Essays on Executive Compensation and Managerial Entrenchment

by

Swarnodeep HomRoy

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Abstract

This thesis is comprised of three empirical studies on CEO pay and CEO turnover in the USA. It specifically examines the effects of the market for corporate control and governance on CEO turnover and CEO pay, and the effect of risk of dismissal on CEO pay.

Using data on CEO pay, CEO turnover and acquisitions in the US, we analyze the risk of CEO turnover in the period 1992-2010 and the effect of market for corporate control on turnover probability. 31% of the CEOs in the sample are replaced in this period, either for performance related reasons or following takeovers. Post Sarbanes-Oxley act of 2002, the performance sensitivity of turnover is stronger and CEOs face a higher dismissal risk, which indicates partial success of governance regulations in mitigating agency problems. Small and more independent boards are associated with higher likelihood of CEO exit. Takeovers act as external force of discipline and increase the probability of turnover for poor performing CEOs by 129%. These results contribute to the debate on the role of governance regulations in enforcing optimal contracting.

Next, we examine the impact of acquisitions on the pay of acquiring CEOs to explore whether acquisitions exacerbate the divergence of interest between shareholders and CEOs. To examine systematic agency problems, we further examine if CEOs are rewarded differentially for shareholder wealth-generating (good) and shareholder wealth-destroying (bad) acquisitions. Controlling for firm size, our estimates suggest that CEOs are paid a 3.5-4% premium in post-acquisition pay, which increases the pay of the median CEO of an acquiring firm in the sample by US$ 173,000. Consistent with the earlier studies by Bliss and Rosen (2001), we find no evidence that post-acquisition premium in CEO pay is conditional upon the ex-post wealth-effect of the acquisition, thereby suggesting possible decoupling of pay and performance following acquisition. Further, our results that acquisition premium in CEO pay can be partially attributed to weak corporate governance is in agreement with managerial power and rent-seeking hypotheses.

Controlling for post-acquisition survivor bias, we observe a smaller acquisition premium in CEO pay which may suggest that stronger governance exposes CEOs undertaking bad acquisitions to higher risk of turnover.

Average CEO Pay has grown significantly in the last two decades but so has the risk of forced turnover. Most explanations for increased CEO compensation focus on market power - the increased competition in the external CEO market, or entrenchment – rent extraction by CEOs from captured boards. We attempt to provide an alternate explanation for the recent growth in CEO pay.

We estimate the compensating differentials in CEO pay for increasing risk of dismissal. Our estimates suggest that CEOs are paid 2-4% premium in pay for a percentage point increase in the risk of dismissal, which is manifest in the form of increased cash payments. The compensating differential is higher in

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the post- Sarbanes Oxley sub-period (2003-2010). The increasing use of risk-free cash payments to compensate for higher turnover risk may lower the performance sensitivity in CEO pay. We highlight this as a possible inadvertent effect of governance regulations.

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To Maa, Baba, Bonu and Mithu

Chapter 1

Introduction

Chief Executive Officers arguably have the greatest impact on a firm's fortunes. How the labour market for Chief Executive Officers (henceforth CEOs) operates is central to the understanding of separation of ownership and control of firms. The level and structure of CEO pay has an impact on CEO behaviour and risk taking, and long term profitability of the firm. Therefore, studies on CEO labour market have gained increased prominence in personnel economics and corporate finance. The literature on the CEO labour market has traditionally focused on the determinants and structure of CEO pay (Murphy, 1999; Lazear and Rosen, 1981; Bebchuk and Fried, 2003). In these models CEO pay is determined by firm level factors viz. firm profits, firm size or CEO level factors viz. managerial power and entrenchment. Only recently a growing body of literature focuses on the effect of the external environment on CEO pay (Mikkelson and Partch, 1997; Guest, 2009). The empirical evidence on the determinants of CEO pay and their relative importance is inconclusive across data periods and countries.

Another body of literature analyzes CEO dismissal and replacement decisions of firms. The central hypothesis in a vast majority of these studies is that in an efficient market

paradigm, non-performing CEOs are replaced by the shareholders or by the market for corporate control (Zajac, 1990; Gregory-Smith, Thompson and Wright, 2009). There are reasons to believe that the dynamics of CEO turnover changes with the macroeconomic environment and changes in governance regulations significantly impact upon CEO replacement decisions (Kaplan and Minton, 2012). At the same time, the dynamics of CEO replacement may impact on the structure and level of CEO pay (Peters and Wagner, 2012).

This thesis contributes to the literature on CEO pay and CEO replacement decisions in the following ways: We use a wide range of governance controls to analyze the effect of corporate governance on the dynamics of CEO labour market. Results of the majority of previous research are based on data prior to 2002. Our results partially reflect the effects of governance regulations and stock market reforms in the US post-2001 and contributes to the debate on the effectiveness of the regulations. Controlling for the probability of post-acquisition CEO turnover, we find a smaller acquisition premium in CEO pay. This adds to the debate on the misaligned incentives of CEOs to undertake acquisitions. Finally, our results suggest that the growth in CEO pay in the last two decades may be partially attributed to the compensating differential paid to CEO for the growing risk of dismissal from the job.

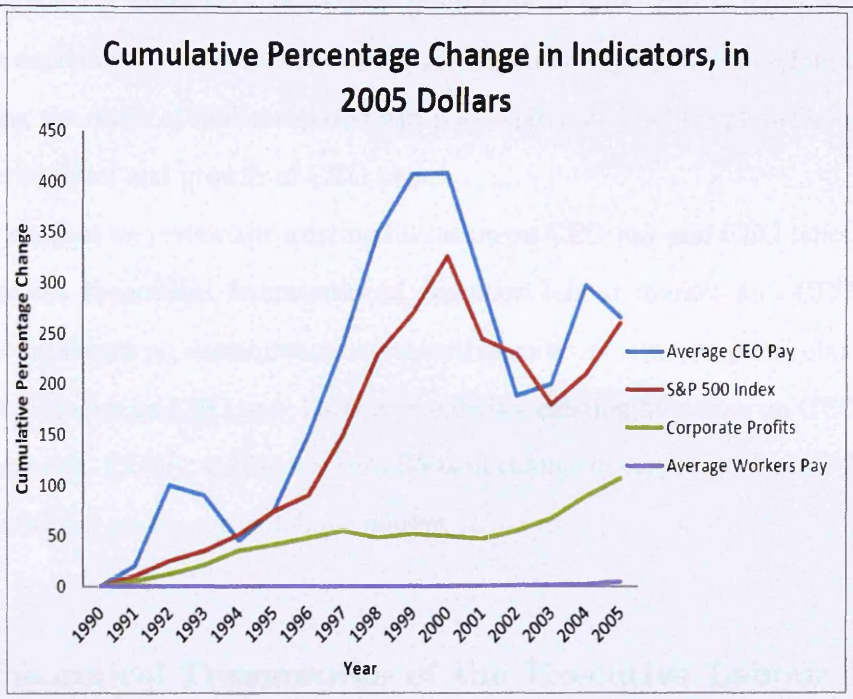
The structure of the thesis is as follows. Chapter 2 provides an overview of the theories of CEO pay and CEO replacement. Chapter 3 discusses the main data sources used in our analyses. Chapter 4, the first empirical chapter, examines the effect of governance and the market for corporate control on CEO replacement. Chapter 5 investigates the impact of acquisitions on the pay of the acquiring CEO and examines whether the CEOs have an misaligned incentive in undertaking acquisitions. Chapter 6 analyzes the effect of the risk of dismissal from job on CEO pay and estimates the compensating differential in CEO pay. Finally, Chapter 7 provides a summary of the empirical results and concludes.

Chapter 2

Theory and Literature Review

Chief Executive Officers inspire extreme sentiments. They change the future of individuals, organizations and, sometimes, the course of business history (Lorange, 1980). It is interesting to know how a business professional is chosen for the top job, how she is compensated for the great risks and responsibilities that she assumes and other aspects of the CEO labour market, which is different from the labour market for other classes of labour (Beatty and Zajac, 1987). From Figure.2.1 we observe that in the fifteen year period between 1990 and 2005 corporate profit and average worker's pay in the USA has increased by 106.7% and 4%, respectively, but the growth in CEO pay (cash compensations plus stock options) has been 298.2%.

Figure 2-1: The Growth in CEO Pay: 1990-2005



Note: Data adapted from The Consumerist, April 9, 2007 for S&P 500

Thus we see from Figure 2.1 that there has been a disproportionate increase in CEO pay in the last four decades.

Economists have been interested in understanding the governing principles of CEO pay and the dynamics of executive labour market for over five decades now (Roberts, 1956). Consequently, a rich body of literature has been generated with varying focus on CEO pay, CEO turnover, agency problems and executive labour market mobility. Over this period, the nature and complexity of executive labour markets has changed substantially and so have research interests. However, there has always been a division of opinion regarding the determinants of CEO pay and their relative importance. The decisive explanation still remains elusive. In the early decades of research on the executive

labour market, the division was based on the usage of firm size or profitability measures as determinants of CEO pay. In reality, the nature of CEO pay is more complex and cannot be explained by any one variable. Contemporary approaches therefore aim at understanding the series of intercorrelated variables that would help explain the underlying forces driving level and growth of CEO pay.

In this chapter we review the existing literature on CEO pay and CEO labour market. We review the theoretical frameworks of executive labour market and CEO pay and review the literature on determinants of executive compensation, in particular the effect of firm performance on CEO pay. Further, we review existing literature on CEO turnover and replacement. Finally, we discuss the effects of change in corporate control (Takeovers and Acquisitions) on executive labour market.

2.1 Theoretical Frameworks of the Executive Labour Market and CEO pay

The dynamics of the executive labour market and the setting of executive pay have attracted the interests of managers, compensation executives, organization theorists, accountants and economists (Cisel and Carroll, 1980, Lazear and Rosen, 1981, Nalebuff and Stiglitz, 1983). One of the key motivators of academic interest in this is that while in the 1980s public company CEOs in the US earned 42 times the wage of factory workers on average, by 2010 the median CEO was earning 343 times the wage of an average factory worker (Businessweek, 2010). Various theories are expounded to explain why CEOs receive so much in compensation and how the compensation contracts are formulated. Chief among these are the Tournament Model, Principal-Agent theory, and the Managerial Power theory. These theories are interdependent and the testable hypotheses are often

inseparable. The level and growth of CEO pay is co-determined by the variables that are central to these three theories and are econometrically estimated within a general wage equation.

2.1.1 Tournament Theory

Tournament theory, formalised by Lazear and Rosen (1981), offers a model for promotions in an organization. In this model, a group of contestants compete for a set 'prize' (in an organization context promotion to the next higher level) and the winner is decided based on the relative performance of the players (Green and Stockey, 1983; Lazear and Rosen, 1981; Bloom, 1999). The promotion is associated with higher salary and in turn higher lifetime earnings. The prize comes not only in the form of promotion to the next higher level, but also as the option of participating in further tournaments and to move to higher levels. This option-value of larger prizes provides incentives for participants to exert effort. There is no option value of promotion for a CEO. The lack of option value of further promotion is therefore compensated by a higher wage-premium for promotions to CEO level (Rosen, 1986). In essence, the tournament model predicts that compensation is a convex function of organizational levels (Lambert et al, 1993; Main et al, 1993). Thus to induce greater investment from individual players ($C(\mu)$) and and higher productivity, a firm will increase the spread of the prize between levels ($W_2 - W_1$).

If the behaviour of all the contestants are identical, a contestants expected utility is:

$$(P)[W_1 - C(\mu)] + (1 - P)[W_2 - C(\mu)] = PW_1 + (1 - P)W_2 - C(\mu) \tag{2.1}$$

where P is the probability of winning the tournament. In essence, tournament theory implies that CEO pay is a function of firm size because a larger firm will need a bigger

spread of prizes. Therefore,

$$W = f(\Lambda) \tag{2.2}$$

where Λ is the size of the firm.

This predictions of the tournament model was tested on a sample of 1115 executive and non-executive managers at 100 UK companies by Conyon, Peck and Sadler (2001). Using multivariate regression analysis, they observed that a promotion from a divisional CEO to a group CEO entails a 62% increase in median total compensation (i.e. from £448, 601 to £724,496) while a promotion from an Executive Director to a Divisional CEO brings about an increase of 27% in median total compensation (from £352,882 to £448,601). This study is one of the first to use the Black-Scholes valuation formula to arrive at a more comprehensive measure of compensation by taking into account the present values of stock option grants. However, the results are based on longitudinal data for the short period of 1997-98 and therefore do not capture the time-varying nature of such tournaments.

The tournament model of promotion also predicts that with an increasing number of contestants, the prize (i.e. the spread of income between the two levels for which the tournament is being contested) increases (Lambert, 1993; O'Reilly et al, 1988). Empirical evidence on this proposition has been varied. Main et al. (1993) and O'Reilly et al. (1988) used US data and Danish data, respectively, and find similar results. Conyon, Peck and Sadler (2001) found partial consistency of their results with the proposition. They observed an approximate increase of 3.5 percent in the difference of average (median) pay between the CEO and the rest of the management team, for each additional executive in the number of contestants.

Whether the observed wage dispersion between the CEO pay and the next organization

level has any effect on firm performance has been debated in academic research for many years. Main et al. (1993) reported a positive association between the coefficient of variation of wages with firm performance in USA whereas Eriksson (1999) observed the same relationship using a sample of Danish firms. Testing this hypothesis on a sample of UK firms, Conyon, Peck and Sadler (2001) observed no significant positive effect of wage dispersion on firm performance. However, the study by Conyon et al. (2001) did not include measures of executive interdependence like the earlier studies.

Thus, the tournament model provides a framework to explain why CEO salaries are higher and the dynamics of promotion to the CEO level. However, the empirical evidence for the theory remains mixed. Effects of different governance structures on the outcome of tournament remains empirically untested to a great extent.

2.1.2 The Principal-Agent Theory

In traditional market-based economic models the owner of the business bears the risk and reaps the rewards of success (Marris, 1964). In large publicly owned firms, the shareholders are the owners of a firm and they bear the ultimate risk. However, the dispersed nature of shareholding calls for management to make decisions and run the firm on behalf of the owners. This is the Principal-Agent approach to understanding CEO compensation and employment whereby the Manager/CEO (the agent) has the fiduciary responsibility to act on behalf of the shareholders (the principal). This framework explains how a risk-averse agent (i.e. a CEO) chooses to maximize his utility, $U(w, \theta)$, where 'w' is the wage he receives and 'θ' is any unobserved action that leads to $x(\theta)$ stochastic output (Mirrless, 1976).

In a principal-agent framework, the shareholders' expected payoff can be expressed as:

$$\pi^{Shareholders} = E[\Pi(e,\theta) - w(\Pi(e,\theta))] = \int [\Pi(e,\theta) - w(\Pi(e,\theta))] f(\Pi; e) d\Pi \tag{2.3}$$

and risk averse managers expected payoff can be expressed as:

$$\pi^{Manager} = E(U(\Pi(e,\theta)), e)] = \int u(w(\Pi(e,\theta)) f(\Pi; e) d\Pi - \Phi(e) \tag{2.4}$$

where e is the effort exerted by the agent, θ is uncertainty affecting firm's profits and is independent of managerial effort, $\Pi(e,\theta)$ is random firm profit and in an agency theory framework $\Pi' > 0$. Further, $w(\Pi)$ is the agent's wage function, $\Phi(e)$ is the agent's disutility of effort and $f(\Pi; e)$ is the density function of the stochastic firm profit Π, given the effort level, e.

The utility function of the agent can be expressed as:

$$U(w,e) = u[w(\Pi(e,\theta))] - \Phi(e) \tag{2.5}$$

We assume $U' > 0$ and $U" < 0$. This implies that the agent is risk averse and the utility function is separable in income and effort.

The shareholders, therefore need to design a wage contract $w^*(.)$ and pick a effort level e^* that maximizes their expected payoff:

$$\{w^*(.), e^*\} \equiv \arg\max \pi^{Shareholders} = \arg\max \int [\Pi(e,\theta) - w(\Pi(e,\theta))] f[\Pi; e) d\Pi \tag{2.6}$$

subject to the following constraints:

$$argmax \pi^{Manager} = \arg\max \int u(w(\Pi(e,\theta))) f(\Pi; e) d\Pi - \Phi(e) \geq U_0 \tag{2.7}$$

and

$$\int u(w(\Pi(e^*,\theta)))f(\Pi;e^*)d\Pi - \Phi(e^*) \geq \int u(w(\Pi(e,\theta)))f(\Pi;e)d\Pi - \Phi(e), \forall e \epsilon [e^{\min}, e^{\max}] \qquad (2.8)$$

The first constraint is the Individual Participation constraint. Given the wage contract $w^*(.)$ a rational agent will require that the utility maximizing effort level is at least equal to the reservation utility, U_0. The second constraint is that of Incentive Compatibility whereby given the wage contract, the unobservable effort level chosen by the shareholders (e^*) must lie within the band of utility maximizing efforts of the agent ($\forall e \epsilon [e^{\min}, e^{\max}]$). This is necessary to induce appropriate level of effort from the agent, thereby minimizing risk of moral hazard.

In large publicly held organizations, there may not be a single equity holder with a substantial stock holding. Under such situations, where external constraints are not rigid, the CEO may have discretion to pursue their own interest, even if it is at the cost of the shareholders (Marris, 1964; Williamson, 1964). These actions can range from resorting to empire building in an effort to increase his/her own salary (Jensen, 1974, Williamson, 1964), failure to distribute wealth when the firm does not have suitable investment opportunities (Jensen, 1986) to the manipulation of power to entrench themselves in the organization (Shleifer and Vishny, 1990). This problem of the agents not acting in the interests of the principal but in their own interests is called the "Agency Problem" (Jensen and Meckling, 1976). The cost to the shareholders of the agency problem is the sum of the loss in wealth when the CEO acts in her own interest and the costs of monitoring CEO actions and performance. These costs are called agency costs (Jensen and Meckling, 1976). The implicit agency cost can be greater than observed agency costs if we account for the distortion of managerial incentives which may affect long term firm

performance. Thus, it becomes imperative to align the shareholders' interest and the CEOs interests so as to minimize the agency costs. Financial economists prescribe the "Optimal Contracting Approach" as a partial remedy to the agency problem.

A contract, in this context, is a legal document enumerating the clauses of the agreement between the principal and the agent on the issue of the rights of each party, the performance monitoring process and the rewards for performance (Fama and Jensen, 1983). Thus, the optimal contracting approach refers to designing an efficient compensation contract that would provide strong incentives for the CEOs to act in the interests of the shareholders and at the same time minimize compensation costs for the shareholders (Murphy, 1999; Core, Guay and Larcker, 2001). The optimal contract would maximize risk neutral shareholders' utility, '$x - w(x)$' by paying the manager a wage of '$w * x$'. According to this approach, CEOs are highly paid for their unique skills and experience and not because of managerial rent capture (Grossman and Hart, 1982). The optimal contracting model attributes the divergence from optimal contracting to political limitations (Jensen and Murphy, 1990). However, empirical evidence of divergence from optimal contracting is too frequent to be accounted for by political limitations only (Shleifer and Vishny, 1994).

Divergence from optimal contracting can also be partially explained by understanding the role of the Board of Directors, who act as custodians of the shareholders' interests. A key assumption of optimal contracting is that the process is carried out through an arm's-length bargaining relationship between the boards and the executives, or the interplay market forces induce on such optimal contracting (Bebchuk, Fried and Walker, 2002). This assumption of arm's-length bargaining is violated when the Directors themselves suffer from the agency problem. This argument of how Directors directly, or implicitly, collude with the CEO and cause divergence from optimal contracting has led to the development of the 'Managerial Power' theory. Further, if the market for corporate

control is weak, the external force on optimal contracting is inefficient (Bebchuk, Fried and Walker, 2002).

2.1.3 The Managerial Power Theory

Managerial power theory stems from the deviation of executive compensation from optimal contracting predictions. This is often used to explain the influence of CEOs on the optimal contracting process and how managerial rent capture may be possible (Bebchuk and Fried, 2002). Bebchuk, Coates and Subramanian (2002) highlight how an inefficient market for corporate control may lead to a CEO resisting hostile takeover bids that would be beneficial to shareholders' wealth. The provision of golden parachutes further weakens the effect of market forces for corporate control by making CEO replacements costly and driving up the acquisition costs. It has been observed that the existence of CEO golden parachute lowers the likelihood of a target firm's participation in non-auction inducing resistance to takeover attempts (Buccholtz and Ribbens, 1994).

The managerial power approach argues that in organizations with an absence of a large number of outside directors, a few instititutional shareholders or the existence of anti-takeover protection, the CEOs can wield power in developing an inefficient contract and extract rent. The theory builds on the premise that the Directors may have strong incentives to act against the interests of the shareholders. It may be of greater benefit to the Board of Directors to favour the CEO. A study by Pearl, Meyer and Partners (2005) noted that the median annual compensation of Directors of top 200 US companies was $182,000, with the highest paid Director at United Health receiving about $900,000. The same study notes that the average time spent by Directors on company affairs is 275

[0]A golden parachute is a term used to describe the clause in a CEO's employment contract that specifies the compensation he would receive in the event of a change in control and the termination of employment. This form of compensation is generally large and is in the form of severance pay, vesting of stock options, cash bonuses or any combination of these.

hours a year. Thus the financial benefits of Directorship are obvious. This provides an incentive for the Directors to favour the CEO as she can implicitly or explicitly influences nominations of new Directors on the Board. Except for the case of hostile takeovers, Board elections are rarely contested (Bebchuk and Kahan, 1990). Hence, getting the nomination almost ensures a substantial financial gain and social prestige. In their self-interest, Directors may have an incentive to fail to develop an optimal contract. Cyert, Kang and Kumar (2002) provide further empirical support by noting that when a CEO is the Chairman of the Board, her compensation is higher by 20-40 percent. They also observed a negative association of CEO ownership with the equity holdings of the largest shareholders. Bertrand and Mullainathan (2001) finds weak pay-performance sensitivity but one that does not filter out common shocks. In other words, CEOs may be paid for "luck". Further, they find that in firms lacking larger shareholders or blockholders, the pay-performance sensitivity in CEO pay is even weaker. A higher concentration in shareholding pattern is also associated with lesser number of option grants.

What then prevents the CEOs from capturing all of the economic rents? Managerial power theory argues that it is the outrage cost that prevents the CEO from capturing all the rent. If the Director's bias becomes too obvious, the financial press and institutional share holders would take notice and may initiate a change. This fear of outrage acts as a buffer against blatant managerial rent capture but leads to camouflage of CEO pay in various other forms. Empirical evidence confirms that CEO pay levels and pay increases are tempered by public views (Johnson, Porter and Shackell, 1997). Hence managers may resort to obscuring their rent-extraction.

In summary, these theories suggest that a CEOs wage function is co-determined by the size of the firm (Λ), stochastic firm performance ($\Pi(\theta)$) and managerial entrenchment. We discuss the theoretical frameworks that underpins our empirical analysis and the econometric methods to test the hypotheses in the individual empirical chapters (Sections

4.2, 5.2 and 6.2)

2.2 Executive Compensation and Firm Performance

In the agency-theoretic framework that forms the basis of executive compensation research, academics have been interested to analyze the performance parameters that can be used to align the interests of the principal and the agent efficiently. Further research has focused on estimating the strength of the pay-performance sensitivity in executive compensation design.

At one end of the spectrum are the managerialists, who support the corporate growth hypothesis and provide evidence that the size of the firm (measured by sales or assets) is the major determinant of CEO pay. The rationale for this argument is that as the size of the firm increases, a higher level of CEO pay is required to maintain the pay differential between hierarchical levels. This high pay differential would act as an incentive for a large number of people to select into the tournament for the CEO position and hence drive up productivity (Simon, 1957). It has also been argued, that with the increase in firm size, the CEOs face higher job complexity and higher risk, and hence must be paid to compensate for this increased risk (Ungson and Steers, 1984).

Taking a different approach are those who link corporate profitability (measured by net profit or the return on assets) with CEO pay (Ciscel and Carroll, 1979). The argument in favour of this is that if optimal contracting holds, then the performance of the agent will be reflected in the firm performance which is aligned to the interest of the shareholders. This school of thought calls for a strong pay-performance relationship in CEO compensation. However, there has been a debate about the measure of firm performance that best reflects the performance of the agent (Garen, 1994; Agarwal and Samwick, 1999; Core et al, 2002).

No conclusive evidence has been established about the applicability of these two schools of thoughts in determining managerial contracts. The first generation of studies on this debate seems to validate the argument that firm size has a greater impact on CEO pay than firm performance (Roberts, 1956). Later work has reported mixed results. Whereas some studies have noted a strong effect of firm performance in terms of accounting measures (Lewellen and Huntsman, 1970; Kokkelenberg, 1988), another group of researchers have found evidence of both firm performance and firm size in having an impact on CEO pay (Meeks and Whittington, 1975; Leonard, 1990). These studies included the top five executives in a firm, and used a range of measures for executive compensation. The early studies on firm size-executive pay relationship were criticized by Murphy (1985) and Hall and Liebmann (1998) for omitting stock options, deferred compensation and stock awards, which are deemed to be more performance-sensitive components of pay than salary and bonuses. In his seminal work, Murphy (1985) used US panel data to test the relationship between executive pay and returns to shareholders, measured by stock appreciation and dividends. Using fixed effects and first difference regression models, he reported a significant positive association between executive pay and stock price performance. In further research to estimate the elasticity of this association in a sample of 2000 CEOs spanning five decades, he noted that the pay performance sensitivity is low as reflected by the semi-elasticity value of 0.12-0.16. Hence his work highlighted the limited effectiveness of optimal contracting.

Research from a managerial power theory standpoint argues that even though a range of papers estimate the semi-elasticity of the pay-performance relationship with varying degrees of consistency, they stop short of exploring the full spread of contingencies that are involved in pay-performance dynamics (Tosi and Gomez-Mejia, 1989). For example, it highlights the fact that the pay performance relationship is not a constant and varies with, among other parameters, CEO tenure. Murphy (1986), using a human capital model

perspective, finds that the CEO pay-performance relationship has a decreasing sensitivity because with increases in tenure, the information asymmetry between the shareholders and the CEO decreases and the base pay starts to reflect managerial productivity with increased precision. Using CEO tenure as a proxy for CEO influence over the Board, Hill and Phan (1991) report that the CEO pay-performance relationship decreases over time. The reason for this decline is that with an increase in tenure the CEO may entrench himself more in the firm, making dismissal more challenging. Also, with an increase in tenure, the CEO begins to nominate new Board members and may choose not to re-nominate difficult ones, thereby increasing her influence over the Board (Finklestein and Hambrick, 1989).

Studies on the effect of firm performance on CEO wealth produces ambiguous results. Kallen (1991), Bradley and Rosenzweig (1992) argue that CEO wealth is unaffected by firm performance even when the firm files for bankruptcy because of their ability to control corporate assets. In widely cited research, Smith and Watts (1992) build on their earlier work and notes that there is a substantial reduction in CEO salaries and bonuses in financially distressed[1] firms. They attribute the difference in inference to the fact that during financial distress about 33% of the sample firms replace their CEOs which is consistent with evidence provided by Gilson (1989, 1990). The successors are nominated from inside the firm or hired externally. They note that the outgoing CEO is replaced from within in almost 40% of the cases and that is associated with a 35% drop in median CEO compensation whereas the external hire of CEOs is associated with a 36% increase in CEO compensation even in times of financial distress. This difference in CEO salary depending on the mode of CEO succession is explained by arguing that since insiders are held responsible for financial distress, an internal promotion is likely to be associated with

[1] A firm is said to be in financial distress if it cannot meet or has difficulty paying off its financial obligations to its creditors. Financial distress is characterized by high fixed costs, illiquid assets, or exposure to industry risk.

decreased CEO pay as a measure of risk-sharing (Jensen and Meckling, 1976) whereas an external candidate would be hired for her specific skills of bailing a firm out of financial crisis (Dumaine, 1990).

Aggarwal and Samwick (1999) establish that the pay performance sensitivity of CEOs will be decreasing in the riskiness of the firm's performance i.e. they observed that CEOs in firms with high performance variances have a pay-performance sensitivity that is lower than CEOs in firm's with low variances. The pay-performance sensitivity mean of US$ 14.52 and median US$ 69.41 per 1000 US$ is higher than the 1998 estimates of Hall and Liebman (mean=US$ 5.29, median=US$ 25.11). Omitting the variances of stock price performance from the model is shown to create a substantial downward bias in pay-performance sensitivity.

The study is based on compensation survey reports to which firms voluntarily participate generating selection-bias in sample and skewed industry and size distribution. Also, the data is an unbalanced panel as some firms have not participated in the surveys on a year-on-year basis.

Most studies of the pay-performance relationship have tried to explore this correlation but only a few have tried to establish causation. Most of these causal studies have been inconclusive. Leonard (1990) could not establish a clear relationship between various components of CEO pay with return on equity. Using a sample of US CEOs, he reported a significant association of the accounting measures of firm performance and CEO pay but statistically insignificant relationship of stock performance and CEO pay. The causal relationship between firm performance and CEO compensation has been inconclusive.

Numerous studies have been carried out to understand the benefits accrued to the firm by stock options as a form of CEO payment. The efficiency of options as a tool of incentive alignment has found mixed empirical support. It has been argued that firms facing financial constraints would try to conserve cash by resorting to option grants (Core

et al, 2002). Empirical studies on new firms have noted that companies with greater cash flow use option grants more extensively (Ittner, Lambert and Larcker, 2003).

Their effectiveness as a retention tool is also found to be limited, contingent upon the external environment. In a bullish market when stock prices are above exercise values, the retention tool is efficient but in a bear market, when the stock options are "underwater", the incentives can become counter-productive as executives may seek to move to organizations offering fresh contracts.

Research on the effectiveness of option grants report the calculated 'certainty equivalents' and note that the perceived cost of option grants are lower than the actual economic costs of such option-grants (Lambert, Larcker and Verecchia, 1991). They proposed a framework to evaluate the compensation contract from a CEOs perspective, which does not follow from the market based valuation formulae like the Black-Scholes model (1973). A greater benefit of option grants may be obtained when option exercise prices are indexed to the market. Indexing creates less noisy performance measure which is protected from market shocks. In practice, indexing to the market is not widespread. This may be attributed to accounting requirements to report indexed income which deflates corporate earnings figures and even though it reduces company's cost of granting options, it reduces the value of the compensation package to the CEO. Hall and Murphy (2003) conclude that the maximization of incentives (per $ of compensation) occur when options are granted below the market price of the grant date.

Even though there has been sustained interest in the pay-performance relationship in executive compensation contracts, there has been little research to understand if the pay-performance sensitivity actually yields the intended results of mitigating the agency problem by enhancing company performance.

In summary, a general model of CEO wage function can be expressed as:

$$Pay_{it} = \alpha + \beta_1 FirmPerformance + \beta_2 FirmSize + \beta_3 CEOTenure + \beta_4 X_{it} \quad (2.9)$$

where X_{it} represents other CEO level and firm level observables.

2.3 CEO Turnover

To mitigate the agency problem, shareholders entrust the board of directors with the responsibility of designing optimal contracts for CEOs. In addition, it becomes imperative for shareholders to monitor the performance of the CEOs so that the actions taken by the CEOs are in their interest. Hence, the size and composition of the board of directors, compensation of directors and equity ownership structure become important determinants of CEO performance and firm profitability. These parameters have been dynamic and evolved with time and so have the monitoring mechanisms (Weisbach, 1988; Karpoff, Malatesta and Walkling, 1996; Yermack, 1997; Mikkelson and Partch, 1997). Understanding how corporate governance structure and changes in that affect CEO monitoring, leading to CEO dismissal, will be facilitated by analyzing the changes in corporate governance regimes.

Studies that seek to understand the effects of composition of the board argue that since directors from within the organization may be influenced by the CEO and have their stakes linked with the CEOs, outside Directors are more efficient in enforcing monitoring mechanisms as they are less susceptible to the influence of managerial power (Fama and Jensen, 1983; Weisbach, 1988). Weisbach found evidence that outside directors are more likely to replace a poorly performing CEO than inside directors. In keeping with this argument, there has been an increasing trend in the proportion of outsiders on the board of directors since the 1970s. In 1972, 71 percent of manufacturing firms in the USA had a majority of outside directors on the board, however, by 1986, 86 percent of manufacturing

firms adopted this strategy (Bacon, 1990). This thrust for greater board independence was also enforced by institutional investors through shareholder proxy proposals (Gillan and Starks, 2000). However, it may be counterproductive to have a board composed entirely of outside directors even if it may seem a more unbiased way to monitor CEO performance. This is because many prospective CEOs are promoted from among the inside directors and having insiders on the Board exposes them to the requirements of the job and also a chance for outside directors to evaluate the prospective CEOs (Weisbach, 1988). The effect of the change in composition of board of directors on firm performance is not conclusive. McAvoy et al (1983) observes that there is no difference in performance of firms which has majority of outside directors when compared to those who do not. This result may suffer from the simultaneity problem where many competing and inseparable factors lead to a result whose results may be confounding (Hermalin and Weisbach, 1987).

At the same time there has been an effort to optimize the size of the board of directors. Academic research suggests that a streamlined board would enhance efficiency of the board and ensure better monitoring. In the period between 1972 and 1989, the median size of the board of directors in large US firms reduced from 14 to 12 (Bacon, 1990; Jensen, 1993; Yermack, 1997). The median board size further reduced to 9.31 in the period 2003-2010 (Execucomp).

The changes in corporate governance frameworks have been towards a more sophisticated mechanism of monitoring CEO performance that would ensure that non-performing CEOs are replaced by potentially better candidates. Some economists, however, are of the opinion that the compensation contracts and product and capital market forces, provide enough incentives to minimize agency problems and the monitoring by directors cannot provide significant improvement over that (Hart, 1983). Thus CEO turnover is expected to be dependent on the corporate governance measures. The rationale is that

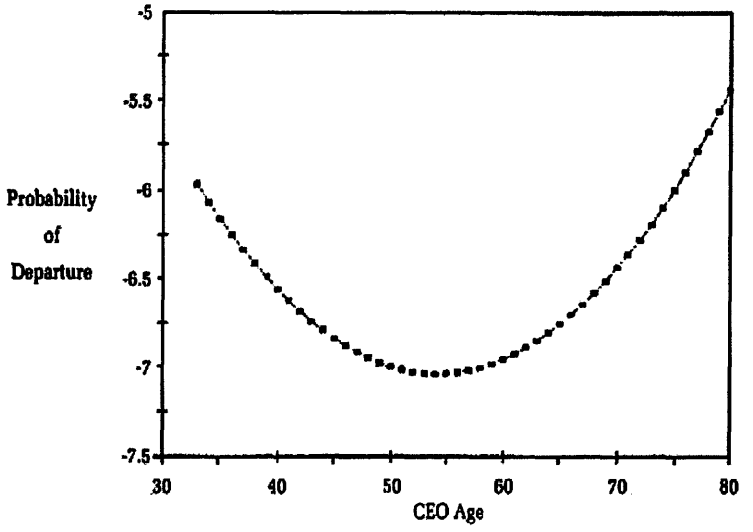
the threat of dismissal acts as an incentive for the CEOs as they are generally paid a compensation which is greater than their opportunity cost in the external market. Hence, in alignment with the agency theory framework, the CEOs will be incentivized to act in the best interests of the owners. Empirical evidence shows a negative association between firm performance and probability of CEO turnover, supporting the predictions that CEOs are dismissed for poor firm performance (Couglan and Schmidt, 1985). This is in contrast to findings by Vancil (1987), who reports that CEOs are seldom fired and CEO turnover occurs generally as a natural succession process. An early study on the impact of corporate governance on CEO turnover reports that an outsider dominated board is more likely to replace a CEO on grounds of low performance than an insider dominated board (Weisbach, 1988). However, simultaneous endogeneity of board formation and CEO removal remains, particularly in the light of evidence that in times of poor performance there is an increase in the number of outside directors on boards (Hermalin and Weisbach, 1987).

2.4 Effects of Mergers and Acquisitions on CEO Pay and CEO Turnover

A growing body of research connects CEO turnover and the change of control of a firm, particularly acquisitions. The objective of such enquiries is to analyze the determinants of post-acquisition CEO departures. This research, carried out from a market discipline standpoint, argues that the dismissal function for under-performing CEOs are influenced by the strength of market for corporate control (Martin and McConnell, 1991), or from the view which focuses on decline of relative standing of CEO in the firm that may cause CEO departure (Hambrick and Cannella, 1993). Buchholtz, Ribbens and Houle

(2003) explained the patterns in post-acquisition CEO turnover using a human capital perspective. They used Cox proportional hazards model on a sample of 181 acquiring firms in the US for the period 1987-1990. Their results suggest that the probability of CEO departure follows a U-shaped profile with CEO age. Younger CEOs, with little investment in the firm are most mobile in the labour market whereas the older CEOs have relatively lower future returns on investments in the firm. Hence the probabilities of post-acquisition turnover are higher for these two age groups. The findings are represented in Figure 2.2 by plotting CEO age with probability of CEO departure. This is consistent with earlier work of Buchholtz and Ribbens (1994) and Sonnenfeld (1988: 14).

Figure 2-2: Proprtional Hazards of CEO Turnover with Age



Source: Buchholtz, Ribbens and Houle, 2003

Consistent with the findings of Hambrick and Cannella (1993), Buchholtz et al, noted a positive non-monotonic relationship of post-acquisition CEO turnover with the length of CEO tenure. This may be because with increasing tenure, the firm specific skills that the CEO acquired may become redundant for the acquiring firm. Also, with increase in the tenure, a CEO makes human capital investments (Williamson, 1985) and a psychological investment (Rubin and Brockner, 1975) in a firm making him more entrenched[2]. This may lead to filtering of information sources (Hambrick and Fukutomi, 1991). Thus, long tenured CEOs are more likely to be removed post-acquisition. The paper also notes that with the increase of 'relatedness' between acquiring and acquired firm, the higher is the probability of post-acquisition CEO departure. The reason for such a relationship can be that the industry-specific human capital of the CEO is no longer scarce but is now, in

[2]Managerial entrenchment is the extent to which managers are able to use their discretion and capture economic rent and agency costs.

fact, replicated. The study however does not differentiate between forced CEO turnover and voluntary CEO turnover post acquisition which could have given a clearer indication of the dynamics.

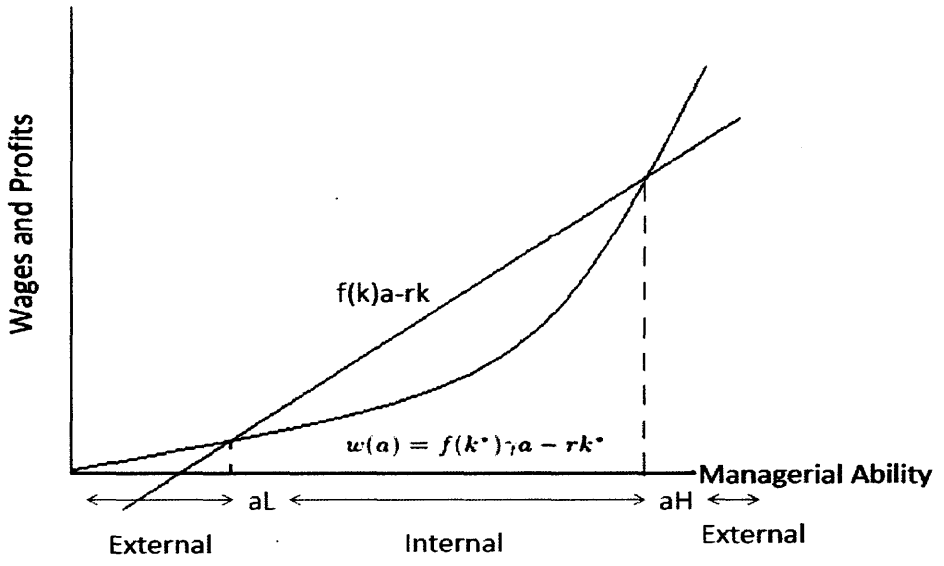
It has been observed that with increasing CEO tenure and higher relatedness of the target and acquiring firm, the likelihood of post acquisition CEO departure increases (Buccholtz et al, 2003). However, with increasing intensity in the takeover market, the sensitivity of CEO turnover to firm performance has not changed substantially (Huson et al, 2001).

Research on CEO turnover is naturally extended to CEO replacement. The research in this domain focuses on the trade-off between internal promotion and external hiring and the choices of firms thereof. Murphy and Zabojnik (2004) uses a partial equilibrium model to predict the optimal strategies of internal-external hiring of CEOs. They argue that over the years, with technological innovations, there is a growing need of general human capital over specific human capital. Thus, in their framework, CEO pay is determined by the competitive market for CEOs where firms compete for most productive CEOs and that the increasing general management skill explains the rapid growth of CEO pay in recent history.

