# The Effectiveness of Board and Ownership Structures in New Zealand*


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# The Effectiveness of Board and Ownership Structures in New Zealand

**Abstract**

We examine the effectiveness of New Zealand boards of directors in mitigating agency costs. Their main tools are the right to set CEO pay and to replace management. We find that, for the most part, boards do a good job of designing compensation packages and implementing CEO turnover strategies that align CEO interests with shareholders' interests. We also examine the impact of board characteristics and ownership structures on board effectiveness as a governance mechanism. Surprisingly we find that director share ownership may reduce board effectiveness in governance. In addition, we find that, as expected, CEO duality, busy directors and large boards reduce the governance quality of the board.

JEL classification: G18; G34; G38

Keywords: CEO compensation, CEO turnover, Corporate governance

## 1. Introduction

The role of the board of directors is to hire, monitor, compensate and fire the chief executive officer (CEO), (Jensen, 1993). The effectiveness of this internal control system impacts the performance of both the firm and the CEO. Boards whose culture centres on politeness and self-service can become influenced by the CEO allowing the pursuit of self-interest at the expense of shareholders (Jensen and Meckling, 1976).

The New Zealand share market provides an interesting environment in which to examine the relationship between the CEO and the board of directors. Unlike the US, the labour market in New Zealand is much smaller and often CEOs and board members are known to one another. CEOs often sit on the board and may even be a member of their own compensation committee. New CEOs may even come from the board itself. These suggest that board members of New Zealand firms will hold different incentives to those of other more regulated environments. In addition, CEO compensation data only became public in 1997. Prior to this change in reporting requirements no studies of this nature could be undertaken. We examine the pay-performance relationship for CEOs and the effectiveness of the board of directors as a governance mechanism using a hand-collected data set of New Zealand firms. One data constraint on this study is the lack of information about CEO ownership. Ownership information is only disclosed for those firms where the CEO is a member of the board of directors. For those firms where this is not the case no details about CEO shareholding interests are disclosed.

The setting of an optimal compensation package together with a turnover strategy, risking job loss in the event of poor management, by the board should encourage behaviour that favors shareholders' interests. If boards of directors truly act on behalf of shareholders, two relationships should be observed. First, rates of change in CEO pay will be positively related to changes in firm value.[1] Second, the probability of CEO turnover will be negatively related to firm performance. Both of these effects should be present after adjusting for changes in the market and other identifiable factors outside the control of the CEO. The sample in this study contains 27 instances of change in CEO using 62 firms.

We measure board effectiveness by examining the relationship between CEO pay-performance and CEO turnover-performance. The study answers the following questions:

1. Are CEOs paid more for positive abnormal stock returns?
2. Is CEO turnover greater when firms have negative abnormal stock returns?
3. How do board and ownership structures affect the ability of the board to control management through compensation?
4. Is the ability of the board to control management through CEO turnover affected by board and ownership structures?

We find:

1. A positive relationship between change in CEO pay and stock price performance.
2. Weak evidence that poorly performing CEOs experience a higher rate of turnover.
3. Director share ownership is ineffective as a governance mechanism.
4. CEO duality, busy directors and larger boards reduce board effectiveness in goverance.

The findings of this study are of potential interest to the academic community, financial market regulators, investors in the New Zealand sharemarket (NZX) and other Pacific countries with public share markets governed by similar disclosure rules.

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[1]CEO compensation increases when shareholder value increases; however, it may not be the case that CEO compensation decreases when shareholder value decreases, as this relationship has been shown to be asymmetric (Bertrand and Mullainathan, 2000; Roberts, 2007).

## 2. Previous research

Under optimal contracting, the board of directors designs compensation packages to minimise agency costs, encouraging the CEO to maximise firm value. The elasticity of CEO cash compensation (salary and bonus) with respect to changes in firm value for US firms lies in the range of 0.10 to 0.15. Broadening the definition of CEO compensation to include stock option grants, restricted stock grants, other compensation, changes in the value of stock holdings and changes in the value of stock option holdings increases the estimate to 3.9 (Hall and Liebman, 1998). Contemporaneous and lagged firm performance have positive, significant relationships to CEO compensation (Boschen and Smith, 1995).

"Managerial power" (Bebchuk et al., 2004) presents an alternative view of CEO compensation. This is not mutually exclusive to optimal contracting. It suggests that boards do not operate at arm's length in devising CEO compensation arrangements. Rather, a CEO is able to exert power over the board to influence his or her own pay, leading to overpayment. Different board characteristics and board ownership structures influence the effectiveness of the board. These affect how much power the CEO is able to exert on the board in order to extract excess pay. Consistent with this approach Core et al. (1999 p. 371) find that "CEO compensation is a decreasing function of the percentage of the board composed of inside directors, and is an increasing function of board size, the percentage of the board who are outside directors appointed by the CEO, the percentage of the board who are grey outside directors, the percentage of outside directors who are over age of 69, the percentage of outside directors who serve on three or more boards, and whether the CEO is also board chair.

A number of US studies also investigate the relationship between stock price performance and CEO turnover (see Coughlan and Schmidt (1985); Warner, watts, and Wrcuk (1988); Jensen and Murphy (1990); Murphy and Zimmerman (1993); Hadlock and Lumar (1997); Mikkelson and Partch (1997); Murphy (1999); Huson, Parrino and Starks (2001)). In general, they find that CEO turnover is inversely related to firm performance as measured by both market and accounting returns. Brickley (2003) argues, the economic significance of this relationship is quite small.[2] The relationship between CEO turnover and stock price performance may also have declined over time (Mikkelson and Partch, 1997; Murphy, 1999). This mixed evidence makes how effective the threat of turnover may be in deterring CEO self interest unclear.

Managerial power (Bebchuk et al., 2004) can also be applied in examining the relationship between CEO turnover and stock price performance. Given the CEO is able to exert power over the board, this power can be used to entrench the CEO from turnover. Consistent with this view, the magnitude of the turnover-performance relationship is strongest in companies dominated by independent outside directors (Weisbach, 1988). The probability of CEO turnover is negatively related to the equity ownership of officers and directors after controlling for potential determinants of turnover (Denis et al., 1997).

## 3. New Zealand evidence

Currently only five published studies have examined the CEO pay-performance relationship of New Zealand firms.[3] The results from this research are mixed. Andjelkovic et al. (2002) examine the CEO pay-performance relationship during the first year of public disclosure of CEO compensation in 1997. They find no evidence of a positive relationship between pay and

[2] "The typical study finds that moving from the top to bottom decile of performance increases the probability of CEO turnover in publicly traded firms by about 4 percent (p. 228)."

[3] Three studies look at data from publicly traded firms in New Zealand, and one study uses public sector corporation data.

performance regardless of firm size, leverage and board structure. They also examine the effect of board size, inside directors and director ownership, finding that both the level of CEO pay and its relationship to performance is unrelated to governance and ownership factors.

Elayan et al. (2003) investigate executive incentive compensation schemes and firm performance over the period 1996 to 1998. They find no significant statistical relationship between historical firm performance and contemporaneous CEO compensation levels. They also report that the percentage of outside directors on the board is insignificant in determining CEO pay. Gunasekaragea and Wilkinson (2002) examine the influence of firm performance in setting CEO pay over the period 1998 to 2000. They report that firm performance is not an influential variable in the determination of CEO cash compensation; however, when the change in the value of CEO share holdings is added to cash compensation, firm performance becomes a significant determinant of the total compensation package for CEOs.

Cahan et al. (2005) use a sample of 80 New Zealand public sector companies to examine whether board structure affects board effectiveness in public sector corporations. They find, after controlling for other factors affecting CEO pay levels, that smaller boards, boards that do not have the CEO as a member and boards with higher-quality directors are more effective at constraining CEO pay. Variables representing the percentage of busy directors, grey directors and inside directors are not significantly related to CEO pay. The study concludes that board structure does affect board effectiveness in public sector corporations in New Zealand.

Jiang, Habib and Smallman (2009) investigate the effect of ownership concentration on the pay-performance relationship of New Zealand CEOs. The study finds that firms with lower levels of ownership concentration have a stronger pay-performance association than firms with high levels of ownership concentration. The results suggests that CEOs may be able to entrench themselves in firms with large shareholdings. The smaller shareholders in these firms bear the cost of this power imbalance.

**4. Relevance of current study**

This study examines the effectiveness of the board of directors in mitigating agency costs for publicly traded New Zealand firms and how board characteristics and ownership affect this relationship. Elayan et al. (2003) note that the results from previous overseas research cannot be extrapolated with any degree of confidence to a New Zealand setting due to differences in business environment and culture. The limited pool of directorial talent available in New Zealand means that most firms recruit directors from existing boards. This recruitment practice may potentially decrease the objectivity in appointing directors and reduce the board's governance role (Smith, 1994). The unique regulatory environment and the limited amount of published research examining the role of the board of directors in detail makes this study particularly interesting. In addition, none of the published empirical studies examine the role of the board of directors in detail.[4] Compared to previous work this study uses a longer time series of data that can capture changes in the pay-performance relationship and its relationship to CEO turnover.

**5. Data**

This study uses a pooled data sample of companies listed on the NZX during the period 1997 to 2005. A data set containing information on CEO pay, CEO turnovers, board

[4]Andjelkovic et al. (2002) provide the most comprehensive study of the effect of board ownership structure and board characteristics on CEO pay-performance sensitivity using only board size, percentage of inside directors and percentage of director ownership in 1997. Also, Roberts (2007) finds that, in New Zealand, CEO cash compensation is positively related to firm size, board size, contemporaneous and lagged stock returns, and negatively related to director ownership.

characteristics, board ownership structures and cumulative abnormal returns was formed to undertake the study. Information on CEO turnover, the firms' board characteristics and board ownership structures were gathered from firm annual reports using the Datex database and the Hocken Collections, held at the University of Otago's Hocken Library.

Two different measures of CEO pay are used in the analysis. CEO cash compensation is defined as the sum of salary, bonus, superannuation, health insurance coverage and motor vehicle allowances paid annually for each CEO. This definition is expressed in Equation 1 for firm *i* in year *t*.

$$\begin{aligned} CEO\ Cash_{i,t} &= Salary_{i,t} + Bonus_{i,t} + Superannuation_{i,t} \\ &+ Health\ Insurance_{i,t} + Motor\ Vehicle_{i,t} \end{aligned} \quad (1)$$

CEO wealth change is the second compensation measure. This is defined as the sum of CEO cash compensation as given in Equation 1, plus the value of first-time option grants awarded to CEOs during each fiscal year, plus the change in the value of existing option holdings as stated in Equation 2 for firm *i* in year *t*.[5]

$$CEO\ Wealth\ Change_{i,t} = CEO\ Cash_{i,t} + O_{i,t}.V_{i,t} + O'_{i,t}.\Delta V_{i,t} \quad (2)$$

where

$O_{i,t}$ = Number of first-time firm *i* options granted in year *t*

$V_{i,t}$ = Value of one first-time firm *i* option granted in year *t*

$O'_{i,t}$ = Number of existing firm *i* options outstanding in year *t*

$\Delta V_{i,t}$ = The change in the value, during the firm's fiscal year, of one existing firm *i* option

Abnormal stock price performance is measured using estimates of $\alpha_i$ and $\beta_i$ from the market

[5]Options are valued using the Black Scholes pricing method.

model. The parameters are estimated on a set of daily data from the 252 trading days just prior to the period of interest.[6] The estimates of $\alpha_i$ and $\beta_i$ are used to calculate daily excess returns or abnormal stock price performance according to the formula:

$$\varepsilon_{i,j} = R_{i,j} - \alpha_i - \beta_i \, R_{m,j} \qquad (3)$$

where

$\varepsilon_{i,j}$ = Daily abnormal stock price performance of firm *i* for day *j*

$R_{i,j}$ = Daily stock price return of firm *i* for day *j*

$R_{m,j}$ = Daily return on the market for day *j*

The daily abnormal returns are summed over the firms' fiscal year to give the cumulative abnormal return for fiscal year *t* as defined in Equation 4. This definition is taken from Coughlan and Schmidt, 1985.

$$CUMABN_{i,j} = \sum_{j=1}^{J} \varepsilon_{i,j} \qquad (4)$$

where

$CUMABN_{i,t}$ = the cumulative abnormal return for firm *i* in year *t*

J = the last day in the fiscal year *t*

The daily returns are calculated by taking first differences of the natural log of the share price series. Daily New Zealand stock prices are obtained from the share data base maintained by the

[6] Despite using annual compensation data the annual excess stock returns are calculated from daily excess returns. This is because firm betas can change over time. The parameters used to estimate the daily excess stock returns are calculated using daily data. The annual excess stock returns are then calculated using daily excess stock returns as shown by Equation 4. Coughlan and Schmidt, 1985 note that similar empirical results were obtained using the "product of the daily abnormal returns over the firm's fiscal year, minus one, as the measure of abnormal returns."

University of Otago School of Business. The original sample contained 72 different NZX listed companies. Since construction of the cumulative abnormal returns requires daily share price data and not all stocks listed on the NZX are traded daily, liquidity issues arise in the implementation of the market model. Nonsynchronous trading of securities introduces into the market model a potentially serious econometric problem of errors in variables (Scholes and Williams, 1977). To mitigate any bias this may have caused five firms were dropped from the sample due to trading less than four out of every five days over the estimation period. The sample also excludes any firm that was the subject of a merger or acquisition to ensure that any price variation due to the acquisition process does not bias the results. The return data were then matched with the CEO compensation, CEO turnover, board characteristics and board ownership structure data for each firm in each year. The resulting CEO turnover sample contained 247 firm-year observations. After allowing for changes in CEO the pay-performance sample contained 217 firm-year observations.

