

# **Institutional Investors, Managerial Ownership and Executive Compensation**

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### **Abstract**

We examine the association between executive compensation and the interaction between the monitoring role of institutional investors and managerial ownership. We find that top-five institutional investors' ownership is more positively associated with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership. We also find that top-five institutional investors' ownership is more negatively associated with level of executive compensation for firms with small managerial ownership than firms with large managerial ownership. Collectively, the evidence provides support for the managerial power theory.

## **I. Introduction**

Hartzell and Starks (2003) show that institutional ownership concentration is positively related with pay-for-performance sensitivity of executive compensation, and negatively related with the level of executive compensation. Their evidence suggests that institutional investors provide a monitoring role and influence executive compensation. The objective of this paper is to extend Hartzell and Starks (2003) by examining the relationship between executive compensation and the interaction between the monitoring role of institutional investors and managerial ownership.

Examining the interaction between managerial ownership and institutional investor ownership on executive compensation provides insights into the validity of the managerial power theory (Bebchuk, Fried and Walker, 2002; Finkelstein and Hambrick, 1990; Lambert, Larcker and Weigelt, 1993) and the efficient contracting theory based on principal-agent models of hidden-action and hidden-information (see Holmstrom, 1979; Harris and Raviv, 1979, Grossman and Hart, 1983, Jensen and Murphy, 1990). Both efficient contracting and managerial power theories suggest that the institutional investor monitoring will be related more positively with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership. However, they differ in their predictions with respect to the impact of institutional investor monitoring on the level of executive compensation. Specifically, efficient contracting (managerial power) theory suggests that the institutional investor monitoring is related more positively (negatively) with level of compensation for firms with small managerial ownership than firms with large managerial ownership.

We measure managerial ownership using the CEO ownership and following Hartzell and Starks (2003) we measure the influence of institutional investors through their ownership concentration in firms: institutional ownership by the five largest institutional investors. Firms are classified into three managerial ownership groups: managerial ownership less than one percent representing the small managerial ownership group and managerial ownership greater than and equal to five percent representing the large managerial ownership group. Consistent with Morck, Vishny and Shleifer (1988), we find that the large managerial ownership group exhibits better performance in terms of size-adjusted stock returns and Tobin's  $q$  than the small managerial ownership group. This suggests that firms with large managerial ownership have lower agency problems arising from separation of ownership and control, and consequently would have less demand for mechanisms such as executive compensation to align the incentives of managers and shareholders as proposed by the efficient contracting theory. We thus predict that institutional investors would be more effective monitors in firms with small managerial ownership than in firms with large managerial ownership. Consistent with this prediction we find that top-five institutional investors' ownership is more positively associated with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership.

This finding is also consistent with the predictions based on managerial power theory. Managerial power theory suggests that firms with large managerial ownership would have more power vested with managers and hence, the institutional investors'

influence in designing incentives that are related to performance may be reduced.<sup>1</sup> We thus examine the level of executive compensation. We find that top-five institutional investors' ownership is more negatively associated with level of executive compensation for firms with small managerial ownership than firms with large managerial ownership.

We further examine by partitioning the top five institutional investors into institutional investors who have a long-term strategy, i.e., dedicated institutional investor and institutional investors who are more active (see Bushee 1998, 2001) and thus have a greater incentive to monitor the managers. We find that the dedicated/active institutional investors are also not additionally associated with decreasing the level of manager's pay for firms with large managerial ownership. In additional sensitivity tests, we examine the period prior to 2002 and after 2002, because of the increased scrutiny on executive compensation in the later period. Interestingly, we find that the level of pay is negatively associated with large managerial ownership for the period after 2002. This shows that the increased scrutiny by the public on executive compensation after 2002, likely disciplines the rent extraction. Collectively, our evidence provides some degree of support for the managerial power theory over the efficient contracting theory.

We contribute to the literature in several ways. First, we provide insights into the validity of the managerial power and the efficient contracting theories. Recently, the debate on efficient contracting theory and managerial power theory has risen in prominence. Weisbach (2007) states, "The number of high-publicity scandals, the seemingly enormous salaries paid to executives, and the celebrity status of CEOs has created unprecedented public interest in corporate governance." On the one hand

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<sup>1</sup> Bebchuk and Fried (2003, 2004, 2005) argue that managers determine their own compensation, and thus extract rents. By implication, managers who have more ownership are likely to be able to extract such rents more easily than managers with small ownership.

Bebchuk and Fried (2003, 2004) argue that principal-agent models are ‘inadequate’ to provide insights into executive compensation. On the other hand, Murphy (2002), Murphy and Zbojnik (2004, 2007) and Core, Guay and Thomas (2005) argue that managerial power theory does not explain why executive compensation was not high in the 1960s and 1970s. They propose an alternative argument based on firm-specific versus general expertise of managers. In particular, they show that compared to the 1960s and 1970s, managers have more general expertise in recent years and as such command more rents in the labor market. Our use of managerial ownership as a proxy for managerial power over investors, side-steps the issue of firm-specific versus general expertise of managers. There is no reason for us to believe that high levels of managerial ownership would also imply more general expertise of managers. As such, our evidence provides some validity to the managerial power theory.

Recently, other studies employing different approaches have found some supports for the managerial power theory. Brick, Palmon and Wald (2006) examine the relation between CEO compensation and director’s compensation and show that excess compensation of CEOs and directors are associated with firm underperformance. Core, Guay and Larcker (2008) examine the role of the press, i.e., the notion of Bebchuk and Fried’s (2004) ‘outrage constraint’ on executive compensation. They find that negative press coverage is more strongly associated with excess annual pay than raw annual pay, and as such provides support to the existence of ‘outrage constraint,’ a key ingredient in the managerial power theory. Consistent with the outrage constraint, we find that in the

post-2002 period, the level of pay is negatively associated with large managerial ownership firms.<sup>2</sup>

Second, we contribute to the literature that examines the relationship between managerial ownership and executive compensation. Early research examining CEO compensation and CEO ownership find that CEO compensation is negatively associated with CEO ownership (for instance, see Lambert, Larcker and Weigelt, 1993; Core, Holthausen and Larcker, 1999). On the other hand, Cyert, Kang and Kumar (2002) find no association between CEO compensation and ownership. In contrast we find that the interaction between managerial ownership and institutional investors' ownership is an important determinant for the pay-for-performance sensitivity as well as the level of executive compensation. Specifically, we find that managerial ownership is negatively associated with the level of compensation only when the monitoring by institutional investors is effective, i.e., managerial power is low. We thus show that considering the governance mechanisms is important for examining the relationship between managerial ownership and executive compensation.

Third, we add to the literature on executive compensation and institutional investors as the governance mechanism. Research examining CEO compensation and institutional investors' ownership shows that large blockholder ownership is negatively associated with the level of CEO compensation (for instance, see Hartzell and Starks, 2003; Cyert, Kang and Kumar, 2002) and positively associated with pay-for-performance (see Hartzell and Starks, 2003). Almazan, Hartzell and Starks (2005) partition the top five institutions into active, i.e., investment advisors and investment companies and passive,

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<sup>2</sup> In a different setting, Grinstein and Hribar (2004) examine CEO compensation for completing M&A deals. They also find that CEOs with more power get larger bonus and thus their evidence is consistent with the managerial power theory.

i.e., banks and insurance companies. They show that the active institutions are associated with increased pay-for-performance. We extend these findings and provide insights into how institutional investor monitoring influences executive compensation. Our finding suggests that institutional investors are more effective monitors capable of influencing executive compensation when managerial power as measured by the managerial ownership is not high.

The rest of the paper is organized as follows: In section II, we discuss the related literature for hypothesis development. In section III, we describe the sample and the empirical methodology. Results are provided and discussed in section IV and we conclude in the last section.

## **II. Hypothesis Development**

Executive compensation is a mechanism to align the incentives of investors and managers to mitigate agency problems arising from separation of ownership and control. Executive compensation designed to align the goals of investors and managers imposes an additional risk on managers (Holmstrom, 1979; Harris and Raviv, 1979, Grossman and Hart, 1983, Jensen and Murphy, 1990). Like most individuals, if executives are risk averse then they would demand a premium for the additional risk that is imposed on them through their pay packages.

Managerial ownership reduces agency problems arising from separation of ownership and control (Berle and Means, 1932; Jensen and Meckling, 1976). Large managerial ownership would decrease the demand for mechanisms such as executive pay to align the goals of investors and executives. Thus, efficient compensation contracting

suggests that firms with large managerial ownership have lower incentives than firms with small managerial ownership (Smith and Watts, 1992).<sup>3</sup> Hartzell and Starks (2003) show that institutional investors influence executive compensation by improving the pay-for-performance sensitivity, on average. Institutional investors will be more effective monitors in firms with more agency problems, i.e., small managerial ownership firms. Thus, based on efficient contracting hypothesis we expect that institutional investor monitoring is related more positively with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership. Correspondingly, institutional investor monitoring is related more positively with the level of compensation for firms with small managerial ownership than firms with large managerial ownership.<sup>4</sup> Overall, based on the efficient contracting hypothesis if institutional investors are sophisticated monitors who influence design of the compensation package, we expect institutional investor monitoring to be more positively related to both pay-for-performance and level of pay for firms with small managerial ownership than large managerial ownership.<sup>5</sup>

Bebchuk, Fried and Walker (2002), and Bebchuk and Fried (2003, 2004) propose a managerial power based theory of executive compensation. They argue that the maintained assumptions in the efficient contracting approach, namely (a) that boards operate at arms length, (b) the efficient executive market, and (c) the power of

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<sup>3</sup> The agency problem due to separation of ownership and control is lower for firms with large managerial ownership, because for a large part managers are owners themselves.

