

# Effect of Mergers and Acquisitions on CEO Turnover in Large Firms and SMES: A Hazard Analysis

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## Abstract

This study analyses the effect of M&A on the probability of CEO exit and examines the effects of firm performance, cost of CEO removal, corporate governance, and industry effects on the hazard of CEO exits, using discrete duration models. My findings suggest that M&A increase the hazard of CEO turnover, in both large firms and SMEs. This increase in hazard is more pronounced in case of acquired firms than in targets of mergers and in cross-border M&A than in domestic M&As. Poor performing CEOs face higher risk of exit but events of M&A does not significantly alter this sensitivity. This suggests weak influence of takeover market as market force discipline on corporate governance. I find evidence that post Sarbanes-Oxley act of 2002(SOX), CEOs face a higher hazard of turnover which may indicate the effect of SOX in intensifying the monitoring of corporate governance. This paper also provides empirical evidence that the dynamics of M&A between small and large firms are different; indicating ownership structure of the firm has a significant effect on firm performance and post-M&A CEO exit. This is the first study to focus on the effect of M&A on risk of CEO turnover in SMEs.

**KEY WORDS:** CEO Turnover, Personnel Economics, Duration Analysis, SME

**JEL Classification:** J63, J32, C41,

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All errors remain my own.

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## 1. Introduction

Over the last decades, the relation between CEO turnover and firm performance has gained much prominence in economic research as well as in the financial world. The growing concerns over corporate governance in the USA led to the formulation of the Sarbanes Oxley (SOX) act in 2002. Criticisms of CEOs being overpaid and entrenching themselves in the firm has gained momentum over the last two decades. This is in light of the fact that in the period 1990-2005, corporate profit and average workers' pay in USA has increased by 106.7% and 4% respectively whereas in the same time period, growth in CEO pay (cash compensation plus stock options) has been 298.2% (Figure 1). Board of Directors are also drawing criticism for inefficiency in administering optimal contract for the CEOs. Jensen, et al (2004), Bebchuk and Fried (2003) and Bebchuk and Grinstein (2005) attributed a large part of the increase in CEO pay to weak corporate governance and failure to ensure optimal contracting. These works, however, are largely based on datasets prior to 2000 and hence does not represent the effect of increased regulation and monitoring of CEO performance and pay that characterizes the last decade.

The effect of this increased focus on corporate control over CEO turnover has received little empirical attention. When internal controls of governance are being criticised for inefficiency, it becomes of interest to study the effects of market controls on CEO behaviour. Empirical evidence suggests that CEO turnovers have increased over the last two decades but only marginally (Jensen, et al, 2004; Khorana, 2003). Mergers & Acquisitions (M&A henceforth) is sometimes used as a measure of market force to discipline top executives who are not maximizing shareholder's wealth (Jensen 1988, Denis and Denis, 1995). These events can generate value by replacing non-performing management in the target firm. Consistent with the argument, a body of empirical research has established that rates of CEO turnover increase after such events of corporate control (Walsh 1988, Mikkelson and Partch, 1997). If the force of market discipline is strong, the executives with poor past performance are the ones more likely to depart post M&A (Walsh and Ellwood, 1991).

The last decade has witnessed a proliferation of M&A deals with increasing deal value. Thomson's *Worldwide Mergers and Acquisitions Database* reports that in the year 2000, there were 20,000 M&A deals in the USA worth over US\$ 2 trillion reaching up to US\$ 4.83 trillion by 2007 (Wall Street Journal, 2007). Thus, it becomes of interest to understand the discipline effect these M&As have on corporate governance and CEO turnover by using recent data.

This study analyses the effect of M&A on the probability of CEO exit using discrete duration models and examines the effects of firm performance, cost of CEO removal and industry effects on the hazard of CEO exits. Previous studies have used acquisitions as the only means of change in corporate control (Buchholtz, et al. 2003; Geddes and Vinod, 1997). However, it can be argued that mergers

also affect the hazard of CEO exit by creating a new set up where the CEOs firm specific human capital may get devalued, the CEO may be misfit in the new strategies of the merged firm or are locked in power struggles (Hambrick and Cannella, 1993; Buchholtz, et al. 2003).

In this paper, I study the effect of CEO turnover from 1992-2010 for a sample of 2762 large firms listed in S&P 1500 ratings and 52 listed Small and Medium Enterprises in the USA. The hazard of CEO turnover in the event of M&A is compared with the overall hazard of CEO exit in this study period. The estimations suggest that CEOs face a higher hazard of turnover in the events of M&A after controlling for firm performance and corporate governance.

This paper contributes to several strands of research on CEO turnover, corporate governance and M&A. A key contribution of this study is the expansion of the definition of change in corporate control to mergers and acquisitions. This study provides evidence that mergers, like acquisitions, increase the hazard of CEO exit. In addition, I use discrete-time duration models which haven't been employed before in analysing CEO turnover. Duration models have been used to model CEO turnover infrequently and existing literature have used continuous time duration models (Buchholtz, et al. 2003; Geddes and Vinod, 1997). This is the first empirical study to use discrete duration models to analyse CEO exit. Most of these studies use a sample set before or up to year 2000 and assume a proportional distribution of hazards. With the increasing focus on corporate governance, the proportionality hazard of CEO exit with duration may not hold. Also, I argue that since many CEOs have tied survival times and some observations are interval censored, it is an appropriate method to model CEO turnover events.

I also contribute to the literature on small and medium enterprises. I use a novel dataset which provides us insights into the dynamics of the M&As and CEO turnover in small firms, which has received very little empirical attention. This is the first empirical work on CEO turnover in SMEs and the impact of M&A on the hazard of turnover.

My study provides evidence that the hazard for CEO exit is higher for poorly performing CEOs and the events of M&A doesn't significantly alter this hazard. Thus market for corporate control seems to have weak effect on governance. Also, estimations suggest that firm performance has no significant effect on the hazard of post-M&A CEO exit in SMEs.

Finally, the findings are relevant to the debate on the impact of SOX. My estimations suggest that in the post-SOX period, CEOs face a higher hazard of exit. The hazard of post M&A CEO exit is also higher in the post-SOX period indicating an increase in strength in market for corporate control. By using SOX and stock exchange amendments, I circumvent the simultaneity between CEO exit and corporate governance.

My results may have a number of policy implications:

Consistent with the findings of Murphy and Zabojnik (2004) and Kaplan (2006), I provide evidence that the median CEO tenure has declined from 1980s and 1990s. In the post-SOX period, the median tenure is 4.8 years, substantially 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 decline in median CEO tenure. This finding may have an implication on moral hazard as CEOs with shorter tenures and higher sensitivity of pay and stock performance may engage in earnings management (Kaplan, 2006).

I also provide evidence that the stock market reforms and adoption of Sarbanes Oxley Act has led to a higher sensitivity of CEO turnover to firm performance and that in the post-SOX period, the job of a CEO has become increasingly hazardous and the objectives of SOX in imposing corporate discipline seems to have yielded some results.

The rest of the paper is structured as follows: section 2, briefly summarizes the relevant literature on CEO turnover, effect of M&A on CEO exit and use of duration models for estimating hazards of CEO exit is provided. Section 3 discusses the data, sources, limitations, transformations and descriptive statistics. Section 4 discusses the duration model specifications and robustness issues. Empirical Analysis is presented and analysed in Section 5 whereas Section 6 concludes.

## **2. Theory and Literature Review**

Most of the major studies in this domain are on large US firms listed in NYSE and NASDAQ. These studies analyse the CEO turnover from early 1980s to late 1990s. The major limitation of extant literature is that the study period doesn't go beyond the year 2000 and hence doesn't reflect the period when CEO pay and corporate governance has been arguably under the most intense scrutiny. My study analyses CEO turnover with the most extensive dataset as of now (1992-2010).

Mikkelsen 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 positively 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". However, in a recent study, Kaplan (2006) finds no evidence of stock market performance to CEO turnover in the event of M&A.

Research examining the effects of market forces for corporate control (Bebchuk, et al. 2002) on optimal contracting also focus on the consequent effect of CEO exit if she fails to uphold

shareholders' interest. Many studies have noted an above average rate of CEO turnover around the events of M&A. (Buchholtz, et al. 2003, Phan and Lee, 1995). One view of M&A is as an external market force to discipline corporate governance and replace non-performing managers (Asquith, 1983). Walsh and Ellwood (1991) found no significant relationship between firm performance and post-M&A CEO turnover in target firms. However, consistent with the market discipline argument, Hambrick and Cannella (1993) found empirical evidence suggesting that poor firm performance leading up to M&A increases the likelihood of post M&A CEO turnover. Thus, it is of interest to empirically estimate if there is a higher likelihood of post-M&A CEO exit in firms with low levels of firm performance. They used CEO tenure as a control variable but an absence of significant monotonic relationship made them drop the variable from the final analysis. They analysed the hazard of post-acquisition CEO turnover as a function of CEO age.

From a human capital perspective (Rosen, 1987), Buchholtz, et al. (2003) argue that the probability of exit of CEO post-acquisition is higher for younger CEOs (due to low firm-specific human capital and lower opportunity cost of loss of job) and CEOs approaching retirement (due to fewer productive years remaining to the person, increase in retirement income and lesser motivation to invest in firm-specific skills).

Thus the relationship between CEO tenure with post-acquisition CEO turnover is not well established and is the focus of interest of this study where I use discrete-time duration models to analyse the change in hazard of CEO exit in the event of change in corporate control. The findings of Buchholtz, et al. (2003) indicates that there may be little justification for using parametric duration models to study the hazard rate over the duration of CEO tenure. This study doesn't use CEO age as a determinant as it is collinear with the tenure in years.

Phan and Lee (1995) argue that once the firm is acquired, the acquiring firm may look for different skillset (Hambrick, et al. 1993) and want to remove the CEO for his embeddedness in the firm (Hambrick and Fukutomi, 1991). Change in corporate control also increases the likelihood of voluntary turnover of long serving CEOs because of the firm specific human capital investment and psychological investment that is associated with long tenure may decrease in importance (Brockner, 1985). Thus, it is of interest to estimate the duration dependence of CEO turnover in the event of mergers and acquisitions. Existing evidence suggests that the hazards are not smooth and are high both early and late into a CEOs tenure in a firm (Buchholtz et al. 2003).

The studies on the effect of CEO ownership on CEO turnover post M&A suggests a lower likelihood of CEO exit post M&A if the CEO has a large ownership in the firm. Brunello et al (2003) draws on the Managerial Power theory whereby the CEOs entrench themselves in the firm and influence the board of directors to argue that significant ownership of the CEO weakens internal monitoring and it would be costly for acquiring/merged board to replace him. Jensen (1993) established that CEO

duality affects the board's independence and response to failure of the top management. A change in corporate control, generally associated with the change in board composition may be more independent and hence a higher likelihood of CEO exits post-M&A is expected. Core, Guay and Verecchia (1999) on the other hand provides an alternative argument suggesting that CEO ownership in a firm aligns the interest of the CEO with that of the shareholders and maximize firm value. In this study, I would estimate whether CEO ownership as percentage of shareholding in the firm affects the risk of post-M&A turnover. To test the effect of corporate governance, Sarbanes Oxley Act (SOX) of 2002 has been treated as an exogenous shock leading to an increase in strength of corporate governance.

