<i>High_tax</i>	-	-0.011 (0.19)	-0.011 (0.27)		-0.012 (0.15)	-0.012 (0.23)
<i>Low_tax</i>	+	0.015 (0.29)	0.021 (0.24)		0.014 (0.32)	0.020 (0.26)
<i>Lev</i>	?	0.010 (0.70)	-0.013 (0.57)		0.011 (0.69)	-0.012 (0.58)
<i>Btm</i>	-	-0.009 (0.50)	0.003 (0.75)		-0.010 (0.45)	0.002 (0.86)
<i>Ownership</i>	-	-0.478*** (0.00)	-0.122** (0.03)		-0.475*** (0.00)	-0.119** (0.03)
<i>Size</i>	+	0.045*** (0.00)	0.043*** (0.00)		0.045*** (0.00)	0.043*** (0.00)
<i>New</i>	+	0.092*** (0.00)	0.093*** (0.00)		0.093*** (0.00)	0.094*** (0.00)
<i>Fcf</i>	-	0.004 (0.83)	0.007 (0.28)		0.003 (0.86)	0.007 (0.28)
<i>Bd_size</i>	?	-0.004 (0.82)	-0.019 (0.28)		-0.010 (0.61)	-0.024 (0.18)
<i>Num_mtg</i>	?	0.008 (0.49)	0.004 (0.76)		0.008 (0.48)	0.004 (0.75)
<i>Dual</i>	?	-0.004 (0.64)	-0.012 (0.23)		-0.005 (0.61)	-0.012 (0.22)

TABLE 3 (continued)

Variable	Predicted sign	Model 1		Predicted sign	Model 2	
		(1) Tobit	(2) OLS		(3) Tobit	(4) OLS
		Coefficient (p-value)			Coefficient (p-value)	
<i>Bd_ind</i>	?	0.027 (0.29)	-0.004 (0.86)		0.025 (0.31)	-0.006 (0.82)
<i>Tenure</i>	?	-0.001** (0.05)	-0.0004 (0.51)		-0.001** (0.04)	-0.0004 (0.47)
<i>Dirown</i>	+	0.076*** (0.00)	0.048** (0.05)		0.079*** (0.00)	0.049** (0.04)
<i>N</i>		3983	3983		3983	3983
F-test: <i>Bank =Ins=Ia=Cps</i> <i>=Pps=Ufe</i>			<i>P <0.01</i>			<i>P <0.05</i>
% of non-censored obs		81.9%			81.9%	
Adjusted R-squared			13.1%			13.0%

See Table 4.1 for variable definitions.

*, **, and ***: Significant at the 10%, 5% and 1% levels, respectively (two-tailed test). For parsimony, the coefficients on year-dummies and industry dummies are not reported.

OLS standard errors are Huber/White robust standard errors.

TABLE 4
Influence of Institutional Legal Types on the Total CEO Equity Portfolio Incentives

$$\begin{aligned}
 \text{Equity_incen}_{i,t} &= \beta + \sum_{j=1}^6 \beta_j \text{Inst_type}_{i,t} + \beta_7 \text{Concen_Top5}_{i,t} + \beta_8 \text{Size}_{i,t} + \beta_9 \text{Btm}_{i,t} + \beta_{10} \text{Fcf}_{i,t} \\
 &+ \beta_{11} \text{Idiosyn}_{i,t} + \beta_{12} \text{Tenure}_{i,t} + \beta_{13} \text{Bd_size}_{i,t} + \beta_{14} \text{Num_mtg}_{i,t} + \\
 &\beta_{15} \text{Dual}_{i,t} + \beta_{16} \text{Bd_ind}_{i,t} + \sum_{i=1}^4 \beta_{i+16} \text{Year} + \sum_{i=1}^{13} \beta_{i+20} \text{Industry} + \varepsilon_{i,t} \\
 \\
 \text{Equity_incen}_{i,t} &= \beta + \sum_{j=1}^6 \beta_j \text{Concen_Inst_type}_{i,t} + \beta_7 \text{Tih}_{i,t} + \beta_8 \text{Size}_{i,t} + \beta_9 \text{Btm}_{i,t} + \beta_{10} \text{Fcf}_{i,t} \\
 &+ \beta_{11} \text{Idiosyn}_{i,t} + \beta_{12} \text{Tenure}_{i,t} + \beta_{13} \text{Bd_size}_{i,t} + \beta_{14} \text{Num_mtg}_{i,t} + \beta_{15} \text{Dual}_{i,t} \\
 &+ \beta_{16} \text{Bd_ind}_{i,t} + \sum_{i=1}^4 \beta_{i+16} \text{Year} + \sum_{i=1}^{13} \beta_{i+20} \text{Industry} + \varepsilon_{i,t} \\
 &(\text{t} = 1998\text{-}2002)
 \end{aligned}$$