<sup>4</sup> Increased pay-for-performance sensitivity is akin to increasing the risk imposed on the manager. This will lead to a higher level of compensation for the additional risk that the manager bears. An implicit assumption here is that the risk aversion characteristics of executives of large and small managerial ownership are similar. Intuitively, executives of the large managerial ownership firms are likely to be less risk averse than executives of the small managerial ownership firms. This will bias the results towards finding support for the conjecture.

<sup>5</sup> Dutta (2007) considers a manager's firm-specific and general expertise and shows that risk and incentive could be positively or negatively related. However, as long as the manager is risk averse and the pay-for-performance sensitivity increases, we should expect the level of pay to also increase.

shareholders are not consistent with practice. Violation/ departure from these maintained assumptions lead them to propose that executive compensation is largely determined by the executives themselves, i.e., managerial power and thus enables them to extract rents. The power of the managers is likely to be constrained by corporate government practices and monitoring by institutional investors as shown in Hartzell and Starks (2003). Similar arguments are proposed by Morck, Shleifer and Vishny (1988) in the context of management controlled firms and managerial entrenchment. Specifically, they state, "...a manager who controls a substantial fraction of the firm's equity may have enough voting power or influence more generally to guarantee his employment with the firm at an attractive salary." These arguments put together suggest that managerial power is higher in firms with large managerial ownership than small managerial ownership. It follows that the executive compensation is less likely to be influenced by institutional investors as monitors in firms with more managerial power. Thus, based on the managerial power theory we conjecture that the institutional investor monitoring is related more positively with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership. Correspondingly, if executive compensation is the conduit for rent extraction, institutional investor monitoring is likely to be more negatively related with level of compensation for firms with small managerial ownership than firms with large managerial ownership.

Earlier studies have shown that the level of executive compensation is negatively associated with managerial ownership and blockholders with holdings of five percent (see for example, Core, Holthausen and Larcker, 1999; Lambert, Larcker and Weigelt, 1993; Mehran, 1995). Cyert, Kang and Kumar (2002) examine a negotiation model of

executive compensation with directors as a strategic player and blockholder monitoring. They show that the effect of managerial ownership and compensation is indeterminate.<sup>6</sup> The managerial power theory conjectures a positive relationship between executive compensation and managerial ownership (see also, for example Finkelstein and Hambrick, 1990). Hartzell and Starks's (2003) evidence shows that institutional investors influence executive compensation by improving pay-for-performance sensitivity as well as decreasing the level of compensation.<sup>7</sup> Based on the arguments above, this evidence is more consistent with the managerial power hypothesis. Our conjectures based on the managerial power theory are summarized below.

### **Hypothesis**

H1: Institutional investor monitoring is more positively related with pay-for-performance for firms with small managerial ownership than firms with large managerial ownership.

H2: Institutional investor monitoring is more negatively related with the level of compensation for firms with small managerial ownership than firms with large managerial ownership.

The efficient contracting theory also provides an alternative conjecture. If institutional investors provide a direct monitoring role and a greater threat to managers in terms of firing "bad" executives, then the demand for providing incentives through executive compensation would be lower (see Burkart, Gromb and Panunzi, 1997; Inderst and Mueller, 2005). This possibility of direct monitoring by institutional investors in

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<sup>6</sup> An increase in managerial ownership has two conflicting effects: one effect which leads to lower investment which is more efficient, i.e., the incentive effect and the other, a direct wealth effect that induces a larger investment. This is driven by investments directly providing the manager with utility.

<sup>7</sup> Dikolli, Kulp and Sedatole (2009) shows that firms with more transient institutional investors place less weight on the short term earnings component of CEO bonus. This suggests that the contract designers take the external governance mechanisms into account.

terms of decreasing the likelihood of retaining bad executives is more possible in firms with small managerial ownership. Thus, the pay-for-performance sensitivity for firms with small managerial ownership could be lower than that for firms with large managerial ownership. In other words, if such direct monitoring by institutions is true then hypothesis H1 may not hold.

Another alternative to the hypotheses specified above is the notion that CEO power may not be determined by their ownership, but by their ability to influence institutions. Westphal and Bednar (2008) find survey evidence consistent with the notion that “CEOs ingratiation and persuasion tactics towards institutional fund managers reduce the effect of institutional ownership on specific changes in ...CEO compensation.” If managerial ownership is not related to manager’s power vis. a vis. the institutions, then we do not expect to find support for our hypotheses.

We proceed to the empirical analysis.

### **III. Empirical Analysis**

#### **3.1 Data and Sample**

We obtain the managerial ownership and compensation data for US companies from the ExecuComp database.<sup>8</sup> The number of executives per firm covered by ExecuComp database is the same as the number of executives for whom the compensation and share ownership data are reported by the company in its proxy statements and this number varies cross-sectionally. The number of executives covered

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<sup>8</sup> Executive Compensation data is collected from each company's annual proxy, which must be filed within 120 days from the fiscal year end. Executive Compensation database contains over 2,500 active and inactive companies. The database includes all current S&P 1500 companies, companies removed from the index that are still trading, and some client requests. Data collection on the S&P 1500 began in 1994 and hence, data is available from 1992 onwards.

per firm varies from five (corresponding to the first decile of the distribution) to eight (corresponding to the top decile of the distribution) and the median number of executives in our sample is six. Therefore, in order to include as many firms in our analysis as possible, we retrieve the share ownership and compensation package details for up to five top executives in each firm. For firms which provide compensation details for more than five executives, we consider only the top five executives (as ranked by their reported salary).<sup>9</sup> The sample includes 1,434 firms consisting of 494 firms in the S&P 500 index, 379 firms in the S&P Midcap Index, and 561 firms in the S&P Smallcap Index.

We collect the salary, bonus, long-term incentive plan payouts, stock and option grants, and other compensation for the top five executives. Similar to Hartzell and Starks (2003), we measure the executive compensation in two ways: cash compensation (TCC) is defined as the sum of salary and bonus, and total compensation (TDC) is defined as the sum of cash compensation, long-term incentive payouts, dollar value of stock grants and stock option grants and other compensation. We assess the pay-for-performance sensitivity by relating the changes in the level of compensation to the changes in stock price.

We collect the share ownership data (data item SHROWN) for each executive from the ExecuComp database. This data item corresponds to the percentage of managerial ownership reported by the company in its annual proxy. Companies are not required to disclose the percentage of managerial ownership if it is below one percent. Therefore, if this data item is missing for any executive, it implies that the particular executive has an ownership of less than one percent of equity.

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<sup>9</sup> The multiple observations for each firm in any given year may create a cross sectional correlation problem for regression. We address this problem in the later part of our analysis.

We compute the mean CEO's equity ownership as shares owned by the CEO divided by the number of outstanding shares. The mean ownership for each firm is computed over the sample years. The mean ownership is used to classify firms into small, medium and large managerial ownership firms depending on the proportion of mean ownership. Specifically, firms with mean CEO ownership less than one percent are classified as small managerial ownership firms, firms with mean CEO ownership greater than or equal to five percent are classified as large managerial ownership firms and the rest of the sample firms (i.e. firms with ownership between one and five percent) are classified as medium managerial ownership firms. We use the firm's long-run average managerial ownership, rather than annual ownership data, to classify firms into the managerial ownership groups because it represents the long-term measure and thus is appropriate to capture the severity of the agency problem arising from separation of control from ownership. For instance, a CEO who currently holds a small proportion of the firm but has intentions to increase his/her holdings at a later date would currently behave like a large owner, and vice versa. We also use annual CEO ownership and the mean long-run managerial ownership not limited to CEO (mean of all officers' equity holdings) for classifying firms into managerial ownership groups to check the robustness of our results. These alternate characterizations of managerial ownership may have some limitations. For example, characterizing a firm's managerial ownership as high, medium or low based on proportion of equity owned by a CEO on a yearly basis can potentially result in the same firm being classified differently over the years.<sup>10</sup> Nevertheless this measure is appealing as it can be interpreted as a measure of CEO's current power vis a vis the institutional investors.

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<sup>10</sup> We discuss these aspects in the robustness section.

Data on institutional holding is obtained from 13-f filings of institutions compiled by CDA Spectrum. Following Hartzell and Starks (2003), we use the proportion of the top-five institutional investors' ownership as the measure of institutional investor influence. This is based on the premise that institutional investors would have more influence when they have larger holdings (see Shleifer and Vishny, 1986), and when they have support from other institutions with large ownership (see Black, 1992).

Data on stock price and returns are obtained from CRSP, and data on other financial measures are obtained from COMPUSTAT. Our final sample consists of 50,423 firm-year observations with data available from all sources representing a total of 1,350 firms spanning from 1993 to 2008. The final sample consists of 463 firms in the S&P 500 Index, 357 firms in the S&P Midcap Index, and 530 firms in the S&P Smallcap Index.

