

# Relative Compensation and Forced CEO Turnover

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## Abstract

This paper investigates if and how CEO compensation relative to the size and industry adjusted peer groups is related to forced CEO turnover. Results indicate that CEO compensation relative to the peer groups is positively related to forced CEO turnover. Further results show that CEOs who receive higher-than-median compensation also face higher likelihood of forced turnover, increased sensitivity of turnover to firm performance and increased sensitivity of turnover to corporate governance. These relations are not significant for CEOs who receive lower-than-median compensation. Overall, results indicate that CEO compensation relative to a peer group does not represent CEO power or influence. Rather it reflects a reward or premium for CEO talent and expected performance.

*Keywords:* compensation, peer groups, turnover, governance

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## **1 – Introduction**

The rise in CEO compensation in the last few decades is widely contributed to the use of peer groups in setting CEO compensation. However there is no consensus on how the use of peer groups affects CEO pay. One group of studies known as the managerial power theory argues that CEOs opportunistically choose peer groups and set their own pay (Bebchuk et al. (2002)). These studies argue that powerful executives influence passive boards and manipulate the pay setting process in their own favour. Crystal (1991) for example, argues that the strategic use of peer groups results in inflated pay packages for all CEOs. Faulkender and Yang (2010) and Laschever (201) find that firms select highly paid peers to justify their own CEO compensation and this effect is stronger in firms with weaker corporate governance.

In contrast, the other group of studies known as the efficient contracting theory contends that pay relative to the peer groups and the rise in CEO pay levels are efficient responses of the market for CEO talent in terms of attracting, motivating and retaining top executives (Holmstrom and Kaplan (2003), Murphy and Zbojnik (2004)). These studies argue that boards use peer groups to match CEO skills and talent to their firms' needs. They suggest that relative peer group compensation may represent compensation for CEO talent (Bizjak et al. (2008), Albuquerque et al. (2013) and Cadman and Carter (2014)).

A comparative analysis of this literature shows that there is no conclusive evidence on the use of relative CEO compensation. Most of these studies directly or indirectly estimate the effect of relative compensation on the level of CEO compensation. In this study, I contend that firms offer both compensation and termination incentives to align the interests of managers with those of shareholders. Most of the above mentioned studies focus on how pay relative to a peer group affects CEO compensation and does not use termination in their analysis. I argue that forced CEO turnover provides another angle to look at the use of relative compensation. If powerful CEOs receive higher relative compensation then CEO compensation in excess of peer group median compensation should reflect CEO influence and power. In this case the CEOs should be less likely to be removed for poor performance. On the other hand, if relative peer group compensation is an efficient method for attracting and retaining talented CEOs, then CEO compensation in excess

of peer group median compensation represents premium for CEO talent and not power. In such cases, CEOs who receive pay higher than peer group median should face similar turnover probability relative to CEOs who receive lower than peer group median pay.

There is a third way to look at it too. CEO pay higher than peer group median pay may also represent a reward for expected star performance. If boards award star pay packages to their CEOs, they also expect star performance from such CEOs and don't hesitate to remove them if they don't come up to the expectations. Here, CEOs who receive higher than peer group median pay (star packages) should also face higher likelihood of forced turnover for poor performance.

The results in this study generally support the efficient market theory. I find that CEO compensation relative to industry and size adjusted peer group median compensation is positively associated with the likelihood of forced CEO turnover. To dig deeper, I divide the sample into CEOs who receive higher than peer group median pay and the CEOs who receive lower than peer group median pay to see if higher than median pay represents CEO power or is a result of efficient contracting and/or a compensation for higher expected performance. Results show that CEOs who receive pay higher than the peer group median pay also face a higher likelihood of forced turnover. However, there is no significant relation between relative pay and forced turnover for CEOs in the lower than peer group median compensation sample. I interpret these results as supporting both the efficient market theory and the expected star performance hypothesis.

The analysis of performance turnover sensitivities shows that turnover sensitivities to various levels of performance are also higher for CEOs who receive higher than peer group median compensation relative to the CEOs who receive lower than median compensation. Results also show that forced CEO turnover is much more sensitive to the quality of governance in the higher than median sample. Firms with strong corporate governance are more likely to remove a powerful CEO than firms with weak corporate governance. Overall, results show that relative peer group compensation is driven by market for talent and strong corporate governance.

The remainder of the study is organized as follows: Section 2 discusses motivation and hypotheses. Section 3 describes data and variables, section 4

provides details about estimation and empirical methodology, section 5 discusses results, section 6 checks the robustness of the empirical results and section 7 concludes.

## **2- Motivation and hypotheses**

CEO compensation has increased manifold in the last three decades.<sup>1</sup> This extraordinary increase in CEO pay has attracted research in corporate finance to explain the reasons behind this increase. However, both the theoretical research and empirical evidence are controversial. Some studies show that the rise in CEO compensation is the result of managerial power and influence due to failure of corporate governance. For example Crystal (1991) argues that CEOs manipulate their pay setting process by strategically choosing peer groups and this choice of peers' results in inflated pay packages for all CEOs. Faulkender and Yang (2010) find empirical evidence of firms' selecting highly paid peers to justify their own CEO compensation. Laschever (2013) finds that companies choose peers with higher than own CEO compensation to set their CEO pay. Similarly, Bizjak et al (2011) suggest that firms construct peer groups in biased manner that causes an upward increase in CEO compensation.

The market efficiency or efficient contracting studies suggest otherwise. These studies contend that the rise in CEO compensation is consistent with the demand for CEO talent (Jensen and Murphy (1990), Murphy and Zabojanik (2004)). Gabaix and Landier (2008) argue that CEO pay and firm size are positively related. The general increase in CEO pay is a market response towards higher demand for CEO talent which is more important for larger firms. Bizjak et al (2008) find that peer group pay provides an efficient mechanism to the board to match CEO talent to firm needs and to retain valuable CEO talent. Albuquerque et al (2013) argue that the selection of highly paid peers mostly represents compensation for CEO talent. Cadman and Carter (2014) suggest that the selection of peers for CEO pay may not be opportunistic.

