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# Institutional Monitoring and REIT CEO Compensation

**Zhilan Feng · Chinmoy Ghosh · Fan He · C. F. Sirmans**

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**Abstract** Our objective in this paper is to investigate the relationship between institutional ownership and CEO compensation structure of REITs. Based on detailed analyses of data on institutional ownership, performance, CEO and board characteristics over the 10 year period 1998–2007, we find significant evidence that large institutions influence governance through CEO compensation—greater institutional ownership is associated with greater emphasis on incentive-based compensation (higher pay-performance sensitivity of CEO compensation), and higher cash and total compensation for CEOs. Further, we find that institutions are less active when managers are performing in a superior fashion. Two important conclusions emerge from the analysis. First, similar to unregulated firms, institutional owners do act as monitors in REITs. Broadly, this result suggests that

Z. Feng (✉)
School of Management, Union Graduate College, Schenectady, NY 12308, USA
e-mail: fengz@uniongraduatecollege.edu

C. Ghosh · F. He
Center for Real Estate and Urban Economic Studies, School of Business, University of Connecticut, Storrs, CT 06268, USA

C. Ghosh
e-mail: chinmoy.ghosh@business.uconn.edu

C. F. Sirmans
The J. Harold and Barbara M. Chastain Eminent Scholar in Real Estate,
Department of Risk Management./Insurance, Real Estate & Business Law, Florida State University,
821 Academic Way, P.O. Box 3261110, Tallahassee, FL 32306-1110, USA
e-mail: cfsirmans@cob.fsu.edu
URL: www.cob.fsu.edu/rmi

governance is necessary for REITs. Second, institutional investors set a high pay-performance sensitivity for CEOs, but are willing to pay higher cash compensation to induce managers to take risk.

**Keywords** Institional ownership · CEO compensation · REIT · Mornitoring

## Introduction

Current literature on corporate governance suggests that CEO compensation package (especially pay-for performance contract) is effective in aligning CEO's interests with those of shareholders and can mitigate agency conflicts between shareholders and managers and improve firm performance. However, as Hermalin and Weisbach (1998) observe, a CEO can negotiate with the board and demand a compensation package to his liking as consideration for his support of director candidates preferred by the board. In their model, CEO compensation is the negotiated outcome depending on the balance of power between the CEO and the board. The more powerful the CEO, and the less independent the board, the more favorable is the compensation package to the CEO. So, as CEO power (entrenchment) increases and board independence erodes, a risk-averse CEO demands more income in terms of cash salary and bonus, and less in long-term equity-based compensation, and vice versa. In essence, the greater the agency conflict due to the separation of ownership and control, the less performance-based is CEO compensation.

In this paper, we examine if, and to what extent the adverse effect of agency conflicts on CEO compensation is mitigated by monitoring mechanisms, with special focus on institutional ownership. As noted above, the effect depends on CEO's power, and the effectiveness of monitoring. We focus on Real Estate Investment Trusts (REITs), where the need for and the impact of corporate governance and monitoring continue to be a subject of debate. The board of directors is responsible for internal monitoring, while the market for corporate control provides external monitoring. Several authors have noted the absence of hostile takeovers among REITs (Campbell et al. 2001). In effect, REIT managers face no real threat of job loss and ex-post settling up, and are largely insulated from the disciplining forces of the capital market, adding to their power and entrenchment. Additional power to REIT managers derives from the unique regulatory structure of REITs, especially ownership restrictions which inhibit formation of blockholders and reduce the threat of takeovers. However, mandated high dividend payment which forces REIT managers to raise funds regularly from the capital market and face the natural scrutiny of the suppliers of investment capital, and restrictions on the type of activities REITs may engage in, may offset the entrenchment effect. Internal monitoring by the board may be thwarted by a powerful CEO who can assert considerable authority and influence on the board forcing the directors to compromise their independence. Elected to protect shareholders' interest, directors are often swayed by the fame, power and prestige associated with the position. Since a powerful CEO can exercise decisive influence on the nomination process for board seats, outside directors may be eager to remain loyal to the CEO to retain their board

positions.[1] In conjunction, the lack of monitoring by the market for corporate control and outside directors' willingness to accommodate the CEO afford the incumbent CEO considerable power to influence the structure of his compensation package. Under this scenario, the pay-for-performance contract is rendered less effective in aligning managerial interests with shareholders'.

One entity that has the incentive and the ability to monitor managers' rent-seeking behavior is institutional investors. As owners of large blocks of shares, institutions have substantial financial stake and hence voting power to monitor and influence managerial decisions. And, because the performance and compensation of institutional portfolio managers is closely tied to the performance of firms they invest in, they have the incentive to monitor managerial action, and if necessary, limit managers' discretionary power through board seats and hostile takeover threats. Our objective is to investigate if the presence of institutional investors has significant influence on the structure and mix of REIT CEO compensation.

While the focus on REITs may raise questions about the generality of our conclusions, it offers some special advantages. Limiting the analysis to a single industry allows us to control the impact of risk, investment opportunities, and product market competition on executive compensation. It also eliminates the possibility that the costs and benefits of particular monitoring devices may vary across firms. Second, no general consensus exists on whether institutional investors actively monitor managers, or to just "vote with their feet" (momentum traders). Extant literature suggests that if information asymmetry and cost of monitoring are low, institutional investors are inclined to be actively involved in governance. Conversely, if information asymmetry and monitoring costs are high, large institutions would rather "vote with their feet" instead. The evidence on the information asymmetry in the REIT sector is inconclusive. Glascock et al. (1998) demonstrate that asymmetric information costs are significantly greater in REITs than comparable non-REIT firms. McDonald et al. (2000) show that despite the high payout policy, dividend announcements of REITs reveal important new information. Downs et al. (2000) come to similar conclusions. Han (2006) argues that it is difficult to determine the market value of real property transactions which often include a wide range of heterogeneous and illiquid assets. Feng et al. (2005, 2007a, b) also suggest that information asymmetry complicates the valuation of REITs. Some authors hold the contrary view, however. Gentry et al. (2003) argue that the value of a REIT is simply the aggregate fair market value of its assets. Hartzell et al. (2005) and Hartzell et al. (2008) assert that REITs are easy to value due to their tangible assets and relatively transparent structure. In view of this controversy surrounding the transparency of REITs, the intensity of monitoring by institutions is essentially an empirical issue.

Finally, a major motivation of our study is its potential contribution to the growing controversy surrounding the broad issue of the need and relevance for

[1] Gerety et al. (2001) report that over the period of 1987 to 1998, 128 out of 289 firms in their sample have an independent nomination committee (CEO does not serve on the nomination committee). In general, CEO involvement in the selection of directors has reduced over the last twenty years. For instance, between 1988 and 1991, 32 percent of the firms in the sample have a nomination committee that does not include its CEO. This number increases to 49 percent during the 1992–1998 period. The trend is similar for REITs.

corporate governance of REITs. The authors advocating governance point to the overwhelming evidence that REIT managers face little hostile takeover threat from the market for corporate control, and maintain that governance through other alternative devices is critical for REITs. These authors also express concern that the 5-50 rule under which the top five largest shareholders of a REIT are restricted to owning no more than 50% of the REIT shares may deter the formation of large blocks, and the intensity of monitoring.[2] The authors leaning towards reduced governance offer the counterargument that since institutional investors are not counted as a single investor under the 5-50 rule, it should not jeopardize their monitoring function. These authors also argue that the requirement that REITs must pay most of their taxable earnings as dividends leaves limited amount of free cash flow at managers' discretion, and the restriction on the types of investments REITs can undertake further limits managers' opportunity for self-dealing.[3] Hartzell et al. (2008) note that in their sample of REIT IPOs, REIT CEOs own smaller number of shares compared to CEOs of other similar firms. The authors contend that this may offset the potential lack of monitoring arising from barriers to blockholder formation. In our sample, however, REIT CEOs own more than 5% of outstanding shares, which is higher than ownership reported for CEOs (2%) in other studies. Overall, the issue is far from settled. Against this background our evidence on the role of institutions as monitors can provide new insight on the importance of corporate governance in REITs. If our findings suggest that, consistent with extant evidence with non-regulated firms, institutions do influence CEO compensation, we are justified to conclude that despite regulatory restrictions, REIT managers need governance. However, as we observe later, more research is necessary before any definitive conclusions can be made.

Following Hartzell and Starks (2003), our central hypothesis is that if institutional ownership serves as a monitoring device, then institutional investors will influence executive compensation structure. If firms prefer to use both institutional investment and CEO compensation as monitoring devices, then we expect institutional investors to positively impact CEO incentive-based compensation as a motivation for greater effort. Conversely, the cash components of CEO compensation (salary and bonus) will be impacted negatively by institutional ownership. The alternative hypothesis is that if corporate governance is not important for REITs, the data will show no significant association between institutional ownership and CEO performance-based incentives. We follow the institutional ownership of 124 REITs for a 10 year period starting in 1998 (1998 to 2007). Consistent with the monitoring hypothesis, firms with high institutional ownership exhibit high pay-for-performance sensitivity in CEO compensation. Detailed investigation reveals that even though ownership by large institutional owners is associated with an increase in CEO performance-based compensation, small institutional investors assert little influence over CEO compensation. Also, institutional investors seem to prefer REITs with larger market capitalization. If firm size serves as a proxy for unidentified variables, this evidence implies that

[2] For a detailed discussion on how the regulatory structure of REITs can make governance critical to performance, see Campbell et al. (2001), Ghosh and Sirmans (2003), and Feng et al. (2007a, b).

[3] Hartzell et al. (2008) conjecture that because of high mandatory dividend payment and the scrutiny and monitoring associated with capital raising activities, governance through independent board and incentive-based managerial compensation is not as critical for REITs.

institutions employ alternative criteria in their choice of investments. Further analyses reveal that institutions do not necessarily limit CEO cash and total compensation. For firms with superior performance, high institutional ownership is associated with higher CEO compensation. This evidence is not consistent with that in Hartzell and Starks (2003); based on a more comprehensive sample, these authors report an inverse relation between institutional ownership and total CEO compensation. As such, while our data suggest that institutional investors constitute an alternative monitoring mechanism for REITs, a coherent picture must await further research.

The paper is organized as follows. In the next section, we discuss the extant literature and develop the hypotheses; this is followed by discussion of data, summary statistics and preliminary results from univariate analysis. Next, the relationship between institutional ownership and CEO compensation is explored with multivariate models. The paper is summarized in the last section.