The model presented in Figure 2.3, expresses firm profits as a function of firm size and managerial ability and compares the cases of internal promotion and external CEO hire. The model establishes cutoffs aL and aH as a decision rule for internal promotion and external hire. When a is managerial ability, k is the firm size, r is the cost of capital, $wM(\hat{a})$ is the market wage for CEO with ability a and π is the profit, then a firm will find it profitable to internally promote a CEO candidate when $\pi(k, \hat{a}, 1) \geq 0$ that is to say

$$f(k)\hat{a} - rk \geq wM(\hat{a})$$

Figure 2-3: CEO Hire: Internal Promotion vs. External Hire



Source: Murphy and Zabojnik, 2006.

Figure 2.3 depicts the strictly convex wage function $w(a)$ and a linear $f(k)\hat{a} - rk$ function which shows monotonic increase in $\hat{a}$. If the managerial ability of an internal candidate is higher than aH or lower than aL, the firm will prefer to hire an external candidate. This is because of insufficient managerial ability of the internal candidate to manage a firm of size k (lower than $.aL$) or to compensate the high potential internal candidate for foregoing outside employment (higher than aH)

This model is consistent with the results of Huson, Parrino and Starks (1998) who document the growing trend of outside CEO hires. Other studies of CEO promotion explore the linkage of firm performance with means of CEO succession and bring to the fore the view that higher performing firms will promote CEOs from within rather than hire from outside. The argument is that in case of an outside hire, the information asymmetry between the Board of Directors and the CEO is greater than for an internal

hire. The hypothesis is empirically tested for a sample of 92 CEOs in the US and it was found that the internal CEO hires are correlated with higher firm profitability (Zajac, 1990). The results are consistent with the results of Datta and Guthrie (1994) who find that firms with lower profitability are more likely to hire outside CEOs than from inside. However, there has been no causal study to establish whether external CEO hire leads to higher firm performance.

There has been academic interest in analysing how the market for corporate control and product market conditions affect CEO pay. A number of papers examine the effect of mergers and acquisitions on CEO compensation and find that mergers and acquisitions do not add to shareholders wealth and in most cases actually destroy it (Jensen, 1986; Dodd, 1980; Langetieg, 1978). This makes it all the more interesting to understand why CEOs undertake these activities, how these activities impact upon firm performance and whether the CEOs are rewarded differentially for wealth-generating and wealth-destroying mergers and acquisitions. In one of the first generation studies in this domain, Firth (1980) noted that CEOs benefitted from mergers and acquisitions and hence they undertake such activities, irrespective of its effect on firm performance and shareholders' wealth. The results have been consistent in later studies that established a significantly positive relation between mergers and acquisitions and executive compensation (Kroll, Simmons and Wright, 1990; Bliss and Rosen, 2001; Girma, Thompson and Wright, 2006; Guest, 2008). Conyon and Gregg (1994) study a sample of 169 UK firms in the period 1985 to 1990 and estimate a 6.5% pay increase for CEOs of firms that were involved in three or more acquisition activities in any three year period whereas the premium was 2.5% for CEOs of firm involved in at least two acquisitions. In a contrasting finding, Avery et al (1998) uses an executive career tracking methodology from 1986 through 1991 and reports that CEOs have very little incentives to undertake acquisitions to increase her own pay.

Using data from a relatively small sample of 50 firms that have undergone mergers and acquisitions in the period 1979-1986, Kroll et al (1990) explore the relationship between acquisition and CEO pay, controlling for the ownership of the firm. They observed that there is a substantial increase of CEO pay in the year following acquisition and this increase is associated with industry-adjusted Return-on-Equity performance of the firm for owner controlled firm and unrelated to such industry standard performance measures for manager controlled firms. For hostile takeovers, the CEOs of the acquiring firm suffers a 5-6% pay decrease in the third year from the event, which can be attributed to divestments and spin-offs that generally follow hostile takeovers. In the year of merger, while CEOs completing a wealth generating merger deal enjoys a 1.9% increase in salary on average, ceteris paribus, a CEO completing a wealth reducing takeover is penalized by a 2.80% reduction in salary. The differential wealth effect of merger on CEO pay is insignificant in the second lag from the year of merger. However the study only uses cash components of CEO compensation and hence does not predict changes in total CEO compensation through impact on share prices.

In a further study of the differential impact of mergers and acquisitions on CEO pay with respect to ownership structure, Kroll, Wright, Toombs and Leavell (1997) noted that whereas acquisitions announced by the owner controlled firms are associated with positive excess returns accruing to the shareholder, acquisitions announced by a manager controlled firm bring about a negative return to shareholders' wealth. Furthermore, post-acquisition increases in CEO pay in an owner controlled firm are associated with positive excess returns accrued to shareholders whereas for manager controlled firm, the association is with greater firm size.

Khoranna and Zenner (1998) use a pooled panel data model on a sample of 46 executives of 27 acquiring firms in the US during 1982-1986 and find a positive association between CEO pay and the event of acquisition. They also report a large increase in

stock and option grants in the year of acquisition. The increase in cash compensation and total compensation were estimated to be 10.5% and 4.9% respectively. Controlling for wealth-generating and wealth-reducing acquisitions, the study also noted that wealth generating acquisitions have a positive effect on CEO compensation whereas the effect of wealth reducing acquisitions is not significantly different from zero.

To understand what the determinants of the post-acquisition pay-premium are for CEOs, Grinstein and Hribar (2004) studied 327 large acquisitions by US firms in the period 1993-1999. They found that the CEO pay increase is positively associated with deal size and the time taken to complete the deal and that the pay increase is in the form of cash bonuses. Consistent with arguments of Bebchuk and Fried (2003), they observed that in firms where CEOs have more power and undertake large deals, the cash bonus is significantly larger. The wealth effect of the merger has an insignificant effect on the bonus payout.

In one of the most comprehensive studies on the impact of M&A on CEO compensation, Guest (2008) uses a sample of 4528 acquisitions of 2469 publicly listed UK firms over the period 1984-2001 and reports that there is no significant difference in the impact on CEO pay following good and bad acquisitions. The absence of difference in payment post good and bad acquisitions is unrelated to the strength of corporate governance.

Controlling for domestic and cross border acquisitions, the study observed that there is no significant difference in CEO pay increases post cross border and domestic acquisition and that acquisitions of target firms in countries with higher pay levels has no significant effect on CEO pay. That solicits an inquiry to understand which CEOs will have a greater propensity to resort to mergers and acquisitions in an effort to increase their own salary? It appears that CEOs who have a lower proportion of equity based compensation are more likely to undertake acquisitions (Bliss and Rosen, 2001). Looking from a different perspective to understand if CEOs have vested interests in M&A deals, it has been

observed that in a target firm whose CEO has no golden parachute, CEO stock ownership will have a stronger effect on takeover resistance than in a firm who's CEO has a golden parachute (Buccholtz and Ribbens, 1994). Moral hazard, hence, is considered by many economists as an important empirical phenomena in CEO compensation (Margiotta and Miller, 2000). Moral hazard in optimal contracting is often tested by investigating the risk-taking behaviours of CEOs (like undertaking acquisitions) and the impact of such actions on firm performance and CEO pay (Guest, 2008; Lehn and Zhao, 2006).

2.5 Conclusion

The theoretical frameworks and empirical evidence suggest that CEO pay is co-determined by interaction of several inter-correlated variable. The key variables identified are firm performance, firm size and managerial entrenchment. CEO tenure (Harford and Li, 2007) and governance parameters like board size and percentage of outside directors on board (Kaplan and Minton, 2012) are used as proxies for managerial entrenchment and strength of corporate governance. Whilst the Principal-Agent model suggests a strong association of firm performance and CEO pay, it has been observed that CEO pay is more sensitive to firm size (Gabaix and Landier, 2008) and that pay-performance sensitivity is only marginally significant (Murphy, 1985; Bebchuk and Fried, 2004). Thus, the relative importance of these variables in determining the level and growth in CEO pay is still debated in literature. There has been contrasting evidence on CEO's incentives in undertaking risky projects (acquisitions) to increase firm size and consequently her pay and to what extent such risk-taking behaviours reflect agency problems. Further, in an agency framework, if a poor performing CEO is more likely to be removed from the job, the risk of CEO turnover may impact upon CEO pay. There is limited evidence on the effect of risk of CEO turnover on CEO pay.

Chapter 3

Data

3.1 Introduction

The objective of this thesis is to study the dynamics of the labour market for Chief Executive Officers. In this chapter we discuss the datasets used to collate information on pay, tenure, firm level and individual characteristics of the CEOs. Further, we collect information on the major macroeconomic and regulatory changes that overlap with our study period. The objective of this chapter is to discuss the various data sources employed for our empirical analysis and the coverage of the data. We also present the summary statistics of the key variables used in the empirical chapters. In each of the following empirical chapters, we discuss the sampling procedure and the final sample used for analysis.

3.2 Data Source and Coverage

The Securities and Exchange Commision (SEC) of the United States of America mandated full disclosure of CEO pay from 1992. Public listed firms are required to file a

proxy-statements (DEF-14A) with the SEC within 120 days from the end of fiscal year, detailing the level and structure of all components of pay of the top executives. Economic research on CEO compensation has relied on secondary sources of CEO pay data, compiled from the proxy filings of the firm. Data sources includes Standard and Poor's Execucomp, Forbes, The Wall Street Journal/Mercer CEO Compensation survey and annual surveys of major consulting firms and rating agencies viz. Hewitt Associates and Moody's. The primary dataset used in this thesis is the Standard and Poor's Execucomp.

Earlier studies of CEO pay rely almost exclusively on the Forbes database and proxy filings of firms. Proxy filings on CEO pay earlier than 1992 are hard to get, particularly in electronic format. This makes the Forbes data from 1970 the most reliable source of historical data on CEO pay. Seminal works of Jensen and Murphy (1990) and Hall and Liebmann (1998) use the Forbes data for their analysis. Since 1999, however, the Execucomp database has been the most used database, particularly because of its wide range of coverage on CEO pay components. In this research, we rely on the Execucomp database for data on CEO pay.

The Execucomp database compiles CEO pay data from 1992 and updates the database annually in the month of October. It covers Standard and Poors (henceforth S&P) 500 firms in the year 1992 and 1993 and S&P 1500 firms thereafter, representing approximately 90% of US market capitalization. S&P 1500 contains S&P 500 firms (500 firms), S&P Midcap (400 firms) and S&P Small Cap (600 firms). In the period 1992-1997, Execucomp provides data on 1157 firms. From 1997 onwards Execucomp covers all firms in S&P 1500. In the period 1992-2010, Execucomp covers over 208,000 firm year observations for CEO and top executives of 3267 firms. For the purpose of this study, we include only the CEO in our sample. We follow CEO from the beginning of the sample period (or the time they first appear on the database, whichever is earlier) until the end

of the sample period or until the time they drop out of the sample through takeovers, delisting or bankruptcy. Some firms drop out of the sample for a period of time before re-appearing which we discuss later in the chapter. This leads to an unbalanced panel.

Individual firms are identified by a range of identifiers consistent with the Compustat databse. The most commonly used firm identifiers are ticker symbol (TIC), CUSIP and GVKEY. Ticker is an alpha-numeric abbreviation used to uniquely identify publicly traded stock of shares on a particular stock market. The ticker symbol of a firm's stocks are often used as an identifier for the firm. CUSIP is also a commonly used alphanumeric firm level identifier assigned by an independent agency. CUSIP codes are generally nine characters long, of which the first six characters identifies a firm; the next two characters identify a particular asset (e.g., a class of stock or a bond issue) issued by the firm; whereas the last character is a "check digit" to improve the accuracy of electronic transmission of CUSIPs. Company name, CUSIP codes and ticker symbols are subject to change over time. To circumvent this problem, Standard and Poor's have defined a unique six-digit identifier, Global Company Key or GVKEY, for each firm in their datasets. This allows for more accurate tracking of firms, particularly in situations of takeovers and reverse-mergers.

For each firm, annual compensation details of the top five executives are reported although some firms may disclose information on top ten executives' pay. The CEO of a firm in a given year is identified from the CEOANN field in Execucomp. Each executive is identified by a unique identifier (EXECID) and each executive-firm combination has an unique identifier, which enables career tracking of individual CEOs and other executives.

Execucomp provides information on 145 variables, most of which are regarding compensation. In addition, it provides limited information on CEO characteristics (age, date joined as CEO, gender, etc.) and board memberships (Chairman CEO, percentage equity holdings of the CEO etc.). Information on pay is disaggregated by components of pay.

Salary and bonus and other cash-based components of pay are reported in thousands of US dollars. The value of stock option grants are estimated using the Black Scholes option pricing model. The grant date for options is assumed to be July 1st of every year with the risk free rate being the yield-to-maturity of 7-year US treasury bills. Exercise prices are obtained from the annual proxy filings of the firms and the market price is assumed to be the strike price per share, unless otherwise mentioned in the proxy filings. Execucomp also reports information on Restricted Stock Units, Long Term Incentive Payments and measures of total compensation including (TDC1) or excluding (TDC2) option grants. We use TDC1 in all our estimations.

In our analysis we use Execucomp data from 1992-2010 for information on CEO pay and CEO tenure. We augment the Execucomp data with the following databases: Thomson Financial Securities Data's SDC Platinum^{TM} Worldwide Mergers and Acquisitions Database, Thomson One Banker and Forbes company database is used to identify events of mergers and acquisitions. Thomson Reuters SDC Platinum provides information on 672,000 mergers and acquisitions from 1985 and is updated daily. The database provides information on mergers and acquisitions, proxy fights for corporate control, repurchases and spin-offs, covering a comprehensive range of corporate restructuring.

Finally, information on governance is obtained from the RiskMetrics database (formerly IRRC). Although the IRRC data starts in 1990, it was inaccessible for our study due to licensing issues. Hence we rely on RiskMetrics data from 1996. Corporate governance data is available for the period 1996-2007 and hence analysis with controls for governance is done with a smaller sample size. In the sample period, RiskMetrics covers over 12000 observations from 1526 firms. The potential bias due to the sample selection are discussed in the empirical chapters. The database provides information on structure and composition of the board and the nomination, compensation and audit committees. Further, it has information on shareholder rights, voting norms, takeover defenses

(prevalence of poison pills) and directors' compensation. The definition and regulatory requirement of independent directors on board were refined by NYSE and NASDAQ in 2002. We have used information on directors from the Forbes database to check the robustness of the definition of independent directors throughout the sample period.

Thus, we test our hypotheses with an extensive dataset of CEO pay which is augmented by information on firm performance, corporate governance, mergers and acquisitions. Our database improves upon the information of the Execucomp database by incorporating information on CEO turnover from company press releases, media reports and tracking the career movement of individual CEOs.

Description of key variables and their sources are compiled in Table 3.1 below:

Table 3.1: Variable Descriptions

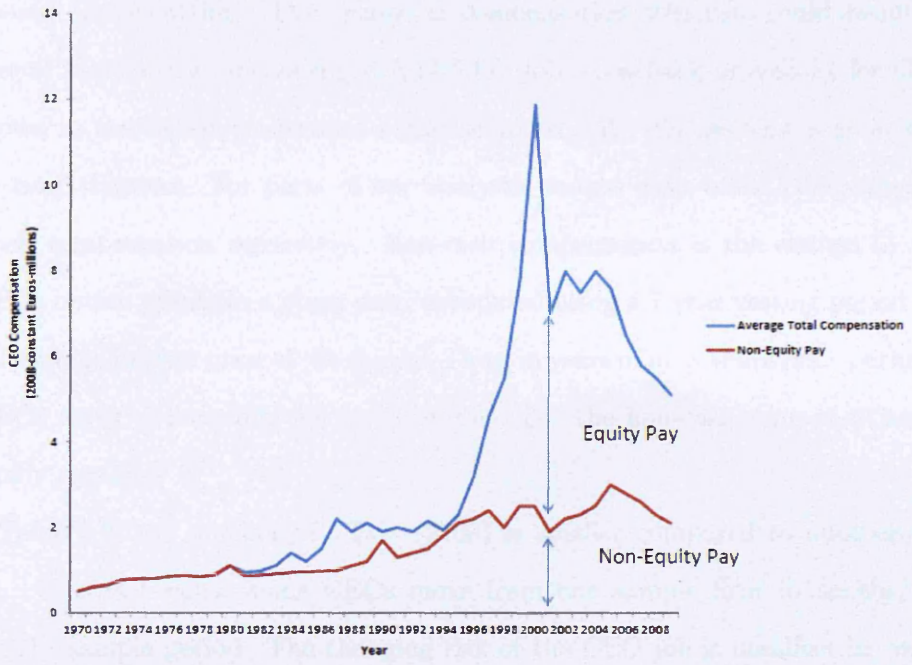
Variable	Descriptions	Source
Turnover	Indicator for event of CEO exit for a firm in a given year	Execucomp, Forbes
Duration	Length of CEO tenure in a firm	Execucomp, Forbes
CEO Pay	Salary + Bonus + Stock awards + LTI +RSU + Option_awards + nonequity incentives	Execucomp
RSU	Restricted Stock Units	Execucomp
LTI	Long Term Incentives	Execucomp
EBIT	Earnings Before Interest and Taxes = Revenue – Operating expenses + Non-operating income	CRSP
ROA	Return on Assets = Net Profit/Total Assets	CRSP
Value Weighted Return	Weighted average of all stock returns, weights given by the market value of the stock issue (price*shares outstanding) at the end of the previous trading period.	CRSP
Benchmarked Value Weighted Return	Difference of firm's annual value weighted return from that of the median firm in the 2-digit SIC level	CRSP
M&A	Indicator for event of M&A in a given year	Thomson One Banker, Forbes
Board Size	Number of Directors on a board	RiskMetric
Board Independence	Percentage of outside Directors on the board	RiskMetric
Board Busyness	Average number of directorships held by the Directors	RiskMetric
CEO Duality	Indicator for Chairman-CEOs	RiskMetric

3.3 Descriptive Statistics

In the following tables we present descriptive statistics for the augmented Execucomp data for the full sample period (1992-2010) and the two sub-periods, before and after the promulgation of the corporate governance regulations in 2002. In 2002, following the corporate scandals surrounding Enron Corporation, a host of corporate governance regulations were enacted in 2002. Chief among them are the Sarbanes Oxley Act and the NYSE and NASDAQ reforms. These governance regulations, designed to make corporate governance more transparent and increase managerial accountability, may have an impact on CEO pay and CEO turnover decisions. The major implications of these regulations are discussed in details in the subsequent empirical chapters. From Table 3.4 and 3.5, a mean CEO in the dataset is paid US$ 4.3 millions, going up to US$ 6.6 million in the

later sub-period of the data. In addition, Figure 3.1 shows that CEO pay has a general upward trend in the period 1992-2009. The rise in CEO pay is characterised by increasing use of stock option grants in the mid-1990s. The growth in equity based pay with respect to non-equity based payment is detailed in the figure and tables 3.4 and 3.5.

Figure 3-1: A Time Series Structure of CEO Pay



Source: Conyon et al (2011)

From the mid-1990s, the explosive growth in equity-based CEO pay can be attributed to an increased concern to align CEO pay to performance, accounting and tax norms that did not require options to be treated as expenses under FASB (123).[1] In response to the stock market crash of 2001 surrounding the dot-com and Enron crises that pushed the stock options of the CEO underwater [2], and FAS(123r) that requires firms to treat option grants as accounting expenses, there has been increasing use of restricted stock units as a preferred equity payment vehicle. However, as evident from Figure 3.1 and detailed in Table 3.5, the 2003-2010 sub-period of the dataset is characterized by a

[1] FASB (123) refers to article no. 123 of Financial Accounting Standards Board of United States of America that laid down accounting norms for stock based compensation. This was subsequently revised in December 2002 in article no. 148 in response to the financial irregularities and accounting scandals surrounding Enron Corporation, Worldcom, Tyco International, etc. Article 148 was superseded by FASB (123r) in 2004.

[2] "Underwater" is a term used to refer to a situation when the exercise price of a stock is higher than the market price for the underlying stock.

decreasing proportion of non-equity compensation in average CEO pay with respect to cash-based compensation. The change in compensation structure could result from a number of factors, viz. increasing risk of CEO job, claw-back provisions for CEO pay laid down in the recent governance regulations, etc. We discuss this is greater details in the later chapters. For parts of our analysis, we use cash based compensation and non-cash compensation separately. Non-cash compensation is the change in value of the CEOs option grants in a given year, calculated using a 7-year vesting period and the annual average market price of the shares. Thus, in years of poor share price performance, the CEOs stock options may be "underwater", i.e. the non-cash compensation can be notionally negative.

In Table 3.2, the number of CEOs (2703) is smaller compared to number of firms (2755). This is because some CEOs move from one sample firm to another sample firm in the sample period. The changing risk of the CEO job is manifest in the higher proportion of CEOs leaving the post in the second half of the data. About 26% CEOs in the 2002-2010 period left their post compared to 22.6% of the CEOs in the earlier part of the sample period. For our empirical analysis we classify CEO turnovers by reasons of exit[3] (Table 3.2). CEO turnovers arising out of retirements, resignations, and forced dismissals are classified as internal turnover, where internal refers to reasons arising from within the firm set up. CEO turnover following a tender offer is classified as takeover-related turnover. In the data period there have been six events of an incumbent CEOs death. We do not treat these events as turnover.

Median CEO tenure in the data period is about eight years although it is significantly shorter in the second sub-period at six and half years. This declining median CEO tenure may indicate an increasing likelihood of CEOs to be dismissed or forced to resign.

[3]We study the press reports around events of CEO turnover to identify the reasons of exit and whether the CEOs have been forced out. Some degree of discretion has been applied in the classification process.

Alternatively, it may mean a large proportion of CEOs retiring towards the end of the first sub-period (1993-2001) so that the later sub-period is characterized by CEOs who are early in their tenure. However, the median CEO age in the first sub-period (60.28 years) is marginally lower than that of the second sub-period (61.04 years) making such an argument untenable.

Table 3.2: Classifications of Turnover

	1993-2010
No. of firms	2755
No. of CEOs	2703
No. of CEO exits	855
% of CEO exits	31.63%
No. of Takeover related exits	381
% of Takeover related exits	14.10%
Number of Forced exits	360
% of Forced exits	13.42%
No. of Resignations	66
% of Resignations	2.44%
No. of Retirements	48
% of Retirements	1.78%
No. of Internal Turnovers	474
% of Internal Turnovers	17.5%
Total Observations	15121

We discuss the time series nature of CEO turnover and the possible modes of CEO exit in more detail in Chapter 4.

From Tables 3.4 and 3.5 the median firm in the dataset has annual sales of about US$ 9,259,000, converted to 2000 US$. Thus, the median firm in the data is a large firm. A median firm in the dataset has a positive return on assets (3.81) with some outliers at both ends of the distribution. A median (mean) board in sample firms is constituted of 9 (9.5 directors). The board size does not change significantly over the time period. The 2003-2010 sub-period which follows the corporate scandals and the subsequent regulations on corporate governance is characterized by a higher percentage of independent directors on board (76.21%) compared to the 1993-2001 sub-period (64.58%). This can partly be attributed to the mandatory requirement of independent directors[4] on the board laid down in Section 303A of the NYSE corporate governance reforms (2002). In the same period, the number of directorships held by a median director increased from 2 to 3,

[4]Vide Article 303A of NYSE and Rule 4200 of NASDAQ, an "independent director" is one who is deemed to have no material interest in the firm and have no political, social and familial connection with any employee of the firm. The definition does not include people having connection to a firm in the capacity of auditors and tax consultants of their family thereof as independent directors.

indicating that an increasing number of directors are being involved in the governance of multiple firms. This may result from residual demand for skilled and competent directors or an increasingly refined definition of "independent" directors that publicly listed firms are required to maintain on the board of governance committees.

The period 1992-2010 overlaps with two merger waves in recent economic history: the Fifth merger wave (1992-2000) which saw a significant increase in cross-border M&As and the Sixth merger wave (2003-2008) which was driven by shareholder activism in the USA and the Europe. We augment our dataset with information on takeovers and acquisitions to study the likely impact of corporate restructuring on CEO tenure and CEO pay. We use Acquisition Weekly, Thomson One Banker and Forbes company database to identify events of acquisitions and takeover. From Table 3.3, in the sample period we identify 1311 takeovers of which 169 were undertaken acquiring firms not listed on a US stock exchange and hence classified as "international". Takeover is defined as an event whereby a firm owning less than 50% of a sample firm's (target) voting shares before the acquisition increases the ownership to more than 50% after the event (Guest, 2008). Using a similar definition of acquisition where a sample firm is the acquirer, we identify 8247 acquisitions in the sample period of which 946 were international.

Merger [5] processes may involve significant involvement of the CEOs of both the firms in pre-merger negotiations and can potentially induce bias in estimation of the effect of mergers on CEO pay and CEO turnover (Buchholtz, Ribbens and Houle, 2003, Mikkelson and Partch, 1997). The CEO turnover and CEO pay decisions may be endogenous in mergers because such decisions are usually arrived at the pre-merger negotiations involving the CEOs of both the firms. Also, mergers are often undertaken for business synergy rather than for disciplinary purposes . Thus mergers may not reflect the disci-

[5] Any event of corporate restructuring funded by common stock and classified as "Merger" in the databases and financial press are defined as mergers.

plining effect of the external market for corporate control (Buccholtz et al, 2003). We exclude mergers from our analysis. Similar arguments may hold true for some acquisitions where the CEO of the target firms may exert influence over the post-acquisition pay and turnover decisions. In some friendly acquisitions, the CEOs of target firms are often inducted in the Board of Directors and sometimes as the Chairman of the Board. This can induce some bias in estimating post-acquisition performance and turnover decisions. We attempt to circumvent the endogeneity arising from such scenarios in our estimations. If the CEO of a target firm in our sample is inducted in the Board of Directors following an acquisition, we do not treat such an event as a turnover. This is because such events may not be performance related and can result from pre-acquisition negotiations.

Further, we exclude events of bankruptcy and delisting from our definition of corporate restructuring. In chapter 4 and chapter 5, we discuss the classification of corporate restructuring in greater details.

Table 3.3: Classifications of Acquisitions and Takeovers
Data Source: Thomson One Banker,
Acquisition Weekly and Forbes
Company Database

	1993-2010
No. of Takeovers	1311
No. of International Takeovers	169
No. of Acquisitions	8247
No. of International Acquisitions	946

3.4 Conclusion

We employ Execucomp as the primary dataset for our analysis which provides us with a wide range of information of level and structure of CEO pay, CEO tenure and board memberships. Additional datasets have been used to augment our main dataset with information on firm performance, board size and composition and events of corporate restructuring. We have frequently used financial press (Financial Times, The Wall Street Journal, etc.) to supplement our database and check for possible data errors and missing observations. A range of databases have been employed to minimize omitted variable bias in our empirical analysis.

Table 3.4: Summary Statistics
Data Source: Wharton Research Data Services' Execucomp,
CRSP and RiskMetrics

	N	Mean	Median	SD	Max	Min
CEO pay ('000 US$)	15121	4329.13	1610.22	10252.03	295136.40	0.01
Salary ('000 US$)	15121	600.92	543.84	335.25	5613.20	40.00
Bonus ('000 US$)	15081	564.06	191.82	1678.68	76951.00	0.00
Cash Compensation ('000 US$)	15121	1164.98	800.00	1782.24	77926.00	70.00
Non-Cash Compensation ('000 US$)	15121	1725.24	920.80	2486.75	69850.63	-12465.61
Tenure (Years)	15121	9.33	7.81	10.95	43.93	2.57
ROA ('000 US$)	14748	2.53	3.81	43.38	3551.35	-1314.88
Average Value weighted Return	14765	0.0033	0.0115	0.0494	0.1105	-0.1846
Termination Payment ('000 US$)	15081	1393.78	0.00	7272.403	241089.80	0.00
Sale ('000 US$)	15121	4137.88	9259.39	13858.90	42507189.00	0.00
CEO Share Ownership (%)	15081	0.7022	0.00	3.83	87.60	0.00
Board Size	11522	9.52	9.00	2.63	34.00	3.00
Outside Directors (%)	11522	70.38	71.35	16.87	92.30	55.60
No. of Directorships	11522	2.73	3.10	8.61	14.00	0.00

Table 3.5: Descriptive Statistics: Sub-Period

	1993-2001	2003-2010	1993-2010
No. of firms	1632	1884	2755
No. of CEOs	1614	1860	2703
No. of CEO exits	366	489	855
% of CEO exits	22.67%	26.299%	31.63%
Total Observations	6923	7271	15121
External CEO	691	1044	1412
Mean Tenure (in Years)	10.73	7.89	9.33
Median Tenure (in Years)	8.79	6.53	7.83
Mean CEO Pay ('000 US$)	2583.84	6166.02	4329.13
Mean Salary ('000 US$)	477.66	719.34	600.92
Mean Bonus ('000 US$)	494.47	620.39	564.06
Mean Cash Compensation ('000 US$)	972.13	1339.74	1164.98
Mean Non-Cash Compensation ('000 US$)	2024.54	1506.53	1725.24
Mean Annual Value weighted Return	0.0021	0.0053	0.0033
Mean Termination payment ('000 US$)	1137.66	1911.21	1393.78
Mean Sale ('000 US$)	2530.35	5739.32	4137.88
Mean CEO Share Ownership (%)	0.1738	1.288	0.7022
Mean Board Size	11.23	9.31	9.52
Mean Outside Directors (%)	64.58	76.21	70.38
Mean No. of Directorships	1.99	2.88	2.73

Chapter 4

Are CEOs Replaced For Poor Performance? Effects of Takeovers on CEO Turnover

4.1 Introduction

Over the last two decades, the dynamics of executive pay setting and corporate governance have gained importance in both the economic literature and financial media. Boards of Directors have been criticized for weak governance and concerns are raised about misaligned incentives of the CEO with shareholder value. The growing concern over corporate governance has led to the promulgation of a number of governance and accounting regulations, notably the Sarbanes Oxley Act (2002) and the Financial Accounting Standards Board pronouncement 123R (2004)[1].

[1] FASB (123) refers to article no. 123 of Financial Accounting Standards Board of United States of America that laid down accounting norms for stock based compensation. This was subsequently revised in December 2002 in article no.

The recent literature on executive pay focuses on the determinants of CEO pay growth and agency problems in CEO compensation contracts whereas the dynamics of CEO turnover has received relatively little empirical attention. If optimal contracting holds, poorly performing CEOs will be replaced by the board of directors. The probability of being dismissed as CEO can be a major constraint on CEO behaviour as the cost of job loss is manifest in the form of loss of managerial reputation, prolonged period of unemployment, working for smaller firms and loss of future earnings (Fama 1980; Fee and Hadlock 2004). If the governance of the board of directors is effective, the CEO pay would be closely tied to firm performance and poor performing managers will be replaced.

Poor performing firms are more likely to be taken over and therefore the CEOs of poorly performing firms may face higher risk of being dismissed (Jensen 1988, Mikkelson and Partch, 1997). Empirical evidence suggests that takeovers are associated with a higher than average rate of CEO turnover (Walsh 1988, Mikkelson and Partch, 1997). During times of strong market for corporate control, the executives of firms with poor pre-takeover performance are the ones more likely to depart post takeover (Walsh and Ellwood, 1991).

In a recent study, Kaplan and Minton (2012) finds secular increase in annual turnover rates for both board-driven turnover and post-takeover turnover in the sample period 1992-2007.

In this chapter, we analyze the nature and determinants of CEO turnover in S&P 1500 firms in the sample period 1993-2010. We estimate and compare the risk of CEO exit due to internal reasons (poor performance, active shareholders, etc.) and in the events of their firm being taken over. Our sample period, 1994-2010 overlaps with the fifth (1992-

148 in response to the financial irregularities and accounting scandals surrounding Enron Corporation, Worldcom, Tyco International, etc. Article 148 was superseded by FASB (123r) in 2004.

2000) and the sixth (2003-2008) merger waves and also with the last decade of intense regulatory scrutiny on corporate governance, particularly since the Sarbanes Oxley Act (2002) and the NASDAQ and NYSE reforms (2002). Thus we analyze whether board characteristics and composition has an impact on CEO turnover probability. Finally, we test the effectiveness of the corporate governance regulations on the dismissal function.

The central finding of our analysis suggests that CEOs are being increasingly replaced for poor performance. This is consistent with the principal-agent view that CEOs are disciplined by an implied probability of dismissal.

CEOs of target firms of a takeover face higher probability of exit. We attempt to control for potential endogeneity arising from the fact that poor performing firms may have a higher probability of being acquired. Our findings suggest that there is a strong negative association between pre-takeover firm performance and the probability of CEO exit of the target firm. This is qualitatively similar to the findings of Mikkelson and Partch (1997) but controlling for a wider range of governance parameters, we find a higher magnitude of impact of takeover on turnover probability. We also find evidence that controlling for performance, CEOs of target firms face a higher probability of exit if the acquiring firm is overseas than CEOs of target firms whose firm is acquired by a domestic firm.

Further, we examine the evolving effect of corporate governance and the effects of recent regulations (Sarbanes Oxley Act, 2002) on the likelihood of CEO exit. We find that a smaller, and more independent board, increases the hazard of internal turnover by 3% but has no significant effect on post-takeover CEO turnover. Our evidence suggests that the monitoring of boards and market for corporate control could act as alternate forces on managerial discipline. We find evidence that the post-SOX period is characterized by a significantly shorter average CEO tenure, higher hazards of internal and external turnover and a stronger sensitivity of hazard of turnover with firm performance.

This chapter contributes to several strands of research on executive labour market and corporate governance. While similar studies on CEO turnover exists for the UK (Gregory-Smith, Thompson and Wright, 2009), we present a comprehensive analysis of the dynamics of CEO turnover for the US with updated data and a wider range of governance controls. Consistent with the findings of Kaplan and Minton (2012), we note that there has been a secular rise in the hazard of CEO turnover in the last two decades. Poorly performing CEOs are increasingly being replaced by the board. This is the first study to control for the geography of the acquiring firm and provide evidence that CEOs face a higher probability of exit in the event of a takeover by a foreign acquirer.

Finally, the findings of this chapter are relevant to the debate on the impact of corporate governance regulations on managerial discipline. Consistent with the findings of Murphy and Zabonjik (2004) and Kaplan and Minton (2012), in the post-SOX period, median CEO tenure is 4.8 years, significantly lower than the CEO tenure in the overall sample (7.83 years). Thus the period of rapid pay increase in CEO pay is also characterized by a higher likelihood of CEO turnover. In addition, CEO stock and option grants are currently valued using Black Scholes (1979) model which assumes ten year vesting period of these options. A shortening CEO tenure may mean an overestimation of current CEO compensation measures.

The rest of the chapter is structured as follows; Section 2 briefly summarizes the relevant literature on CEO turnover, the effect of acquisitions on probability of CEO exit and the use of duration models for estimating hazards of CEO exit is provided. Section 3 discusses the data and presents the descriptive statistics. In Section 4 we discuss the duration model specification and robustness issues. Finally, Section 5 presents the empirical analysis and Section 6 concludes.

4.2 Theory and Literature Review

4.2.1 CEO Turnover and Firm Performance

A potent instrument of aligning the interests of the shareholders and the CEO is the ability of the board of directors to dismiss the CEO for poor performance (Zajac, 1990; Lin, 1996). Being dismissed may have a significant negative impact on the future income of the CEOs and may impede career growth. Fee and Hadlock (2004) provide evidence that forced turnover has a detrimental effect on both career growth and pay of the CEOs. Using a sample of 443 large US firms from 1993-1998, they suggest that only a fraction of dismissed executives obtain new employment but those that do find new employment, it is mostly in an inferior job at a smaller firm and accept a pay cut of about 20% on their previous pay. The strength of the dismissal-threat will depend on the degree of monitoring of CEO performance. However, CEO's effort and contributions are often difficult to quantify and measure. Therefore, the likelihood of dismissal depend on the observed firm performance:

$$\Pr\left(Dismissal\right) = g(\Pi) \tag{4.1}$$

where Π is firm performance and $\partial Dismissal/\partial\Pi < 0$.

Conyon (1998) and Gregory-Smith et al. (2009) find evidence that the risk of CEO dismissal responds to firm performance. However, they report a weak influence of governance on CEO turnover risk. These papers, however, are largely based on data sets prior to the year 2002 and hence do not capture the effect of increased regulation and monitoring of CEO performance and pay that characterizes the last decade. In a recent study, Kaplan and Minton (2012) examine a sample of US firms from 1992-2007 and report a secular increase in annual CEO turnover rates for poor performance. They report

an average CEO tenure of just over seven years which reduces to under six years in the second sub-period of the sample, indicating that CEOs are increasingly being replaced for poor performance.

Since the dismissal probability depends on the strength of monitoring, the size, structure and composition of the board are likely to be an important determinant of CEO turnover. From a managerial power perspective, a Chairman CEO may be expected to have greater influence on the governance process and have a higher degree of entrenchment. *A priori*, it may not be reasonable to assume that a smaller board size will have a similar strength of vigilance as that of a larger board. The board of directors is composed of executive (inside) directors and non-executive (outside) directors. An executive director may have closer ties to an incumbent CEO or may be easily influenced by her and may not have sufficient interest to replace her for poor performance. The outside directors may have better experience in governance and may want to signal their competence to the market (Fama and Jensen, 1983). On the other hand, the outside directors may have little financial stake in the firm to ensure effective monitoring (Weisbach, 1988). Further, the directors are members of boards for multiple firms at the same time. A higher number of board membership for a director may reflect her competence and expertise. It may also lead to dilution in her monitoring and vigilance skills. Thus the effects of outside directors on the board and the average number of board membership of the directors are ambiguous.

4.2.2 Post-Takeover CEO Turnover

CEOs can be replaced by the board of directors for poor performance. Alternatively, firms with persistent poor performance may be taken over, thereby increasing the probability of post-takeover CEO departure (Jensen 1988, Denis and Denis, 1995). Theoretical

propositions on the post-takeover CEO turnover often focus on three perspectives.

First, Martin and McConell (1991) suggest that the market for corporate control has a disciplining effect on governance and CEOs of target firms with poor pre-takeover performance are more likely to be replaced (Walsh and Ellwood, 1991). This assumes an efficient market for corporate control as an alternate force of governance to dismiss ineffective and entrenched CEOs. Consistent with the market discipline argument, Hambrick and Cannella (1993) found empirical evidence suggesting that poor firm performance leading up to takeover increases the likelihood of CEO turnover. Mikkelson and Partch (1997) analyse executive turnover during the active takeover market of 1984-1988 and the less active market of 1989-1993 in the US. They find that sample firms experience a 5% higher rate of CEO turnover during the active takeover market and that poor firm performance is associated with the higher rate of exit during the active takeover market. Thus they conclude that strength of external takeover market acts as a measure of "management discipline". Phan and Lee (1995) argue that once the target firm is acquired, the acquiring firm may look for a different skill-set (Hambrick, et al. 1993) and want to remove the CEO of the target firm for his embeddedness in the firm (Hambrick and Fukutomi, 1991). Kaplan and Minton (2012) report a shortening CEO tenure and increasing likelihood of post-takeover CEO turnover but find no significant association of firm performance and the probability of turnover probability of CEOs of the target firms.

Second, from a relative standing perspective, Hambrick and Cannella (1993) suggest that CEOs of acquired firms may not always be dismissed but may also voluntarily resign after acquisition. CEOs of target firms are more likely to resign due to loss of status in the new organizational hierarchy or face the prospect of a power struggle with the management of the acquiring firm. Change in corporate control also increases the likelihood of voluntary turnover of long serving CEOs because of firm specific human

capital investment and psychological investment that is associated with long tenure may also have less importance (Brockner, 1985).

Finally, an alternative explanation of takeover related CEO turnover can be made from a human capital perspective. Human capital theory distinguishes between general human capital, which can be used in a variety of jobs, and specific human capital, which is useful in a specific setting (Becker, 1962). CEOs and firms invest in a wide range of firm-specific and industry-specific human capital during a CEO's tenure (Harris and Helfat, 1997). When a firm is taken over, the importance of the firm-specific and industry-specific human capital is altered. As discussed in Section 2.4, Buchholtz et al. (2003) argue that if the acquiring and the target firm are in a closely related industry, the specific human capital of the CEO may become redundant and the acquiring firm may feel little need to retain the target CEO. Further, they find that CEOs with lower tenure in the firm (and younger CEOs) have lower investment in firm-specific human capital and a lower opportunity cost of job loss and hence are more likely to be replaced or resign after takeover. Similarly CEOs nearing retirement tend to lose little in future income and the possible requirement of a different skill-set to manage the new firm may explain the higher probability of post-acquisition departure.