Table 1, Panel A provides the distribution of the sample by industry. Manufacturing firms (SIC 2-digits code: 20 to 39) account for roughly 47 percent of the sample, and finance and services (SIC 2-digits code: 60 to 89) account for roughly 25 percent of the sample. Table 1, Panel B provides the distribution of the sample firm-year observations by year. The number of firm-year observations range from a minimum of 1,361 in 1993 to a maximum of 5,301 in 2007 indicating the increasingly wider coverage of firms in the executive compensation database in recent years. Overall, the sample is distributed among a wide variety of industries.<sup>11</sup>

Table 2, Panel A provides some descriptive statistics on managerial ownership and stock price performance. The number of firms with less than one percent managerial ownership is 779 representing about 57 percent of firms in the sample. The total

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<sup>11</sup> The number of observations in 2008 is much smaller than that of immediately preceding years because data for all firms were not available.

managerial ownership by all executives is monotonically increasing with the CEO ownership and is positively correlated, indicating that both CEO ownership and total managerial ownership could be used as proxies for managerial power.<sup>12</sup> The total institutional ownership is decreasing with CEO ownership: the total institutional ownership is about 66 percent for firms with CEO ownership less than one percent and is about 48 percent for firms with CEO ownership ranging between 25 and 30 percent. Consistent with Hartzell and Starks (2003), the top-five institutions' holding as a percentage of total institutional ownership, our measure of institutional investor influence, is on average about 40 percent across all managerial ownership groups. On average, the market capitalization for the less than one percent CEO ownership group is \$9.2 billion and the market capitalization for the greater than and equal to five percent CEO ownership group is \$4.1 billion, indicating that larger size firms have smaller managerial ownership (Lennox, 2005).

The stock market performance of the less than one percent CEO ownership group is, on the average, inferior to that of the greater than and equal to five percent CEO ownership group. The Tobin's  $q$  (size-adjusted annual stock return) of the less than one percent CEO ownership group is 1.99 (0.06) and the Tobin's  $q$  (size-adjusted annual stock return) of the greater than and equal to five percent CEO ownership group is 2.45 (0.09), indicating a substantial difference in performance between these two groups of firms. This is consistent with the findings of earlier studies such as Morck, Shleifer Vishny, (1988), Core, Holthausen, Larcker (1999), Mehran (1995) and Anderson and Reeb (2003).

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<sup>12</sup> Because of the monotonic relation between managerial ownership and CEO ownership for each ownership group, we use managerial ownership and CEO ownership interchangeably in all our later discussion.

Descriptive information for the various components of the total compensation for each managerial ownership group is provided in Table 2, Panel B. Similar to the results from prior studies (for example, see Smith and Watts, 1992; Lambert, Larcker and Weigelt, 1993; Core, Holthausen and Larcker, 1999) firms with lower managerial/CEO ownership on average pay much higher total cash compensation (TCC) and total direct compensation (TDC). This observation is consistent with the argument that incentive alignment for high managerial ownership firms can be achieved with lower compensation, perhaps because the large managerial ownership firms, in general, suffer from less severe agency problems compared to the lower managerial ownership firms.

Panel C of Table 2 reports the duration of firms in sample together with four measures for executives' turn-over for each managerial ownership group. The sample duration of a firm is the total number of years a particular firm is covered in the sample and the maximum possible duration is 17 years. The measures of turnover are officers' turnover, number of CEOs, CEOs' turnover and number of new officers. Officers' turnover is defined as the total number of unique executives working for each firm during the sample period divided by the average number of executives per year for that firm.<sup>13</sup> Number of CEOs is defined as the total number of CEOs working for each firm during the sample period. CEOs' turnover is defined as the total number of CEOs working for each firm during the sample period divided by the duration of that firm in the sample. Finally, the number of new officers is defined as the sum of the number of new officers across all years over the life of the firm within the sample (i.e. conditional on year t-1).<sup>14</sup> The sample duration of firm for the group of firms with low managerial ownership is on

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<sup>13</sup> Officers include the number of executives reported by each firm each year in firm's annual proxy statements.

<sup>14</sup> Dividing the number of new officers by the sample duration of the firm provides similar results.

average lower than that in the high managerial ownership group (i.e. 9.01 years vs. 10.22 years). The results of all the four measures of executives' turnover consistently show that the rate of executives' turnover is a decreasing function of the firms' managerial ownership. Collectively, this evidence suggests that low managerial ownership firms experience a higher rate of executive turnover possibly because of the more severe agency problem. Alternatively, this could also suggest that institutional investors effectively monitor partly by "firing" executives.

### **3.2 Relationship of pay-for-performance sensitivity and level of compensation to concentration of institutional ownership**

First, we replicate Hartzell and Starks (2003) by estimating the following equation.

$$\begin{aligned} \Delta(\text{Manager's Compensation})_{i,t} = & \beta_1 \Delta(\text{Shareholder Wealth})_{i,t-1} \\ & + \Delta(\text{Shareholder Wealth})_{i,t} * [\beta_2 (\text{Top5 Holding/Total Institutional Ownership})_{i,t-1} \\ & + \beta_3 (\text{Total Institutional Ownership})_{i,t} + \beta_4 (\text{Tobin's } q)_{i,t-1} + \beta_5 (\text{Market Capitalization})_{i,t-1} \\ & + \beta_6 (\text{CEO Dummy})_{i,t} ] + \sum \beta_x (\text{Year Dummies})_t \end{aligned} \quad (1)$$

In equation (1), the dependent variable is measured in two ways: change in cash compensation and change in total compensation (Jensen and Murphy, 1990). Change in shareholders' wealth,  $\Delta(\text{shareholder wealth})_{it}$  is computed as the firm's market capitalization at (t-1) times firm's raw return obtained from CRSP from period (t-1) to period t for firm i. The market capitalization is defined as the number of shares outstanding times the price at the beginning of the year. The Top5 Holding/Total Institutional Ownership is the measure of the institutional investors' influence (institutional ownership concentration) defined as the sum of the top-five institutional investors' ownership divided by the total institutional holdings at the beginning of the

year. The control variables are total institutional ownership, Tobin's  $q$  ratio, market capitalization, CEO indicator variable that equals to one if the observation corresponds to a CEO, zero otherwise, industry dummies corresponding to the two-digit SIC in which the firm operates, and year dummies that equals to one if the observation corresponds to a particular year, and is zero otherwise. Total institutional ownership is defined as the shares held by all 13-f institutional investors divided by the total number of shares outstanding at the beginning of the year. Tobin's  $q$  ratio is calculated using COMPUSTAT data and is defined as the market value of assets computed as the sum of market value of equity and the book value of debt, divided by book value of assets. We use lagged measures of Tobin's  $q$ , which controls for the presence of growth opportunities and market capitalization, which controls for firm size. In equation (1) the coefficient  $\beta_2$  measures the influence of firm's top-five institutional holders on executives' pay-for-performance sensitivity.

The results of estimating equation (1) are presented in Table 3. In all our multivariate regression estimation, the standard errors for computing the t-statistics are corrected using the Huber-White-Sandwich procedure with firm as the cluster.<sup>15</sup> The first two columns of Panel A of Table 3 present the regression results for the analysis where the managers' compensation is measured as the change in cash compensation ( $\Delta TCC$ ). The next two columns present the results for the analysis where the dependent variable in the regression is measured as the change in total compensation of the managers ( $\Delta TDC$ ). The results are qualitatively similar to Hartzell and Starks's (2003) results. The results

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<sup>15</sup> We find qualitatively similar results when we use years as the cluster.

show that firms' pay-for-performance sensitivity is positively associated with top-five institutional holding.

Following Hartzell and Starks (2003) we estimate the following equation to examine the influence of the top-five institutional ownership on the level of manager's compensation.

$$\begin{aligned}
 (\text{Level of Manager's Compensation})_{i,t} = & \\
 & \beta_1 \Delta(\text{Shareholder Wealth})_{i,t-1} + \beta_2 \Delta(\text{Shareholder Wealth})_{i,t} \\
 & + \beta_3 (\text{Top5 Holding/Total Institutional Ownership})_{i,t-1} + \beta_4 (\text{Total Institutional Ownership})_{i,t-1} \\
 & + \beta_5 (\text{Tobin's q})_{i,t-1} + \beta_6 (\text{Market Capitalization})_{i,t-1} + \beta_7 (\text{CEO Dummy})_{i,t} + \sum \beta_j (\text{Year Dummies})_t
 \end{aligned} \tag{2}$$

Panel B of Table 3 presents the results of this analysis. Again, consistent with Hartzell and Starks (2003) the level of compensation is lower for firms with higher concentrated institutional ownership suggesting that the concentrated institutional ownership helps to effectively monitor the managers.