Given the conflicting evidence, it is not clear if relative pay practice is driven by rent extraction on the part of powerful CEOs or is an efficient

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<sup>1</sup> Economic Policy Institute issue brief #380.

response of the market for CEO talent. I argue that we can use another part of CEO incentives i.e. termination to look for answers. If power is the driving force behind CEO pay practices then powerful CEOs (i.e. those who receive more than the peer group median compensation) must also be less likely to be removed from their positions. In this case, higher than median peer group compensation measures CEO power and is expected to be negatively related to forced CEO turnover. On the other hand, if higher than median peer group compensation represents compensation for CEO talent, then these CEOs should face similar turnover probabilities. There is also a third possibility: if higher than median peer group compensation represents incentives for CEOs to deliver star performance, then the highly paid CEOs should face higher likelihood of forced turnover in case of poor performance. The above discussion leads to the following hypotheses:

H<sub>1a</sub>: CEO compensation relative to a peer group is not related to forced CEO turnover

H<sub>1b</sub>: CEO compensation relative to a peer group is negatively related to forced CEO turnover.

Similarly, if powerful CEOs use peer groups to award themselves higher than peer group median compensation, then these CEOs should also face lower performance-turnover sensitivities. In other words, these CEOs are not held at a high performance threshold compared to the CEOs who receive lower than median peer group compensation due to their power and influence. Their turnover is less sensitive to firm performance. However, if CEO talent is the reason for the use of peer groups then higher than median peer group compensation represents reward for talent and such CEOs also face higher performance threshold. This also is true if higher than median peer group compensation represents reward for expected star performance.

H<sub>2a</sub>: CEO compensation relative to a peer group higher than peer group median is less sensitive to firm performance.

H<sub>2b</sub>: CEO compensation relative to a peer group higher than peer group median is more sensitive to firm performance.

Hermalin (2005) argues that greater board diligence and better governance could lead to greater pay, shorter CEO tenures and more external

hires. Thus, firms' quality of corporate governance plays a significant role in determining the performance turnover probabilities for the highly paid executives. Firms with strong corporate governance are efficient monitors and are more likely to fire their CEOs in the event of poor performance than firms with weak corporate governance. Consequently these firms are more likely to fire the highly paid CEOs for poor performance. We should therefore expect higher governance-turnover sensitivities for such CEOs. In other words, an improvement in corporate governance should result in an increase in performance turnover sensitivities for the highly paid CEOs.

H<sub>3</sub>: Performance turnover sensitivities for higher than median peer group compensation group increase with improvement in corporate governance.

### **3- Data and variables**

I collect my sample from the Standard and Poor's Execucomp database for the period 1993-2007. Execucomp provides detailed information on various components of executive compensation for firms in the S&P 500, S&P Midcap 400 and S&P Smallcap 600. Following prior work, I drop firms that are subject to regulation and firms in the financial sector (SIC codes in the range 4910-4949 and 6000-6999). Huson et al. (2001) exclude the first two years that a CEO has been in office from their sample since the overlap between the incoming and outgoing CEO implies that the performance measures for those years may not correctly reflect the new CEO's contribution. I also exclude all CEOs who have fewer than two years of tenure. Data about company financials are drawn from the Compustat Industrial database and data on stock returns and their volatility of stock return are taken from the CRSP. I collect data on board characteristics from the RiskMetrics directors' database. However, RiskMetrics data are only available starting from 1996. As a result, all specifications that include board size and composition have significantly fewer firm-year observations compared to benchmark regressions.

Turnover equals 1 if the CEO at the end of year is different from the CEO at the beginning of year and 0 otherwise. Since the Execucomp database does not distinguish between forced and voluntary turnover, I searched the business news on the Lexis-Nexis Academic Universe to find out the true reasons for a CEO change. Changes not corroborated by news items are excluded. The

method of identifying forced turnover is similar to that of Weisbach (1988), Denis and Denis (1995) and Huson et al. (2001). Out of 2011 CEO changes 335 are classified as forced (16.7%). The definition of forced turnover is very careful and strict. A change is classified as forced if the news item specifically reports firing; mentions poor performance; or mentions restructuring or change in strategy.

The dependent variable FORCED equals 1 for forced turnovers and 0 otherwise. In order to address the potential misclassification of forced turnover, I expand the definition and construct FORCED2. FORCED2 is less restrictive and less careful compared to FORCED. In addition to all changes classified as FORCED, a change is also classified as forced if the CEO is less than 60 years of age and leaves to pursue other interests; no reason is identified in the news item; or I could not find any news about the CEO change. FORCED2 classifies 489 (24.3%) changes as forced. I use FORCED2 to test the robustness of benchmark results to a change in the definition of turnover. Table 1 provides turnover rates for the period 1993-2007.<sup>2</sup>

I started with 19,828 firm year observations with at least two observations for each CEO. After excluding all CEO changes that are not classified as forced (1,676), there are 18,152 firm year observations. The number further drops down to 14,077 observations after creating control variables. However, samples used in various models are different in each specification due to data availability of governance variables.

I follow Bizjak et al. (2008) to construct peer groups for relative pay. First, for each year and within each two-digit SIC industry, all firms are ranked according to their prior year sales. A firm is classified as large (small) if the prior year sales are higher than the median sales in the same year and industry group. Second, all CEOs are ranked within each industry and size (sales) group according to their total compensation. This creates a peer group for each CEO within its industry based on firm size.