Studies on the effect of CEO ownership on post-takeover CEO turnover suggests a lower likelihood of CEO exit if the CEO has a large ownership in the target firm. Brunello et al (2003) draws on the managerial power hypothesis of CEOs entrenchment to argue that significant ownership of the CEO weakens internal monitoring and it would be costly for the acquiring firm to replace him. Jensen (1993) reports that CEO duality affects the board's independence and their response to failure of the top management. A change in corporate control is generally associated with the change in board composition and hence increases likelihood of post-takeover CEO exits. Core, Guay and Verecchia (1999) provide an alternative argument suggesting that CEO ownership in a firm aligns the

interest of the CEO with that of the shareholders and maximizes firm value. Therefore a CEO with higher ownership in the firm will have greater incentive alignment.

The impact of cross border acquisitions on CEO turnover has received little empirical attention. Cross border acquisitions may be associated with a higher degree of information asymmetry and involve differences in currency, regulatory and capital market structures and organizational culture. In such events, the knowledge and skills of the CEO of the target firm may be depreciated.

Most studies of post-takeover CEO turnover assume proportionality of the turnover hazard with respect to duration of CEO tenure. However, some studies suggest that the hazards may not be proportional but vary with CEO tenure (Buchholtz et al. 2003) and that there may be little justification for using parametric duration models to study the hazard rate over the duration of CEO tenure.

4.2.3 CEO Turnover and Governance Reforms

There has been sustained scrutiny of CEO pay and corporate governance over the last two decades, particularly since the financial crisis of 2007. The corporate scandals surrounding Enron led to the promulgation of a number of corporate governance regulations, most notably the Sarbanes Oxley Act (SOX) in 2002 and the NYSE and NASDAQ reforms 2002. The stock market reforms set down guidelines for the proportion of outside directors in listed firms and aimed at making corporate accounting more transparent. The main objectives of SOX were to increase corporate accountability (e.g. Section 404 on internal controls to prevent financial frauds) and boost investors' confidence in capital markets. Post-SOX, CEOs are faced with higher penalties leading up to criminal prosecution for non-compliance with financial reporting norms. In addition, Sections 302 and 304 of SOX require the CEO to refund any incentive based compensation in the event

of subsequent identification of financial misstatements. These regulations alter the risk profile of CEO jobs and have potential effects on compensation structuring and corporate governance.

The effectiveness of governance policies in aligning the interest of the CEO to that of the shareholders is much debated in the literature. Weisbach (2007) argues that if a CEO is entrenched in the firm, then it is not inconceivable that s/he may be able to influence the compliance with regulations to shield his interests.

There has been academic interest in the analysis of the effect of SOX and the economic cost of SOX (Cohen, Dey and Lys, 2008; Engel, Hayes and Wang, 2007). Zhang (2007) reports a decline in market capitalization of all firms traded in US stock exchanges by US$ 1.4 trillion. The decline may be a result of compliance costs to the firm or adopting low-risk corporate strategies. Firms with weak corporate governance shield the CEO from increased risk by increasing the weightage of low-risk performance measures for bonus payouts (Wang, 2005; Carter, Lynch and Zechman, 2007). The exogenous shocks on governance and disclosure regulations may have a significant impact on the CEO labour market by changing the risks associated with the CEO job and the compensation level and structure.

4.3 Data

The sample of firms is drawn from S&P 1500 indices[2] for the period 1993-2010. Execucomp provides information on 3016 CEOs in that sample period. 302 firms do not report either the CEOs or the start date and date of turnover of their CEOs (in case of the event of turnover) and have been dropped from the study because their duration of exposure

[2] S&P 1500 contains S&P 500 firms (500 firms), S&P Midcap (400 firms) and S&P Small Cap (600 firms). In the beginning of the sample period, Execucomp covers 1157 S&P 1500 firms. From 1997, Execucomp covers all firms in S&P 1500.

to turnover hazard couldn't be determined. We also drop observations on firms which are in the sample for only one year. This leads to the omission of 12 more firms from the analysis. Probit regressions to analyse sample selectivity (reported in Table 4.3) were performed using firm performance and CEO pay measures but none of the parameters were estimated to be statistically significant and hence there seems to be no evidence of systematic non-disclosure of information. The remaining 2755 organizations, observed in the period 1993-2010, are included in the analysis. Thus the final sample contains 15121 CEO-year observations for 2703 CEOs. The number of CEOs is smaller than the number of firms. This is because our sample consists of firms listed in S&P 500, S&P Midcap and S&P Smallcap firms. There is considerable movement of CEOs among these cohorts of firms. CEOs change jobs within the S&P 500 firms but also take up CEO jobs at smaller firms listed in the S&P Midcap and S&P Smallcap indices. Thus we have 2703 unique individuals who are appointed as CEOs in the sample firms in our sample period.

The firms are observed from the first year they appear on the Execucomp database until the end of the study period or until the firm drops out of the sample due to mergers and acquisitions or delisting from the S&P indices and stock exchange. The firms that we lose from observation within the sample period are not omitted to avoid survivor bias.

Events of CEO turnover are identified from the Execucomp database, Fortune 500 and Fortune 1000 lists, the Wall Street Journal and Lexis/Nexis Business news database. Consistent with the definition used by Huson et al. (2004), turnover is defined as an event of a CEO relinquishing/being discharged of his duties at any particular time in the study period. Thus turnover in a given year of observation, t, means that a CEO who is observed in a firm on 1st day of October of year, t, would no longer be observed in the same firm on 1st day of October of year, t+1.[3]

Using the afore mentioned databases on executives and press releases around the events

[3] We use October-September cycle to overlap with the DEF 14 A filing cycles.

of turnover, we identify 855 events of CEO turnover of which we can classify 381 events to have occurred within two years of takeover.[4] Further, there were 144 instances where following takeover, the CEO of the target firm ceases to be the CEO but continues to be an executive member and/or Chairman of the board. These situations are ambiguous as the CEOs have been replaced but continues to be in senior management of the governance committee. This may reflect the fact that removal from a CEO position may not be due to performance related reasons, a change in human capital requirements or a power-struggle. In our research, we do not treat these events as turnover.[5]

We classify two types of CEO turnover, internal turnover, associated with the performance of the firm and board of directors and external turnover where events of turnover occur within two years from an event of a takeover.[6] Internal turnover are further classified into Resignations, Retirements and Forced Turnovers. Thus the forced turnover variable does not include those CEOs who exit their job following an event of takeover because it is classified as a performance-related board driven internal turnover. CEO turnover for which the press reports that the CEO was fired, forced out through retirement or resigned due to policy differences or internal pressures are classified as events of "Forced Turnover".The events of CEO turnover which explicitly mentions that the CEO has resigned to pursue other interests or join another firm are categorized as "Resignations" and if the CEO retires on attainment of retirement age or for health-related reasons, we classify those events as "Retired". Using this definition we identify 360 Forced Turnovers, 66 resignations and 48 retirements in our sample period.[7]

In the event of CEO turnover within a financial cycle, Execucomp reports the com-

[4] There have been 6 instances of incumbent CEO's death within the sample period. These events are not treated as events of turnover. If a CEO resigns from a firm due to poor health and subsequently expires, we treat the events as turnover.

[5] As a measure of robustness we include these 144 events in our definition of post-acquisition CEO turnover. The results are qualitatively similar but the hazard of turnover increases.

[6] Turnover due to bankruptcy and delisting from stock exchange are classified as internal turnovers. If the delisting is preceded by a takeover within 24 months, we classify the events as turnovers due to takeover.

[7] Robustness check was performed with reclassifying the modes of turnover and is discussed in Section 5.3.

pensation of the CEO who has been in office for the longer period of time. We identified such events and care was taken to map the CEOs and corresponding pay.[8] Further, the severance pay entitlement in the event of involuntary turnover is used to control for the cost of CEO replacement. The data for severance payment and change in control payments are obtained from Execucomp and annual DEF 14A filings of the firms. In USA, typical severance plan provides 6 to 24 months of pay (including bonus) for general severance and 12-36 months for severance arising out of change in control. Severance in the event of change in control also allows the CEO immediate vesting of the stock options at the grant price. However, there is no mandatory statute on the prevalence and amount of severance payments that a CEO can be eligible for. About 36% CEOs in the sample have severance pay provisions with mean (median) severance pay of US$ 1.4 million (US$ 0.00).[9] The median CEO pay of US$ 0 means that the effect of severance pay on turnover hazard reflects the differential effect for only the CEOs having a severance pay eligibility.

Using information on the CEOs date of assuming office and the date of turnover, we construct a measure of CEO tenure (in years). To account for potential non-linearity in the tenure effect (Gregory-Smith et al. 2009) we use the quadratic function of tenure. The median tenure of a CEO in a firm in the sample is 7.83 years. This is consistent with the estimates of Kaplan (2012) who reports an average CEO tenure of just over seven years for Fortune 500 firms in the period 1992-2007. We use a bigger sample of S&P 1500 firms and for a longer period (1992-2010). In the sub-period 2003-2010, the median CEO tenure is 6.53 years. Execucomp also provides information on the date the CEO joined the firm. Using this information, we construct an indicator for outside CEO

[8] We identified events of turnover within a financial cycle. If the outgoing CEO has been in the office for the greater part of the year, we record an event of turnover in that year. On the other hand, if the new CEO is in office for the greater part of the year, we record an event of turnover in the previous year. In 8 occassions when the turnover occured around the middle of the financial period, we treat them as if the outgoing CEO has been in the office for greater part of the year.

[9] We seek to control for potential endogeneity in firms having provisions for severance pay. Probit estimations were performed using an indicator for presence of severance pay agreement as dependent variable, and firm size, firm performance and governance variables as independent variables. Coefficients of all independent variables were statistically insignificant.

hire. If the date of joining the firm and becoming the CEO is the same, then the CEO is hired from outside and the indicator takes on a value of '1'. Similarly, if the date joining the firm is earlier than the date of becoming CEO, then it is an internal promotion.

We identify events of takeovers using the Thomson Financial Securities Data's SDC Platinum^{TM} Worldwide Mergers and Acquisitions Database and Forbes company database. For the purpose of this study, takeover is defined as an event whereby a firm owning less than 50% of the voting shares of a target firm before the acquisition increases the ownership to more than 50% after the event (Guest, 2008). The date of announcement is used as the year of the event for our analysis. This is because the CEOs are exposed to higher risk of turnover from the time the takeover is announced. We identify the events where a target firm in our sample is taken over by another sample firm or a firm outside the sample. In the sample period, we identify 1311 events of takeover of a sample firm or a major subsidiary of the sample firm. Following the sample selection method of Lehn and Zhao (2006), the sample of takeovers for this study was drawn from the database using the following criteria: (a) The takeovers were announced between January, 1, 1992 and December, 31, 2010; (b) both the acquiring and target firms are publicly listed[10]; (c) the deals are categorized as Tender Offers; (d) the deals are "completed"; and (e) the size of the target firm, measured as natural logarithm of total assets, is at least 10% of that of the acquiring firm.[11] These filters help in identifying 844 events of takeover of target firms. 840 firms in the sample witness at least one event of takeover [12]. In the sample period, 1915 firms do not take part in any takeover related activities and are

[10] Although Thomson's databases do contain information of privately held firms, we only base our analysis on listed firms. This is because information on privately held acquiring firms not listed in the US are not easily available and may not be consistent.

[11] The central objective of our study is to analyze the likelihood of post-takeover CEO turnover. Hence, the events of management buy-outs are not considered as post-acquisition CEO dismissal.

[12] In the sample period, there have been four instances when a target firm (T) is acquired by another firm (A) in the sample and subsequently the acquiring firm (A) is taken over by a third firm (X). However, these events of sequential takeovers are not in close proximity in time so as to have confounding effect on probability of exit. Only one of these four instances result in a CEO turnover.

used as a reference group. Takeovers are classified as international if the acquiring firm is not listed in US stock exchanges. Using this definition, we identify 118 international takeovers. Consistent with Buchholtz et al (2003) we exclude mergers from our analysis since the CEOs may have some degree of influence over pre-merger negotiations.

CEO pay for each year is calculated as the sum of the salary, annual bonus payout, Black-Scholes value of stock and option awards granted in the year, non-equity incentives, value of restricted stock grants (RSUs) and long term incentives (LTIP) due that year and all other cash compensation paid in that year. The nominal CEO pay is converted to 2000 US dollars by using Consumer Price Indices published by the US Bureau of Labour Statistics. The natural log of CEO pay is used in the analysis as an explanatory variable.[13] Total Pay is skewed with a mean (median) of US$ 4.3 (1.7) million.

Firm performance measures were obtained from S&P's COMPUSTAT Research Tape whereas the stock price data was merged from the Centre for Research in Securities Prices (CRSP) database at the 2-digit SIC code level. Based on existing literature (Buccholtz, Ribbens and Houle, 2003, Hambrick and Cannella, 2004, Jensen, et al, 2004), we use Return on Assets (ROA) as the accounting measure of firm performance, [14] and we use natural logarithm of sales as a measure of firm size.[15] Firm performance may not always be a reflection of managerial effort but may be significantly influenced by industry wide shocks. We construct a measure of relative performance to control for industry shocks. First, we calculate the yearly average of the value weighted returns on the firm's stock from monthly data. The annual average value weighted return for a firm is then benchmarked to the average annual value weighted return of the median firm in the same

[13] The estimations are robust to alternate specifications of CEO pay, without using the LTI and RSU. "All Other Total" payments include severance payout that may have been made in an year and has been excluded from the analysis.

[14] Estimation with Earnings Before Interest and Taxes (EBIT) and Earning Per Share (EPS) yield qualitatively similar results.

[15] Alternate specification of firm size using natural log of total assets was used as a measure of robustness. The estimations were statistically indifferent from the estimations with log Sales as measure of firm size. The results are not presented here and is available on request.

industry. Further, to control for the risk in firm's operating and information environment, we use the volatility in firm's stock returns by using the standard deviations of monthly value-weighted returns on a firm's stock in a given year.

A priori, we may expect the strength of corporate governance to have an impact on the probability of CEO dismissal. Data on corporate governance were obtained from the Risk Metrics database (formerly IRRC). The number of directors on a board and the percentage of outside directors are used as measures of board size and board independence respectively. If the CEO also acts as the Chairman of the board (CEO duality) and/or has higher stock holdings in the firm, she may enjoy some degree of power over the board of directors. We also control for a "busy board" using the average number of board memberships of the directors of a given firm in a given year.

Corporate governance data is available for 1996-2010 and hence specifications with corporate governance controls contain 11522 firm-year observations. The summary statistics of the reduced sample in provided in Panel B of Table 4.1.

Table 4.2 lists figures for turnover and takeover for the two sub-periods of the sample. The overall rate of turnover reported in this study is higher than the estimates in the existing literature. Overall turnover is 31.63% in the entire sample period. Studies by Jensen et al. (2004) and Murphy and Zabonjik (2004) report CEO turnover at 10.2% in 1970s, 10.0% in 1980s and 11.3% in 1990s. Kaplan (2006) reports 16.5% level of CEO turnover in the period 1998-2005, which is consistent with our estimates for the second sub-period of our sample. Our sample contains observations from the decade 2000-2010. This period, concurrent and after the formulation of the Sarbanes Oxley Act (2002), and stock exchange reforms on corporate governance, is characterised by an increased focus on corporate governance measures. The turnover rate in the seven post-SOX years is 13.75%. In this chapter, we estimate the effect of change in corporate governance regulation on the baseline hazard of CEO exit.

4.4 Methodology

Our sample comprises CEOs who began their tenure prior to the start date of the sample period (left-truncation) and CEOs whose tenure extends beyond the end of sampling period (right truncation). The existing literature on CEO turnover has used probit regression models or Cox-Proportional Hazards models to account for a left truncated and right truncated sample (Gregory-Smith, et al., 2009, Buchholtz, Ribbens and Houle, 2003). In our sample, we observe firms which drop out of the sample but reappear after a few years. Thus, in addition to left truncated and right truncated observations, we also have interval truncated observations and delayed entries. The interval truncation results from sample firms dropping out of S&P 1500 listings and subsequently reappearing after a gap. We do not follow the firms after they drop out of the S&P 1500 listings and hence during the period they are not in the listings, we do not observe them in our sample.

Heckman and Singer (1984) argue that events occur in continuous time and there is no naturally discrete time period for occurrence of events. However, in practice, time is generally measured in discrete units (hours, weeks, years, etc.). For events occurring frequently in small intervals of discrete time (seconds, minutes etc.), a continuous time approach is a reasonable assumption. If the time intervals are large (months, years etc.), the continuous time assumption may be a strong one. Discrete time analysis is more suitable than continuous time models in the following situations (Allison, 1982):

1. If the events occur only after discrete time points.

2. If the process is observed to be discrete but the underlying process is continuous.

To deal with events occurring in discrete time but having an continuous underlying process, Prentice and Gloecker (1978) proposed discrete time proportional hazard models. This class of models can deal with the discrete time nature of the events but can also readily handle the continuous time assumption of the underlying process within its

framework. Further advances in this method are made by Han and Haussman (1990) and Jenkins (1995). Discrete time models can be obtained from grouping the continuous failure times into half open intervals $[0= t_0,t_1)$, $[t_2,t_3)...,[t_{k-1},t_k=\infty)$, and the probability of exit for ith individual in the jth interval is:

$$\Pr\{T\epsilon[t_{j-1},t_j)\} = P_{ij}= S(t_{j-1}|\, x_{j-1}) - S(t_j|\, x_j) \tag{4.2}$$

where $S(t_{j-1} \mid x_j)$ is the survivor function at the start of the interval $[t_{j-1},t_j)$ i.e. the probability of not failing until time t_{j-1} and $S(t_j \mid x_j)$ is the survivor function at the end of the time interval.

Equivalently, the survivor function can be given by:

$$\ln[-\ln(1-h_{ij}(t))] = x_i^{'}\beta + \gamma_j(t) \tag{4.3}$$

The above expression, a complementary log-log transformation follows from the proportional hazards model without any further distributional assumption (Narendranathan and Stewart, 1993). By introducing separate parameters, $\gamma(t)$, for each half-open duration interval, the above specification can be estimated non-parametrically. The specification is non-parametric because it does not impose a functional form on the baseline hazard, which can take any shape. However, within each time interval, the baseline hazard is assumed to be exponentially distributed and the parameter $\gamma(t)$ for each time interval can be estimated with the structural parameters, β.

The duration data used in this analysis are measured in discrete time units of years, and hence we employ discrete time duration models. In a sample period characterized by an increasing rate of CEO turnover and decreasing tenure, the assumption of propor-

tionality of hazards of exit with tenure (or age) may be debatable.[16] Little theoretical and empirical evidence exists to suggest that the distribution of hazards of CEO turnover and the effects of the covariates are proportional or parametric. The median CEO tenure is lower in the second sub-period (2003-2010) of our sample, indicating that assuming a non-parametric distribution of the hazard may be most appropriate.

The hazard of exit for an individual CEO, i, to an exit state can be described as:

$$h_i(t) = h_0(t) \exp(x_i'\beta) \tag{4.4}$$

where$h_0(t)$ is the baseline hazard and x is a vector that controls for observable parameters and β is a vector of estimated coefficients. If each individual exits through a given exit state in the interval $[t_0,t_1)$, the discrete time hazard is given by

$$h_i(t) = 1\text{-}\exp\left\{-\int_{t_0}^{t_1} h_i(u)\,du\right\} = 1\text{-}\exp\{-\exp(x_i'\beta)\gamma(t)\} \tag{4.5}$$

where the baseline hazard is of the form:

$$\gamma(t) = \int_{t_0}^{t_1} h_0(u)\,du \tag{4.6}$$

No distribution assumption is imposed on $\gamma(t)$ and the model is estimated semi-parametrically. The log likelihood contribution of a spell of length (tenure) d_i is:

[16] The proportional hazards assumption is that changing any explanatory variable has the effect of multiplying the baseline hazard by a constant. Equivalently, the estimated baseline hazard parameters are independant to all other explanatory variables. This further implies the use of random effects terms to control for unobserved heterogeneity (discussed further below).

$$L_i = c_i \ln h_i(d_i) + \sum_{t=1}^{d_i-1} \ln\{1\text{-}h_i(t)\} \tag{4.7a}$$

$$= c_i \ln\left(1\text{-}\exp\left[\text{-}\exp\left\{x_i(d_i)'\beta + \gamma(d_i)\right\}\right]\right) \tag{4.7b}$$
$$\text{-}\sum_{t=1}^{d_i-1} \exp\{x_i'\beta + \gamma(t)\}$$

where c_i is a censoring indicator which takes the value '1' if d_i is uncensored and zero otherwise. a_i denotes the length of tenure of an individual CEO. For incremental increase in tenure (b_i), the total duration can be expressed as $d_i = a_i + b_i$, which can be either censored or uncensored. Hence, the above equation can be expressed as:

$$L_i = c_i \ln h_i(a_i + b_i) + \sum_{t=a_i+1}^{a_i+b_i-1} \ln\{1\text{-}h_i(t)\} \tag{4.8a}$$

$$= c_i \ln\left(1\text{-}\exp\left[\text{-}\exp\left\{x_i(d_i)'\beta + \gamma(a_i + b_i)\right\}\right]\right) \tag{4.8b}$$
$$\text{-}\sum_{t=a_i+1}^{a_i+b_i-1} \exp\{x_i'\beta + \gamma(t)\}$$

γ's can be interpreted as the log of a non-parametric baseline hazard. This constitutes a panel for each individual $j = 1, 2...d_i$ observations.

We specify a baseline discrete duration model of the following form:

$$cloglog(h_{sij}) \equiv \ln[-\ln(1 - h_{sij})] = \alpha_1 d_{1ij} + \cdots +$$
$$\alpha_p d_{pij} \ldots + \beta_1 X_{1ij} + \cdots + \beta_p X_{pij} \tag{4.9}$$

The hazard of a subject facing a certain event (h_{sij}) is calculated using a complemen-

tary log-log model. $d_{1ij}...d_{pij}$ are yearly spells of CEO tenure in a given firm and $X_{1ij}...X_{pij}$ controls for the effects of all observables on the baseline hazard.

We use cloglog estimation technique in our analysis. The choice of logit, probit of cloglog estimation technique is unlikely to affect the results, although Beck, Katz and Tucker (2008) indicates the symmetric nature of logit and probit models around a median probability ($\lambda = 0.5$). The estimates of cloglog models can be interpreted as semi-elasticities. To ascertain that our results are not mere artefacts of the choice of estimation technique we also conduct a logit estimation of our baseline model.

The dependent variable in this analysis is "Turnover" that takes on the value of '1' in the time period when an event of CEO exit is observed and '0' otherwise. Turnover as a binary variable to identify events of CEO exit are commonly used in literature (Gregory-Smith et al. 2009, Conyon, 1998). Our dependent variable comprises of events of turnover through dismissal, retirement or resignation. CEO exit after interim appointments and cases where an incumbent CEO leaves the job but continues as the Chairman of the Board are not treated as turnover.

Jensen and Murphy (1990) and Buchholtz et al. argue that probability of CEO exit is a function of CEO age. Younger CEOs with lower firm-specific human capital and higher mobility face higher hazard of exit. Similarly, CEOs close to the retirement age also face a higher probability of turnover because the changing industry conditions may require different skill set. In our analysis, CEO age is strongly and significantly correlated with tenure ($\rho = 0.632$) and therefore we control for only CEO tenure in our analysis.

There are contrasting views on the appropriate measures of firm performance. Choice of stock returns as a measure of firm performance (Couglan and Schmidt, 1985) reflects the expected value created by a CEO but is subject to market noise. On the other hand, accounting measures only partially reflect the value created by the existing CEO and the remainder is reflected as future earnings (Engel et al. 2003). Further, Tirole

(1988) and Jensen and Murphy (1990) argue for using performance measures relative to the industry to control for demand, productivity and technology shocks. Therefore we control for performance using both accounting and stock market performance. Return on Assets,ROA_{it}, is used to control for accounting performance[17]. The accounting measure of performance is not benchmarked to the industry. We use average annual value weighted returns on a firm's stock as alternate measure of firm performance. The average annual value weighted returns are calculated from the monthly value weighted returns. The annual value weighted return of firms are then benchmarked to the returns on the stock of the median firm in the same 2-digit SIC code.[18]

Further, we control for the lagged firm performance(Geddes and Vinod, 1997). It can be argued that CEO dismissals not only result from contemporaneous firm performance but also from the past performance of the firm. Annual Sales of a firm is used to control for firm size.[19]

The board of directors are entrusted to align the shareholders' and the CEO's interests (Jensen, 1993). The board of directors may design incentives by making CEO pay contingent on firm performance or by replacing poor performing CEO. Thus board characteristics are potentially important determinants of hazard of CEO turnover. We control for the size and composition of the board as proxies for strength of corporate performance. The number of directors on the board in a given year and the percentage of outside directors on the board are used to control for board size and board independence, respectively. It may not be reasonable to assume that a smaller board size will have a similar strength of vigilance. The board of directors are composed of executive

[17] Alternate measures of performance like Earning Per share and Pre-tax Income have been used as robustness check. The results are qualitatively similar and have been omitted for brevity.

[18] We estimate alternate specifications using equal weighted returns as measures of performance. The estimates (not reported) from both the models are similar in magnitude and significance.

[19] We made a conscious choice of using Sales over Assets as a measure of firm size because visual inspection revealed that some firms with relatively large Sales volume have lower assets, notably firms in IT industry and proportion of such firms increases towards the later half of the sample period. However, we checked for robustness of our measure of firm size and find no significant difference in the effect of firm size by using log of assets as the control.

(inside) directors and non-executive (outside) directors. Executive director may have closer ties to the incumbent CEO or may be easily influenced by her and may not have sufficient interest to replace her for poor performance. The outside directors may have better experience in governance and may want to signal their competence to the market (Fama and Jensen, 1983). On the other hand, the outside directors may have little financial stake in the firm to ensure effective monitoring (Weisbach, 1988). Further, the directors are members of boards for multiple firms at the same time. A higher number of board membership for a director may reflect her competence and expertise. It may also lead to dilution in her monitoring and vigilance effort. Thus the proportion of outside directors on the board and the average number of board membership of the directors may have significant effect on the strength of corporate governance. We also control for CEO duality- if the CEO is also the Chairman of the board, he may have significant influence over the monitoring and vigilance of the board.

Turnover hazard may be correlated with unobservable CEO characteristics like skill and ability. To account for unobservables, we control for a range of CEO characteristics.

First, we control for previous experience as CEO in another firm to account for CEO skills and competence. A CEO with previous experience may have a different skill set and competence compared to a newly promoted CEO. Second, we use an indicator variable for external hires to control for whether the CEO has been hired externally or has been promoted from within. We also control for the percentage share holding of the CEO in the firm. *A priori*, we may expect that a CEO promoted from within and having higher equity ownership in the firm will have higher firm specific knowledge and higher degree of entrenchment. Thus CEO share-ownership and the mode of hire may have significant impact on turnover hazard. We don't for CEO gender because it may not be apparent how gender may impact turnover behaviour and small proportion (6 out of 2703) of female CEOs.

We estimate the following empirical model for our analysis:

$$c\log\log(Turnover_{it}) = \alpha + \beta_1 Duration_{it} + \beta_2 ROA_{it} + \beta_3 IndustryAdjustedValueWeighted\,\mathrm{Re}turns_{it} + \beta_4 Sales_{it} + \beta_5 X_{it} + \beta_6 Governance_{it} + \epsilon_{it} \quad (4.10)$$

In equation (4.10), $\mathrm{Duration}_{it}$ refers to the annual spells of CEO tenure. We create indicator variables for each year for which an incumbent CEO is in office. These indicator variables capture the effect of each unit increase in CEO tenure on the hazard of exit and circumvent distributional assumptions. The use of multiple time spells may lead to a loss of degrees of freedom and fluctuations in hazard functions.

The vector X_{it} controls for all other observable CEO and firm characteristics that may be associated with CEO turnover. β_5 captures the contemporaneous effects of these parameters on hazard of CEO exit. β_6 reflects the effect of governance varibales on the baseline hazard. If badly governed firms are associated with a lower CEO turnover hazard, the signs of the coefficients on board independence, CEO duality and percentage share ownership of the CEO can be expected to be positive.

To estimate the effect of takeovers on the probability of CEO turnover, we modify the baseline hazard by adding an indicator for events of takeover and estimate the following equation:

$$c\log\log(Turnover_{it}) = \alpha + \beta_1 Duration_{it} + \beta_2 ROA_{it} + \beta_3\,\mathrm{Re}lativeValueWeighted\,\mathrm{Re}turns_{it} + \beta_4 Sales_{it} + \beta_5 X_{it} + \beta_6 Governance_{it} + \beta_7 Takeover_{it} + \epsilon_{it} \quad (4.11)$$

The dummy $Takeover_{it}$ takes the value of '1' if an event of a sample firm being acquired in a particular year and '0' otherwise. To capture the lagged effects, we also use $Takeover_{i,t-1}$ and $Takeover_{i,t-2}$ dummies for the years following an event of takeover.[20] In alternate specifications, we use contemporaneous and lagged indicators for takeovers by foreign acquiring firms.

The CEOs and firms in this study may have some unobserved characteristics that influences outcomes for instance, some firms more may be more prone to have tender offers and some CEOs more prone to face the hazard of turnover. If unobserved heterogeneity between the subjects due to omitted variables is not accounted for, the duration dependence of the baseline hazard will be overestimated (if it is a negative relationship) or underestimated (if it is a positive relationship). Observations with high frailty fail faster, ceteris paribus, so survivors at any given time would be have increasing proportions of subjects who face lower hazards. So, as discussed in subsection 4.4.2, we seek to control for unobserved heterogeneity.

4.4.1 The Competing Risk Approach

In the above analysis we make an implicit assumption that an individual in a given state (j) either exits through failure in state (k) or remains in state (j) across a given time interval t. This may imply that hazard of CEO exit are similar across all modes of CEO exit i.e. the hazard of dismissal is the same as the likelihood of retirement over a CEO's tenure. However, such assumptions may not reveal the underlying dynamics of CEO exit as CEOs exit the firm through various mutually exclusive states viz. resignation, retirement, dismissal, etc. These states are competing in the sense that they censor each other. To account for that, we require a modelling approach that allows for individuals to

[20] In some cases, the target firms are integrated with the acquiring firm in the year of the event and ceases to exist as before. The lagged effects could not be calculated for such events. However, visual inspection suggests that all these events resulted in the dismissal of the CEO of the target firm in the year of turnover.

exit through multiple failure states and allows for right hand censoring. [21] The competing risk models are often used to model multiple exit states in duration analysis.

Alternatively, a single risk state can be modelled while controlling for each exit state as covariates. Although simple in computation and easier to interpret, this approach linearizes all other covariates across exit states. In the context of CEO turnover, it will imply that over the tenure of a CEO, the hazard of exit through retirement may not be the similar to the hazard of being dismissed. From managerial entrenchment perspective, an entrenched CEO will reduce her risk of being dismissed but the risk of retirement will rise with increasing CEO tenure. Therefore, we use competing risk models in our analysis to account for the probability of CEOs making exit through multiple failure states.

Exit states denote an exit to a different destination state. For each failure state, observations at all time intervals d_i are zero except the last, where the last is equal to '1' iff the individual exits to that state. Hence, there is a hazard for each j time period for each exit state. For each exit state (m), we can estimate equation (4.10). We assume proportionality of hazards and estimate complementary log-log model.

The likelihood of exit to a given failure state m (Π_m) and the survival time until failure via state m (Γ_m) both depend on hazards to each failure state, through the overall survival function:

$$\Pi_m = \sum_{t=1}^{\infty} h_{mt} S_{t-1}, \Gamma_m = \frac{1}{\Pi_m} \sum_{t=1}^{\infty} t h_{mt} S_{t-1}, S_t = \prod_{s=1} \left(1 - \sum_{m=1}^{M} h_{ms} \right) \tag{4.12}$$

Where s is the survival function at time t.

We can estimate the probability of exit via state m conditional on exiting during interval t :

[21] Right hand censoring occurs when subjects never exit their origin state till the end of sample period.

$$P_{mt}=\frac{h_{mt}}{\sum_{thmt}}, m = 1, 2, ..., M. \tag{4.13}$$

The baseline hazards can be specified as:

$$\widehat{h}_{mt}= 1\text{-}\exp\left[-\exp\left\{\overline{x}'\widehat{\beta}+\widehat{h_{0mt}}\right\}\right] m = 1, 2, ..., M. \tag{4.14}$$

where $\overline{x}$ is the sample mean.

4.4.2 Controlling for Unobserved Heterogeneity

We have controlled for many of the conceivable parameters that may impact on the probability of post-acquisition CEO turnover. However, it may still be possible to have omitted variable bias resulting from some other parameter that simultaneously effects the probability of being taken over and the probability of CEO dismissal such as the nature of the industry the firm operates in. Due to the heterogeneity of the different industries, the CEOs may be exposed to higher risk of post-takeover exit in some particular industries than in others. It may also be argued that targets of acquisition are hardly a random sub-sample of firms. If unobserved heterogeneity is not accounted for, the shape of the baseline hazard and the parameter estimates can be severely biased (Flinn and Heckman, 1982; Heckman and Singer, 1984).

Assuming unobservables are constant over time, frailty models were estimated to control for heterogeneity at the industry and firm levels .

A random intercept cloglog model allows for the difference of survival times of subjects that can be grouped at industry and firm levels. Conditioning on the covariates, a positive random intercept term, ζ_i, for each group is added in the cloglog model.

where

$$\zeta_i : d_{ij}, X_{ij} \tilde{} N(0, \psi) \tag{4.15}$$

The hazard function is therefore modified as:

$$\begin{aligned} h_{ij}(t) &= 1 - \exp[-\zeta_i \exp(x_i\beta + \gamma_j(t))] \\ &= 1 - \exp[-\exp(x_i\beta + \gamma_j(t) + u_i)] \end{aligned} \tag{4.16}$$

where $u = \log \zeta$ and has a density $g_v(v)$ for the random variable v $(v > 0)$ introduced to capture the effects of unobservables, so that:

$$h(t) = h_0(t) \exp(x_i\beta) v_i = h_0(t) \exp(x_i\beta + u_i) \tag{4.17}$$

$h_0(t)$ represents the baseline hazard. The discrete time likelihood for turnover of an individual CEO will therefore be:

$$L_i(\beta, \gamma) = \int_{-\infty}^{+\infty} \left[\prod_{j=1}^{t} h_j(t \mid x, u_i)^{y_{ij}} [1 - h_j(t \mid x, u_i)^{1-y_{ij}}] \right] g_u(u_i) du_i \tag{4.18}$$

with $h_j(t \mid x, \varsigma) = 1 - exp[-\exp(x_i\beta + \gamma_j(t) + u_i)]$

The exponentiated random intercept, exp (ζ_i), is the shared frailty of the subjects belonging to a certain grouping classification. Since we do not observe the heterogeneities, in principle equation 4.18 cannot be estimated. This problem can be circumvented by assuming a parametric distribution of the frailties. Stewart (1996) discusses several functional forms to estimate the maximum likelihood in presence of frailty terms. The most commonly used distributions are Gamma (Lancaster, 1979) and Gaussian (Behrman

et al. 1990; Narendranathan and Stewart, 1993). The Gamma distribution assumption yields a closed form solution for the likelihood function but the Gaussian assumption does not.

In this chapter, we use both the Gaussian quadrature technique and Gamma frailty estimations to control for unobserved heterogeneity and the effects of omitted variables. We acknowledge that the choice of heterogeneity distributions may effect the parameter estimates and a non-parametric strategy suggested by Heckman and Singer (1984) may overcome the distribution restrictions. However, in addition to being computational intensive, the Heckman and Singer (1984) methodology has been criticized for being sensitive to the specification of the hazard (Trussell and Richards, 1985). For our analysis, we use firm performance measures that are relative to the median firm in the industry. Hence, we partially control for unobserved industry-wide fluctuations in our performance measures. Therefore, we believe that the choice of distribution of heterogeneity would not significantly alter our results.

4.5 Results

The hazard function of CEO dismissal with tenure is presented in Figure 4.1. The hazard of CEO exit in the early years of tenure rises with tenure and then starts declining. The CEO hazard function is likely to increase in information asymmetry (Jovanovic, 1979). Once all the poor performers are revealed, the hazard of CEO exit decreases with the decrease in information asymmetry and only the better performers survived. An alternate argument is that after the initial years, the CEOs entrench themselves in the firm by exerting their managerial power, thereby reducing the hazard of turnover (Bebchuk and Fried, 2003). This is consistent with the human capital perspective that CEOs early in their career have lower firm-specific human capital and lower opportunity cost of job loss.

Therefore the likelihood of CEO departure or dismissal is high during the early years of tenure and falls with further increase in tenure. In the following sections we present the results of our estimations.

4.5.1 Are CEOs replaced for Poor Performance?

Table 4.4 documents the results of our baseline turnover model. The estimates reported are the hazard ratios. A hazard ratio greater than '1' indicates a positive association of the independent variable with the turnover hazard and a hazard ratio less than '1' indicates negative effect of a covariate on the baseline hazard. Additionally, we report marginal effects in Table 4.14.

We report estimates with the accounting measures of firm performance (column 1) and benchmarked value weighted return of the firm (column 3). Column (2) and (4) additionally controls for governance measures. The estimates reported can be interpreted as elasticities.

Our results are consistent with the principal-agent perspective. The measures of performance show a significant negative association with the hazard of turnover. A unit decrease in accounting performance, measured as ROA, increases the likelihood of CEO turnover by 3.4 percentage points. Similarly, a percentage point decrease in value weighted return in the firm's stock with respect to the median firm in the industry increases the hazard of exit by 1.3%. Our results are comparable with the estimates of Kaplan and Minton (2012). CEO replacement decisions may not be solely based on firm performance in the current period but may also be influenced by past performance. Therefore, we control for lagged firm performance. Past performance significantly affects the hazard of CEO turnover. However, the magnitude of the effects are smaller than that for contemporaneous performance. This effect persists till the second lag of performance. The effects of third lags of performance measures are insignificant at conventional lev-

els. The statistically significant estimates on industry-benchmarked returns suggest that CEOs are increasingly being replaced for poor performance relative to the industry. Our results suggest that CEOs are increasingly being replaced for poor accounting performance as well as poor industry-adjusted returns. There may be potential non-linearities in the impact of firm performance on CEO turnover decisions. We examine the effects of the performance quartiles on internal CEO turnover and turnover following takeovers. The results are reported in Table 4.12. There is no suggestion of non-linear effects of performance on takeover-driven turnover. For internal turnover, CEO of a firm in the upper quartile of firm performance is twice as likely to be replaced for poor performance than CEO of firm in the lower quartile. CEOs of firms having an ROA over 7.75 is more likely to be replaced. Thus there is evidence of non-linearity in the effect of performance on CEO turnover.

Further, the risk in firm's operating and information environment may have an impact on the hazard of CEO turnover. We control for firm risk with the volatility in firm's monthly value weighted returns over the period of a given year. We find a positive association of firm risk with hazard of turnover. A percentage point increase in firm risk increases the hazard of turnover by 1.47%.

We control for a range of CEO characteristics that may impact the dismissal function. First, we use CEO pay as a covariate to control for the fact that high paid CEOs may face a higher hazard of turnover due to higher performance expectations. Our results suggests that CEO pay has an insignificant effect on the hazard of CEO turnover.

Second, we test for the effect of firm size on the hazard of turnover. We find an insignificant impact of firm size on the baseline hazard. Thus CEOs of bigger and smaller firms in the sample face similar hazards of CEO exit for poor firm performance.

Further, the estimates on previous CEO experience in another firm in the same universe of firms, used as a proxy for CEO ability, has been estimated to be statistically

insignificant. Thus, controlling for performance,previous CEO experience doesn't appear to reduce the hazard of turnover for a CEO.

Finally, we control for the cost of CEO removal. *A priori*, we may expect a higher cost of CEO replacement to lower the hazard of CEO exit. We find termination payment entitlement to be negatively associated with the hazard of CEO exit across all specifications, indicating that higher cost of CEO removal may lower the hazard of exit for non-performing managers.

To control for managerial power and governance, we augment the baseline specifications with a range of governance parameters in specifications (3) and (4) of Table 4.4. If the CEO is also the Chairman of the board, he may have a disproportionate influence on the pay setting and dismissal process. Similarly, a higher equity ownership of the firm may lead to higher degree of managerial entrenchment. A higher ownership of the CEO also makes it costly to replace her post-takeover (Brunello, et al. 2003). Alternatively, a higher equity ownership may also expose the CEO to greater firm risk.