## Background Literature and Hypotheses

There are two major motivations for our study. The first is the recent controversy surrounding the impact of institutional owners on executive compensation. A series of recent studies have identified potential limitations and biases in Hartzell and Starks' (2003) analysis. Second, the findings of our analyses in the highly regulated environment of REITs can shed new light on the effectiveness of monitoring in regulated industries where such evidence is limited.

### Institutional Investors as Monitors

The evidence on whether institutional investors are actively involved in designing executive compensation, or indirectly prefer firms with certain compensation mix, or are indifferent about executive compensation structure is inconclusive. Hartzell and Starks (2003) propose the hypothesis that if institutional investors are active in monitoring management, they will influence CEO compensation structure and induce compensation schemes that emphasize effort and performance.[4] So, high institutional ownership will be associated with high incentive or performance based compensation, and low cash compensation. They study executive compensation for 1914 firms from 1992 to 1997. Consistent with the monitoring hypothesis, the authors find that high institutional ownership increases pay-for-performance sensitivity of executive compensation and decreases the level of cash and total compensation.[5] They conclude that monitoring by institutional investors is effective

[4] CEO compensation is usually set by the Board of Directors. As such, it is not clear that institutional investors have any direct influence on CEO compensation structure or type. However, institutional investors can affect governance and decision making by Boards though their large shareholdings or block ownerships. We are grateful to an anonymous referee for this observation.

[5] Pay performance sensitivity (PPS) is measured as the change in value of executive option grants for $1000 change in the value of equity. Since PPS is a direct function of the number of options granted, it raises the concern of potential CEO entrenchment when the options are exercised. Which effect dominates—the incentive effect of PPS or the entrenchment effect on conversion—is an empirical issue which, to our knowledge, has not been explored in literature. Our data do not allow us to address this issue, but it is an interesting topic for future research. This point was brought to our attention by an anonymous referee.

in mitigating agency conflicts. They also find that institutional investors prefer specific compensation structures. Their results suggest that institutional ownership and performance-based compensation are used in concert rather than as substitutes for each other.

Smith and Swan (2007) report contradictory results in their recent paper. They follow Hartzell and Starks' (2003) model to investigate S&P500 firms from 1992–2002. Based on a larger sample and a longer period, they find that Hartzell and Starks' results are driven largely by their measurement of concentration of institutional ownership. According to these authors, strong correlation between this variable and firm size introduces a bias in Hartzell and Starks' analysis. After a minor adjustment in the measurement of concentration of institutional ownership and a log transformation of firm size to reduce the pay-size effect, Smith and Swan find that institutional investors increase both option grant pay-for-performance sensitivity, and the level of base salary and total compensation, as well. The authors advance the notion that when an executive is willing to expend greater effort to maximize incentive-based pay, he deserves a higher cash salary and bonus to compensate for the greater risk. Ostensibly, institutional shareholders are willing to endorse a pay structure with high cash compensation as a reward for greater effort and higher performance.

Smith and Swan's (2007) finding that institutional ownership increases CEO's salary and total compensation is borne out by Khan et al. (2005) and Kang and Liu (2005). Further corroboration derives from the recently documented record on proxy voting by mutual fund institutional investors. A recent study reports that mutual funds are remarkably in favor of management on matters of pay. In fact, in 66% of times, funds voted in management's favor on issues of executive compensation. The only instance that is opposed by all mutual fund families is the attempt to limit executive pay. Indeed, mutual funds usually back executive compensation plans and oppose shareholder attempts to rein them (Davis and Kim 2005; Levitz 2006). Several potential explanations are consistent with this observation. First, institutional investors are reluctant to dictate executive pay packages because high levels of monitoring by large shareholders may damage firm value (Plitch and Whitehouse 2006; Burkaart et al. 1997). Second, institutional investors trust that the executive team is genuinely committed to improving the performance of the firm. Hence, rather than impose a rigid and prescriptive compensation policy on executives, institutions are more interested in retaining top executives by offering a favorable compensation package.

Other studies that cast doubt on Hartzell and Starks' (2003) results include Gallagher et al. (2005) who report that mutual funds' preference for executive compensation is linked to their investment style, not necessarily monitoring. They further report that mutual funds are insensitive to changes in compensation, and preference for compensation structure does not lead to better mutual fund performance. These results are reminiscent of Brickley et al. (1988) who classify institutional investors as pressure-sensitive or pressure-resistant. Banks, insurance companies and nonbank trusts are pressure-sensitive since these investors are susceptible to influence due to their business relationships with firms. On the other hand, public pension funds, mutual funds, and endowments and foundations are pressure-resistant because these investors are less likely to have a business

relationship with firms. David et al. (1998) and Almazan et al. (2005) find that ownership concentration of pressure-resistant institutional investors is positively associated with pay-for-performance sensitivity and negatively associated with the level of executive pay, whereas stock ownership by pressure-sensitive institutional ownership have no significant impact. Shin (2006), however, finds that public pension funds, mutual funds, endowments and foundations are not pressure-resistant as previous literature implied. According to him, institutions' desire to sell 401(K) and other financial services induces them to compromise on their monitoring role, and not require a compensation structure for the CEO which is sensitive to firm performance. Following this literature and the definition in Brickly et al. (1988), we separate the top-five institutional investors into pressure-sensitive and pressure-resistant to examine if different types of institutional investors have differential impact on CEO compensation.

Overall, the issue of the impact of institutional monitoring on CEO compensation remains unresolved. The effect depends on the type of institution, and how institutional ownership is measured. Our research can provide additional evidence on this growing controversy.

## Regulatory Structure and Governance of REITs

To develop the hypotheses on the role of institutions in the monitoring of REIT managers, it is instructive to discuss the regulatory environment of REITs. In general, CEOs are less powerful in regulated industries because regulation diminishes managerial discretion. However, the purpose of regulation of REITs was mainly to improve liquidity, diversification, and transparency to attract institutional investors, not so much to enforce fiduciary responsibility and protection of stakeholder interest. Consider the regulatory provisions of REITs with potential impact on governance:

1. *Ninety percent distribution rule*: For tax exemption, 90% of a REIT's taxable income must be paid out as dividends. This rule reduces managers' access to discretionary cash flow, and forces firms to raise capital from the market, subjecting them to the disciplining forces of investment bankers. Consequently, agency conflict is mitigated.
2. *Restriction on income sources*: Seventy-five percent of REIT assets must be held in real estate assets, or cash and government securities. Indeed, not more than 25% of REIT assets can be securities other than real estate. Restricting activity to the real estate sector limits managers' experience and employment potential. To protect their careers, REIT managers likely collude to thwart hostile takeovers (Campbell et al. 2001). The resulting entrenchment increases agency costs.
3. *Restriction on ownership*: Ownership of REITs must be dispersed among at least 100 shareholders, the five biggest of which may not own more than 50% of total shares outstanding. This provision calls for diffused ownership, making it difficult for large blockholders to acquire ownership stakes, and shareholders to form alliances to pose a takeover threat. Agency problems escalate under dispersed ownership (Ghosh and Sirmans 2003).

Clearly, provisions 2 and 3 can effectively insulate management from hostile takeover threats. As noted earlier, the market for corporate control is virtually non-existent among REITs. The protection from external monitoring gives the CEO power which he can use to pressure the board of directors to abide by his preference and support his agenda. CEO can assert influence over internal governance mechanisms through ownership of stock, length of service, and participation in nomination committee. Ghosh and Sirmans (2003) find CEO ownership has a significantly negative impact on REITs' performance. The directors who value the privileges and perquisites associated with directorships will be happy to comply with the CEO's priorities to extend their tenure. This results in a captive board, and poor internal governance.

We seek to investigate two issues: 1) do institutional investors have preference for a particular compensation structure?; and, 2) do different institutional investors have different impact on CEO compensation? Following Hartzell and Starks (2003), if pay-for-performance compensation is effective in reducing agency costs, and if institutional investors are interested in monitoring, then we expect institutional investors to prefer firms with high pay-for-performance compensation, and low cash and total compensation (salary and bonus). Lack of support for this hypothesis would be consistent with at least two potential explanations: one, rather than monitoring, institutional investors "vote with their feet"; two, institutional investors allow both higher pay-for-performance and cash compensation to attract and retain the most competent managers. Evidence on these issues would enable us to shed light on the effectiveness of the pay-for-performance compensation scheme. Specifically, if pay-for-performance compensation is actually a symptom of potential agency conflicts and is used as a camouflage for managers' motive for rent extraction (Bebchuk and Fried 2003), then more sophisticated institutional investors (*i.e.* pressure-resistant) should be able to discern managers' motives and make investment decisions on the basis of alternative criteria, and not pay attention to executive compensation.

Our premise is that because of their unique regulatory structure, REITs present a particularly suitable laboratory to explore the motoring intensity of institutional investors. The evidence is relevant for two issues that have recently generated some debate. First, does the 5-50 rule deter blockholdings and induce institutions that are interested in monitoring to avoid REITs? Considering that institutional investors are not counted as a single investor, the rule should not jeopardize monitoring by institutions. Second, how important is governance for REITs? Under mandated dividend payment and restricted investment options, managerial discretion is limited so that governance is not critical. However, absence of an active takeover market may insulate managers and foster entrenchment. If our analyses suggest that presence of institutional investors influences REIT CEO compensation, the evidence has implications for both issues. It jointly implies that governance is necessary for REITs, and that institutions are active in monitoring despite the regulatory constraints.

The evidence on the monitoring effectiveness of institutional investors of REITs is scarce. One notable exception is Ghosh and Sirmans (2003) who find institutional owners have no impact on REIT performance. Below et al. (2000) and Ciochetti et al. (2002) find that institutional investors prefer larger and more liquid REIT stocks.

Chan et al. (1998) indicate that REIT stocks on average attract more institutional investors than non-REIT stocks after 1994. Institutional investors prefer to hold a diversified REIT stock portfolio, instead of concentrating their holdings in a few stocks. By presenting new evidence, our study has the potential to initiate future enquiries in this area.

## Data and Summary Statistics

We identify all exchange listed REITs from the SNL database and the NAREIT annual list for the year 1998. The number of exchange-traded REITs is about two hundred. The data on financial variables are collected from the SNL database. The data on CEO compensation and board characteristics are collected from the SNL Executive Compensation Review and proxy statements. The non-availability of proxy statements limits our dataset to a total of 124 REITs. To keep our focus on how changes in institutional ownership affect CEO compensation mix, we follow the same REITs for the next 10 years over the period 1998–2007. Due to attrition for non-availability of various data items, the final sample contains 67 REITs for which all the necessary variables are available.[6] The size of the sample through time and for each individual data item is presented in Table 10 in the appendix. We then collect all the variables for 1998 to 2007 for these REITs. To control for outliers, we winsorize our variables by 1%.