Benchmarked CEO compensation is measured as the ratio of CEO total compensation to the size and the industry adjusted peer group median compensation. CEOs whose compensation is greater than the median

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<sup>2</sup> Forced turnover rate in other studies: Huson et al. (2001) 16.2%, Dezso (2007) 21.5%, Jenter and Kannan (2014) 13.2% and Hazarika et al. (2009) 21.2%.

compensation of their peer group have values greater than 1. I also create a binary variable, higher than median peer group compensation that equals 1 if CEO compensation is greater than 1 and 0 otherwise. This is a logical way of dividing the sample as most compensation committees use median peer group compensation when they set CEO pay.

Table 1: CEO turnover rates by type

Year	Number of Firm Years	Total Turnover		Forced Turnover	
		Number	Percent	Number	Percent
1993	856	38	4.44	4	10.53
1994	1,189	107	9.00	18	16.82
1995	1,267	125	9.87	20	16.00
1996	1,308	124	9.48	21	16.94
1997	1,347	147	10.91	17	11.56
1998	1,380	137	9.93	22	16.06
1999	1,454	177	12.17	31	17.51
2000	1,426	184	12.90	43	23.37
2001	1,340	134	10.00	25	18.66
2002	1,332	140	10.51	27	19.29
2003	1,368	121	8.85	17	14.05
2004	1,391	159	11.43	20	12.58
2005	1,367	143	10.46	21	14.69
2006	1,424	146	10.25	29	19.86
2007	1,379	129	9.35	20	15.50
Total	19,828	2,011	10.14	335	16.66

CEO changes for the fiscal years 1993-2007 from the Execucomp database. A CEO change is defined if the CEO at the beginning of the year is different from the CEO at the end of last year. Total turnover is all CEO turnovers. Forced Turnover is performance related turnover. A CEO change is categorized as forced if (i) news items reports that the CEO was forced (ii) mentions poor performance as the primary reason of change (ii) mentions restructuring or strategic policy change as the reason for CEO replacement. CEOs with less than two years of tenure are not included in the sample. Firms in the financial sector and regulated industries (SIC codes 4910-4949 and 6000-6999) are also excluded.

#### **4- Estimation and empirical methodology**

I present estimates of the marginal effects of changes in the independent variables on the probability of forced turnover. I use the binomial logit model to estimate the effect of relative pay on forced turnover:

$$\text{Pr [forced turnover]} = F(\mathbf{X}\beta) + \varepsilon \quad (1)$$

Where  $F(\cdot)$  is the cumulative distribution function of the logistic distribution and  $\varepsilon$  is an idiosyncratic error term.  $\mathbf{X}$  includes variables that affect forced CEO turnover.

Marginal effects from logit models are typically reported based on the mean value of the independent variables. These are the so-called marginal effects at the mean or MEM. A preferable estimation procedure is to first compute the marginal effect at each observation and then determine the average marginal effect (or AME) over the set of observations. Cameron and Trivedi (2005) and Bartus (2005) recommend the use of the AME instead of the MEM. Bartus (2005) points out that the MEM may result in nonsensical results if the sample mean is at a location that is unreasonable or if the underlying distribution of the independent variables is skewed. CEO compensation, ownership and corporate governance variables often exhibit a skewed distribution. Therefore, in all tabulated results, average marginal effects (AMEs) of each of the explanatory variables are presented: that is, the change in predicted probability of forced turnover from a one-unit change in the explanatory variable. For an indicator variable  $Z$ , the change in predicted probability is computed by comparing the value with  $Z=0$  to the value with  $Z=1$ . The change in predicted probability is computed for each CEO and averaged over observations to produce an estimate of the average marginal effect of the explanatory variable. The precision of the AMEs is computed by the delta method, using the margins command in Stata version 13.

The computation of AMEs is more complex for models that contain interactions of firm performance or a governance index with the indicator variable of higher than median peer group compensation. In these models, the total effect of higher than median peer group compensation must be evaluated at a particular level of the continuous variable. Consequently, our measures of the sensitivity of the forced turnover probability to firm performance and

governance are evaluated at selected percentiles of the continuous variables, as presented in table 5b.

#### **4.1 Control variables**

I include several control variables that affect the probability of forced CEO turnover. Prior firm performance is documented to be the most important determinant of the likelihood of forced CEO turnover. Firms that perform poorly, particularly relative to their industry, are more likely to terminate their CEOs than firms that perform well. I use two measures of relative performance: prior year's stock return and change in firm's return on assets (ROA). Prior year's stock return measures market performance and change in ROA measures accounting performance. Both of these variables are measured relative to the two-digit SIC industry medians.

Among firm characteristics, I control for firm size, performance, growth opportunities and leverage. Larger firms have higher turnover-performance sensitivities because they are likely to have a larger talent pool from which to choose a successor (Parrino 1997). I use the natural log of sales to measure firm size. Market-to-book ratios measure quality of investment policy and the presence of growth opportunities (Smith and Watts, 1992). Firms with better growth opportunities may use more performance-based compensation (Clinch (1991), Gaver and Gaver (1993)). Also, firms with low market-to-book ratios may face greater pressure from shareholders to make top executive changes. Firms that are more highly leveraged may experience financial distress and experience a higher probability of poor performance, increasing the likelihood of forced turnover. I use the debt-to-assets ratio to capture the impact of leverage on forced turnover and expect a positive sign.

Among the CEO characteristics, I include CEO tenure, stock ownership, duality of CEO and chair and whether CEO was hired from within or outside the company. Longer tenures allow CEOs to build powerful relations and influence board turnover decisions. Similarly, CEO stock ownership may affect their termination decisions. Following Denis et al. (1997) I include CEO percentage stockholding as a control variable. CEOs can also influence turnover decisions when they sit on their boards as chairs. Goyal and Park (2002) find that the sensitivity of CEO turnover to firm performance is significantly lower when the CEO is also the chair of the board. I include an indicator variable CEO/chair that equals one if the CEO is also chair of the

board and zero otherwise. Finally, CEOs hired from within the company may have influential relations with the board over time that can affect turnover decisions. To control for the type of CEO succession, I include an indicator variable outsider that equals 1 if the CEO was hired from outside the company and 0 otherwise.