### Test of Hypothesis H1

To test our first hypothesis (H1), we augment Hartzell and Starks's (2003) model and estimate the following equation.

$$\begin{aligned}
 \Delta(\text{Manager's Compensation})_{i,t} = & \\
 & \Delta(\text{Shareholder Wealth})_{i,t-1} * [\beta_1 + \beta_{1M} (1\% \leq MO < 5\%) + \beta_{1H} (MO \geq 5\%)] \\
 & + \Delta(\text{Shareholder Wealth})_{i,t} * \\
 & [(\text{Top5 Holding/Total Institutional Ownership})_{i,t-1} * [\beta_2 + \beta_{2M} (1\% \leq MO < 5\%) + \beta_{2H} (MO \geq 5\%)] \\
 & + (\text{Total Institutional Ownership})_{i,t-1} * [\beta_3 + \beta_{3M} (1\% \leq MO < 5\%) + \beta_{3H} (MO \geq 5\%)] \\
 & + (\text{Tobin's q})_{i,t-1} * [\beta_4 + \beta_{4M} (1\% \leq MO < 5\%) + \beta_{4H} (MO \geq 5\%)] \\
 & + (\text{Market Capitalization})_{i,t-1} * [\beta_5 + \beta_{5M} (1\% \leq MO < 5\%) + \beta_{5H} (MO \geq 5\%)] \\
 & + \beta_6 (\text{CEO Dummy})_{i,t} + \sum \beta_i (\text{Industry Dummies})_{i,t} + \sum \beta_j (\text{Year Dummies})_t
 \end{aligned} \tag{3}$$

Equation (3) estimates the difference in pay-for-performance sensitivity for the different managerial ownership groups. We consider three managerial ownership groups based on the long-run average ownership of CEO: the small (large) managerial ownership contains

firms where the average holdings of the CEO are less (greater) than one (five) percent, the rest are considered medium managerial ownership group. In equation (3), we set the small managerial ownership group as the benchmark group and create two dummy variables: one for the medium and one for the large managerial ownership group. To test the hypothesis, we consider the pay-for-performance sensitivities across small and large managerial ownership groups.<sup>16</sup> The null hypothesis, corresponding to our first hypothesis, is that the estimated coefficient  $\beta_{2H}$  is not significantly different from zero.

The results of estimating equation (3) are presented in Table 4, Panel A. The first two (last) columns present the results pertaining to the results of pay-for-performance sensitivity for total cash compensation, TCC (total direct compensation, TDC) using all observations, i.e., each firm-year-executive as a separate observation. The following discussion pertains to the results TDC; the results with TCC are qualitatively similar for the test variables. Similar to Jensen and Murphy (1990) and Hartzell and Starks (2003), we find that the past performance is associated with current year's compensation. We also find that the past performance is less strongly associated with current year's performance for firms with higher managerial ownership: The estimated coefficient of the interaction term between high managerial ownership and lagged change in shareholder wealth is -0.029 (t-value = -3.70).

The estimated coefficient for the interaction term between concentrated institutional ownership and change in shareholder wealth equals 0.232 (t-value = 11.85) suggesting that the concentrated institutional ownership, on the average, improves the

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<sup>16</sup> Even though we have the medium managerial ownership group in the research design, we do not predict the nature of institutional investors' influence for this group. For instance, based on the power theory the medium group could be the one where either the manager or the investor has more power. Since our hypothesis is seemingly based on a threshold value of managerial ownership we consider only the small and large ownership groups.

pay-for-performance sensitivity. The estimated coefficient ( $\beta_{2M}$ ) that captures the influence of concentrated institutional ownership on the pay-for-performance sensitivity of firms with managerial ownership lying between 1 and 5% is positive (0.246 with t-value = 5.76). As pointed out in the text earlier, our hypothesis is couched in terms of comparing the large and small managerial ownership groups. Our first hypothesis predicts that for firms with large managerial ownership, either the top-five institutional ownership are not effective monitors because of the power wielded by the managers or the agency problems are less severe and hence there is no demand for incentive pay. Consequently, we expect a negative coefficient on the interaction between “top-five institutional ownership” and “large managerial ownership,” i.e.,  $\beta_{2H}$ . Consistent with hypothesis H1, the coefficient ( $\beta_{2H}$ ) is negative (-0.353 with t-value = -7.16). We also observe a similar effect when the change of cash compensation is used as the dependent variable. The total pay-for-performance sensitivity for the large managerial ownership group is  $\beta_2 + \beta_{2H} = 0.232 - 0.353 = -0.121$ , which is statistically significant (F-value = 6.58). This shows that the pay is not positively associated with performance for the large managerial ownership group, which is consistent with Bebchuk and Fried’s (2004, 2005) arguments and evidence.

### Test of Hypothesis H2

To test hypothesis H2, in equation (2) we add interactions of managerial ownership groups. Specifically, we estimate the following equation:

$$\begin{aligned}
& (\text{Level of Manager's Compensation})_{i,t} = \\
& \beta_{11}\Delta(\text{Shareholder Wealth})_{i,t-1} + \beta_{12}\Delta(\text{Shareholder Wealth})_{i,t} \\
& + (\text{Top5 Holding/Total Institutional Ownership})_{i,t-1} * [\beta_2 + \beta_{2M}(1\% \leq MO < 5\%) + \beta_{2H}(MO \geq 5\%)] \\
& + (\text{Total Institutional Ownership})_{i,t} * [\beta_3 + \beta_{3M}(1\% \leq MO < 5\%) + \beta_{3H}(MO \geq 5\%)] \\
& + (\text{Tobin's q})_{i,t-1} * [\beta_4 + \beta_{4M}(1\% \leq MO < 5\%) + \beta_{4H}(MO \geq 5\%)] \\
& + (\text{Market Capitalization})_{i,t-1} * [\beta_5 + \beta_{5M}(1\% \leq MO < 5\%) + \beta_{5H}(MO \geq 5\%)] \\
& + \beta_6(\text{CEO Dummy})_{i,t} + \sum \beta_i(\text{Industry Dummies})_{i,t} + \sum \beta_j(\text{Year Dummies})_{i,t}
\end{aligned} \tag{4}$$

Based on the efficient contracting hypothesis, given that pay is not related to performance for the large managerial ownership group (see discussion above), we expect the coefficient on the interaction between top-five institutional ownership and large managerial ownership to be negative. This is because a risk averse manager will require less certainty equivalent. However, based on the managerial power theory, given that pay is not related to performance for the large managerial ownership group (see discussion above), we expect the coefficient on the interaction between top-five institutional ownership and large managerial ownership to be zero or positive. In other words, based on the power theory, compared to the small managerial ownership group firms with large ownership would get paid similar or more compensation, even though their pay-for-performance sensitivity is lower.

Table 4, Panel B presents the results. The following discussion pertains to the analysis where the dependent variable is total compensation (TDC). Unlike pay-performance sensitivity, the level of compensation is not influenced by past performance. The estimated coefficient for the concentrated institutional ownership of the low managerial ownership group is -964.81 and significant (t-value = -11.52) suggesting that the concentrated institutional ownership, on average, decreases the level of compensation. While this is consistent with Hartzell and Starks's (2003) result showing institutional investor monitoring, it is seemingly not consistent with the efficient contracting

hypothesis, because the small managerial ownership group has a positive pay-for-performance sensitivity (see Table 4, Panel A). However, this is consistent with managerial power theory because for the small managerial ownership group the power of the executives is likely to be less: thus, institutional investors are able to design a higher pay-for-performance and pay a smaller amount in levels.

The estimated coefficient for the interaction term between concentrated institutional ownership and large managerial ownership group is -115.16 and insignificant (t-value=-1.06) implying that institutional investors do not influence the level of compensation, even though the pay-for-performance sensitivity is much lower than that of the small managerial ownership group. This is consistent with the managerial power theory. Collectively, the results provide support for the managerial power theory.

### **3.3 Monitoring by Dedicated/Active Institutional Investors**

Almazan, Hartzell and Starks (2005) show that some institutions are more active in monitoring corporations than others. As such, among the top-five institutional investors, we consider the dedicated institutional investors who are likely to be the most effective monitors. Bushee (1998, 2001) defines dedicated institutional investors as intuitions following a long-term strategy. Such dedicated institutional investors are likely to have more incentives to monitor the firm actively (also see Chen, Harford and Lai, 2007). We perform this analysis for two reasons: first, if dedicated institutions are the most likely ones to monitor, then our earlier results may have been due to the noise in the top-five institutions being effective monitors. Second, the dedicated institutions may be able to discipline the manager's vested power more effectively than the other institutions.

For this purpose, we augment equations (3) and (4) by adding another interaction ‘Dedicated’ to the ‘Top5/Total Institutional Ownership’ variable. Dedicated is a dummy variable that is one if three or more institutions among the top-five institutions are classified as dedicated. We obtain the classification of institutions from Bushee’s website (see <http://brianbushee.com>).

Table 5 Panel A provides the results for the pay-for-performance sensitivity and level of pay for total compensation, i.e., TDC. Comparing the results with those discussed in Table 4, the estimates on the variable ‘Top5/Total Institutional Ownership’ are qualitatively similar, indicating that the results discussed in Table 4 are not driven by the measurement noise of institutional investors’ monitoring. The pay-for-performance sensitivity of dedicated top-five institutions amplifies the pattern of the non-top-five. That is, the pay-for-performance sensitivity of the dedicated, small managerial ownership firm is higher than that of non-dedicated, small managerial ownership firm (for TDC the coefficients are 0.189 for non-dedicated and  $0.189 + 0.103$  for the dedicated). Thus, dedicated institutions are better monitors. However, interestingly the pay-for-performance sensitivity for the large managerial ownership firms with dedicated institutions is zero ( $-0.024 = 0.103 - 0.127$ , F-value = 1.83) and with non-dedicated institutions is negative ( $-0.125 = 0.189 - 0.314$ , F-value = 7.98). This indicates that dedicated institutional investors do not appear to have additional influence than non-dedicated institutions in firms with high managerial ownership.