From the results in column (3) and (4), a higher percentage of stock ownership of the CEO reduces the hazard of exit by 4.7%. A similarly pronounced effect is observed for CEO duality wherein all other things held constant, a Chairman-CEO faces a 3.7% lesser risk of turnover. Our results suggest partial managerial entrenchment. We further analyze the impact of governance in mitigating managerial entrenchment.

We find evidence that smaller boards are associated with a higher hazard of turnover. Smaller boards may involve more rigorous evaluation of performance and enforcement of dismissal mechanism. The Board Independence variable sheds light on the role of outside directors on CEO turnover mechanism. Consistent with Conyon (1998) and Kaplan and Minton (2012), we find that a higher percentage of external directors on the board increases turnover hazard by 9.2%. Further, we examine the effect of busy directors on boardroom monitoring. For each percentage point increase in the average

number of board memberships of the directors of a firm, the hazard of turnover reduces by 2.1%. According to the efficient market hypothesis a higher number of board memberships would imply greater competence of the director. However, our results suggest that higher numbers of board membership may dilute boardroom vigilance and decrease the likelihood of CEO replacement for poor performance.

The SOX and NYSE and NASDAQ reforms of 2002 arguably has led to a more demanding governance regime. We test if these governance regulations had an impact on the baseline hazard of CEO turnover. The results are presented in Table 4.4.

In the second sub-period of the sample (2003-2010), CEOs are exposed to 33% more hazard of turnover due to poor performance. This suggests partial effectiveness of SOX and stock market reforms in aligning interests of the CEO and the shareholders. Board independence has an insignificant effect on CEO turnover hazard in the first sub-period (1992-2001) but in the second sub-period (2003-2010), an independent board is more likely to replace a non-performing manager. This finding provides support to the effectiveness of the Board independence regulations formulated by NASDAQ and NYSE in 2002. Thus, over the period of study, increasing strength of corporate governance has made CEO jobs more risky.

Competing Risks

At every point in her tenure, a CEO faces risk of various exit states. These exit states are mutually exclusive and may have different time paths. Since the events censor each other, they are often referred to as competing events. Geddes and Vinod (1997) circumvent this issue by excluding subjects that experience competing events. Gregory-Smith et al (2009) employs competing risk estimation to compare the hazards of competing events by estimating a proportional hazard model stratified by each risk type. For this analysis, we use competing risk estimates for our discrete event-time panel data. We identify three

different exit states for internal turnover: Retirement, Resignation and Forced turnover.

The variation of turnover hazard with CEO tenure is presented in Figure 4.2. Retirement is the least likely exit state in the early years of tenure but the likelihood increases steadily and is the most likely outcome in the later years of CEO tenure. The likelihood of turnovers through resignation and forced exit seems to follow similar trends over a CEO's tenure. The likelihood of resignation and forced turnover increases and then decreases in CEO tenure. These results are consistent with findings of Gregory-Smith et at. (2009).

The results are presented in Table 4.8. Columns (1)-(3) reports the effects of the covariates on the baseline hazards for Forced Turnover, Retirement and Resignation, respectively. From column (1), firm performance is negatively associated with the probability of forced turnover. A percentage point decrease in firm performance leads to a 4.5 % increase in the likelihood of CEO dismissal. This effect is larger than the effect of performance on the probability of CEO exit through retirement and resignation in specifications (2) and (3). Consistent with an optimal contracting perspective, firm performance increases the hazard of forced exit for the CEO. However, firm performance is significant and positively associated with the probability of resignation. A better performing CEO has a greater likelihood of resigning and presumably accepting other job offers. A high performing CEO may also tender resignation after accumulating enough wealth and leaving for different challenges. The positive association of performance with likelihood of resignations may be driven by the CEOs in very high performing firms. This could be investigated using a categorical variable for performance quartiles and testing the effect of performance quartiles on the probability of resignations. We could address this issue in future research by using a categorical variable for the quartiles of firm performance and examining the effect of each quartile of firm performance on the likelihood of CEO resignation. The effect of performance on the likelihood of retirement

is insignificant at all conventional levels.

Chairman-CEOs are less likely to be replaced or resign than their non-Chairman counterparts. Similarly, CEOs with higher equity holdings in the firm face a lower hazard of exit through dismissal or resignation. A larger equity holding in the firm may increase the opportunity cost of resignation. Higher CEO ownership may also lead to greater managerial power or better incentive alignment and thereby lower the likelihood of being dismissed. CEO stock ownership and CEO duality are not significantly associated with the hazard of retirement.

Further, we examine the effects of governance on the baseline hazard for each exit state. Our measures of board characteristics and composition have statistically significant association with forced turnovers only. The effect of governance parameters on hazard of retirement and resignation are statistically insignificant. Controlling for performance, a smaller and more independent board is more likely to dismiss a CEO. Similarly a more busy board is less likely to dismiss a CEO for poor performance. Gregory-Smith et al. (2009) reports significant negative association of percentage of outside directors on the board to the probability of forced departure. We find evidence that board size and board busyness are also significant predictors of forced turnover.

Managerial Entrenchment vs Information assymetry

From the previous discussion, the hazard of exit varies with CEO tenure, increasing in the initial years of tenure, peaking at just over 5 years and decreasing subsequently. This hazard profile may have competing explanations from managerial entrenchment and information revelation perspectives. In the early years of tenure, the information asymmetry between the firm and the CEO is likely to be high. If the job-incumbent match is not optimal, there may be some early dismissals and resignations. Over the period of tenure, information asymmetry is likely to decrease, leading to survival of the

better fit incumbents. Alternatively, increasing CEO tenure may lead to managerial entrenchment and captured boards, thereby reducing likelihood of exit. To investigate these alternative explanations, we split our sample at the median CEO tenure of 7 years. In Table 4.9, we report the results of our competing risk models for CEOs with tenure less than 7 years (columns 1-3) and CEOs with tenure greater than 7 years (columns 4-6). In column (1) and (4), we estimate the effects of covariates on hazard of forced turnover and in columns (2) and (5) we estimate the hazard of resignation.

In this analysis, we use alternate measures for performance to test for possible effects of managerial entrenchment on performance parameters. A risk-averse and entrenched CEO will try to maximize her utility by decreasing the turnover hazard and increasing pay. This objective can be facilitated by adopting a low-risk performance criteria for evaluation. Using accounting and benchmarked stock return performance, we test for possible switching of performance criteria. In columns (1), (2), (4) and (5), we use benchmarked value weighted return and ROA as measures of firm performance. In specifications (3) and (6), we use return on assets as a measure of performance to test for possible switching effects for all internal exit modes combined together.

For CEOs with a tenure greater than 7 years, firm performance has a marginal impact on the baseline hazard of turnover. The association of firm performance with the hazard for forced turnover and resignation are stronger when CEOs are in office for less than 7 years. A poor performing CEO is more likely to be dismissed in the first 7 years of her tenure. Similarly, a high performing CEO is more likely to resign in the first 7 years of tenure. The effect of firm performance on the hazard of resignation is only marginally significant at 10% level. Further, the lagged measures of performance are estimated to be insignificant, indicating that long serving CEOs can shield themselves from effects of poor past performance.

We find evidence of possible switching in performance evaluation criteria. For tenure

less than 7 years, the estimates of both benchmarked value weighted return and return on asset are significant across specifications (1) and (3). However, for tenure greater than 7 years, only ROA is strongly associated with the hazard of exit. The estimates of benchmarked value weighted return in specifications (4) and (5) are lower than that in (1), (2) and (6) and are borderline significant. It seems then that long serving CEOs can successfully switch from more risky performance evaluation measures (benchmarked value weighted return) to low-risk measures of performance (Return on Assets). According to the managerial power hypothesis, a long-serving CEO may entrench herself in the firm and thereby reduce the probability of being dismissed. Our results suggest that one way a CEO can achieve this is by switching the benchmark performance to a low-risk performance indicator. The parameter estimates on governance variables retain their usual sign and significance.

In summary, our results suggest that poor performing CEOs are increasingly likely to be dismissed. Small and more independent boards are more effective in replacing poor performing CEOs. We also find evidence of a possible managerial entrenchment effect whereby lower likelihood of dismissal for CEOs with high tenure can be partially attributed to managerial entrenchment and possible switching to low-risk performance evaluation measures.

4.5.2 Do Takeovers increase the hazard of CEO turnover?

The market for corporate control may have an impact on replacing poor performing managers. A poor performing firm may have a higher risk of being taken over, leading to higher likelihood of CEO turnover. We analyze the effects of takeovers on the baseline hazard for CEO exit by using an indicator variable for takeover in the year of the event.[22]

[22] In cases where the takeover was completed over a period of more than year, we recorded takeover to have occured in the year of tender offer.

However, the CEO turnover due to takeover may occur at a lag and hence we control for lagged effects of takeover on CEO turnover hazard. The results are presented in Table 4.5.[23] If takeovers affect the hazard of CEO exit, it can be expected that poor performing managers are more likely to be replaced. In our analysis, we control for accounting measure of firm performance in column (1) and relative share return performance in column (2). Figure 4.1 shows that takeovers shifts the hazard function upwards, signifying a higher degree of hazard faced by CEOs in the events of their firms being taken over.

Consistent with the findings of Mikkelson and Partch (1997) and Buchholtz et al. (2003), we estimate that takeovers double the likelihood of CEO exit. In the event of a takeover, the CEO of the target firm is 129% more likely to be replaced in the year of tender offer or in the year following the takeover. However, the hazard of exit due to takeover is insignificant for the second lag. CEOs in poorly performing firms are more likely to be replaced post-takeover. Both measures of firm performance employed are significant and negatively associated with the turnover hazard. The performance sensitivity of CEO turnover in the events of takeover is similar to the performance sensitivity of internal turnovers. Kaplan and Minton (2012) find no significant association of firm performance to probability of CEO turnover. Using a larger dataset, we suggest that takeovers act as external force of management discipline and replace non-performing managers. This is consistent with the disciplinary nature of takeovers in the sixth merger wave (2003-2008).

To test the effect of the nationality of the acquiring firm on post-takeover CEO hazard, we use indicators for domestic takeovers (if the acquirer is listed on an US stock exchange) and international (if the acquirer is not listed in US stock exchange). CEOs in firms that are acquired by an overseas firm are about 50% more likely to be replaced than in target firms acquired by US firms. This may be attributed to differences in organization culture, geographic differences, and higher probability of managerial hubris (Duru and

[23] Marginal effects are reported in Table 4.14.

Reeb, 2002).

Finally, we control for the change in control payment, that is, the monetised value of the compensation due to a CEO for involuntary turnover in the event of takeover. The cost of replacing the CEO of the target firm is negatively associated with hazard of post-takeover CEO exit. The results are consistent with the findings of Hambrick and Cannella (1993) and Buchholtz et al. (2003) and robust to different firm performance specifications. Thus 'Golden Parachute' schemes partially shield the CEOs from being replaced after takeovers.

In section 4.5.1, we reported evidence in favour of partial managerial entrenchment. We analyze whether managerial entrenchment has any significant effect on the hazard of post-takeover turnovers. If CEO entrenchment does not effect the likelihood of post-takeover turnovers, then it may seem that market for corporate control is more effective in replacing entrenched CEOs than internal controls. Our results are inconclusive on this. Unlike the results for internal turnovers, CEO duality is unrelated to post-takeover turnover hazards. However, higher stock-ownership of the CEO in the firm reduces the hazard of post-takeover turnover by 4.8%. The lower turnover hazard for CEOs with ownership may be due to either managerial entrenchment or higher cost of replacing the CEO.

Augmenting our baseline model with the indicator for takeover, we find board independence and board busyness to have insignificant effects on hazard of turnover. The effect of board size is borderline significant, with a smaller board being associated with higher hazard of post-takeover exit. These results, in conjunction with the performance sensitivity of post-takeover exit, suggests that effects of governance controls and takeovers in replacing non-performing managers are susbstitutes to some degree.

Thus, our results suggest that takeovers increase the risk of CEO exit, particularly for poor performing managers. We also provide first evidence on the effect of nationality

of the acquiring firm on hazard of post-takeover CEO exit and note that target CEOs are more likely to be replaced by an international acquirer than by a domestic acquiring firm.

Unobserved Heterogeneity Corrections

It may be argued that target firms are not a random sub-sample and the likelihood of being taken over may be driven by some unobserved endogenous factors. This can arise out of disproportionate takeover activities in different industries. Similarly, certain geographical clusters may be have a more active takeover market due to strategic reasons. In our analysis we test for unobserved heterogeneity in different industry classifications to control for endogenous likelihood of takeovers by omitting industry dummies in the frailty analysis.

We use parametric estimations of unobserved heterogeneity and estimate random effects cloglog models and Gamma frailty models to control for potential endogeneity in takeovers and CEO exit. The results are presented in Table 4.6.

The p-value of the likelihood test in random effect cloglog estimation is 0.496, which is not significant at conventional levels. Therefore, the null hypothesis of frailty estimate is equal to zero cannot be rejected and this result confirms that there is no significant frailty in the model. Similar results were obtained from gamma frailty tests. Likelihood tests indicate that there is no significant frailty and the parameter estimates are in the same order when controlling for unobserved heterogeneity.

In Table 4.6, the models are simplified by omitting the lags of the financial parameters and the dummies for domestic and international takeovers. This simplification is necessary because the random components models are otherwise difficult to converge. Thus, industry classification of the firms does not seem to be a source of bias in our estimation.

4.5.3 Robustness Issues

In this section, we discuss the robustness of our results to alternate choice of variables, classification of turnovers and estimation methods.

First, the classification of turnover based on reports in the financial press may induce bias in estimation (Parrino, 1997). We use alternate classification of turnovers to estimate the competing risks. Peters and Wagner (2012) argue that the financial press follows certain types of firms and industries more than others and hence the reporting of reasons and analysis for CEO turnover may not be consistent across industries. Thus, we construct an alternative indicator of forced turnover which indicates a forced turnover if the departing CEO is less than 55 years of age and the reason for turnover is not classified as death, ill-health or immediate employment as CEO in another firm. This method of classifying forced turnover overestimates the number of forced turnover below the age threshold and underestimates the number of forced turnover above the age threshold with respect to our first method of classification. Using this method, we classify 368 forced turnovers, 58 resignations and 48 retirements. The competing risk estimation results are tabulated in Table 4.10. There is no significant difference in estimated effects and significance from our earlier estimation.

Second, to confirm that our results are not simply an artefact of the complementary log-log model, we use Cox Proportional Hazard estimation for our baseline specification. The present the proportional hazards results in Table 4.11. We observe some differences in significance levels of some estimates but the effects are qualitatively similar.

Third, we test the robustness of our results across the distribution of firm performance and board characteristics. We use a categorical variable to capture the effect across different performance quartiles. The results are reported in Table 4.12. The results are not significantly different for the different quartiles of firm performance. Firms in the

75th percentile of performance has stronger performance sensitivity of turnover hazards for forced turnovers and resignations. However, the estimates for the median and the 25th percentile are also significant at 5% levels. Thus, the performance sensitivity of our estimations are not driven by outliers in firm performance.

The effect of the board size in the 25th percentile on forced turnover probability is insignificant. This may suggest that while larger boards dissipate the monitoring and vigilance of the board, a very small board size may not also have the desired effect. If the board size is too small, the directors may be overworked and not be able to be vigilant about wide range of governance matters These results indicate that there may exist a optimum range for board size for effective monitoring. We don't address this issue in this research. Similar results are obtained for board busyness. The effects of busy board in the 25th percentile on CEO turnover probability is insignificant. While a small number of directorships held by the directors may not dissipate the strength of governance, or may indeed reveal the competence of the directors, a larger number of board membership of the directors reduce the strength of monitoring and vigilance.

Finally, we were concerned that the estimated hazards may be driven largely by mechanical association in industries with more active takeover market and higher turnover rates. Therefore, we re-estimate our model excluding the High Tech industry which has the highest proportion of takeovers and highest turnover rate the sample period. Technology as an industry in our classification consists of 45 SIC codes for high tech manufacturing (SIC codes: 35XX, 36XX, 38XX), communications services (SIC codes: 48XX), and software and computer-related services (SIC codes: 73XX). We recognize that this may not be the exhaustive classification of high tech industries and some allied industries may have been omitted but we believe that this would not make significant difference to our results. The results of estimation with the reduced sample presented in Table 4.13 are not significantly different from our original estimation.

Thus, our results appear robust to alternate classification of turnovers, across the distribution of firm performance and governance variables and to choice of alternate estimation techniques.

4.6 Conclusion

The domain of CEO turnover, particularly around the events of change in corporate control is under represented in economic literature. In this chapter, we analyze the determinants of internal and post-takeover CEO turnover for S&P 1500 firms from 1992-2010.

There has been a secular rise in CEO turnover hazard in the sample period. Total turnover in the sample period is 31.63% indicating average CEO tenure of 7.83 years. In the later sub-period of our sample, concurrent with the period after the promulgation of Sarbanes Oxley Act, 2002 and the stock market reforms, there has been a decrease in the median CEO tenure and higher sensitivity of CEO turnover to firm performance. These results indicate partial effectiveness of corporate governance regulations in enforcing managerial discipline. Thus, the CEO job has become increasingly risky and that the lifetime earning of a CEO has decreased. [24]

Takeovers significantly increase the hazard of CEO turnover. Controlling for performance, CEOs in target firms are twice as likely to be replaced with respect to firms which have not had a tender bid. Further, cross border acquisitions are associated with higher hazards of exit compared to domestic takeovers. In conjunction with findings of Guest (2009) on the effects of target nationality on post-acquisition CEO pay, my result makes fundamental contribution to the literature on CEO labour market. The perfor-

[24] If the severance pay has increased consistently to compensate for decreasing tenure, the life time earning may not have decreased significantly. However, in our later chapters, we find that the severance pay provisions have only increased modestly.

mance sensitivity of both internal and post-takeover turnovers are similar, indicating that takeovers act as an alternate "force of managerial discipline " (Mikkelson and Partch, 1997). Further, we find evidence of the indexing of CEO turnover to industry performance. Bebchuk and Fried (2002) criticizes board of directors for lack of performance indexing in CEO pay. Our evidence suggests that decisions on CEO replacements may be made on the basis on industry-benchmarked performance.

Consistent with the managerial power hypothesis of Bebchuk and Fried (2004), CEO duality and higher equity ownership of the CEO reduces the hazard of turnover. A more independent board on the other hand increases the performance sensitivity of turnover. In addition, we find evidence that CEOs with longer tenure may be able to switch the evaluation criteria to a low-risk performance measure (viz. Return on Assets).

The results of this paper have a number of policy implications. Consistent with the findings of Hermalin (2005) and Kaplan and Minton (2012), we provide evidence that the recent decade of high CEO pay growth is also characterized by a higher risk of turnover. In addition, the post-SOX period is characterized by a significantly shorter CEO tenure and sensitivity of turnover to performance, highlighting the role of SOX and stock market reforms in enforcing corporate discipline.

A higher percentage of outside directors on the board and a smaller board increases the performance sensitivity of turnover but the effect is negated if the directors are members of multiple boards. Thus a strong case can be made for having a higher representation of external directors and lower number of directorships for each individual director on the board to ensure stronger monitoring and performance sensitivity.

Finally, as suggested initially by Kaplan and Minton (2012), a decreasing tenure and higher performance sensitivity may imply a lesser effective value and a shorter effective vesting period of CEO option grants. Current valuations of stock and option grants are calculated using Black-Scholes (1979) methodology which is not flexible to such modifi-

cations. Hence an alternative stock option valuation method may be useful to calculate the effective worth of CEO option grants. Execucomp uses a 7-year vesting period. If the CEO tenure is falling, this may lead to overestimation of CEO pay.

Figure 4-1: Summary Statistics of Full sample and Sample with Governance Controls

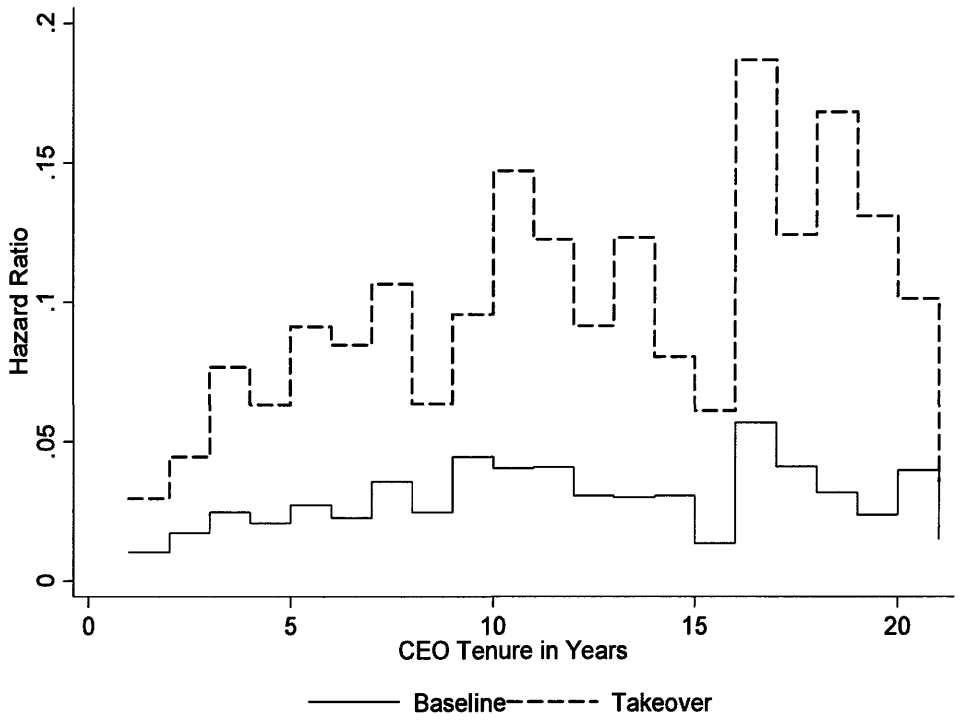


Figure 4-2: Comparative Turnover Hazards

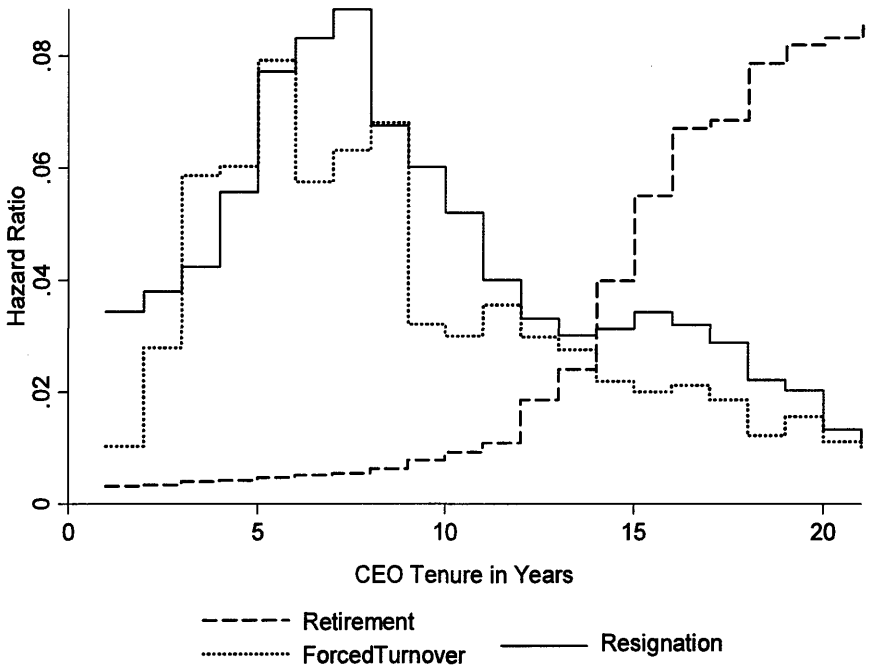


Figure 4-3: CEO Turnover Over Time

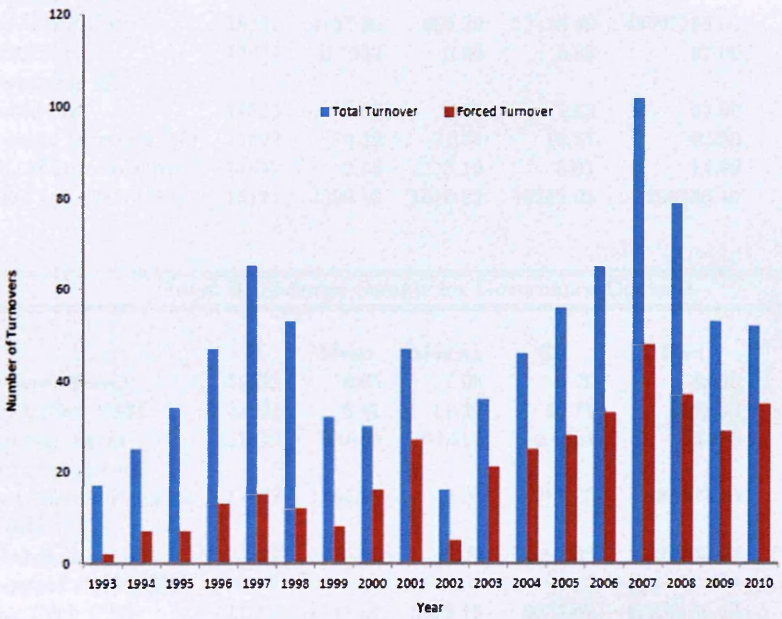


Table 4.1: Summary Statistics of Full Sample and Sample with Governance Controls

Panel A: Full Sample

	N	Mean	Median	SD	Max	Min
Tenure (Years)	15121	9.33	7.83	10.95	43.93[a]	2.57
ROA ('000 US$)	14748	2.53	3.81	43.38	3551.35	-1314.88
EBIT ('000 US$)	14872	364.89	66.79	2214.70	83397.00	-108761.00
Average Value weighted Return	14765	0.0033	0.0115	0.0494	0.1105	-0.1846
Termination Payment ('000 US$)	15081	1393.78	0.00	7272.403	241089.80	0.00
Change in control payment ('000 US$)	15081	3111.11	0.00	12448.36	525360.10	0.00
Sale ('000 US$)	15121	4137.88	899.39	13858.90	42507189.00	0.03
CEO Share Ownership (%)	15081	0.7022	0.00	3.83	87.60	0.00
Board Size	11522	9.52	9.00	2.63	34.00	3.00
Outside Directors (%)	11522	70.38	71.35	16.87	92.30	55.60
No. of Directorships	11522	2.73	3.10	8.61	14.00	0.00
CEO pay ('000 US$)	15121	4329.13	1610.22	10252.03	295136.40	0.01[b]

Panel B: Reduced Sample for Governance Controls

	N	Mean	Median	SD	Max	Min
Tenure (Years)	11522	8.65	7.03	9.29	43.93	2.57
ROA ('000 US$)	11522	8.61	11.20	39.71	3551.35	-1053.14
Average Value weighted Return	11522	0.0109	0.0226	0.0094	0.1105	-0.1846
Termination Payment ('000 US$)	11522	1567.50	0.00	6757.20	241089.80	0.00
Change in control payment ('000 US$)	11522	5275.50	0.00	11092.33	525360.10	0.00
Sale ('000 US$)	11522	5371.66	9879.15	9024.67	42507189.00	2190.03
CEO Share Ownership (%)	11522	0.7022	0.00	3.83	87.60	0.00
Board Size	11522	9.52	9.00	2.63	34.00	3.00
Outside Directors (%)	11522	70.38	71.35	16.87	92.30	55.60
No. of Directorships	11522	2.73	3.10	8.61	14.00	0.00
CEO pay ('000 US$)	11522	5016.63	3661.76	9724.10	295136.40	1348.88

[a]The longest serving CEO in the sample is Warren Buffet of Berkshire Hathaway who has been the CEO since 1970.

[b]Dr. Myron W. Wentz of Usana Heath Services Inc. did not take any compensation for the year 2004 as reported by Execucomp and cross checked with the DEF-14A filings of Usana Heath Services inc. for 2004.

Table 4.2: Summary Statistics by Sub-Periods

The sub-periods are designed to examine the effects of governance regulations and stock market reforms of 2002.

	1993-2002	2003-2010	1993-2010
No. of firms	1632	1884	2755
No. of CEOs	1614	1860	2703
No. of CEO exits	366	489	855
% of CEO exits	22.67%	26.299%	31.63%
No. of Takeover related exits	197	184	381
% of Takeover related exits	12.21%	9.89%	14.10%
Number of Forced exits	104	256	360
% of Forced exits	6.63%	13.76%	13.42%
No. of Resignations	36	30	66
% of Resignations	2.23%	1.61%	2.44%
No. of Retirements	29	19	48
% of Retirements	1.80%	1.02%	1.78%
No. of Internal Turnovers	169	305	474
% of Internal Turnovers	10.47%	16.39%	17.5%
Total Observations	6923	7271	15121
No. of Takeovers	409	435	844
No. of International Takeovers	76	42	118
External CEO	691	1044	1412
Mean Tenure (in Years)	10.73	7.89	9.33
Median Tenure (in Years)	8.79	6.53	7.83
Mean CEO Pay ('000 US$)	2583.84	6166.02	4329.13
Mean Salary ('000 US$)	477.66	719.34	600.92
Mean Bonus ('000 US$)	494.47	620.39	564.06
Mean Cash Compensation ('000 US$)	972.13	1339.74	1164.98
Mean Non-Cash Compensation ('000 US$)	2024.54	1506.53	1725.24
Mean Annual Value weighted Return	0.0021	0.0053	0.0033
Mean Termination payment ('000 US$)	1137.66	1911.21	1393.78
Mean Sale ('000 US$)	2530.35	5739.32	4137.88
Mean CEO Share Ownership (%)	0.1738	1.288	0.7022
Mean Board Size	11.23	9.31	9.52
Mean Outside Directors (%)	64.58	76.21	70.38
Mean No. of Directorships	1.99	2.88	2.73

Table 4.3: Probit Analysis for Sample Selection

	Co-Efficient	Standard Error
ROA	0.000638	0.00400
Firm Size (Ln Sale)	-0.00003	0.000056
CEO Pay	-0.000048	0.0000856
Tenure	-0.001848	0.048716
One Observation	0.23068	0.1466667

Dependent variable is an indicator which equals '1' if there is non-reporting of data and '0' otherwise.

We use probit estimation to test for selective non-reporting.

Table 4.4: Duration Model Estimates: All Turnover

	(1) Hazard Ratio	(2) Hazard Ratio	(3) Hazard Ratio	(4) Hazard Ratio
ROA	0.976*		0.972**	
	(0.012)		(0.009)	
ROA_{t-1}	0.982**		0.977**	
	(0.020)		(0.025)	
ROA_{t-2}	0.988		0.988	
	(0.166)		(0.183)	
Benchmarked Value		0.987**		0.987**
Weighted Return		(0.004)		(0.002)
Benchmarked Value		0.991**		0.989**
Weighted $Return_{t-1}$		(0.044)		(0.038)
Benchmarked Value		0.994		0.990
Weighted $Return_{t-2}$		(0.137)		(0.114)
CEO Pay	0.950	0.991	0.953	0.948
	(0.240)	(0.252)	(0.335)	(0.350)
Firm Size (Ln Sales)	0.938	0.988	0.971	0.967
	(0.400)	(0.385)	(0.360)	(0.360)
Previous CEO	0.935	0.957	0.944	0.952
experience	(0.232)	(0.250)	(0.230)	(0.235)
Termination Payment	0.969 **	0.961**	0.948**	0.951**
	(0.020)	(0.023)	(0.008)	(0.011)
σ_{VWR}	1.277**	1.128**	1.259**	1.136**
	(0.002)	(0.008)	(0.005)	(0.010)
External CEO	1.106**	1.087**	1.112**	1.091**
	(0.023)	(0.031)	(0.025)	(0.030)
Percentage			0.986**	0.982**
Stock Holding			(0.004)	(0.002)
CEO Duality			0.956**	0.963***
			(0.004)	(0.000)
Board Size			0.973**	0.965**
			(0.003)	(0.008)
Board			1.132**	1.201**
Independence			(0.032)	(0.021)
Board Busyness			0.989*	0.982*
			(0.060)	(0.055)
SOX	1.330***	1.458***	1.358***	1.402***
	(0.000)	(0.000)	(0.000)	(0.000)

The dependent variable equals 1 if the CEO turnovers and '0' otherwise.
Column (1) and (2) estimates the sensitivity of turnover hazard to accounting measures of firm performance. Column (3) estimates the stock price elasticity of hazard and Column (4) estimates the sensitivity of hazard to benchmarked performance of firm's stocks. The hazard ratios greater than 1 indicate a positive association of the variable with the dependent variable. Models are estimated with robust standard errors to control for heteroskedasticity.
*, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.5: Effect of Takeovers on the Hazard of Turnover

	(1) Hazard Ratio	(2) Hazard Ratio	(3) Hazard Ratio	(4) Hazard Ratio
ROA	0.978**		0.973**	
	(0.010)		(0.007)	
Benchmarked Value Weighted Return		0.979**		0.982**
		(0.016)		(0.020)
Takeover_{it}	2.296***	2.275**	2.287***	2.280**
	(0.000)	(0.000)	(0.000)	(0.000)
Takeover_{t-1}	1.177**	1.162**	1.171**	1.169**
	(0.004)	(0.003)	(0.004)	(0.004)
Takeover_{t-2}	1.138	1.141	1.139	1.144
	(0.202)	(0.178)	(0.207)	(0.181)
International Takeover_{it}	3.799**	3.780**	3.744**	3.761**
	(0.005)	(0.001)	(0.008)	(0.003)
CEO Pay	0.946	0.940*	0.950	0.944
	(0.110)	(0.090)	(0.110)	(0.110)
Firm Size (Ln Sales)	1.001	0.947	0.951	0.948
	(0.174)	(0.160)	(0.162)	(0.160)
Previous CEO experience	0.984	0.966	0.987	0.991
	(0.422)	(0.400)	(0.425)	(0.433)
σ_{VWR}	1.177**	1.119**	1.162**	1.112**
	(0.017)	(0.003)	(0.011)	(0.004)
External CEO	1.059	1.027	1.064	1.033
	(0.226)	(0.187)	(0.234)	(0.193)
Change in Control	0.939**	0.921**	0.944**	0.952**
Payment	(0.004)	(0.021)	(0.020)	(0.050)
Percentage Stock			0.986**	0.973**
Holding			(0.005)	(0.003)
CEO Duality			0.972	0.979
			(0.249)	(0.221)
Board Size			0.973**	0.975**
			(0.040)	(0.037)
Board Independence			1.129	1.122
			(0.140)	(0.110)
Board Busyness			0.997	0.985
			(0.360)	(0.330)

The dependent variable equals 1 if the CEO turnovers and '0' otherwise.
Column (1) and (2) estimates the sensitivity of turnover hazard to accounting measures of performance. Column (3) estimates the stock price elasticity of hazard and Column (4) estimates the sensitivity of hazard to benchmarked stock. The hazard ratios are greater than 1 indicate a positive association of the variable with the dependent variable. Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.6: Frailty Estimates

	Base Model Hazard Ratio	Takeover Model Hazard Ratio	Random Effects Hazard Ratio	Gamma Frailty Hazard Ratio
Benchmarked Value	0.987*	0.982**	0.980**	0.984**
Weighted Return	(0.072)	(0.020)	(0.020)	(0.009)
Takeover_{it}		2.310***	2.319**	2.300**
		(0.000)	(0.013)	(0.003)
Percentage Stock	0.953***	0.983**	0.958**	0.959**
Holding	(0.000)	(0.004)	(0.041)	(0.025)
CEO duality	0.967***	0.969	0.966	0.966
	(0.000)	(0.127)	(0.143)	(0.121)
σ_{VWR}	1.136**	1.119**	1.122**	1.125**
	(0.008)	(0.003)	(0.015)	(0.009)
External CEO	1.091**	1.027	1.018	1.023
	(0.031)	(0.187)	(0.189)	(0.166)
Change in Control		0.939**	0.938**	0.929**
Payments		(0.004)	(0.011)	(0.018)
CEO pay	0.950	0.946	0.949	0.938
	(0.240)	(0.110)	(0.118)	(0.122)
Firm Size	0.937	1.001	0.993	0.997
	(0.400)	(0.174)	(0.160)	(0.162)
Board Size	0.973**	0.979**	0.977	0.982**
	(0.003)	(0.025)	(0.005)	(0.005)
Board Independence	1.132**	1.126	1.124	1.129
	(0.045)	(0.120)	(0.110)	(0.111)

The dependent variable equals 1 if the CEO turnovers and '0' otherwise.
the indicator from '0' to '1'. Models are estimated with robust standard errors
to control for heteroskedasticity. *, **, *** indicate significance at 10%
, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.7: Hazard Estimates by Sub-Period

	Full Sample (1992-2010)	1992-2001	2003-2010
Benchmarked value		0.994**	0.977**
weighted return	(0.020)	(0.025)	(0.031)
Takeover_{it}	2.295***	1.971***	2.414***
	(0.000)	(0.000)	(0.000)
Board Size	0.973**	0.979**	0.968**
	(0.003)	(0.004)	(0.011)
Board	1.132**	0.989**	1.338**
Independence	(0.045)	(0.009)	(0.035)
Number of	14699	6585	7954
Observations			
Log Likelihood	1690.071	-653.72	-1001.214

The dependent variable equals 1 if the CEO turnovers and '0' otherwise. Estimates on controls for CEO characteristics and firm risk are not reported.

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively.

The p-values are given in the brackets.