It is argued that firms' quality of corporate governance plays a significant role in monitoring the management and their turnover decisions. Firms with weak governance or weak shareholder rights are less likely to fire a CEO for poor performance relative to firms with strong governance. Gompers et al. (2003) compile comprehensive data on corporate governance provisions and state laws from the publications of the Investor Responsibility Research Center (IRRC) and construct an index, called the G-index.

Table 2: Summary Statistics

variable	Full sample		Higher-than-median		Lower-than-median		P-values
	Median	SD	Median	SD	Median	SD	
<u>CEO Characteristics</u>							
Total compensation	2,166	11,282	3,530	14,509	1,519	8,806	0
Option compensation	0.306	0.293	0.368	0.298	0.234	0.269	0
Stock ownership	0.382	7.281	0.34	5.44	0.537	8.638	0
Age	55	7.58	56	7.21	56	7.72	0.362
Tenure	5	7.89	6	7.45	6	8.35	0.291
CEO/chair	1	0.494	1	0.47	1	0.495	0
Outsider	0	0.444	0	0.451	0	0.434	0
<u>Firm Characteristics</u>							
Sales	1,044	14,126	1,459	18,957	957	8,754	0
Market-to-book	1.667	2.518	1.748	2.059	1.571	1.698	0
Debt-to-assets	0.527	0.402	0.532	0.236	0.528	0.544	0.324
Stock return	0.175	43.582	0.164	5.248	0.166	3.294	0.736
ROA	5.234	55.488	0.056	0.165	0.05	0.771	0
Volatility	0.025	0.015	0.024	0.015	0.025	0.015	0
Governance index	9	2.645	9	2.565	9	2.702	0.028

Comparison between higher-than-median and lower-than-median peer group compensation groups. I categorize a CEO as being in the higher-than-median group if her total compensation in the prior year was above (below) the peer group median compensation. Total Comp includes salary, bonus, other annual compensation, restricted stock grants, value of options exercised and long term incentive payouts. Option comp is the ratio of option compensation to total compensation in previous year. Stock ownership is the percentage of company stock held by CEO. CEO/Chair is a binary variable that equals 1 if CEO is also chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO is was hired from outside the company and 0 otherwise. Market to book is  $[\text{Book value of debt} + \text{market value of equity}]/[\text{Book value of assets}]$ . Debt-to-assets is the ratio of total long term debt to total assets. ROA is the ratio of net income to total assets. Stock return is the annual stock return for the fiscal year. Stock return volatility is the standard deviation of daily stock returns. G-index is the Gompers et al (2003) governance index. CEOs with less than two years of tenure are not included in the sample. P-value reports the difference in medians between the two groups.

A higher value of the index indicates weak shareholder rights and poor quality of governance and a lower value implies better quality of governance.

Table 2 provides summary statistics for the full sample and the two sub-samples. A cursory look shows that CEO compensation in the higher than peer group median sample is almost twice the median compensation of the lower than median sample. Higher than peer group median CEOs own less equity than lower than median CEOs. Similarly, higher than peer group median CEOs are at larger firms that have higher market-to-book ratios. However, the stock performance is not significantly different between the two groups.

## **5- Results**

### **5.1 Relative compensation and forced turnover**

Table 3 presents average marginal effects (AMEs) of the determinants of forced CEO turnover from the logit regressions. The variable of primary interest is relative compensation, which is the ratio of industry- and size-adjusted CEO compensation to the industry- and size-adjusted peer group median compensation. This variable equals 1 if total CEO compensation equals peer group median compensation in the previous year. It is greater (less) than 1 if total CEO compensation is greater (less) than peer group median compensation. Model 1 measures firm performance as prior year's industry-adjusted stock returns and model 2 measures firm performance as

industry-adjusted change in ROA. The average marginal effect of lagged relative compensation is positive and significant for both measures of firm performance. Results indicate that increased CEO compensation relative to peer group median compensation is associated with an increase in the probability of forced turnover.

Other control variables in the table have expected signs too. The average marginal effects of CEO tenure, stock ownership and CEO/chair are all negative and significant. Longer tenured CEOs and CEOs with higher stock ownership face lower probabilities of forced turnover. Similarly, CEOs who are also chairs of their boards have a lower probability of being removed, reflecting their influence on the board. The average marginal effects of relative performance for both models 1 and 2 are negative and statistically significant. Results indicate that relative pay is associated to higher forced turnover rates, which supports the notion that boards use peer groups to attract talent in CEO market.

Table 3: Relative compensation and forced CEO turnover

Variables	Model 1	Model 2
Relative compensation	0.0005*** (0.000)	0.0005*** (0.000)
CEO Age>60	0.0005*** (0.109)	0.0005*** (0.100)
CEO tenure	-0.0004* (0.075)	-0.0004* (0.059)
CEO stock ownership	-0.0014*** (0.010)	-0.0014** (0.011)
CEO/Chair	-0.0119*** (0.000)	-0.0122*** (0.000)
Outsider	0.0108*** (0.000)	0.0115*** (0.000)
Log(sales)	0.0030*** (0.001)	0.0028*** (0.006)
Performance	-0.0360*** (0.000)	-0.0002*** (0.001)

Performance <sub>t-1</sub>	-0.0083*** (0.006)	
Market-to-book	-0.0046*** (0.007)	-0.0098*** 0.000
Debt-to-assets	0.0053*** (0.003)	0.0063** (0.038)
Observations	13537	13567

Average marginal effects reported from logit estimates of relative CEO compensation and the probability of forced turnover for the period 1993-2007. The dependent variable (FORCED) equals 1 if the current CEO is forced out during the following fiscal year. Relative peer group compensation is the ratio of CEO compensation to the peer group median compensation. CEO/Chair is a binary variable that equals 1 if CEO is also the chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO was hired from outside the company and 0 otherwise. Performance is the industry adjusted one-year stock returns in the prior year in model 1 and change in ROA in model 2. Market to book is [Book value of debt + market value of equity]/[Book value of assets]. Debt-to-assets is the ratio of total long term debt to total assets. Year dummies not reported. P-values calculated from robust standard errors clustered around firm id are in parentheses. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% levels respectively.