The parameter estimates $\beta_i$ used in Equation 3 are calculated using ordinary least squares (OLS) and the Scholes-Williams (S-W) beta estimation technique, which provides a more consistent parameter estimate in the presence of nonsynchronous data (Scholes and Williams, 1977). As a further robustness check, two different indices are used as a proxy for market performance. The first, the NZX40, comprises the securities of the top 40 companies listed on the NZSX market weighted by full market capitalisation. The second index used is a personally constructed equally weighted index comprising all stocks listed on the NZX that traded at least four out of every five possible trading days. Combining the two different beta estimation techniques with the two market return proxies gives four alternate series of cumulative abnormal returns for each firm. Summary statistics for the CEO compensation and performance measure are reported in Table 1.

The returns are estimated using the equally weighted index and the Scholes-Williams betas.[7]

[Insert Table 1 here]

## 6. Methodology

### *6.1 CEO pay and stock price performance*

The first research question investigates the relationship between CEO compensation and abnormal stock returns. The hypothesis is that the board of directors pay the CEO with higher compensation for positive abnormal stock returns and vice-versa. CEO pay-performance sensitivity is measured by regressing the difference in natural logarithms of CEO pay in performance year *t* and the previous year *(t-1)*, on the contemporaneous cumulative abnormal returns (CUMABN) and their lag over the firm's fiscal year *t*.[8] The dependent variable measures the rate of change in compensation. The model is fitted assuming the existing wage structure represents an equilibrium dispersion of wage levels. This avoids the problem of inter-firm and inter-industry differences explaining CEO pay variation (Murphy, 1999). Using CUMABN as the performance measure in setting CEO pay ensures that the CEO is paid for performance attributed to his or her individual decisions and not general market movements. We estimate regression models of the general form:

$$ln\left[\frac{CEO\ Pay_{i,t}}{CEO\ Pay_{i,t-1}}\right] = \alpha + \beta_1 CUMABN_{i,t} + \beta_2 CUMABN_{i,t-1} + \varepsilon_{i,t} \tag{5}$$

[7]The equally weighted index is more appropriate given the nature of the sample as the NZ40 contains the 40 largest firms listed on the NZX. The Scholes-Williams beta estimates ensure that problems with nonsynchronous trading in the data are also addressed. Summary statistics for the abnormal returns calculated using the NZ40 and OLS beta estimates are reported in Table 10 in the appendix.

[8]Consistent with Boschen and Smith (1995) who conclude that the pay-performance relationship does have a significant long-run component and is incompletely characterized by a contemporaneous-only relationship.

where

$CEOPay_{i,t}$ = CEO cash or CEO wealth change for firm $i$ in year $t$

$\alpha$ = the common intercept term

$CUMABN_{i,t}$ = the cumulative abnormal return for firm $i$ in year $t$

$\varepsilon_{i,t}$ = the error term for firm $i$ in year $t$

The common intercept term, $\alpha$, is interpreted as the average rate of change in CEO pay for all firms over the period 1997 to 2005 after controlling for any effects attributable to cumulative abnormal returns. The estimated coefficient $\beta$ is the "semi-elasticity" of pay with respect to the rate of return (Rosen, 1992).[9] The advantage of estimating the "semi-elasticity" instead of the "pay-performance sensitivity" is that it produces a better "fit" in the sense that rates of return explain more of the cross-sectional variation of $\Delta ln(CEO\ Pay)$ than changes in shareholder value explain of $\Delta(CEO\ Pay)$ (Murphy, 1999). In addition, while pay-performance sensitivities vary monotonically with firm size (larger firms have smaller slope coefficients), the elasticity is relatively invariant to firm size (Gibbons and Murphy, 1992). Our primary interest is in the estimates of these coefficients. We expect the coefficient estimate of CUMABN and the lag of CUMABN to be positive. All reported models also include a full set of time dummy variables (1998 being the excluded year) to capture the effect of any average increases in pay.

### *6.2 CEO turnover and stock price performance*

The second research question examines the relationship between CEO turnover and firm performance. We use a logit regression for this analysis.[10] The dependent variable, Y, is a

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[9]Semi-elasticity is defined as $\frac{dln(Compensation)}{dr}$ for rate of return r.

[10]When the dependent variable in a regression is dichotomous, estimation via ordinary least squares produces

dummy variable, (Y=1, if it is the CEO's last full year in office; 0, otherwise). This is regressed on the positive and negative CUMABN and the lag of CUMABN from the previous period. The logit regression model is estimated as

$$ln\left[\frac{P(Turnover)_{i,t}}{1-P(Turnover)_{i,t}}\right] = \delta + \psi_1 CUMABN^+_{i,t} + \psi_2 CUMABN^-_{i,t}$$

$$+\psi_3 CUMABN^+_{i,t-1} + \psi_4 CUMABN^-_{i,t-1} + \nu_{i,t} \qquad (6)$$

where

$P(Turnover)_{i,t}$ = Probability of CEO's last full year in office for firm *i* in year *t*

$\delta$ = the common intercept term

$CUMABN^+_{i,t}$ = the positive cumulative abnormal return for firm *i* in year *t*

$CUMABN^-_{i,t}$ = the negative cumulative abnormal return for firm *i* in year *t*

$\nu_{i,t}$ = the error term for firm *i* in year *t*

Equation 6 estimates the log of the odds ratio in favour of the CEO being replaced in year *(t+1)*. The common intercept term, $\delta$, is the average of the log odds ratio in favour of the CEO being replaced in year *(t+1)* if the firm had zero cumulative abnormal returns; $\psi_1$ and $\psi_2$ represent how the log odds ratio in favour of the CEO being replaced in year (*t+1)* changes for a one unit increase or decrease in CUMABN, respectively. Similarly, $\psi_3$ and $\psi_4$ represent change in the log odds ratio, given a one unit change in the lagged CUMABN term. If poor CEO

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unbiased but inefficient estimates. The logit regression constrains the dependent variable to range between zero and one, and produces unbiased and efficient estimates under the assumption that the error term has the Weibull distribution (Coughlan and Schmidt, 1985). The STATA Logistic procedure was used to estimate the logit regressions reported here.

performance is reflected in negative abnormal stock returns, then it is hypothesised that negative abnormal stock performance will increase the probability of management turnover. We expect the negative return measures ($\psi_2$ and $\psi_4$) to have negative coefficients.

### *6.3 Board characteristics, ownership structure and stock price performance*

The third research question investigates the impact of board of director characteristics and ownership structure on the ability of the board to mitigate agency costs. We include variables describing these factors in Equations 5 and 6. These variables are also interacted with the cumulative abnormal returns. These variables are used to assess how board characteristics and ownership structure affect the rate of change in pay and the probability of CEO turnover. The interaction terms measure their incremental effect on the CEO pay-performance and CEO turnover-performance relationships, respectively.

The board of directors generally design CEO compensation packages at the start of the year in which they are awarded. To investigate how different board characteristics and ownership structures affect the CEO pay-performance relationship, the board characteristics and ownership structure of each firm are lagged one period. The decision to replace a CEO, however, is generally made in the concurrent period to that in which the CEO is replaced. In order to determine how different board characteristics and ownership structures affect the CEO turnover-performance relationship, the board characteristics and ownership structure of the firm are recorded in the same period to that when turnover occurs. Thus Equation 5 becomes

$$ln\left[\frac{CEO\ Pay_{i,t}}{CEO\ Pay_{i,t-1}}\right] = \alpha + \lambda_{j,i,t-1} + \beta_1 CUMABN_{i,t} + \beta_2 CUMABN_{i,t-1}$$

$$+ \gamma_j(\lambda_{j,i,t-1}.CUMABN_{i,t}) + \xi_j(\lambda_{j,i,t-1}.CUMABN_{i,t-1}) + \varepsilon_{i,t} \quad (7)$$

and Equation 6 becomes

$$ln\left[\frac{P(Turnover)_{i,t}}{1-P(Turnover)_{i,t}}\right] = \delta + \lambda_{j,i,t} + \psi_1 CUMABN^{+}_{i,t} + \psi_2 CUMABN^{-}_{i,t}$$

$$+\psi_3 CUMABN^{+}_{i,t-1} + \psi_4 CUMABN^{-}_{i,t-1}$$

$$+\eta_j(\lambda_{j,i,t}.CUMABN^{+}_{i,t}) + \eta'_j(\lambda_{j,i,t}.CUMABN^{-}_{i,t})$$

$$+\phi_j(\lambda_{j,i,t}.CUMABN^{+}_{i,t-1}) + \phi'_j(\lambda_{j,i,t}.CUMABN^{-}_{i,t-1}) + \nu_{i,t} \qquad (8)$$

where $\lambda_{j,i,t}$ = the $j^{th}$ board characteristic or ownership structure variable for firm *i* in year *t*, *j* = 1, ...,5.

The models are estimated separately for each board characteristic or ownership structure, $\lambda$. These variables are defined in Table 2 and summarised below.

[Insert Table 2 here]

**CEOCHAIR**

A CEO who is also the chairman of the board holds a wider power base and locus of control (Hambrick and Finkelstein, 1987; Harrison et al., 1988; Patton and Baker, 1987). The dual leadership position of CEO chairman enables the CEO to exert additional power over the board, reducing the effectiveness of the directors as a governance mechanism. It is hypothesised that a CEO who also serves as board chair will extract a higher rate of pay, have lower pay-performance elasticities, be less likely to be replaced and have lower turnover-performance sensitivity.

**INSIDE**

Inside directors are defined as executive directors. Pfeffer (1981) argues that inside directors are more loyal to management; thus, the CEO can exert relatively more control over inside directors as opposed to outside directors. In addition, Weisbach (1988) finds that CEOs of poorly performing firms are more likely to be replaced in firms with outsider-denominated rather than insider-dominated boards. It is hypothesised that CEOs of firms with a large proportion of inside directors on the board will extract higher rates of pay, have lower pay-performance elasticities, are less likely to be replaced and have lower turnover-performance sensitivities.

**BDSIZE**

Jensen (1993) argues that as groups increase in size they become less effective due to coordination and process problems overwhelming the advantages of having more people to draw on. Psychology studies find that people in large groups are less likely to voice a contrary opinion to that of the group and feel less responsible for decisions reached collectively (for example, Gerard et al., 1968; Latane, 1981). This enables the CEO to dominate the decision-making process. Consistent with this point of view, Yermack (1996) finds that companies with small boards provide stronger CEO performance incentives through compensation and the threat of dismissal. It is hypothesised that CEOs of firms with larger boards extract higher rates of pay, have lower pay-performance elasticities, are less likely to be replaced and have lower turnover-performance sensitivities.

**DSOB**

According to agency theory, board ownership is a powerful incentive for fulfilling corporate control responsibilities (Patton and Baker, 1987). It is hypothesised that CEOs of firms with higher proportions of board ownership will extract lower rates of pay, have higher pay-performance elasticities, are more likely to be replaced and have higher turnover-performance sensitivities.

**BUSY**

Directors that hold multiple directorships have less time to devote to performing duties required of them as a director. Therefore a director with multiple directorships is, ceteris paribus, less effective than a director with fewer directorships. In support of this argument, Fich and Shivdasani (2006) find that firms with busy boards are associated with weak corporate governance. The firms exhibit lower market-to-book ratios, weaker profitability and lower sensitivity of CEO turnover to firm performance. However, in contrast to these findings, Ferris et al. (2003) find no evidence that multiple directors shirk their responsibilities to serve on board committees. In spite of this, it is hypothesised that CEOs of firms with boards that have a large proportion of busy directors will extract higher rates of pay, have lower pay-performance elasticities, are less likely to be replaced and have lower turnover-performance sensitivities.

## 7. Results

### *7.1 CEO pay and stock price performance*

**Cash compensation**

The first research question is examined by estimating Equation 5 using ordinary least squares on the panel data set with year dummy variables and White period standard errors.[11] The results of this analysis are reported in columns 1 to 3 of Table 3. The rate of change in CEO cash compensation is regressed on contemporaneous cumulative abnormal returns in column 1, contemporaneous and lagged cumulative returns in column 2 and lagged cumulative abnormal returns only in column 3. The results are based on the CUMABN returns using the equally

[11]White period standard errors are robust to arbitrary serial correlation and time-varying variances in the error terms of the model when estimated over a pooled data sample. The inclusion of time dummy variables in the model is used to address the problem of cross-sectional dependence parametrically. This occurs when the residuals of a given year may be correlated across firms and allows for the estimation of standard errors which deal with both contemporaneous and serial correlation simultaneously (Petersen, 2009).

weighted market index and the Scholes-Williams beta estimates. The results for the other CUMABN specifications are reported in Table 11 of the appendix.

[Insert Table 3 here]

The constant term is significant at the 1% level for each specification of the cash compensation model. The estimated coefficients indicate that New Zealand CEOs' nominal cash compensation grows by 12–13% on average each year after controlling for any variation due to abnormal stock price performance. This is equivalent to an annual growth rate in real cash compensation of between 10.1% and 11.1%.[12]

Contemporaneous cumulative abnormal returns do not explain any of the variation in the rate of change in cash compensation during the period 1998 to 2005.[13] Consistent with Boschen and Smith (1995), the lagged cumulative abnormal return is significant and has a larger effect on CEO cash compensation.[14] Pay-performance semi-elasticity estimates reported in columns 2 and 3 are are 0.21 and 0.18, respectively. These estimates are similar in magnitude to the findings of

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[12] 12% −1.9% = 10.1% and 13%– 1.9% = 11.1%, CPI index for 1997:1 is 820.57, CPI index for 2005:1 is 953.41 where baseline CPI index: 1000 = June 2006 quarter. Compound average rate of annual inflation =

$$\left[\frac{953.41}{820.57}\right]^{\frac{1}{8}} - 1 = 1.9\%$$

[13] This is true regardless of the beta estimation technique or proxy for return on the market used in the construction of the abnormal returns. Table 11 in the appendix shows the results for the models using the different estimations of the cumulative abnormal returns.