Table 4.8: Risk of CEO Turnover: Logit Estimates

	(1) Forced Turnover	(2) Resignations	(3) Retirements
Benchmarked Value	0.954***	1.719**	0.988**
Weighted Return	(0.000)	(0.007)	(0.031)
Benchmarked Value	0.975**	1.014**	0.983*
Weighted Return$_{t-1}$	(0.019)	(0.009)	(0.061)
Benchmarked Value	0.967	1.017*	0.988
Weighted Return$_{t-2}$	(0.141)	(0.076)	(0.164)
Firm Size	0.988*	0.961	0.971
(Ln Sales)	(0.088)	(0.234)	(0.381)
Percentage Stock	0.979**	0.984**	0.996
Holding	(0.006)	(0.010)	(0.166)
CEO Duality	0.966***	0.979***	0.993
	(0.000)	(0.000)	(0.212)
σ_{VWR}	1.199**	1.214**	1.009*
	(0.004)	(0.012)	(0.062)
External CEO	1.327**	1.114**	0.997
	(0.021)	(0.033)	(0.231)
Board Size	0.979**	0.992*	1.076
	(0.011)	(0.077)	(0.247)
Board	1.271**	0.984	0.999
Independence	(0.023)	(0.379)	(0.128)
Board	0.992**	0.991*	0.993
Busyness	(0.019)	(0.092)	(0.152)
No. of CEOs	2703	2703	2703
No. of Failures	360	66	48
Log Likelihood	1266.23	836.94	698.19

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.9: Competing Risk Estimates

	Tenure < 7			Tenure >7		
	(1)	(2)	(3)	(4)	(5)	(6)
	Forced Turnover	Resignations	Internal Turnover	Forced Turnover	Resignations	Internal Turnover
Benchmarked Value	0.963**	1.338**	0.977**	0.989*	1.105*	0.991*
Weighted Return	(0.009)	(0.007)	(0.004)	(0.057)	(0.083)	(0.089)
ROA	0.988**	1.191**	0.980**	0.974**	1.138**	0.982**
	(0.011)	(0.017)	(0.016)	(0.012)	(0.019)	(0.016)
Firm Size	0.990*	0.981	0.985	0.988*	0.987	0.988
(Ln Sales)	(0.057)	(0.211)	(0.208)	(0.092)	(0.333)	(0.315)
Percentage Stock	0.987**	0.991**	0.973**	0.961**	0.957**	0.964**
Holding	(0.007)	(0.014)	(0.013)	(0.008)	(0.010)	(0.009)
CEO Duality	0.979***	0.984***	0.971***	0.955***	0.963**	0.966**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.005)
σ_{VWR}	0.980**	0.972**	0.983**	0.982**	0.979**	0.985**
	(0.004)	(0.006)	(0.012)	(0.009)	(0.012)	(0.016)
External	1.111**	1.124**	1.107**	1.102	1.110	1.082
CEO	(0.026)	(0.014)	(0.023)	(0.162)	(0.144)	(0.181)
Board Size	0.964**	0.972**	0.977**	0.988**	0.986**	0.983**
	(0.003)	(0.008)	(0.005)	(0.004)	(0.011)	(0.009)
Board	1.228**	1.091**	1.162**	1.139**	1.044**	1.111**
Independence	(0.010)	(0.014)	(0.007)	(0.010)	(0.018)	(0.017)
Board	0.973**	0.980**	0.987**	0.988**	0.993*	0.987**
Busyness	(0.022)	(0.022)	(0.029)	(0.037)	(0.055)	(0.035)
No. of CEOs	1846	1846	1846	857	857	857
No. of Failures	283	54	352	77	12	122
Log Likelihood	833.41	526.75	1171.03	612.92	365.46	929.87

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.10: Hazard Estimates-Alternate Classifications of Turnovers

	(1) Forced Turnover	(2) Resignations	(3) Retirements
Benchmarked Value	0.953***	1.720**	0.988**
Weighted Return	(0.000)	(0.007)	(0.031)
Benchmarked Value	0.975**	1.014**	0.983*
Weighted Return$_{t-1}$	(0.019)	(0.009)	(0.061)
Benchmarked Value	0.967	1.017*	0.988
Weighted Return$_{t-2}$	(0.141)	(0.076)	(0.164)
Firm Size	0.988*	0.960	0.971
(Ln Sales)	(0.088)	(0.238)	(0.381)
Percentage Stock	0.981**	0.984**	0.996
Holding	(0.008)	(0.010)	(0.166)
CEO Duality	0.962***	0.979***	0.993
	(0.000)	(0.000)	(0.212)
σ_{VWR}	1.203**	1.214**	1.009*
	(0.003)	(0.012)	(0.062)
External CEO	1.327**	1.114**	0.997
	(0.021)	(0.033)	(0.231)
Board Size	0.979**	0.990*	1.076
	(0.016)	(0.073)	(0.247)
Board	1.275**	0.984	0.999
Independence	(0.020)	(0.379)	(0.128)
Board	0.992**	0.991*	0.993
Busyness	(0.019)	(0.092)	(0.152)
No. of CEOs	2703	2703	2703
No. of Failures	368	58	48
Log Likelihood	1272.56	823.00	698.19

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.11: Cox Proportional Hazard Estimates

	(1) Internal Turnovers	(2) Post-Takeover Turnovers
Benchmarked Value	0.988**	0.986**
Weighted Return	(0.031)	(0.037)
Benchmarked Value	0.981*	0.977*
Weighted Return$_{t-1}$	(0.063)	(0.059)
Benchmarked Value	0.989	0.992
Weighted Return$_{t-2}$	(0.231)	(0.246)
Firm Size	0.977	0.972
(Ln Sales)	(0.334)	(0.389)
Termination Payment	0.962**	0.955*
	(0.029)	(0.022)
Percentage	0.981**	0.988**
Stock Holding	(0.014)	(0.009)
CEO Duality	0.977***	0.985
	(0.000)	(0.134)
Takeover		2.175**
		(0.001)
σ_{VWR}	1.178**	1.134**
	(0.022)	(0.015)
External CEO	1.441**	1.344*
	(0.033)	(0.057)
Board Size	0.969**	0.974**
	(0.008)	(0.006)
Board	1.126**	1.098**
Independence	(0.017)	(0.011)
Board Busyness	0.975*	0.983*
	(0.053)	(0.067)

Dependent variable is an indicator for Forced Turnover, equals to '1' if a CEO is dismissed in a given year, '0' otherwise.
Column (1) estimates the sensitivity of turnover hazard to accounting measures of firm performance. Column (3) estimates the sensitivity of hazard to relative performance of firm's stocks. Specifications (3) and (4) additionally control for board size and composition.
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.12: Turnover Hazards Across Performance Quartiles
to test for association of turnover hazard
with firm performance and governance parameters
across the distribution

	(1) Internal Turnovers	(2) Post-Takeover Turnovers
Benchmarked Value Weighted Return		
Lower quartile-	0.991**	0.984*
Median	(0.006)	(0.010)
Median-Upper	0.987**	0.982**
Quartile	(0.004)	(0.009)
Upper Quartile	0.981**	0.982**
	(0.001)	(0.006)
Firm Size	0.967	0.968
(Ln Sales)	(0.360)	(0.347)
Board Size		
Lower quartile-	0.990	0.981
Median	(0.161)	(0.192)
Median-Upper	0.966**	0.975**
Quartile	(0.008)	(0.003)
Upper Quartile	0.952**	0.952**
	(0.009)	(0.013)
Board Independence		
Lower quartile-	1.055**	1.109*
Median	(0.017)	(0.021)
Median-Upper	1.091**	1.122**
Quartile	(0.001)	(0.007)
Upper Quartile	1.134**	1.217**
	(0.007)	(0.015)
Board Busyness		
Lower quartile-	0.988**	0.982**
Median	(0.032)	(0.027)
Median-Upper	0.982**	0.985**
Quartile	(0.045)	(0.039)
Upper Quartile	0.973**	0.967**
	(0.038)	(0.042)

Models are estimated with controls for lagged performance, CEO duality and CEO shareholding but are not reported for brevity.
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.13: Estimates without High Turnover Industries

	(1) Internal Turnovers	(2) Post-Takeover Turnovers
Benchmarked Value	0.971**	0.973**
Weighted Return	(0.000)	(0.057)
Firm Size	0.970	0.955
(Ln Sales)	(0.281)	(0.242)
σ_{VWR}	1.102**	1.115**
	(0.009)	(0.013)
Externally	1.004*	1.007*
Hired CEO	(0.052)	(0.077)
Takeover		2.252***
		(0.000)
Percentage Stock	0.987**	0.981**
Holding	(0.004)	(0.002)
CEO Duality	0.964**	0.975
	(0.001)	(0.136)
Board Size	0.966**	0.973**
	(0.016)	(0.013)
Board	1.114**	1.108**
Independence	(0.020)	(0.017)
Board	0.980**	0.981**
Busyness	(0.048)	(0.042)

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.14: Marginal Effects of Covariates: All Turnover

	(1) Marginal Effects	(2) Marginal Effects	(3) Marginal Effects	(4) Marginal Effects
ROA	-0.00079**		-0.00079**	
	(0.012)		(0.009)	
ROA_{t-1}	-0.00081**		-0.00080**	
	(0.020)		(0.025)	
ROA_{t-2}	-0.00078		-0.00080	
	(0.161)		(0.180)	
Benchmarked Value		-0.00083**		-0.00085**
Weighted Return		(0.003)		(0.002)
Benchmarked Value		-0.00081**		-0.00084**
Weighted $Return_{t-1}$		(0.044)		(0.033)
Benchmarked Value		-0.00077		-0.00080
Weighted $Return_{t-2}$		(0.138)		(0.111)
CEO Pay	-0.00138	-0.00145	-0.000133	-0.000146
	(0.241)	(0.249)	(0.332)	(0.352)
Firm Size (Ln Sales)	-0.00134	-0.00129	-0.00131	-0.00133
	(0.396)	(0.389)	(0.356)	(0.349)
Previous CEO	-0.00011	-0.00013	-0.00013	-0.00015
experience	(0.234)	(0.253)	(0.230)	(0.233)
Termination Payment	-0.00263**	-0.00270**	-0.00277**	-0.00273**
	(0.020)	(0.022)	(0.005)	(0.011)
σ_{VWR}	0.00566**	0.00563**	0.00570**	0.00567**
	(0.006)	(0.008)	(0.005)	(0.009)
External CEO	0.0032**	0.0037**	0.0028**	0.0034**
	(0.021)	(0.030)	(0.021)	(0.030)
Percentage			-0.0062**	-0.0066**
Stock Holding			(0.004)	(0.002)
CEO Duality			-0.0089**	-0.0084***
			(0.004)	(0.000)
Board Size			-0.0075**	-0.0078**
			(0.003)	(0.009)
Board			0.0071**	0.0080**
Independence			(0.032)	(0.021)
Board Busyness			-0.0059*	-0.0063*
			(0.060)	(0.053)
SOX	0.0068***	0.0064***	0.0067***	0.0070***
	(0.000)	(0.000)	(0.000)	(0.000)

The dependent variable equals 1 if the CEO turnovers and '0' otherwise.
Column (1) and (2) estimates the marginal effects using accounting measures of firm performance. Column (3) estimates the stock price elasticity of hazard and Column (4) estimates the marginal effects for benchmarked performance of firm's stocks. A value greater than zero indicates a positive association of the variable with the dependent variable. Models are estimated with robust standard errors to control for heteroskedasticity.
*, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 4.15: Marginal Effects of Takovers on Risk of CEO Turnover

	(1) Marginal Effects	(2) Marginal Effects	(3) Marginal Effects	(4) Marginal Effects
ROA	-0.00079**		-0.00077**	
	(0.010)		(0.007)	
Benchmarked Value Weighted Return		-0.00081**		-0.00077**
		(0.016)		(0.025)
Takeover_{it}	0.0239***	0.0244***	0.0239***	0.0236**
	(0.000)	(0.000)	(0.000)	(0.000)
Takeover_{t-1}	0.0151**	0.0153**	0.0156**	0.0155**
	(0.004)	(0.001)	(0.004)	(0.002)
Takeover_{t-2}	0.0120	0.0124	0.0121	0.0121
	(0.208)	(0.178)	(0.212)	(0.180)
International Takeover_{it}	0.0274**	0.0259**	0.0251**	0.0254**
	(0.007)	(0.003)	(0.008)	(0.002)
CEO Pay	-0.00128	-0.00133	-0.00131	-0.00133
	(0.111)	(0.108)	(0.110)	(0.110)
Firm Size (Ln Sales)	0.00003	-0.00130	-0.00133	-0.00131
	(0.177)	(0.160)	(0.166)	(0.160)
Previous CEO experience	-0.00011	-0.00014	-0.00013	-0.00015
	(0.425)	(0.411)	(0.425)	(0.430)
σ_{VWR}	0.00434**	0.00442**	0.00454**	0.00448**
	(0.017)	(0.003)	(0.015)	(0.005)
External CEO	0.0027	0.0022	0.0021	0.0024
	(0.221)	(0.178)	(0.227)	(0.199)
Change in Control	-0.00351**	-0.00377**	-0.00355**	-0.00356**
Payment	(0.007)	(0.021)	(0.019)	(0.051)
Percentage Stock Holding			-0.0062**	-0.0067**
			(0.006)	(0.002)
CEO Duality			-0.0083	-0.0077
			(0.249)	(0.223)
Board Size			-0.00732**	-0.00730**
			(0.033)	(0.035)
Board Independence			0.0066	0.0060
			(0.144)	(0.116)
Board Busyness			-0.0054	-0.0059
			(0.365)	(0.330)

The dependent variable equals 1 if the CEO turnovers and '0' otherwise.
Column (1) and (2) estimates the marginal effects using accounting measures of performance. Column (3) estimates the stock price elasticity of hazard and Column (4) estimates the marginal effects of benchmarked stock. A coefficient greater than zero indicates a positive association of the variable with the dependent variable. Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Chapter 5

The Impact of Acquisitions on CEO Pay

5.1 Introduction

The last decade has witnessed a proliferation of M&A activities of increasing financial values. In the year 2000, there were 20,000 M&A deals in the USA worth over US$ 2.5 trillion reaching up to US$ 5.6 trillion by the end of 2007 (Zephyr, 2009). However, acquisitions lead to a decline in firm profitability and shareholder's wealth more often than not (Hughes, 1989; Dickerson et al. 1997). Therefore the motivations of Chief Executive Officers (CEO) to undertake acquisitions are called into question.

Empirical evidence on CEO pay establishes a strong, positive, and statistically significant, association between firm size and CEO pay (Conyon and Gregg 1994, Bliss and Rosen, 2001). This leads to a concern that the motivation behind acquisitions reflect an agency problem in CEO compensation contracts (Jensen, 1986; Harford and Li, 2007).

Empirical studies report that CEOs of acquiring firms enjoy higher compensation post-acquisition (Bliss and Rosen 2001; Grinstein and Hribar 2004). Evidence is inconclusive as to whether CEOs are rewarded differentially for good and bad acquisitions. Bliss and Rosen (2001) and Anderson, Becher and Campbell (2004) find no evidence of differential rewards to CEOs for "good" and "bad" acquisitions. Studies of US and UK firms by Khorana and Zenner (1994) and Girma, Thompson and Wright (2006) report decreases in CEO pay post 'wealth reducing' acquisitions. Their results suggest that the acquisition premium in CEO pay is contingent on the wealth effects of the acquisition.

If the CEOs undertake acquisitions to increase their pay by increasing firm size, such deviation from optimal contracting can potentially be mitigated by strong corporate governance. Empirical evidence on the role of corporate governance in post-acquisition CEO pay is inconclusive. Anderson et al (2004) finds no evidence that CEO share ownership or entrenchment has any effect on post-acquisition CEO pay, whereas Grinstein and Hribar (2004) and Coakley and Iliopoulou (2006) report higher post-acquisition bonuses in firms with weak corporate governance.

Research on the effect of governance reforms, particularly the Sarbanes Oxley Act of 2002 (henceforth SOX), on the post-acquisition premium in CEO pay are few and provides inconclusive evidence. Little empirical evidence exists on the difference in CEO pay changes in the US for domestic and international acquisitions. This is particularly important since the fifth merger wave (1994-2000) overlapping with our sample period is characterized by a surge of cross border acquisitions. Existing literature uses cash-based payments (salary, bonus and other cash payments) as the definitions of CEO pay (Guest 2009, Girma et al, 2006). The differential impact of acquisitions on equity and non-equity components on CEO pay may offer insights into the nature of any acquisition premium in pay.

In this chapter we study the effect of acquisitions on the pay of acquiring CEOs using

a sample of 1105 domestic and 305 international acquisitions completed by 1525 firms listed in S&P 1500 in the period 1992-2010. We examine the effect of acquisitions on post-acquisition CEO pay and analyze whether the pay premium is associated with the wealth effect of the acquisition. Further, we examine the impact of corporate governance and governance regulations, in particular SOX[1] on post-acquisition CEO pay.

We contribute to the literature by analysing the effect of governance on CEO pay by employing a wider set of governance control. We also seek to estimate the effects of governance regulations on the acquisition premium in CEO pay. We control for the nationality of the target firm to analyze the effect of cross-border acquisitions on CEO pay. Evidence on the effect of cross-border acquisitions for UK firms exist (Guest, 2008) but no studies with US sample focus on the effect of target nationality. We seek to test the findings of Guest (2008) for US sample. Finally, we attempt to analyse the effect of post-acquisition CEO turnover on the acquisition premium in pay.

Our results suggest a 4% premium in post-acquisition pay of acquiring CEOs which increases the pay of the mean CEO undertaking acquisition by US$ 173,000. Further, we also examine whether the acquisition premium in CEO pay is contingent upon the effect of the acquisition on shareholders' wealth. In contrast to the findings of Girma, Thompson and Wright (2006) for the U.K., we find no evidence of a differential acquisition premium in pay for wealth-enhancing and wealth-reducing acquisitions. Finally, we examine the impact of governance and governance regulations on post-acquisition CEO pay. Our results suggest that a small and independent board is associated with a lower acquisition premium. The observed acquisition premium in CEO pay can be attributed in part to the strength of corporate governance. In the post SOX sub-period, the acquisition premium in pay is not significantly associated with the wealth effects of the acquisition, indicating

[1] The effect of SOX can not be isolated from the effects of the NYSE and NASDAQ reforms of 2002. However, since all these regulations aimed at more transperant governance, our results reflect the overall effect of governance regulations on CEO pay.

a limited impact of governance regulations and systematic agency problems in current compensation contracts.

These results suggest that CEOs may have misaligned incentives to undertake acquisitions to increase their own pay. Higher post-acquisition CEO pay can be partially attributed to poor corporate governance. We find no significant difference in acquisition premium in pay in the post-SOX sub-period. Therefore, we suggest limited success of the governance regulations in mitigating agency problems. Finally, our results suggest significant survivor bias in the acquisition premium. Controlling for post-acquisition CEO turnover, the acquisition premium in pay is reduced to 2%.

The rest of the chapter is structured as follows- Section 2 briefly summarizes the relevant literature on the debate on firm size-CEO pay elasticity and the effects of M&A on CEO pay. Section 3 discusses the data and in Section 4 we discuss the choice of methodology and robustness tests. Findings from empirical analysis are discussed in Section 5 whereas Section 6 concludes.

5.2 Theory and Literature Review

Two differing views on CEO compensation exist in the economic literature. The principal-agent view of incentive alignment suggests that CEOs are rewarded for their skills and contribution to company performance and that under the condition of incomplete monitoring, a reward structure should be designed to align the interests of the (risk-neutral) shareholders and the (risk-averse) CEOs (Jensen and Meckling, 1976). This theory posits a strong link between firm performance and CEO pay. Bebchuk et al (2003) argues that the optimal contracting framework is fraught with problems of moral hazard as monitoring and incentive alignments are only partial and often costly. Consistent with his

argument, empirical evidence suggests that the statistical relationship between CEO pay and firm performance is weak and less robust to changes in specifications and functional form of the variables. Conyon and Leech (1994) finds weak pay-performance relationship in UK firms. Murphy (1999) notes that there exists a statistically significant but small positive association between CEO pay and firm performance. The performance sensitivity in CEO pay was estimated to be of the order of 0.12-0.16 (Coughlan and Schmidt 1985; Murphy, 1999).

Hall and Liebmann (1998) used a wider definition of CEO pay to include stock and option grants for a sample of 478 US firms from 1980-1994 to report a stronger association of pay and performance. Omitting the variances of stock and option grants from the model is shown to create a downward bias in pay-performance sensitivity.

In contrast, a large body of literature reports a positive and robust association between CEO pay and firm size which is stronger than the CEO pay-firm performance elasticity (Bliss and Rosen 2001, Murphy 1999). These findings are consistent with the implications of tournament theory which predicts that compensation is a convex function of organizational levels (Lambert et al. 1993; Main et al, 1993). CEO pay-firm size sensitivity is of comparable magnitude (0.20-0.35) across different temporal, industry-specific and geographic dispersion of the sample (Rosen, 1992). This could be because firm size acts as an easily available and unambiguous yardstick for the board of directors and remuneration committees to benchmark CEO pay (Rosen 1992; Conyon 1997).

An alternative explanation for the high levels and rapid growth of CEO pay can be provided using arguments related to managerial power and rent capture. Core et al. (1999) and Harford and Li (2007) provide evidence that CEOs of firms with weaker corporate governance are systematically paid higher than their contemporaries in firms with stronger corporate governance. The dual role of CEOs as the Chairman of the Board significantly increases managerial influences over the board (Brickley et al. 1997) and

reduces the degree of independent monitoring by the board (Jensen, 1994). Empirical studies also note that CEOs receive higher pay if they have a greater influence in the nomination and selection of board of directors (Main et al. 1993; Core et al. 1999).

The relationship between CEO pay and firm size, irrespective of reasons, has a potential implication for the motivation of CEOs to undertake acquisitions. If CEO pay is strongly associated with firm size, then undertaking acquisitions provides the CEO with a viable option to increase her own pay, even at the cost of shareholders. Larger firms, along with tangible benefits to CEO wealth, also generate several non-pecuniary benefits to the CEO in terms of perquisites and lowering the probability of her own firm getting acquired (Singh, 1975). Completions of acquisitions also serve as signals of managerial ability and may have an impact on the long term earnings of the CEO.

Most studies in U.K. and the U.S. on the impact of acquisition on CEO pay find that the CEOs of acquiring firms enjoy significant post-acquisition pay premiums. Khorana and Zenner (1998) find evidence that CEOs of acquiring firms enjoy 10.5% higher post-acquisition cash compensation than CEOs of non-acquiring firms. They also report a persistent premium in CEO pay in the years following acquisitions. The impact on total compensation is estimated to be lower due to a decline in the average stock price following merger announcements[2]. In a recent study, Harford and Li (2007) find a positive and significant acquisition premium in pay for US CEOs. The wealth effects of the acquisitions was reported to have an insignificant impact on the pay premium. Girma et al (2006) report a "pure" acquisition premium in pay for UK CEOs after controlling for performance and the growth in firm size through acquisition. They argue that the post-acquisition premium in pay can be attributed to the signalling effect of managerial ability that is manifested in the completion of acquisitions. They also report a differential

[2]The fall in share price may not impact upon CEO wealth contemporaneously as the CEOs have the discretion not to exercise their stock grants at that point but wait for the price to increase.

impact of acquisitions on CEO pay contingent on the wealth effects. In contrast, Guest (2009) finds a positive acquisition effect on CEO pay irrespective of the effect it has on shareholders' wealth and that corporate governance doesn't have a significant impact on post-acquisition CEO pay in the UK. He also finds no evidence of a differential impact of target nationality on acquisition premium in pay.

Conyon et al (2006) suggest that acquisitions are often followed by spin-offs and divestments. Therefore, any contemporaneous increase in CEO pay due to acquisition may have a downward adjustment in the following years due to a possible decline in sales. Thus, the effect of acquisitions on CEO pay may not only be contemporaneous but may be gradually adjusted to a higher level. The lagged increase in pay may also be due to deliberate smoothing of CEO pay rises to avoid attracting media and institutional shareholder attention.

Most noted US studies use sample periods up to the year 2000 and thus do not reflect the last decade's increased scrutiny on CEO pay and corporate governance. Governance regulations aim at better incentive alignment and hence *a priori* it may be expected that post-SOX, the acquisition premium in pay may have stronger association with the wealth effects of acquisition.

5.3 Data

The data used in this analysis is derived from Standard and Poor's Execucomp database. The Execucomp database provides detailed information on executive salary, bonus, stock and option awards and a range of firm and CEO specific information, generated from the annual proxy filings (Def-14A) of listed US firms. It covers executive compensation data from 1992 to 2010. The dataset contains firms listed in the S&P 1500 indices, representing about 90% of the US market capitalization.

The study period for this analysis is 1994-2010. Execucomp identifies the CEOs of a firm in a given financial year and provides compensation details for 3016 CEOs in that sample period. 313 firms do not report the CEOs or the full compensation details and have been omitted from this study. Probit regressions to analyze sample selectivity (not tabulated) were performed using firm performance, firm size and CEO pay measures but none of the parameters was estimated to be statistically significant and hence there seems to be no evidence of systematic non-disclosure of information.

The remaining 2755 organizations are observed for the period 1994-2010. We also omit firms which are observed for less than 3 years within the sample period. This leads to omission of 3144 firm-year observations. Thus the final dataset contains 14767 firm-year observations for 2703 CEOs. The firms are observed from the first year they appear on the Execucomp database until the end of the study period or until the firm drops out of the sample due to mergers and acquisitions or delisting from the stock exchange.

CEO pay for each year is calculated as the sum of the cash and non-cash compensation paid in that year. The nominal CEO pay is converted to year 2000 dollars by using Consumer Price Indices published by the US Bureau of Labour Statistics. The natural log of CEO pay is used in the analysis as an explanatory variable.[3] Total Pay is skewed with a mean (median) of 4.3 (1.7) million USD. Further, we use natural logs of cash compensation and non-cash equity based compensations separately to analyze changing compensation mix.

The firm performance data is obtained from S&P's COMPUSTAT Research Tape whereas the stock price data is obtained from Centre for Research in Securities Prices (CRSP) database. The databases were matched on the basis of the six digit CUSIP (Committee on Uniform Security Identification Procedures) numbers of the firms. A

[3]The estimations are robust to alternate specifications of CEO pay, without using the LTI and RSU. "All Other Total" payments include severance payout that may have been made in an year and has been excluded from the analysis.

second level matching was performed based on the ticker symbols of the firms. The industry performances are matched by the firm's 2-digit SIC codes. We chose a set of firm performance measure based on discussions in existing literature (Hambrick and Cannella, 2004) and use Return on Total Assets (ROA) as accounting measures of firm performance[4]. Firm performance may not always be a reflection of managerial effort but may be significantly influenced by industry wide shocks. We construct a measure of relative performance to control for industry shocks. The annual average value weighted return for a firm is benchmarked to the average annual value weighted return of the median firm in the same industry. Further, to control for the risk in firm's operating and information environment, we use the volatility in firm's stock returns by using the standard deviations of monthly value-weighted returns on a firm's stock in a given year.

Using Acquisition Weekly, Thomson One Banker and Forbes company databases, the events of acquisitions are identified and categorized as domestic or international acquisitions. For the purpose of this study, acquisition is defined as an event whereby a firm owning less than 50% of the target's voting shares before the acquisition increases the ownership to 50% or more after the event (Guest, 2008). In the sample period 8247 acquisition deals are reported. Following the sample selection method of Lehn and Zhao (2006), the sample for this study is selected using the following criteria: (a) The acquisitions were announced between January, 1, 1992 and December, 31, 2010 (b) the deals are "completed", (c) both the target and the acquiring firms are publicly listed[5] and (d) the size of the target firm, measured as natural logarithm of total assets, is at least 10% of that of the acquiring firm. These requirements lead to 3243 acquisitions in the sample period. We use the year of completion of acquisition as the event year.

[4] Using Earning Before Interest and Taxes (EBIT) and Earnings Per Share (EPS) as alternate measures of firm performance yields qualitatively similar estimates.

[5] Although Thomson's databases do contain information of privately held firms, we only base our analysis on listed firms. This is because information on privately held acquiring firms not listed in the US are not easily available and may not be consistent.

To isolate the effects of individual acquisitions, we apply a materiality constraint of non-overlapping acquisitions, consistent with the definition used by Harford and Li (2007). This restriction is necessary to understand the lagged effects of an individual acquisitions on CEO pay and account for the smoothing of the post-acquisition pay premium. An overlap is categorized as a gap of less than 24 months between the announcements of two M&A. This leads to elimination of 1793 acquisitions[6].

The final sample consists of 1450 acquisitions undertaken by 1230 firms in the sample period. 1525 firms in the dataset do not take part in any acquisition in the given sample period.[7] An acquisition is classified as international if the target firm is not listed in an US stock exchange. Using this definition, there are 1145 domestic acquisitions and 305 international acquisitions.

A priori, we may expect the strength of corporate governance to have an impact on the probability of CEO dismissal and the compensating differential paid for rising risk of turnover. Data on corporate governance was obtained from the Risk Metrics database (formerly IRRC). Number of directors on a board and percentage of outside directors are used as measures of board size and board independence respectively. If the CEO also acts as the Chairman of the board (CEO duality) and/or has higher stock holdings in the firm, she may enjoy some degree of power over the board of directors. We also control for a busy board using the number of average number of board memberships of the directors of a given firm in a given year.

Corporate governance data is available for 1996-2010 and hence specifications with corporate governance controls contain 11522 firm-year observations.

[6] Robustness check was performed including the overlapping acquisitions in the dataset. The estimate on the contemporaneous indicator for acquisition was (0.053) almost one-and-half percentage points higher than our baseline estimates and significant at 1% level. The higher estimated effect of acquisition on CEO pay possibly reflects the overlapping effects of closely timed acquisitions.

[7] Rossi and Volpin (2004) reports the percentage of hostile takeovers in USA from 1990-2002 to be 6.44%. In this study, I have not differentiated between hostile and friendly acquisitions because of the small proportion of hostile takeovers.

5.4 Methodology

Recent studies on M&A and CEO pay in the context of UK samples have used a dynamic panel approach (Girma et al. 2006, Guest 2008). In the presence of time persistence in CEO pay, introducing a lagged dependent variable of CEO pay growth may help in capturing the effect of smoothed increase in post-acquisition CEO pay. We test for the existence of serial correlation of CEO pay using Wooldridge (2002) test for auto correlation in panel data. The test provides insufficient evidence to reject the null hypothesis of no first order auto-correlation in CEO pay (p = 0.6862)[8]. In the absence of first order autocorrelation in CEO pay, we employ a fixed effect estimation of the model for CEO pay. A Hausman test suggests the use of a fixed effect estimation over random effects (p = 0.000).

Using the various determinants of CEO pay identified in the existing literature and discussed in Section 2, we construct the baseline model to estimate the effect of M&A on the post-acquisition CEO pay for firm 'i' in time 't'.

$$LnPay_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 Sales_{it} + \beta_3 X_{it} + \beta_4 Acquisition_{it} + \beta_5 \sigma_{\mathrm{Re}\,t_{it}} + f_i + h_t + \varepsilon_{it} \qquad (5.1)$$

In equation (5.1), Pay_{it} is calculated as the sum of the salary, bonus, Black Scholes value of stock and option awards, non-equity incentives, value of Restricted Stock Grants and Long Term Incentives and all other cash compensation paid in that year[9]. To control

[8] Using natural log transformations of CEO pay as the dependant variable, the Wooldridge's test for autocorrelation is insignificant at 10% level . The use of monetary value of CEO pay yields no first-order autocorrelation in CEO pay. The significant autocorrelation in CEO pay as reported in UK studies may be due to the use of cash only measures of compensation.

Drukker (2003) notes that the test may have less power in the presence of conditional heteroskedastic error in small samples. However, simulations on power and sample size for AR and MA show that for our sample size, the power of the test is 1.00.

[9] Kaplan (2006) reports that Execucomp's Black-Scholes valuations may be overestimate the values of the stocks and options if the tenure is less than seven years since the valuations are done with an assumption of seven year vesting period. He proposed a binomial tree valuation approach. The median tenure of CEOs in our dataset is over 7 years and hence we use the Execucomp's valuation of stocks and options. Execucomp also values restricted stocks with the assumption of fully vested stocks which may overestimate CEO pay. Lack of practicable alternatives and assuming the effect to be similar for

for smoothed increase of CEO pay, we estimate the lagged effects of acquisition on CEO pay(Girma et al. 2006).

The coefficient β_1 estimates the effect of firm performance on CEO pay. There are contrasting views on the appropriate measures of firm performance. Choice of stock returns as measure of firm performance reflects the expected value created by a CEO but is subject to market noise (Couglan and Schmidt, 1985). Accounting measures partially reflect the value created by the existing CEO in the given period and the remainder is reflected in future earnings (Engel et al. 2003). Therefore, we use both accounting measures of firm performance (ROA_{it}) and stock price performance. We benchmark the annual average value weighted return on the firms stocks with respect to the annual average value weighted return of the median firm in the same industry (at 2-digit SIC level). This controls for the industry effects in firm performance. Consistent with the existing literature, historical firm performance is associated with post-acquisition pay up to two lag periods and hence we control for two lags of firm performance (Geddes and Vinod, 1997; Girma, Thompson and Wright, 2006).

$Sales_{it}$ is used as the measure of firm size.[10] It is difficult to decompose the sales into "organic sales" and increases in sales due to acquisition particularly since acquisitions in the sample includes cross border targets for which data is often not available. Existing empirical studies predict a significant positive association of CEO pay with firm size. Thus, β_2 reflects the effect of firm size on the acquisition premium, allowing β_4 to capture the pure acquisition effect on CEO pay. If acquisitions are associated with a rise in CEO pay, then the coefficients on the $Acquisition_{it}$ (and its lags) will be significant and positive. $Acquisition_{it}$ is an indicator which takes on values of '1' if an acquisition is

all, I use Execucomp valuation for restricted stocks.

The estimations are robust to alternative definition of Total Compensation that excludes option grants and non-equity incentive as suggested by Bebchuk and Fried (2002).

[10] Qualitatively similar results are obtained using Number of employees and Total Assets as measures of firm size.

undertaken in a given year. The use of lagged indicators for acquisition are expected to yield qualitatively similar results to that obtained from dynamic panel models. Since the effects of acquisition on CEO pay may persist in the lags, the coefficient on $Acquisition_{it}$ indicator only partially capture the impact. We also control for trend effects in CEO pay to isolate the pure acquisition effect. β_3 captures the effects of all other observable firm performance measures contained in the vector, X_{it}.

A set of year dummies, h_t are used to account for any macroeconomic shocks. Natural log transformations of all monetary variables have been used in the estimation. The estimation reports robust standard errors that are clustered at firm level.

Next, we examine whether CEOs are rewarded differentially for *expost* 'wealth-enhancing' and 'wealth-reducing' acquisitions. In equation (5.2), we introduce interaction dummies of acquisition with negative annual return on the firm's industry benchmarked stocks (Harford and Li, 2007). This is in contrast to studies that use 3-day or 7-day or 30-day Cumulative Abnormal Returns (CAR[$-1, +1$] , CAR[$-3, +3$] or CAR[$-10, +20$]) around the announcement date to categorize 'wealth-enhancing' and 'wealth-reducing' acquisitions (Girma et al. 2006, Lehn and Zhao, 2006). The horizon of the performance effect of the acquisition and the unvested equity options of the CEO may extend beyond few days around the announcement (Vijh 1997; Rau and Vermaelen, 1998). Thus, the announcement effect on stock returns is a short-term statistic to use as a proxy for wealth effects of merger. Consistent with the arguments of Harford and Li (2007), we use industry-benchmarked annual value weighted return on a firm's stocks of a firm as a metric to assess the wealth effects of acquisitions. $Positive\,\mathrm{Re}turn_{it}$ ($Negative\,\mathrm{Re}turn_{it}$) is an indicator variable that takes the value of '1' if the change in annual value weighted return on the firm's stocks are higher (lower) than the change in annual value weighted return of the median firm in the same 2-digit SIC level. The interaction of $Positive\,\mathrm{Re}turn_{it}$ ($Negative\,\mathrm{Re}turn_{it}$) with $Acquisition_{it}$ are used to estimate the effects of wealth-enhancing

(wealth-reducing) acquisitions on CEO pay. Using standard deviations over the previous two years monthly percentage stock returns, we control risk in firm's information and operating environment, which is reported to be a significant determinant of CEO pay (Core et al. 1999).

$$LnPay_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 \sigma_{\mathrm{Re}t_{it}} + \beta_3 Sales_{it} + \beta_4 Acquisition_{it} + \tag{5.2}$$
$$+ \beta_5 Negative\,\mathrm{Re}turn_{it} + \beta_6 (Acquisition_{it} * Negative\,\mathrm{Re}turn_{it}) +$$
$$f_i + h_t + \varepsilon_{it}$$

In the final specification, we control for the size and independence of the board of directors to examine the effect of corporate governance on post-acquisition pay premiums. If weak corporate governance is associated with higher post-acquisition pay increase, it may be suggestive of agency problems. We control for CEO duality, board size, board independence, board busyness and percentage of CEO shareholding in the firm. The number of directors on the board is used to control for board size. A board is classified as independent if it is constituted with more than 60% outside directors and the CEO is not the Chairman of the Board.[11] A busy board may indicate a dilution in strength of monitoring or may also indicate that firms optimally choose directors who are highly skilled and hence are in short supply. We use the mean number of board memberships held by the directors of a sample firm to control for the dilution effect in governance.[12]

If acquisitions are undertaken efficiently, the controls for governance should have in-

[11] Directors who are not employees, relatives of employees, former employees or employees, attorneys, solicitors and accountants of any other firm which has contractual relations with the sample firm are classified as outside directors.

[12] The results were robust to alternate specifications of busy board where we use an indicator for busy board which takes on the value of '1' if more than 50% of the directors on the board have number of board memerships higher than the mean number of board memberships held by all directors in the sample.

significant effects on the post-acquisition premium in CEO pay. The measures of governance should also not have an effect on the pay premiums for "bad" acquisitions. Using the indicator variable $Acquisition_{it} * Negative\,\mathrm{Re}turn_{it} * IndependentBoard_{it}$, we estimate whether a more independent board is associated with a lower post-acquisition pay premium for wealth-reducing acquisitions. Independent Board indicator equals to '1' if the CEO is not the chairman of the board, the percentage of outside directors' representation on the board is more than 60% and if the CEO is not the Chairman of the nominating committee and the compensation committee.

$$\begin{aligned} LnPay_{it} = {} & \alpha + \beta_1 ROA_{it} + \beta_2 \sigma_{\mathrm{Re}t_{it}} + \beta_3 Sales_{it} + \beta_4 Acquisition_{it} + \beta_5 Negative\,\mathrm{Re}turn_{it} \\ & + \beta_6 Board\,\mathrm{Si}ze_{it} + \beta_7 IndependentBoard_{it} + \beta_8 BoardBusyness_{it} \\ & + \beta_9 (Acquisition_{it} * Negative\,\mathrm{Re}turn_{it} * IndependentBoard_{it}) + f_i + h_t + \varepsilon_{it} \end{aligned} \tag{5.3}$$

The acquiring firms may not be a randomly selected subsample and the decisions to undertake acquisitions may be endogenous. We seek to circumvent this problem in two ways. Firstly, we use firm fixed effects in the model to mitigate potential biases due to time invariant omitted variables.

Secondly, the probability of a firm undertaking an acquisition is instrumented using CEO tenure and an indicator for whether the firm has undertaken acquisition(s) in the previous two years. $AcquisitionHistory$ equals one if a sample firm has undertaken one or more acquisition in the previous two years and zero otherwise. We chose these instruments because CEO tenure may affect the entrenchment of the CEO and hence his decision to undertake acquisition. Similarly, prior acquisition history may be a predictor of the

likelihood of future acquisition. Thus the baseline first stage model is specified as follows:

$$\begin{aligned}\Pr(Acquisition) &= \alpha_0 + \alpha_1 ROA + \alpha_2 \sigma_{\mathrm{Re}t_{it}} + \alpha_3 Sales + \alpha_4 Board\,\mathrm{Si}ze + \alpha_4 IndependentBoard + \\ &\quad \alpha_4 BoardBusyness + \alpha_5 CEOTenure + \alpha_6 AcquisitionHistory \\ &\quad + f_i + h_t + \varepsilon_{it} \qquad (5.4)\end{aligned}$$

In the second stage baseline specification we use the predicted probability of acquisition as a regressor:

$$\begin{aligned}LnPay_{it} &= \beta_0 + \beta_1 ROA_{it} + \beta_2 Sales_{it} + \beta_3 X_{it} + \beta_4 Acquisition_{it} + \beta_5 \sigma_{\mathrm{Re}t_{it}} + \\ &\quad \rho(\widehat{Acquisition}) + f_i + h_t + \varepsilon_{it} \qquad (5.5)\end{aligned}$$

where ρ is the association of probability of undertaking acquisition with CEO Pay. This helps us in estimating pure acquisition effect in the presence of bias due to endogenous choice to undertake acquisitions. Results of Sargan Test (p=0.088) and tests for weak instruments [$F = 138.31$] suggest that the set of instruments used are valid and uncorrelated to the distribution of errors. The sample size for instrument variable estimations are smaller because the history of acquisition is only available from the second acquisition of each firm. The results are presented in column 6 of Table 5.1 and columns 2 and 4 of Table 5.2.

Further we control for the post-acquisition CEO turnover and the effect of such turnover on the acquisition-premium in CEO pay by using Heckman selection models. By not controlling for post-acquisition CEO turnover, the studies on effects of acquisition on CEO pay may be susceptible to survivor bias (Guest 2008; Girma et al. 2006; Harford

and Li, 2007). These studies either limit their sample to acquiring firms whose CEO remain in post for at least one year from the date of announcement or assumes zero compensation to the departing CEOs in the subsequent years. Harford and Li (2007) report no significant difference in turnover probability for acquiring and non-acquiring CEOs. The current literature either limits the understanding of the effect of CEO turnover or suffers from survivor bias and over-estimates the merger effect. In our estimations, survivor bias is controlled for using Heckman selection equations. Termination payment and change in control payments are used as additional variables.

The first stage of the model is a probit estimation of the probability of CEO retention post-acquisition using controls for contemporaneous and lagged firm performance measures, firm size, corporate governance measures, industry dummies and, termination payment and change in control payment as exclusion restrictions. Termination payment is the payment eligibility of a CEO in the event of an involuntary turnover whereas change in control payment is the payment eligibility of the CEO in the event of involuntary turnover arising out of change in corporate control (viz. acquisitions). *A priori*, it can be expected that a higher termination payment and change in control payment will increase the probability of CEO retention post acquisition. Turnover payment and change in control payment is only relevant when an event of turnover is under consideration and effects the pay of a CEO only through its effect on survival probability. The tests for the validity of the exclusion restrictions are presented in the subsection 5.5.4. In the second stage, the predicted probability of CEO retention is used to estimate the effect of acquisitions on CEO pay using the same set of parameters as delineated in equation (2). We estimate the following model to control for endogenously determined CEO turnover decisions and hence control for survivor bias.

$$LnPay_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 Sales_{it} + \beta_3 X_{it} + \beta_4 Acquisition_{it} + f_i + h_t + \varepsilon_{it} \quad (5.6)$$

Where observations of Pay_{it} are conditional on the outcome of the selection equation specified as

$$\text{Re tention}_{it} = \begin{cases} 1 \; if \gamma z_{it} + \nu_{it} > 0 \\ 0 \quad Otherwise \end{cases} \quad (5.7)$$

z_{it} contains all the observable parameters of firm performance, firm size, CEO tenure, corporate governance measures and industry classifications that contribute to the probability of retention of the CEO in the event of an acquisitions.