## **5.2 Relative compensation and forced turnover: higher than peer group median compensation**

Next I divide the sample into higher and lower than peer group median compensation. The higher than median peer group compensation sample includes only those CEO-year observations where CEO compensation is above peer group median compensation. The lower than median peer group compensation sample includes only those CEO-year observations where CEO compensation is below peer group median compensation. Higher than median peer group compensation may signal CEO power and influence according to the managerial power hypothesis. It could also be viewed as a reward for CEO talent or compensation for expected star performance.

Results are provided in table 4. As before, models 1 and 2 measure firm performance in terms of industry-adjusted prior year stock returns and change in ROA respectively. The average marginal effect of relative compensation is positive and significant only for the higher than median peer group sample. For the lower than median peer group sample, relative compensation does not

seem to have any statistically significant effect on forced turnover. All other control variables in table 4 have expected signs.

These results indicate that CEOs who receive higher than median peer group compensation also face higher probability of forced turnover. This result rejects hypothesis 1b and does not support the managerial power hypothesis. If peer group compensation is used by powerful CEOs to extract rents from their firms, then these CEOs should face lower probability of forced turnover for the same level of performance due to their influence. It seems that higher than median peer group compensation does not represent CEO power and influence. Rather it represents a compensation for CEO talent. Boards pay higher than median peer group compensation to attract and retain talented CEOs. It could also be interpreted as a method used by board to reward expected star performance and to punish those highly paid CEOs with higher probability of termination if they do not perform up to the expectations.

Table 4: Relative compensation and forced CEO turnover: higher and lower than peer group compensation

Variables	Higher-than-median group		Lower-than-median group	
	Model 1	Model 2	Model 1	Model 2
Relative compensation	0.0006*** (0.000)	0.0005*** (0.000)	-0.0093 (0.111)	-0.0102 (0.101)
CEO Age>60	-0.0239* (0.090)	-0.0242* (0.086)	-0.0031 (0.709)	-0.0032 (0.704)
CEO tenure	-0.0001 (0.840)	-0.0002 (0.478)	-0.0005* (0.074)	-0.0005* (0.093)
CEO stock ownership	-0.0029** (0.014)	-0.0029** (0.013)	-0.0007 (0.138)	-0.0007 (0.146)
CEO/Chair	-0.0171*** (0.000)	-0.0172*** (0.000)	-0.0086** (0.016)	-0.0088** (0.014)
Outsider	0.0132*** (0.001)	0.0146*** (0.000)	0.0072* (0.058)	0.0073* (0.061)
Log(sales)	0.0039*** (0.003)	0.0034** (0.018)	0.0011 (0.394)	0.0008 (0.526)

Performance	-0.0495*** (0.000)	-0.0002*** (0.008)	-0.0229*** (0.000)	-0.0001** (0.011)
Performance <sub>t-1</sub>	-0.0068 (0.116)		-0.0095** (0.025)	
Market-to-book	-0.0037* (0.090)	-0.0089*** (0.002)	-0.0071** (0.046)	-0.0124*** (0.001)
Debt-to-assets	0.0169** (0.021)	0.0197** (0.023)	0.0053 (0.190)	0.0077** (0.041)
Observations	6632	6648	6828	6842

Average marginal effects reported from logit estimates of relative CEO compensation and the probability of forced turnover for the period 1993-2007. The dependent variable (FORCED) equals 1 if the current CEO is forced out during the following fiscal year. Relative peer group compensation is the ratio of CEO compensation to the peer group median compensation. Higher-than-median CEO is a binary variable that equals 1 if the CEO compensation in the prior year was greater than the peer group median compensation and 0 otherwise. CEO/Chair is a binary variable that equals 1 if CEO is also the chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO was hired from outside the company and 0 otherwise. Performance is the industry adjusted one-year stock returns in the prior year in model 1 and change in ROA in model 2. Market to book is [Book value of debt + market value of equity]/[Book value of assets]. Debt-to-assets is the ratio of total long term debt to total assets. Year dummies not reported. P-values calculated from robust standard errors clustered around firm id are in parentheses. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% levels respectively.

### 5.3 Sensitivity of forced turnover to

#### 5.3.1 Performance

If CEOs who are paid higher-than-median peer group compensation face higher performance pressures than CEOs who are paid lower-than-median peer group compensation, then we would expect the turnover probabilities to be more sensitive to a change in firm performance for such CEOs. In this section I calculate performance turnover sensitivities for both higher than peer group median and lower than peer group median samples. To calculate average marginal effects of performance turnover sensitivities I proceed in two steps. First, I estimate the effect of firm performance on forced CEO turnover for the two groups using the interaction of an indicator variable (higher-than-median peer group compensation) and the continuous variables of firm performance (prior year stock returns and change in ROA). I then use these interactions and calculate the sensitivity of forced CEO turnover to

different levels of firm performance using the estimated coefficients. The results of step one are provided in table 5a and those of step two are given in table 5b.