The impact of cross border M&A on CEO turnover has received little empirical attention. A cross border M&A may be associated with a higher degree of information asymmetry than domestic turnovers. Also cross border M&A involves differences in regulatory and capital market structures. In such events, the knowledge and skills of the incumbent CEO assumes great importance. This might lead to an expectation that cross border M&As be associated with lower likelihood of CEO exit. This study estimates the hazard of CEO exit in events of domestic and international M&As.

A small body of research focuses on analysing post-M&A CEO turnover in large and small firms. They suggest that the CEO turnover rate post events of corporate control are different in large and small firms (Warner et al. 1988; Walsh, 1988). However, the evidences are mixed and don't conclusively establish that SMEs have systematically higher/lower rate of post-M&A CEO exit and the possible causes of such differences. In owner-controlled SMEs, there exists no principal-agent problem and thus the managerial rent seeking interest in undertaking M&A can be ruled out. Also, Weitzel and McCarthy (2009) suggest that information asymmetry is inversely related to firm size and leaves non-owner CEOs little discretion to act in their own benefit at the cost of shareholders' value. Thus, although the decision making of CEOs of large firms and SMEs are both boundedly rational, a closer alignment of CEOs interest with that of firm interest means, a CEO of an SME is more likely to withdraw from a bad merger than a CEO of a large firm. The impact of M&As on CEO turnovers in SMEs is an under-researched area and this is the first empirical work to examine the relation. I argue that since managers in SMEs act in the interest of the firm, the market for corporate control will have lesser impact on SMEs than in the large firms and hence the hazard of CEO turnover post M&A should be lower compared to that of larger firms. I estimate the effect of both mergers and acquisitions and cross-border & domestic M&As on hazard of CEO exit in SMEs are estimated.

Based on the above discussion, a general model of CEO turnover can be formulated as:

$$Pr (CEO Turnover) = X\beta_{it} + M\&A + f_{it} + h_{it} \quad (1)$$

Where the  $\beta$ s capture the effects of CEO tenure, Firm Performance, CEO salary, Firm Size, Cost of CEO replacement, Industry classification of the firm, Corporate Governance for the  $i^{\text{th}}$  firm in the time period,  $t$ , M&A is a dummy for an event of Mergers and Acquisitions,  $f_{it}$  controls for firm fixed effects and  $h_t$  is a range of year dummies to control for macroeconomic fluctuations.

There is little theoretical framework or empirical evidence to suggest that the distribution of turnover hazard over the duration of CEO tenure is parametric and imposing distributional assumptions may bias the estimation. Thus I use a non-parametric discrete duration model to analyse the hazards of CEO exit.

The above equation sets out that probability of CEO turnover is a function of the tenure of the CEO (some researchers use CEO age instead of tenure), firm performance, size of the firm, the financial cost associated with CEO replacement (Golden parachute or otherwise), industry grouping of the firm. This probability is also a function of the strength of monitoring of CEO performance, both internal (corporate governance) and external (strength of takeover market). A range of firm performance measures have been used in the literature, the commonly used ones being Earnings Before Interests and Taxes (EBIT), Earnings per Share (EPS) and stock prices. In the literature, firm size is generally controlled for by using either natural logarithm of total assets or natural log of the total sale value. There is also an argument that some industries are impacted more by market conditions than others and thus the performance of the CEO (consequently, the hazard of CEO exit) is also likely to be different for different industries. Therefore, I use industry adjusted value weighted returns and market adjusted value weighted returns for each firm to index for industry and market performance.

Based on the findings from the literature, I expect that CEOs of poor performing firms will have a higher hazard of CEO exit. I use accounting measures of firm performance and stock performance relative to the industry and the S&P index to analyse the effect of firm performance on the hazard of CEO pay.

In my second specification, I test the effect of mergers and acquisitions on the hazard of CEO exit. Extant literature provides evidence that acquisitions increase the hazard of CEO pay. I test the hypothesis using controls for mergers and acquisitions separately and also for domestic and international M&As.

The final specification tests the role of corporate governance on the hazard of CEO exit. The role of corporate governance has been tested in literature using various measures like board size, composition of the board, CEO shareholding, etc. Consistent with the managerial power hypothesis, a higher percentage share ownership of the CEO and CEO duality will weaken the monitoring of the board and may reduce the hazard of CEO exit. Also, a higher cost of CEO replacement may make it difficult for the board or the acquiring firm to replace the CEO and may lead to lowering of turnover hazard. I add

covariates for corporate governance and test if they have a significant effect on turnover hazard and whether it impacts the hazard posed by M&A.

In addition to the above hypotheses, I test for industry-effects on the hazard of CEO turnover to analyse if the firm's being in a particular industry would expose a CEO to higher hazard of turnover than others. The models also control for the gender of the CEO and CEO ability through the use of dummy for previous experience of CEO of other firms. The results are listed in Table 7 and Table 8.

### **3. Data**

The data was obtained from Standard and Poor's Execucomp database. Disclosure norms by US Security and Exchange Commission mandate each firm to disclose information on executive pay as well as a wide range of information on corporate governance. The Execucomp database provides summary compensation data, as well as detailed information on executive stock and option awards and pension plans, thereby providing full details of executive compensation generated from the annual proxy filings (Def-14A) of US companies.. It covers executive compensation data from 1992 and gets updated each year in the month of October. 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 1992-2010. Execucomp provides information on 3016 CEOs in that sample period. CEOs for a given financial year are marked in the CEOANN field for each year. 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 facing the hazard couldn't be determined. Four more CEOs with duration less than two years have been dropped from the sample. Furthermore, for the analysis complete information on firm performance, compensation, and share-ownership is required. This leads to omission of 8 more firms from the analysis. Probit regressions to analyse sample selectivity (not tabulated) was performed using firm performance and CEO pay measures but none of the parameters was estimated to be statistically significant and hence systematic non-disclosure of information was ruled out. The remaining 2754 organizations are observed for the eighteen year period 1992-2010. Thus the final dataset contains 15121 CEO-year observations for 2702 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.

For each CEO-firm combination, data is available for the date the CEO assumed the responsibility and the day she relinquished/was discharged of her duties. Some of the observations on CEO tenure are truncated or censored influences our choice of discrete duration models as appropriate



methodology. For each CEO, thus, the duration of stay in a particular firm (in days) can be calculated by subtracting the dates of joining as a CEO from the last time a CEO is observed in that firm. The average tenure of a CEO in a firm in the sample is 9.35 years and the median tenure is 7.83 years. Harford (2003) estimates the average tenure of CEOs in large US firms is 8.6 years. This study is based on data from 1985-2000. My data has a larger span of observation time which may account for the higher average CEO tenure.

The dataset provides data on the demographic characteristics of the CEO (age and gender) and the industry classification of the firm. There are 372 unique Standard Industrial Classification (SIC) codes listed in the database. I classify the industries into 10 broad industry classifications by their two-digit SIC code viz. Airlines, Mining and Metals, Agriculture, Retail, Banking and Financial Services Industry, Automobiles, Public Utilities, Pharmaceuticals and Healthcare, Real Estate and Technology. These groupings were done using the listing of high M&A active industries in the USA (Weston and Weaver, 2001) and using agriculture and public utilities as controls for regulated industries.

A secondary dataset has been manually developed for the purpose of this research comprising of CEO compensation data of 61 CEOs from 52 listed Small and Medium Enterprises (SMEs) of the United States. Since most of the SMEs are privately held, it is not a statutory obligation for them to declare the CEO compensation. For the publicly listed SMEs, data is only available from 2004-2009. The data has been collected from the yearly DEF-14 A proxy filings of these firms. The data provides similar information to that of the Execucomp database with some key omissions. The values of the Golden parachute or the payment due to the CEO for involuntary turnover arising out of change of control are not reported. For both the datasets, firm performance measures have been integrated manually from S&P database. Both accounting and stock price performances are noted for firms in Execucomp database but no stock-based measure of firm performance could be found for the SMEs. A full list of variable description is provided in Table 10 and a table of descriptive statistics for both Execucomp and SME database in panel A and B of Table 3.

The firm performance measures were obtained from S&P's COMPUSTAT Research Tape whereas the stock price data was obtained from Centre for Research in Securities Prices (CRSP) database. The industry grouping was done by the firm's 2-digit SIC codes. I chose a set of firm performance measure based on extant literature (Buccholtz, et al, 2003, Hambrick and Cannella, 2004, Jensen, et al, 2004) and use natural logarithm of total sales, Earnings Before Interest and Taxes (EBIT), Return on Total Assets (ROA) and Earnings-Per-Share (EPS) <sup>1</sup> as accounting measures of firm performance and I use natural logarithm of total assets as a measure of firm size. There are contrasting views on the appropriate measures of firm performance. Choice of stock returns as measure of firm performance (Coughlan and Schmidt, 1985) reflects the expected value created by a CEO but is also 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). Consistent with existing literature, up to the third lags of these measures from the date of turnover has also been used (Geddes and Vinod, 1997). It can be argued that CEO dismissals not only result from contemporaneous firm performance but also from the historical performance of the firm. Existing evidence indicates that firm performance prior to three years leading up to the event of M&A has insignificant effects (Guest, 2008). The SME dataset has data from 2003-2009 but only few firms have data reported for more than three consecutive financial years and hence only the first lag of the financial variable could be modelled.

Payment in the event of change of control is included in the analysis to estimate if the cost of CEO replacement post change in corporate control has an effect on the baseline hazard. To control for the cost of CEO firing, I use measures for the payment due to CEO in case of involuntary turnover (natural logarithm of the dollar value of the Golden parachute) and also the measure for the payment due to the CEO in case of an involuntary exit in the event of change of control. The average and median cost of CEO firing for involuntary turnover is US\$ 5,543,121 (US\$ 604,528.50) whereas that the cost of CEO removal in the event of change of control is US\$ 12,337,270 (US\$ 6,312,771).

CEO compensation for each year is calculated as the sum of the Salary, Bonus, Black Scholes value of stock and option awards granted in the year<sup>2</sup>, non-equity incentives, value of Restricted Stock Grants and Long Term incentives due that year and all other compensation paid in that year.<sup>3</sup>

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1. Share Price Volatility has been used to check for robustness of firm performance measures. The sensitivity of hazard to EPS and stock price volatility are of the same order. Thus only EPS is used in estimations.
  2. 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 my dataset is over 7 years and hence I 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 all, I use Execucomp valuation for restricted stocks.
  3. 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).

In SMEs, the definition of total CEO compensation varies since little record of LTI vehicles are recorded for these firms. Thus, the Total CEO Compensation in a year is the sum of Salary, Bonus, Stock awards, Option awards Non-equity incentive compensation and any other payment due to the CEO in that particular year.

Percentage of shares a CEO holds in a firm is used as a control for CEO ownership in the firm. On an average, a CEO owns 4.15% share (median of 1.3%) in the firms in the Execucomp dataset. This data was unavailable for SMEs. For SMEs, CEO ownership is controlled for by using indicator for owner-CEOs. I also use SOX dummy as a measure of strength of corporate governance, which takes a value of 1 for each time period after 2002, and zero otherwise.

Using Thomson Financial Securities Data's SDC Platinum™ Worldwide Mergers and Acquisitions Database and Forbes company database, the events of change of corporate control are identified and categorized each event as:

- Mergers or Acquisitions (M&A)
- International M&A or domestic M&A

Following the sample selection method of Lehn and Zhao (2006), the sample for this study was drawn from the database using the following criteria: (a) The Mergers and Acquisitions were announced between January, 1, 1990 and December, 31, 2010, (b) both the acquiring and target firms are listed corporations, (c) the deals are categorized as Mergers or Acquisitions, (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.