Theoretically, Heckman selection models are identified when the same explanatory variables appear in the selection and the outcome equations. However, the identification is conditional upon distributional assumptions of the residuals and the non-linearity of the inverse mills ratio. Following (Sartori, 2003) we include two variables that hold theoretical significance in the selection equation but not in the outcome. These exclusion restrictions act as instruments of identification parameters the two equations without the rigid assumptions on distributions. It can be shown that in the presence of an exclusion restriction, Heckman selection models are identified at infinity.

5.5 Results And Analysis

5.5.1 Do acquisitions affect CEO Pay?

The estimation results are tabulated in Table 5.1with four different specifications which vary in terms of the compensation measures used as the dependent variable: (1) Salary,

(2) Bonus, (3) Variable Pay, (4) and (5) Total Pay[13]. Estimations in column (4) and (5) report the post-acquisition premium in Total CEO pay using alternate measures of firm performance. Estimates in column (6) are corrected for endogeneity using instruments for undertaking acquisitions.

The effect of accounting firm performance on CEO pay is insignificant in specifications (1)-(4). In specification (5) we use industry-benchmarked stock returns as a measure of firm performance. The semi-elasticity of firm performance and CEO pay is estimated to be 0.029 which is significant at the 5% level. This estimate is in the same order as the estimates on firm performance measures for US samples (Harford and Li, 2007) and UK samples (Girma et al. 2006). Thus, firm performance has a marginal impact on executive pay.[14] In comparison, the effect of firm size on all the specifications of CEO pay is much larger. The effect of firm size is more pronounced for post-acquisition bonuses and variable pay. Overall, a one percentage point increase in firm size leads to a 0.41 units increase in CEO pay, ceteris paribus.

From Table 5.1, the coefficient on the acquisition dummy is positive in specifications (4)-(6), after controlling for firm size (0.037-0.042). However, the estimates are only marginally significant for Total Pay and insignificant for specifications with bonus and salary. We find no contemporaneous pure acquisition effect on CEO bonuses and that the growth in post-acquisition CEO bonuses can be attributed to the increased firm size. Acquisitions have a negative contemporaneous effect on variable pay, probably as a result of declines in average stock price.

The coefficients on the indicators for lagged effects of acquisition are positive across all specifications. Controlling for firm size and performance, the acquisition effect on

[13] Variable Pay = All performance related pay components- Bonus+ Stock Grants + Option Grants + Restricted Stocks + Long Term Incentives and all other annual pay

[14] The estimations are robust to specifications with alternate measures of firm performance like and EBIT and annual value wighted return of firm's stocks (not tabulated).

total pay persists for the next two years after the event, suggesting smoothing of post-acquisition pay premium. The effect of acquisition on both salary and bonus in the first lag is positive and significant, indicating the absence of any substitution effect in the Total Pay design. The lagged positive effect of acquisition on the variable pay component counter-balances the decline in variable pay in the year of acquisition. The acquisition effect persists in the second lag although the effect weakens. Thus, after controlling for increases in firm size, CEOs are paid a 3.5-4% post-acqusition premium in total pay. The increase is driven not only by bonuses as suggested by Grinstein and Hribar (2004) but all the components of Total Pay as evident from the estimates in Column (1)-(5). In an attempt to get a dollar value of the acquisition premium, we multiply the mean CEO pay of the sample with the percentage acquisition premium. Thus, a mean CEO undertaking an acquisition experiences an increase of US$ 4,329,000 X 4% i.e. US$ 173,000 in total pay in the year of acquisition and a comparable pay increase in the next year. The estimates of the indicator for acquisition are of similar order of magnitude across specifications (4) and (6). Thus the results appear to be robust to specification error arising out of endogenous choice to undertake acquisition. The predicted probability of undertaking acquisition is significant and positively associated with CEO pay. From the endogeneity corrected estimates in column (6), CEOs of acquiring firms are paid 4% more in the post-acquisition premium, increasing the pay of a median CEO undertaking acquisition by approximately US$ 4,329,000 X 4% or US$ 173,160. Lagged pay increases are of a comparable order. The estimates on the indicators for contemporaneous and lagged acquisitions are not significantly different from our central finding. The estimates of other control variables are qualitatively similar to our baseline estimates. Thus, our results do not seem to be driven by the potentially endogenous choice of firms to undertake acquisitions.

To test the effects of target nationality on acquisition premium in CEO pay, we employ an indicator variable for cross-border acquisitions that takes on the value of '1' if the

target firm of the acquisition is not listed on a US stock exchange, and '0' otherwise. Consistent with the findings of Guest (2008), we find no differential effect of target nationality on post-acquisition CEO pay. The indicator for cross border acquisitions is estimated to be insignificant across specifications. This is the first study to separately analyze the effects of international and domestic acquisitions on CEO pay in the context of US firms. There is no evidence that acquisition of a foreign target has a differential effect on post-acquisition CEO pay.

A priori, there is no reason to believe that the distribution of CEO pay is normal. The distribution of CEO pay is skewed as presented in Figures 5.1 to 5.3. To test for the effect of acquisition across the distribution of pay, we use quantile regressions. The results are presented in Table 5.4. The coefficient on the acquisition dummy for the 75th percentile is 0.056 (p-value = 0.000) and 0.023 for the 25th percentile (p value = 0.011). Both the estimates are significant at 5% significance level but the difference of the two point estimates is not statistically significant at usual levels of significance (p value = 0.137). Thus, the pure acquisition effect on CEO pay seems to persist across the distribution. The results are presented in Table 5.4.

In summary, we estimate a 4% post-acquisition increase in CEO pay, after controlling for the effect of increased firm size, firm performance and fixed effects. The pure acquisition effect is estimated in all specifications and is persistent up to two years after an event. This suggests that acquisition premium in CEO pay is not only an idiosyncratic increase arising out of a higher bonus in the year of the event (Grinstein and Hribar, 2004) but is a systematic increase in the components of Total pay. Lagged increase in pay is suggestive of smoothing in post-acquisition pay increase. We also find no differential increase in pay for international M&A, providing evidence that target nationality has insignificant effects on post-acquisition CEO pay.

5.5.2 Are CEOs rewarded differentially for 'wealth-enhancing' and 'wealth –reducing' acquisitions?

In this section, we examine whether the CEO pay increase post-acquisition is contingent on the effect of the acquisition on shareholder's wealth. In other words, we examine whether CEOs may be motivated to carry out acquisitions for self-serving interests even if it reduces shareholders' wealth[15]. From an agency-theory framework, CEO and firm performance is expected to be asymmetric for positive and negative firm performance (Harford and Li, 2007 and the references therein). We use indicators for positive (negative) benchmarked annual value weighted returns on the firm's stocks in the year of announcement of acquisition which takes on a value of '1' if the benchmarked annual value weighted returns on the firm's stocks in the year of announcement of acquisition is positive (negative) or '0' otherwise.

We measure the wealth effect of acquisitions by introducing an interaction variable. Acquisition_{it} * Negative Annual Return_{it} that takes on the value of '1' if a firm 'i' undertakes an acquisition in the year, 't' , and there is negative annual return on its stocks in that year benchmarked to returns on the median firm in the same 2-digit SIC code, thus characterizing 'wealth-reducing' acquisitions. We also estimate the lagged effects of wealth-reducing acquisitions on managerial pay. If the coefficients on the Acquisition_{it} * Negative Annual Return_{it} dummy (and its lags) are positive, then the hypothesis of asymmetry of CEO pay-firm performance will not hold and CEOs undertaking acquisitions will seem to be rewarded in the same way for good and bad acquisitions. Core et al. (1999) and Harford and Li (2007) indicates that risk in firm's information and operating environment is a significant determinant of CEO pay, particularly in the events of acqui-

[15] We acknowledge some ex-ante good acquisitions may turn out to be ex-post bad acquisitions and that there may be some degree of managerial hubris in undertaking acquisitions. However, we argue that if bad acquisitions result in differential pay impacts, a CEO's risk-taking may be downward adjusted.

sitions. A significant and positive coefficient on firm risk parameters will indicate that post-acquisition CEO pay change can be partially due to the change in the firms' risk environment. We control for the risk in firm's operating environment by using standard deviations of monthly value weighted return on firm stocks for the prior two years.

The estimation results are presented in Table 5.2. In column (1), we present estimates of the effects of wealth-reducing acquisitions on Total Pay and column (2) re-estimates specification (1) with correction for endogeneity. The estimations include year fixed effects with robust standard errors clustered at firm level. The effects of firm performance, firm size and acquisition are similar to the estimates reported earlier in Table 5.1. ROA has an insignificant effect on post-acquisition CEO pay. Firm size is significantly positive and has a stronger association with pay than ROA. The estimated coefficient on the measure of firm risk is positive and significant indicating that greater risk in firm's information and operating environment increases the CEO pay. The coefficient on Acquisition_{it} is positive and significant indicating that there is a pure acquisition effect on CEO pay.

Using indicators for negative benchmarked returns, we find that in years of poor firm performance with respect to the median firm in the same industry, CEOs are paid lower compared to years of good performance. This result is consistent with the principal-agent model. The estimate on the interaction indicator of acquisition and negative benchmarked return is negative and insignificant. The lagged effects of the indicator variable is also estimated to be insignificant. The results suggest that while non-acquiring CEOs experience a lower pay growth for negative benchmarked performance, there is no differential effect on pay for acquiring CEOs for undertaking bad acquisitions. Thus, the wealth effects of the acquisitions have an insignificant effect on the post-acquisition pay of CEOs. Controlling for endogeneity in column (2) produces qualitatively similar estimates. There seems to exist further incentives for CEOs to undertake self-serving acquisitions as their pay is largely decoupled from the wealth effects of the acquisition.

5.5.3 How much of the acquisition premium in CEO pay can be explained by poor corporate governance?

Next, we analyze whether the increase in post-acquisition CEO pay can be attributed to agency problems. *A priori*, we would expect weak corporate governance to be associated with higher post-acquisition pay, if the weak association of firm performance and CEO pay is not contractually optimal. No unique measure for strength of corporate governance exists in the literature (see Hermalin and Weisbach (2003) for an overview). Hermalin and Weisbach (2003) and Harford and Li (2007) used CEO tenure as a proxy for the relative strength of the board and the CEO. However, this measure can also reflect the tenure effect on CEO pay.

We use a set of variables to proxy for board strength and board independence. Consistent with the methodology of Harford and Li (2007), we use interaction variables, Independent Board_{it}*Acquisition_{it}*Negative Annual Return_{it} to estimate the effect of governance on post-acquisition pay in events of wealth-reducing acquisitions. A negative coefficient on the interaction dummy would indicate that presence of an independent board leads to differential post-acquisition pay with respect to wealth effect of the acquisitions. In other words, a negative relationship will imply that the post-acquisition pay premium of CEO can be, in part, attributed to weak corporate governance and captive boards.

The estimation results are presented in Table 5.2. Column (3) presents estimates with the individual measures of corporate governance while column (4) provides endogeneity corrected estimation results. The coefficient on board size is positive and significant. A smaller board pays lower than a larger board. A higher percentage of outside directors on the board is associated with lower CEO pay. Board busyness[16] and equity ownership of

[16] Banding the average number of board memberships held by the directors of the board of a sample firm yields qualitatively similar results.

the CEO has insignificant effects on CEO pay. Controlling for the governance parameters does not change the acquisition premium in CEO pay.

Next, we test if stronger corporate governance leads to differential post-acquisition CEO pay contingent on the wealth effects of the acquisition. The coefficient on Independent Board$_{it}$*Acquisition$_{it}$* Negative Annual Return$_{it}$ is negative and significant. This indicates that ceteris paribus, CEOs in firms with independent corporate governance are paid less for wealth reducing acquisitions and the acquisition premium in CEO pay can be partially attributed to weak and captive boards.

Further, we test the effect of regulatory changes in corporate governance on post-acquisition CEO pay. Using the Sarbanes Oxley Act (SOX), and NASDAQ and NQSE reforms of 2002[17] as exogenous changes in corporate governance regulations, we test the effects of governance regulations on the post-acquisition pay premium in CEO pay. In column (5), we use an indicator variable which is equal to '1' for the post-SOX sub period of the sample (2003-2010) and '0' otherwise. Also, in this specification we do not use the year dummies. The coefficient on SOX dummy is positive and significant indicating higher pay for CEOs in the post-SOX period. The effects of firm size and firm performance are similar to the estimations is specifications (1)-(4). The pure acquisition effect is smaller but comparable to the estimates in specification (5) indicating a consistent acquisition premium in CEO pay in the post-SOX period. However, the estimate on Negative Annual Return$_{it}$ is insignificant in specification (5) which may suggest that in the post-SOX period, CEO pay increase is insignificant for negative benchmarked return on firm's stocks. Post-SOX, the acquisition pay premium seems to be contingent on the wealth effects of acquisition to some degree. The coefficient on, Independent

[17] SOX mandates enhanced accounting disclosure, independence of audit committe and disclosure of stock swap deals. It also makes the executives liable to forfeit bonus and compensation in the events of material non-compliance in disclosure and imposes criminal penalties for corporate fraud.
NASDAQ and NQSE reforms includes stringent director and board independence standards on public companies.

Board_{it}*Acquisition_{it}*Negative Annual Return_{it} is negative and of the same order as specification (4). The interactions of firm performance measures, acquisition dummy and the measures of corporate governance with SOX are all estimated to be insignificant at 10% significance level. This may indicate no significant difference of acquisition premium in pay in the post-SOX period. However, SOX may have led to better benchmarking of pay premium to firm performance outcomes with respect to the industry.[18]

5.5.4 CEO Turnover and Survivor-Bias

Finally, we seek to examine the effect of post-acquisition CEO turnover on CEO pay. We control for post-acquisition CEO turnover, and estimate the post-acquisition premium on CEO pay, conditional on the probability that a CEO retains her job, by employing a two-stage Heckman selection model. In this analysis we use the severance payment eligibility of the CEO in the event of involuntary turnover arising out of change in corporate control as the exclusion restriction. There are no readily available tests for instrument validity for Heckman selection models. However, regression estimates of the exclusion restriction on CEO pay and probability of CEO turnover suggests that termination pay eligibility in events of change in control is significantly (and negatively) associated with probability of CEO turnover (p value = 0.006) but has an insignificant effect on CEO pay (p value = 0.108). Although this is marginally significant, this was the best instrument available. Further, the exclusion restriction accounts for 5.7% of the variation in the probability of CEO turnover following acquisitions. Thus, eligibility of change and control payments is used as valid exclusion restrictions for the Heckman two stage models.

Estimates of Heckman models may suffer from heteroskedastic errors. Stata can readily yield unbiased standard errors for Heckman selection models. To check the robustness of our estimates, we also used bootstrapped standard errors. The results obtained are

[18] The post-SOX period overelaps with the financial crisis of 2007 and it is not possible to decouple these effects.

similar to that of the non-bootstrapped models. For brevity, we do not include the non-bootstrapped estimates.

The estimates of the Heckman selection models, presented in Table 5.3 are qualitatively similar to the results from our earlier estimations. In column (1) we tabulate the results of the baseline specification of the Heckman selection model. In column (2) we report the outcome equation and in column (3), we report the fixed effects estimation from column (5) of Table 5.1 for comparison. The association parameter (ρ) of the estimation is significantly positive ($\rho = 0.215$) indicating that any parameter that increases the probability of retention in the event of an acquisition also increase the post-acquisition CEO pay. The association parameter has a robust standard error of 0.04019. The Wald test of independent equations rejects the null hypothesis of $\rho = 0$ and suggests significant association of the two equations (p=0.000).

From the first stage of estimation, contemporaneous firm performance is significantly (and negatively) associated with the probability of retention in the event of acquisition whereas firm size (measured by sales and total assets of the firm) has insignificant effects. The exclusion restriction is significant and positive, providing evidence that supports the hypothesis that higher change in control payment lowers the hazard of CEO exit. More importantly, acquiring CEOs have a higher probability of turnover. The estimation results of the outcome equation suggest that acquiring CEOs enjoy a post-acquisition premium in pay, after controlling for firm size, firm performance and turnover hazards. Increases in firm size due to acquisition partially accounts for this increase in pay. However, the acquisition premium in CEO pay in column (2) is significantly lower than the fixed effects estimates in column (3). Thus, controlling for the strength of corporate governance and the hazards of post-acquisition turnover downward adjusts the pure acquisition effect in CEO pay. The results indicate that a part of estimated premium in post-acquisition CEO pay can be attributed to the survivor bias in the estimations.

Strong corporate governance has an impact on both CEO pay and post-acquisition survival rates. This is further strengthened by the corporate governance regulations as evident from a small decline in post-acquisition pay premium in the post-SOX period compared to the full sample. The sub-period 2003-2010 is also associated with a higher pay-performance sensitivity than the overall sample period, indicating some degree of effectiveness of SOX and stock market reforms in enforcing managerial discipline.

5.6 Conclusion

In this paper we use a sample of 2755 US firms from 1994-2010 to estimate the effect of acquisition on CEO pay. We also seek to determine whether CEOs are rewarded differentially for wealth reducing and wealth enhancing acquisitions and whether the post-acquisition pay premium can be attributed to the strength of corporate governance. Previous studies are limited by their sample period up to 2000 and hence don't reflect the last decade of increased regulatory scrutiny on CEO pay and corporate governance.

We find evidence suggesting that CEOs have a misaligned incentive to undertake acquisitions, even at the cost of decline in shareholders' wealth. Following the work of Guest (2008), we examine if target nationality has an impact on the post-acquisition CEO pay. We find no evidence of higher pay increases for international acquisitions with respect to domestic acquisitions. This adds to the existing literature on executive compensation in the USA. Existing literature uses cash compensation as a measure of CEO pay. We provide a more detailed analysis of CEO pay, using a wider range of components of CEO pay. Our estimations suggest that CEOs experience a rise in salary post-acquisition, possibly through a renegotiation of the contract but the impact of acquisition on CEO bonus is due to the increased size of the firm. We also provide evidence that acquisitions reduce the valuation of the CEOs variable component of pay, due mainly to a decline in

the average share price. However, as pointed out by Harford and Li (2007), the horizon of these grants are long term and a short term decline in their valuation are unlikely to have a major impact as CEOs have the discretion in timing the exercise of these options. Thus we find evidence that CEOs have an incentive to undertake acquisitions to increase their own pay.

One of the key concerns is agency problems in CEO compensation contracts that may provide the CEO with a misaligned incentive to undertake an acquisition, even if it at the cost of shareholders' wealth. Using industry-adjusted measures of firm performance, we find no evidence that post-acquisition pay rise is related to the wealth effect of the acquisition and CEOs enjoy an acquisition premium even for wealth-reducing acquisitions. Therefore there seems to be evidence of misaligned interests of CEOs in undertaking acquisitions, even after controlling for the change in risk environment after an acquisition.

Another focus of our research is the role of corporate governance in aligning the interests of CEOs and shareholders'. Using a wider range of controls for corporate governance, we find evidence that strong and independent boards are associated with lower post-acquisition pay rises. CEO duality, higher percentage of equity holding of the CEO and a lower percentage of independent directors lead to magnification of the post-acquisition pay premium. However, we find no evidence of asymmetric benchmarking of CEO pay depending on the wealth effects even in the presence of a strong and independent board. Thus, a strong and independent board seems to partially mitigate the misaligned incentive in the current executive compensation system. we also find evidence of the effectiveness of corporate governance regulations on managerial discipline. The post-SOX sub-period is associated with a higher pay-performance sensitivity and a lower pure acquisition premium in pay.

Our results appear to be robust to selection bias in the estimation of post-acquisition pay premium. Controlling for post-acquisition CEO turnovers, we find evidence of a

stronger role of corporate governance. This can be because a part of the role of board of directors to enforce corporate discipline is in replacing the non-performing managers. Thus by jointly estimating post-acquisition CEO pay and CEO turnover, we find evidence of a lower acquisition premium in CEO pay.

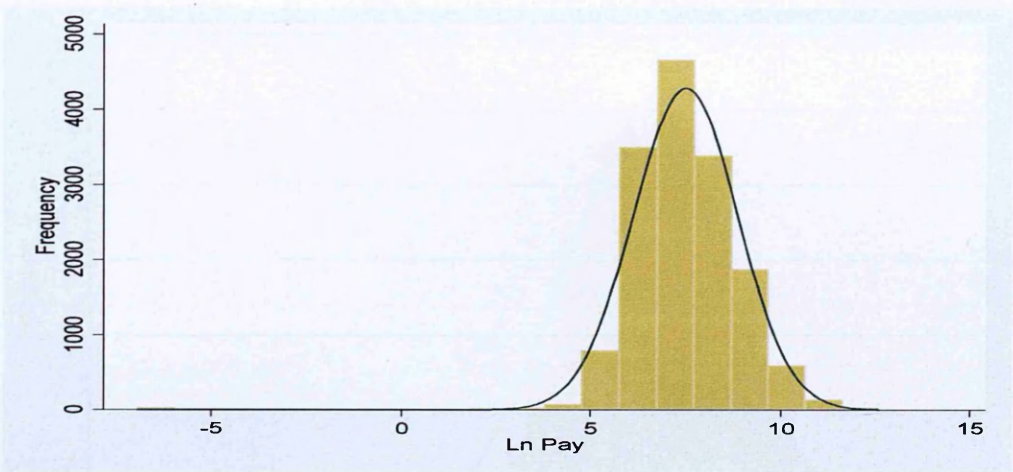


Figure 5-1: Distribution of CEO Pay

Figure 5-2: Distribution of Salary

Figure 5-3: Distribution of Variable Pay

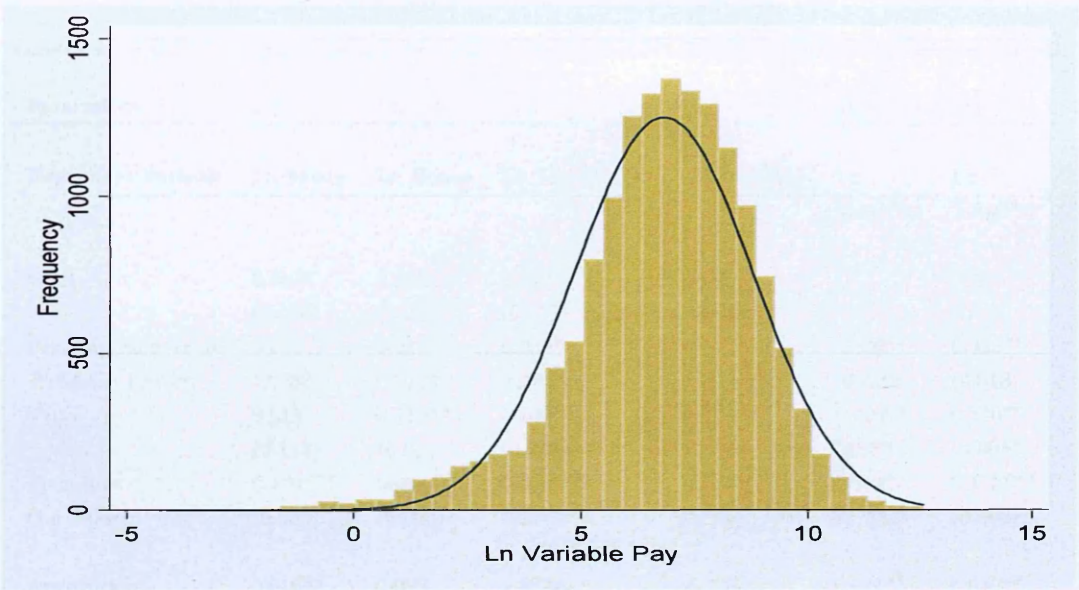


Table 5.1: Impact of Acquisitions on CEO Pay

Parameters	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Ln Salary	Ln Bonus	Ln VariablePay	Ln TotalPay	Ln TotalPay	Ln TotalPay
ROA	0.0871	0.003	0.003	0.00191		
	(0.126)	(0.244)	(0.127)	(0.178)		
Benchmarked Value	0.006	0.012**	0.037**		0.029**	0.032**
Weighted Return	(0.233)	(0.020)	(0.009)		(0.018)	(0.018)
σ_{Ret}	0.013	0.119**	0.138**	0.091**	0.110**	0.110**
	(0.112)	(0.011)	(0.003)	(0.008)	(0.005)	(0.003)
Firm Size	0.104***	0.604***	0.656***	0.434**	0.412***	0.412***
(Ln Sales)	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)
Acquisition_{it}	0.018**	0.098	– 0.096**	0.042**	0.037**	0.040**
	(0.023)	(0.147)	(0.017)	(0.037)	(0.013)	(0.042)
$\text{Acquisition}_{it-1}$	0.017**	0.026*	0.097***	0.052**	0.038**	0.043**
	(0.013)	(0.070)	(0.000)	(0.015)	(0.011)	(0.013)
$\text{Acquisition}_{it-2}$	0.002*	0.012**	0.018***	0.027**	0.029**	0.027**
	(0.056)	(0.015)	(0.000)	(0.041)	(0.038)	(0.025)
International	0.043	0.203	-0.063	0.034	0.034	0.035
Acquisition	(0.167)	(0.179)	(0.420)	(0.573)	(0.686)	(0.531)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.30	0.38	0.32	0.31	0.33	0.33
No. of Observation	14767	14697	14363	14767	14767	10239

Column (4) estimates the sensitivity of total pay to Return on Assets and Column (5) estimates benchmarked stock return-CEO pay sensitivity. Estimation results in Column (6) are endogeneity corrected using instrumental variable method. Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 5.2: Impact of Wealth Effects and Governance on Acquisition on pay Premium

Parameters	(1)	(2)	(3)	(4)	(5)
ROA_{it}	0.016	0.018	0.016*	0.018*	0.016*
	(0.108)	(0.102)	(0.090)	(0.088)	(0.060)
σ_{vwr}	0.110**	0.110**	0.114**	0.115**	0.122**
	(0.018)	(0.015)	(0.020)	(0.018)	(0.003)
Firm Size	0.397***	0.397***	0.381***	0.393***	0.385***
(Ln Sales)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Acquisition_{it}$	0.032***	0.032***	0.029**	0.030**	0.025**
	(0.000)	(0.001)	(0.004)	(0.002)	(0.002)
Negative Annual $Return_{it}$	-0.080**	-0.080**	-0.033**	-0.031**	-0.079**
	(0.011)	(0.009)	(0.027)	(0.020)	(0.008)
$Acquisition_{it}$*	-0.350	-0.360	-0.301	-0.300	-0.297
Negative Annual $Return_{it}$	(0.198)	(0.199)	(0.262)	(0.255)	(0.438)
$Acquisition_{it-1}$*	-0.077	-0.075	-0.071	-0.070	-0.056
Negative Annual $Return_{it-1}$	(0.260)	(0.250)	(0.312)	(0.333)	(0.414)
$Acquisition_{it-2}$*	-0.075	-0.074	-0.073	-0.071	-0.061
Negative Annual $Return_{it-2}$	(0.269)	(0.265)	(0.290)	(0.310)	(0.450)
Board Size			0.022**	0.022***	0.010**
			(0.009)	(0.000)	(0.000)
Board Independence			-0.030***	-0.031**	-0.035*
			(0.000)	(0.004)	(0.055)
Board Busyness			0.008	0.007	0.009
			(0.118)	(0.104)	(0.111)
$Acquisition_{it}$*					
Negative Annual $Return_{it}$			-0.154**	-0.156**	-0.151**
* Independent Board			(0.040)	(0.020)	(0.009)
SOX					0.234**
					(0.002)
SOX*					-0.0214
$Acquisition_{it}$					(0.654)
SOX*					-0.068
Negative $Return_{it}$					(0.255)
SOX*$Acquisition_{it}$*					-0.053
Negative Annual $Return_{it}$					(0.765)
Year Dummies	Yes	Yes	Yes	Yes	No
Adj. R^2	0.299	0.302	0.364	0.367	0.191
No. of Observation	14767	10239	11234	7927	14767

Dependent variable in all the specifications is $LnPay_{it}$
Estimations in Column (2) and (4) are endogeneity corrected estimations. Specification (5) is estimations for the sub-period (2003-2010)
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 5.3: Estimation of Acquisition Premium with Survivor Bias Correction

	Full Sample (1992-2010)			2003-2010	
Parameters	Selection Equation (1)	Heckman Corrected (2)	Fixed Effects (3)	Selection Equation (4)	Outcome Equation (5)
Benchmarked Returns	0.031*** (0.000)	0.014* (0.055)	0.029** (0.018)	0.044** (0.002)	0.027** (0.018)
σ_{vwr}		0.137** (0.011)	0.110** (0.005)		
Firm Size (Ln Sales)	0.040* (0.058)	0.388*** (0.000)	0.412*** (0.000)	0.043** (0.036)	0.635*** (0.000)
Acquisition_{it}	-0.366*** (0.000)	0.018** (0.003)	0.037** (0.013)	-0.409** (0.009)	0.015** (0.012)
$\text{Acquisition}_{it-1}$	-0.233** (0.035)	0.016** (0.007)	0.038** (0.011)	-0.347** (0.022)	0.012** (0.009)
$\text{Acquisition}_{it-2}$	-0.210 (0.177)	0.015* (0.064)	0.029** (0.038)	-0.329 (0.212)	0.0.010 (0.071)
International Acquisition	-0.094 (0.240)	0.022 (0.434)	0.034 (0.686)	-0.108 (0.237)	0.027 (0.453)
Change in Control Payments	-0.016** (0.010)				
ρ	0.219			0.214	

The dependent variables in columns (1) and (4) is probability of retention and that in columns (2), (3) and (5) is LnPay_{it}.The estimates in column (2) are survivor bias corrected and estimates in column (5) is for the sub-period 2003-2010. Estimates are marginal effects from the two-step estimation. Models are estimated with robust standard errors. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 5.4: QuantileRegressions for Impact of Acquisitions on CEO Pay

	(1) P25	(2) P50	(3) P75
Benchmarked Value	0.010*	0.020*	0.311**
Weighted Return	(0.65)	(0.057)	(0.022)
Firm Size	0.364***	0.383***	0.421***
(Ln Sales)	(0.000)	(0.000)	(0.000)
Acquisition_{it}	0.023**	0.036***	0.056***
	(0.011)	(0.000)	(0.000)
Board Size	0.013**	0.029**	0.0340**
	(0.002)	(0.011)	(0.009)
Board	-0.027**	-0.030**	-0.039**
Independence	(0.004)	(0.001)	(0.003)
Board	0.007	0.013	0.018
Busyness	(0.124)	(0.155)	(0.131)

Dependent variable: Ln Pay_{it}

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Chapter 6

Are CEOs Paid a Compensating Differential for Higher Turnover Risk?

6.1 Introduction

In his seminal work, An Inquiry into the Nature and Causes of the Wealth of Nations (1776), Adam Smith puts forward the proposition of compensating wage differentials whereby a worker needs to be paid a premium to motivate her to do a job that involves risk of physical harm, mental fatigue and job insecurity. However, empirical evidence on this proposition has been "inconclusive with respect to every job characteristic except the risk of death" (Brown, 1980). Most studies on compensating wage differentials have relied on self-reported data from workers about the risks involved in the job and the cross-sectional data sets employed for these research inadequately controls for parameters like

motivation, attitude to risk and skill (Duncan and Holmland, 1983; Arnould and Nichols, 1983).

In this chapter, we attempt to test for the presence of compensating wage differentials in CEO pay. In the last decade, CEO compensation and corporate governance have been a topic of much debate among regulators, financial press and academics. Between 1990 and 2005, corporate profit and average worker's pay has increased by 106.7% and 4%, respectively. In the same period, the growth in total CEO pay has been 298.2%. Over the last two decades there have been growing concerns over the rapid growth of and lack of performance sensitivity in CEO pay. Thus, CEOs may seem an unlikely worker-group to merit a compensating wage differential.

Under the conditions of optimal contracting, a poorly performing CEO should receive lower compensation or be replaced by the board of directors. Fama (1980) and Fee and Hadlock (2004) report that the high opportunity cost of CEO dismissal is manifest in the form of loss of managerial reputation, prolonged period of unemployment, working for smaller firms and loss of future earnings and thus the implied probability of earning loss is a major constraint on CEO behaviour. In the last two decades when CEO pay and corporate governance has attracted public outrage, there has been a secular increase in the rate of CEO turnover and the average tenure for US has fallen from eight years to approximately six years (Kaplan and Minton, 2012). Empirical evidence also suggests an increasing likelihood of CEO dismissal (Peters and Wagner, 2012). This motivates the investigation of whether the increase in CEO pay can be partially attributed to the rising likelihood of CEO dismissal[1]. A positive association of CEO pay with the probability of forced turnover will imply that the cost of being fired is reflected in the higher levels of pay. The prospect of compensating wage differentials as a possible reason of high growth in CEO pay has received little empirical attention.

[1] We use "Dismissal" and "Forced-turnover" interchangeably.

Using a dataset of US firms from 1993 to 2009, Peters and Wagner (2012) report a 10% increase in CEO pay for a percentage point rise in forced turnover risk. They suggest that under optimal contracting and a given reservation utility of the CEO, a rising risk of turnover is compensated with a pay premium. The basic premise of their analysis is that the probability of forced turnovers are predicted by firm and industry risk. It can be argued that firm and industry risk may be a predictor of both probability of dismissal and CEO pay. Hence, our paper differs from Peters and Wagner (2012) in using severance pay entitlements of the CEO as an instrument to examine the effect of increasing likelihood of CEO dismissal on CEO pay for a sample of S&P 1500 CEOs during the period 1993-2010.[2] Our results suggest that the CEOs are paid a 2%-4% premium in pay for each percentage point rise in the risk of dismissal, supporting the proposition of a compensating wage differential. In addition, we examine the potential change in compensation mix to compensate for rising dismissal risk and the possible effect of compensating wage differentials on performance sensitivity of CEO pay. We find evidence that the pay premium is driven by an increase in cash-based pay, suggesting a structural change in the composition of CEO pay to compensate for the higher risk of dismissal.

Further, we investigate the effects of corporate governance regulations, in particular Sarbanes Oxley Act (henceforth SOX), and enhanced disclosure requirements which may be expected to have an impact on the risk profile of CEO jobs. Our results suggest that in the sub-period 2003-2010 which immediately follows the governance regulations, CEOs are paid higher compensating differentials, predominantly in the form of cash payments. Thus, it seems the governance regulations may have had a negative effect on performance sensitivity of CEO pay by leading to a higher proportion of risk-free pay.

[2] Arguments can be made that the risk of turnover may be reflected in the severance pay arrangements itself. We discuss our choice of instrument in detail in Section 6.3.

This study adds to several strands of research on executive compensation and corporate governance.

First, our findings suggest the presence of compensating wage differentials in CEO compensation. Controlling for a range of firm and CEO characteristics, we find evidence that CEOs are paid a premium for increasing uncertainty of their job. This is similar to Peters and Wagner (2012) who report a positive association between forced turnover risk and CEO pay. However, we use a different instrumentation strategy and find significantly lesser compensating differentials than that reported by Peters and Wagner (2012). In the context of the recent debate on executive compensation, the compensating differentials in executive compensation due to increasing risk of dismissal is a matter of interest for economists and policy makers alike.[3] Bebchuk and Fried (2003) suggest managerial entrenchment as a major determinant of increasing CEO pay. Gabaix and Landier (2008) indicate firm size as a major determinant of CEO pay growth. We control for managerial entrenchment, firm performance and firm size in our analysis and find significant compensating differentials in CEO pay for increased risk of forced turnover. Our findings add to the current literature on determinants of CEO pay growth.

Second, our results suggest a changing pay mix to compensate for the rising risk of dismissal. To compensate for increasing dismissal risk, the differential is more likely to be paid as risk-free cash compensation. However, such an arrangement may have implications for performance sensitivity and incentive alignment.

Finally, we contribute to the growing debate on the effect of SOX on CEO compensation contracts. We find higher cash based compensation for higher dismissal risk in the post-SOX period. So, it may seem that even though SOX has resulted in a higher

[3]Kaplan and Minton (2012) report increasing riskiness of CEO job but do not analyze the effect of risk on rising CEO pay. Agarwal and Knoeber (1998) reports risk premium in CEO pay in industries prone to higher risk of takeovers. This study is more closely related to Peters and Wagner (2012) that analyzes the risk of forced CEO turnover and its effect on CEO Pay .

probability of poor performing CEOs being replaced, the performance sensitivity of compensation contracts may have declined due to increasing use of less-risky forms of cash payments. Our results suggest an inadvertent effect of governance regulations on the performance sensitivity of CEO pay design.

The rest of the chapter is arranged as follows: In Section 2, we discuss the relevant literature on CEO pay and CEO turnover; Section 3 provides an overview of the data and in Section 4 we briefly discuss the methodology employed to examine the forced turnover-performance relationship. Section 5 discusses the findings of empirical estimation and Section 6 Concludes.

6.2 Theory and Literature Review

6.2.1 CEO Pay and Pay-Performance Sensitivity

The Principal-agent view of incentive alignment suggests that CEOs are rewarded for their skills and contribution to company performance and that under the condition of incomplete monitoring, the reward structure should be designed to align the interests of the (risk-neutral) shareholders and the (risk-averse) CEOs (Jensen and Meckling, 1976). Firm performance (Π) will depend on CEO's performance (ε) and a chance random variable (υ). The profit function

$$\Pi = f(\varepsilon, \upsilon) \tag{6.1}$$

is non separable in ε and υ. Therefore managerial effort ε is not directly measurable. Therefore, CEO's wage is contingent on the observed company performance

$$W = f(\Pi) \tag{6.2}$$

where firm's profit is positively associated with CEO effort.

This theory posits a strong link between firm performance and CEO pay. A broad range of firm performance measures have been suggested. Total shareholder wealth is commonly used to analyze alignment of incentives between shareholders and CEOs. However, it has been argued that W for a risk averse manager should be contingent on accounting measures of performance (Holmstrom, 1979) and relative measures of firm performance (Jensen and Murphy, 1990; Lazear, 1995). These studies suggest that optimal managerial compensation should be contingent on performance benchmarked against competitors to control for effects of demand shocks and bullish markets. In such case,

$$W = f(\Pi, \Theta) \tag{6.3}$$

where Θ is a measure of industry/competitor performance.

From a tournament theory perspective (Lazear and Rosen 1981), CEO compensation is a convex function of organizational levels. Thus, high CEO compensation acts as an incentive not only for the CEO but also for the sub-ordinates to achieve that level. Empirical evidence exists that larger firms are associated with higher average pay (Brown and Medoff, 1989). If a larger firm has a higher average pay, then the CEO needs to be paid higher in a larger firm to maintain the pay-differential with the next highest level and to compensate the CEO for the loss of option value of promotion. Conventionally, organization levels are positively associated with firm size and hence optimum CEO pay should reflect the size of the firm. Thus,

$$W = f(\Pi, \Theta, \Lambda) \tag{6.4}$$

where Λ is the size of the firm.

Empirical studies have focused on estimating the nature and strength of statistical association between CEO pay and firm performance and firm size. empirical evidence suggests that the statistical relationship between CEO pay and firm performance is weak and less robust to changes in specifications and functional forms of the variables. Conyon and Leech (1994) finds a weak pay-performance relationship using samples of UK firms. Murphy (1999) tests the hypothesis on US sample and notes that there exists a significant but small positive association of CEO pay and firm performance.

A large body of literature reports a positive and robust association between CEO pay and firm size with a higher magnitude of elasticity than the CEO pay-firm performance elasticity (Rosen 1992, Murphy 1999, etc.). Gabaix and Landier (2008) uses extreme value theory to suggest that the increase in CEO pay in the last two decades is an equilibrium outcome of growth in average firm size in the USA.

Bebchuk and Fried (2003) argues that the optimal contracting framework is fraught with problems of moral hazard as monitoring and incentive alignments are only partial and often costly. Their managerial power hypothesis suggests that the CEO exerts her influence over the board of directors to increase her own pay. If managerial entrenchment drives high CEO pay, then strong governance and monitoring may be able to mitigate entrenchment effect. Consistent with this view, Core (1999) and Lehn and Zhao (2006) report that CEOs of firms with weaker corporate governance are systematically paid higher than their contemporaries in firms with stronger corporate governance, although no standard measure for the strength of corporate governance has been identified in the literature. Some studies (Harford and Li, 2007) use CEO tenure as a proxy for relative

strength of corporate governance whereas some others (Zhao and Lehn, 2006) use the number of independent directors as measures of strength of corporate governance.