For the level of pay, the non-dedicated firms’ results are qualitatively similar to that discussed in Table 4. For the dedicated firms, consistent with the efficient contracting the decrease in pay is not much, which corresponds with the higher pay-for-

performance sensitivity. However, similar to the results in Table 4 for the high managerial ownership firms there is no association between top-five institutions and level of pay.

In Panel B of Table 5, we classify the top-five institutions as ‘Active’ if there are more than three institutions in the top-five who are investment companies or investment advisors. This is a classification similar to Almazan, Hartzell and Starks (2005). The results are qualitatively similar to those obtained when institutional investors are classified as Dedicated. Thus, the results are largely consistent with the managerial power theory.

### **3.4 Sub-period analysis**

Weisbach (2007) states, “The number of high-publicity scandals, the seemingly enormous salaries paid to executives, and the celebrity status of CEOs has created unprecedented public interest in corporate governance.” Similarly, Core, Guay and Larcker (2008) state, “Multi-million dollar pay packages, and the potential scandals surrounding the wealthy individuals who receive high pay, can be very entertaining. For example, there were repeated references, and many negative references, in the press about Tyco International’s purchase of a \$6,000 shower curtain for CEO Dennis Kozlowski’s corporate apartment. Similarly, there were repeated references, and many negative references, about the extensive perquisites paid to General Electric’s CEO, Jack Welch, that were disclosed in divorce proceedings after his retirement.” Thus, the scrutiny of the media and the public increased in later years due to the high profile scandals in 2002. Furthermore, the recent economic downturn has continued to keep the

level of scrutiny high on the large top executive pay. Bebchuk and Fried (2003, 2004) state that managerial power is not ‘absolute.’ there are constraints placed by the outrage in the media, public and society. We thus partition the sample into pre- and post-2002 time periods, and estimate equations (3) and (4).

The results are reported in Table 6: Panel A (B) contains the results for the test variables pre- (post-) 2002 for total compensation, i.e., TDC. The left column provides the summary result for equation (3) and the right column provides the result for equation (4). In the period prior to 2002 the results are largely similar to those discussed along with Table 4. Interestingly, in the post-2002 while the pay-for-performance sensitivity result is similar to that in the pre-2002 period, the level of pay for the large managerial ownership group is negative (coefficient estimate = -468.20, t-value = -2.57). This shows that the increased scrutiny in the post-scandal period helps to constrain the managerial power, especially for the large managerial ownership group. Also, comparing the coefficient estimates of the small managerial ownership groups across pre-2002 (coefficient estimate = -452.51, t-value = -4.52) and post-2002 (coefficient estimate = -1,317.97, t-value = -9.85) suggests that institutional investors are more effective in monitoring and containing the executive compensation in later years, possibly due to the decrease in managerial power as a result of an increase in the ‘outrage constraint.’ In summary, these results are largely consistent with the managerial power theory, in that the improved effectiveness of institutions as monitors in the post-2002 period is likely due to the increased public scrutiny which in turn decreased the managerial power.

### **3.5 Other sensitivity analysis**

Our sample consists of multiple observations for the same firm-year, because we have compensation data of up to five different executives for the same firm-year. Including all these observations in the analysis may lead to cross-sectional correlation problem, and therefore in the sensitivity analysis we combine these multiple firm-year observations into one single representative observation. We measure the average change in compensation for a representative executive for a given firm-year by considering the mean change in compensation of all the executives for the firm and use it as the dependent variable in our analysis. Accordingly, Equation (3) is modified without the CEO Dummy. Table 7, Panel A reports the summary of the results for the test variables. The left column provides the summary result for equation (3) and the right column provides the result for equation (4). The results are qualitatively similar to those discussed along with Table 4.

We also consider only the top executive, i.e., the CEO's pay alone for the analysis. Here again, equation (3) is modified without the CEO Dummy. Table 7, Panel B reports the summary of the results for the test variables. Here again, the results are qualitatively similar to those discussed along with Table 4.

We also perform some additional sensitivity tests that are not reported. In our analysis, the managerial ownership for a firm is characterized by the average ownership of only the CEO for the entire sample period. In general, the total ownership of all managers is highly correlated with the CEO ownership pattern and therefore long-run average CEO ownership seems to be a good proxy for the presence or the lack of agency problems related to the separation of ownership and control in a given firm. However,

analysis of the ownership pattern of CEOs and non-CEO managers reveal that for some firms, the CEO ownership pattern may vary significantly over time and for a few firms the variation in the ownership of non-CEO managers may vary significantly through time. In order to test the robustness of our results, we measure “managerial ownership” (instead of the long run average CEO ownership) in two ways. First, we use the annual ownership of the CEO to form the three groups. Second, we use the annual ownership of all executives to form the three groups. The results are robust to the changes in these definitions.

#### **IV. Conclusion**

According to the extant compensation literature, managerial ownership affects agency costs in two ways. First, executives/managers with smaller equity holdings have weaker incentives to act in the interests of outside shareholders, i.e., the agency problem. Second, executives/managers with large equity holdings have greater control over the company and therefore greater scope for acting in their own private interest (Holderness and Sheehan, 1991). This is called the entrenchment effect. If the association between the top-five institutional investors’ ownership and the pay-for-performance sensitivity/level of compensation can be used to proxy for the effectiveness of institutional monitoring (Hartzell and Starks, 2003), then such monitoring function provided by the institutional investors can be expected to be less effective when the agency problem is too severe (i.e. when the managerial ownership is lower than one percent) and/or when managers have more scope to behave opportunistically (i.e. when the managerial ownership is larger than five percent). Our study provides results in

support of our prediction by showing that there is nonlinear association between the top-five institutional investors' ownership and pay-for-performance sensitivity and also the level of compensation. In general, we show that institutional investor monitoring is more positively related with pay-for-performance sensitivity and more negatively related with the level of compensation for firms with small managerial ownership than firms with large managerial ownership.

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**TABLE 1 Sample**

**Panel A: Distribution by Industry**

<b>Industry Grouping</b>	<b>No. of observations</b>	<b>% of observations</b>	<b>No. of firms</b>	<b>% of firms</b>
<b>Agriculture, Forestry, &amp; Fishing</b> (SIC code: 01-09)	44	0.09%	2	0.15%
<b>Mining</b> (SIC code: 10-14)	1,888	3.74%	53	3.93%
<b>Construction</b> (SIC code: 15-17)	916	1.82%	20	1.48%
<b>Manufacturing</b> (SIC code: 20-39)	23,866	47.33%	569	42.15%
<b>Transportation &amp; Public Utilities</b> (SIC code: 40-49)	5,174	10.26%	129	9.56%
<b>Wholesale Trade</b> (SIC code: 50-51)	1,626	3.22%	47	3.48%
<b>Retail Trade</b> (SIC code: 52-59)	4,211	8.35%	110	8.15%
<b>Finance, Insurance, &amp; Real Estate</b> (SIC code: 60-67)	6,670	13.23%	232	17.19%
<b>Services</b> (SIC code: 70-89)	5,852	11.61%	185	13.70%
<b>Nonclassifiable Establishments</b> (SIC code: 99)	176	0.35%	3	0.22%
<b>Total</b>	<b>50,423</b>	<b>100%</b>	<b>1,350</b>	<b>100.00%</b>

**Panel B: Distribution of Firm-Year Observations by Year**

<b>Year</b>	<b>No. of firms</b>	<b>% of firms</b>
1993	1,361	2.70%
1994	1,911	3.79%
1995	1,978	3.92%
1996	2,114	4.19%
1997	2,366	4.69%
1998	2,683	5.32%
1999	2,985	5.92%
2000	3,146	6.24%
2001	3,428	6.80%
2002	3,758	7.45%
2003	4,128	8.19%
2004	4,579	9.08%
2005	4,810	9.54%
2006	4,742	9.40%
2007	5,301	10.51%
2008	1,133	2.25%
<b>Total</b>	<b>50,423</b>	<b>100.00%</b>