These filters help in identifying 330 Mergers and 1547 acquisitions<sup>4</sup>. 1520 firms in the sample witness at least one event of M&A. In addition, there is a control group of 1234 firms which doesn't take part in any M&A activity in the given sample period.

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). I identify Mergers from the Thomson Financial Securities Data's SDC Platinum™ Worldwide Mergers and Acquisitions Database and Forbes company database.

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4. 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 M&As because of the small proportion of hostile takeovers.

Also, any deal between two firms not differing by more than 20% in firm size (measured as log of total assets) and financed by common stocks is classified as a merger. M&A is classified as international if one of the involved firms is not headquartered in the USA. Using this definition, there are 1511 domestic M&As and 342 international M&As.

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 his career. 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,  $y+1$ . A CEO may re-join the same firm in the capacity of a CEO or a CEO-firm observation may be lost from observation for certain number of years; these being the cases as interval truncation. I classify two types of CEO turnover, internal turnover, associated with the performance of the firm and board of directors and external turnover due to M&A.

Internal CEO turnover is characterized by the CEOs not being in the post in the year,  $y+1$ , even though the company continues to be listed in the sample. CEO turnovers due to M&A are when an individual CEO is no longer the CEO of the combined organization following an event of M&A. Events of CEO turnovers are identified using the Fortune 500 and Fortune 1000 lists, 10-K and Def-14A filings of the firms, the Wall Street Journal and Lexis/Nexis Business news database. Following an event of M&A if a CEO vacates his position but is retained in the board, it is classified as an event of CEO turnover. I construct a dummy variable for CEO turnover which equals 1 if the CEO of a firm is replaced in a given year. I also construct another dummy for external CEO exit which equals one if the CEO of a firm experiencing an event of M&A is replaced within two financial years of the event. This dummy enables us to capture the lag effects of M&A on the hazard of CEO exit. Table 4 lists annual figures for turnover and mergers and acquisitions.

The overall rate of turnover reported in this study is higher than the estimates in existing literature. In the dataset, 16.98% of the CEOs face events of turnover in the study period. Studies by Jensen et al. (2004) and Murphy and Zabojnik (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 my estimates.

My dataset used in this research contains data from the decade 2000-2009. This period, concurrent and after the formulation of the Sarbanes Oxley (SOX) act and stock exchange reforms on corporate governance, has witnessed a greater scrutiny of corporate governance practices and hence a higher percentage of CEO turnover can be expected than reported from the estimations prior to the Sarbanes Oxley act. The raw rate of CEO turnover in the post-SOX period (2003-2010) is 11.98%. I test if the change in corporate governance regulation has any impact on the baseline hazard of CEO exit.

## 4. Methodology

Existing studies have used logistic regression models or Cox-Proportional Hazards model (continuous survival analysis) to model for CEO exit. In this study, I use discrete-time duration analysis to model for CEO exit. For each period (year) a CEO survives in a firm, his age is correlated with the duration. Thus, I leave out CEO age as an independent variable. The baseline model can be specified as:

$$\begin{aligned} \text{Prob (Turnover)} = & \alpha + \beta_1 \text{tenure} + \beta_2 \text{EPS} + \beta_3 \log \text{assets} + \beta_4 \text{Total CEO Compensation} + \\ & \beta_5 \text{Female} + \beta_6 \text{Percentage Share Holdings} + \beta_7 \text{Termination Payment} + \beta_7 \text{ROA} + \\ & \beta_8 \text{M\&A identifier} + \beta_9 \text{CEO duality identifier} + e_{it} \end{aligned} \quad (2)$$

More generally, the estimation model can be specified as:

$$\text{cloglog} (h_{sij}) \equiv \ln[-\ln(1 - h_{sij})] = \alpha_1 d_{1sij} + \dots + \alpha_p d_{psij} \dots + \beta_1 X_{1ij} + \dots + \beta_p X_{pij} \quad (3)$$

The dependent variable in this analysis is “Turnover” that takes on the value of 1 in the time period when there is a CEO exit and 0 in the periods when there is no CEO turnover. The hazard of turnover for each period of the duration of the subject  $i$  under study is estimated and also the effects of the covariates  $X_{ij}$  on the baseline hazard.

In continuous time duration models it is assumed that all survival times are unique and there are no two individual with tied survival times. However, grouping of durations (in years) results in large number of tied survival times, in the context of this research, spells of CEO tenure with exactly the same duration. In such situations continuous time duration models lead to biased estimates and standard errors and also lead to spurious negative duration dependence of the baseline hazard if frailty is significant. The restrictive limitation of proportional hazards in a Cox model may not hold because the covariates may intrinsically have a non-proportional impact on the baseline hazard. Estimating the model using Cox model in this case will lead to bias in estimation.

Discrete time duration models on the other hand assume no distribution conditions. Little theoretical and empirical evidence exists to suggest that hazards of CEO turnover and effects of the covariates are parametric and follow any distribution function. Thus, I chose to model hazards of CEO exit using discrete time duration models as it can handle cases of relatively few survival or censoring times and many subjects share the same survival times. Discrete time duration is particularly applicable when observations are interval censored and the scales are intrinsically discrete. In this analysis, CEOs who exit from one firm do not reappear in the dataset as a CEO of the same firm or another firm in that study period.

The likelihood function of the occurrence of an event in discrete time can be represented as:

$$\begin{aligned}\mathcal{L} &= \prod_i^n \{h(t_i)S(t_i - 1)\}^{y_{it}} \{S(t_i)\}^{1-y_{it}} \\ &= \prod_i^n [h(t_i) \prod_{i=1}^{t-1} (1 - h(t_i))]^{y_{it}} [\prod_{i=1}^t (1 - h(t_i))]^{1-y_{it}}\end{aligned}\quad (4)$$

where  $y_{it}$  is the dependent variable and the censoring indicator. Discrete time models can be estimated by binary regression techniques viz. logit, probit and complementary log-log (henceforth cloglog) models.

In this analysis, complementary log-log or cloglog model is used and can be represented as:

$$\log[-\log(1 - \lambda_i)] = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} \quad (5)$$

The above expression can be rearranged to give the probability of an event:

$$\lambda_i = 1 - e^{-e^{X_i \beta}} \quad (6)$$

cloglog models are particularly applicable for interval censored data (Jenkins, 2009) and are direct extensions of continuous time Cox models (Beck, Katz and Tucker, 1998).

In many ways, the CEOs and firms in this study may have some unobserved heterogeneity that makes some firms more prone to undertake M&A and some CEOs more prone to face the hazard of turnover. If unobserved heterogeneity between the subjects is not accounted for, the duration dependence of the baseline hazard will be overestimated (if it's a negative relationship) or underestimated (if it's 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. Lancaster (1990) proves this estimation problem using a gamma distribution frailty model.

In this sample, due to the unobserved heterogeneity of the different industries, the CEOs may be exposed to higher risk of post-M&A exit in some particular industries than in others. More importantly, due to the unobserved heterogeneity in the ability, skills and influences of CEOs, some CEOs may be exposed to a higher rate of post-M&A exit than others. Assuming these unobserved heterogeneities is constant over time, frailty models for both these cases were estimated.

A random intercept cloglog model accommodates for difference of survival times of subjects that can be grouped by a common characteristic, viz. CEO identifier, industry classification, nationality, etc. Conditioning on the covariates, a random intercept term for each group is added in the cloglog model:

$$\ln[-\ln(1 - h_{tij})] = \beta_2 X_{2ij} + \dots + \beta_p X_{pij} + \alpha_1 d_{1,sij} + \dots + \alpha_p d_{p,sij} + \zeta_j \quad (7)$$

where  $\zeta_j : d_{ij}, X_{ij} \sim N(0, \psi)$

The exponentiated random intercept,  $\exp(\zeta_j)$ , is known as the shared frailty because it's the "frailty" of the subjects belonging to a certain grouping classification.

The frailty model can also be expressed in terms of continuous latent responses

$$y_{sij}^* = \beta_2 X_{2ij} + \dots + \beta_p X_{pij} + \alpha_1 d_{1,sij} + \dots + \alpha_p d_{p,sij} + \zeta_j + \epsilon_{sij} \quad (8)$$

Given the covariates and  $\zeta_j$ ,  $\epsilon_{sij}$  has an asymmetric Gumbel distribution with a mean of Euler's constant (0.577) and a variance of  $\frac{\pi^2}{6}$ . Thus, the correlation between the latent responses of two subjects in the same group is given by:

$$\rho = \frac{\psi}{\psi + \frac{\pi^2}{6}} \quad (9)$$

To integrate the unobserved effect, a distribution for unobserved heterogeneity,  $v$ , of each subject needs to be specified. Any continuous distribution with a mean of one and finite variance can be used for the purpose but generally distributions that provide closed form expressions for frailty survivor functions are favoured.

Gama distribution has been most popularly used with discrete time duration models. Fitting a frailty model with the probability density function of  $\alpha$  following a gamma distribution

$$g(\alpha) = \frac{\alpha^{\frac{1}{\theta}} e^{-\frac{\alpha}{\theta}}}{\Gamma(\frac{1}{\theta}) \theta^{\frac{1}{\theta}}} \quad (10)$$

The above expression assumes a parametric distribution of the frailty terms. However, for computational ease, this is the preferred method for this research.

For cloglog models normal distribution may also be used where numerical quadrature techniques are used for integrating out the unobserved heterogeneity. For this analysis, the survivor function is conditioned on the mean of the error term.

Heckman and Singer (1984) technique is an alternative approach to determine non-parametric forms of frailty distribution. This involves fitting an arbitrary distribution using a set of "mass points" along the distribution and estimating the probability of a subject being at each mass point. If each subject belongs to one or more groups and membership of each group is observed, then the hazard function is

parameterized by allowing the intercept term to differ across groups. If a model has  $z = 1 \dots Z$ , hazard function of a subject in group  $z$  can be expressed as:

$$h_{z_t} = 1 - e^{-e^{(m_z + \beta_0 + \beta' x_{it})}} \quad (11)$$

and the probability of belonging to group  $z$  is  $p_z$ . The  $m_z$  in the expression represents the “mass points” in the multinomial distribution. The estimation technique normalizes  $m_1$  to zero and  $p_1 = 1 - \sum_{z=2, \dots, Z} p_z$ . Heckman-Singer, although assumes no parametric forms, is difficult to converge.

More commonly, parametric forms of unobserved heterogeneity are used in studies of discrete time duration.

In this research, I use a set of time dummies for each period or spell and the dummies take on the value of 1 each time a new spell starts for a CEO. The hazard function can thus be modified to account for the temporal dummies:

$$\Pr(Y_{it} = 1: X_{it}) = h(t, X_{it}) = 1 - e^{-e^{X_{it}\beta + \kappa_{t-t_0}}} \quad (12)$$

where  $\kappa_{t-t_0}$  represents the temporal dummy variables. These dummies are equivalent to the continuous time baseline hazard function,  $h_0(t)$ . A Wald test confirms the significance of the time dummies.

## 5. Results

### 5.1 Duration dependence of CEO turnover hazard

The durations of CEO tenure is divided into discrete one-year periods. The baseline hazard of CEO exit as a function of CEO tenure is plotted in Figure 6. The smoothed hazard function, Figure 7, takes an inverted U-shape. The hazard of CEO exit in the early years of tenure rises gradually year on year till it reaches the ninth year after which it starts declining. One explanation of this can be that the CEO-firm misfit is more likely to be found out over time. During this period, the hazard of CEO exit increases as the poor matches are likely to lead to termination of contract from either party. Once all the misfits are revealed, the hazard of CEO exit decreases as the information asymmetry is now accounted for and only the better fits survived. An alternate argument is 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).