Since we are interested in performance turnover sensitivities, I interpret table 5b here. Table 5a is used to calculate these sensitivities. Panel A of table 5b presents estimates of the average marginal effects of higher than peer group median and lower than peer group median samples on the likelihood of termination when firm performance deteriorates (falls from the 90<sup>th</sup> percentile to the 10<sup>th</sup> percentile). We can see that performance turnover sensitivities are increasing for both types of CEOs and for both measures of firm performance (prior year industry-adjusted stock returns, model 1 and change in ROA, model 2). CEOs in the higher than peer group median sample face higher sensitivities for both measures of performance.

However, for industry-adjusted stock returns (model 1), performance sensitivities are not statistically different between the two groups when performance deteriorates from the 90<sup>th</sup> percentile to the 50<sup>th</sup> percentile. The effect is more obvious when performance falls below the 50<sup>th</sup> percentile. The sensitivities in such cases are much higher

Table 5a: Forced turnover probability, performance and governance interactions

Variables	Performance interactions		Governance interactions	
	Model 1	Model 2	Model 1	Model 2
Higher-than-median CEOs	0.0070*** (0.004)	0.0076*** (0.002)	0.0073*** (0.005)	0.0078*** (0.003)
CEO Age>60	-0.0130* (0.098)	-0.0133* (0.092)	-0.0095 (0.210)	-0.0007 (0.154)
CEO tenure	-0.0003 (0.105)	-0.0004* (0.066)	-0.0003 (0.173)	-0.0102 (0.186)
CEO stock ownership	-0.0013** (0.012)	-0.0013** (0.013)	-0.0014** (0.014)	-0.0003 (0.121)
CEO/Chair	-0.0125*** (0.000)	-0.0127*** (0.000)	-0.0114*** (0.000)	-0.0014** (0.017)
Outsider	0.0108***	0.0115***	0.0117***	-0.0112***

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	(0.000)	(0.000)	(0.000)	(0.000)
Log(sales)	0.0028***	0.0025**	0.0023**	0.0121***
	(0.003)	(0.014)	(0.026)	(0.000)
Performance	-0.0361***	-0.0002***	-0.0348***	0.0018*
	(0.000)	(0.000)	(0.000)	(0.093)
Performance <sub>t-1</sub>	-0.0089***		-0.0124***	
	(0.005)		(0.001)	
Market-to-book	-0.0048***	-0.0099***	-0.0030*	-0.0002***
	(0.006)	(0.000)	(0.071)	(0.006)
Debt-to-assets	0.0057***	0.0082***	0.0169***	-0.0076***
	(0.002)	(0.009)	(0.002)	(0.000)
Governance index			-0.0006	0.0204***
			-0.206	0
Interactions included	yes	yes	yes	yes
Observations	13537	13567	12003	12023

Average marginal effects reported from logit estimates of relative CEO compensation and the probability of forced turnover for the period 1993-2007. The dependent variable (FORCED) equals 1 if the current CEO is forced out during the following fiscal year. Relative peer group compensation is the ratio of CEO compensation to the peer group median compensation. Higher-than-median CEO is a binary variable that equals 1 if the CEO compensation in the prior year was greater than the peer group median compensation and 0 otherwise. CEO/Chair is a binary variable that equals 1 if CEO is also the chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO was hired from outside the company and 0 otherwise. Performance is the industry adjusted one-year stock returns in the prior year in model 1 and change in ROA in model 2. Market to book is [Book value of debt + market value of equity]/[Book value of assets]. Debt-to-assets is the ratio of total long term debt to total assets. G-index is the Gompers et al (1983) governance index. Year dummies not reported. P-values calculated from robust standard errors clustered around firm id are in parentheses. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% levels respectively. Detailed results incorporating the estimated interaction coefficients are presented in Table 5.

for CEOs in the higher than peer group median than lower than peer group median sample and are also statistically different from each other. For the accounting measure of firm performance (model 2), the sensitivities for the higher than median peer group are higher and statistically different from the lower-than-median group for all levels of performance.

Table 5b: Sensitivity of turnover to firm performance for higher and lower than peer group median CEOs

Panel A: Sensitivity of forced turnover to firm performance

	Model 1			Model 2		
	Higher-than-median	Lower-than-median	p-values	Higher-than-median	Lower-than-median	p-values
p90	0.0046	0.006	0.4465	0.0223	0.0164	0.0136
p75	0.0114	0.011	0.8105	0.0234	0.0169	0.0064
p50	0.0190	0.015	0.1287	0.0241	0.0172	0.0045
p25	0.0290	0.021	0.0040	0.0248	0.0175	0.0031
p10	0.0445	0.028	0.0005	0.0263	0.0181	0.0019

Panel B Sensitivity of forced turnover to quality of governance

	Model 1			Model 2		
	Higher-than-median	Lower-than-median	p-values	Higher-than-median	Lower-than-median	p-values
p90	0.0201	0.0167	0.3918	0.0198	0.0163	0.3659
p75	0.0223	0.0166	0.0583	0.0221	0.0164	0.0574
p50	0.0247	0.0166	0.0016	0.0246	0.0166	0.0019
p25	0.0273	0.0165	0.0011	0.0274	0.0168	0.0015
p10	0.0287	0.0165	0.0025	0.0289	0.0168	0.0033

The sensitivities have been estimated using logit models incorporating interaction terms of performance and Higher-than-median CEOs in Panel A and Gompers et al. (2003) G-index in panel B.

Thus CEOs in higher than peer group median sample are held at a higher threshold of firm performance. Highly paid CEOs also face higher probabilities of forced turnover for the same level of poor performance. Overall the results in Panel A of table 5b indicate that higher than median pay packages come with higher than median performance expectations and severe punishment in terms of higher probability of forced turnover. We can say that higher than peer group median compensation represents a board's tool to reward expected star performance.