TABLE 2 Summary Statistics

Panel A: Mean of Managerial Ownership, Institutional Influence and Performance

	Managerial Ownership (MO)	No. of Firms	CEO Ownership (%)	Total Managerial Ownership (%)	Total Institutional Ownership (%)	Top 5 Institutional Ownership as % of Total Institutional Holding (%)	Tobin's <i>q</i>	Raw Return	Size-Adjusted Abnormal Return	Market Capitalization (MM)	Wealth Change in Year <i>t</i> (MM)
1	0 - 1 %	779	0.50	1.66	66.07%	38.20%	1.99	0.16	0.06	9,176.82	903.40
2	1 - 2 %	211	1.44	2.79	67.04%	41.24%	2.06	0.18	0.08	3,300.10	332.30
3	2 - 3 %	70	2.47	3.87	63.50%	40.64%	2.31	0.18	0.09	7,557.98	544.98
4	3 - 4 %	48	3.54	5.40	65.51%	42.51%	1.97	0.17	0.09	1,968.78	197.62
5	4 - 5 %	50	4.46	7.73	55.94%	43.22%	2.50	0.19	0.10	2,202.56	217.14
6	5 - 6 %	16	5.57	8.41	60.46%	43.60%	2.57	0.20	0.10	3,161.65	301.23
7	6 - 7 %	17	6.39	11.31	60.81%	43.17%	1.65	0.16	0.07	3,030.24	327.90
8	7 - 8 %	23	7.56	11.58	62.54%	41.26%	2.36	0.16	0.07	2,913.37	284.22
9	8 - 9 %	18	8.54	12.25	61.71%	45.15%	2.74	0.22	0.12	2,186.66	118.70
10	9 - 10 %	15	9.49	12.02	56.15%	42.13%	2.24	0.22	0.13	5,272.36	412.56
11	10 - 15 %	43	11.79	16.46	56.85%	41.78%	2.59	0.20	0.10	6,030.04	741.39
12	15 - 20 %	28	17.76	23.74	48.95%	45.22%	2.44	0.19	0.09	2,182.88	170.48
13	20 - 25 %	12	22.93	32.15	45.09%	46.40%	3.02	0.16	0.06	9,487.76	1,393.76
14	25 - 30 %	8	27.57	21.13	48.71%	47.59%	2.48	0.20	0.11	4,643.39	774.91
15	above 30 %	12	34.63	29.25	41.71%	48.18%	2.06	0.15	0.05	2,414.72	-13.79
<i>Summary</i>											
	MO < 1%	779	0.50	1.66	66.07%	38.20%	1.99	0.16	0.06	9,176.82	903.40
	1% ≤ MO < 5%	379	2.39	3.96	64.70%	41.54%	2.16	0.18	0.09	3,824.81	342.65
	MO ≥ 5%	192	12.41	16.93	55.51%	43.65%	2.45	0.19	0.09	4,167.57	443.80
	Total	1,350									

Table 2 Continue

**Panel B: Mean of Executive Compensation Components**

Managerial Ownership (MO)	No. of Firms	No. of Executives	SALARY	BONUS	LTIP	BLK_VALU	RSTKGRNT	OTHANN	ALLOTHTO	TCC	TDC
MO < 1%	779	10,246	429.04	407.97	127.79	1,112.49	250.56	25.51	34.91	837.01	2,752.27
1% ≤ MO < 5%	379	4,268	371.46	311.51	40.06	737.54	156.99	23.96	15.48	682.97	1,993.14
MO ≥ 5%	192	2,135	403.93	348.70	19.86	833.15	89.75	17.56	17.94	752.63	1,954.19

**Panel C: Mean of Additional Variables**

	Managerial Ownership (MO)	No. of Firms	Age of Firm (years)	Officers' Turn-over	No. of CEOs	CEO's Turn-over	No. of New Officers
1	0 - 1 %	779	9.01	2.31	1.87	0.30	12.85
2	1 - 2 %	211	9.28	2.15	1.69	0.30	10.84
3	2 - 3 %	70	9.69	2.38	1.94	0.28	12.05
4	3 - 4 %	48	8.38	2.23	1.64	0.31	11.54
5	4 - 5 %	50	9.34	2.05	1.55	0.25	8.80
6	5 - 6 %	16	10.75	2.41	1.94	0.23	12.75
7	6 - 7 %	17	7.71	1.78	1.44	0.28	12.25
8	7 - 8 %	23	10.70	2.17	1.87	0.23	10.17
9	8 - 9 %	18	10.11	2.23	1.83	0.31	9.70
10	9 - 10 %	15	12.40	2.46	2.00	0.18	13.00
11	10 - 15 %	43	10.81	2.22	1.63	0.24	9.09
12	15 - 20 %	28	10.25	2.07	1.89	0.28	8.45
13	20 - 25 %	12	10.42	1.96	1.25	0.26	7.83
14	25 - 30 %	8	6.75	1.84	1.50	0.42	10.17
15	above 30 %	12	9.58	2.36	1.75	0.34	10.43
<i>Summary</i>							
	MO < 1%	779	9.01	2.31	1.87	0.30	12.85
	1% ≤ MO < 5%	379	9.25	2.19	1.71	0.29	10.87
	MO ≥ 5%	192	10.22	2.16	1.73	0.26	10.24

**Variable Definition****Panel A**

CEO Ownership (%):	The firm's average CEO equity ownership over the sample period.
Total Managerial Ownership (%):	The firm's average total managerial ownership (up to top-five executives) over the sample period.
Total Institutional Ownership (%):	Firm's total institutional equity holding by all 13-f filers defined as the sum of all institutional equity holdings divided by the total number of shares outstanding in the fiscal year-end quarter.
Top 5 Institutional Ownership as % of Total Institutional Holding (%):	The proportion of the institutional investor ownership accounted for by the top-five institutional investors in the firm defined as the sum of the top-five institutional investors' equity holding by the total institutional holdings across all institutional holders.
Tobin's $q$ :	The sum of the market value of equity and the book value of debt (defined as the difference between the book value of assets and book value of equity) divided by book value of assets.
Raw Return:	Fiscal year raw return.
Size-Adjusted Abnormal Return:	Fiscal year raw return adjusted for firm size using the companion portfolio approach.
Market Capitalization (in millions):	The number of shares outstanding times the price at the beginning of the year.
Wealth Change in Year $t$ (in millions):	The firm's market capitalization times firm's raw return obtained from CRSP from period $(t-1)$ to period $t$ for firm $i$ .

**Panel B**

<i>SALARY</i> :	Salary (\$ Thousands)
<i>BONUS</i> :	Bonus (\$ Thousands)
<i>LTIP</i> :	Long-Term Incentive Payouts (\$ Thousands)
<i>BLK_VALU</i> :	Total Value of Stock Options Granted, Black-Scholes value (\$ Thousands)
<i>RSTKGRNT</i> :	Total Value of Restricted Stock Granted (\$ Thousands)
<i>OTHANN</i> :	Other Annual (\$ Thousands)
<i>ALLOTHTO</i> :	All Other Total (\$ Thousands)
<i>TDC</i> :	Total Direct Compensation (\$ Thousands) = the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation
<i>TCC</i> :	Total Current Compensation (\$ Thousands) = the sum of salary and bonus

**Panel C**

Age of Firm:	Total number of years that firm survives during the sample period.
Officers' Turn-over:	Total number of unique executives working for the firm during the sample period divided by the average number of executives per year for that firm.
Number of CEOs:	Total number of CEOs working for each firm during the sample period.
CEOs' Turn-over:	Total number of CEOs working for each firm during the sample period divided by the age of that firm.
Number of New Officers:	The sum of the total number of new officers across all years that firm stays in the sample during the sample period.

**TABLE 3 Executive Compensation and Institutional Investor Influence**

**Panel A: Pay-for-Performance Sensitivity**

	Dependent Variable			
	$\Delta$ TCC		$\Delta$ TDC	
	Est. Coef.	t-stat	Est. Coef.	t-stat
$\Delta(\text{Shareholder Wealth}_{t-1})$	-0.001**	-1.93	0.033***	17.42
$\Delta(\text{Shareholder Wealth}_t)$				
* ( <i>Top 5/Total Institutional Ownership</i> <sub>t-1</sub> )	0.040***	15.17	0.197***	13.55
* ( <i>Total Institutional Ownership</i> <sub>t-1</sub> )	0.003**	2.32	0.005	0.63
* ( <i>Tobin's q</i> <sub>t-1</sub> )	-0.002***	-6.79	0.001	0.98
* ( <i>Market Capitalization</i> <sub>t-1</sub> )	-0.007***	-6.44	-0.043***	-7.92
* ( <i>CEO Dummy</i> <sub>t</sub> )	0.042***	31.59	0.196***	27.58
Year Dummies	YES		YES	
Number of observations	50,423		50,423	
Adjusted R-Square	0.14		0.42	

**Panel B: Level of Executive Compensation**

	Dependent Variable			
	TCC		TDC	
	Est. Coef.	t-stat	Est. Coef.	t-stat
$\Delta(\text{Shareholder Wealth}_{t-1})$	0.004***	7.63	0.008***	3.61
$\Delta(\text{Shareholder Wealth}_t)$	0.020***	44.39	0.043***	22.67
( <i>Top 5/Total Institutional Ownership</i> <sub>t-1</sub> )	-396.87***	-33.04	-959.09***	-19.11
( <i>Total Institutional Ownership</i> <sub>t-1</sub> )	184.57***	22.36	992.44***	29.05
( <i>Tobin's q</i> <sub>t-1</sub> )	-42.46***	-38.26	-12.91***	-2.77
( <i>Market Capitalization</i> <sub>t-1</sub> )	0.016***	119.83	0.087***	154.40
( <i>CEO Dummy</i> <sub>t</sub> )	442.26***	141.34	1511.98***	118.62
Year Dummies	YES		YES	
Number of Observations	50,423		50,423	
Adjusted R-Square	0.43		0.39	