The duration dependence is robust to the addition of covariates in the model. The estimations are controlled for the gender of the CEO and their past experience as CEO of other firms. From Table 7, being a female CEO is associated with 8% less hazard of turnover and this hazard goes up by 3% in the event of mergers and acquisitions. The CEOs with experience of being a CEO in a firm other than the present firm has a 6.5% lower probability of post-M&A turnover, which can be attributed as a measure of CEO ability. However, these variables are found to be statistically insignificant in all specifications.

I analyse the effect of the industry group of a firm on the baseline hazard of CEO exit. Industries vary in the types and severity of the risks they face, in the capital structure and regulatory norms. Hence industry classification of a firm is expected to have a significant effect on the hazard of CEO exit Parrino (1997). Controlling for the effects of industry classifications on the baseline hazard, it is observed that only Banking and Financial Services Industry (BFSI) have a significant effect on the baseline hazard. Thus CEOs in banking and financial services industry face a significantly higher (55.7%) risk of turnover compared to other industries. BFSI CEOs also face higher hazard of turnover in the events of M&A compared to CEOs of firms in other industries (not tabulated).

The existing literature uses relatedness and homogeneity of industries and not the industry classification itself. I provide empirical evidence that the belonging to a particular industry doesn't make the CEO greater hazard of exit. I use industry adjusted measures of firm performance to control for industry-wide shocks to firm performance. The industry effects are further tested in the frailty models. I use parametric estimations of unobserved heterogeneity and estimate both random effects cloglog models and Gamma frailty models to test if firms in any industry face higher risk of CEO exit after M&A due to unobserved factors not captured in my models. The random effect cloglog model assumes normal distribution of frailty. The p-value of the likelihood test was estimated to be 0.496, which is statistically insignificant. 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. The gamma frailty test assumes a more flexible gamma distribution rather than using Gaussian quadrature technique. The results of gamma frailty test reinforce the result from the random effect cloglog tests and confirm the finding that there is no significant frailty in the model. In Table 9, Model 1 is the base model; Model 2 is the M&A model. Likelihood tests indicate that there is no significant frailty and the parameter estimates doesn't change much when controlling for unobserved heterogeneity. Model 1 and 2 are simplified than the ones reported in Table 7 and Table 8 by omitting the lags of the financial parameters and the dummies for domestic and international M&As. This simplification is necessary because the random components models are otherwise difficult to estimate. Thus, it can be said that no particular industry faces a higher probability of post-M&A CEO exit due to unobserved factors not controlled for in my models.

### *5.2 Firm Performance and CEO turnover hazard*

CEO replacement decisions are more likely to be influenced by historical performance than by contemporaneous firm performance. I use up to third lags of firm performance measures to control for historical firm performance. Robustness checks are done with contemporaneous firm performances and it was found to be significant and does not influence the findings.

Consistent with the findings of Coughlan and Schmidt (1985), I find financial performance measures, both accounting and market-based, having negative and significant effect on CEO turnover. The hazard of CEO turnover goes up 1% for unit decrease in the third lag of EBIT. The effect is of comparable magnitude when the contemporaneous performance and first and second lags of EBIT are used as measures of firm performance. The increase in post-M&A CEO exits for fall in EBIT is of comparable magnitude. In both cases, the third lag is statistically insignificant.

Estimating the base model using EPS as a measure of firm performance, a unit decrease in contemporaneous firm performance is associated with 3.7% increase in hazard of CEO exit. The hazard increases 6.9% for the first lag of EPS and 2.2% for the second lag. From Table 8, unit decrease in contemporaneous EPS leads to a 3.8% increase in hazard of post-M&A CEO exit whereas similar decrease in the first and the second lags of EPS are associated with 4.02%% and 4.07%% increase in hazard of post-M&A CEO turnover respectively. However, the third lag of EPS is statistically insignificant in both the base model and the model for M&A.

Estimates in Table 7 and Table 8 reveal that contemporaneous firm performance and the first and second lag of the performance has a significant effect on the hazard of CEO exit. These estimates are robust to the choice of firm performance measure. Thus, from this estimation, the hazard of CEO exit is affected by the contemporaneous firm performance and the historical firm performance.

### *5.3 M&A and hazard of CEO Turnover*

Extending the scope of existing literature, I use both mergers and acquisitions as means of change in corporate control. Figure 3 shows that events of change in corporate control shifts the hazard function upwards, signifying a higher degree of hazard faced by CEOs and the smoothed function is steeper compared to that of baseline hazard.

Consistent with the findings of Hambrick and Cannella (1993) and Buchholtz et al. (2003), I estimate that an event of change in corporate control increases the hazard of a CEO exit by 132% (Table 8). The result is robust to both contemporaneous turnovers as well as turnovers happening at a lag of up

to two years from the date of M&A. Thus, my analysis provides evidence that events of change in corporate control (Mergers and Acquisitions) increase the hazard of CEO exit.

Further analysis to separately estimate if there is a difference in hazard faced by the CEOs in events of mergers and acquisitions and in case of an event of domestic and cross border M&A was performed, the results of which are listed in Table 8.

The estimated hazard of turnover faced by a CEO in the event of a merger is lower than that faced in an acquisition. The hazard of exit faced by a CEO when a firm undergoes a merger increases by 37.7%, whereas for the CEO involved in an acquisition, the hazard goes up by 141%. This difference in CEO turnover hazard between mergers and acquisitions can be attributed to the greater role of the CEO of the target firm in the pre-merger negotiations, which may influence the probability of retention (Walsh, 1988; Buchholtz et al. 2003). Another explanation to the higher rate of post-acquisition CEO exit can be drawn from the argument that acquisitions replace poor performing managers and that a significant proportion of CEOs of target firms of acquisition vacates the post and gets a position in the Board of Directors (Hartzell, et al., 2004).

It is estimated that CEOs involved in cross-border M&As are 54.23% more likely to make an exit from the firm than in a domestic M&A. Guest (2008) provides evidence that cross-border M&As are associated with higher pay. My results suggest that a higher pay may be associated with a higher hazard of exit. This is the first study to separately calculate the hazard ratio for mergers and acquisitions and hence there is no comparable study to match the results.

#### *5.4 Cost of CEO removal and hazard of CEO Turnover*

I estimate the effect of termination payment on the baseline hazard to analyse the impact of cost of CEO removal on the hazard of exit. I use two measures for the cost of CEO exit to the firm. In the base model, I use the variable for severance package, Termination Payment. This variable captures the monetized value of the severance package entitled to the employee in an event of involuntary turnover. In the M&A model, Termination Payment is replaced with the variable Change in control payment, which reflects the monetized value of the payment due to an existing CEO in the event of an involuntary turnover following an event of change of corporate control. I argue that the cost of CEO replacement is an influencing factor in CEO replacement decisions, both in case of change of corporate control or otherwise. The natural logs of these monetised variables are used in estimation.

It is estimated that an increase in severance package lowers the hazard of CEO exit by 3%. From the M&A model, a negative association of CEO turnover with change in control payment is observed, i.e.

an increase in severance package for a CEO in case of an exit arising out of change in control leads to a lowering of the CEO turnover hazard by 7.86%

These estimates support the argument that the severance package of CEOs for involuntary turnover affects the hazard of CEO turnover and that a higher cost of CEO replacement reduces the probability of CEO exit post change in corporate control. These provisions are therefore a deterrent to optimal contracting and forces of market discipline to replace non-performing managers. Thus the high cost of replacements, or Golden Parachutes, increases the agency cost and lowers the opportunity cost of the hazard of turnover for the CEOs.

### *5.5 CEO Ownership and CEO Turnover hazard*

If a CEO owns a significant proportion of stocks in the company, she is expected to yield greater power over the board of directors, whom, she may have nominated herself. A higher ownership of the CEO also makes it costly to replace her post M&A (Brunello, et al. 2003). In this analysis, a higher percentage of stock ownership of the CEO reduces the hazard of exit by 4.7%. A higher stock-ownership of the CEO in the firm also reduces her hazard of post-M&A turnover by the same margin. Thus, the CEOs with a higher share ownership faces significantly lesser hazard of turnover and this persists even in events of M&A.

I control for CEO control over board of directors by controlling for CEO duality i.e. estimate the difference in hazard if the CEO is also the chairman of the board. Estimations suggest that Chairman-CEOs face significantly lesser hazard of turnover, after controlling for firm performance. The hazard faced by a CEO who is also the chairman of the board is 68.71% lesser than that faced by a CEO who is not the Chairman of the board of directors, *ceteris paribus*. In the events of M&A, the Chairman CEO enjoys 64.10% lesser hazard of exits than the non-chairman CEOs. This result suggests that even in the events of change in corporate control, Chairman CEOs do have a significant influence on the board of directors as reflected in the lower hazard of exit but the influence of CEO on the board of directors is reduced by M&A.

The role of corporate governance in safeguarding shareholders' interest has been under much scrutiny. If corporate governance was optimal, then any exogenous regulatory change in corporate governance shouldn't have any effect on the hazard of CEO exit. In this study, I use SOX, 2002<sup>5</sup> as

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5. In this analysis, SOX also capture the effects of NYSE and NASDAQ regulations of board independence introduced in 2002.

an exogenous shock to corporate governance and estimate whether it has changed the hazard of exit faced by the CEO post 2002. Estimations suggest that after 2002, CEOs are exposed to 33% more hazard of turnover, *ceteris paribus*. In events of M&A, the CEOs face 38% higher risk of turnover in the post-SOX period. These results suggest that corporate governance pre-SOX period was sub-optimal and that SOX has increased the strength of corporate governance which more than offsets the effect of CEO power on the hazard of turnover and that an independent board increases the strength of corporate governance.

### *5.6 The Case of the SMEs*

The analysis performed with the dataset of large firms was performed on the set of SME database to analyse the robustness of the results over a range of firm size and firm performance. I examine the duration dependence of the hazard of CEO exit and the profile takes on an inverted U-shape as observed in the case of large firms (Figure 7). This baseline hazard first increases with increase in duration and then decreases with increase in duration. This is consistent with the implications of the matching model and information asymmetry. As the information asymmetry slowly diminishes, the hazard of CEO turnovers increase as bad matches are likely to be found out. However after a period of time, when the information asymmetry is zero, the right matches remain and the CEO turnover decreases with CEO tenure. One school of thought believes that with increase in tenure, the CEOs entrench themselves in a firm (Bebchuk and Fried, 2003) and hence the hazard of CEO turnover goes down

From Figure 8, the baseline hazard of CEO exit is shifted up when the events of M&A are accounted for. Thus, like in large firms, the CEOs face a greater hazard of exit in the event of an M&A, suggesting the role of these events as external discipline on corporate governance. Further on, I analyse the nature of M&A events, and the impact of mergers and acquisitions separately on the baseline hazard and the impact of cross-border and domestic M&A. Estimations from Panel B of Table 7 and Panel B of Table 8 suggest that CEOs face a significantly lower hazard of turnover in the event of a merger than in the event of an acquisition. Acquisitions increase the hazard of CEO turnover by about 108% whereas for merger, the hazard goes up by 96.09%.