[14] Intuitively this makes sense since the bonus component of cash pay is determined at the end of the year and reflects performance during the year, while salary is set at the start of the year and corresponds to performance from the previous year (and salary is the largest component of the cash pay measure).

prior US studies.[15] The pay-performance link is stronger in the 2002−2005 period, as indicated by the larger estimated coefficients reported in Panel C compared to the 1998−2001 period shown in Panel B.

The positive relationship between CEO pay and stock price performance is in line with the findings of Roberts (2007) though inconsistent with Andjelkovic et al. (2002), Elayan et al. (2003) and Gunasekaragea and Wilkinson (2002), who report no positive relationship between CEO pay and stock price performance in New Zealand. The longer time frame for this study and the work by Roberts (2007) may explain the difference in results, as the pay-performance relationship may have strengthened over time due to additional pressure put on boards to monitor CEO pay following the introduction of mandatory director compensation disclosure.[16] We examine this further by re-estimating the regression model over the periods 1998−2001 and 2002−2005. The results are reported in Panels B and C of Table 3. The models fitted using the alternative definitions of cumulative abnormal returns are reported in Table 11 in the appendix.

The low adjusted $R^2$'s of these regressions are similar to those found in Coughlan and Schmidt (1985), and, as they note, it indicates that stock price performance explains only a small proportion of the variation in salary plus bonus. However, this is not surprising, since the purpose of this payment is to give income security to the CEO and to compensate him or her for performing various other tasks inside the firm.

**CEO wealth change**

The results of the regression model in Equation 5, with CEO wealth change as the compensation measure, are reported in columns 4 to 6 of Table 3. Growth in CEO wealth change

[15] See Murphy (1985, 1986); Coughlan and Schmidt (1985); Gibbons and Murphy (1990); Barro and Barro (1990); Joskow, Rose and Shepard (1993); Kaplan (1994); and Hall and Liebman (1998).

is regressed on contemporaneous cumulative abnormal returns in column 4, contemporaneous and lagged cumulative abnormal returns in column 5, and only on lagged cumulative abnormal returns in column 6. When the cash compenation measure is adjusted to include changes in the value of option holdings, growth in CEO compensation is positively related to contemporaneous cumulative abnormal returns. Estimated pay-performance semi-elasticity ranges from 0.29 to 0.34 for the full sample. The absolute value of the coefficients for the wealth change model are larger than those calculated using the cash compensation measure. Assuming that a higher pay-performance elasticity better ties the interests of the CEO to those of the shareholders, thereby reducing agency costs, this result supports the inclusion of option grants in the CEO compensation package. The models are also fitted using the alternative definitions of cumulative abnormal returns. These are reported in Table 11 in the appendix.

**Predicted change in CEO pay**

The regression results reported in Table 3 indicate that growth in CEO compensation is positively related to abnormal stock price performance, regardless of how CEO pay is defined. Shareholders are usually more interested in knowing how much CEO pay changes relative to change in stock price performance. The predicted change in CEO cash and change in CEO wealth for various percentiles of stock price performance are reported in Tables 4 and 5.

[Insert Tables 4 and 5 here]

The predicted change in CEO cash and CEO wealth change for various percentiles of the lagged and contemporaneous cumulative abnormal returns are computed using the regression coefficients estimated in columns 3 and 4 (cash and wealth change respectively) of Panel A in Table 3. For example, to find the predicted percentage change in CEO cash compensation for an

[16]This requirement came into effect in July 1997.

executive whose firm is in the $99^{th}$ percentile of the lagged abnormal stock return distribution (which corresponds to the top 1%, the lagged cumulative abnormal return is 0.6620), $\alpha$, $\beta_1$ and $\beta_2$ are set equal to 12.90%, 0 and 0.18, respectively (from column 3, Panel A of Table 3). Solving for the percentage change in CEO cash compensation gives a rate of pay increase of 24.82%.

The results reported in Table 4 predict that a firm whose abnormal stock return performance was in the lowest percentile last year will still increase CEO compensation by 2.69%. In contrast, a firm whose performance ranked in the top percentile last year will increase CEO cash compensation by 24.82%. Interestingly, firms in the $1^{st}$ to $40^{th}$ percentile rank of the abnormal stock return distribution experience decreases in firm value but continue to increase CEO cash compensation.[17]

Table 5 reports the predicted growth in CEO wealth change. A CEO whose firm performs very poorly (lagged abnormal return lies in the first percentile) experiences a drop in wealth of 20.17%. A CEO whose firm performance ranks in the highest percentile of the lagged return distribution achieves a 27.46% increase in change in wealth. This is only 10% greater than the growth in cash compensation alone. The results in Tables 4 and 5 suggest that the inclusion of stock options in the compensation package makes the CEO mildly better off if the firm does well; however, CEOs are considerably worse off if the firm performs poorly. The evidence supports the hypothesis that the board of directors reward (discipline) the CEO with higher (lower) compensation for positive (negative) abnormal stock returns. Compensation packages encourage the CEO to maximise shareholder value and reduce agency costs.

[17] A possible explanation is the fact that salary is "sticky", i.e., cash compensation does not decrease for a given year and bonus may be based on past plus current performance, so overall pay still increases despite firm value falling.

### *7.2 CEO turnover and stock price performance*

The second research question is examined by estimating Equation 6 using a logit regression model. The results from the analysis of CEO turnover and abnormal stock price performance are reported in Table 6. CEO turnover in year *(t + 1)* is regressed on the positive and negative contemporaneous and lagged cumulative abnormal return as shown in model specifications 1, 2 and 3 of Table 6, respectively. The models are fitted using the cumulative abnormal returns constructed using the S-W beta estimation technique and the equally weighted market index. The result using the other abnormal return estimation techniques are reported in Table 12 of the appendix.

[Insert Table 6 here]

Consistent with the prediction that good firm performance decreases the probability of the CEO being replaced in year *(t+1)*, the coefficient estimates are negative and significant if CUMABN < 0. CEO turnover is related to contemporaneous performance. However, CEO turnover may also be affected by positive abnormal returns in year *(t-1)*. The results reported in Panels 2 and 3 of Table 12 of the appendix show that past positive performance can reduce the likelihood of turnover.

The failure to find any strong relationship between poor abnormal stock price performance and CEO turnover in New Zealand does not necessarily mean that New Zealand boards are ineffective. However, none of the fitted models are significant. Poor stock price performance can have a variety of causes, many of which do not reflect incompetence or poor performance on the part of top management and therefore may not merit the dismissal of the CEO. A board convinced that the CEO is responsible for poor stock results in the performance year may not effect a change in management within the time period observed because replacing a CEO requires considerable deliberation.[18] This is especially the case in New Zealand, where there exists a limited pool of managerial talent and quite often companies have to look offshore to find a suitable replacement.

### *7.3 Board characteristics, ownership structure and stock price performance*

The third research question asks how do different board and ownership structures affect the ability of the board to control management through compensation? This is examined by estimating Equation 7 separately for the CEO cash and CEO wealth change measures of compensation. The results are reported in Tables 7 and 8, respectively.

[Insert Tables 7 and 8 here]

The model is estimated using a factor referred to as the inverse Mills ratio for the board characteristic when the CEO is also the chairman of the board.[19] This factor tests for the presence of a self-selection bias due to firms choosing to allow the CEO to also hold the position of chairman. A significant coefficient on the inverse Mills ratio indicates self-selection bias. Board size is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility.[20]

The results reported in Table 7 show that only board size affects the sensitivity of the rate of change in cash compensation to lagged performance. The significant lag(CUMABN) term reported in column 9 means that, when growth in cash compensation is the dependent variable,

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[18]Coughlan and Smith (1985).

[19]The ratio is calculated as $\frac{-\phi(\hat{\Psi})}{1-\Phi(\hat{\Psi})}$ when the CEO is not chairman and $\frac{\phi(\hat{\Psi})}{\Phi(\hat{\Psi})}$ when the CEO is chairman. In these expressions, $\phi$ is the standard normal density function, $\Phi$ is the standard normal cumulative distribution function and $\hat{\Psi}$ is the reduced-form probit model prediction.

[20]The results do not change if the original absolute measure of board size is used to estimate the model.

the estimated sensitivity to past performance is 0.39. The incremental effect of having a larger board is -0.03 times board size. A firm with 10 directors would have a net sensitivity of 0.09 (0.39–0.30) to change in firm performance. The larger the board size, the less sensitive growth in pay will be to performance. This effect is not present when the change in CEO wealth measure is the dependent variable. The results also indicate that none of the individual board or ownership structure measures have any discernable impact on the average growth in cash compensation.

Consistent with the managerial power approach, the models examining the relationship between change in CEO wealth semi-elasticity and firm performance show that a CEO chairman can impact the growth rate of his or her change in wealth. The coefficient estimate of the CEOCHAIR variable interacted with the contemporaneous cumulative abnormal returns is negative and significant for both of the models reported in columns 1 and 2 of Table 8. This implies that, when firm value decreases, these CEOs are able to offset the impact of that loss on their change in wealth based on the performance component of their compensation package.

Using the coefficient estimates reported in column 1 from Table 8 shows that, if cumulative abnormal returns are -10%, CEO chairman pay changes by 2.5% (0.52(-0.1) + (-0.77)(-0.1)). In comparison, a CEO who is not also chairman of the board will experience a pay cut based on firm performance of 5.2% (0.52(-0.1)).[21] The elasticity of change in CEO wealth to cumulative abnormal returns is less sensitive to poor performance compared to firms where the CEO is not chairman.

**CEO turnover, board characteristics and board ownership structures**

[21] Including the lagged performance in the model as reported in column 2 means that, following a 10% drop in firm value, CEO chairman wealth change is 3.7% (0.49(-0.1) + (-0.86)(0.1)), while a CEO who is not also chairman experiences a change in wealth of -4.9% on average.

The final research question investigates how different board and ownership structures affect the ability of the board to control management through CEO turnover. This is examined by estimating Equation 8 using a logit regression. The results for the model fitted using the cumulative abnormal returns estimated from the S-W beta estimation and the equally weighted index as a proxy for the market are reported in Table 9. The results for the model fitted using the other estimates of cumulative abnormal returns are reported in the Table 15 of the appendix.

[Insert Table 9 here]

CEO duality (CEO chairman = 1) is a perfect predicter of the CEO turnover variable, and the logit model cannot be estimated for this factor. The model is fitted using the four board characteristic and ownership measures: inside directors, board size, beneficial director share ownership and busy directors.

The positive and significant (at the 1% level) coefficient estimate on the board size variable reported for each of the model specifications shown in columns 4, 5 and 6 of Table 9 indicate that larger boards are more likely to replace a CEO than smaller boards, after controlling for cumulative abnormal returns. There is no evidence to support the managerial power approach that CEOs of firms with larger boards have lower turnover-performance sensitivities. This follows from the result that none of the interactive terms on the performance measures are significant for all the models reported. Beneficial director share ownership does not seem to have any effect on CEO turnover. The significant, positive coefficient on the interaction between director share ownership and lagged cumulative abnormal returns reported in column 8 of Panel 1 of Table 15 of the appendix provides some weak evidence that boards where directors have beneficial shareholdings are less effective at bringing about CEO replacement for poor abnormal stock price performance.

The significant busy director coefficients for each of the models reported in columns 10, 11 and 12 of Table 9 suggest that CEOs of companies with a higher proportion of busy directors are more likely to experience turnover. The significant, positive coefficient on the interaction between the proportion of busy directors and cumulative abnormal returns reported in column 10 of Table 9 provides some weak evidence that boards with a higher proportion of busy directors are less effective at bringing about CEO replacement for poor abnormal stock price performance. The significant lagged interaction term reported in columns 11 and 12 of Panel 1 and Panel 3 of Table 15 also suggests that firms with a higher proportion of busy directors are less likely to discipline CEOs for poor past performance. In contradiction to the findings of Weisbach (1988), the proportion of inside directors on the board is unrelated to CEO turnover.[22]

**8. Conclusion**

This study has examined the effectiveness of New Zealand boards of directors in their role of mitigating agency costs between management and shareholders through their capacity to set CEO pay and enforce change in the CEO when required. Consistent with an optimal contracting view, a positive relationship between CEO pay and stock price performance was found, indicating that boards are designing compensation packages that induce CEOs to maximise shareholder value, thereby reducing agency costs. This positive relationship is in line with the findings of Roberts (2007), but contradicts earlier results reported over shorter time horizons. A possible explanation for this is that the pay-performance relationship has strengthened over time due to additional pressure put on boards to monitor CEO pay following the introduction of mandatory director compensation disclosure.

[22]It should be noted that similar results are achieved when the logit regressions are run using an estimation procedure that adjusted the standard errors for intrafirm correlation.

Weak evidence is found for a negative relationship between CEO turnover and stock price performance. The weak evidence does not mean that in New Zealand the board of directors are ineffective in mitigating agency costs. Poor stock price performance can have a variety of causes, many of which do not reflect incompetence or poor performance on the part of top management and which, therefore, do not merit the dismissal of that manager. Furthermore, finding a new CEO requires considerable deliberation, especially in New Zealand, where many firms have to recruit offshore due to a limited pool of managerial talent. Therefore CEO turnover may not be significant during the time horizon of the study.

This study also examines the effectiveness of the board through different board characteristics and ownership structures to mitigate agency costs through setting compensation and bringing about CEO turnover. After controlling for the effects of firm size, leverage and performance risk, the results indicate that firms with larger boards and a higher proportion of busy directors are more likely to change CEOs. Contrary to expectations, director share ownership may weaken the effectiveness of the board. CEOs of firms with higher director share ownership have higher turnover-performance sensitivity. In the case of large beneficial shareholdings, boards may be less effective at bringing about CEO replacement for poor abnormal stock price performance. The proportion of executive directors has no direct impact on CEO turnover.

Consistent with the managerial power approach, busy directors may reduce the effectiveness of the board as a governance mechanism. CEOs can take advantage of busy directors, reducing their sensitivity of changes in wealth and turnover to performance.