**Notes**

The sample period spans from 1993 to 2008. For each year, up to the top five executives are considered for each firm. Panel A presents results for equation (1) and Panel B presents results for equation (2). TCC is the total cash compensation defined as the sum of salary and bonus. TDC is the total direct compensation defined as the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation. All other variables are defined in Table 2. The standard errors are corrected using the Huber-White-Sandwich procedure to compute the t-statistics with firm as the cluster. One, two, and three asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

**TABLE 4 Executive Compensation, Managerial Ownership and Institutional Investor Influence**  
**Panel A: Pay-for-Performance Sensitivity**

		Dependent Variable			
		$\Delta$ TCC		$\Delta$ TDC	
			<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>
$\Delta(\text{Shareholder Wealth}_{t-1})$	$\beta_1$	-0.001	-0.81	0.040***	16.07
* ( $1\% \leq MO < 5\%$ )	$\beta_{1M}$	0.001	0.52	-0.043***	-6.81
* ( $MO \geq 5\%$ )	$\beta_{1H}$	-0.003**	-2.36	-0.029***	-3.70
$\Delta(\text{Shareholder Wealth}_t)$					
* ( <i>Top 5/Total Institutional Ownership</i> $_{t-1}$ )	$\beta_2$	0.042***	13.95	0.232***	11.85
* ( $1\% \leq MO < 5\%$ )	$\beta_{2M}$	0.019***	2.90	0.246***	5.76
* ( $MO \geq 5\%$ )	$\beta_{2H}$	-0.042***	-5.46	-0.353***	-7.16
* ( <i>Total Institutional Ownership</i> $_{t-1}$ )	$\beta_3$	0.002*	1.67	-0.004	-0.40
* ( $1\% \leq MO < 5\%$ )	$\beta_{3M}$	-0.002	-1.21	-0.135***	-15.60
* ( $MO \geq 5\%$ )	$\beta_{3H}$	0.002*	1.76	0.080***	7.47
* ( <i>Tobin's <math>q_{t-1}</math></i> )	$\beta_4$	-0.002***	-6.10	0.009***	4.16
* ( $1\% \leq MO < 5\%$ )	$\beta_{4M}$	-0.001	-0.36	-0.004	-0.87
* ( $MO \geq 5\%$ )	$\beta_{4H}$	0.002***	3.14	-0.010**	-2.01
* ( <i>Market Capitalization</i> $_{t-1}$ )	$\beta_5$	-0.007***	-5.65	-0.061***	-8.26
* ( $1\% \leq MO < 5\%$ )	$\beta_{5M}$	-0.007***	-2.57	0.117***	6.59
* ( $MO \geq 5\%$ )	$\beta_{5H}$	0.006*	1.76	0.058***	2.61
* ( <i>CEO Dummy</i> $_t$ )	$\beta_6$	0.042***	30.63	0.209***	24.26
Industry Dummies		YES		YES	
Year Dummies		YES		YES	
Number of observations		50,423		50,423	
F-test for $\beta_2 + \beta_{2M} = 0$		F-value = 95.37		F-value = 139.73	
F-test for $\beta_2 + \beta_{2H} = 0$		F-value = 0.00		F-value = 6.58	
Adjusted R-Square		0.14		0.05	

Table 4 Continued

**Panel B: Level of Executive Compensation**

		Dependent Variable			
		TCC		TDC	
		<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>	<u>t-stat</u>
$\Delta(\text{Shareholder Wealth}_{t-1})$	$\beta_{11}$	0.003***	5.68	0.002	0.75
$\Delta(\text{Shareholder Wealth}_t)$	$\beta_{12}$	0.011***	11.92	0.060***	13.66
$(\text{Top 5/Total Institutional Ownership}_{t-1})$	$\beta_2$	-404.89***	-23.81	-964.81***	-11.52
* ( $1\% \leq MO < 5\%$ )	$\beta_{2M}$	-87.75***	-4.71	-220.92**	-2.38
* ( $MO \geq 5\%$ )	$\beta_{2H}$	-41.75	-1.29	-115.16	-1.06
$(\text{Total Institutional Ownership}_{t-1})$	$\beta_3$	181.89***	15.83	1084.08***	19.36
* ( $1\% \leq MO < 5\%$ )	$\beta_{3M}$	-38.96***	-3.11	-417.87***	-6.80
* ( $MO \geq 5\%$ )	$\beta_{3H}$	5.67	0.33	-268.69***	-3.25
$(\text{Tobin's } q_{t-1})$	$\beta_4$	-47.48***	-26.01	-6.90	-0.78
* ( $1\% \leq MO < 5\%$ )	$\beta_{4M}$	12.27***	4.54	62.16***	4.72
* ( $MO \geq 5\%$ )	$\beta_{4H}$	-4.23	-1.44	-71.05***	-4.94
$(\text{Market Capitalization}_{t-1})$	$\beta_5$	0.016***	97.58	0.085***	114.02
* ( $1\% \leq MO < 5\%$ )	$\beta_{5M}$	0.001***	2.83	0.017***	10.49
* ( $MO \geq 5\%$ )	$\beta_{5H}$	-0.003***	-6.74	-0.012***	-5.80
$(\text{CEO Dummy}_t)$	$\beta_6$	490.92***	132.43	1916.17***	108.31
Industry Dummies		YES		YES	
Year Dummies		YES		YES	
Number of Observations		50,423		50,423	
F-test for $\beta_2 + \beta_{2M} = 0$		F-value = 708.79		F-value = 166.68	
F-test for $\beta_2 + \beta_{2H} = 0$		F-value = 406.01		F-value = 102.27	
Adjusted R-Square		0.44		0.40	

**Notes**

The sample period spans from 1993 to 2008. For each year, up to the top five executives are considered for each firm. Panel A presents results for equation (3) and Panel B presents results for equation (4). TCC is the total cash compensation defined as the sum of salary and bonus. TDC is the total direct compensation defined as the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation.  $1\% \leq MO < 5\%$  and  $MO \geq 5\%$  are two dummy variables which equal to one if firms are in the median and large managerial ownership group respectively. All other variables are defined in Table 2. The standard errors are corrected using the Huber-White-Sandwich procedure to compute the t-statistics with firm as the cluster. One, two, and three asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

**TABLE 5 Executive Compensation, Managerial Ownership and Type of Institutional Investor**

<b>Panel A: Dedicated Investors</b>						
<i>Δ(Shareholder Wealth<sub>it</sub>)</i>	<b>Pay-for-performance sensitivity</b>				<b>Level of compensation</b>	
	<b>Dependent Variable = <math>\Delta TDC</math></b>				<b>Dependent Variable = TDC</b>	
		<b>Est. Coef.</b>	<b>t-stat</b>		<b>Est. Coef.</b>	<b>t-stat</b>
<i>*(Top 5/Total Institutional Ownership<sub>it-1</sub>)</i>	$\beta_2$	0.189***	9.41	<i>(Top 5/Total Institutional Ownership<sub>it-1</sub>)</i>	-1525.05***	-9.57
<i>*(1%<math>\leq</math>MO&lt;5%)</i>	$\beta_{2M}$	0.249***	6.03	<i>*(1%<math>\leq</math>MO&lt;5%)</i>	-326.82***	-2.05
<i>*(MO<math>\geq</math>5%)</i>	$\beta_{2H}$	-0.314***	-6.78	<i>*(MO<math>\geq</math>5%)</i>	-128.86	-0.69
<i>*(Top 5/Total Institutional Ownership<sub>it-1</sub>)*(Dedicated<sub>it</sub>)</i>	$\beta_{2D}$	0.103***	3.90	<i>(Top 5/Total Institutional Ownership<sub>it-1</sub>)*(Dedicated<sub>it</sub>)</i>	1001.36***	4.46
<i>*(1%<math>\leq</math>MO&lt;5%)*(Dedicated<sub>it</sub>)</i>	$\beta_{2DM}$	0.138***	4.32	<i>*(1%<math>\leq</math>MO&lt;5%)*(Dedicated<sub>it</sub>)</i>	-198.72	-1.47
<i>*(MO<math>\geq</math>5%)*(Dedicated<sub>it</sub>)</i>	$\beta_{2DH}$	-0.127***	-3.21	<i>*(MO<math>\geq</math>5%)*(Dedicated<sub>it</sub>)</i>	-143.77	-0.91
Number of observations		50,423			50,423	
F-test for $\beta_2+\beta_{2M}=0$		F-value = 127.74			F-value = 201.00	
F-test for $\beta_2+\beta_{2H}=0$		F-value = 7.98			F-value = 136.46	
F-test for $\beta_{2D}+\beta_{2DM}=0$		F-value = 67.41			F-value = 107.26	
F-test for $\beta_{2D}+\beta_{2DH}=0$		F-value = 1.83			F-value = 74.24	
Adjusted R-Square		0.05			0.41	
<b>Panel B: Active Investors</b>						
<i>Δ(Shareholder Wealth<sub>it</sub>)</i>	<b>Pay-for-performance sensitivity</b>				<b>Level of compensation</b>	
	<b>Dependent Variable = <math>\Delta TDC</math></b>				<b>Dependent Variable = TDC</b>	
		<b>Est. Coef.</b>	<b>t-stat</b>		<b>Est. Coef.</b>	<b>t-stat</b>
<i>*(Top 5/Total Institutional Ownership<sub>it-1</sub>)</i>	$\beta_2$	0.185***	9.76	<i>(Top 5/Total Institutional Ownership<sub>it-1</sub>)</i>	-766.49***	-8.49
<i>*(1%<math>\leq</math>MO&lt;5%)</i>	$\beta_{2M}$	0.303***	7.05	<i>*(1%<math>\leq</math>MO&lt;5%)</i>	-100.75	-1.17
<i>*(MO<math>\geq</math>5%)</i>	$\beta_{2H}$	-0.372***	-7.25	<i>*(MO<math>\geq</math>5%)</i>	9.50	0.09
<i>*(Top 5/Total Institutional Ownership<sub>it-1</sub>)*(Active<sub>it</sub>)</i>	$\beta_{2A}$	0.111**	2.26	<i>(Top 5/Total Institutional Ownership<sub>it-1</sub>)*(Active<sub>it</sub>)</i>	-307.08***	-2.55
<i>*(1%<math>\leq</math>MO&lt;5%)*(Active<sub>it</sub>)</i>	$\beta_{2AM}$	-0.080**	-1.92	<i>*(1%<math>\leq</math>MO&lt;5%)*(Active<sub>it</sub>)</i>	-28.19	-0.40
<i>*(MO<math>\geq</math>5%)*(Active<sub>it</sub>)</i>	$\beta_{2AH}$	0.037	0.73	<i>*(MO<math>\geq</math>5%)*(Active<sub>it</sub>)</i>	55.48	0.66
Number of observations		50,423			50,423	
F-test for $\beta_2+\beta_{2M}=0$		F-value = 143.41			F-value = 77.25	
F-test for $\beta_2+\beta_{2H}=0$		F-value = 14.24			F-value = 47.88	
F-test for $\beta_{2A}+\beta_{2AM}=0$		F-value = 4.81			F-value = 40.51	
F-test for $\beta_{2A}+\beta_{2AH}=0$		F-value = 15.41			F-value = 27.50	
Adjusted R-Square		0.05			0.41	