### Institutional Ownership

Data on institutional ownership are collected from the CDA Spectrum database. We measure concentration of institutional ownership as suggested by Smith and Swan (2007). They note that Hartzell and Starks measure of ownership concentration of top-five institutions is significantly and negatively correlated with firm size, which can seriously bias the coefficients in the linear regression model. In our data, we find the same negative correlation between the two variables. Smith and Swan argue that to address this concern, it is appropriate to measure shareholding by top-five institutional investors as a proportion of total number of outstanding shares. In our sample, twenty-four percent of the outstanding shares of REITs are owned by top-five large institutional investors. Further, we manually separate the top-five institutional investors into pressure-sensitive and pressure-resistant investors following Brickley et al. (1988) and Almazan et al. (2005). Their analyses demonstrate that pressure-resistant investors are more inclined to actively monitor

[6] We recognize this method suffers from the survivorship bias that surviving firms are likely to be those that register better long-term performance and attract greater institutional interest. However, as noted by Boone et al. (2007), it offers some advantages. Our focus is to examine how monitoring by institutional investors influences CEO compensation. Extant evidence suggests that internal governance mechanisms (board structure, ownership composition etc.) evolve gradually over time after the firm goes public and once a stable structure is reached, further changes are infrequent. Following the same set of firms over time allows us to focus on monitoring by institutional owners with other factors at stable levels. In addition, we repeat the tests with the 67 firms that survive through 10 years. The results are similar although the significance levels drop because of smaller sample size.

the CEO and participate in designing CEO compensation package. In our data, eleven percent of total shares are owned by pressure-resistant investors.[7]

### Pay Performance Sensitivity (PPS) of Executive Stock Option Grants

We follow Yermack (1995) and Hartzell and Starks (2003) to calculate the option-grant pay-for-performance sensitivity (PPS). First, option delta is calculated using Black-Scholes model modified for dividends. In applying the model, we make the same assumptions as Yermack, which is the current practice in most academic studies on option grants. Specifically, where we cannot determine the date the options awarded, we assume the stock price to be equal to the exercise price as most executive stock options are issued at the money. Dividend rate is defined as four times the last dividend paid divided by the year-end stock price. Yield on the 10-year treasury bond at the time of issue is used as a proxy for interest rate. Ideally, the life of options would be set equal to the longest period options are granted according to the firm's most recently approved plan. However, since this information could not be obtained for most cases, we set the options' life equal to 10 years, consistent with the academic literature on this issue. Annualized volatility is measured as the standard deviation of stock returns during the last 120 days of the fiscal year, multiplied by 254, the number of trading days in a typical year. Finally, in conformity with Yermack, we consider only newly awarded options.[8] To obtain the pay-for-performance sensitivity, option Delta is multiplied by the number of options granted and divided by the number of shares outstanding at the beginning of the year, and then multiplied by 1,000. This gives us the dollar change in managerial wealth per $1,000 change in shareholder wealth.[9]

### Summary Statistics

The summary statistics are presented in Table 1. On average, fifty-three percent of REITs' outstanding shares are owned by institutional investors over the sample period 1998–2007. The top-five institutions own about 24% of outstanding shares, while the pressure-resistant institutions hold a little over 11% of shares, on average. Figure 1 presents the trend of institutional ownership for REITs during 1998 to 2007. Two patterns are discernible. First, institutional ownership of REITs has increased significantly over the 10 year study period, highlighting the important role of institutions in valuation and governance of REITs. Two, there are clearly two regimes. During the first regime spanning the period 1998–2002, average institutional ownership remains essentially flat at about 45%, and ownership by

[7] We only have the names and types of institutional investors from 2000 to 2007 that we can use to classify them into pressure-sensitive and pressure-resistant.

[8] As observed by an anonymous referee, this method ignores the impact of time variation of stock price, stock price volatility, and other factors on the value of previously awarded options. However, lack of detailed information on the history of option awards makes such an analysis difficult.

[9] It is worth noting that CEO option grant PPS is not included in calculating CEO equity ownership. Theoretically, there is no a-priori reason to expect a relation between option grant PPS and CEO stock ownership, although over the long run, CEO ownership in a firm with high option grant will be high through the exercise of stock options.

**Table 1** Descriptive statistics for CEO compensation, institutional ownership and control variables of REITs

| Variables | Average | Minimum | Maximum | Standard Deviation |
|---|---|---|---|---|
| CEO compensation | | | | |
| Option-grant PPS ($) | 1.07 | 0.00 | 19.47 | 2.61 |
| Percentage of equity-based compensation (%) | 39.77 | 0.00 | 100.00 | 29.97 |
| Option Compensation (000,$) | 586 | 0 | 10078 | 1448 |
| Base Salary (000,$) | 402 | 0 | 1,000 | 211 |
| Bonus (000,$) | 310 | 0 | 2000 | 408 |
| Total compensation (000,$) | 1738 | 0 | 15991 | 2475 |
| Institutional ownership | | | | |
| Total institutional ownership (%) | 52.74 | 25.08 | 98.63 | 26.85 |
| Top-five institutional ownership (%) | 23.62 | 25.08 | 51.76 | 11.29 |
| Pressure-resistant total institutional ownership (%, 2000 to 2007) | 11.58 | 0.00 | 80.18 | 9.04 |
| Control variables | | | | |
| CEO duality (%) | 0.54 | 0.00 | 1.00 | 0.50 |
| CEO tenure | 7.34 | 0 | 47 | 6.25 |
| CEO ownership (%) | 5.46 | 0.00 | 60 | 9.11 |
| Percentage of outside directors (%) | 73.81 | 44.44 | 92.86 | 10.94 |
| Dummy for independent nomination committee | 0.46 | 0.00 | 1.00 | 0.49 |
| Dummy for Staggered Board | 0.65 | 0.00 | 1.00 | 0.48 |
| Change in shareholder wealth (million $) | 204 | −2287.01 | 3960.48 | 773.92 |
| Tobin's Q | 1.23 | 0.75 | 2.16 | 0.29 |
| Market capitalization (million $) | 1712 | 7.19 | 13463 | 2457 |
| Leverage (%) | 53.32 | 4.10 | 95.88 | 14.21 |

We report the descriptive statistics for our variables for 124 REITs from 1998 to 2006. Option-grant PPS is the change in value of the option per $1000 change in shareholder value. Percentage of equity-based compensation is percentage of equity compensation (option compensation plus restrictive stocks) to total compensation. Option compensation is the value of option granted to CEO. Total compensation is cash compensation plus value of newly granted option and restricted stocks. The data for CEO compensation are from SNL Executive compensation Review. Total institutional ownership is the percentage of shares owned by all institutional investors. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. Pressure-resistant institutional ownership is shares owned by pressure-resistant institutional investors to total shares outstanding. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for staggered board is 1 for firms with staggered board and 0 otherwise. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy for staggered board is 1 for firms with staggered board, and 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of this year to the end of the last year. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets. Market capitalization is shares outstanding times stock price. Leverage is total debt over total assets

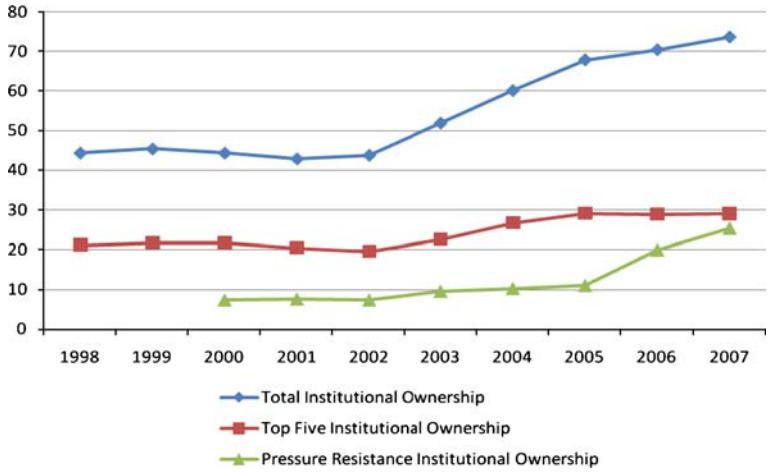


**Fig. 1** Trend of institutional ownership over years. The institution ownership data is obtained from SNL and the sample period is from 1998 to 2007. Total Institution Ownership is defined as total institutional shared divided by total shares outstanding. Top five institution ownership is defined as shares owned by top five institutions divided by total shares outstanding. Pressure-resistant institutional ownership is shares owned by pressure-resistant institutional investors to total shares outstanding. We manually separate the top-five institutional ownership into pressure-sensitive and pressure-resistant following Brickley et al. (1988) and Almazan et al. (2005)

top five institutions holds at about 20%. Data for pressure-resistant institutions are available from 2000, and the ownership by this group is steady at around 9% during 2000–2003. Since 2003, total institutional ownership in REITs has grown rapidly, reaching as high as over 70% in 2007 from 44% in 2002. Ownership concentration of top five institutions and pressure-resistant also significantly increased since 2003, though to a slightly less degree than total institutional ownership. It is worth noting that the growth in institutional ownership coincided with tremendous growth in value of REITs over the same period. Clearly, institutions were attracted by the superior performance of REITs.

As discussed in more detail in Table 2, among REITs of different asset types, institutional investors have strong preference for larger size REITs. The largest asset type REITs, Office REIT, has an average total institutional ownership of 69% across the sample period, going up as far as 84% in 2007. In contrast, institutional ownership of smaller REITs, such as Hotel REITs, only accounted for 48%.