## Appendix

### Table 10. Summary statistics for CEO cash and CEO wealth change and performance 1997–2005

This table reports the sample size, mean, median, maximum, minimum and standard deviation for each of the CEO pay variables and the cumulative abnormal return measures used in the study. The compensation measures are calculated as the natural log of the difference in pay between successive time periods for each firm over successive time periods during which the same CEO was in place.[23] Firm performance is measured using the cumulative abnormal return defined in Equation 4. Firm betas are estimated using OLS and the Scholes-Williams technique. The NZ40 and an equally weighted index are used as proxies for market performance.

| Variable | Sample size | Mean (%) | Median (%) | Maximum (%) | Minimum (%) | Standard deviation (%) |
|---|---|---|---|---|---|---|
| Cash | 217 | 10.74 | 8.83 | 91.67 | -66.81 | 22.34 |
| Wealth change | 202 | 14.16 | 10.44 | 451.60 | -163.70 | 54.09 |
| **Pay-Performance Sample** | | | | | | |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index** | | | | | | |
| CUMABN | 217 | -0.79 | 0.33 | 107.74 | -190.44 | 30.43 |
| lag(CUMABN) | 188 | 2.22 | 0.46 | 107.74 | -136.17 | 26.82 |
| **Panel 2: Abnormal returns constructed using OLS and an equally weighted index** | | | | | | |
| CUMABN | 217 | -0.77 | -0.64 | 88.44 | -149.92 | 28.11 |
| lag(CUMABN) | 188 | 1.85 | -0.83 | 75.24 | -109.09 | 24.47 |
| **Panel 3: Abnormal returns constructed using S-W and NZ40 as index** | | | | | | |
| CUMABN | 217 | -1.08 | 0.58 | 119.76 | -201.08 | 30.18 |
| lag(CUMABN) | 188 | 1.95 | 1.25 | 119.76 | -130.57 | 26.74 |
| **Turnover-Performance Sample** | | | | | | |
| **Panel 4: Abnormal returns constructed using OLS and NZ40 as index** | | | | | | |
| CUMABN | 247 | -0.34 | 0.01 | 107.74 | -190.44 | 30.65 |
| lag(CUMABN) | 215 | 0.99 | 0.05 | 107.74 | -150.12 | 28.85 |
| **Panel 5: Abnormal returns constructed using OLS and an equally weighted index** | | | | | | |
| CUMABN | 247 | -0.33 | -0.15 | 88.44 | -149.92 | 28.20 |
| lag(CUMABN) | 215 | 0.68 | -0.88 | 75.24 | -123.30 | 26.28 |
| **Panel 6: Abnormal returns constructed using S-W and NZ40 as index** | | | | | | |
| CUMABN | 247 | -0.69 | -0.09 | 119.76 | -201.08 | 30.30 |
| lag(CUMABN) | 215 | 0.66 | -0.51 | 119.76 | -152.54 | 28.73 |

[23] This is calculated as $ln\left[\frac{CEO\ Pay_t}{CEO\ Pay_{t-1}}\right]$ where the CEO Pay variable is defined by Equation 1 for cash and Equation 2 for the CEO wealth change measure.

**Table 11. CEO cash and CEO wealth change pay-performance semi-elasticities 1997–2005**

This table reports the regression coefficients and their respective standard errors (in brackets) for the various specifications of Equation 5 using the panel data set for the period 1998 to 2005. The natural logarithm for the ratio of CEO pay for successive fiscal years using the CEO cash compensation and wealth change definitions of pay are the dependent variables. These are regressed on the nominal cumulative abnormal returns to estimate the CEO pay-performance semi-elasticity for the sample of New Zealand firms in the study. The results for the CEO cash compensation measure are reported in columns 1 to 3. The results for the CEO wealth change measure are reported in columns 4 to 6. The results for each series of estimated cumulative abnormal returns are reported in Panels A to C.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

Dependent Variable, $ln\left[\frac{CEO\ Pay_t}{CEO\ Pay_{t-1}}\right](\%)$

| | Cash | | | Change in CEO wealth | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index, 1998–2005** | | | | | | |
| Constant | 12.66$^{***}$ | 13.53$^{***}$ | 13.25$^{***}$ | 9.08 | 2.07 | 1.01 |
| | (3.46) | (2.91) | (2.80) | (8.53) | (13.35) | (12.98) |
| CUMABN | 0.01 | 0.04 | | 0.19 | 0.21 | |
| | (0.05) | (0.06) | | (0.13) | (0.13) | |
| lag(CUMABN) | | 0.17$^{**}$ | 0.14$^{**}$ | | 0.17 | 0.04 |
| | | (0.07) | (0.07) | | (0.14) | (0.14) |
| Sample size | 217 | 188 | 188 | 202 | 177 | 177 |
| Number of year dummies | 7 | 7 | 7 | 7 | 7 | 7 |
| Adj. R-Squared | 0.04 | 0.06 | 0.06 | 0.03 | 0.03 | 0.02 |
| F-ratio | 2.02$^{**}$ | 2.33$^{**}$ | 2.58$^{**}$ | 1.86$^{*}$ | 1.56 | 1.46 |
| **Panel 2: 1998–2001** | | | | | | |
| Constant | 13.41$^{***}$ | 14.00$^{***}$ | 13.31$^{***}$ | 9.38 | 2.10 | 0.87 |
| | (3.72) | (2.72) | (2.69) | (9.06) | (13.72) | (13.14) |
| CUMABN | 0.08 | 0.11$^{**}$ | | 0.22 | 0.24 | |
| | (0.09) | (0.05) | | (0.19) | (0.20) | |
| lag(CUMABN) | | 0.14 | 0.09 | | 0.30$^{*}$ | 0.17 |
| | | (0.10) | (0.09) | | (0.17) | (0.12) |
| Sample size | 114 | 93 | 93 | 106 | 87 | 87 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |
| F-ratio | 1.85 | 1.84 | 1.87 | 2.18$^{*}$ | 1.64 | 1.55 |
| **Panel 3: 2002–2005** | | | | | | |
| Constant | 10.06$^{*}$ | 7.74 | 7.75 | 11.86 | 12.15 | 11.87 |
| | (5.44) | (5.90) | (5.80) | (10.64) | (12.00) | (11.96) |
| CUMABN | -0.05 | -0.01 | | 0.17 | 0.17 | |
| | (0.07) | (0.10) | | (0.14) | (0.15) | |
| lag(CUMABN) | | 0.20$^{*}$ | 0.21$^{**}$ | | 0.00 | -0.11 |
| | | (0.11) | (0.10) | | (0.26) | (0.26) |
| Sample size | 103 | 95 | 95 | 96 | 90 | 90 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.04 | 0.06 | 0.07 | 0.00 | 0.00 | 0.00 |
| F-ratio | 1.94 | 2.11$^{*}$ | 2.67$^{**}$ | 0.97 | 0.62 | 0.62 |

**Table 11** (continued)

| | Dependent Variable, $ln\left[\frac{CEO\ Pay_t}{CEO\ Pay_{t-1}}\right]$(%) | | | | | |
|---|---|---|---|---|---|---|
| | **Cash** | | | **Change in CEO wealth** | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| **Panel 4: Abnormal returns constructed using OLS and an equally weighted index, 1998–2005** | | | | | | |
| Constant | 12.56*** | 12.94*** | 13.03*** | 7.80 | 0.24 | 1.08 |
| | (3.17) | (2.86) | (2.90) | (7.74) | (12.74) | (12.92) |
| CUMABN | -0.02 | 0.05 | | 0.32* | 0.26** | |
| | (0.05) | (0.06) | | (0.17) | (0.13) | |
| lag(CUMABN) | | 0.20*** | 0.17*** | | 0.15 | -0.01 |
| | | (0.08) | (0.06) | | (0.15) | (0.14) |
| Sample size | 217 | 188 | 188 | 202 | 177 | 177 |
| Number of year dummies | 7 | 7 | 7 | 7 | 7 | 7 |
| Adj. R-Squared | 0.04 | 0.07 | 0.07 | 0.05 | 0.03 | 0.02 |
| F-ratio | 2.03** | 2.55*** | 2.82*** | 2.31** | 1.68* | 1.45 |
| **Panel 5: 1998–2001** | | | | | | |
| Constant | 12.62*** | 13.00*** | 13.14*** | 7.98 | 0.18 | 0.92 |
| | (3.18) | (2.76) | (2.77) | (7.75) | (12.93) | (13.02) |
| CUMABN | 0.02 | 0.08 | | 0.39 | 0.23 | |
| | (0.05) | (0.05) | | (0.28) | (0.18) | |
| lag(CUMABN) | | 0.17** | 0.12* | | 0.20 | 0.06 |
| | | (0.08) | (0.07) | | (0.18) | (0.13) |
| Sample size | 114 | 93 | 93 | 106 | 87 | 87 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.02 | 0.05 | 0.05 | 0.07 | 0.02 | 0.01 |
| F-ratio | 1.53 | 1.92* | 2.14* | 2.90** | 1.40 | 1.28 |
| **Panel 6: 2002–2005** | | | | | | |
| Constant | 10.11* | 7.49 | 7.47 | 12.43 | 11.97 | 11.65 |
| | (5.41) | (5.91) | (5.85) | (10.61) | (11.98) | (11.97) |
| CUMABN | -0.05 | 0.02 | | 0.24 | 0.29 | |
| | (0.08) | (0.12) | | (0.16) | (0.18) | |
| lag(CUMABN) | | 0.25* | 0.24** | | 0.08 | -0.09 |
| | | (0.14) | (0.11) | | (0.26) | (0.25) |
| Sample size | 103 | 95 | 95 | 96 | 90 | 90 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.04 | 0.06 | 0.07 | 0.01 | 0.00 | 0.00 |
| F-ratio | 1.92 | 2.27* | 2.86** | 1.16 | 0.81 | 0.60 |

**Table 11** (continued)

| | Dependent Variable, $ln\left[\frac{CEO\ Pay_t}{CEO\ Pay_{t-1}}\right](\%)$ | | | | | |
|---|---|---|---|---|---|---|
| | **Cash** | | | **Change in CEO wealth** | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| **Panel 7: Abnormal returns constructed using S-W and NZ40 as index, 1998–2005** | | | | | | |
| Constant | 12.69*** | 13.54*** | 13.82*** | 8.37 | 1.73 | 1.09 |
| | (3.33) | (2.87) | (2.94) | (8.24) | (13.15) | (12.92) |
| CUMABN | 0.01 | 0.05 | | 0.19 | 0.20 | |
| | (0.05) | (0.05) | | (0.12) | (0.12) | |
| lag(CUMABN) | | 0.17*** | 0.15** | | 0.14 | 0.04 |
| | | (0.07) | (0.06) | | (0.14) | (0.14) |
| Sample size | 217 | 188 | 188 | 202 | 177 | 177 |
| Number of year dummies | 7 | 7 | 7 | 7 | 7 | 7 |
| Adj. R-Squared | 0.04 | 0.06 | 0.07 | 0.03 | 0.03 | 0.02 |
| F-ratio | 2.02** | 2.41** | 2.64*** | 1.87* | 1.53 | 1.46 |
| **Panel 8: 1998–2001** | | | | | | |
| Constant | 13.23*** | 14.07*** | 13.48*** | 8.84 | 2.02 | 1.20 |
| | (3.49) | (2.75) | (2.74) | (8.62) | (13.47) | (13.06) |
| CUMABN | 0.09 | 0.11 | | 0.26 | 0.26 | |
| | (0.08) | (0.05) | | (0.21) | (0.21) | |
| lag(CUMABN) | | 0.14 | 0.08 | | 0.28* | 0.15 |
| | | (0.09) | (0.09) | | (0.17) | (0.12) |
| Sample size | 114 | 93 | 93 | 106 | 87 | 87 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.03 | 0.05 | 0.04 | 0.05 | 0.04 | 0.02 |
| F-ratio | 1.92 | 1.86 | 1.83 | 2.27* | 1.64 | 1.48 |
| **Panel 9: 2002–2005** | | | | | | |
| Constant | 10.20* | 7.74 | 7.73 | 11.49 | 11.77 | 11.56 |
| | (5.38) | (5.94) | (5.86) | (10.57) | (12.05) | (12.00) |
| CUMABN | -0.04 | 0.01 | | 0.14 | 0.14 | |
| | (0.06) | (0.09) | | (0.12) | (0.13) | |
| lag(CUMABN) | | 22.28** | 21.76** | | -0.72 | -8.80 |
| | | (10.67) | (9.81) | | (26.05) | (26.04) |
| Sample size | 103 | 95 | 95 | 96 | 90 | 90 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.03 | 0.06 | 0.07 | 0.00 | 0.00 | 0.00 |
| F-ratio | 1.91 | 2.25* | 2.85** | 0.91 | 0.57 | 0.60 |