These theories suggest that optimal CEO pay reflects firm performance, firm size, industry performance, managerial power and strength of corporate governance.

6.2.2 CEO Turnover and Firm Performance

Principal agent theory suggests that CEOs may be motivated to act in the interest of the shareholders by making CEO pay contingent on firm performance. Yet another instrument of incentive alignment is the ability of the board of directors to dismiss the CEO (Zajac, 1990). Being dismissed has a significant negative impact on the future income of the CEOs and may impede career growth. Fee and Hadlock (2004) provide evidence that forced turnover has a detrimental effect on both career growth and the pay of CEOs. CEO effort is often difficult to observe and measure. Therefore, the likelihood of dismissal may depend on firm performance:

$$\Pr\left(Dismissal\right) = g(\Pi) \tag{6.5}$$

where $\partial Dismissal/\partial\Pi < 0$.

The CEO turnover rate has increased marginally over the last two decades (Jensen et al. 2004). Conyon (1998) and Gregory-Smith et al. (2009) find evidence that the risk of CEO dismissal is negatively associated with firm performance. However, an increasing body of literature questions the ability and willingness of the board of directors to replace under-performing CEOs (Jensen, 1993). Bebchuk and Fried (2003) and Bebchuk, Cohen and, Ferrell (2004) argue that if the CEOs have a significant influence over the board of directors and the pay-setting process, the compensation contracts are not optimal and suffer from agency problems.

In a recent study, Kaplan and Minton (2012) examine a sample of US firms from 1992-2007 and report a secular increase in annual CEO turnover rates that can be attributed to poor performance. Their results indicate an increasing frequency of performance related CEO turnover, particularly in the later part of their sample period. They report decreasing average CEO tenure throughout the sample period.

The structure and composition of the board of directors are likely to be important determinants of CEO turnover. *A priori*, it may not be reasonable to expect that a smaller board size will have a similar strength of vigilance as that of a larger board. The board of directors are composed of executive (inside) directors and non-executive (outside) directors. The percentage of outside directors on the board are often used as a measure of board independence. (Hermalin and Weisbach, 1998). Further, the number of boards an individual director is a member of may reflect her competence and expertise. Alternatively, it may also lead to dilution in her monitoring and vigilance effort.

The corporate scandals surrounding Enron led to the promulgation of a number of corporate governance regulations, most notably the Sarbanes Oxley Act (SOX) in 2002 and the NYSE and NASDAQ reforms of 2002. The main objectives of SOX was to increase corporate accountability and boost investors' confidence in capital markets. Post-SOX, CEOs are faced with higher penalties leading up to criminal prosecution for non-compliance to financial reporting norms. In addition, Sections 302 and 304 of SOX require the CEO to refund any incentive based compensation in the event of subsequent identification of financial misstatements. These regulations change the risk profile of CEO jobs and have potential effects on compensation structuring and corporate governance.

There has been academic interest in analyzing the effect of SOX and in calculating the economic cost of SOX (Cohen, Dey and Lys, 2008; Engel, Hayes and Wang, 2007). Zhang (2007) reports a decline in market capitalization of all firms traded in US stock exchanges by US$ 1.4 trillion in 2002-2003. The decline may be a result of compliance costs to the

firm or of adopting low-risk corporate strategies. Firms with weak corporate governance may help shield the CEO from the increased risk by altering the performance sensitivity in pay. This can be done either by increasing the proportion of low-risk cash compensation or by making CEO pay contingent on low-risk measures of firm performance (Carter, Lynch and Zechman, 2009). Cohen et. al (2008) finds evidence that post-SOX, CEOs are paid more in bonus (cash-compensation) than incentive compensation. This may shield the CEOs from some of the risk arising out of SOX regulations.

6.2.3 Compensating Differentials In CEO Pay

From the standpoint of optimal contracting and principal agent theory, CEO pay (W) should be contingent on the observed company performance measures (Π), measure of industry/competitor performance (Θ) and firm size (Λ) (Jensen and Murphy, 1990; Lazear, 1995; Eriksson, 1999; Gabaix and Landier, 2008).

$$W = f(\Pi, \Theta, \Lambda) \tag{6.6}$$

Empirical evidence suggests that the statistical relationship between CEO pay and firm performance is weak and less robust to choice of firm performance indicators. The performance sensitivity for US CEOs has been estimated to be of the order of 0.12-0.16 (Jensen and Murphy, 1990; Coughlan and Schmidt 1985). However, a large proportion of studies on CEO pay-performance sensitivity use cash-based measures of CEO pay.

A large body of literature reports a positive association between CEO pay and firm size which is stronger and more robust than the CEO pay-firm performance elasticity (Murphy 1999).

Bebchuk and Fried (2003) argue that the optimal contracting framework is fraught with problems of moral hazard as monitoring and incentive alignments are only partial

and often costly. Their managerial power hypothesis suggests that CEO exerts her influence over the board of directors to increase her own pay. If managerial entrenchment drives high CEO pay, then strong governance and monitoring may be able to mitigate entrenchment effect.

If the entrenchment theory holds, turnover probability and CEO pay should be negatively associated[4]. Such a situation would mean a deviation from optimal contracting and the breakdown of the corporate governance structure. On the other hand, from an efficient market point of view, since the CEOs face higher risk of being forced out of job in the recent times, the dismissal risk should be positively associated with CEO pay. Therefore, there may be a compensating differential in CEO pay to compensate for the increased risk of forced turnover. The increase in pay over the last two decades may thus be partially due to the risk premium paid to the CEOs. The optimum CEO pay can be expressed as:

$$W = f(\Pi, \Theta, \Lambda, \Phi) \tag{6.7}$$

where Φ is the risk of being dismissed from job. Thus, *a priori*, $\partial W/\partial \Phi > 0$ indicating a compensating differential in CEO pay for increased risk of forced turnover.

Kaplan and Minton (2012) report shortening CEO tenure and rising risk of forced turnover for US CEOs in the period 1992-2007 and comment that the increasing risk of turnover offsets the rise in CEO pay over the same period of time but do not formally test for compensating differential. The first empirical work on risk premium in CEO pay was by Peters and Wagner (2012). The central theme of their work is that CEOs are more likely to be dismissed for changes in firm and industry risk. Using industry level equity volatility and credit ratings as instruments, they estimate a 10% increase in CEO pay for

[4] For detailed discussion on entrenchment constraint and multiplicative preferences in the context of CEO pay see Peters and Wagner (2012) and Gabaix and Landier (2008).

each percentage point increase in dismissal risk for US CEOs in the period 1993-2009. The median CEO is paid US$ 220,000 for one percentage point increase in risk of forced turnover. Peters and Wagner's (2012) study contradicts the simple entrenchment model whereby a CEO enjoys both higher pay and lower turnover risk. They suggest an efficient labour market model[5] of compensating pay differential for higher job risk.

There is very limited empirical evidence on the magnitude of compensating differentials in CEO pay. Peters and Wagner (2012) is the only study in this domain. The effect of turnover risk on CEO compensation design and possible substitution effect in components of CEO pay to hedge the risks of dismissal can aid policy making on governance and CEO compensation. Further, it may be of interest to analyze the effect of SOX and corporate governance reforms on the risk of turnover and CEO compensation contracts.

6.3 Data

The sample of firms are drawn from S&P 1500 indices[6] for the period 1993-2010, which represents about 90% of the US market capitalization. The data were obtained from Standard and Poor's Execucomp database. The database provides detailed information on CEO pay and its components, generated from the annual proxy filings (Def-14A) of US companies. The firms in the sample are large with a highly skewed distribution of annual Sales with mean (median) of US$ 9.26 billion (US$ 4.2 billion).

Execucomp provides information on 3016 CEOs in that sample period. 302 firms do not report either the CEOs or the start date and date of turnover of their CEOs (in case of the event of turnover) and have been dropped from the study because their duration

[5]Efficient labour market, in the context, refers to a system whereby a poor performing CEO is dismissed and a high performing CEO is rewarded with higher pay.

[6]S&P 1500 contains S&P 500 firms (500 firms), S&P Midcap (400 firms) and S&P Small Cap (600 firms). In the beginning of the sample period, Execucomp covers 1157 S&P 1500 firms. From 1997, Execucomp covers all firms in S&P 1500.

of being at risk couldn't be determined. We also drop observations on firms which have been represented for only one year in the sample period. This leads to the omission of 12 more firms from the analysis. Probit regressions to analyse sample selectivity (not tabulated) were performed using firm performance and CEO pay measures but none of the coefficients was estimated to be statistically significant and hence there seems to be no evidence of systematic non-disclosure of information. The remaining 2755 organizations, observed in the period 1993-2010, are included in the analysis. Thus the final sample contains 15121 CEO-year observations for 2703 CEOs. The firms are observed from the first year they appear on the Execucomp database until the end of the study period or until the firm drops out of the sample due to mergers and acquisitions or delisting from the stock exchange. The firms that drop out of the sample before 2010 are not omitted to avoid survivor bias.

Events of CEO turnovers are identified from the Execucomp database, Fortune 500 and Fortune 1000 lists, the Wall Street Journal and Lexis/Nexis Business news database. Consistent with the definition used by Huson et al. (2004), turnover is defined as an event of a CEO relinquishing/being discharged of his duties at any particular time in the study period. Thus turnover in a given year of observation, y, means that a CEO who is observed in a firm on 1st day of October of year, y, would no longer be observed in the same firm on 1st day of October of year, y+1.[7] Classifying forced turnover is difficult as firms rarely state the reason for a CEO exit as forced. Using the above databases on executives and press releases around the events of turnover, we identify 855 events of CEO turnover of which 360[8] are classified as forced.[9] CEO turnovers occurring around change of corporate control are not classified as forced turnovers as the central theme of our

[7] We use October-September cycle to overlap with the DEF 14 A filing cycles.

[8] CEO turnovers for which the press reports that the CEO was fired, forced out or resigns due to policy differences or internal pressures are classified as events of forced turnover.

[9] Unavailability of official data may lead to a underestimation of the forced turnover number. The problem is persistent throughout the sample period. This will make our estimates the lower bound of the actual compensating wage differential.

analysis is estimating compensating differentials for forced dismissal. Our classification of turnover and forced turnover differs from Peters and Wagner (2012) in that they use an age-based algorithm to identify forced turnovers. Also, in our analysis cases where CEOs vacate the post but continue in the same firm as the Chairman of the board are not treated as an event of turnover.

Figures 6.1 and 6.2 present the yearly variations in CEO pay and CEO dismissal through the sample period. In the events of CEO turnover within a financial cycle, Execucomp reports the compensation of the CEO who has been in office for the longer period of time. We identified such events and care was taken to map the CEOs and corresponding pay.[10]

CEO pay for each year is calculated as the sum of the salary, annual bonus payout, Black-Scholes value of stock and option awards granted in the year, non-equity incentives, value of restricted stock grants (RSUs) and long term incentives (LTIP) due that year and all other compensation paid in that year. The nominal CEO pay is converted to 2000 dollars by using Consumer Price Indices published by the US Bureau of Labour Statistics. The natural log of CEO pay is used in the analysis as an explanatory variable.[11] Total Pay is skewed with a mean (median) of 4.3 (1.7) million USD. Further, we use natural logs of cash compensation and equity based compensations separately to analyze changing compensation mix. Descriptive statistics for total pay and the components of pay are presented in Table 6.2 for the full sample period and for the pre-SOX and post-SOX sub-periods.

Using information on the CEOs date of assuming office and the date of turnover, we

[10] We identified events of turnover within a financial cycle. If the outgoing CEO has been in the office for the greater part of the year, we record an event of turnover in that year. On the other hand, if the new CEO is in office for the greater part of the year, we record an event of turnover in the previous year. In 8 occassions when the turnover occured around the middle of the financial period, we treat them as if the outgoing CEO has been in the office for greater part of the year.

[11] The estimations are robust to alternate specifications of CEO pay, without using the LTI and RSU. "All Other Total" payments include severance payout that may have been made in an year and has been excluded from the analysis.

construct a measure of CEO tenure (in years). To account for potential non-linearity in the tenure effect (Gregory-Smith et al. 2009), we use the quadratic function of tenure. Execucomp also provides information on the date the CEO joined the firm. Using this information, we construct an indicator for outside CEO hire. If the date of joining the firm and becoming the CEO is the same, then the CEO is hired from outside and the indicator takes on a value of '1'. Similarly, if the date joining the firm is earlier than the date of becoming CEO, then it is treated as an internal promotion.

Firm performance measures were obtained from S&P's COMPUSTAT Research Tape whereas the stock price data was merged from Centre for Research in Securities Prices (CRSP) database at the 2-digit SIC code level. Based on existing literature (Buccholtz, Ribbens and Houle, 2003, Hambrick and Cannella, 2004, Jensen, et al, 2004), we use Returns on Asset (ROA) as an accounting measure of firm performance[12] and we use the natural logarithm of sales as a measure of firm size.[13].

Peters and Wagner (2012) suggest that CEOs are only dismissed for industry-specific shocks. Therefore, we use an alternative industry-adjusted measure of performance to account for industry-specific shocks. The average annual value weighted return on a firm's stocks are benchmarked with the average annual value weighted return on the stocks of the median firm in the same 2-digit SIC code to construct the relative measure of firm performance[14]. We also control for the volatility in firm's stock returns by using the standard deviations of monthly value-weighted returns on a firm's stock in a given year.

[12] Estimation with Earnings Before Interest and Taxes (EBIT) and Earning Per Share (EPS) yield qualitatively similar results. The results are not presented but can be made available on request.

[13] Alternate specification of firm size using natural log of total assets was used as a measure of robustness. The estimations were statistically indifferent from the estimations with log Sales as measure of firm size. The results are not presented here and is available on request.

[14] As a measure of robustness, we estimate alternate specifications with equal weighted returns on a firm's stocks. We also check for alternate benchmarking at 3-digit SIC code level. The coefficient estimates with equal weighted returns are lower than the estimates with value weighted return but the difference is statistically insignificant. The estimations with benchmarking at 3-digit SIC code level are qualitatively similar. These estimations are omitted for brevity but is available on request.

The cost of CEO removal in the events of involuntary turnover (natural logarithm of the dollar value of the severance pay entitlement) is used as an instrument to circumvent the potential endogeneity in CEO dismissal and CEO pay. In USA, typical severance plan provides 6 to 24 months of pay (including bonus) for involuntary severance. Some firms allow the CEO immediate vesting of the stock options at the grant price following dismissal. However, there is no mandatory statute on the prevalence and amount of severance payments that a CEO can be eligible for.

The data for severance payment are obtained from Execucomp and annual DEF 14A filings of the firms. Severance pay eligibility is distributed with a mean (median) of US$ 1.4 million (US$ 0.00). Richard S. Fuld, Jr. of Lehmann Brothers Holdings Inc. had the highest severance pay eligibility of US$ 241.1 millions among the sample firms.

All firms having a contractual severance agreement are mandated to disclose the information on severance agreement in the DEF-14A filings. However, some CEOs are granted an *ad-hoc* ex-post severance payment which has not been contractually agreed upon at the beginning of the tenure. In our analysis we only include the contractual severance pay eligibilities and not the final payouts. About 36% CEOs in the sample have severance pay provisions.

Probit estimations was performed using an indicator for presence of severance pay agreement as dependent variable and firm size, firm performance and governance variables as independent variables. Coefficients of all the independent variables were statistically insignificant, suggesting that firms having severance pay provisions for CEOs are not systematically grouped.

The severance pay entitlement prevalence and mean entitlement has not changed significantly over the sample period. In the sub-period 1993-2001, the mean (median) severance pay is US$ 1.13 million (US$ 0.00) whereas in the 2003-2010 sub-period the mean (median) severance pay is US$ 1.91 million (US$ 0.00). The difference in the two

mean is statistically insignificant. This may suggest that the higher turnover risk is not significantly underwritten by the severance pay guarantee.

A priori, we may expect the strength of corporate governance to have an impact on the probability of CEO dismissal and the compensating differential paid for rising risk of turnover. Data on corporate governance was obtained from the Risk Metrics database (formerly IRRC). The number of directors on a board and percentage of outside directors are used as measures of board size and board independence respectively. If the CEO also acts as the Chairman of the board (CEO duality) and/or has higher stock holdings in the firm, she may enjoy some degree of power over the board of directors. We also control for a busy board using the number of average number of board memberships of the directors of a given firm in a given year.

Corporate governance data is available for 1996-2007 and hence specifications with corporate governance controls contain 11522 firm-year observations. The summary statistics of the reduced sample in provided in Panel B of Table 6.1.

6.4 Methodology

The above discussion highlights that there is a significant cost to the CEOs for job loss. In a competitive labour market such a risk of unemployment and loss of future earnings needs to be compensated with higher pay (Abowd and Ashenfelter, 1981; Heywood, 1989). To analyze the causal effect of turnover risk on CEO pay we need to estimate the effect of turnover risk on CEO pay. However, turnover risk is potentially endogenous and CEOs are not randomly assigned to different turnover probabilities. The simultaneous increase in CEO pay and the probability of turnover may be driven by unobserved variables which may affect both the parameters, leading to endogeneity concerns. An instrumental variable approach can be employed in an attempt to circumvent the en-

dogeneity issue. Thus, we need to identify variables which are significantly associated with turnover probability but is uncorrelated with CEO pay, except through the effect on probability of turnover.

In the context of CEO turnover and pay, no specific robust instruments have been documented in the existing literature. Most conceivable determinants of turnover hazard also impact upon pay. In the spirit of Peters and Wagner (2009), we use the conditional probability of CEO-firm match as an identification strategy. We designed a variable for the number of historic CEO turnovers of a sample firm upto the given year. This variable has been estimated to be insignificant and leads to significant loss of degrees of freedom. In the later version of their paper (2012), Peters and Wagner argue that firm and industry risks are valid instruments for forced CEO turnovers. They use industry level equity volatility, semi volatility and credit ratings as exogenous change in firm and industry risk. We find firm and industry risks to be significantly correlated with both CEO pay and the probability of CEO turnover. The correlation of industry risk with the probability CEO turnover is 0.33 and that with CEO pay is 0.27. Similarly, the correlation of firm risk with the probability of CEO turnover is 0.24 and that with CEO pay is 0.22.

We use the severance payment entitlement of the CEO as an instrument for our analysis. Severance payment affects the probability of forced exit in that a high severance pay entitlement increases the cost of CEO replacement and is expected to reduce the probability of forced turnover. However, this entitlement may not have any direct bearing on the CEO's pay on an yearly basis once the contract is negotiated at the beginning of the tenure, except through the effect on turnover hazard. The severance pay eligibility can be co-determined at the beginning of the CEO tenure but the value option grants, which forms the major proportion of CEO pay are determined by the stock price performance. Thus the yearly variation in CEO pay is not significantly correlated with the severance

pay eligibility. The severance payout may be correlated to the lagged pay because it is based as 6-24 months of the CEO pay. However, in our analysis we use the severance pay eligibility as the instrument and not the payout.

It may be argued that the severance pay provision partly compensates for any rising risk of forced dismissal. If increasing risk of forced turnover is underwritten in severance pay agreements then it should be reflected in the higher prevalence and provisions of severance pay over time. However, as presented in Table 6.2, the median provisions for severance pay over time has varied only marginally. This suggests that higher turnover risk is not significantly underwritten in severance payment provisions. The correlation between severance pay and CEO pay is weak (0.18) and statistically insignificant[15]. In addition, we use a set of year dummies to control for macroeconomic fluctuations in the first stage of the analysis. We estimate the second stage of the regressions without the year dummies. This is because firms are more likely to fire a CEO during economic downturns but CEO pay may not vary significantly with time[16]. Further, we test for instrument validity using the Sargan test for overidentifying restrictions. We don't find evidence to reject the null hypothesis of joint exogeneity of the instruments (p=0.079). Tests for weak instruments were also performed. The cost of CEO removal (p=0.009) and the year dummies (p=0.000) are all significant at 5% level. The F-statistic of the first stage estimation provides further evidence $[F(23.14790) = 32.03]$ to reject the null hypothesis of weak instruments. A similar result was obtained $[F(18.14790) = 29.52]$ from the test of joint significance of the instruments. These results support the validity and reliability of the set of instruments used for this analysis.

We also report the results for the just-identified case with year fixed effects in both

[15] Correlation between forced CEO turnover and severance pay eligibility is comparatively stronger (0.48) and statistically significant.

[16] We regress CEO turnover with the year dummies and find significant association of turnover probability with year dummies. However, when we regress CEO Pay with year dummies as independent variables, only the indicators for 2001 and 2003 are significant.

stages of estimation and using severance pay eligibility as the only instrument. For the just-identified case, the first stage estimation has an Fstatistics of 66.23. Thus the null hypothesis of weak instrument is strongly rejected.

We control for variables that are potentially related to the risk of forced turnover and CEO pay. As discussed in Sections 6.2.1 and 6.2.2, CEO pay and probability of dismissal are functions of firm performance. We control for both accounting measures and relative stock performance of a firm. The relative performance measure is benchmarked to the median firm in the same industry code and thus controls for industry wide demand, productivity and technology shocks. Using volatility of a firm's monthly stock prices, we control for firm level risk. Further, firm size is potentially associated with CEO pay (Gabaix and Landier, 2008) and may have a potential correlation with CEO skills. Thus we control for firm size in our models. Finally, in an attempt to control for unobserved heterogeneity, we control for CEO tenure and percentage shareholding of the CEO in the firm. A higher CEO tenure may reflect higher competence of the incumbent or a higher degree of entrenchment. In either case, the unobserved effect can influence both probability of turnover and CEO pay. Similarly, higher shareholding of the CEO in the firm may result in better incentive alignment or entrenchment, which is likely to have an effect on turnover risk and CEO pay.

However, the possibility of omitted variable bias cannot be completely over-ruled due to unobserved heterogeneity in CEO ability, risk environment and power within the firm. With controls for firm risk, CEO characteristics and industry-adjusted performance, we attempt to control for any unobserved bias. The standard errors are clustered at firm level.

From an agency theory and tournament theory perspective, a standard wage equation for CEO pay can be expressed as:

$$Pay_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 FirmPerformance_{it} + \beta_3 FirmSize + \upsilon_{it} \quad (6.8)$$

where X_{it} is a vector of CEO characteristics, the estimate of β_2 is the pay-performance sensitivity in CEO compensation contracts. However, if CEOs are paid a compensating differential for the increasing risk of exit, the probability of exit will be an important determinant of CEO compensation contracts and β_2 may be potentially over-estimated.

In this study, we control for the risk of turnover and estimate its effect on CEO pay by using a two-stage least squares approach. In the first stage we estimate the predicted probability of forced turnover and use it as a regressor in the second-stage wage model (Wooldridge, 2002).

We estimate the following linear probability model in the first stage:

$$ForcedTurnover_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 X_{i,t-1} + \alpha_3 \sigma + \alpha_4 Governance_{it} + \gamma Z_{it} + f_i + + h_t + \epsilon_{it} \quad (6.9)$$

In equation (6.9), the dependent variable $ForcedTurnover_{it}$ is an indicator variable for events of forced turnovers in any given firm in year, 't'. Angrist and Kreuger (2001) suggests that using a probit or logit estimation in the first stage may have a high possibility of misspecification errors and that using linear probability model with an indicator variable generates consistent second stage estimates. (We estimate logit models to test the robustness of our findings. The results are not qualitatively different from our preferred model)

The estimates of α_1 reflect the effects of contemporaneous firm performance, firm size and other observable parameters associated on the probability of forced turnover. α_2 estimates the lag effects of firm performance, firm size and other observables. We control

for risk in firm's operating and information environment by the standard deviation of the monthly stock returns of a firm in the given year (σ). $Governance_{it}$ controls for board size, board independence (i.e. the percentage of outside directors on the board) and average number of directorships of the board members. Z_{it} represents severance pay eligibility of individual CEOs and is used as the instrumental variable. f_i and h_t controls for firm fixed effects and year fixed effects respectively.

The wage equation in the second stage estimates the effect of forced turnover hazards on CEO pay.

$$LnPay_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{i,t-1} + \beta_3 \sigma + \beta_4 Governance_{it} + \rho(\widehat{ForcedTurnover}_{it}) + f_i + \nu_{it} \quad (6.10)$$

In equation (6.10), $LnPay_{it}$ is the natural logarithm of CEO pay in a given year. Pay_{it} is the summation of the salary, bonus, value of stock and option grants and long term incentives paid to a CEO in a given year [17]. Vectors X_{it} and $X_{i,t-1}$ contains contemporaneous and lag effects of firm performance, firm size, governance parameters and other observables σ is the standard deviation of monthly returns on a firms stock in a given year and controls for firm risk. β_4 estimates the effect of governance strength on CEO pay. We omit the year fixed effects in this stage as our identification strategy and use f_i to control for firm fixed effects. We don't include industry dummies in both the stages as the firm performance measure is benchmarked to the industry returns. $\widehat{ForcedTurnover}_{it}$ is the predicted probability of forced turnover estimated from equation (1). ρ is the estimation for association of forced turnover risk and CEO pay and can be interpreted as percentage change in CEO pay for one percentage change in probability of dismissal. [18]

[17] For the equity based vehicles, we use the Black-Scholes valuation of the CEO's equity holdings at that given year as reported in Execucomp.

[18] To test for reverse causation of higher pay leading to higher turnover, we estimate the difference in CEO pay in three

We report estimates with bootstrapped standard error using 500 resampling.

6.5 Results and Analysis

6.5.1 Are CEOs dismissed for poor performance?

In Table 6.3, we present the results of the first stage linear probability estimations of forced turnover. Columns (1) and (2) report estimates with alternate controls for firm performance: accounting measures of firm performance and benchmarked share price measures of firm performance, respectively. Columns (3) and (4) report the results of estimations with both firm performance and corporate governance controls.

We control for both contemporaneous and lagged firm performance as CEOs are as likely to be replaced for historical poor performance as contemporaneous performance. The estimated coefficients on the firm performance measures are negative and significant at 5% levels. However, the impact of firm performance on CEO turnover is weak for both the measures of performance employed. The results suggest that CEO of a firm with return on assets (benchmarked value weighted return) two standard deviation below the mean is about 1% (3%) more likely to be dismissed[19] from the post. Our results are similar to the findings of Kaplan and Minton (2012), Conyon (1998) and Gregg, Machin and Syzmanski (1993) who report a negative but weak association of CEO turnover with firm performance.

The above results also suggest that CEOs are more likely to be dismissed for poor performance with respect to the industry and suggests stronger emphasis on relative performance.

preceeding periods from forced turnovers and three preceeding periods from voluntary turnover and we find no significant difference (not tabulated).

[19]Standard deviation of ROA is 43.38 units. Thus the effect of poor firm performance is calculated by 2 x 43.38 x 0.00011.

The lagged effect of firm performance on the probability of CEO turnover is of comparable magnitude as that of contemporaneous firm performance. However, the second lags of performance measures are estimated to be statistically insignificant.

Controlling for firm performance, the estimated coefficient on firm size is insignificant. Thus, large firms and small firms are equally likely to dismiss the CEO for a given level of performance.

It can be argued that CEO-firm matches are not random and industries with high CEO turnover attract high-skilled risk-prone CEOs (Graham, Harvey and Puri, 2010) . We control for the risk in firm's operating and information environment and our results suggest that higher risk in firm's operating environment increases the likelihood of forced turnover. This may be due to the fact that fast changing industry conditions alter the skill set required from the CEO. Our results are similar to Peters and Wagner (2012) who use industry and firm risks as instrumental variable. However they argue that industry volatility doesn't impact upon CEO pay. We examine this relationship in section 6.5.2.

Unobserved skills and risk-preferences of CEOs may lead to spurious correlation between probability of turnover and CEO pay. Thus we attempt to account for unobserved skills by controlling for CEO tenure in the firm. Consistent with the findings of Gregory-Smith et al (2009), our results suggest that CEOs face a higher probability of dismissal with increasing tenure in the job. The coefficient on tenure is positive and significant across specifications. However, estimating with a quadratic function, our results suggest that the risk of being dismissed peaks and eventually declines with tenure after 5 years.

In columns (3) and (4), we augment our basic forced turnover model with controls for CEO power and strength of corporate governance. We use two measures to control for CEO power, percentage stockholding of the CEO in the firm and CEO duality. Consistent with the managerial power hypothesis, the estimates on both the measures are significant and negative. A Chairman-CEO is less likely to be fired compared to her non-Chairman

counterparts. Similarly, a CEO with percentage stock holding in the firm one standard deviations above the mean are about 3% less likely to be dismissed. Additionally if the entrenchment effect operates, *a priori* we may expect CEOs promoted from within the firm to have a higher probability of being entrenched than CEOs hired from outside. This can be due to higher firm-specific knowledge or higher political influence of an insider CEO. We find no significant difference in turnover probability for insider CEOs with respect to CEOs hired from outside. Thus, our results suggest partial managerial entrenchment.

The board room governance variables controls for the potential monitoring role of the board of directors in the CEO dismissal process. CEOs of firms with a larger board size face a lower likelihood of dismissal. Using the control for percentage of outside directors as a proxy for board independence, our results suggest that a higher proportion of outside directors increases the likelihood of CEO dismissal. Finally, a higher average number of directorships held by the directors lower the probability of forced CEO exit. However, the estimates on board busyness is only borderline significant at 5% levels.[20]

The evidence on board structure and composition suggests that a smaller and more independent board results in better monitoring and is more likely to dismiss a non-performing CEO. However, our estimations also suggest that a busy board may dissipate the monitoring effect. Our results are different from the predictions of an efficient market for directors which suggests that the best-skilled directors are recruited on multiple boards. Our findings indicate that higher average number of board memberships may lead to a dilution of board vigilance and supervision or at best, has marginal impact.

Termination payment eligibility of a CEO is negatively associated with the probability

[20] We follow Conyon (1998) and introduce three period lags on governance variables to analyze the dynamics of monitoring strength. The idea is that the monitoring strength of a newly constituted more independent board may take time to evolve. The estimates on lags of board size was significant but the lags on other two measures of governance were estimated to be insignificant.

of exit; a higher cost of firing reduces the probability of firing. From our estimates, a CEO with a severance pay eligibility one standard deviation above the mean is about 30% less likely to be terminated. Thus, we estimate a system of equations whereby the predicted value of the probability of CEO dismissal from first stage is used in the second stage Pay equation. The predicted probability from the first stage of estimation ranges from [0,0.77] with a mean and median of 0.015 and 0.027 respectively. The F-statistic of first-stage regressions are significantly higher than the threshold level of 10 (Stock, Wright and Yogo, 2002), thus suggesting that the instruments employed are not weak.

6.5.2 Are CEOs paid a premium for higher risk of turnover?

The results of the second-stage regressions are presented in Table 6.4. In the second stage of estimation, we use the predicted probability of forced turnover from the first stage of estimation to estimate the effect of turnover probability on CEO pay. In the specifications (1)-(4), the dependent variable is log total pay whereas in specifications (5) and (6) the dependent variable is log Cash compensation and log Non-Cash compensation respectively. Turnover payment eligibility is used as an instrument and the year dummies are omitted from the second-stage regressions.

In the first two specifications in Table 6.4, We control for accounting measures of firm performance (ROA) and benchmarked share price performance respectively. In specifications (3) and (4), we additionally control for board characteristics and composition. The respective predicted probabilities of forced turnover from the first stage has been used in all the specifications. In specifications (5) and (6), we estimate the effects of turnover hazards on the cash and non-cash components of the pay respectively to estimate the effect of risk of turnover on the cash and the non-cash components of the pay.[21]

[21] Cash component of pay = Salary + Bonus + All other cash payments in the year. Non-Cash component of pay = Stock grants + Option grants + RSU + LTI

Estimates of second-stage regressions indicate that predicted probability of forced exit is positively and significantly associated with pay and the components of pay across all specifications. Thus, our results support the hypothesis of compensating differential in CEO pay for higher risk of forced exit. The CEOs are paid 1.5-2% more in Total Pay for a percentage point increase in turnover risk. Thus for a median CEO, one percentage increase in turnover risk leads to increase of Total Pay by (US$ 1.6mn * 2%) US$ 32,200 and the mean CEO is compensated by (US$ 4.3mn * 2%) US$ 86,580 for each percentage point rise in risk of turnover. Using severance pay eligibility as the instrumental variable, we estimate a significantly lower compensating differential in CEO pay compared to the estimate of a 10% (US$ 220,000 for median CEO) risk-premium in CEO pay. In contrast to their suggestion that industry risk doesn't have an impact on CEO pay, except through the effect on risk of turnover, we find a significantly positive association of industry volatility with CEO pay. Our estimates suggest that CEOs of firms in highly volatile industries are paid higher. This result may be intuitive from an agency theory perspective whereby a risk averse agent may have to be compensated in excess for the bearing the risk of industry volatility (Garen, 1994). Controlling for the positive association of CEO pay with industry risk, we report a lower but statistically and quantitatively significant compensating differential in CEO pay.

Consistent with previous studies (Rosen 1992, Murphy 1999, etc.), CEO pay is strongly and positively associated with firm size. To compare with the risk-premium in CEO pay, in a firm which is one standard deviation larger than the mean firm, the CEO pay is higher by (US$ 13859 * 0.43) US$ 5,682.

We report the results from the just-identified estimation in Table 6.10. In this regression, we use year fixed effects in both stages and severance pay eligibility as the only instrument. The estimate of predicted probability of dismissal is comparable to that of our baseline estimates. Thus our choice of instruments do not seem to bias the

estimations.

CEO pay is significant and positively associated with firm performance, although the pay-performance sensitivity is weak. The estimations are robust to alternate specifications of firm performance. CEO pay is more strongly associated with stock price performance of the firm, possibly arising out of the higher proportion of stock based pay in CEO compensation package. Strong past performance is associated with higher CEO pay. The pay-performance sensitivity is qualitatively similar for the first lag. However, the second lag of firm performance is insignificant across all specifications. Return on Assets one standard above the mean will increase the pay of the CEO by US$ 43.38, indicating weak pay-performance sensitivity.

From these results, the compensating differential in CEO pay for turnover risk is significantly higher than the firm-size and firm-performance effects on CEO pay.

Next, we control for managerial power and governance in specifications (3) and (4). CEO duality has a strong and significant effect on CEO pay. Similarly, higher percentage equity holding of the CEO is positively associated with total CEO pay. In addition to the first stage estimates of lower probability of turnover, this indicates partial impact of managerial power in CEO entrenchment and pay. CEOs hired externally are paid more than CEOs promoted from within. A possible explanation can be that CEOs hired from outside may have a higher bargaining power and may have to be compensated for the opportunity cost of foregoing the equity ownership from the previous job. An alternative comes from tournament theory whereby external hires may have a negative impact on the value of tournaments for all in lower level. Therefore, the spread of the levels is increased by overpaying the external CEO.

Controlling for the size and composition of board, we find that firms with larger board size pay the CEO more. Boards with a higher proportion of outside directors pay the CEO lesser however the effect of board independence is statistically weak and is significant at

10% level. Busy boards seem to dissipate the monitoring effect of the board as busy boards are associated with higher CEO pay. Thus, rise in CEO pay can be partially attributed to weaker corporate governance strength and busy boards.

Since the CEOs are paid a compensating differential for higher risk of turnover, it may be of interest to know the change in compensation design that may result from the risk-premium in CEO pay. The results in columns (5) and (6) suggests that one percentage point increase in risk of dismissal increases cash compensation by $\sim$ 3% and non-cash-compensation by $\sim$ 1%. A percentage increase in risk of dismissal increases mean cash payment and mean non-cash payment by US$ 34,000 and US$ 17,252 respectively. The mean risk premium in cash payment is almost twice the size of mean risk premium in non-cash payments. Thus it seems that higher turnover risk is compensated by increased risk-free cash-payments. This is consistent with Conyon et al. (2011) who report a decreasing trend in equity based compensation since 2001. They attribute this to the stock market crash of the early 2000s and the expensing of options under FASB(123r) as discussed in this thesis in section 3.3. We add to that literature in suggesting that a declining trend in use of stock-based payment may partially reflect the compensating differentials paid to the CEOs for higher risk of dismissal. Thus there may be a systematic shift in CEO compensation design over time to account for increasing risk of turnover. We examine this in greater detail in section 6.5.3.

The effect of firm performance on cash payments is weak and insignificant at 5% level. Firm performance seems to have a stronger effect on non-cash payments which is an expected result as non-cash payments are designed to be contingent on performance. The point estimates on firm size is bigger in column (5) than in column (6), suggesting higher non-cash payments in larger firms. This is consistent with Core and Guay (1999) who report that CEOs of larger firms are likely to have higher equity incentives. The negative association of CEO stock-ownership with cash payments in column (5) may be

further indication of substitution effects in CEO pay. Thus, a risk averse CEO may be paid a higher cash compensation and lesser in stock grants.

The effects of board vigilance and monitoring has similar effects on cash and non-cash payments and are qualitatively similar to the estimates in columns (1)-(4).

6.5.3 Has the risk-premium in CEO pay increased in the last decade?

We examine the effect of governance regulations laid down in SOX and the NYSE and NASDAQ reforms of 2002 on risk of turnover and CEO compensation contracts. These reforms aim at increasing managerial accountability and transparency in corporate governance. However, since these reforms were promulgated in the same year, it is difficult to isolate the effect of each reform separately. In our analysis we use SOX as an indicator of all the governance reforms of 2002 collectively.

We begin by dividing our samples in pre-SOX (1993-2001) and post-SOX (2003-2010) sub-samples and estimating the compensating differential for both sub-periods. Further we analyze the effect of forced turnover-risk on the individual components of compensation and on the total compensation to investigate the substitution effect in compensation design. Cohen et. al (2007) finds evidence that post-SOX, CEOs are paid more in bonus (cash-compensation) than incentive compensation to shield the CEOs from some of the risk arising out of SOX regulations. We test for the effect of changing risk environment on the components of CEO pay.

A priori, it can be expected that more stringent performance targets and governance regulations will make the job of the CEO more risky and may lead to a higher risk premium in pay. It may also be possible for firms to respond to the changing risk environment by altering performance targets to less risky measures of performance.

Table 6.5 presents the estimates of the second-stage regressions by sub-periods. Column (1)-(3) replicates the estimations for the full sample from Table 6.4. The dependent

variables for each specification is mentioned explicitly in the table. Columns (4)-(6) reports the estimations of the post-SOX sub period.

In the post-SOX sub-period, CEOs are paid 4% more in Total Pay for each percentage point increase in risk of dismissal, which is about twice the compensating differential for the full sample. Thus, in the post-SOX period, a median CEO is paid ~ US$ 110,000 (4% * US$ 2.7 million) for a percentage rise in risk of getting fired. Consistent with Cohen et al (2007) we find evidence of substitution effect in CEO pay in the post-SOX period. A percentage increase in turnover risk is compensated by a 5% risk-premium in CEO pay. Thus, a median CEO in the post-SOX period is paid ~US$ 67,000 (5% * US$ 1.3 million)- in cash payments for one percent rise in risk of forced turnover, which is twice as much the cash premium in CEO pay for the full sample period.

Further, the risk-premium in non-cash payments in the post-SOX period is insignificant. Thus, post-SOX, risk premium in pay seems to be largely driven by cash payments. Our results indicate that firms shield the CEOs from some of the risks of SOX regulations by paying a higher compensating differential in pay. It appears, the regulations on corporate governance to monitor growth in CEO pay may have led to further increase in CEO pay.

The other covariates retain their sign and significance and are qualitatively similar to the estimates for the full sample. There seems to be no significant difference in pay-performance sensitivity in the second sub-period as compared to the full sample. The point estimates on measures of performance are larger in the post-SOX period than that of the full sample but they are not significantly different. The objective of SOX regulations is to ensure better alignment of incentives and make compensation contracts more performance sensitive. This would have led to an increase in performance sensitivity in CEO pay. However, in response to the regulations, the firms may have restructured the compensation design and set low-risk performance targets for bonus payments.

Our result is different from Cohen et al (2007) who reports the sensitivity of CEO wealth to share holder wealth decreased post-SOX. Our measure of relative performance suggests that there has been no significant difference in pay-performance sensitivity post-SOX. Cohen et al. (2007) use data from sample 1992-2006. Thus it may be possible that their result reflects the short-term effect of SOX on pay-performance sensitivity whereas we report a longer term effect.

Firms with larger boards pay more in cash compensation in the post-SOX period but the effect of board size on total pay and non-cash pay is not different from that of the full sample. The regulations post SOX and NYSE reforms of 2002 mandates a minimum percentage of independent directors on the board which may be reflected in the stronger effect of board independence on CEO pay in the post-SOX period.