This difference in hazard rate between mergers and acquisitions is lower than that observed in case of large firms. This smaller gap in hazard is because for SMEs, mergers are associated with greater hazard of turnover than in large firms. This difference can be attributed to the inherent difference in the motives of mergers in SMEs.

A large percentage of SMEs have owner-manager and they merge into bigger firms to exploit the opportunities of synergy in their niche market/technology/expertise. These kinds of mergers involve the owner CEO of the SME relinquishing their post to join the board of directors of the bigger firm (Weitzel and McCarthy, 2009).

In keeping with the findings from the large firms, the cross-border M&As in SMEs are characterized with a higher hazard of CEO turnover than domestic M&As. Cross border M&As increase the hazard of CEO exit by more than three-fold (318%) whereas domestic M&As raise the hazard 54%. So a CEO is 264% more likely to exit from the firm if it undergoes a cross border M&A than if it undergoes a domestic M&A.

I test whether historical and contemporaneous firm performance has any effect on the hazard of CEO turnover and whether pre-M&A firm performance affect the hazard of CEO exit after the event. Similar to the analysis with large firms, Earnings before Interest and Taxes (EBIT) are used as the measure of firm performance. The reliability of the sources of data on capital market performance of SMEs is not beyond doubt and some of the firms' data were not available and hence only accounting based performance measures have been used.

I control for CEO ownership in the SMEs and estimate the effect of ownership on the hazard of post M&A CEO exit. The estimates on the parameter of owner-CEOs are negative and insignificant. Thus being an owner-CEO does not significantly reduce the hazard of turnover. This is consistent with the findings of Weitzel and McCarthy (2009) that due to smaller firm size and consequently lower information asymmetry, non-owner CEOs little discretion to act in their own benefit at the cost of firm value. A closer alignment of CEOs interest with that of firm interest means, a CEO of an SME is less likely to be replaced by forces of corporate control. The SOX compliance requirements of SMEs are mostly for auditing and accounting purposes and not on corporate governance and hence SOX dummy is not used for SMEs.

EBIT and the first lag of it were found to have insignificant effect on the hazard of CEO turnover both in the base model and in the model estimating the effect of M&A on the baseline hazard. For SMEs, firm performance, both historical and contemporaneous. This finding suggests that in SMEs, M&As are value-generating in nature and unlike in large firms, firms are not taken over for poorly performing managers. That the firm performance parameters are insignificant to the hazard of CEO exit in the event of M&A suggests weaker impact of market for corporate control on the hazard of CEO exit in SMEs.

Thus, for SMEs, events of M&A significantly increases the hazard of CEO exit from the firm and this is particularly pronounced in case of cross border M&As and for a CEO of a target firm. However, CEO pay and firm performance has an insignificant effect on the hazard of CEO exit and is also

insignificant in events of M&As. A wider range of covariates would be helpful in understanding how the baseline is modified but availability and reliability of data for SMEs was a major limitation.

Presence of unobserved heterogeneity can arise from the fact that firms in the sample belongs to different industries. These industries may have inherent unobservable characteristics that impact the hazard of CEO exit. The CEOs may have unobserved characteristics that add to their hazard of turnover. Estimation of parametric frailty models found no significant frailty in the industry classifications of the firms. Using a random effect cloglog model and gamma frailty model, I find CEOs of firms in no particular industry are frailer than the others.

Similar to the findings for large firms, this study notes no significant unobserved heterogeneity. Thus, covariates in the estimated models explain the hazard of turnover faced by the CEOs in the events of M&A seems to be unaffected when controlling for unobserved heterogeneity (Table 9, Panel B).

## **6. Conclusion**

The domain of CEO turnover in events of mergers and acquisitions is under researched. Particularly, the nature and dynamics of M&A and CEO turnover in SMEs has received little empirical attention. The existing literature on CEO turnover offers little previous works with duration models (Buchholtz et al. 2003; Geddes and Vinod, 1997) and most of these works have used continuous time duration models. I argue that discrete duration models are appropriate to analyse CEO turnover as it relaxes the assumption of proportional hazards and can analyse interval truncated data. A key contribution of this study is the use of the discrete-time duration models which hasn't been employed before for analysis of CEO turnover. This methodology helps in accounting for tied survival times and interval censored observations in my data. Another key contribution of this study is the expansion of the definition of change in corporate control to mergers and acquisitions.

Estimation suggests that M&A does increase the hazard of CEO turnover, in both large firms and SMEs. This increase is more pronounced in case of acquisitions than in mergers and in cross-border M&A than in domestic M&As.

Secondly, I find that hazard of CEO exit is sensitive to all measures of firm performance used in the study but events of M&A does not significantly alter the relationship. Thus M&As do not increase the firm performance-CEO turnover sensitivity. This suggests weak influence of takeover market as an external agent of imposing discipline on corporate governance. Also, I provide evidence of negative association of severance package/Golden parachute with the hazard of CEO turnover. Thus, a higher severance package lowers the hazard of CEO exit, both in the event of an M&A or otherwise.

Thirdly, analysis of unobserved heterogeneity among firms due to their operating in different industry segments found that there is no significant frailty between firms belonging to different classification and the hazard of a CEO turnover doesn't significantly change because of the industry the firm operates in. Banking and Financial Industry is the only industry found to have significant impact on the baseline hazard, by raising the hazard of CEOs operating in that industry.

I also provide empirical evidence that firm performance doesn't have a significant impact on the hazard of CEO exit in the events of M&A for SMEs. In SMEs, where M&As are undertaken predominantly for maximizing firm value and there is minimum agency cost, the concurrent and historic performance of the firm is insignificant. It can thus be concluded that SMEs undertake M&As for synergistic resonance and the CEO turnover occurs because a large proportion of these M&As happen when SMEs merge with/gets acquired by larger firms to gain synergy in a niche market/technology/skill set. Similar to large firms, SME mergers are associated with lower hazard of CEO exit than acquisitions and cross-border M&As to be associated with higher hazard of CEO turnover than domestic M&As. Furthermore, I do not find any evidence of unobserved heterogeneity between firms in different industry groups.

I believe my findings have a number of implications. I provide empirical support for the findings of Kaplan (2006) with a larger dataset and report a significantly shorter CEO tenure than reported in studies using sample up to year 2000. Thus, my results provide evidence that in the last decade the scrutiny and regulations on CEO pay and CEO governance have had a disciplining effect. Sarbanes Oxley Act of 2002 seems to have intensified the regulatory discipline on corporate governance.

Furthermore, there seems to be significant sensitivity of firm performance to internal turnover, signifying that board of directors replace CEOs for poor firm performance. However, in an event of M&A, firm performance doesn't have a significant effect on hazard of CEO exit. This study also suggests that CEOs face a greater hazard of turnover for non-performance post-SOX, suggesting an impact of SOX on strength of corporate governance.



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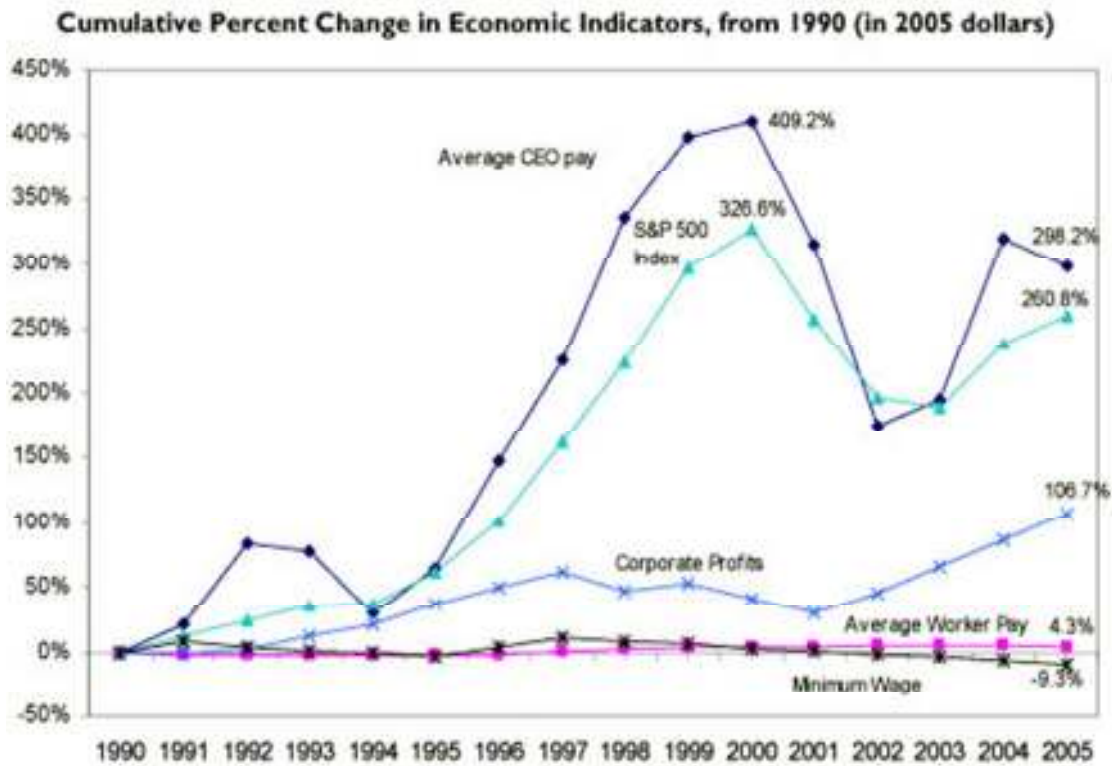


Figure 1: Change of CEO pay, corporate profits and average workers' pay

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Source: The Consumerist, April 9, 2007. Data depicts growth of economic indicators for S&P 500 companies, USA