## Table 12. CEO turnover-performance sensitivity

This table reports the coefficients for logit regression Equation ?? using the panel data set for the period 1997 to 2005. CEO turnover from year *t* to year (*t*+1) is regressed on the positive and negative cumulative abnormal return for years *t* and (*t* - 1). The dependent variable has a value of one if there was a change in CEO in year (*t*+1). CUMABN is the sum of daily abnormal returns over the firm's fiscal year. The cumulative abnormal returns are constructed using the OLS and Scholes-Williams beta estimation technique together with the NZ40 and an equally weighted index to proxy for the market. Standard errors for the coefficients are given in parentheses.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

| | Dependent Variable, $ln\left[\frac{P(turnover)_{i,t}}{1-P(turnover)_{i,t}}\right]$ | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index** | | | |
| Constant | -2.22$^{***}$ | -1.83$^{***}$ | -1.62$^{***}$ |
| | (0.30) | (0.41) | (0.35) |
| CUMABN $\geq 0$ | 0.46 | 0.59 | |
| | (1.33) | (1.55) | |
| CUMABN $< 0$ | -1.8$^{**}$ | -2.53$^{**}$ | |
| | (0.94) | (1.11) | |
| Lag(CUMABN) $\geq 0$ | | -3.25 | -1.52 |
| | | (2.14) | (1.64) |
| Lag(CUMABN) $< 0$ | | 0.49 | 0.48 |
| | | (1.85) | (1.78) |
| Sample Size | 215 | 172 | 172 |
| No. of Turnover Cases | 27 | 24 | 24 |
| Chi-Square | 4.07 | 6.22 | 1.04 |
| **Panel 2: Abnormal returns constructed using OLS and an equally weighted index** | | | |
| Constant | -2.37$^{***}$ | -1.77$^{***}$ | -1.35$^{***}$ |
| | (0.33) | (0.43) | (0.36) |
| CUMABN $\geq 0$ | 1.09 | 1.86 | |
| | (1.44) | (1.60) | |
| CUMABN $< 0$ | -2.75$^{**}$ | -3.73$^{***}$ | |
| | (1.17) | (1.39) | |
| Lag(CUMABN $\geq 0$) | | -4.51$^{*}$ | -2.16 |
| | | (2.49) | (1.83) |
| Lag(CUMABN) $< 0$ | | 3.87 | 3.29 |
| | | (2.49) | (2.40) |
| Sample Size | 215 | 172 | 172 |
| No. of Turnover Cases | 27 | 24 | 24 |
| Chi-Square | 5.82$^{*}$ | 10.33$^{**}$ | 2.62 |
| **Panel 3: Abnormal returns constructed using S-W and NZ40 as index** | | | |
| Constant | -2.19$^{***}$ | -1.73$^{***}$ | -1.54$^{***}$ |
| | (0.30) | (0.41) | (0.36) |
| CUMABN $\geq 0$ | 0.21 | 0.33 | |
| | (1.36) | (1.60) | |
| CUMABN $< 0$ | -1.84$^{**}$ | -2.93$^{**}$ | |
| | (0.94) | (1.17) | |
| Lag(CUMABN) $\geq 0$ | | -4.96$^{*}$ | -2.48 |
| | | (2.55) | (1.96) |
| Lag(CUMABN) $< 0$ | | 0.63 | 0.60 |
| | | (1.83) | (1.78) |
| Sample Size | 215 | 172 | 172 |
| No. of Turnover Cases | 27 | 24 | 24 |
| Chi-Square | 3.98 | 8.85$^{*}$ | 2.19 |

**Table 13. CEO cash-performance semi-elasticities and board characteristics**

This table reports the coefficients and White period standard errors (in parentheses) for Equation 7 using the panel data set over the period 1997 to 2005. The effect of different board characteristics and ownership structures on the pay-performance relationship is investigated by including a variable, $\lambda$, that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. The Inverse Mills Ratio is included in the $\lambda$ =CEOCHAIR model. Board size is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility. CEO pay is measured as change in CEO cumulative abnormal returns. CEO pay is measured as cash compensation and the results are reported for abnormal returns constructed using OLS and S-W beta estimation techniques and the return on the NZ40 and an equally weighted index as a proxy for the return on the market.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index** | | | | | | | | | | | | | | | |
| Constant | $0.13^{***}$ | $0.14^{***}$ | $0.14^{***}$ | $0.14^{***}$ | $0.14^{***}$ | $0.14^{***}$ | $0.16^{**}$ | $0.19^{***}$ | $0.19^{***}$ | $0.09^{**}$ | $0.08^{**}$ | $0.09^{**}$ | $0.19^{***}$ | $0.13^{***}$ | $0.13^{***}$ |
| | (0.04) | (0.03) | (0.03) | (0.04) | (0.03) | (0.03) | (0.06) | (0.07) | (0.07) | (0.04) | (0.04) | (0.04) | (0.06) | (0.05) | (0.05) |
| lag( $\lambda$ ) | -0.01 | 0.00 | 0.01 | -0.04 | -0.02 | -0.03 | 0.00 | -0.01 | -0.01 | 0.27 | 0.31 | 0.35 | -0.08 | -0.01 | 0.00 |
| | (0.13) | (0.13) | (0.13) | (0.07) | (0.08) | (0.08) | (0.01) | (0.01) | (0.01) | (0.19) | (0.20) | (0.18) | (0.06) | (0.07) | (0.07) |
| CUMABN | 0.02 | 0.07 | | 0.01 | -0.02 | | -0.06 | 0.07 | | 0.03 | 0.06 | | 0.02 | -0.05 | |
| | (0.02) | (0.07) | | (0.13) | (0.13) | | (0.12) | (0.21) | | (0.09) | (0.11) | | (0.21) | (0.19) | |
| lag( $\lambda$ ) $^{*}$ CUMABN | -0.07 | -0.16 | | 0.27 | 0.38 | | 0.01 | 0.00 | | 0.36 | 0.39 | | 0.03 | 0.18 | |
| | (0.07) | (0.16) | | (0.43) | (0.45) | | (0.01) | (0.02) | | (0.50) | (0.66) | | (0.35) | (0.31) | |
| lag(CUMABN) | | $0.22^{**}$ | $0.17^{**}$ | | 0.06 | 0.06 | | $0.35^{*}$ | $0.30^{***}$ | | 0.10 | 0.07 | | 0.09 | 0.13 |
| | | (0.09) | (0.08) | | (0.12) | (0.11) | | (0.20) | (0.11) | | (0.13) | (0.11) | | (0.18) | (0.21) |
| lag( $\lambda$ ) $^{*}$ lag(CUMABN) | | -0.24 | -0.14 | | 0.24 | 0.08 | | -0.03 | -0.02 | | -0.30 | -0.42 | | 0.07 | -0.05 |
| | | (0.28) | (0.20) | | (0.27) | (0.28) | | (0.03) | (0.02) | | (0.67) | (0.64) | | (0.29) | (0.36) |
| Inverse Mills Ratio | -0.02 | -0.03 | -0.04 | | | | | | | | | | | | |
| | (0.08) | (0.08) | (0.08) | | | | | | | | | | | | |
| Adj. R-Squared | 0.03 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.06 | 0.01 | 0.00 | 0.01 | 0.06 | 0.06 | 0.07 |
| F-Ratio | 1.56 | $1.83^{**}$ | $2.05^{**}$ | 0.95 | 0.77 | 0.83 | $1.64^{*}$ | $1.82^{**}$ | $2.16^{**}$ | 1.16 | 0.99 | 1.12 | $2.20^{**}$ | $1.82^{**}$ | $2.13^{**}$ |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 217 | 188 | 188 | 161 | 132 | 132 | 217 | 188 | 188 | 144 | 136 | 136 | 179 | 159 | 159 |

**Table 13** (continued)

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 2: Abnormal returns constructed using OLS and an equally weighted index** | | | | | | | | | | | | | | | |
| Constant | 0.12*** | 0.14*** | 0.13*** | 0.14*** | 0.13*** | 0.14*** | 0.16*** | 0.18** | 0.18*** | 0.09** | 0.09** | 0.09** | 0.18*** | 0.12** | 0.13** |
| | (0.03) | (0.03) | (0.03) | (0.04) | (0.03) | (0.03) | (0.06) | (0.07) | (0.07) | (0.04) | (0.04) | (0.04) | (0.06) | (0.05) | (0.05) |
| lag( $\lambda$ ) | 0.01 | 0.03 | 0.04 | -0.05 | -0.03 | -0.03 | 0.00 | -0.01 | -0.01 | 0.28 | 0.35* | 0.35* | -0.08 | 0.00 | 0.00 |
| | (0.13) | (0.12) | (0.12) | (0.07) | (0.08) | (0.08) | (0.01) | (0.01) | (0.01) | (0.18) | (0.21) | (0.19) | (0.06) | (0.07) | (0.07) |
| CUMABN | 0.00 | 0.08 | | -0.01 | -0.01 | | -0.10 | 0.07 | | 0.05 | 0.07 | | -0.06 | 0.05 | |
| | (0.06) | (0.07) | | (0.12) | (0.14) | | (0.11) | (0.23) | | (0.09) | (0.10) | | (0.20) | (0.20) | |
| lag( $\lambda$ ) * CUMABN | -0.06 | -0.24* | | 0.22 | 0.34 | | 0.01 | 0.00 | | 0.20 | -0.04 | | 0.16 | 0.03 | |
| | (0.08) | (0.09) | | (0.45) | (0.47) | | (0.01) | (0.03) | | (0.50) | (0.66) | | (0.34) | (0.32) | |
| lag(CUMABN) | | 0.27*** | 0.23*** | | 0.08 | 0.06 | | 0.37 | 0.32** | | 0.12 | 0.10 | | 0.31* | 0.29 |
| | | (0.09) | (0.09) | | (0.11) | (0.10) | | (0.27) | (0.14) | | (0.12) | (0.10) | | (0.18) | (0.21) |
| lag( $\lambda$ ) * lag(CUMABN) | | -0.43 | -0.27 | | 0.25 | 0.16 | | -0.03 | -0.02 | | -0.58 | -0.58 | | -0.26 | -0.29 |
| | | (0.29) | (0.25) | | (0.27) | (0.27) | | (0.04) | (0.02) | | (0.73) | (0.73) | | (0.29) | (0.36) |
| lnverse Mills Ratio | -0.03 | -0.04 | -0.05 | | | | | | | | | | | | |
| | (0.08) | (0.08) | (0.08) | | | | | | | | | | | | |
| Adj. R-Squared | 0.03 | 0.08 | 0.08 | 0.00 | 0.00 | 0.00 | 0.03 | 0.06 | 0.07 | 0.01 | 0.00 | 0.01 | 0.06 | 0.08 | 0.08 |
| F-Ratio | 1.56 | 2.20** | 2.40*** | 0.83 | 0.82 | 0.92 | 1.65* | 1.96** | 2.32** | 1.09 | 1.00 | 1.19 | 2.22** | 2.08** | 2.43*** |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 217 | 188 | 188 | 161 | 132 | 132 | 217 | 188 | 188 | 144 | 136 | 136 | 179 | 159 | 159 |

**Table 13** (continued)

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 3: Abnormal returns constructed using S-W and NZ40 as index** | | | | | | | | | | | | | | | |
| Constant | 0.13*** | 0.14*** | 0.14*** | 0.14*** | 0.14*** | 0.14*** | 0.16** | 0.19** | 0.19*** | 0.09** | 0.08** | 0.09** | 0.19*** | 0.13*** | 0.13*** |
| | (0.04) | (0.03) | (0.03) | (0.04) | (0.03) | (0.03) | (0.06) | (0.08) | (0.07) | (0.04) | (0.04) | (0.04) | (0.06) | (0.05) | (0.05) |
| lag($\lambda$) | -0.01 | 0.01 | 0.02 | -0.04 | -0.02 | -0.03 | 0.00 | -0.01 | -0.01 | 0.27 | 0.31 | 0.34* | -0.08 | 0.00 | 0.00 |
| | (0.13) | (0.13) | (0.13) | (0.07) | (0.08) | (0.08) | (0.01) | (0.01) | (0.01) | (0.19) | (0.21) | (0.19) | (0.06) | (0.07) | (0.07) |
| CUMABN | 0.03 | 0.09 | | -0.04 | 0.06 | | -0.04 | 0.07 | | 0.04 | 0.06 | | 0.04 | 0.01 | |
| | (0.05) | (0.06) | | (0.14) | (0.12) | | (0.13) | (0.21) | | (0.09) | (0.10) | | (0.20) | (0.18) | |
| lag($\lambda$)* CUMABN | -0.07 | -0.16 | | 0.35 | 0.44 | | 0.01 | 0.00 | | 0.26 | 0.30 | | -0.01 | 0.09 | |
| | (0.07) | (0.16) | | (0.42) | (0.43) | | (0.02) | (0.02) | | (0.49) | (0.70) | | (0.33) | (0.29) | |
| lag(CUMABN) | | 0.23** | 0.18** | | 0.06 | 0.06 | | 0.34* | 0.31*** | | 0.10 | 0.07 | | 0.15 | 0.15 |
| | | (0.09) | (0.08) | | (0.11) | (0.12) | | (0.18) | (0.12) | | (0.12) | (0.11) | | (0.16) | (0.20) |
| lag($\lambda$)* lag(CUMABN) | | -0.23 | -0.14 | | 0.20 | 0.05 | | -0.03 | -0.03 | | -0.27 | -0.35 | | -0.01 | -0.09 |
| | | (0.28) | (0.21) | | (0.28) | (0.31) | | (0.02) | (0.02) | | (0.66) | (0.63) | | (0.28) | (0.36) |
| Inverse Mills Ratio | -0.02 | -0.04 | -0.03 | | | | | | | | | | | | |
| | (0.08) | (0.08) | (0.09) | | | | | | | | | | | | |
| Adj. R-Squared | 0.03 | 0.06 | 0.06 | 0.00 | 0.00 | 0.00 | 0.03 | 0.05 | 0.06 | 0.01 | 0.00 | 0.01 | 0.06 | 0.06 | 0.07 |
| F-Ratio | 1.56 | 1.91** | 2.10** | 1.01 | 0.79 | 0.81 | 1.63* | 1.87** | 2.20** | 1.11 | 0.96 | 1.11 | 2.21** | 1.87** | 2.19** |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 217 | 188 | 188 | 161 | 132 | 132 | 217 | 188 | 188 | 144 | 136 | 136 | 179 | 159 | 159 |