During our study period, the average equity-based compensation (value of option and restrictive stocks to total compensation) accounts for about 39%. For perspective, the mean option-grant PPS for non-regulated firms increases from $0.59 before 1991 (Yermack 1995) to $0.977 through 1992 to 1997 (Hartzell and Starks 2003). The average option-grant PPS for REITs of $1.07 over the study period of 1998 to 2007 is comparable to similar numbers reported in extant literature. The typical REIT CEO receives $586,000 in option compensation, $402,000 in base-salary and $310,000 in bonus during 1998 to 2007. These numbers are within close range of corresponding numbers in Pennathur et al. (2005). They report that CEO base-salary is $319,000, bonus is $224,000 and option value is $627,000 from 1997 to 2000. The difference in option compensation between the two studies is mainly driven by

**Table 2** Descriptive statistics for CEO compensation, institutional ownership and control variables by REITs assets types

| Variables | Retail (288) | Residential (216) | Office (198) | Hotel (108) | Mixed (306) |
|---|---|---|---|---|---|
| CEO compensation | | | | | |
| Option-grant PPS ($) | 0.86 | 1.08 | 1.18 | 1.08 | 1.16 |
| Percentage of equity-based compensation (%) | 38.62 | 41.22 | 35.90 | 36.04 | 42.65 |
| Option compensation (000,$) | 491 | 547 | 578 | 432 | 763 |
| Base salary (000,$) | 420 | 350 | 461 | 327 | 406 |
| Bonus (000,$) | 272 | 301 | 448 | 195 | 295 |
| Total compensation (000,$) | 1616 | 1547 | 2099 | 1462 | 1847 |
| Institutional ownership | | | | | |
| Total institutional ownership (%) | 47.32 | 54.35 | 69.28 | 47.73 | 47.57 |
| Top-five institutional ownership (%) | 21.50 | 23.94 | 30.49 | 21.23 | 21.28 |
| Pressure-resistant institutional ownership (%) | 10.46 | 12.06 | 13.64 | 11.26 | 11.05 |
| Control variables | | | | | |
| CEO duality (%) | 0.58 | 0.57 | 0.38 | 0.68 | 0.54 |
| CEO tenure | 8.18 | 8.53 | 5.42 | 6.5 | 7.25 |
| CEO ownership (%) | 7.66 | 4.55 | 4.29 | 7.08 | 3.50 |
| Percentage of outside directors (%) | 70.69 | 73.85 | 72.78 | 74.87 | 76.91 |
| Dummy for independent nomination committee | 0.47 | 0.47 | 0.42 | 0.43 | 0.48 |
| Dummy for staggered board | 0.66 | 0.57 | 0.68 | 0.81 | 0.61 |
| Change in shareholder wealth (million $) | 264 | 169 | 165 | 72.68 | 246.71 |
| Tobin's Q | 1.28 | 1.26 | 1.15 | 1.01 | 1.27 |
| Market capitalization (million $) | 1779 | 1720 | 1960 | 842 | 1789 |
| Leverage (%, t-1) | 84.43 | 57.83 | 49.05 | 51.29 | 49.42 |

We report the descriptive statistics for our variables for 124 REITs by assets types. Option-grant PPS is the change in value of the option per $1000 change in shareholder value. Percentage of equity-based compensation is percentage of equity compensation (option compensation plus restrictive stocks) to total compensation. Option compensation is the value of option granted to CEO. Total compensation is cash compensation plus value of newly granted option and restricted stocks. The data for CEO compensation are from SNL Executive compensation Review. Total institutional ownership is the percentage of shares owned by all institutional investors. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. Pressure-resistant institutional ownership is shares owned by pressure-resistant institutional investors to total shares outstanding. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for staggered board is 1 for firms with staggered board and 0 otherwise. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy for staggered board is 1 for firms with staggered board, and 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of this year to the end of the last year. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets. Market capitalization is shares outstanding times stock price. Leverage is equal to total debt over total assets

sample size and outliers. Our data are more complete including 1240 observations while the Pennathur et al. (2005) study includes only 471 firm-year observations. Finally, CEO's average total compensation is $1, 738,000.

About 54% of the CEOs in our sample also serve as the Chairman of the board, and have been on this position for about 7 years, and own about 5% of the outstanding shares of their firms. Seventy-four percent of the directors are independent in that they are not current or former managers or employees of the firm. Forty-six percent of the REITs have an independent nomination committee (CEO is not a member of the committee). Sixty-five percent of the REITs have staggered boards. Over the study period, these REITs have an average Tobin's Q of 1.23 and market capitalization of $1712 million which increases by about $204 million from previous year, the average leverage of the REITs is 53% through the period.

In Table 2, we report the descriptive statistics for the variables by REIT asset types. Current literature suggests that different asset types may be associated with different risk levels. Hence, CEO might have preference for different levels of equity-based compensation. In the interest of brevity, we only report the statistics for the largest 4 groups of REITs asset classes as well as the means for residual sample during our study period. We find that office REITs are largest in market capitalization. These REITs also have highest total institutional ownership and option compensation. That institutional investors prefer large REITs has been documented in several earlier studies (Below et al. 2000; Ciochetti et al. 2002). Consistent with Hartzell and Starks (2003), our data reveal that high institutional ownership is associated with high level of equity-based compensation and high sensitivity of pay-for-performance compensation. Also, consistent with findings in Kang and Liu (2005), Khan et al. (2005) and Smith and Swan (2007), both CEO salary and total compensation, and institutional ownership are higher for larger REITs. On the other hand, Hotel REITs which have smaller market capitalization are associated with lower level of cash, option and total compensation, and have fewer shares owned by institutional investors. As such, our data reveal a clear pattern consistent with the "size effect"—strong correlation between firm size and institutional ownership. Interestingly, no clear pattern is discernible between the standard measures of corporate governance and different asset types.

In Table 3, we report the trend of the key variables during the ten-year period. As demonstrated by the average market value of the sample REITs over the ten-year period, REITs experienced double-digit growth in value for most of the 1990s. However, stock returns turned negative in 1998. Hence, the early part of our study period (1998 to 2001) can be characterized as a period of correction for the REIT sector. Not surprisingly, REITs reduced their equity-based compensation and pay-for-performance sensitivity and increased cash and bonus compensation from 1998 to 2001 in response to the negative stock returns suffered in 1998 and 1999. However, equity-based compensation significantly increased since 2002 as stock market boomed. It is interesting that option grant PPS steadily decreased over the study period from a high of 2.24 in 1998 to 0.38 in 2007. To control for these effects, we add dummy variables for asset type and year in the multiple regression models.

In Table 4, we report the pair-wise correlation coefficients for the main variables. We find positive correlation between CEO option grant PPS and CEO option and

total compensation, but there is no correlation between option grant PPS and cash compensation. Also, firms that pay high option-based compensation to CEOs also pay high total compensation. Firm size is significantly positively correlated with option compensation, cash compensation as well as total compensation. Also, large firms tend to be better performers (*i.e.* change in shareholder wealth). REITs that attract more institutional investors also have high concentration in top-five institutional holdings.

In summary, the univariate analysis reveals that institutional investors prefer larger firms. Consistent with Hartzell and Starks (2003), preliminary analyses of data suggest that high institutional investment is associated with high level of option compensation. Also, consistent with findings in Kang and Liu (2005), Khan et al. (2005) and Smith and Swan (2007), CEO's salary and total compensation are higher for larger REITs with more institutional ownership.

## Multivariable Regressions

### CEO Compensation and Institutional Ownership: Pay Performance Sensitivity (PPS)

The univariate analysis demonstrates that firms with high institutional ownership are associated with high equity-based compensation for the CEO. However, other potential factors must be incorporated in the analyses to arrive at a definitive conclusion. We study these relationships in more depth and report the results in Table 5, where the dependent variable is option-grant PPS. Option-grant PPS represents the sensitivity of the option grant per US$ 1000 change in shareholder value. It has been calculated using the partial derivative of the Black-Scholes value as suggested by Yermack (1995). For example, a PPS value of 1.28 implies that the value of stock option compensation increases by US$1.28 per US$1000 increase in shareholder value.

In addition to institutional ownership, we include the corporate governance variables and other control variables in our analysis. Standard internal governance variables used in the literature fall in broad categories of CEO characteristics (CEO duality, CEO tenure, CEO ownership), and board characteristics (percentage of outside directors, composition of the nomination committee, and staggered board). Longer tenure makes the CEO more powerful and entrenched, a dual role as CEO and Chairman of Board has a similar effect. In accordance with agency theory, an entrenched CEO will prefer a greater proportion of his compensation in cash which implies a negative coefficient for CEO duality and CEO tenure in the model estimating the pay-performance sensitivity (PPS) of CEO compensation. Stock ownership aligns CEO's incentives with shareholders' interest and should positively impact CEO PPS. However, ownership can empower and entrench CEOs and lead to sub-optimal decisions.

Theory suggests that independent boards are more effective in monitoring, although empirical studies have yielded less than consistent support for this notion. Previous literature suggests that it is difficult to remove incumbent directors in a staggered board, so dissidents are at a disadvantage. If the CEO is not a member of the nomination committee, we classify it as independent. CEO has less influence in

**Table 3** Descriptive statistics for CEO compensation, institutional ownership and control variables by REITs assets year

| Variables | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| CEO Compensation | | | | | | | | | | |
| Option-grant PPS ($) | 2.24 | 1.44 | 1.66 | 1.17 | 1.03 | 0.65 | 0.45 | 0.59 | 0.51 | 0.38 |
| Percentage of equity-based compensation (%) | 39.73 | 33.46 | 37.44 | 30.81 | 38.11 | 40.5 | 42.24 | 43.71 | 49.01 | 52.19 |
| Option compensation (000, $) | 824 | 384 | 488 | 426 | 1031 | 834 | 626 | 585 | 618 | 353 |
| Base salary (000,$) | 312 | 338 | 363 | 386 | 384 | 414 | 459 | 464 | 492 | 525 |
| Bonus (000,$) | 210 | 227 | 281 | 257 | 292 | 363 | 466 | 464 | 313 | 290 |
| Total compensation(000,$) | 1,806 | 1,386 | 1,542 | 1,562 | 2,044 | 1908 | 2060 | 1861 | 1745 | 1486 |
| Institutional ownership | | | | | | | | | | |
| Total institutional ownership (%) | 44.38 | 45.41 | 44.37 | 42.92 | 43.83 | 51.94 | 60.14 | 67.86 | 70.4 | 73.61 |
| Top-five institutional ownership (%) | 21.18 | 21.75 | 21.7 | 20.42 | 19.58 | 22.53 | 26.71 | 29.08 | 28.93 | 28.99 |
| Pressure-resistant institutional ownership (%) | | | 7.43 | 7.69 | 7.42 | 9.64 | 10.34 | 11.12 | 20.04 | 25.45 |
| Control variables | | | | | | | | | | |
| CEO duality (%) | 0.58 | 0.57 | 0.59 | 0.57 | 0.53 | 0.49 | 0.55 | 0.45 | 0.5 | 0.47 |
| CEO tenure | 6.5 | 6.67 | 6.8 | 7.4 | 7 | 7.53 | 7.63 | 7.88 | 8.38 | 8.75 |