### **Notes**

The sample period spans from 1993 to 2008. For each year, up to the top five executives are considered for each firm. Panel A presents results for equations (3) and equation (4) with an additional interaction term with ‘Dedicated’.

*Dedicated*, equals one if there are more than three institutional investors among the top-five institutional investors for each firm-year who can be classified as dedicated institutional investors, or otherwise equals zero. Panel B presents results for equation (3) and equation (4) with an additional interaction term with ‘Active’. *Active*, equals one if there are at least four institutional investors among the top-five institutional investors for each firm-year who can be classified as active institutional investors (i.e., either the institutional investors are investment advisors or investment companies), or otherwise equals zero. We obtain data of institutional investors types from Brian Bushee’s website. TDC is the total direct compensation defined as the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation.  $1\% \leq MO < 5\%$  and  $MO \geq 5\%$  are two dummy variables which equal to one if firms are in the median and large managerial ownership group respectively. All other variables are defined in Table 2. The standard errors are corrected using the Huber-White-Sandwich procedure to compute the t-statistics with firm as the cluster. One, two, and three asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

**TABLE 6 Executive Compensation, Managerial Ownership and Institutional Investor Influence before and after 2002**

**Panel A: Pre-2002**

	Pay-for-performance sensitivity		Level of compensation	
	Dependent Variable = $\Delta TDC$		Dependent Variable = TDC	
	<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>	<u>t-stat</u>
<i><math>\Delta</math>(Shareholder Wealth<sub>t</sub>)</i>				
* (Top 5/Total Institutional Ownership <sub>t-1</sub> )	0.262***	12.25	(Top 5/Total Institutional Ownership <sub>t-1</sub> )	-452.51*** -4.52
* ( $1\% \leq MO < 5\%$ )	0.073	1.52	* ( $1\% \leq MO < 5\%$ )	-219.49* -1.94
* ( $MO \geq 5\%$ )	-0.134***	-2.48	* ( $MO \geq 5\%$ )	80.04 0.59
Number of observations	21,972		21,972	
F-test for $\beta_2 + \beta_{2M} = 0$	F-value = 51.99		F-value = 37.68	
F-test for $\beta_2 + \beta_{2H} = 0$	F-value = 6.24		F-value = 8.05	
Adjusted R-Square	0.07		0.34	

**Panel B: Post-2002**

	Pay-for-performance sensitivity		Level of compensation	
	Dependent Variable = $\Delta TDC$		Dependent Variable = TDC	
	<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>	<u>t-stat</u>
<i><math>\Delta</math>(Shareholder Wealth<sub>t</sub>)</i>				
* (Top 5/Total Institutional Ownership <sub>t-1</sub> )	0.294***	10.96	(Top 5/Total Institutional Ownership <sub>t-1</sub> )	-1317.97*** -9.85
* ( $1\% \leq MO < 5\%$ )	-0.196***	-2.71	* ( $1\% \leq MO < 5\%$ )	-274.41* -1.73
* ( $MO \geq 5\%$ )	-0.467***	-6.99	* ( $MO \geq 5\%$ )	-468.20*** -2.57
Number of observations	24,963		24,963	
F-test for $\beta_2 + \beta_{2M} = 0$	F-value = 2.01		F-value = 109.96	
F-test for $\beta_2 + \beta_{2H} = 0$	F-value = 7.38		F-value = 102.85	
Adjusted R-Square	0.04		0.44	

**Notes**

The sample period spans from 1993 to 2008. For each year, up to the top five executives are considered for each firm. Panel A presents results for equations (3) and equation (4) for the period before 2002 (1993-2001). Panel B presents the results for equations (3) and (4) for the period after 2002 (2003-2008). We delete year 2002 observations in this analysis. TDC is the total direct compensation defined as the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation.  $1\% \leq MO < 5\%$  and  $MO \geq 5\%$  are two dummy variables which equal to one if firms are in the median and large managerial ownership group respectively. All other variables are defined in Table 2. The standard errors are corrected using the Huber-White-Sandwich procedure to compute the t-statistics with firm as the cluster. One, two, and three asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

**TABLE 7 Executive Compensation, Managerial Ownership and Institutional Investor Influence, Sensitivity Tests**

**Panel A: Average executive compensation for all executives in a firm-year**

	Pay-for-performance sensitivity Dependent Variable = $\Delta TDC$		Level of compensation Dependent Variable = TDC	
	<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>	<u>t-stat</u>
$\Delta(\text{Shareholder Wealth}_t)$				
* (Top 5/Total Institutional Ownership <sub>t-1</sub> )	0.285***	9.22	(Top 5/Total Institutional Ownership <sub>t-1</sub> )	-1049.40*** -6.33
* ( $1\% \leq MO < 5\%$ )	0.122*	1.74	* ( $1\% \leq MO < 5\%$ )	-328.54* -1.81
* ( $MO \geq 5\%$ )	-0.271***	-3.34	* ( $MO \geq 5\%$ )	-316.57 -1.47
Number of observations	12,485		12,485	
F-test for $\beta_2 + \beta_{2M} = 0$	F-value = 38.62		F-value = 90.77	
F-test for $\beta_2 + \beta_{2H} = 0$	F-value = 0.04		F-value = 65.29	
Adjusted R-Square	0.07		0.51	

**Panel B: CEO compensation**

	Pay-for-performance sensitivity Dependent Variable = $\Delta TDC$		Level of compensation Dependent Variable = TDC	
	<u>Est. Coef.</u>	<u>t-stat</u>	<u>Est. Coef.</u>	<u>t-stat</u>
$\Delta(\text{Shareholder Wealth}_t)$				
* (Top 5/Total Institutional Ownership <sub>t-1</sub> )	0.385***	8.13	(Top 5/Total Institutional Ownership <sub>t-1</sub> )	- 1527.62*** -6.07
* ( $1\% \leq MO < 5\%$ )	0.509***	4.79	* ( $1\% \leq MO < 5\%$ )	-422.65 -1.51
* ( $MO \geq 5\%$ )	-0.396***	-3.46	* ( $MO \geq 5\%$ )	-404.07 -1.23
Number of observations	12,485		12,485	
F-test for $\beta_2 + \beta_{2M} = 0$	F-value = 78.80		F-value = 49.61	
F-test for $\beta_2 + \beta_{2H} = 0$	F-value = 0.01		F-value = 35.81	
Adjusted R-Square	0.05		0.38	

**Notes**

The sample period spans from 1993 to 2008. For each year, up to the top five executives are considered for each firm. Panel A presents results for equations (3) and (4) using the mean TDC for each firm-year. Panel B presents results for equations (3) and (4) using the CEO's compensation alone for TDC. TDC is the total direct compensation defined as the sum of salary, bonus, option and stock grants, long-term incentive payouts, and other compensation.  $1\% \leq MO < 5\%$  and  $MO \geq 5\%$  are two dummy variables which equal to one if firms are in the median and large managerial ownership group respectively. All other variables are defined in Table 2. The standard errors are corrected using the Huber-White-Sandwich procedure to compute the t-statistics with firm as the cluster. One, two, and three asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.