This evidence suggests that the post-SOX period is characterized by a higher risk-premium in CEO pay. The dramatic growth in CEO pay in the last decade can partially be attributed to the increasing risk of dismissal and increasing compensating differential in CEO pay. Also, the growth may in part be driven by increase in low-risk cash component in CEO pay. The increase in cash-based compensation makes it challenging to increase the performance sensitivity of CEO compensation contracts.

6.5.4 Robustness

In this section, we discuss the alternative variables, classification of turnovers and estimation methods used as robustness check for our results.

First, there has been some debate on the appropriate measure of firm performance (see discussion in Section 6.2.1). Thus we use alternate measures of firm performance to estimate pay-performance sensitivity. Using (i) Earnings Per Share (basic-excluding extraordinary items), (ii) Pre-Tax Income and equal weighted returns on firm stocks as

measures of performance, we find qualitatively similar estimates for pay performance sensitivity. All the estimated coefficients are low and negatively associated with probability of forced turnover and positively associated with CEO pay. The results are not reported for brevity.

Second, to confirm that our results are not simply an artefact of the linear probability model, we use logit estimation for the first steps. The results of the first stage are presented in Table 6.6. The results report the marginal effects and not the coefficient estimate. The results are very similar to the estimations using linear probability model. However, there are differences in the significance level of some variables but his doesn't change the central findings of our analysis.

Third, in the spirit of Peters and Wagner (2012) we use an alternative age-based classification of forced turnover. Peters and Wagner argues that financial press follows certain types of firms and industries more than others and hence the reporting of reasons and analysis for CEO turnover may not be consistent across industries. Thus, we construct an alternative indicator of forced turnover which indicates a forced turnover if the departing CEO is less than 55 years of age and the reason for turnover is not classified as death, ill-health or immediate employment as CEO is another firm. This method of classifying forced turnover overestimates the number of forced turnover below the age threshold and underestimates the number of forced turnover above the age threshold with respect to our first method of classification. Using this classification, we identify 368 forced turnovers. The second stage results are tabulated in Table 6.7. The parameter estimate on predicted turnover probability is lower (1.84) but the difference of the estimate with our original estimation (1.98) in Table 6.4 is not significant. Thus, our results are robust to alternate classification of forced turnovers.

Fourth, we test the validity of our results across the distribution of firm performance, board size and board busyness. We generate categorical variables to test for the effect

of dismissal risk across the quartiles of these variables. The results for these regressions are reported in Table 6.8. The results are not significantly different for the different firm performance. However, the effect of the board size in the 25th percentile on forced turnover probability and CEO pay is insignificant. This may suggest that while larger boards dissipate the monitoring and vigilance of the board, a very small board size may not also have the desired effect. If the board size is too small, the directors may be overworked and not be able to be vigilant about wide range of governance matters These results indicate that there may exist a optimum range for board size for effective monitoring. We highlight this as an area of future research. Similar results are obtained for board busyness. The effects of busy board in the 25th percentile on CEO turnover probability and CEO pay is insignificant. While a small number of directorships held by the directors may not dissipate the strength of governance, or may indeed reveal the competence of the directors, a larger number of board membership of the directors reduce the strength of monitoring and vigilance.

Finally, we were concerned that the estimated compensating differential in pay may be driven largely by mechanical association in industries with high turnover rates and high CEO pay. Therefore, we re-estimate our model excluding the High Technology industry which has the highest turnover and the finance sector which has experienced the highest growth in CEO pay in the sample period. The High Tech industry in our classification consists of 45 SIC codes for high tech manufacturing (SIC codes: 35XX, 36XX, 38XX), communications services (SIC codes: 48XX), and software and computer-related services (SIC codes: 73XX). We classify four broadly defined SIC codes to constitute banking and finance industry, viz. National Commercial Banks, Credit Unions, Federally Chartered, Savings Institutions, Federally Chartered and Security Brokers, Dealers and Flotation Companies. The SIC codes for the first three sectors are 60XX and for the fourth sector is 62XX. We recognize that this may not be the exhaustive classification of high tech

industries and some allied industries may have been omitted but we believe that this would not make significant difference to our results. Omission of these two industries reduces our sample to 9244 firm-year observations. The results of estimation with the reduced sample presented in Table 6.9 are not significantly different from our original estimation. However, the point estimate of compensating differential is lower (1.87) than the estimate with the full sample (1.98). Even if CEOs in industries that face higher turnover are paid a higher compensating differential, this is not influencing our findings significantly and the robustness tests collectively support our central finding that the large growth in CEO pay may be partially attributed to the compensating differential in pay for the higher risk of forced turnover.

6.6 Conclusions

There has been sustained interest in the dynamics and determinants of executive compensation. Various theories have been put forward to explain the growth in CEO pay in the recent decades. Kaplan (2004) suggests that CEO pay is largely driven by market forces. Indicating that a significant proportion of total CEO pay is equity based, Hall and Murphy (2003) argue that CEO pay is driven by stock market valuations. Some suggest that the recent growth in CEO pay may be attributed to the growth in average US firm size (Gabaix and Landier, 2008). Bebchuk and Fried (2004) indicate the possibility of managerial entrenchment to explain the rapid growth in CEO pay. Our results add to the literature and suggest that the rise in CEO pay in the last decade may be partially attributed to the risk-premium in CEO pay to compensate for the rising risk of being dismissed from the job.

We estimate compensating differentials in CEO pay for a sample of US firms in the period 1993-2010. Empirical evidence suggests that the growth in CEO pay can be

partially attributed to the rising hazards of forced turnover. CEOs are paid 1.5-2% premium in pay for each percentage point increase in turnover risk, i.e. the median CEO is paid US$ 32,200 for one percentage point rise in turnover. Further our results indicate possible substitution effect in compensation design. The differential in pay is driven largely by the increase in risk-free cash component of the total CEO pay.

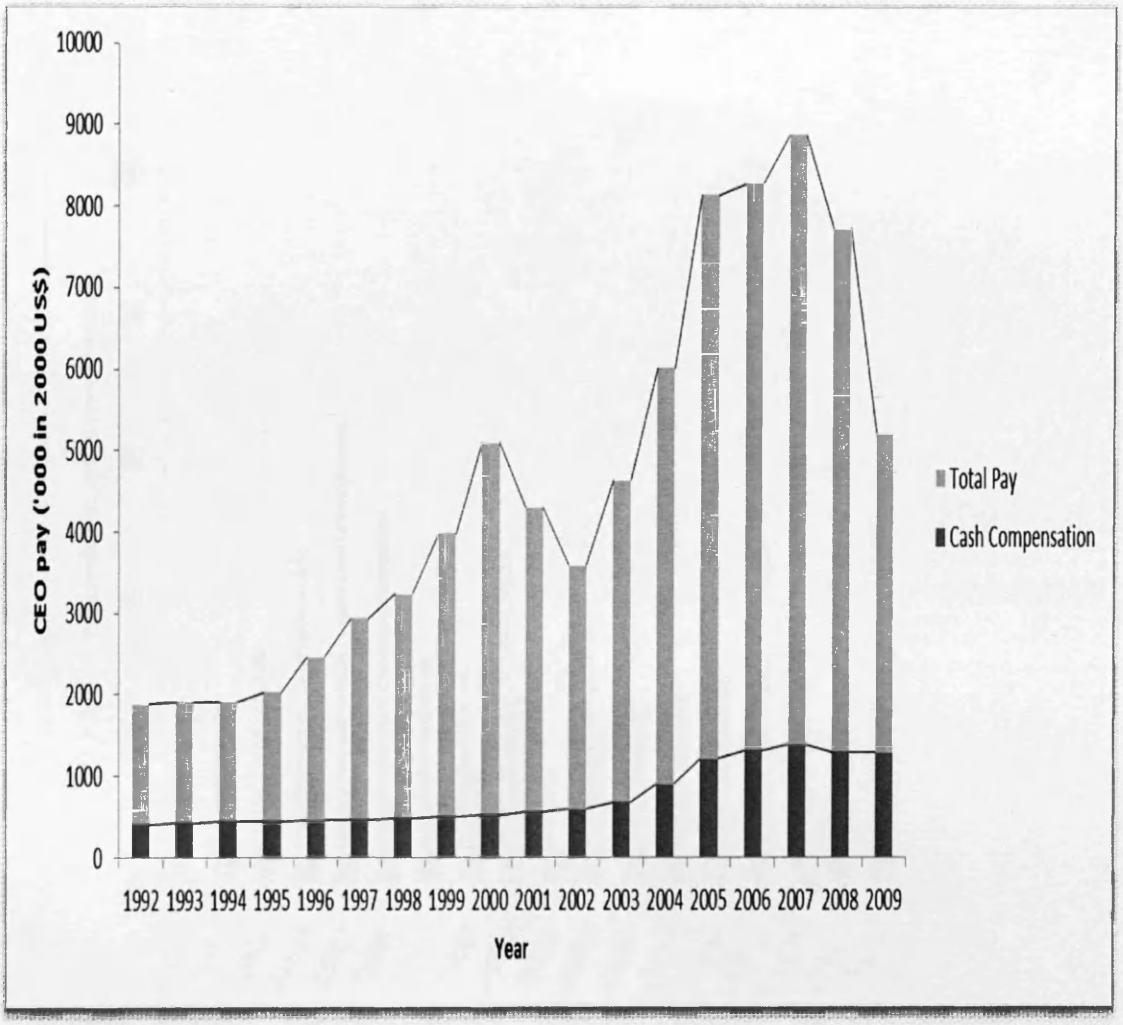
We find a higher risk-premium in CEO pay ($\sim$ 4%) in the post-SOX period (2003-2010). In the post-SOX period we find a greater association of turnover risk with cash compensation. This is consistent with Cohen et al. (2007) who reports a higher prevalence of cash compensation in the post-SOX period.

We examined the effect of governance on CEO turnover and CEO pay. Firms with larger and more busy boards are less likely to dismiss the CEOs and pay more. Higher proportion of outside directors seems to have a positive effect on monitoring strength of the board.

Our results have a number of policy implications. Firstly, it furthers the understanding on the dynamics of CEO pay setting by estimating significant premium in CEO pay for increasing risk of exit. Our results suggest partial managerial entrenchment in the form of lower risk of forced turnover for Chairman-CEOs and CEOs with higher equity ownership. CEO duality and higher equity ownership also increases CEO pay.

Next, our results indicate the board characteristics that may mitigate agency problems and enhance board room vigilance and monitoring. Finally, we contribute to the debate on SOX. Empirical evidence suggests a higher risk-premium in CEO pay in the post-SOX period, indicating that whilst the CEO pay and turnover probability are becoming increasingly performance sensitive, CEOs are paid a higher premium as compensating differential for rising risk of being dismissed.

Figure 6-1: Annual Growth of CEO Pay and CEO Salary



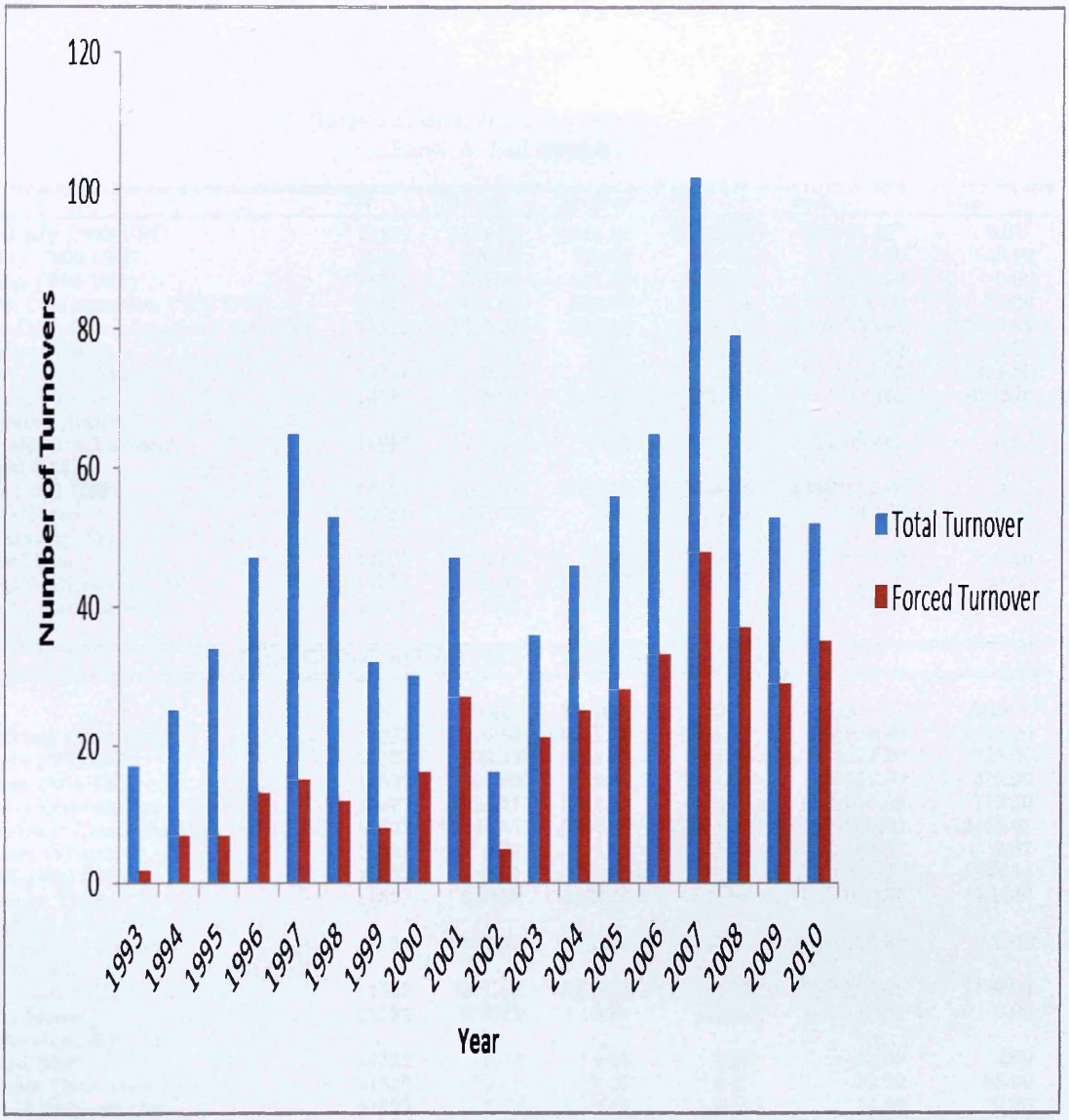


Figure 6-2: Number of Turnovers and Forced Turnovers: 1993-2010

Table 6.1: Sample Characteristics
Panel A: Full Sample

	N	Mean	Median	SD	Max	Min
CEO pay ('000 US$)	15121	4329.13	1610.22	10252.03	295136.40[a]	0.01[b]
Salary ('000 US$)	15121	600.92	543.84	335.25	5613.20	40.00
Bonus ('000 US$)	15081	564.06	191.82	1678.68	76951.00	0.00
Cash Compensation ('000 US$)	15121	1164.98	800.00	1782.24	77926.00	70.00
Non-Cash Compensation ('000 US$)	15121	1725.24	920.80	2486.75	69850.63	-12465.61
Tenure (Years)	15121	9.33	7.81	10.95	43.93	2.57
ROA ('000 US$)	14748	2.53	3.81	43.38	3551.35	-1314.88
Average Value weighted Return	14765	0.0033	0.0115	0.0494	0.1105	-0.1846
Termination Payment ('000 US$)	15081	1393.78	0.00	7272.403	241089.80	0.00
Sale ('000 US$)	15121	4137.88	9259.39	13858.90	42507189.00	0.03
CEO Share Ownership (%)	15081	0.7022	0.00	3.83	87.60	0.00
Board Size	11522	9.52	9.00	2.63	34.00	3.00
Outside Directors (%)	11522	70.38	71.35	16.87	92.30	55.60
No. of Directorships	11522	2.73	3.10	8.61	14.00	0.00

Panel B: Reduced Sample for Governance Controls

	N	Mean	Median	SD	Max	Min
CEO pay ('000 US$)	11522	5016.63	3661.76	9724.10	295136.40	1348.88
Salary ('000 US$)	11522	699.35	603.00	276.30	5613.20	320.00
Bonus ('000 US$)	11522	891.88	553.49	1241.05	76951.00	379.99
Cash Compensation ('000 US$)	11522	1621.21	1201.50	1450.10	77926.00	713.50
Non-Cash Compensation ('000 US$)	11522	3444.55	2080.67	1884.39	69850.63	-12465.61
Tenure (Years)	11522	8.65	7.03	9.29	43.93	2.57
ROA ('000 US$)	11522	8.61	11.20	39.71	3551.35	-1053.14
Average Value weighted Return	11522	0.0109	0.0226	0.0094	0.1105	-0.1846
Termination Payment ('000 US$)	11522	1567.50	0.00	6757.20	241089.80	0.00
Sale ('000 US$)	11522	5371.66	9879.15	9024.67	42507189.00	2190.03
CEO Share Ownership (%)	11522	0.7022	0.00	3.83	87.60	0.00
Board Size	11522	9.52	9.00	2.63	34.00	3.00
Outside Directors (%)	11522	70.38	71.35	16.87	92.30	55.60
No. of Directorships	11522	2.73	3.10	8.61	14.00	0.00

[a]The highest CEO pay in any given year our sample is that of Mr. Barry Diller of IAC Corporation in 2005.

[b]Dr. Myron W. Wentz of Usana Heath Services Inc. did not take any compensation for the year 2004 as reported by Execucomp and cross checked with the DEF-14A filings of Usana Heath Services inc. for 2004.

Table 6.2: Sample Characteristics: Sub-Periods

	1993-2001	2003-2010	1993-2010
No. of firms	1632	1884	2755
No. of CEOs	1614	1860	2703
No. of CEO exits	258	597	855
Number of Forced exits	104	256	360
% of CEO exits	22.67%	26.29%	31.63%
% of Forced exits	6.63%	13.76%	13.42%
Total Observations	6923	7271	15121
External CEO	691	1044	1412
Mean Tenure (in Years)	10.73	5.89	9.33
Mean CEO Pay ('000 US$)	2583.84	6166.02	4329.13
Mean Salary ('000 US$)	477.66	719.34	600.92
Mean Bonus ('000 US$)	494.47	620.39	564.06
Mean Cash Compensation ('000 US$)	972.13	1339.74	1164.98
Mean Non-Cash Compensation ('000 US$)	2024.54	1506.53	1725.24
Mean Annual Value weighted Return	0.0021	0.0053	0.0033
Mean Termination payment ('000 US$)	1137.66	1911.21	1393.78
Mean Sale ('000 US$)	2530.35	5739.32	4137.88
Mean CEO Share Ownership (%)	0.1738	1.288	0.7022
Mean Board Size	11.23	9.31	9.52
Mean Outside Directors (%)	64.58	76.21	70.38
Mean No. of Directorships	1.99	2.88	2.73

Table 6.3: Likelihood of Forced Turnovers: Linear Probability Model

	(1) Co-Efficient	(2) Co-Efficient	(3) Co-Efficient	(4) Coefficient
Tenure	0.000019***	0.000011**	0.000016***	0.000013**
	(0.000)	(0.004)	(0.000)	(0.002)
$Tenure^2$	-0.00008	-0.00006	-0.00007	-0.00006
	(0.118)	(0.121)	(0.223)	(0.210)
ROA	-0.00011**		-0.00013**	
	(0.038)		(0.018)	
ROA_{t-1}	-0.00010**		-0.00011**	
	(0.035)		(0.030)	
ROA_{t-2}	-0.00006*		-0.0008*	
	(0.060)		(0.058)	
Benchmarked Value		-0.00042**		-0.00073**
Weighted Return		(0.025)		(0.022)
Benchmarked Value		-0.00039**		-0.00065**
Weighted $Return_{t-1}$		(0.028)		(0.025)
Benchmarked Value		-0.00013*		-0.00051*
Weighted $Return_{t-2}$		(0.055)		(0.069)
Firm Size	-0.0017*	-0.0014*	-0.0017*	-0.0013*
(Ln Sales)	(0.059)	(0.087)	(0.056)	(0.078)
Termination Payment	-0.0047**	-0.0038**	-0.0042**	-0.0035**
	(0.014)	(0.016)	(0.014)	(0.016)
σ_{VWR}	-0.0051**	-0.0033**	-0.0047**	-0.0031**
	(0.012)	(0.008)	(0.010)	(0.005)
Externally	0.0008	0.0011	0.0008	0.0017
Hired CEO	(0.211)	(0.325)	(0.234)	(0.330)
Percentage			-0.0008**	-0.009**
Stock Holding			(0.013)	(0.006)
CEO Duality			-0.040***	-0.043***
			(0.000)	(0.000)
Board Size			-0.0002**	-0.0007**
			(0.010)	(0.005)
Board			0.0006**	0.0009**
Independence			(0.028)	(0.011)
Board Busyness			-0.0009*	-0.0008*
			(0.058)	(0.055)
Year Dummies	Yes	Yes	Yes	Yes
No. of Observations	14765	14765	14765	14765
Adj R^2	0.243	0.299	0.231	0.284

Dependent variable is an indicator for Forced Turnover, equals to '1' if a CEO is dismissed in a given year, '0' otherwise.
Column (1) estimates the sensitivity of turnover hazard to accounting measures of firm performance. Column (3) estimates the sensitivity of hazard to relative performance of firm's stocks. Specifications (3) and (4) additionally control for board size and composition.
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.4: Compensating Differential in CEO Pay

Dependent Variable	(1) Ln Pay	(2) Ln Pay	(3) Ln Pay	(4) Ln Pay	(5) Ln Cash	(6) LnNon-Cash
Predicted Probability	1.474***	1.612***	1.788***	1.984***	2.922***	0.938**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.031)
Tenure	0.00066***	0.00064***	0.00058***	0.00056***	0.00067***	0.00093**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
Tenure^2	-0.00037	-0.00030	-0.00034	-0.00029	-0.00013	-0.00022
	(0.111)	(0.123)	(0.121)	(0.133)	(0.210)	(0.194)
ROA	0.0010**		0.00094**			
	(0.036)		(0.011)			
ROA_{t-1}	0.0018**		0.00092*			
	(0.048)		(0.045)			
ROA_{t-2}	0.0012		0.00081			
	(0.111)		(0.108)			
Benchmarked Value		0.0021***		0.0021***	0.0016*	0.0038**
Weighted Return		(0.000)		(0.000)	(0.071)	(0.012)
Benchmarked Value		0.0023**		0.0017**	0.0014	0.0023**
Weighted Return_{t-1}		(0.015)		(0.022)	(0.119)	(0.041)
Benchmarked Value		0.0018		0.0016	0.0007	0.0020
Weighted Return_{t-2}		(0.122)		(0.117)	(0.136)	(0.144)
Firm Size	0.418***	0.409***	0.411***	0.402***	0.261***	0.501***
(Ln Sales)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
σ_{VWR}	0.072**	0.057**	0.069**	0.058**	0.113**	0.044**
	(0.014)	(0.009)	(0.012)	(0.003)	(0.001)	(0.027)
Externally	0.236**	0.194**	0.241**	0.195**	0.287**	0.169**
Hired CEO	(0.021)	(0.015)	(0.023)	(0.019)	(0.010)	(0.035)
Percentage Stock			0.00084**	0.00021**	-0.114***	0.0094**
Holding			(0.033)	(0.035)	(0.000)	(0.002)
CEO Duality			0.638***	0.641***	0.367***	0.419**
			(0.000)	(0.000)	(0.000)	(0.007)
Board Size			0.0022**	0.0037**	0.0012**	0.0033**
			(0.010)	(0.008)	(0.003)	(0.027)
Board			-0.0018*	-0.0021*	-0.0008*	-0.0019*
Independence			(0.061)	(0.059)	(0.079)	(0.088)
Board			0.0034**	0.0030**	0.0001*	0.0021**
Busyness			(0.028)	(0.033)	(0.052)	(0.022)
Year Dummies	No	No	No	No	No	No
No. of Observations	14748	14765	11522	11522	11522	11522
Adj R^2	0.250	0.248	0.266	0.253	0.201	0.339

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.5: Compensating Differential:By Sub-Periods

	Full Sample			Post-SOX		
	(1)	(2)	(3)	(4)	(5)	(6)
	LnPay	LnCash	LnNonCash	LnPay	LnCash	LnNonCash
Predicted Probability	1.984***	2.922***	0.938**	4.070**	5.037***	0.421*
	(0.000)	(0.000)	(0.031)	(0.001)	(0.000)	(0.057)
Benchmarked value	0.0021***	0.0016*	0.0038**	0.0025**	0.0023**	0.0031**
weighted return	(0.000)	(0.071)	(0.012)	(0.030)	(0.022)	(0.017)
Benchmarked value	0.0017**	0.0014	0.0023**	0.0021**	0.0020**	0.0029**
weighted return$_{t-1}$	(0.022)	(0.119)	(0.041)	(0.017)	(0.010)	(0.009)
Benchmarked value	0.0016	0.0007	0.0020	0.0019	0.0012	0.0014
weighted return$_{t-2}$	(0.117)	(0.136)	(0.144)	(0.166)	(0.212)	(0.141)
Firm Size	0.402***	0.261***	0.501***	0.378***	0.240***	0.421***
(Ln Sales)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
σ_{VWR}	0.058**	0.113**	0.044**	0.067**	0.145**	0.026**
	(0.003)	(0.001)	(0.027)	(0.012)	(0.008)	(0.039)
Externally	0.195**	0.287**	0.169**	0.199**	0.295**	0.167**
Hired CEO	(0.019)	(0.010)	(0.035)	(0.026)	(0.014)	(0.033)
CEO Duality	0.641***	0.367***	0.419**	0.479***	0.350**	0.409**
	(0.000)	(0.000)	(0.007)	(0.000)	(0.003)	(0.009)
Board Size	0.0037**	0.0012**	0.0033**	0.0044**	0.0038**	0.0048**
	(0.008)	(0.003)	(0.027)	(0.005)	(0.004)	(0.002)
Board	-0.0021*	-0.0008*	-0.0019*	-0.0034**	-0.0040**	-0.0044**
Independence	(0.059)	(0.079)	(0.088)	(0.019)	(0.011)	(0.008)

Columns (1)-(3) reports estimations for the full sample and columns (4) -(6) reports estimates for the post-SOX sub period (2003-2010).
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.6: Likelihood of Forced Turnover: Logit Estimation

	(1) Co-Efficient	(2) Co-Efficient
Tenure	0.00024**	0.00021**
	(0.012)	(0.009)
$Tenure^2$	-0.0011	-0.0010
	(0.495)	(0.434)
ROA	-0.00020**	
	(0.027)	
ROA_{t-1}	-0.00017**	
	(0.034)	
ROA_{t-2}	-0.00012*	
	(0.083)	
Benchmarked Value		-0.00089**
Weighted Return		(0.031)
Benchmarked Value		-0.00081**
Weighted $Return_{t-1}$		(0.033)
Benchmarked Value		-0.00071*
Weighted $Return_{t-2}$		(0.081)
Firm Size	-0.0011	-0.0014
(Ln Sales)	(0.103)	(0.111)
Termination Payment	-0.0055**	-0.0047**
	(0.019)	(0.026)
Percentage	-0.0013**	-0.0015**
Stock Holding	(0.023)	(0.019)
CEO Duality	-0.032**	-0.038**
	(0.009)	(0.013)
Board Size	-0.0006**	-0.0009**
	(0.018)	(0.015)
Board	0.0005**	0.0007**
Independence	(0.037)	(0.041)
Board Busyness	-0.0015*	-0.0013*
	(0.063)	(0.067)
Year Dummies	Yes	Yes
No. of Observation	11522	11522
Adj R^2	0.178	0.192

Dependent variable is an indicator for Forced Turnover, equals to '1' if a CEO is dismissed in a given year, '0' otherwise.
Column (1) estimates the sensitivity of turnover hazard to accounting measures of firm performance. Column (3) estimates the sensitivity of hazard to relative performance of firm's stocks. Specifications (3) and (4) additionally control for board size and composition.
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.7: Compensating Differential: Alternate Classification of Forced Turnover

Dependent Variable	(1) Ln Pay	(2) Ln Cash	(3) LnNon-Cash
Predicted Probability	1.843***	2.916***	0.938**
	(0.000)	(0.000)	(0.031)
Tenure	0.00054***	0.00067***	0.00093**
	(0.000)	(0.000)	(0.004)
Tenure^2	-0.00030	-0.00013	-0.00022
	(0.123)	(0.209)	(0.194)
Benchmarked Value	0.0021***	0.0017*	0.0038**
Weighted Return	(0.000)	(0.073)	(0.012)
Benchmarked Value	0.0019**	0.0015	0.0023**
Weighted Return$_{t-1}$	(0.015)	(0.116)	(0.041)
Benchmarked Value	0.0016	0.0007	0.0020
Weighted Return$_{t-2}$	(0.122)	(0.136)	(0.144)
Firm Size	0.404***	0.261***	0.501***
(Ln Sales)	(0.000)	(0.000)	(0.000)
σ_{VWR}	0.058**	0.111**	0.044**
	(0.005)	(0.002)	(0.027)
Externally	0.193**	0.283**	0.168**
Hired CEO	(0.019)	(0.013)	(0.035)
Percentage Stock	0.00020**	-0.114***	0.0094**
Holding	(0.035)	(0.000)	(0.002)
CEO Duality	0.641***	0.367***	0.419**
	(0.000)	(0.000)	(0.007)
Board Size	0.0035**	0.0012**	0.0033**
	(0.007)	(0.007)	(0.024)
Board	-0.0021*	-0.0008*	-0.0019*
Independence	(0.057)	(0.078)	(0.088)
Board	0.0030**	0.0001*	0.0021**
Busyness	(0.033)	(0.052)	(0.022)
Year Dummies	No	No	No
No. of Observations	11522	11522	11522
Adj R^2	0.253	0.201	0.339

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.8: Compensating Differential across the Quartiles of Performance and Governance Parameters

Dependent Variable	(1) Ln Pay	(2) Ln Cash	(3) LnNon-Cash
Predicted Probability	1.984***	2.922***	0.938**
	(0.000)	(0.000)	(0.031)
Tenure	0.00056***	0.00067***	0.00093**
	(0.000)	(0.000)	(0.004)
$Tenure^2$	-0.00029	-0.00013	-0.00022
	(0.133)	(0.210)	(0.194)
Benchmarked Value Weighted Return			
Lower quartile-Median	0.0019***	0.0009*	0.0020**
	(0.000)	(0.077)	(0.028)
Median-Upper Quartile	0.0022***	0.0016*	0.0038**
	(0.000)	(0.079)	(0.011)
Upper Quartile	0.0031***	0.0022*	0.0053**
	(0.000)	(0.066)	(0.008)
Firm Size (Ln Sales)	0.402***	0.261***	0.501***
	(0.000)	(0.000)	(0.000)
Board Size			
Lower quartile-Median	0.0013	0.0006	0.0024
	(0.108)	(0.122)	(0.116)
Median-Upper Quartile	0.0037**	0.0012**	0.0033**
	(0.008)	(0.003)	(0.027)
Upper Quartile	0.0043**	0.0022**	0.0037**
	(0.004)	(0.003)	(0.015)
Board Independence			
Lower quartile-Median	-0.0014*	-0.0002*	-0.0016*
	(0.067)	(0.081)	(0.073)
Median-Upper Quartile	-0.0021*	-0.0008*	-0.0019*
	(0.059)	(0.079)	(0.088)
Upper Quartile	-0.0041**	-0.0022*	-0.0032*
	(0.047)	(0.055)	(0.075)
Board Busyness			
Lower quartile-Median	0.0017	0.00005	0.0009
	(0.132)	(0.127)	(0.116)
Median-Upper Quartile	0.0030**	0.0001*	0.0021**
	(0.033)	(0.052)	(0.022)
Upper Quartile	0.0043**	0.0011**	0.0029**
	(0.023)	(0.044)	(0.013)
Year Dummies	No	No	No
No. of Observation	11522	11522	11522
Adj R^2	0.253	0.201	0.339

Models are estimated with controls for lagged performance, CEO duality and CEO shareholding but are not reported for brevity.
Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.9: Compensating Differential: Without High-Risk Industries

Dependent Variable	(1) Ln Pay	(2) Ln Cash	(3) LnNon-Cash
Predicted Probability	1.873***	2.808***	0.917**
	(0.000)	(0.000)	(0.022)
Tenure	0.00068***	0.00046**	0.00089**
	(0.000)	(0.009)	(0.007)
Tenure^2	-0.00027	-0.00017	-0.00024
	(0.124)	(0.188)	(0.191)
Benchmarked Value	0.0011***	0.0025*	0.0053**
Weighted Return	(0.000)	(0.057)	(0.010)
Benchmarked Value	0.0009**	0.0017	0.0034**
Weighted Return_{t-1}	(0.018)	(0.111)	(0.037)
Benchmarked Value	0.0007	0.0011	0.0029
Weighted Return_{t-2}	(0.108)	(0.121)	(0.138)
Firm Size	0.408***	0.260***	0.517***
(Ln Sales)	(0.000)	(0.000)	(0.000)
σ_{VWR}	0.056**	0.115**	0.049**
	(0.006)	(0.003)	(0.025)
Externally	0.144**	0.255**	0.159**
Hired CEO	(0.033)	(0.021)	(0.037)
Percentage Stock	0.00027**	-0.114***	0.0091**
Holding	(0.023)	(0.000)	(0.008)
CEO Duality	0.636***	0.363***	0.413**
	(0.000)	(0.000)	(0.006)
Board Size	0.0033**	0.0009**	0.0035**
	(0.015)	(0.013)	(0.027)
Board	-0.0018**	-0.0008*	-0.0019*
Independence	(0.047)	(0.064)	(0.069)
Board	0.0037**	0.0001**	0.0021**
Busyness	(0.021)	(0.045)	(0.027)
Year Dummies	No	No	No
No. of Observations	9244	9244	9244
Adj R^2	0.248	0.199	0.333

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Table 6.10: Compensating Differential in CEO Pay: Just Identified Case

Dependent Variable	(1) Ln Pay	(2) Ln Cash	(3) LnNon-Cash
Predicted Probability	1.713***	2.998***	0.911**
	(0.000)	(0.000)	(0.025)
Tenure	0.00061***	0.00064***	0.00087**
	(0.000)	(0.000)	(0.001)
Tenure^2	-0.00030	-0.00016	-0.00029
	(0.125)	(0.222)	(0.210)
Benchmarked Value	0.0027**	0.0018*	0.0044**
Weighted Return	(0.006)	(0.057)	(0.007)
Benchmarked Value	0.0033**	0.0019	0.0030**
Weighted Return_{t-1}	(0.025)	(0.127)	(0.033)
Benchmarked Value	0.0016	0.0011	0.0025
Weighted Return_{t-2}	(0.120)	(0.153)	(0.135)
Firm Size	0.411***	0.268***	0.512***
(Ln Sales)	(0.000)	(0.000)	(0.000)
σ_{VWR}	0.062**	0.113**	0.049**
	(0.010)	(0.003)	(0.016)
Externally	0.216**	0.286**	0.166**
Hired CEO	(0.015)	(0.011)	(0.027)
Percentage Stock	0.00027**	-0.114**	0.0098**
Holding	(0.020)	(0.002)	(0.005)
CEO Duality	0.661***	0.361***	0.414**
	(0.000)	(0.000)	(0.003)
Board Size	0.0033**	0.0012**	0.0031**
	(0.005)	(0.007)	(0.021)
Board	-0.0025**	-0.0016**	-0.0023*
Independence	(0.044)	(0.047)	(0.066)
Board	0.0033**	0.0004*	0.0019**
Busyness	(0.021)	(0.055)	(0.030)
Year Dummies	Yes	Yes	Yes
No. of Observations	14748	11522	11522
Adj R^2	0.271	0.220	0.346

Models are estimated with robust standard errors to control for heteroskedasticity. *, **, *** indicate significance at 10%, 5% and 1% levels respectively. The p-values are given in the brackets.

Chapter 7

Conclusion

This thesis investigates the dynamics of CEO turnover and CEO pay in an increasingly regulated business environment. The recent growth in CEO pay in the USA and in parts of Europe, and the controversies surrounding it makes this thesis topical. We have made an attempt to understand the underlying causes of CEO turnover, CEOs' attitude towards risk and recent growth in CEO pay. The findings of this thesis are subject to some limitations and need further research.

At a time when the rapid rise in CEO pay is being criticised, we analyze the dynamics of CEO turnover in Chapter 4. We are motivated to examine if, according to the principal agent framework, the poorly performing CEOs are being replaced. Our results suggest that the CEO job has become more risky over the sample period and CEOs face a higher probability of being dismissed from their jobs. The risk of dismissal increases significantly since the governance regulations and stock market reforms of 2002.

Performance sensitivity of turnover is stronger for forced turnovers, indicating that poor performing CEOs are increasingly being replaced. We find that smaller and more independent boards are more efficient in replacing CEOs for poor performance. There is partial evidence of managerial entrenchment manifested in the switching of performance

benchmarks to less-risky accounting measures for CEOs with tenure greater than seven years.

Takeovers significantly increase the hazard of CEO turnover. Controlling for performance, CEOs in target firms are twice as likely to be replaced with respect to firms which have not had a tender bid. Further, cross border acquisitions are associated with higher hazards of exit compared to domestic takeovers. The performance sensitivity of both internal and post-takeover turnovers is comparable, indicating that takeovers act as an alternate "force of managerial discipline" (Mikkelson and Partch, 1997). Our results suggest partial success of governance regulations to mitigate agency problems.

The classification of causes of CEO turnover is an inexact science as CEOs are rarely publicly dismissed. We have checked for robustness of the classification used in this thesis. However, lack of information on reasons for CEO turnover may affect the precision of our estimates. The role of international acquirers on the risk of exit for target CEOs can be an interesting area of future research.

In Chapter 5, we examine the incentive-alignment hypothesis and investigate whether the CEOs have a misaligned incentive to undertake acquisitions. We also seek to study whether CEOs are rewarded differentially for wealth reducing and wealth enhancing acquisitions and whether the post-acquisition pay premium can be attributed to the strength of corporate governance.

We find that CEOs undertaking acquisitions are paid more, even after controlling for increased firm size. Our estimations suggest that acquisition premium in CEO pay is systematic across all components of pay and is possibly achieved through a renegotiation of the contract.

One of the key concerns is principal-agent theory is that CEO compensation contracts may provide the CEO with misaligned incentive to undertake acquisitions, even if it is detrimental to shareholders' wealth. Using industry-adjusted measures of firm

performance, we find no evidence that post-acquisition pay premium is related to the wealth effect of the acquisitions. This may indicate systematic agency problems in CEO compensation contracts.

A strong and independent board seems to partially mitigate the misaligned incentive in the current executive compensation system. We attempt to correct for selection bias in estimation of post-acquisition pay premium. Controlling for post-acquisition CEO turnovers, the acquisition premium in CEO pay is estimated to be lesser. This can be because a part of the role of board of directors to enforce corporate discipline is in replacing the non-performing managers.

The parameters used to classify 'good' and 'bad' acquisitions are quite varied in literature. We use the performance of the firm's stocks with respect to the industry in the year of the event to classify good and bad acquisitions. Future research can explore the predictors of good and bad acquisitions in more detail.

Various theories have been put forward to explain the growth in CEO pay in the recent decades. In Chapter 6, we study the determinants of CEO pay growth in the recent decades. Our results add to the existing literature and suggest that the recent rise in CEO pay may be partially attributed to the premium paid to the CEOs to compensate for the rising risk of being dismissed from the job. CEOs are paid 1.5-2% premium in pay for each percentage point increase in turnover risk. Further our results indicate possible substitution effect in compensation design. The differential in pay is driven largely by the increase in risk-free cash component of the total CEO pay. In the post-SOX period we find a greater association of turnover risk with cash compensation, indicating a possible change in executive compensation design. Thus, SOX and other corporate governance reforms may inadvertently lead to reduced performance sensitivity of CEO pay.

The main identification challenge for establishing a causal link between increased compensation and employment risk is the many omitted attributes of firms, CEOs and

industries that simultaneously affect pay premiums and forced CEO turnover. We use the severance pay eligibility of the CEOs in the event of involuntary turnover and year dummies as exclusion restrictions. Whilst we validate our instruments using tests for weak instrument and joint exogeneity, we acknowledge the possibility of other instruments. Designing novel and robust instruments to isolate the compensating differential in CEO pay may give us further insights into the dynamics of CEO pay.

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