**Table 14. Change in CEO wealth-performance semi-elasticities and board characteristics**

This table reports the coefficients and White period standard errors (in parentheses) for Equation 7 using the panel data set for the period 1997 to 2005. The effect of different board characteristics and ownership structures on the pay-performance relationship is investigated by including a variable, $\lambda$, that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. The Inverse Mills Ratio is included in the $\lambda$ =CEOCHAIR model. Board size is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility. CEO pay is measured as change in CEO cumulative abnormal returns. CEO pay is measured as change in CEO wealth and the results are reported for abnormal returns constructed using OLS and S-W beta estimation techniques and the return on the NZ40 and an equally weighted index as a proxy for the return on the market.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index** | | | | | | | | | | | | | | | |
| Constant | 0.11 | 0.06 | 0.04 | 0.10 | 0.03 | 0.04 | 0.21 | 0.00 | -0.03 | 0.16$^{***}$ | 0.15$^{***}$ | 0.18$^{***}$ | 0.09 | 0.07 | 0.08 |
| | (0.09) | (0.13) | (0.12) | (0.11) | (0.17) | (0.17) | (0.18) | (0.15) | (0.14) | (0.06) | (0.05) | (0.06) | (0.08) | (0.13) | (0.12) |
| lag( $\lambda$ ) | -0.22 | -0.29 | -0.27 | -0.02 | -0.16 | -0.18 | -0.02 | 0.00 | 0.01 | 0.60 | 0.59 | 0.75 | 0.04 | 0.06 | 0.05 |
| | (0.20) | (0.23) | (0.22) | (0.12) | (0.24) | (0.28) | (0.02) | (0.02) | (0.02) | (0.40) | (0.39) | (0.51) | (0.17) | (0.18) | (0.17) |
| CUMABN | 0.29$^{*}$ | 0.33$^{**}$ | | 0.19 | -0.07 | | 0.13 | 0.13 | | 0.20 | 0.23 | | 0.03 | 0.33 | |
| | (0.16) | (0.16) | | (0.32) | (0.34) | | (0.39) | (0.40) | | (0.23) | (0.24) | | (0.37) | (0.50) | |
| lag( $\lambda$ )$^{*}$ CUMABN | -0.47$^{**}$ | -0.61$^{**}$ | | 0.56 | 1.59 | | 0.01 | 0.01 | | 0.65 | 1.45 | | 0.47 | -0.27 | |
| | (0.18) | (0.25) | | (1.26) | (1.69) | | (0.05) | (0.05) | | (1.54) | (1.23) | | (0.63) | (0.72) | |
| lag(CUMABN) | | 0.24 | 0.05 | | -0.25 | -0.22 | | 0.39 | 0.34 | | 0.03 | -0.10 | | 0.58 | 0.39 |
| | | (0.17) | (0.18) | | (0.24) | (0.26) | | (0.43) | (0.28) | | (0.20) | (0.22) | | (0.26) | (0.27) |
| lag( $\lambda$ )$^{*}$ lag(CUMABN) | | -0.42 | -0.05 | | 1.62 | 0.88 | | -0.04 | -0.05 | | -0.25 | -0.55 | | -1.17$^{*}$ | -1.05$^{*}$ |
| | | (0.39) | (0.31) | | (1.03) | (0.75) | | (0.06) | (0.05) | | (1.80) | (1.90) | | (0.68) | (0.65) |
| Inverse Mills Ratio | 0.06 | 0.12 | 0.10 | | | | | | | | | | | | |
| | | (0.13) | (0.14) | | (0.14) | | | | | | | | | | |
| Adj. R-Squared | 0.04 | 0.03 | 0.01 | 0.02 | 0.00 | 0.00 | 0.03 | 0.01 | 0.01 | 0.03 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| F-Ratio | 1.67$^{*}$ | 1.41 | 1.15 | 1.31 | 0.83 | 0.60 | 1.52 | 1.19 | 1.21 | 1.40 | 1.16 | 1.09 | 1.36 | 1.10 | 1.17 |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 202 | 177 | 177 | 148 | 123 | 123 | 202 | 177 | 177 | 133 | 127 | 127 | 166 | 150 | 150 |

**Table 14** (continued)

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 2: Abnormal returns constructed using OLS and an equally weighted index** | | | | | | | | | | | | | | | |
| Constant | 0.10 | 0.05 | 0.04 | 0.09 | 0.01 | 0.04 | 0.19 | -0.04 | -0.03 | 0.17*** | 0.17*** | 0.18*** | 0.06 | 0.07 | 0.10 |
| | (0.08) | (0.12) | (0.12) | (0.10) | (0.15) | (0.16) | (0.17) | (0.14) | (0.14) | (0.06) | (0.06) | (0.06) | (0.09) | (0.13) | (0.11) |
| lag( $\lambda$ ) | -0.24 | -0.31 | -0.28 | -0.06 | -0.17 | -0.15 | -0.02 | 0.01 | 0.01 | 0.63 | 0.70 | 0.78 | 0.04 | 0.03 | 0.02 |
| | (0.19) | (0.22) | (0.22) | (0.14) | (0.25) | (0.26) | (0.02) | (0.01) | (0.02) | (0.39) | (0.42) | (0.50) | (0.17) | (0.17) | (0.17) |
| CUMABN | 0.48** | 0.42*** | | 0.43 | 0.13 | | 0.04 | -0.07 | | 0.26 | 0.26 | | 0.16 | 0.28 | |
| | (0.20) | (0.16) | | (0.37) | (0.35) | | (0.55) | (0.54) | | (0.21) | (0.21) | | (0.42) | (0.46) | |
| lag( $\lambda$ ) * CUMABN | -0.71*** | -0.84*** | | 0.21 | 0.88 | | 0.04 | 0.05 | | 0.62 | 0.97 | | 0.49 | -0.10 | |
| | (0.22) | (0.28) | | (1.51) | (1.65) | | (0.07) | (0.07) | | (1.68) | (1.39) | | (0.69) | (0.68) | |
| lag(CUMABN) | | 0.20 | -0.02 | | -0.28 | -0.40 | | 0.39 | 0.48 | | -0.04 | -0.14 | | 0.44 | 0.29 |
| | | (0.18) | (0.18) | | (0.25) | (0.28) | | (0.60) | (0.36) | | (0.19) | (0.21) | | (0.36) | (0.34) |
| lag( $\lambda$ ) * lag(CUMABN) | | -0.56 | -0.02 | | 1.53 | 1.29 | | -0.04 | -0.08 | | -0.82 | -1.05 | | -0.91 | -0.86 |
| | | (0.41) | (0.14) | | (1.22) | (1.02) | | (0.08) | (0.06) | | (2.26) | (2.41) | | (0.71) | (0.66) |
| Inverse Mills Ratio | 0.07 | 0.14 | 0.11 | | | | | | | | | | | | |
| | (0.12) | (0.13) | (0.14) | | | | | | | | | | | | |
| Adj. R-Squared | 0.07 | 0.05 | 0.01 | 0.04 | 0.00 | 0.00 | 0.04 | 0.03 | 0.02 | 0.03 | 0.02 | 0.01 | 0.04 | 0.01 | 0.01 |
| F-Ratio | 2.26** | 1.69* | 1.14 | 1.80* | 0.92 | 0.75 | 1.92** | 1.39 | 1.27 | 1.49 | 1.23 | 1.21 | 1.72* | 1.03 | 1.05 |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 202 | 177 | 177 | 148 | 123 | 123 | 202 | 177 | 177 | 133 | 127 | 127 | 166 | 150 | 150 |

**Table 14** (continued)

| $\lambda$ | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Panel 3: Abnormal returns constructed using S-W and NZ40 as index** | | | | | | | | | | | | | | | |
| Constant | 0.10 | 0.05 | 0.04 | 0.10 | 0.02 | 0.04 | 0.20 | -0.02 | -0.03 | 0.16$^{***}$ | 0.16$^{***}$ | 0.18$^{***}$ | 0.08 | 0.08 | 0.09 |
| | (0.09) | (0.13) | (0.12) | (0.10) | (0.17) | (0.17) | (0.18) | (0.15) | (0.14) | (0.06) | (0.06) | (0.06) | (0.09) | (0.13) | (0.12) |
| lag( $\lambda$ ) | -0.21 | -0.28 | -0.27 | -0.02 | -0.15 | -0.18 | -0.02 | 0.00 | 0.01 | 0.64 | 0.63 | 0.74 | 0.08 | 0.08 | 0.09 |
| | (0.20) | (0.22) | (0.22) | (0.12) | (0.23) | (0.28) | (0.02) | (0.02) | (0.02) | (0.42) | (0.42) | (0.50) | (0.09) | (0.13) | (0.12) |
| CUMABN | 0.28$^{*}$ | 0.32$^{**}$ | | 0.20 | -0.07 | | 0.20 | 0.10 | | 0.20 | 0.22 | | 0.07 | 0.33 | |
| | (0.16) | (0.16) | | (0.33) | (0.33) | | (0.41) | (0.40) | | (0.24) | (0.24) | | (0.36) | (0.47) | |
| lag( $\lambda$ )$^{*}$ CUMABN | -0.46$^{**}$ | -0.56$^{**}$ | | 0.63 | 1.65 | | 0.00 | 0.01 | | 0.29 | 0.95 | | 0.38 | -0.32 | |
| | (0.19) | (0.24) | | (1.25) | (1.64) | | (0.05) | (0.05) | | (1.41) | (1.33) | | (0.61) | (0.67) | |
| lag(CUMABN) | | 0.22 | 0.05 | | -0.28 | -0.25 | | 0.29 | 0.29 | | 0.00 | -0.11 | | 0.54$^{**}$ | 0.38 |
| | | (0.16) | (0.17) | | (0.23) | (0.26) | | (0.43) | (0.31) | | (0.20) | (0.22) | | (0.24) | (0.28) |
| lag( $\lambda$ )$^{*}$ lag(CUMABN) | | -0.38 | -0.06 | | 1.59 | 0.90 | | -0.02 | -0.04 | | -0.29 | -0.41 | | -1.18$^{*}$ | -1.03 |
| | | (0.38) | (0.32) | | (1.02) | (0.81) | | (0.06) | (0.05) | | (1.79) | (1.86) | | (0.65) | (0.64) |
| Inverse Mills Ratio | 0.05 | 0.11 | 0.10 | | | | | | | | | | | | |
| | (0.13) | (0.14) | (0.14) | | | | | | | | | | | | |
| Adj. R-Squared | 0.04 | 0.03 | 0.01 | 0.02 | 0.00 | 0.00 | 0.03 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| F-Ratio | 1.65$^{*}$ | 1.38 | 1.15 | 1.37 | 0.89 | 0.62 | 1.53 | 1.16 | 1.19 | 1.32 | 1.07 | 1.09 | 1.31 | 1.09 | 1.19 |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 202 | 177 | 177 | 148 | 123 | 123 | 202 | 177 | 177 | 133 | 127 | 127 | 166 | 150 | 150 |

**Table 15. Change in CEO turnover-performance sensitivities and board characteristics**

This table reports the coefficients and standard errors (in parentheses) for the logit regression given in Equation ?? using the panel data set for the period 1997 to 2005. The effect of different board characteristics and ownership structures on the turnover-performance relationship estimated earlier is examined by including a variable, $\lambda$, that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. Board size (BDSIZE) is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility. A different measure of cumulative abnormal return is examined in each panel of the table. These are constructed using both OLS and S-W beta estimation techniques and the return on the NZ40 index as well as an equally weighted index as a proxy for the return on the market.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

| $\lambda$ | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel 1: Abnormal returns constructed using OLS and NZ40 as index** | | | | | | | | | | | | |
| Constant | -1.89$^{***}$ | -1.78$^{***}$ | -1.80$^{***}$ | -4.72$^{***}$ | -4.45$^{***}$ | -4.03$^{***}$ | -2.09$^{***}$ | -2.12$^{***}$ | -1.94$^{***}$ | -3.29$^{***}$ | -3.50$^{***}$ | -3.43$^{***}$ |
| | (0.36) | (0.39) | (0.38) | (0.97) | (1.03) | (0.94) | (0.29) | (0.36) | (0.32) | (0.71) | (0.83) | (0.80) |
| $\lambda$ | -0.59 | -0.49 | -0.12 | 0.38$^{***}$ | 0.36$^{***}$ | 0.31$^{**}$ | 1.74 | 2.78 | 1.86 | 2.31$^{**}$ | 2.75$^{**}$ | 2.62$^{**}$ |
| | (1.50) | (1.63) | (1.57) | (0.13) | (0.13) | (0.12) | (1.87) | (2.21) | (2.03) | (1.08) | (1.22) | (1.17) |
| CUMABN | 0.45 | 0.05 | | -3.84$^{*}$ | -5.47$^{**}$ | | -1.42 | -2.74$^{**}$ | | -2.61 | -3.42 | |
| | (1.32) | (1.52) | | (2.00) | (2.56) | | (0.96) | (1.17) | | (2.54) | (3.13) | |
| $\lambda^{*}$ CUMABN | -7.43 | -6.57 | | 0.36 | 0.56 | | 4.47 | 10.96 | | 2.09 | 3.40 | |
| | (5.70) | (6.33) | | (0.29) | (0.37) | | (4.82) | (7.13) | | (3.22) | (3.89) | |
| lag(CUMABN) | | -1.10 | -1.01 | | -5.44 | -0.27 | | -3.43$^{**}$ | -1.73 | | -5.50$^{*}$ | -4.56$^{*}$ |
| | | (1.74) | (1.56) | | (4.22) | (3.69) | | (1.41) | (1.18) | | (2.89) | (2.69) |
| $\lambda^{*}$ lag(CUMABN) | | -0.67 | 2.04 | | 0.56 | -0.02 | | 14.25$^{*}$ | 5.43 | | 7.69$^{*}$ | 6.83$^{*}$ |
| | | (7.19) | (6.35) | | (0.54) | (0.49) | | (8.26) | (6.45) | | (4.47) | (4.06) |
| McFadden R-Squared | 0.03 | 0.03 | 0.01 | 0.08 | 0.10 | 0.05 | 0.03 | 0.10 | 0.03 | 0.05 | 0.09 | 0.07 |
| Chi-Squared | 4.40 | 4.49 | 0.64 | 13.66$^{***}$ | 13.67$^{**}$ | 6.90$^{*}$ | 2.82 | 10.02$^{*}$ | 3.23 | 7.21$^{*}$ | 9.88$^{*}$ | 8.30$^{**}$ |
| Sample size | 215 | 172 | 172 | 215 | 172 | 172 | 151 | 114 | 114 | 184 | 145 | 145 |