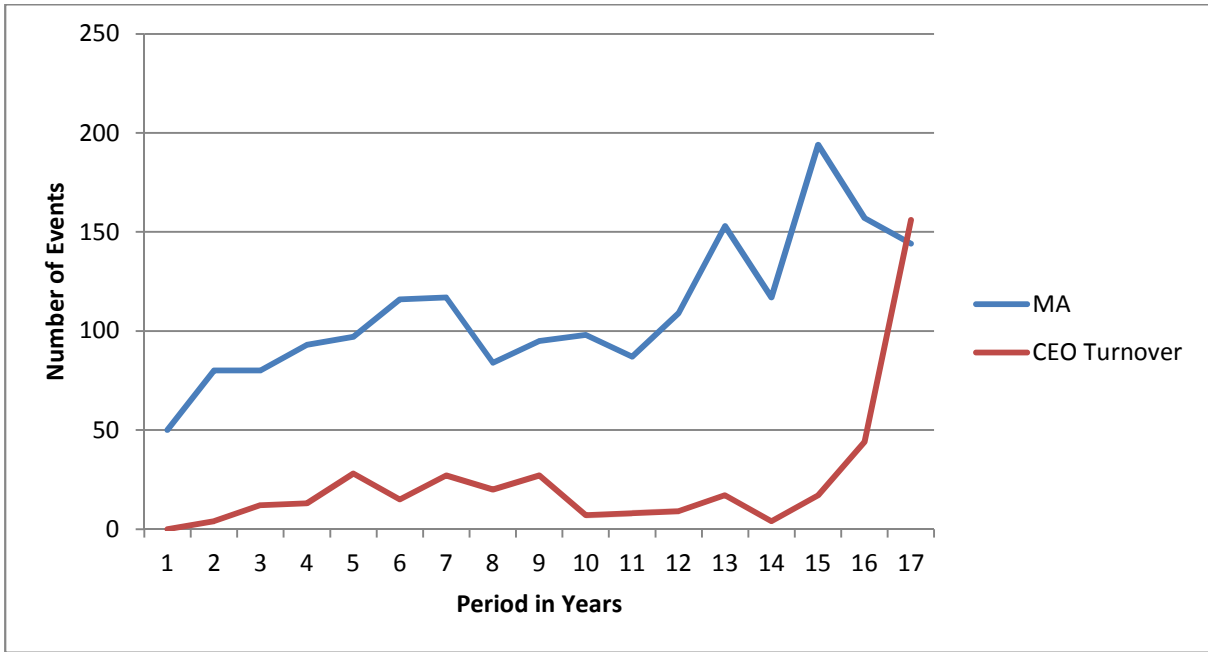


Figure 2: M&A and CEO Turnover over the Year in Large Firms

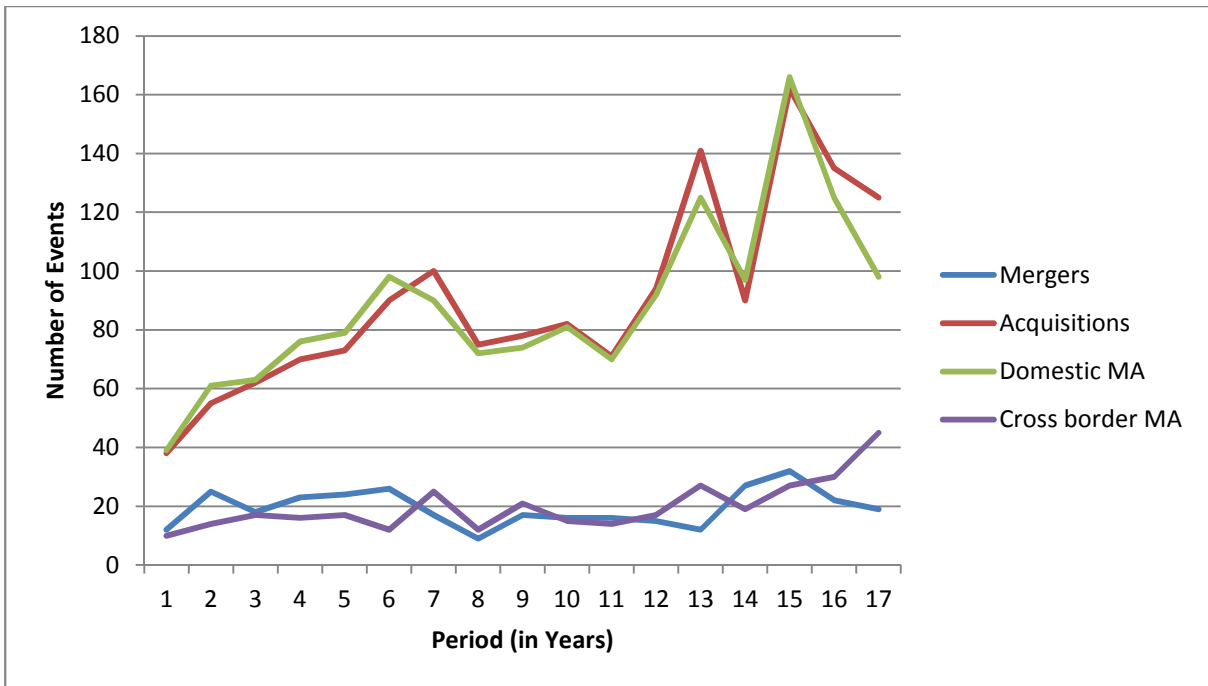


Figure 3: Mergers and Acquisitions over the Year in Large Firms

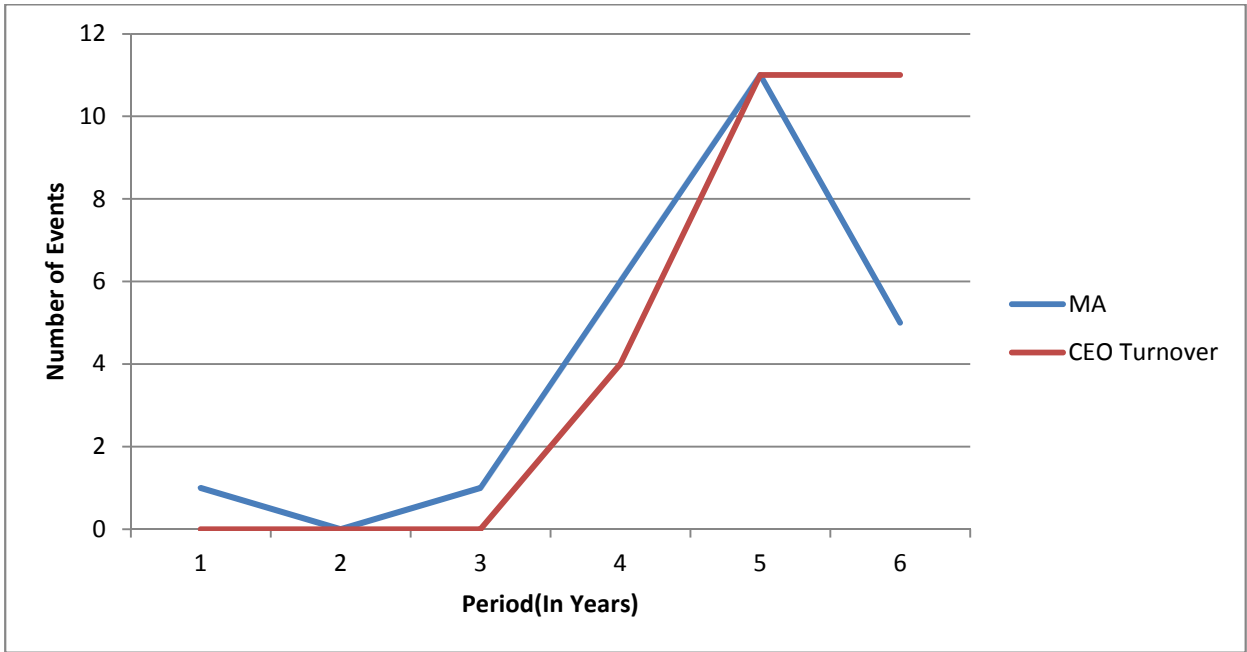


Figure 4: M&A and CEO Turnover over the Year in SMEs

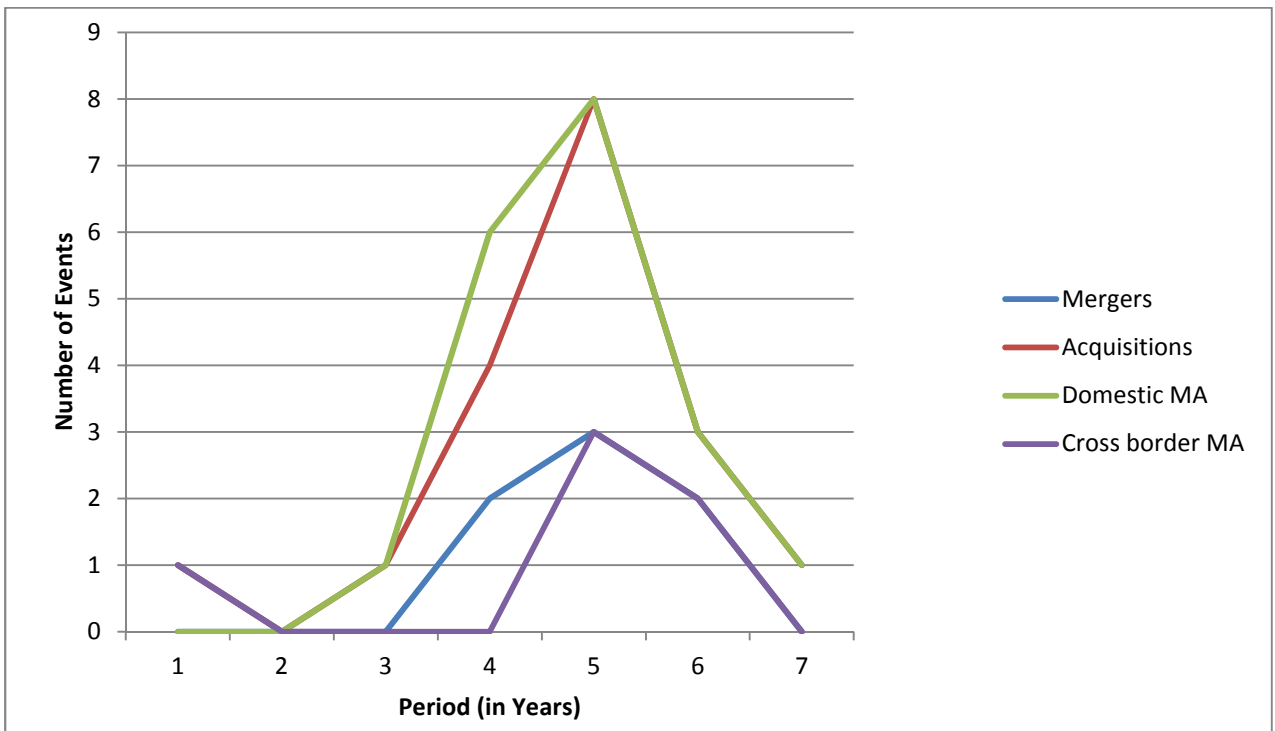


Figure 5: Mergers and Acquisitions over the Year in Large Firms



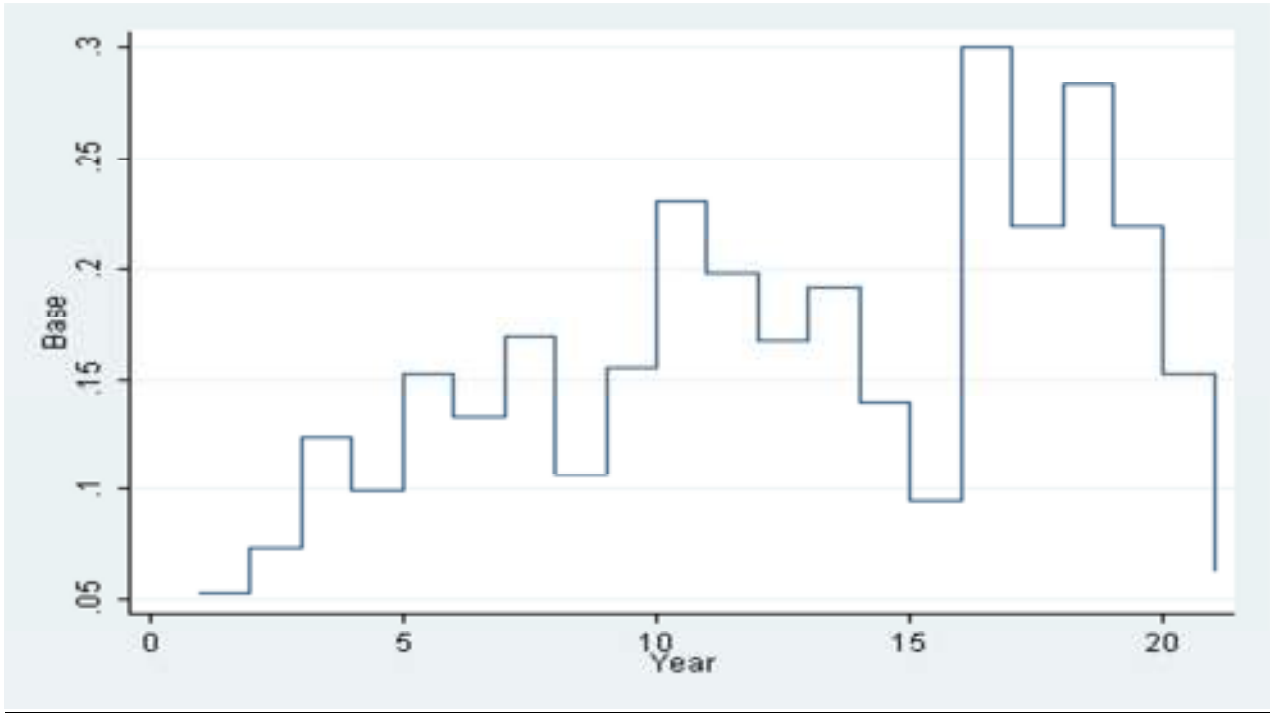


Figure 6: Duration Dependence of hazard of CEO turnover in large firms

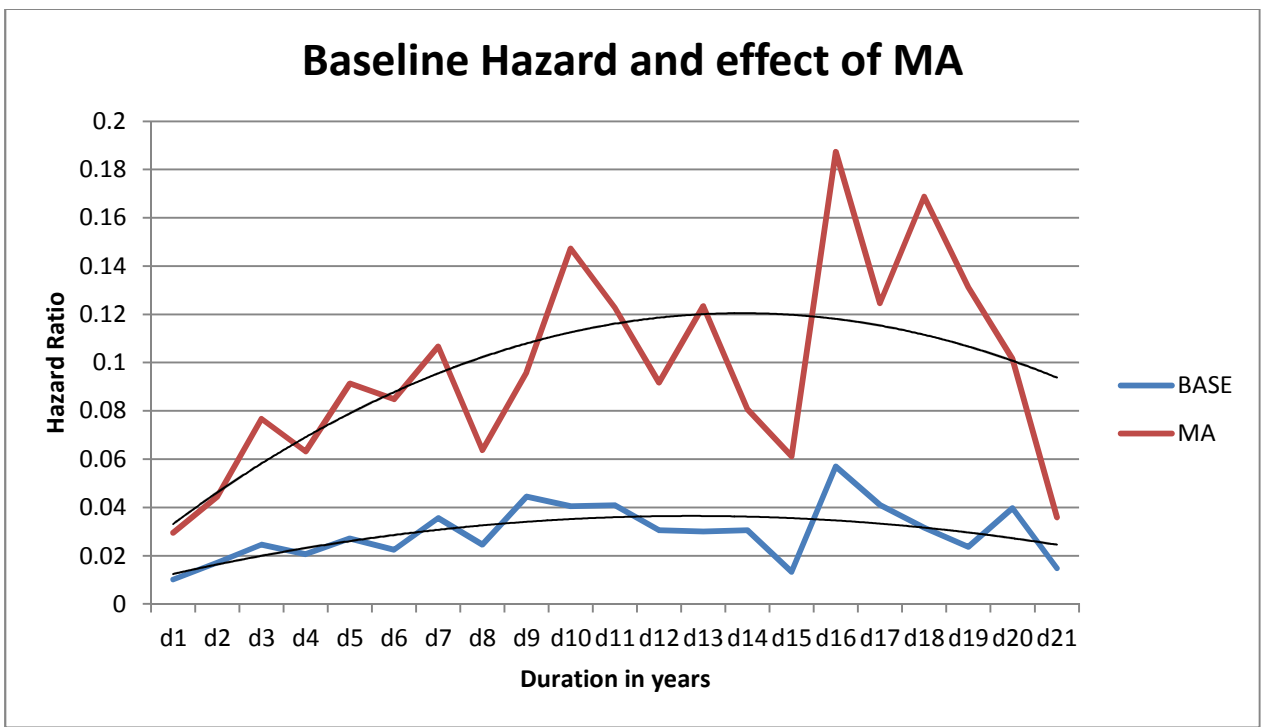


Figure 7: Smoothed Hazard profile for hazard of CEO exit in the events of M&A for large firms

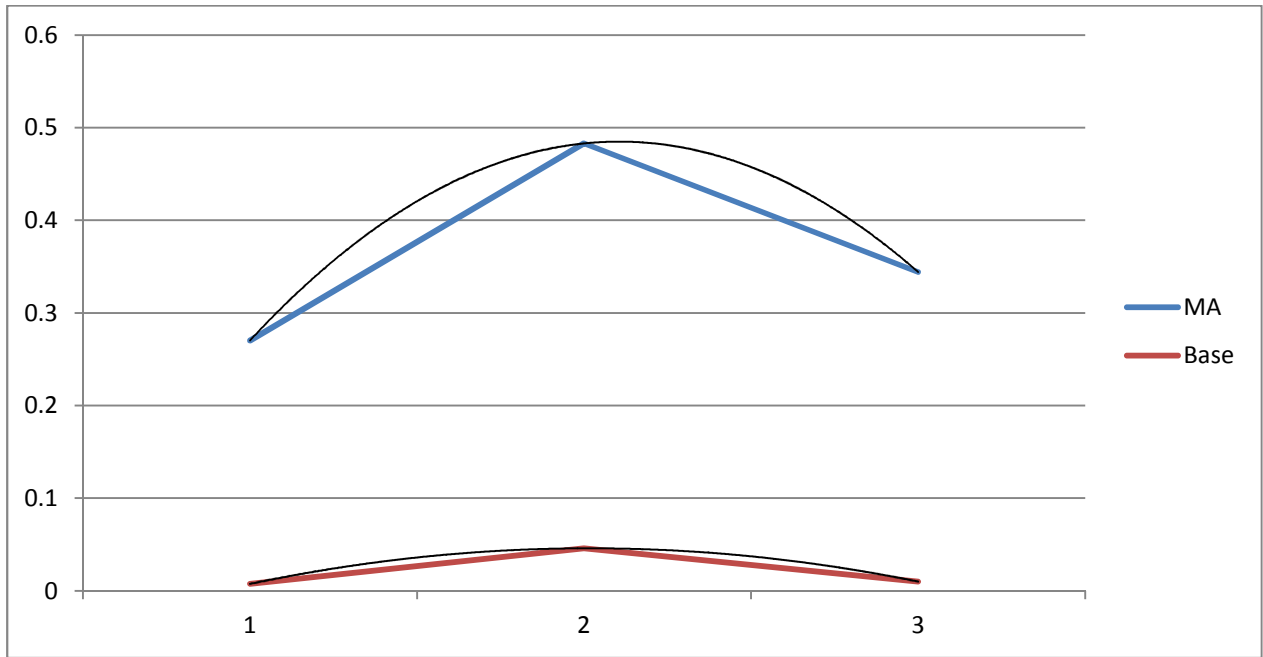


Figure 8: Smoothed Hazard profile for hazard of CEO exit in the events of M&A for SMEs

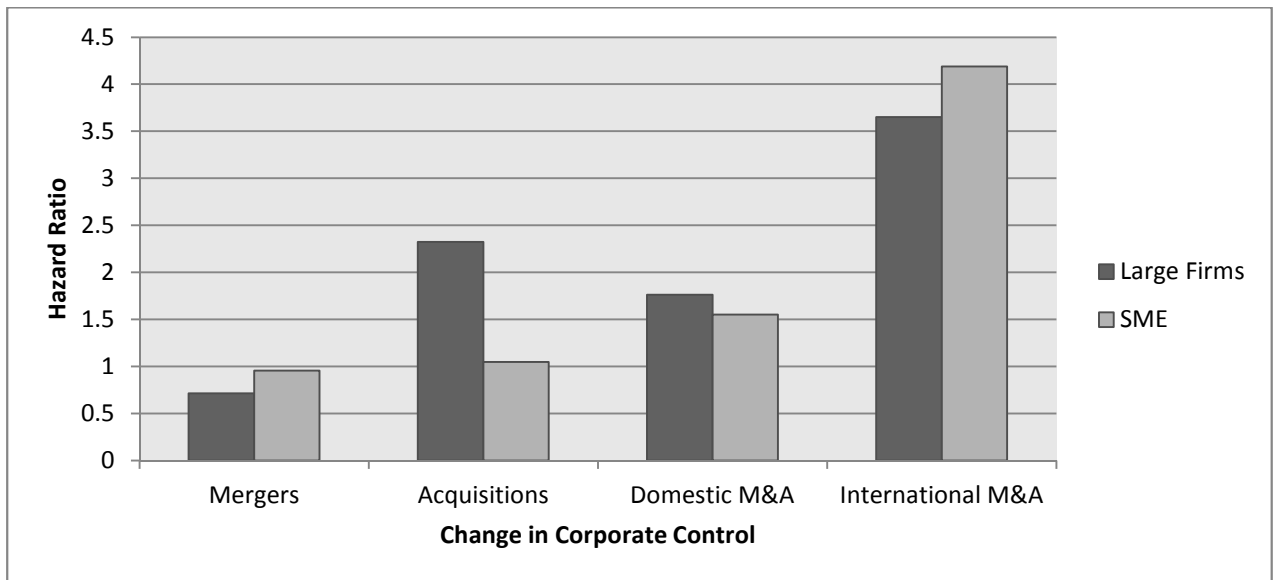


Figure 9: Relative Hazard Ratios in events of change in corporate control

Table 1: CEO turnover by age group

Age Group	Number of CEOs in the age group	Number of Exiting CEOs	Proportion of CEO exit
Below 40	6	1	16.67