**Table 3** (continued)

| Variables | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| CEO ownership (%) | 4.77 | 6.22 | 5.80 | 5.86 | 4.84 | 4.53 | 5.19 | 5.55 | 6.00 | 5.9 |
| Percentage of outside directors (%) | 73.53 | 75.02 | 75.17 | 75.77 | 70.41 | 71.35 | 73.39 | 73.87 | 75.04 | 72.91 |
| Dummy for staggered board | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 | 0.67 | 0.65 | 0.61 | 0.60 | 0.59 |
| Change in shareholder wealth (million $) | −8.84 | −25.69 | 190.13 | 216.26 | 8.75 | 472 | 555 | 278 | 1071 | −622 |
| Tobin's Q | 1.11 | 1.03 | 1.1 | 1.17 | 1.16 | 1.28 | 1.39 | 1.39 | 1.53 | 1.34 |
| Market capitalization (million $) | 820.78 | 787.98 | 978.06 | 1200.41 | 1192.03 | 1720 | 2289 | 2644 | 3820 | 3189 |
| Leverage (%) | 41.82 | 49.04 | 50.55 | 52.7 | 53.74 | 54.86 | 53.56 | 53.46 | 55.08 | 57.77 |

We report the descriptive statistics for our variables for 124 REITs by year. Option-grant PPS is the change in value of the option per $1000 change in shareholder value. Percentage of equity-based compensation is percentage of equity compensation (option compensation plus restrictive stocks) to total compensation. Option compensation is the value of option granted to CEO. Total compensation is cash compensation plus value of newly granted option and restricted stocks. The data for CEO compensation are from SNL Executive compensation Review. Total institutional ownership is the percentage of shares owned by all institutional investors. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. Pressure-resistant institutional ownership is shares owned by pressure-resistant institutional investors to total shares outstanding. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for staggered board is 1 for firms with staggered board and 0 otherwise. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy for staggered board is 1 for firms with staggered board, and 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of this year to the end of the last year. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets. Market capitalization is shares outstanding times stock price. Leverage is total debt divided by total assets

**Table 4** Pair-wise correlation coefficients

| | Option-grant PPS ($) | Percentage of equity-based compensation (%) | Option compensation (000, $) | Total cash compensation (000,$) | Total compensation (000,$) | Total institutional ownership (%) | Top-five institutional ownership (%) | Change in shareholder wealth (million $, t)) | Change in shareholder wealth (million $, t-1) | Tobin's Q | Market capitalization (million $) | Leverage (%, t-1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Option-grant PPS ($) | 1 | 0.36[a] | 0.42[a] | −0.01 | 0.29[a] | −0.01 | 0.02 | −0.06[c] | −0.03 | −0.13[a] | −0.07[b] | −0.09[a] |
| Percentage of equity-based compensation (%) | | 1 | 0.46[a] | 0.03 | 0.50[a] | 0.22[a] | 0.12[a] | 0.13[a] | 0.12[a] | 0.11[a] | 0.22[a] | −0.42[a] |
| Option compensation (000, $) | | | 1 | 0.17[a] | 0.77[a] | 0.12[a] | 0.06[c] | 0.11[a] | 0.20[a] | 0.06[c] | 0.22[a] | −0.08[a] |
| Total cash compensation (000,$) | | | | 1 | 0.67[a] | 0.36[a] | 0.22[a] | 0.24[a] | 0.24[a] | 0.21[a] | 0.41[a] | −0.03 |
| Total compensation (000,$) | | | | | 1 | 0.30[a] | 0.16[a] | 0.29[a] | 0.29[a] | 0.18[a] | 0.42[a] | −0.08[a] |
| Total institutional ownership (%) | | | | | | 1 | 0.86[a] | 0.29[a] | 0.27[a] | 0.24[a] | 0.43[a] | −0.06[c] |

**Table 4** (continued)

| | Option-grant PPS ($) | Percentage of equity-based compensation (%) | Option compensation (000, $) | Total cash compensation (000,$) | Total compensation (000,$) | Total institutional ownership (%) | Top-five institutional ownership (%) | Change in shareholder wealth (million $, t)) | Change in shareholder wealth (million $, t-1) | Tobin's Q | Market capitalization (million $) | Leverage (%, t-1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Top-five institutional ownership (%) | | | | | | | 1 | 0.11[a] | 0.08[a] | 0.13[a] | 0.16[a] | −0.04 |
| Change in shareholder wealth (million $, t)) | | | | | | | | 1 | 0.28[a] | 0.43[a] | 0.76[a] | 0.03 |
| Change in shareholder wealth (million $, t-1) | | | | | | | | | 1 | 0.23[a] | 0.57[a] | −0.06[c] |
| Tobin's Q | | | | | | | | | | 1 | 0.38[a] | 0.23[a] |
| Market capitalization (million $) | | | | | | | | | | | 1 | −0.05 |
| Leverage (%, t-1) | | | | | | | | | | | | 1 |

a, b, c denotes significance at 1%, 5%, and 10% respectively

**Table 5** Impact of institutional ownership on CEO option-grant PPS

| Independent variable | Regression 1 | Regression 2 | Regression 3 | Regression 4 | Regression 5 |
|---|---|---|---|---|---|
| Total institutional ownership (%, t-1) | 0.011** | 0.012** | | | |
| Top-five institutional ownership (%, t-1) | | | 0.019** | 0.021** | |
| Pressure-resistant institutional ownership (%, t-1) | | | | | 0.007 |
| CEO duality (%) | | 0.336 | | 0.331 | 0.252 |
| CEO tenure | | −0.027* | | −0.027* | −0.017 |
| CEO ownership (%) | | −0.002 | | −0.004 | −0.002 |
| Percentage of outside directors (%) | | −0.005 | | −0.005 | −0.003 |
| Dummy for independent nomination committee | | 0.028 | | −0.006 | 0.145 |
| Dummy for staggered board | | −0.089 | | −0.067 | −0.171 |
| Change in shareholder wealth (mil $, t) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Change in shareholder wealth (mil $, t -1) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tobin's Q (t-1) | −0.212 | −0.349 | −0.290 | −0.379 | −0.221 |
| Ln(market capitalization) ( t-1) | −0.219** | −0.259** | −0.146* | −0.186* | 0.029 |
| Leverage (%, t-1) | −0.015** | −0.016** | −0.014** | −0.015** | −0.002 |
| Year and asset type (dummy) | Yes | Yes | Yes | Yes | Yes |
| Intercept | 2.653*** | 4.483*** | 2.316*** | 3.214*** | 1.062 |
| Pseudo $R^2$ (%) | 23.84 | 25.17 | 23.87 | 25.22 | 20.33 |

We use Tobit model to study the impact of the institutional ownership on CEO option—grant PPS. The dependent variable is option sensitivity which is defined as the change in value of the option per $1000 change in shareholder value. The data for CEO compensation are from SNL Executive compensation Review. In addition to institutional ownership variables, we include corporate governance variables and lag control variables. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy variable for staggered board is 1 for firms with staggered board, 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of the last year to the end of the year before. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets at the end of last year. Market capitalization is shares outstanding times stock price at the end of last year. Leverage is total debt divided by total assets at the end of last year. In regression 1 and 2, we add total institutional ownership. Total institutional ownership is the percentage of shares owned by all institutional investors. In regression 3 and 4, we include top-five institutional ownership. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. In regression 5, we include pressure-resistant/total institutional ownership. We manually separate the total institutional ownership into pressure-sensitive and pressure-resistant following Brickley et al. (1988) and Almazan et al. (2005)

the nomination process if the nomination committee is independent. We use dummy variables to identify a staggered board (value of 1 if yes, 0 otherwise) and an independent nomination committee (value of 1 if yes, 0 otherwise). Under the premise that these variables serve as alternate monitoring devices, we predict positive impact of percentage of independent directors in the board, and the dummy for independent nomination committees, and a negative impact for the dummy for

staggered board on the PPS of CEO compensation. The impact on cash component of CEO compensation is opposite.

Control variables include performance (change in shareholder wealth from the previous year to the current year, and Tobin's q in the previous year) and firm size (market capitalization in the previous year). Change in shareholder wealth is the difference in the market value of equity (shares outstanding times stock price) from the beginning to the end of the year. Tobin's q is measured as total assets minus total equity plus market value of equity (shares outstanding times stock price) over total assets at the end of the previous year. If Tobin's q represents future (risky) growth opportunities, higher pay-performance sensitivity will induce managers to undertake these initiatives, predicting a positive impact of Tobin's q. Larger and better performing firms are more closely followed by analysts and hence require less monitoring. Finally, we include leverage ratio as an explanatory variable. A series of papers have explored the link between a firm's leverage ratio and executive compensation. Ortiz-Molina (2007) argues that financial leverage can have two potential impacts on managerial incentive. First, interest on debt can mitigate shareholder-manager agency conflicts by reducing free cash flow and managers' opportunity to use corporate resources for their own benefit. Debt covenants can also increase monitoring. Hence, debt serves as a substitute monitoring device, which implies that the incentive to align managerial objective with shareholders' is less critical. This line of reasoning predicts a negative relation between leverage and managerial pay-performance sensitivity. From the perspective of shareholder-bondholder conflicts of interest, strong alignment between shareholders and managers through pay-for-performance sensitivity increases managers' incentive to invest in negative net present value projects (which transfer wealth from bondholders to shareholders). The propensity to transfer wealth to stockowners through distortions in investment choices increases in leverage ratio. As rational lenders are expected to take the agency cost of debt into account in pricing the debt, shareholders may find it optimal to choose a lower alignment with their managers. Under this premise, a negative relation between leverage and managerial pay-performance sensitivity is implied.

We examine the impact of total institutional ownership in models 1 and 2, while in model 3 and 4 the focus is ownership concentration of top five institutional investors. Current literature suggests that when monitoring cost is higher than trading cost, institutional investors prefer to abandon their holdings and liquidate their position in underperforming stocks. Also, firms with many small institutional investors may face the "free rider" problem, resulting in less effective monitoring. However, when institutions hold large stakes, they may not be able to sell without driving the price down and suffering further losses. Hence, larger investors are more likely to be involved in monitoring and governance, even though it might not be cost effective for them to do so. Moreover, it is difficult for institutional investors to find appropriate alternate investments, considering that they already own significant stakes in many firms in the economy (David et al. 1998). In terms of expertise, large institutional owners have stakes in many organizations, as well as experienced professionals to monitor their investments, and are therefore more effective than dispersed individual owners in influencing compensation arrangements (Khan et al. 2005). Hence, we expect a positive relation between top-five institutional ownership and option-grant PPS.