Variable	Predicted sign	Model 1	Model 2
		Coefficient (t-statistic)	Coefficient (t-statistic)
<i>Constant</i>		2.273 *** (4.71)	2.269 *** (4.72)
<i>Bank</i>	-	-2.543 *** (-4.58)	
<i>Ins</i>	?	-0.351 (-0.55)	
<i>Ia</i>	?	-0.072 (-0.37)	
<i>Cps</i>	?	-3.454 ** (-2.25)	
<i>Pps</i>	+	-1.179 (-0.94)	
<i>Ufe</i>	?	-3.361 * (-1.67)	
<i>Concen_Top5</i>	+	0.165 (0.63)	
<i>Concen_Bank</i>	-		-0.905 ** (-2.24)
<i>Concen_Ins</i>	?		0.201 (0.45)
<i>Concen_Ia</i>	?		0.322 (1.19)
<i>Concen_Cps</i>	?		-1.154 (-1.19)
<i>Concen_Pps</i>	+		-0.383 (-0.83)

TABLE 4 (continued)			
		<u>Model 1</u>	<u>Model 2</u>
		(1)	(2)
Variable	Predicted sign	Coefficient (t-statistic)	Coefficient (t-statistic)
<i>Concen_Ufe</i>	?		-2.391 (-1.56)
<i>Size</i>	+	0.707 *** (23.56)	0.693 *** (23.69)
<i>Btm</i>	-	-0.542 *** (-5.34)	-0.547 *** (-5.36)
<i>Fcf</i>	-	-0.129 (-1.46)	-0.125 (-1.42)
<i>Idiosyn</i>	+	6.157 ** (2.18)	7.290 *** (2.58)
<i>Tenure</i>	+	0.046 *** (8.57)	0.046 *** (8.48)
<i>Bd_size</i>	?	-0.494 *** (-3.35)	-0.532 *** (-3.61)
<i>Num_mtg</i>	?	-0.082 (-1.01)	-0.079 (-0.97)
<i>Dual</i>	?	0.281 *** (4.87)	0.280 *** (4.85)
<i>Bd_ind</i>	?	-0.943 *** (-5.07)	-0.951 *** (-5.08)
<i>N</i>		3976	3976
Adjusted R-squared		58.6%	58.3%

See Table 4.1 for variable definitions.

*, **, and ***: Significant at the 10%, 5% and 1% levels, respectively (two-tailed).

For parsimony, the coefficients on year-dummies and industry dummies are not reported. Standard errors are Huber/White robust standard errors.

TABLE 5
Results of Sensitivity Checks regarding H1-H3 Using New Grants of Options and Stocks (*Incen_ratio*)

Variable	Sign	Tobit Coefficient (p-value)	OLS
<i>1. Use of Lagged Institutional Holding (<i>Inst_type_{t-1}</i>)</i>			
<i>Bank</i>	–	-0.177*** (0.05)	-0.165** (0.02)
<i>Ins</i>	?	-0.025 (0.83)	-0.031 (0.74)
<i>Ia</i>	?	0.028 (0.37)	0.011 (0.71)
<i>Cps</i>	?	-0.391 (0.28)	-0.466* (0.06)
<i>Pps</i>	+	-0.401* (0.10)	-0.408*** (0.01)
<i>Ufe</i>	?	0.392 (0.37)	0.373 (0.25)
<i>Concen_Top5</i>	+	0.020 (0.61)	0.044 (0.27)
<i>2. Controlling for Investment Horizons</i>			
<i>Bank</i>	–	-0.246** (0.03)	-0.251*** (0.00)
<i>Ins</i>	?	-0.053 (0.62)	-0.098 (0.31)
<i>Ia</i>	?	-0.010 (0.80)	-0.018 (0.54)
<i>Cps</i>	?	-0.320 (0.38)	-0.269 (0.41)
<i>Pps</i>	+	-0.456** (0.05)	-0.397*** (0.00)
<i>Ufe</i>	?	0.230 (0.61)	0.194 (0.52)
<i>Concen_Top5</i>	+	0.033 (0.41)	0.060* (0.07)

TABLE 6
Results of Sensitivity Checks regarding H1-H3 Using Total CEO Equity Incentives
(Equity_incen)

Variable	Sign	Coefficient (t-statistics)
<i>1. Use of Lagged Institutional Holdings (Inst_type_{t-1})</i>		
<i>Bank</i>	–	-0.462*** (-4.05)
<i>Ins</i>	?	0.038 (0.06)
<i>Ia</i>	?	0.034 (0.17)
<i>Cps</i>	?	-2.205* (-1.78)
<i>Pps</i>	+	-1.319 (-0.98)
<i>Ufe</i>	?	-2.850 (-1.42)
<i>Concen_Top5</i>	+	0.472* (1.75)
<i>2. Controlling for Investment Horizons</i>		
<i>Bank</i>	–	-2.706*** (-4.91)
<i>Ins</i>	?	-0.448 (-0.70)
<i>Ia</i>	?	-0.515** (-2.17)
<i>Cps</i>	?	-3.581** (-2.36)
<i>Pps</i>	+	-1.790 (-1.43)
<i>Ufe</i>	?	-3.313* (-1.72)
<i>Concen_Top5</i>	+	0.387 (1.45)