**Table 15** (continued)

| $\lambda$ | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel 2: Abnormal returns constructed using OLS and an equally weighted index** | | | | | | | | | | | | |
| Constant | -1.90*** | -1.78*** | -1.78*** | -4.77*** | -4.38*** | -4.10*** | -2.12*** | -2.02*** | -1.87*** | -3.69*** | -3.59*** | -3.22*** |
| | (0.36) | (0.39) | (0.38) | (0.99) | (1.05) | (0.94) | (0.30) | (0.34) | (0.30) | (0.81) | (0.85) | (0.74) |
| $\lambda$ | -0.61 | -0.57 | -0.25 | 0.38*** | 0.34** | 0.32*** | 1.48 | 2.36 | 2.06 | 2.84** | 2.88** | 2.38** |
| | (1.53) | (1.64) | (1.59) | (0.13) | (0.14) | (0.12) | (2.09) | (2.35) | (1.91) | (1.18) | (1.23) | (1.11) |
| CUMABN | 0.46 | 0.03 | | -5.29** | -6.41** | | -2.23** | -2.92** | | -6.15** | -5.59 | |
| | (1.44) | (1.59) | | (2.36) | (2.88) | | (1.14) | (1.29) | | (3.22) | (3.49) | |
| $\lambda^*$ CUMABN | -8.47 | -6.17 | | 0.53 | 0.69 | | 11.31 | 17.53* | | 6.81 | 6.17 | |
| | (6.13) | (6.56) | | (0.33) | (0.40) | | (7.87) | (10.37) | | (4.33) | (4.53) | |
| lag(CUMABN) | | -1.17 | -0.96 | | -3.90 | 1.00 | | -1.84 | -0.29 | | -2.69 | -0.82 |
| | | (1.82) | (1.67) | | (4.20) | (3.73) | | (1.49) | (1.27) | | (3.35) | (3.03) |
| $\lambda^*$ lag(CUMABN) | | 2.87 | 4.45 | | 0.44 | -0.12 | | 10.43 | -0.94 | | 3.63 | 1.39 |
| | | (6.97) | (6.46) | | (0.54) | (0.49) | | (10.47) | (6.98) | | (5.17) | (4.66) |
| McFadden R-Squared | 0.03 | 0.03 | 0.01 | 0.09 | 0.10 | 0.05 | 0.05 | 0.09 | 0.01 | 0.07 | 0.07 | 0.05 |
| Chi-Squared | 4.85 | 3.49 | 0.49 | 15.09*** | 13.33** | 6.70* | 5.22 | 8.20 | 1.12 | 9.99** | 8.63 | 5.40 |
| Sample size | 215 | 172 | 172 | 215 | 172 | 172 | 151 | 114 | 114 | 184 | 145 | 145 |

**Table 15** (continued)

| $\lambda$ | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel 3: Abnormal returns constructed using S-W and NZ40 as index** | | | | | | | | | | | | |
| Constant | -1.88*** | -1.79*** | -1.82*** | -4.74*** | -4.61*** | -4.04*** | -2.09*** | -2.13*** | -1.95*** | -3.39*** | -3.70*** | -3.53*** |
| | (0.36) | (0.39) | (0.39) | (0.97) | (1.06) | (0.94) | (0.29) | (0.36) | (0.32) | (0.74) | (0.88) | (0.82) |
| $\lambda$ | -0.66 | -0.54 | -0.05 | 0.38*** | 0.37*** | 0.31** | 1.74 | 3.09 | 2.07 | 2.43** | 3.01** | 2.38** |
| | (1.51) | (1.66) | (1.58) | (0.13) | (0.14) | (0.12) | (1.87) | (2.12) | (1.94) | (1.11) | (1.27) | (1.19) |
| CUMABN | 0.30 | -0.19 | | -3.93** | -6.14** | | -1.41 | -2.59** | | -3.52 | -4.50 | |
| | (1.33) | (1.53) | | (2.01) | (2.58) | | (0.97) | (1.15) | | (2.63) | (3.21) | |
| $\lambda^*$ CUMABN | - 6.92 | -6.14 | | 0.37 | 0.62 | | 4.64 | 10.85 | | 3.07 | 4.51 | |
| | (5.61) | (6.16) | | (0.29) | (0.37) | | (5.12) | (7.36) | | (3.32) | (3.97) | |
| lag(CUMABN) | | -1.45 | -1.21 | | -6.93* | - 1.47 | | -3.28** | -1.80 | | -5.99** | -5.10* |
| | | (1.81) | (1.63) | | (4.19) | (3.72) | | (1.38) | (1.20) | | (2.87) | (2.72) |
| $\lambda^*$ lag(CUMABN) | | -0.63 | 1.53 | | 0.71 | 0.10 | | 12.75 | 4.30 | | 7.99* | 7.33* |
| | | (7.23) | (6.53) | | (0.54) | (0.49) | | (8.37) | (6.30) | | (4.51) | (4.12) |
| McFadden R-Squared | 0.03 | 0.04 | 0.01 | 0.09 | 0.11 | 0.05 | 0.02 | 0.10 | 0.04 | 0.06 | 0.10 | 0.08 |
| Chi-Squared | 4.50 | 5.72 | 1.20 | 13.98*** | 15.67*** | 7.40* | 2.73 | 9.52* | 3.35 | 8.29** | 11.56** | 8.95** |
| Sample size | 215 | 172 | 172 | 215 | 172 | 172 | 151 | 114 | 114 | 184 | 145 | 145 |

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**Table 1. Summary statistics for CEO cash and ceo wealth change and performance 1997–2005**

| Variable | Sample size | Mean (%) | Median (%) | Maximum (%) | Minimum (%) | Standard deviation (%) |
|---|---|---|---|---|---|---|
| **Pay-Performance Sample** | | | | | | |
| Cash | 217 | 10.74 | 8.83 | 91.67 | -66.81 | 22.34 |
| Wealth change | 202 | 14.16 | 10.44 | 451.60 | -163.70 | 54.09 |
| CUMABN | 217 | -0.44 | 0.50 | 102.90 | -115.40 | 27.59 |
| lag(CUMABN) | 188 | 1.88 | 1.11 | 102.90 | -109.93 | 26.18 |
| **Turnover-Performance Sample** | | | | | | |
| Cash | 247 | 9.55 | 8.54 | 91.67 | -80.98 | 24.63 |
| Wealth change | 225 | 12.56 | 8.88 | 451.60 | -163.70 | 52.95 |
| CUMABN | 247 | -0.31 | -0.38 | 102.90 | -115.40 | 28.09 |
| lag(CUMABN) | 215 | 0.64 | 0.60 | 102.90 | -122.04 | 27.61 |

The sample size, mean, median, maximum, minimum and standard deviation for each of the CEO pay variables and the cumulative abnormal return measures used in the study. Compensation growth is calculated as the natural log of the difference in pay between successive time periods for each firm over the years for which the CEO was in place. Firm betas are estimated using the Scholes-Williams technique. An equally-weighted index is used to proxy for market performance.

**Table 2. Summary of board characteristic and ownership structure variables**

| j | Variable | Description |
|---|---|---|
| 1 | CEOCHAIR | = 1, if CEO = Chair; 0 otherwise |
| 2 | INSIDE | $\frac{\textit{Number of inside directors}}{\textit{Board size}}$ |
| 3 | BDSIZE | Number of directors at year end |
| 4 | DSOB | $\frac{\textit{Beneficial director ownership}}{\textit{Total shares on issue}}$ |
| 5 | BUSY | $\frac{\textit{Number of directors with three or more directorships}}{\textit{BDSIZE}}$ |

## Table 3. CEO cash and CEO wealth change pay-performance semi-elasticities 1997–2005

Dependent Variable, $ln\left[\frac{CEO\ Pay_t}{CEO\ Pay_{t-1}}\right](\%)$

| | Cash | | | Change in CEO wealth | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| **Panel A: 1998–2005** | | | | | | |
| Constant | 12.61*** | 12.54*** | 12.90*** | 5.71 | 1.46 | 1.03 |
| | (3.14) | (2.85) | (3.06) | (7.57) | (12.53) | (12.94) |
| CUMABN | -0.01 | 0.06 | | 0.34* | 0.29** | |
| | (0.05) | (0.06) | | (0.17) | (0.13) | |
| lag(CUMABN) | | 0.21*** | 0.18*** | | 0.15 | 0.01 |
| | | (0.07) | (0.06) | | (0.14) | (0.13) |
| Sample size | 217 | 188 | 188 | 202 | 177 | 177 |
| Number of year dummies | 7 | 7 | 7 | 7 | 7 | 7 |
| Adj. R-Squared | 0.04 | 0.08 | 0.08 | 0.05 | 0.04 | 0.02 |
| F-ratio | 2.02** | 2.81*** | 3.05*** | 2.38** | 1.75* | 1.45 |
| **Panel B: 1998–2001** | | | | | | |
| Constant | 12.49*** | 12.44*** | 13.09*** | 5.24 | -1.42 | 1.00 |
| | (3.10) | (2.65) | (2.84) | (7.66) | (12.75) | (12.96) |
| CUMABN | 0.04 | 0.11* | | 0.46 | 0.27 | |
| | (0.06) | (0.06) | | (0.32) | (0.19) | |
| lag(CUMABN) | | 0.17** | 0.11* | | 0.17 | 0.02 |
| | | (0.07) | (0.06) | | (0.17) | (0.12) |
| Sample size | 114 | 93 | 93 | 106 | 87 | 87 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.02 | 0.06 | 0.05 | 0.08 | 0.03 | 0.01 |
| F-ratio | 1.58 | 2.07* | 2.11* | 3.18** | 1.47 | 1.24 |
| **Panel C: 2002–2005** | | | | | | |
| Constant | 10.19* | 7.42 | 7.40 | 11.97 | 11.09 | 10.56 |
| | (5.32) | (6.00) | (5.92) | (10.57) | (11.98) | (11.97) |
| CUMABN | -0.05 | 0.01 | | 0.22 | 0.30* | |
| | (0.07) | (0.11) | | (0.14) | (0.15) | |
| lag(CUMABN) | | 0.26** | 0.25** | | 0.13 | 0.00 |
| | | (0.11) | (0.10) | | (0.22) | (0.22) |
| Sample size | 103 | 95 | 95 | 96 | 90 | 90 |
| Number of year dummies | 3 | 3 | 3 | 3 | 3 | 3 |
| Adj. R-Squared | 0.04 | 0.08 | 0.09 | 0.00 | 0.00 | 0.00 |
| F-ratio | 1.91 | 2.66** | 3.35** | 1.11 | 0.81 | 0.56 |

This table reports the regression coefficients and their respective White period standard errors (in brackets) for the various specifications of Equation 5 using the panel data set for the period 1997 to 2005. The natural logarithm for the ratio of CEO pay for successive fiscal years using the CEO cash compensation and wealth change definitions of pay are the dependent variables. These are regressed on the nominal cumulative abnormal returns constructed using Scholes-Williams betas and an equally weighted index. The results for the CEO cash compensation measure are reported in columns 1 to 3. The results for the CEO wealth change measure are reported in columns 4 to 6.

* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

**Table 4. Predicted percentage change in CEO cash compensation for percentiles of the abnormal stock return distribution**

| Percentile rank in stock return distribution | lag(CUMABN) Cumulative abnormal return for year (*t*-1) | Predicted percentage change in (salary + bonus) |
|---|---|---|
| 1% | -0.5671 | 2.69% |
| 10% | -0.2642 | 8.14% |
| 20% | -0.1896 | 9.49% |
| 30% | -0.0972 | 11.12% |
| 40% | -0.0559 | 11.89% |
| 50% | 0.0046 | 12.98% |
| 60% | 0.0913 | 14.54% |
| 70% | 0.1374 | 15.37% |
| 80% | 0.2368 | 17.16% |
| 90% | 0.3031 | 18.36% |
| 99% | 0.6620 | 24.82% |

This table reports the predicted change in CEO cash compensation estimated using the regression coefficients and the lag CUMABN for various percentile ranks of the lagged cumulative abnormal stock return. The regression coefficients are based on the model reported in Panel A, column 3 of Table 3.[24]

[24] The predicted percentage change in CEO cash compensation is calculated using the regression equation $\Delta ln(CEO\ Cash) = a + b(lag\ abnormal\ stock\ return)$, where a = 0.1290, b = 0.18 (Table 4, Column 3, Panel A), and the cumulative abnormal return is constructed using the Scholes–Williams beta estimation technique and the equally weighted index.

**Table 5. Predicted percentage change in CEO wealth for percentiles of the abnormal stock return distribution**

| Percentile rank in stock return distribution | lag(CUMABN) cumulative abnormal return for year ($t$-1) | Predicted percentage change in (salary + bonus + $\Delta$ option value) |
|---|---|---|
| 1% | -0.7188 | -18.73% |
| 10% | -0.3340 | -5.64% |
| 20% | -0.2198 | -1.76% |
| 30% | -0.1172 | 1.73% |
| 40% | -0.0471 | 4.11% |
| 50% | 0.0058 | 5.91% |
| 60% | 0.0622 | 7.82% |
| 70% | 0.1124 | 9.53% |
| 80% | 0.2111 | 12.89% |
| 90% | 0.2973 | 15.82% |
| 99% | 0.6041 | 26.25% |

The predicted change in CEO wealth change estimated using the regression coefficients and the lag CUMABN for various percentile ranks of the lagged cumulative abnormal stock return. The regression coefficients are based on the model reported in Panel A, column 4 of Table 3.[25]

[25] The predicted percentage change in CEO wealth change is calculated using the regression equation $\Delta ln(Change\ in\ CEO\ wealth) = a + b(cumulative\ abnormal\ return)$ where a = 0.0571, b = 0.34 (Table 3, Column 4, Panel A), and the cumulative abnormal return is constructed using the Scholes-Williams beta estimation technique and the equally weighted index.