We follow the current literature and use the Tobit regression model since CEO option-grant PPS is truncated at 0 (some firms do not award options to their CEOs).

The results are consistent with the predictions of the monitoring hypothesis. Total institutional ownership as well as top-five institutional ownership have significantly positive impact on CEO option-grant PPS. This demonstrates that institutional investors use compensation structure to incentivize the CEO and align his interests with those of shareholders. The coefficient of the logarithm of market capitalization has a significantly negative coefficient, which implies larger firms pay significantly less option compensation. This is consistent with the interpretation that since large firms are more visible, and have wider analysts' following, they are subject to closer scrutiny. Hence they are more transparent and subject to greater governance. Under this scenario, lower option price sensitivity reflects lesser need to monitor and motivate the CEO. Tobin's q is not significant. Consistent with the agency cost of equity hypothesis that debt serves as a substitute monitoring device, and the agency cost of debt hypothesis that greater leverage induces investment distortions, greater leverage is significantly negatively associated with option compensation sensitivity. This result is consistent also with the notion that managers are risk averse and prefer compensation package with less risk when the firm risk is high.[10] CEO tenure has a significantly negative coefficient in models 2 and 4. This supports the notion that an entrenched CEO is averse to performance-based compensation. No other corporate governance measure is significant, suggesting that either monitoring by institutional investors is more effective compared to these mechanisms, or that institutional monitoring is an effective substitute as a monitoring device. In the interest of space, we do not report the coefficients for dummy variables for year and type of assets.

In model 5, we use percent of pressure-resistant institutional investors as the explanatory variable. The model shows no significance for any of the independent variables. We discuss this result in more detail later.

## CEO Cash Compensation and Institutional Ownership

Next we study the impact of institutional investors on cash compensation (salary plus bonus) and total compensation in Tables 6 and 7, respectively. We incorporate the same variables and run the pooled OLS regression instead of Tobit regression. We expect positive coefficients for CEO duality and CEO tenure. These variables contribute to CEO entrenchment which will positively impact cash components of CEO's salary. Conversely, greater percentage of outside director and dummy for independent nomination committee reduce CEO's power, so they are predicted to have negative coefficients. The coefficient for CEO ownership is unclear. Previous literature shows that CEOs of large firms receive large cash and total compensation. Hence, we predict a positive coefficient for market capitalization and also a positive coefficient for change in shareholder wealth. However, the effect of Tobin's Q is unclear. Assuming that Q is a proxy for the firm's growth potential, and hence riskiness, a positive coefficient is predicted if CEOs of riskier firms expect higher cash and total compensation as reward for taking risk.

[10] Hardin and Wu (2008) show that leverage has a strong impact on the interest rate markup over LIBOR paid by REITs. The authors assert that highly leveraged REITs have higher credit risk and thus have to pay a risk premium. These authors also report that REITs losing their primary agent banking relationship due to a bank merger face higher post merger loan pricing and may receive smaller amount of loan commitments from the new lenders.

The main focus of all the models is the coefficient for institutional ownership. According the Hartzell and Starks (2003), if institutional investors are active in monitoring management, they will influence CEO compensation structure and induce a reduction in the level of cash and total compensation. Their analyses reveal significant evidence that institutional ownership is associated with lower CEO cash and total compensation, which the authors attribute to monitoring by institutional investors. However, other studies indicate that institutional investors are willing to pay CEOs higher cash compensation in order to protect and retain them.[11] The voting records of mutual fund provide additional evidence for this practice.[12]

Contrary to Hartzell and Starks (2003), we find that institutional investors increase both cash compensation and total compensation of REIT CEOs.[13] This result suggests that institutional investors award more cash to CEOs even when they use greater pay-performance sensitivity to align their interests with those of shareholders. Ostensibly, institutional shareholders are willing to pay higher cash compensation to motivate CEOs to expend greater effort to enhance performance. To check the robustness of this finding, we included option grant PPS as an independent variable in the models for both cash and total compensation. Option grant PPS has no significant influence, which indicates that option grant PPS and cash or total compensation are not interdependent. As a further check, we estimated CEO compensation mix (CEO equity compensation as a percent of CEO total compensation) as a function of option grant PPS and institutional ownership. We find no significant relationship between these variables.[14] We conclude that institutional investors reward CEOs with both greater option grant PPS, and cash and total compensation; in essence, greater option grant PPS does not come at the cost of lower cash compensation. Apparently, institutional investors have confidence in management and are willing to pay a higher salary to retain them. Instead of imposing "rigid and prescriptive compensation policies", they choose to reward CEOs with a favorable compensation package to protect and retain them.

As predicted, firm size has strong positive impact on cash and total compensation, suggesting that CEOs of larger REITs attract higher compensation. Leverage ratio has a significantly positive impact on CEO cash and total compensation, which implies an inverse relation between CEO equity-based compensation and leverage ratio. Tobin's q has a significantly negative coefficient. This result is consistent with Hartzell and Starks

[11] See Kang and Liu (2005), Khan et al. (2005) and Smith and Swan (2007) for detail.

[12] See Davis and Kim (2005), Rothberg and Lilien (2005) and Levitz (2006) for detail.

[13] Using our data, we repeated the analyses following Hartzell and Starks definition of market capitalization (without log transformation) and institutional ownership concentration (top-five institutional ownership as a proportion to total institutional ownership). We find similar results as reported by Hartzell and Starks in their Tables 2 and 5. Institutional ownership concentration has a positive coefficient in option-grant PPS model and negative coefficients in cash and total compensation models. However, if we only transformed the market capitalization as suggested by Smith and Swan (2007), the significance of institutional ownership concentration went away in both cash and total compensation models. This confirms Smith and Swan (2007)'s observation that significant results in Hartzell and Starks (2003) are potentially driven by "size effect"—smaller firms have higher institutional ownership concentration, not the "monitoring effect" as they claimed by the authors. Hence, in our main body of the analysis, we use log transformation for market capitalization in all our models and measure the concentration of institutional ownership as proportion of top-five institution investors to total shares outstanding as suggested by Smith and Swan (2007).

[14] We are grateful to an anonymous referee for suggesting these robustness checks. These results are not reported in the tables in the interest of space. They are available from the authors on request.

**Table 6** Impact of institutional ownership on CEO cash compensation

| Independent variable | Regression 1 | Regression 2 | Regression 3 | Regression 4 | Regression 5 |
|---|---|---|---|---|---|
| Total institutional ownership (%, t-1) | 0.007*** | 0.007 *** | | | |
| Top-five institutional ownership (%, t-1) | | | 0.010*** | 0.010 *** | |
| Pressure-resistant institutional ownership (%, t-1) | | | | | 0.014 ** |
| CEO duality (%) | | −0.016 | | −0.025 | −0.034 |
| CEO tenure | | −0.002 | | −0.001 | −0.001 |
| CEO ownership (%) | | −0.009** | | −0.011** | −0.012** |
| Percentage of outside directors (%) | | 0.001 | | 0.001 | 0.001 |
| Dummy for independent nomination committee | | 0.038 | | 0.024 | 0.119* |
| Dummy for staggered board | | −0.043 | | −0.031 | −0.068 |
| Change in shareholder wealth (mil $, t) | 0.000 | 0.0001* | 0.000 | 0.0001** | 0.0001** |
| Change in shareholder wealth (mil $, t -1) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tobin's Q (t-1) | −0.192** | −0.181* | −0.209** | −0.198* | −0.116 |
| Ln(market capitalization) ( t-1) | 0.289*** | 0.281 *** | 0.339*** | 0.326*** | 0.285*** |
| Leverage (%, t-1) | 0.003 | 0.003 | 0.003* | 0.003 | 0.001 |
| Year and asset type (dummy) | Yes | Yes | Yes | Yes | Yes |
| Intercept | 4.374 *** | 4.461*** | 4.171 *** | 4.329*** | 4.739*** |
| Adj R-sqrd. (%) | 41.31 | 42.18 | 40.72 | 41.74 | 41.08 |

This table studies the impact of the institutional ownership on CEO cash compensation. The dependent variable is the log of cash compensation. Cash compensation includes base salary and bonus. The data for CEO compensation are from SNL Executive compensation Review. In addition to institutional ownership variables, we include corporate governance variables and lag control variables. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy variable for staggered board is 1 for firms with staggered board, 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of the last year to the end of the year before. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets at the end of last year. Market capitalization is shares outstanding times stock price at the end of last year. Leverage is total debt divided by total assets at the end of last year. In regression 1 and 2, we add total institutional ownership. Total institutional ownership is the percentage of shares owned by all institutional investors. In regression 3 and 4, we include top-five institutional ownership. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. In regression 5, we include pressure-resistant/total institutional ownership. We manually separate the total institutional ownership into pressure-sensitive and pressure-resistant following Brickley et al. (1988) and Almazan et al. (2005)

(2003) who report highly significant negative relation between level of executive compensation and Tobin's q. Yermack (1995) found a significantly negative relation between CEO stock option awards and Tobin's q. More recently, Bebchuk et al. (2003) report a significantly negative correlation between CEO's pay slice (percentage of aggregate top-five total compensation captured by the CEO) and Tobin's q. A potential implication is that high CEO compensation brings about a lower Tobin's q, a hypothesis tested by Bebchuk et al. (2003). Alternatively, the result may indicate that

**Table 7** Impact of institutional ownership on CEO total compensation

| Independent variable | Regression 1 | Regression 2 | Regression 3 | Regression 4 | Regression 5 |
|---|---|---|---|---|---|
| Total institutional ownership (%, t-1) | 0.008*** | 0.008 *** | | | |
| Top-five institutional ownership (%, t-1) | | | 0.012*** | 0.011*** | |
| Pressure-resistant institutional ownership (%, t-1) | | | | | 0.017** |
| CEO duality (%) | | 0.047 | | 0.027 | −0.009 |
| CEO tenure | | −0.002 | | −0.001 | −0.002 |
| CEO ownership (%) | | −0.008 | | −0.010* | −0.011* |
| Percentage of outside directors (%) | | 0.007*** | | 0.006** | 0.006* |
| Dummy for independent nomination committee | | 0.097 | | 0.079 | 0.147* |
| Dummy for staggered board | | −0.057 | | −0.042 | −0.149** |
| Change in shareholder wealth (mil $, t) | 0.000 | 0.000 | 0.000 | 0.0001** | 0.0001* |
| Change in shareholder wealth (mil $, t -1) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Tobin's Q (t-1) | −0.212* | −0.221* | −0.222* | −0.234* | −0.167 |
| Ln(market capitalization) ( t-1) | 0.431*** | 0.419*** | 0.491*** | 0.474*** | 0.434*** |
| Leverage (%, t-1) | −0.004 | −0.003 | −0.004 | −0.003 | −0.006* |
| Dummy of Bank Debt | | | | | Yes |
| Year and asset type (dummy) | Yes | Yes | Yes | Yes | Yes |
| Intercept | 4.423*** | 4.053*** | 4.167*** | 3.912*** | 4.412*** |
| Adj R-sqrd. (%) | 46.82 | 48.20 | 46.28 | 47.73 | 46.78 |