40-49	225	29	12.89
50-54	434	54	12.44
55-59	595	77	12.94
60-64	633	105	16.58
65-69	463	104	22.46
Over 70	364	49	13.46
Total	2710	419	15.46

Table 2: CEO turnover by Reasons

Reason of CEO exit	Number of Exiting CEOs	Frequency
RESIGNED	211	50.358
RETIRED	153	36.516
UNKNOWN	49	11.695
DECEASED	6	1.432
Total	419	100

Table 3: Descriptive Statistics

Panel A: Large Firms

	N	Mean	Median	SD	Max	Min
Duration (in years)	12260	9.35	7.83	10.98	28.76	0.66
EPS (in dollars per share)	14825	1.44	1.23	26.72	3224.00	-91.05
EBIT (in '000 US\$)	14872	364.89	66.79	2214.70	83397.00	108761.00
CEO pay (in '000 US\$)	15073	4234.19	1605.29	10255.43	295136.40	100.00
Age (in years)	15078	57.24	57.00	7.57	94.00	37.00
Change in control payment (in '000 US\$)	3803	12337.27	6312.77	22377.99	525360.10	0.00
Termination payment (in '000 US\$)	3792	5543.12	604.53	13688.43	241089.80	0.00
Assets (in '000 US\$)	14884	11622.70	1248.59	68186.93	2187631.00	0.06
Share ownership (%)	7318	4.55	1.30	7.97	87.60	0.00
Sale (in '000 US\$)	14870	4198.80	925.32	13947.62	425071.00	15.54