### **5.3.2 Corporate governance**

It is also interesting to test if quality of corporate governance plays any role in the relation between relative peer group compensation and the probability of forced turnover. To test this I calculate governance turnover sensitivities for both types of CEOs. Following previous studies, I use Gompers et al. (2003) G-index to measure the quality of governance. An increase in the G-index means poor quality of governance and a decrease implies an improvement in the quality of governance. Panel B of tables 5a and 5b estimate the effects of change in the quality of governance on forced CEO turnover in two steps.

Panel B of table 5a is used to calculate these sensitivities in 5b. The models used to estimate the sensitivities include interactions between the indicator variable higher than peer group median compensation and the continuous variable of G-index from table 5a. As before, models 1 and 2 use industry-adjusted stock returns and change in ROA to measure firm performance. Panel B of table 5b presents estimates of the average marginal effects on the likelihood of termination when the G-index decreases (falls from the 90<sup>th</sup> percentile to the 10<sup>th</sup> percentile) for higher than peer group median and lower than peer group median samples.

The governance turnover sensitivities increase when the quality of governance improves in the higher than peer group median sample. There is very little change in these sensitivities for lower than peer group median sample. Governance does not seem to play any significant role in the performance turnover relation for these CEOs.

I also test and find that the sensitivities are statistically different from each other in the two groups. Thus, CEOs in the higher-than-median group face a higher probability of turnover for the same level of performance when the quality of governance improves. Strongly governed firms are more likely to punish the highly paid CEOs when they do not deliver star performance. Firms with weak governance not only award huge pay packages to their CEOs; they also offer them lower termination rates when they perform below expectations.

## **6- Robustness**

### **6.1 Controlling for simultaneity**

Although I use lagged values of relative peer group compensation in all specifications, there still may be concerns about the endogeneity of compensation and turnover. I estimate the following simultaneous equations model to see if the results change.

$$\text{Probability (forced turnover)} = f(\text{relative compensation, CEO age, tenure, stock ownership, duality, outsider, firm size, stock performance, market-to-book, debt-to-assets}) \quad (2)$$

$$\text{Relative CEO compensation} = f(\text{forced turnover, CEO tenure, CEO option based compensation, stock performance, market-to book, debt-to-assets, stock return volatility, R\&D intensity, industry controls}) \quad (3)$$

CEO tenure, firm size, stock performance, market-to-book and debt-to-assets are common control variables in both equations. CEO tenure is positively related to compensation and negatively affects the probability of turnover. Large firms pay higher compensation to their CEOs and are also more likely to fire them as these firms are closely monitored by the market. Firms with higher market-to-book ratios have different performance expectations and offer unique compensation contracts to their CEOs.

For the identifying variables in the forced turnover equation, I use CEO stock ownership, CEO/chair duality and outsider status. CEOs with huge stock ownership become entrenched and may influence their companies' termination decisions. Higher CEO stock ownership also helps in aligning the interests of CEOs with shareholders. Similarly, CEOs who chair their boards build valuable relationships with their boards and may affect their CEO replacement decisions. CEOs hired from outside the company lack valuable networking relationships with the board and are more likely to be terminated for performance related reasons. All these variables are directly related to the CEO turnover equation and only indirectly affect the compensation equation.

I use CEO option based compensation, stock return volatility and R&D intensity in the relative peer group compensation equation as identifying variables. CEO option-based compensation is an important determinant of

total compensation. Usually, highly paid CEOs are paid in the form of stock options. Compensation is also a function of firm risk. Firms that operate in risky industries and have higher cash flow uncertainty offer higher total compensation to attract CEOs.

Table 6: Relative compensation and forced CEO turnover: Simultaneous equations estimation

Compensation equation: OLS		Turnover equation: Probit	
Variables		Variables	
Forced turnover	-0.2062 (0.304)	Relative compensation	0.1532*** (0.000)
Option compensation <sub>t-1</sub>	3.0887*** (0.000)	CEO age	-0.3033* (0.070)
CEO tenure	0.0113* (0.059)	CEO tenure	-0.007 (0.143)
Log(sales)	0.3091*** 0.000	CEO ownership	-0.0215*** (0.007)
Performance	0.0039 (0.109)	CEO/Chair	-0.2837*** (0.000)
Performance <sub>t-1</sub>	-0.2218 (0.153)	Outsider	0.1309** (0.046)
Market return	-0.0374 (0.319)	Log(sales)	0.0142 (0.438)
Market-to-book	0.0853*** (0.009)	Performance	-0.7583*** (0.000)
Debt-to-assets	-0.3253* (0.079)	Performance_1	-0.1754*** (0.000)
Volatility	23.8507*** (0.000)	Market-to-book	-0.1118*** (0.000)
R&D intensity	0.0487 (0.940)	Debt-to-assets	0.4004*** (0.000)
Industry controls	Yes	Industry controls	No
Observations	12918	Observations	12918

The dependent variables in the two equation systems are relative peer group compensation and forced turnover. Relative peer group compensation is the ratio of CEO compensation to the peer group median compensation. Turnover equals 1 if the current CEO is forced out during the following fiscal year. Option compensation is the ratio of option compensation to total compensation in previous year. Performance is the industry adjusted one-year stock returns in the prior year. Market return is the S&P500 index performance in the prior year. Volatility is the standard deviation of daily stock returns. R&D intensity is the ratio of R&D expenditures to total assets. CEO/Chair is a binary variable that equals 1 if CEO is also chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO is was hired from outside the company and 0 otherwise. Market to book is [Book value of debt + market value of equity]/[Book value of assets]. Debt-to-assets is the ratio of total long term debt to total assets. P-values calculated from robust standard errors are in parentheses. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% levels respectively.

I use stock return volatility as a proxy of firm risk and a determinant of CEO compensation. Similarly, firms with R&D investment requirements offer a different compensation contract to motivate the CEO to invest in R&D. These variables are directly related to the compensation equation and only indirectly related to the turnover equation.