This table studies the impact of the institutional ownership on CEO total compensation. The dependent variable is the log of total compensation. The data for CEO compensation are from SNL Executive compensation Review. In addition to institutional ownership variables, we include corporate governance variables and lag control variables. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy variable for staggered board is 1 for firms with staggered board, 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of the last year to the end of the year before. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets at the end of last year. Market capitalization is shares outstanding times stock price at the end of last year. Leverage is total debt divided by total assets at the end of last year. In regression 1 and 2, we add total institutional ownership. Total institutional ownership is the percentage of shares owned by all institutional investors. In regression 3 and 4, we include top-five institutional ownership. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. In regression 5, we include pressure-resistant/total institutional ownership. We manually separate the total institutional ownership into pressure-sensitive and pressure-resistant following Brickley et al. (1988) and Almazan et al. (2005)

when firms perform poorly, CEO prefers compensation is cash. Under the first (second) hypothesis, Tobin's q would be related negatively with lagged (contemporaneous) CEO compensation. Given our focus on the monitoring role of institutional investors, detailed exploration of this issue is beyond the scope of this study. It remains an interesting issue for future research, however.

CEO stock ownership reduces cash compensation. Increase in the proportion of outside directors has no impact on CEO cash compensation, but induces greater total compensation. It follows that an outside dominated board is associated with higher equity-based compensation to the CEO. This result is consistent with the notion that outside directors are active and effective in monitoring. Finally, in contrast with the results for CEO pay-performance sensitivity, pressure-sensitive institutions are associated with higher cash and total compensation.

In summary, we find strong evidence that institutional investors increase the pay-performance sensitivity and, at the same time, increase the cash compensation as well as total compensation. As Smith and Swan (2007) suggest, these results "show consistency with agency and monitoring theory fundamentals." Agency theory prescribes that equity-based compensation be used to induce managers to expend costly effort and bear more risk. However, high equity-based compensation decreases the utility levels of risk-averse managers. To satisfy these managers' reservation utility levels, firms have to increase their cash compensation as well as total compensation. CEO stock ownership helps to reduce cash compensation. As expected, an independent board induces an increase in total compensation by raising equity-based compensation. High growth firms reward the CEO with a high proportion of equity-based compensation, but lower total compensation. Also, consistent with managers' risk aversion, CEO prefers lower equity-based compensation when the firm's leverage is high. This result also conforms to the premise that shareholders compromise on the alignment with bondholders to reduce agency cost of debt. Finally, large firms pay high cash compensation and less equity-based compensation to CEOs.

As shown in Fig. 1, institutional ownership of REITs remains essentially flat up to 2002. The next 5 years (2003–2007) is marked by a large increase in institutional ownership of REITs. It is natural to ask if the impact of institutional ownership changes over these two regimes. To address this issue, we re-estimate the model with dummy variables identifying the two time periods. Results are presented in Table 8. The analyses reveal that the impact of institutional investors is significant only in the 1998–2002 period for both total and top five institutional ownership. This is an intriguing result because institutional ownership is almost unchanged over this period. One potential interpretation of this finding draws from the fact that over the latter period, the REIT sector posted double digit growth in market capitalization. Conceivably, institutional investors were attracted by the superior performance with little interest in monitoring managers; these institutions considered monitoring to be unimportant while the company is performing well. When performance falters, these institutions will not hesitate to liquidate their holdings. In contrast, the institutions that owned REITs in the earlier period were long-term investors to whom managerial incentive structure is important to ensure that managers' decisions are consistent with maximization of shareholder wealth. It is well known that REITs lost significant value during 2008. A confirmation of our conjecture must await future investigation when data for 2008 become available.

## Institutional Ownership and Changes in CEO Option-grant PPS

In the previous section, we find evidence that institutional investors influence the level of CEO compensation. In order to investigate the relationship further, we

**Table 8** Impact of institutional ownership on CEO option-grant PPS different by period

| Independent variable | Regression 1 | Regression 2 |
|---|---|---|
| Total institutional ownership * dummy for 1998 to 2002 period | 0.014** | |
| Total institutional ownership * dummy for 2003 to 2007 period | 0.008 | |
| Top-five institutional ownership * dummy for 1998 to 2002 period | | 0.022** |
| Top-five institutional ownership * dummy for 2003 to 2007 period | | 0.011 |
| CEO duality (%) | 0.332 | 0.332 |
| CEO tenure | −0.027* | −0.027* |
| CEO ownership (%) | −0.001 | −0.002 |
| Percentage of outside directors (%) | −0.005 | −0.006 |
| Dummy for independent nomination committee | 0.026 | 0.002 |
| Dummy for staggered board | −0.087 | −0.006 |
| Change in shareholder wealth (mil $, t) | 0.000 | 0.000 |
| Change in shareholder wealth (mil $, t -1) | 0.000 | 0.000 |
| Tobin's Q (t-1) | −0.359 | −0.392 |
| Ln(market capitalization) ( t-1) | −0.262** | −0.194** |
| Leverage (%, t-1) | −0.015** | −0.016** |
| Year and asset type (dummy) | Yes | Yes |
| Intercept | 3.838*** | 3.565*** |
| Pseudo $R^2$ (%) | 25.30 | 25.36 |

We use Tobit model to study the impact of the institutional ownership on CEO option grant PPS across two distinct periods. The dependent variable is option sensitivity which is defined as the change in value of the option per $1000 change in shareholder value. The data for CEO compensation are from SNL Executive compensation Review. In regression 1, we include total institutional ownership times the dummy variables for two periods. Total institutional ownership is the percentage of shares owned by all institutional investors. We also include corporate governance variables and lag control variables. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy variable for staggered board is 1 for firms with staggered board, 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of the last year to the end of the year before. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets at the end of last year. Market capitalization is shares outstanding times stock price at the end of last year. Leverage is total debt divided by total assets at the end of last year. In regression 2, we include top-five institutional ownership times dummy variables for two periods. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding

examine the impact of institutional ownership on subsequent changes in CEO pay-for-performance (option-grant PPS) sensitivity. That is our focus in this section.

Accordingly, we extend our analysis to investigate how institutional investors impact changes in CEO option-grant PPS. To that end, we study long-term changes in institutional ownership on subsequent change in CEO option-grant PPS`. Proxy for long-term change in institutional ownership is measured as the change in ownership of total institutions and top-five institutional ownership as a proportion of total number of shares outstanding from year t-4 to year t. If long-term change in institutional ownership influences CEO compensation, then we expect the change in

institutional ownership in the past 4 years to have significant impact on the subsequent change of CEO option-grant PPS. Our tests focus on the influence of the change in institutional ownership between 1998 and 2007 on CEO option-grant PPS.

The results are reported in Table 9. The dependent variable is the 1 year change in CEO option-grant PPS. In addition to change in institutional ownership over 1998–2007, we also include CEO characteristics, board structure, firm size and performance as explanatory variables. The analysis reveals that long-term change in total institutional ownership does not significantly increase CEO option-grant PPS. However, long-term change in top-five institutional ownership does influence change in CEO option-grant PPS. A potential explanation of the results is that while it is cost effective for large investors to assert their monitoring of the CEO, the marginal cost is high for the smaller institutions. The "non-significant" effect of total institutional ownership on monitoring suggests that smaller institutions prefer to "vote with their feet", while the positive coefficient for top-five institutional ownership confirms that larger institutional investors tend to increase CEO performance-based compensation.

## Robustness Checks

Following Hartzell and Starks (2003), we use the dollar amount of market capitalization changes for both year t and year t-1 as control variables in our regression. However, since dollar change in shareholder wealth is highly correlated with the firm's market capitalization, the effect of change in shareholder wealth may be consumed by the effect of firm's size. To examine the true impact of change in shareholder wealth on CEO's option grant sensitivity, we scaled the change by market cap at beginning of the period. The results show that percentage change in shareholder wealth at time t significantly increases CEO's cash and total compensation but has no effect on CEO's option-grant PPS.

Second, to adjust for lack of independence between same firm observations in a pooled regression, we use clustering corrected standard errors to reexamine the significance of our variables. The key results remain unchanged while corporate governance variables become less significant.

Next, since institutional ownership is correlated with firm size and performance, regression estimates using the three variables together as independent variables in the same model can suffer from the multicollinearity problem. Even though it will not cause biased coefficients, the statistical tests may be affected if the problem is serious. To ensure that our significance levels are not affected by multicollinearity, Variance Inflation Factor (VIF) is calculated.[15] The results indicate that multi-collinearity is not a serious problem in our anallysis.

Finally, a common concern in corporate governance research is the endogeniety problem (Ghosh and Sirmans 2003). For example, there may exist a simultaneous relationship between concurrent institution ownership, firm performance, and CEO

[15] VIF measures how much the variance of a coefficient is increased due to collinearity. The higher the index, the higher the variance is inflated compared to if the independent variable was uncorrelated with the other independent variables.