Panel B: SME

	N	Mean	Median	SD	Max	Min
Duration (in years)	120	6.60	5.33	6.51	44.25	0.05
EBIT (in '000 US\$)	120	674.14	66.55	17413.38	7854.23	-397.50
CEO pay (in '000 US\$)	120	1925.49	835.07	2658.91	16600.00	75.00
Age (in years)	120	55.30	58.63	9.23	78.00	40.00
Sale (in '000 US\$)	120	2355.28	1484.75	1223.66	53609.00	12.30

Table 4: Mergers&Acquisitions (M&A) and CEO Turnover by Year

Panel A: Large Firms

Year	Mergers	Acquisitions	M&A	Domestic M&A	Cross border M&A	CEO Turnover
1992	12	38	50	39	10	0
1993	25	55	80	61	14	4
1994	18	62	80	63	17	12
1995	23	70	93	76	16	13
1996	24	73	97	79	17	28
1997	26	90	116	98	12	15
1998	17	100	117	90	25	27
1999	9	75	84	72	12	20
2000	17	78	95	74	21	27
2001	16	82	98	81	15	7
2002	16	71	87	70	14	8
2003	15	94	109	92	17	9
2004	12	141	153	125	27	17
2005	27	90	117	97	19	4
2006	32	162	194	166	27	17
2007	22	135	157	125	30	44
2008	19	125	144	98	45	156
2009	0	6	6	5	1	10
Total	330	1547	1877	1511	339	418

Panel B: SME

Year	Mergers	Acquisitions	M&A	Domestic M&A	Cross border M&A	CEO Turnover
2003	0	1	1	0	1	0
2004	0	0	0	0	0	0
2005	0	1	1	1	0	0
2006	2	4	6	6	0	4
2007	3	8	11	8	3	1
2008	2	3	5	3	2	1
2009	0	1	1	1	0	0
Total	7	18	25	19	6	6

Table 5: Duration Dependence of hazard: Large Firms

Periods	Panel A: Base model			Panel B: MA model		
	Co-efficient	Hazard Ratio	p-value	Co-efficient	Hazard Ratio	p-value
1	-3.05546	0.047101	0.003	-3.12112	0.044108	0.002
2	-2.06243	0.127145	0.000	-2.15156	0.116303	0.000
3	-1.36205	0.256136	0.001	-1.38449	0.250451	0.001
4	-1.84026	0.158776	0.000	-1.85979	0.155705	0.000
5	-2.41683	0.089204	0.000	-2.55477	0.07771	0.000
6	-1.58595	0.204752	0.000	-1.60545	0.200799	0.000
7	-2.05855	0.127639	0.000	-2.06116	0.127307	0.000
8	-2.45562	0.08581	0.000	-2.46143	0.085313	0.000
9	-2.03396	0.130816	0.000	-2.08598	0.124186	0.000
10	-1.26375	0.282593	0.003	-1.30001	0.272529	0.002
11	-2.47594	0.084084	0.001	-2.52272	0.080241	0.001
12	-1.62197	0.19751	0.003	-1.72008	0.179052	0.002
13	-1.90755	0.148444	0.010	-1.91984	0.146631	0.010
14	-1.5341	0.215651	0.013	-1.64052	0.19388	0.009
15	-1.98433	0.137472	0.007	-2.01998	0.132658	0.006
16	-1.11013	0.329517	0.043	-1.11557	0.32773	0.042
17	-1.71495	0.179973	0.021	-1.78183	0.168331	0.017
18	-0.84857	0.428028	0.121	-0.98862	0.372091	0.072
19	-1.52657	0.21728	0.039	-1.5536	0.211486	0.036
20	-2.83558	0.058685	0.010	-2.73194	0.065093	0.011
21	-2.64485	7.01E-02	0.002	-3.17481	0.041802	0.001

Table 6: Duration Dependence of hazard-SMEs

Periods	Panel A: Base Model			Panel B: MA model		
	Co-efficient	Hazard Ratio	p-value	Co-efficient	Hazard Ratio	p-value
1	-1.15511	0.315022	0.003	-1.20059	0.301018	0.002
2	-0.41619	0.659555	0.007	-0.40731	0.66544	0.671
3	-0.86312	0.421845	0.005	-0.92355	0.397109	0.749

Table 7: Duration Model Estimates

Parameters	Panel A: Large Firms			Panel B: SMEs		
	Co-efficient	Hazard Ratio	p-value	Co-efficient	Hazard Ratio	p-value
<b>Firm performance measures</b>						
EPS	-0.0036	0.96375	0.000			
EPS Lag1	-0.046545	0.9545216	0.003			
EPS Lag2	-0.0146987	0.9787281	0.043			
EPS Lag3	-0.0027598	0.997244	0.005			
EBIT	-0.0004963	0.9995038	0.023	-4.91E-08	1.00000	0.032
EBIT Lag1	-0.01629	0.98384	0.001			
EBIT Lag2	-0.0001221	0.999877	0.001			
EBIT Lag3	-0.00007	0.99993	0.035			
<b>Cost of CEO Removal</b>						
Termination Payment	-0.0312	0.9692	0.001			
<b>Industries</b>						
Regulated Industries	0.18674	1.20531	0.208	0.4381642	0.6452198	0.527
Unregulated Industries	-0.1104	0.89547	0.029	-1.042797	0.3524675	0.058
<b>CEO ownership and Corporate Governance</b>						
Percentage of CEO stock holding	-0.0484837	0.9526729	0.000			
SOX	0.2852708	1.330122	0.010			
Owner CEO				-3.246052	.0389276	0.009
CEO Duality	-1.16171 2	0.312949	0.000			
<b>Others</b>						
CEO pay	-0.05118	0.950104	0.156	-0.0394863	0.9612831	0.078
Firm Size (Log Assets)	-0.06402	0.93798	0.701	-1.28728	0.2760204	0.794
Female	-0.079210	0.92384	0.243	-0.044757	0.9562291	0.537
Previous CEO experience	-0.067184	0.93502	0.541			
<b>Model Specification</b>						
Number of Observation			14798			120
Log Likelihood			-1738.61			-59.911
Wald Chi2			4924.64			49.08
p-value			0.000			0.000

Table 8: Duration Model Estimates in events of M&A

Parameters	Panel A: Large Firms			Panel B: SMEs		
	Co-efficient	Hazard Ratio	p-value	Co-efficient	Hazard Ratio	p-value
<b>Firm performance measures</b>						
EPS	-0.038713	0.962092	0.000			
EPS Lag1	-0.040909	0.959162	0.000			
EPS Lag2	-0.04091	0.95995	0.002			
EPS Lag3	-0.031607	0.968866	0.001			
EBIT	-0.000356	0.99996	0.000	-4.21E-08	1.000000	0.027
EBIT Lag1	-0.00006	0.99994	0.003			
EBIT Lag2	-0.000127	0.999872	0.003			
EBIT Lag3	-0.000118	0.99988	0.012			
<b>Cost of CEO Removal</b>						
Change in Control Payment	-0.08176	0.9214	0.002			
<b>Industries</b>						
Regulated Industries	0.18826	1.207154	0.274	1.28728	0.2760204	0.571
Unregulated Industries	-0.62262	0.939636	0.033	-1.183978	0.3060587	0.083
<b>CEO ownership and Corporate Governance</b>						
Percentage of CEO stock holding	-0.047338	0.953765	0.017			
SOX	0.323344	1.381741	0.002			
Owner CEO				-3.314989	.0363344	0.005
CEO Duality	-1.102466	0.358919	0.000			
<b>Mergers and Acquisitions</b>						
Mergers	0.8440062	2.32566	0.005	0.6850303	1.983832	0.005
Acquisitions	0.3195863	1.37655	0.007	0.673412	1.9609	0.062
Domestic MA	0.8832456	2.41873	0.002	0.733412	2.0821	0.001
Cross-border MA	0.5651866	1.759776	0.002	0.4362649	1.546918	0.233
Merger-Performance Interaction	1.32982	3.7803	0.003	1.431897	4.186635	0.014
Merger-Performance Interaction	0.002949	1.0029	0.936	0.00014	1.0001	0.941
<b>Others</b>						
CEO pay	-0.06229	0.93961	0.060	-0.0501357	0.9511003	0.983
Firm Size (Log Assets)	-0.05466	0.94680	0.894	-0.4261951	0.6529889	0.617
Female	-0.0490	0.95212	0.293	-0.9091606	0.4028622	0.339
Previous CEO Experience	-0.03417	0.9664	0.189			
<b>Model Specification</b>						
Number of Observation			14798			120
Log Likelihood			-1716.67			-58.793
Wald Chi2			4842.23			50
p-value			0.0000			0.000



Table 9: Comparison of Frailty Estimates

Variable	Model1	Model2	Model3	Model4
	Hazard Ratio	Hazard Ratio	Hazard Ratio	Hazard Ratio
<b>Panel A: Large Firms</b>				
EPS	0.9638	0.9621	0.9600	0.9598
EBIT	0.9997	1.0000	0.9999	0.9992
M&A		2.3255	2.3362	2.3192
CEO ownership	0.9591	0.9545	0.9576	0.9501
Change in control Payments		0.9215	0.9279	0.9198
Termination Payment	0.9970			
CEO pay	0.9501	0.9396	0.9386	0.9334
Female	0.9283	0.9521	0.9310	0.9286
Regulated Industry	2.5050	1.2072	1.2706	1.2727
Unregulated Industry	0.8955	0.9396	0.8921	0.8807
Log Assets	0.9380	0.9468	0.9370	0.9328

**Panel B: SME**

EBIT	1.000	1.0000000	0.9999360	0.999981
M&A		1.9833200	1.9878800	1.98833
CEO ownership	0.038	0.0360170	0.0367130	0.36322
CEO pay	0.96128	0.9511000	0.9700100	0.969118

Model 1: Base Model Estimates

Model 2: M&A Model Estimates

Model3: Random Coefficients Estimates

Model4: Gamma Frailty Coefficients

Table 10: Summary of Variable Descriptions

Variables	Description
execid	Executive id, unique for a CEO, remains constant throughout the CEOs career.
salary	Annual Base salary in '000 US dollars
bonus	Annual Bonus in '000 US dollars
stock_awards	Value of stock awards in a year, in '000 US dollars
option_awards	Value of option awards in a year, in '000 US dollars
exec_gender	Dummy variable for gender of the executive
age	Present age of the executive, in years
duration	Tenure of an executive in office, in years
LTI	Long Term Incentive payout, in '000 US dollars
RSU	Value of restricted stock units, in '000 US dollars
othcomp	Value of other annual payments, in '000 US dollars
noneq_incent	Non-equity incentive payment, in '000 US dollars
total compensation	Measure of Total Annual Compensation = salary + bonus + stock_awards + LTI +RSU+ option_awards + noneq_incent + othcomp, in '000 US dollars.
sale	Annual Sale of the firm, in '000 US dollars
EPS	Earnings-per-share, expressed in US\$
EBIT	Earnings before Interest and Taxes, expressed in '000 US\$
log_assets	Natural log of value of assets of the firm
ma	M&A identifier, 1 if M&A occurs in a given year, 0 otherwise
Change in control Payment	Payment due to CEO in the event of involuntary turnover following change in corporate control (M&A)
CEO ownership	Percentage of shares of the firm owned by the CEO
Termination Payment	Payment due to CEO in the event of involuntary turnover
turnover	CEO turnover identifier, 1 if the CEO leaves the firm in a given year, 0 otherwise
Reason	Reason for the CEO turnover, "RESIGNED", "RETIRED", "DECEASED" or "UNKNOWN".
Industry identifier	Dummy variables for industry classification.