Table 6 presents results from the simultaneous equation system. I use the CDSIMEQ command in Stata that implements the two-stage estimation method described in Maddala (1983) for simultaneous equation models in which one of the endogenous variables is continuous and the other is dichotomous. In the above model, the forced turnover equation is estimated using the binomial probit model while the relative peer group compensation equation is estimated using the OLS method. Results show that relative peer group compensation is positively related to the likelihood of forced turnover in the turnover equation. However, the effect of forced turnover on relative compensation is not statistically significant at any conventional level. Thus modeling compensation and turnover in a simultaneous setting does not change our baseline results in tables 3 and 4.

## **6.2 Using an alternative definition of forced turnover**

Until now we have been using a carefully constructed turnover variable (FORCED) to estimate the likelihood of termination. It is interesting to see if the results are sensitive to a change in how forced turnover is defined. In this section I use two alternative measures of forced turnover: FORCED2 and FORCEDALL. In the previous regressions FORCED classified a change as

forced if the news item specifically reports firing; mentions poor performance; or mentions restructuring or change in strategy.

Table 7: Relative compensation and forced CEO turnover: change in the definition of turnover

Variables	Type of Turnover	
	FORCED1	FORCEDALL
Relative compensation	0.0006*** (0.000)	0.0003 (0.690)
CEO Age>60	-0.0288** (0.010)	0.1255*** (0.000)
CEO tenure	-0.0009*** (0.000)	0.0018*** (0.000)
CEO stock ownership	-0.0008** (0.040)	-0.0033*** (0.000)
CEO/Chair	-0.0197*** (0.000)	-0.0304*** (0.000)
Outsider	0.0151*** (0.000)	0.0197*** (0.001)
Log(sales)	0.001 (0.382)	0.0051*** (0.007)
Performance	-0.0349*** (0.000)	-0.0414*** (0.000)
Performance_1	-0.0060** (0.033)	-0.0054 (0.627)
Market-to-book	-0.0027 (0.107)	-0.0007 (0.741)
Debt-to-assets	0.0039* (0.061)	0.0086 (0.249)
Observations	13671	15059

Average marginal effects reported from logit estimates of relative peer group compensation and the probability of forced CEO turnover. The dependent variable FORCED2 includes all changes in FORCED and also includes a change as forced if the CEO is less than 60 years of age and 1) left to pursue other interests; 2) no reason is identified in the news item; 3) or we could not find any news item about the CEO change. It excludes changes resulting from normal

succession, retirement after 60 years of age, mergers and acquisitions, death and illness and voluntary movement to other prestigious positions. FORCEDALL includes all changes and does not differentiate between voluntary and involuntary turnovers. Relative peer group compensation is the ratio of CEO compensation to the peer group median compensation. CEO/Chair is a binary variable that equals 1 if CEO is also chair of the board and 0 otherwise. Outsider is a binary variable that equals 1 if the CEO was hired from outside the company and 0 otherwise. Performance is the industry adjusted one-year stock returns in the prior year. Market to book is  $[\text{Book value of debt} + \text{market value of equity}] / [\text{Book value of assets}]$ . Debt-to-assets is the ratio of total long term debt to total assets. Year dummies not reported. P-values calculated from robust standard errors clustered around firm id are in parentheses. \*, \*\* and \*\*\* denote significance at 10%, 5% and 1% levels respectively.

I construct a new variable FORCED2 which includes all changes classified as forced in the previous variable and expands this to include all other changes where the CEO leaves company to pursue other interests and is less than 60 years of age; no reason is identified in the news item; or no news item is found about the CEO change. FORCED2 is thus less careful in identifying a change as forced compared to FORCED.

However, it still excludes changes related to mandatory retirement, death and illness, mergers and acquisitions, voluntary movement and movement to a spin off or subsidiary. I also construct FORCEDALL that does not differentiate between voluntary and forced turnover and treats all CEO changes as forced. I then use FORCED2 and FORCEDALL to estimate the effect of relative peer group compensation on forced CEO turnover. Results from these specifications are given in Table 7.

The average marginal effect of relative peer group compensation is positive and statistically significant in model 1 where we use FORCED2 as a dependent variable. Thus our primary finding of a positive relationship between relative peer group compensation and forced turnover does not change much when we expand the definition of forced turnover.

However, when we do not distinguish between a forced CEO turnover and other types CEO change as in model 2 (FORCEDALL), the coefficient on relative peer group compensation is not statistically significant at any conventional level. These results indicate that separating forced turnover from other kinds of turnovers is important for a meaningful estimation of effect of relative peer group compensation on forced turnover. We run all other specifications with FORCED2 and FORCEDALL and find similar results.

## **7- Conclusion**

This paper investigates if and how the use of peer group compensation can be explained by the using the relation between relative peer group compensation and forced CEO turnover. Empirical results indicate that relative peer compensation is positively related to the likelihood of forced CEO turnover. Further tests show that CEOs who receive higher-than-median peer group compensation (i.e. powerful CEOs) also face higher likelihood of turnover. However, there is no statistically significant relation between relative peer group compensation and forced turnover for the CEOs who receive lower-than-median peer group compensation. In other words, higher-than-median peer group compensation does not represent CEO power or influence. On the contrary it seems that higher-than-median compensation comes with increased performance expectations and a higher likelihood of termination.

The sensitivity analysis shows that CEOs in the higher-than-median group face significantly higher performance turnover sensitivities compared to the lower-than-median group. Thus higher-than-median compensation does not represent power. Rather it represents reward for CEO talent or expected performance. Moreover, I find that firms with strong corporate governance are more likely to remove CEOs who receive higher-than-median compensation for the same level of poor performance. Overall, results do not support the notion that powerful CEOs set their own pay. It seems that the increase in relative CEO pay is driven by competitive conditions in the CEO talent market.

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