**Table 9** Long-run change in institutional ownership and subsequent change in CEO option sensitivity

| Independent variable | Regression 1 | Regression 2 |
|---|---|---|
| Change in total institutional ownership (%, t- (t-4)) | −0.013 | |
| Change in top-five institutional ownership (%, t- (t-4)) | | 0.036 * |
| CEO duality (%) | −0.695 | 0.007 |
| CEO tenure | 0.002 | −0.023 |
| CEO ownership (%) | −0.030 | −0.032 |
| Percentage of outside directors (%) | 1.093 | 1.680 |
| Dummy for independent nomination committee | 0.311 | 0.834 ** |
| Dummy for staggered board | −0.044 | −0.147 |
| Change in shareholder wealth (mil $, 2000) | 0.001 *** | 0.001 *** |
| Change in shareholder wealth (mil $, 1999) | 0.002 *** | 0.001 *** |
| Change in shareholder wealth (mil $, 1998) | 0.001 ** | 0.001 *** |
| Tobin's Q (2000) | −1.754 ** | −0.146 * |
| Ln(market capitalization) ( 2000) | −0.884 *** | −0.984 *** |
| Asset Type (dummy) | Yes | Yes |
| Intercept | 6.689 ** | 6.715 *** |
| Pseudo $R^2$ (%) | 20.42 | 20.25 |

We use Tobit model to study the impact of long-run change in institutional ownership on changes in CEO option-grant PPS. The dependent variable is the 1 year changes in option-grant PPS. Option sensitivity is defined as the change in value of the option per $1000 change in shareholder value. The data for CEO compensation are from SNL Executive compensation Review. In regression 1 and 2, we include total change in institutional ownership from t-4 to t, corporate governance variables and lag control variables. Total institutional ownership is the percentage of shares owned by all institutional investors. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy variable for staggered board is 1 for firms with staggered board, 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of the last year to the end of the year before. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets at the end of last year. Market capitalization is shares outstanding times stock price at the end of last year. Leverage is total debt divided by total assets. In regression 3 and 4, we include change of top-five institutional ownership from t-4 to t. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding

total and cash compensation, which may bias the OLS results when concurrent variables are used in the regression. But since in our study, CEO compensation is regressed on lagged institutiona ownership and other control variables, the endogenous simultaneous relationship problem is avoided in our estimation.

## Summary

Our analyses reveal several notable findings:

1. Total and top-five institutional ownership has a significantly positive impact on pay-performance sensitivity of CEO compensation. This result is consistent with the notion that institutional investors serve a monitoring role by designing a

compensation structure which rewards the CEO for greater effort and increase in shareholder wealth.
2. Institutional investors are associated with higher levels of cash and total compensation. This result is inconsistent with received evidence from an important study that uses a more comprehensive sample. We assert that this result is not necessarily at variance with the notion of monitoring by institutional investors. Rather, this result indicates that CEOs are compensated with higher cash compensation as a reward to induce them to take on projects of greater risk.
3. Our data show two clearly identifiable periods. We find that the impact of institutions is significant only during the quite period prior to 2002. During the subsequent years when REITs posted significant gains, institutions appear dormant. To us, this result suggests that institutions are more active when managerial action is more critical to performance.
4. We find some evidence that in the long run, top five institutional owners are more active in monitoring. This is consistent with the notion that it may not be cost effective for smaller institutions to be active in monitoring

To our knowledge, this is the first paper to carry out a detailed investigation of the monitoring role of institutions in the REIT sector. Given the great increase in institutional ownership of REITs in recent years, this is an important issue. Our analyses reveal evidence consistent with the notion of monitoring by institutions. However, institutions appear to be dormant and just riding the wave in periods of superior performance, and they are willing to reward CEOs with both higher pay performance sensitivity and cash compensation to induce CEOs to take greater risk. While our results are largely in agreement with extant evidence, there are some inconsistencies, as well.

## Conclusion

Our objective is to investigate the relationship between institutional ownership and CEO compensation structure of REITs. Several recent developments make this an interesting issue to explore. One, institutional ownership of REITs has increased significantly in the last few years. Coincidentally, over this period, REITs have enjoyed strong stock market performance. This gives us the opportunity to examine if (and, which) institutions are interested in monitoring, or are they just chasing valuation gains? Two, the opinion on the need for corporate governance in REITs is divided. Previous academic and anecdotal evidence suggest that external governance through the market for corporate control is not effective in the REIT sector. This leads some authors to argue that alternative monitoring mechanisms must be effective in providing governance. Those holding the opposite view argue that REITs are sufficiently transparent so that intense monitoring is unnecessary. There is compelling evidence that institutional investors are active in monitoring among unregulated firms. If the same is true for REITs, the evidence would be an important contribution to the growing debate on governance of REITs. Three, related to the previous point, our paper can provide new evidence on the impact of the regulatory structure on governance of REITs.

To be effective in governance of managers, the agent must have the incentive, and access to full information about the firm to be effective as a monitor. The opportunity to free-ride induces small, atomistic investors to not involve themselves in disciplining activities like initiating a proxy fight or forcing CEO turnovers. Institutional investors, on the other hand, have considerable wealth at stake through large holdings, and also control over significant voting power to put pressure on managers and change the course of managers' actions. Therefore, they have the incentive to invest in monitoring activities if they choose to do so. However, available evidence indicates that institutional investors often prefer to "vote with their feet" if it is not cost-effective for them to mount disciplining actions. Further, evidence suggests that the cost of monitoring is positively correlated with the firm's information asymmetry. Given the lack of consensus on the severity of information asymmetry in the REIT sector, whether it is more costly for institutions to monitor managers or to "vote with their feet" remains an empirical issue.

Based on detailed analyses of data on institutional ownership, performance, CEO and board characteristics over the 10 year period 1998-2007, we find significant evidence that large institutions influence governance through CEO compensation—greater institutional ownership is associated with greater emphasis on incentive-based compensation (higher pay-performance sensitivity of CEO compensation), and higher cash and total compensation for CEOs. Further, we find that institutions are less active when managers are performing in a superior fashion. Two important conclusions emerge from the analysis. First, similar to unregulated firms, institutional owners do act as monitors. Broadly, this result suggests that governance is necessary for REITs. Second, institutional investors set a high pay performance sensitivity for CEOs, but are willing to pay higher cash compensation to induce managers to take risk.

As the first systematic analysis of the joint monitoring roles of institutional investors and CEO compensation in the REIT context, this paper makes important contribution to the growing literature on the governance of REITs. In general, anecdotal evidence suggests that the efficacy of standard monitoring tools is weak in REITs. The CEO is insulated from hostile takeovers as the market for corporate control is virtually non-existent. A powerful CEO can assert his authority on the board of directors through the nomination process rendering internal governance weak. Against this backdrop, whether institutional investors can maintain their independence and impose discipline on the CEO through his compensation is an interesting issue. That the impact of institutional ownership on REIT CEO compensation is generally consistent with Hartzell and Starks' (2003) prediction confirms that institutions serve as monitors, structural and environmental impediments notwithstanding. Clearly, if asymmetric information is a potential problem for REITs, institutional investors are seemingly undeterred by it.

Finally, our analyses leave some issues unresolved. Specifically, institutional investors appear not to be active in monitoring when REITs post strong performance. We conjecture that the high valuation gains of REITs attracted institutions to this sector. However, these institutions are not interested in monitoring and long-term commitment. These institutions are likely to "vote with their feet" and liquidate their holdings when the market turns negative. Future research can investigate the behavior of these institutions when data become available.

## Appendix

**Table 10** Number of observations for each variable by year

| Variables | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Percentage of equity-based compensation (%) | 110 | 120 | 122 | 123 | 103 | 93 | 97 | 82 | 75 | 66 |
| Option Compensation (000,$) | 108 | 119 | 123 | 124 | 110 | 97 | 97 | 81 | 75 | 66 |
| Base Salary (000,$) | 108 | 121 | 123 | 124 | 110 | 97 | 98 | 82 | 75 | 66 |
| Bonus (000,$) | 108 | 121 | 123 | 124 | 110 | 97 | 97 | 82 | 75 | 66 |
| Total compensation (000,$) | 108 | 121 | 123 | 124 | 110 | 124 | 97 | 124 | 75 | 66 |
| Total institutional ownership (%) | 121 | 124 | 124 | 124 | 119 | 112 | 92 | 84 | 76 | 76 |
| Top-five institutional ownership (%) | 121 | 124 | 124 | 124 | 119 | 112 | 94 | 86 | 76 | 76 |
| CEO duality (%) | 108 | 121 | 123 | 124 | 110 | 97 | 98 | 78 | 74 | 67 |
| CEO Tenure | 107 | 121 | 123 | 124 | 103 | 95 | 100 | 82 | 75 | 67 |
| CEO Ownership | 108 | 121 | 123 | 124 | 108 | 96 | 96 | 81 | 74 | 67 |
| Percentage of outside director (%) | 108 | 121 | 123 | 124 | 103 | 94 | 100 | 82 | 75 | 67 |
| Dummy for independent nomination committee | 111 | 123 | 123 | 124 | 111 | 97 | 100 | 80 | 75 | 67 |
| Change in shareholder wealth at t (million $) | 113 | 123 | 124 | 124 | 119 | 112 | 106 | 96 | 82 | 75 |
| Tobin's Q at t | 122 | 123 | 124 | 124 | 119 | 112 | 106 | 96 | 82 | 75 |
| Market capitalization at t(million $) | 123 | 124 | 124 | 124 | 119 | 112 | 106 | 96 | 82 | 75 |
| Tobin's Q at t-1 | 113 | 122 | 123 | 124 | 124 | 119 | 112 | 106 | 96 | 82 |
| Market capitalization at t-1(million $) | 113 | 123 | 124 | 124 | 124 | 119 | 112 | 106 | 96 | 82 |
| Change in shareholder wealth at t-1 (million $) | 98 | 113 | 123 | 124 | 124 | 119 | 112 | 106 | 96 | 82 |
| Leverage (%, t-1) | 115 | 123 | 123 | 124 | 124 | 119 | 112 | 106 | 96 | 75 |

We report the number of observations for each variable for 124 REITs from 1998 to 2007. Percentage of equity-based compensation is percentage of equity compensation (option compensation plus restrictive stocks) to total compensation. Option compensation is the value of option granted to CEO. Total compensation is cash compensation plus value of newly granted option and restricted stocks. The data for CEO compensation are from SNL Executive compensation Review. Total institutional ownership is the percentage of shares owned by all institutional investors. Top-five institutional ownership is the percentage of shares owned by top five institutional investors to total shares outstanding. Pressure-resistant institutional ownership is shares owned by pressure-resistant institutional investors to total shares outstanding. CEO duality is 1 for firm with CEO also serves as Chairman of board, 0 otherwise. CEO tenure is number of years that CEO serves on this position. CEO ownership is percentage of shares owned by CEO. Percentage of outside directors is number of outside directors to all directors. Dummy for staggered board is 1 for firms with staggered board and 0 otherwise. Dummy for independent nomination committee is 1 for firm with nomination committee and CEO is not a member of that committee, 0 otherwise. Dummy for staggered board is 1 for firms with staggered board, and 0 otherwise. Change in shareholder wealth is change in value of the shares outstanding times stock price from the end of this year to the end of the last year. Tobin's Q is total assets minus total equity plus market value of equity (shares outstanding times stock price) to total assets. Market capitalization is shares outstanding times stock price. Leverage is equal to total debt over total assets

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