**Table 6. CEO turnover-performance sensitivity**

| | Dependent Variable, $ln\left[\frac{P(turnover)_{i,t}}{1-P(turnover)_{i,t}}\right]$ | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Constant | -2.25*** | -1.80*** | -1.52*** |
| | (0.32) | (0.41) | (0.36) |
| CUMABN $\geq 0$ | 0.32 | 1.18 | |
| | (1.40) | (1.63) | |
| CUMABN $< 0$ | -2.24** | -2.92** | |
| | (1.08) | (1.28) | |
| Lag(CUMABN) $\geq 0$ | | -3.16 | -1.49 |
| | | (2.14) | (1.65) |
| Lag(CUMABN) $< 0$ | | 2.37 | 1.77 |
| | | (2.28) | (2.15) |
| Sample Size | 215 | 172 | 172 |
| No. of Turnover Cases | 27 | 24 | 24 |
| Chi-Square | 4.43 | 6.31 | 1.16 |

This table reports the coefficients for logit regression Equation 6 using the panel data set for the period 1997 to 2005. CEO turnover from year *t* to year (*t*+1) is regressed on the positive and negative cumulative abnormal return for years *t* and (*t* - 1). The dependent variable has a value of one if there was a change in CEO in year (*t*+1). CUMABN is the sum of daily abnormal returns over the firm's fiscal year. The cumulative abnormal returns are constructed using the Scholes-Williams beta estimation technique together with an equally weighted index to proxy for the market. Standard errors for the coefficients are given in parentheses.

* Significant at 10% level ** Significant at 5% level *** Significant at 1% level

## Table 7. CEO cash-performance semi-elasticities and board characteristics

| | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Constant | 0.12$^{***}$ | 0.13$^{***}$ | 0.13$^{***}$ | 0.13$^{***}$ | 0.12$^{***}$ | 0.14$^{***}$ | 0.16$^{***}$ | 0.17$^{**}$ | 0.18$^{**}$ | 0.09$^{**}$ | 0.09$^{**}$ | 0.09$^{**}$ | 0.18$^{***}$ | 0.11$^{**}$ | 0.12$^{**}$ |
| | (0.03) | (0.03) | (0.03) | (0.04) | (0.03) | (0.03) | (0.06) | (0.07) | (0.07) | (0.04) | (0.04) | (0.04) | (0.06) | (0.05) | (0.05) |
| lag( $\lambda$ ) | 0.00 | 0.00 | 0.03 | -0.05 | -0.04 | -0.03 | 0.00 | -0.01 | -0.01 | 0.29 | 0.33 | 0.33$^{*}$ | -0.08 | 0.01 | 0.01 |
| | (0.13) | (0.12) | (0.12) | (0.07) | (0.08) | (0.08) | (0.01) | (0.01) | (0.01) | (0.18) | (0.20) | (0.20) | (0.06) | (0.07) | (0.07) |
| CUMABN | 0.01 | 0.11 | | -0.02 | 0.00 | | -0.07 | 0.12 | | 0.04 | 0.06 | | -0.01 | 0.11 | |
| | (0.06) | (0.08) | | (0.12) | (0.13) | | (0.12) | (0.23) | | (0.08) | (0.09) | | (0.17) | (0.16) | |
| lag( $\lambda$ )$^{*}$ CUMABN | -0.09 | -0.23 | | 0.27 | 0.43 | | 0.01 | -0.01 | | 0.04 | -0.16 | | 0.07 | -0.04 | |
| | (0.08) | (0.16) | | (0.42) | (0.48) | | (0.02) | (0.03) | | (0.45) | (0.69) | | (0.31) | (0.29) | |
| lag(CUMABN) | | 0.28$^{***}$ | 0.23$^{***}$ | | 0.09 | 0.07 | | 0.46$^{**}$ | 0.39$^{***}$ | | 0.12 | 0.10 | | 0.33$^{**}$ | 0.29$^{*}$ |
| | | (0.09) | (0.08) | | (0.11) | (0.10) | | (0.20) | (0.13) | | (0.11) | (0.10) | | (0.15) | (0.17) |
| lag( $\lambda$ )$^{*}$ lag(CUMABN) | | -0.35 | -0.23 | | 0.26 | 0.13 | | -0.04 | -0.03$^{*}$ | | -0.35 | -0.32 | | -0.26 | -0.26 |
| | | (0.28) | (0.23) | | (0.27) | (0.27) | | (0.03) | (0.02) | | (0.67) | (0.68) | | (0.26) | (0.31) |
| Inverse Mills Ratio | -0.03 | -0.03 | -0.05 | | | | | | | | | | | | |
| | (0.08) | (0.08) | (0.08) | | | | | | | | | | | | |
| Adj. R-Squared | 0.03 | 0.09 | 0.08 | 0.00 | 0.00 | 0.00 | 0.03 | 0.07 | 0.08 | 0.00 | 0.00 | 0.01 | 0.06 | 0.09 | 0.10 |
| F-Ratio | 1.57 | 2.36$^{***}$ | 2.54$^{***}$ | 0.87 | 0.90 | 0.93 | 1.63$^{*}$ | 2.20$^{**}$ | 2.56$^{***}$ | 1.04 | 0.99 | 1.20 | 2.20$^{**}$ | 2.31$^{***}$ | 2.66$^{***}$ |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 217 | 188 | 188 | 161 | 132 | 132 | 217 | 188 | 188 | 144 | 136 | 136 | 179 | 159 | 159 |

This table reports the coefficients and White period standard errors (in parentheses) for Equation 7 using the panel data set for the period 1997 to 2005. The effect of different board characteristics and ownership structures on the pay-performance relationship is investigated by including a variable, $\lambda$ , that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. The Inverse Mills Ratio is included in the $\lambda$ =CEOCHAIR model. When $\lambda$ =BDSIZE, an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility is used to estimate each model, respectively. CEO pay is measured as cash compensation and the results are reported for abnormal returns constructed using the S-W beta estimation techniques and the return on an equally weighted index as a proxy for the return on the market.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

## Table 8. Change in CEO wealth-performance semi-elasticities and board characteristics

| | | CEOCHAIR | | | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Constant | 0.07 | 0.02 | 0.04 | 0.07 | -0.01 | 0.04 | 0.17 | -0.06 | -0.03 | 0.17$^{**}$ | 0.18$^{***}$ | 0.18$^{***}$ | 0.03 | 0.06 | 0.10 |
| | (0.08) | (0.12) | (0.12) | (0.13) | (0.15) | (0.15) | (0.16) | (0.14) | (0.14) | (0.06) | (0.07) | (0.06) | (0.10) | (0.13) | (0.12) |
| lag( $\lambda$ ) | -0.27 | -0.34 | -0.27 | -0.08 | -0.22 | -0.16 | -0.02 | 0.01 | 0.01 | 0.73 | 0.78 | 0.75 | 0.03 | 0.03 | 0.03 |
| | (0.19) | (0.22) | (0.22) | (0.32) | (0.29) | (0.29) | (0.02) | (0.01) | (0.02) | (0.48) | (0.55) | (0.52) | (0.17) | (0.17) | (0.16) |
| CUMABN | 0.52$^{**}$ | 0.49$^{***}$ | | 0.49 | 0.13 | | 0.04 | -0.16 | | 0.29 | 0.30 | | 0.11 | 0.21 | |
| | (0.22) | (0.16) | | (0.35) | (0.34) | | (0.58) | (0.47) | | (0.22) | (0.22) | | (0.33) | (0.32) | |
| lag( $\lambda$ )$^{*}$ CUMABN | -0.77$^{***}$ | -0.86$^{***}$ | | 0.16 | 1.19 | | 0.05 | 0.07 | | -1.02 | -1.85 | | 0.64 | 0.04 | |
| | (0.24) | (0.27) | | (1.33) | (1.34) | | (0.08) | (0.07) | | (1.11) | (2.24) | | (0.64) | (0.48) | |
| lag(CUMABN) | | 0.24 | 0.02 | | -0.29 | -0.40 | | 0.30 | 0.46 | | -0.04 | -0.14 | | 0.39 | 0.32 |
| | | (0.16) | (0.16) | | (0.30) | (0.28) | | (0.47) | (0.34) | | (0.19) | (0.21) | | (0.27) | (0.27) |
| lag( $\lambda$ )$^{*}$ lag(CUMABN) | | -0.52 | -0.07 | | 1.60 | 1.22 | | -0.03 | -0.07 | | -0.84 | -0.47 | | -0.81 | -0.87 |
| | | (0.38) | (0.34) | | (1.09) | (1.00) | | (0.06) | (0.05) | | (2.18) | (2.23) | | (0.57) | (0.57) |
| Inverse Mills Ratio | 0.09 | 0.16 | 0.11 | | | | | | | | | | | | |
| | (0.12) | (0.13) | (0.14) | | | | | | | | | | | | |
| Adj. R-Squared | 0.07 | 0.06 | 0.01 | 0.05 | 0.01 | 0.00 | 0.05 | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.05 | 0.01 | 0.01 |
| F-Ratio | 2.36$^{***}$ | 1.82$^{**}$ | 1.14 | 1.94$^{*}$ | 1.08 | 0.78 | 1.97$^{**}$ | 1.46 | 1.26 | 1.40 | 1.14 | 1.13 | 1.80$^{**}$ | 1.07 | 1.09 |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 202 | 177 | 177 | 148 | 123 | 123 | 202 | 177 | 177 | 133 | 127 | 127 | 166 | 150 | 150 |

This table reports the coefficients and White Period standard errors (in parentheses) for Equation 7 using the panel data set for the period 1997 to 2005. The effect of different board characteristics and ownership structures on the pay-performance relationship is investigated by including a variable, $\lambda$, that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. The Inverse Mills Ratio is included in the $\lambda$=CEOCHAIR model. Board size (BDSIZE) is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility. CEO pay is measured as change in CEO wealth, and the results are reported for abnormal returns constructed using S-W beta estimation techniques and the return on an equally weighted index as a proxy for the return on the market.

$^{*}$ Significant at 10% level $^{**}$ Significant at 5% level $^{***}$ Significant at 1% level

**Table 9. Change in CEO turnover-performance sensitivities and board characteristics**

| $\lambda$ | INSIDE | | | BDSIZE | | | DSOB | | | BUSY | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Constant | -1.89*** | -1.78*** | -1.79*** | -4.76*** | -4.43*** | -4.13*** | -2.11*** | -2.01*** | -1.87*** | -3.87*** | -3.71*** | -3.23*** |
| | (0.36) | (0.39) | (0.38) | (0.98) | (1.03) | (0.94) | (0.30) | (0.33) | (0.30) | (0.86) | (0.89) | (0.74) |
| $\lambda$ | -0.61 | -0.53 | -0.20 | 0.38*** | 0.35*** | 0.32*** | 1.67 | 2.87 | 2.17 | 3.05** | 3.01** | 2.41* |
| | (1.54) | (1.65) | (1.58) | (0.13) | (0.13) | (0.12) | (2.00) | (2.17) | (1.88) | (1.23) | (1.27) | (1.11) |
| CUMABN | 0.32 | 0.03 | | -4.65** | 4.96* | | -2.15* | -2.78** | | -6.80** | -6.03* | |
| | (1.39) | (1.51) | | (2.28) | (2.86) | | (1.13) | (1.27) | | (3.15) | (3.44) | |
| $\lambda^*$ CUMABN | -7.68 | -6.10 | | 0.43 | 0.48 | | 9.62 | 15.31 | | 7.53** | 6.57 | |
| | (5.84) | (6.18) | | (0.31) | (0.39) | | (7.10) | (9.97) | | (4.28) | (4.57) | |
| lag(CUMABN) | | -1.02 | -0.81 | | -1.56 | 2.01 | | -1.70 | -0.31 | | -1.71 | -0.06 |
| | | (1.73) | (1.57) | | (3.87) | (3.32) | | (1.46) | (1.25) | | (2.85) | (2.71) |
| $\lambda^*$ lag(CUMABN) | | 1.57 | 2.82 | | 0.11 | -0.29 | | 5.92 | -2.57 | | 1.71 | -0.18 |
| | | (6.49) | (6.00) | | (0.50) | (0.45) | | (9.09) | (6.47) | | (4.50) | (4.23) |
| McFadden R-Squared | 0.03 | 0.03 | 0.01 | 0.09 | 0.09 | 0.05 | 0.04 | 0.08 | 0.02 | 0.08 | 0.08 | 0.05 |
| Chi-Squared | 4.80 | 3.48 | 0.29 | 14.27*** | 11.95** | 7.05* | 4.86 | 7.49 | 1.44 | 11.70*** | 9.61* | 5.34 |
| No. Year dummies | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sample size | 215 | 172 | 172 | 215 | 172 | 172 | 151 | 114 | 114 | 184 | 145 | 145 |

This table reports the coefficients and standard errors (in parentheses) for the logit regression given in Equation 8 using the panel data set for the period 1997 to 2005. The effect of different board characteristics and ownership structures on the turnover-performance relationship estimated earlier is examined by including a variable, $\lambda$, that describes a board characteristic or board ownership structure, as an explanatory variable and also interacting it with the cumulative abnormal returns. Board size (BDSIZE) is an instrument equal to the sum of the intercept and the residual from a regression of board size on firm sales, leverage and volatility. The cumulative abnormal return is constructed using the S-W beta estimation technique and the return on an equally weighted index as a proxy for the return on the market.

* Significant at 10% level ** Significant at 5% level *** Significant at 1% level