# The Impact of Executive Compensation and Pay Disparities on IPOs Mortality

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## Abstract

Using a U.S. sample from 2000 to 2012, we find that, IPO firms with high compensated CEOs and pay disparities have lower failure rates and longer time to survive in subsequent periods following the offering. Particularly, a unit increase in total CEO compensation increases the average firm's survival time by 14.7 months. The positive impact of total remuneration on IPO survival concentrates among firms with lower agency conflicts and with young CEOs who are also the founders, have high education prestige and special skills. Additionally, our results suggest that this effect is stronger among less powerful and less overconfident CEOs. Regarding the pay gap, our findings indicate that the positive association between pay disparities and survivorship is more pronounced in firms with older and non-founder CEOs who have general skills.

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*"Compensation is not the work of a cartel, but it is light years from being an ideal market"*

[The Economist, 2016]

## 1. Introduction

The dramatic rise in executive compensation witnessed in public firms over the last decades has fueled an intense debate on the effectiveness of compensation arrangements. In particular, the superiority of Chief Executive Officers (CEOs) in the decision making process has raised a fundamental question: Does the level and composition of compensation contracts elicit the appropriate effort by senior management, or it is a symptom of agency conflicts at the expense of shareholder? While a substantial number of studies have examined this question from different perspectives, the evidence continues to be conflicting (Bebchuk and Fried, 2003; Conyon, 2006; Gabaix and Landier, 2008; Kaplan, 2008; Murphy, 1999, 2013). In this study, we study the implications of CEO pay on firm mortality by utilizing a novel dataset that exploits variation in executive compensation packages of firms undergoing Initial Public Offerings (IPOs). In doing so, we investigate the impact of the level of CEO pay on IPO survival. Additionally, we evaluate the influence of pay disparities between the CEO and senior management members on firm mortality. The reason that we use IPOs survival is that prior studies have proposed firm mortality as a measure of firm performance.[2]

In the longstanding debate among scholars about the justification of CEO pay, the most prominent arguments against the observed rising trends of executive compensation are based on three widespread perceptions (Kaplan, 2013). First, CEOs are overpaid, and presumably the rising trend of their total pay is largely driven by the excess award component. Second, CEO pay packages have grown increasingly complex, and yet, they are not sufficiently tied to corporate performance. Finally, corporate boards are ineffective in monitoring both executive pay practices and performance.

Not surprisingly, a number of theories have been proposed for the growth of CEO compensation. One view, draws from the "efficient contracting camp" and postulates that the observed level and composition of compensation is set through an arms-length negotiation, and as such, it reflects a competitive equilibrium in the market for managerial talent (Murphy and Zabojnik, 2004, 2010). According to this perspective, compensation levels are simply a reflection of the demands of a position that requires considerable time, skill, and attention (Kaplan, 2008). In line with this view, Gabaix and Landier (2008) show that the rise CEO pay is primarily due to increases in firm size, and interpret this as a natural outcome of an ability-matching mechanism where the impact of managerial talent is magnified in large firms (Tervio, 2008).

[2] See for example, Welbourne and Andrews, (1996) and Audretsch and Lehmann (2005).

On the other side of the spectrum lies the "managerial power" camp, i.e., those who firmly believe that the CEO pay process is not determined by competitive market forces but rather by captive board members catering to rent-seeking, entrenched CEOs (Bebchuk and Fried, 2004; Kuhnen and Zwiebel, 2009). To support this perspective, they cite as evidence the large and growing disparity between pay granted to CEO and the compensation of the average worker (Hayes and Schaefer, 2009), and more often than not, the widening pay gap among the members inside the boardroom (Kale et al., 2009). Further, numerous studies demonstrate that CEO compensation is related to a series of unfavorable corporate outcomes, such as excess risk (Kini and Williams, 2012) or the incidence of fraud (Hass et al., 2015).[3]

In addition to the conflicting empirical evidence, several researchers emphasize, neither camp offers convincing explanations for the well-documented CEO pay patterns. With respect to the contracting view, Frydman and Jenter (2010) and Nagel (2010), note that the correlation between size and compensation is sensitive to sample selection and depends on very strong parameter assumptions. As for the managerial power view, the upwards trend of corporate governance over the last decades (Holmstrom and Kaplan, 2001) cannot be easily reconciled with the story of increased CEO pay due to weak corporate governance mechanisms (Kaplan, 2008). As such, it is not surprising that prominent opinion makers are puzzled about the drivers and implications of CEO pay. For instance, the Editorialists at The Economics who call executive compensation "neither rigged nor fair" arguing that while pay is a function of market forces, those forces are not efficient in setting pay levels relative to managerial value creation and average worker pay" ('Neither Rigged nor Fair,' 2016).[4]

Missing from the discussion, however, is a context where clearer inferences can be made about the role of compensation relative to prior studies. The IPO setting provides a unique opportunity to evaluate the role of CEO pay, because it represents the first time that firms raise capital from a dispersed investor based, and therefore confront significant agency problems. Since, the main purpose of compensation contracts is specifically to mitigate such agency problems, and because the extant literature on the implication of CEO compensation has focused mostly on large, established firms, the IPO setting represents a potentially fruitful area of research.

This study draws motivation from the scarce evidence regarding the relation between executive compensation and IPO survival. Therefore, we utilize the prospectuses of 1,128 IPO firms

[3] Similarly, various researchers posit that CEO compensation has risen due to changes in the nature of the job. Commonly cited reasons include the increased competition and higher volatility of the external environment (Cuñat and Guadalupe, 2009a; 2009b; Dow and Raposo, 2005), the increased risk of being fired (Frydman, 2014), and the higher demand for general, rather firm specific skills (Murphy and Zabojnik, 2010).

[4] https://www.economist.com/news/briefing/21701109-bosses-pay-rich-world-not-fix-it-flawed-neither-rigged-nor-fair

that went public from 2000 to 2012 and we construct a unique hand-collected data-set about the compensation arrangements of all executive board members, prior to the offering. Accordingly, we examine the influence of CEO pay on IPO survival along two dimensions, namely, absolute CEO compensation, and relative CEO compensation (or firm pay gap). The absolute form refers to the total remuneration of the CEO, measured as the natural logarithm of the sum of salary, bonus, stock and option awards, non-equity incentives, and other elements. Relative CEO compensation accounts for the pay disparities inside the boardroom and is measured as the natural logarithm of the difference between the total CEO compensation and the median total compensation of the other executives (Kale et al., 2009).

We assess the survival profile of IPO issuers by evaluating their survival and hazard functions. To achieve this, we initially apply the Cox proportional hazard analysis which reveals that total CEO compensation and firm pay gap are significant predictors of the probability of failure and time-to-failure. Specifically, we find that IPO firms with highly compensated CEOs and/or high pay disparities a have a lower probability of failure and survive longer in subsequent periods after the offering. To get a sense of economic magnitude, the result reveal that the failure risk of IPO firms with a high remunerated CEO is 90% that of firms with a low remunerated CEO. Consistent with the differences in the incentive structure between the equity and the cash-based elements of CEO pay, these relations are driven by the long-term component rather than the short-term component.

We also consider an alternative method in the survival literature, the accelerated failure time (AFT) model. Under this approach, our findings indicate that highly compensated CEOs and firms with high pay disparities have a highly and significant, positive impact on survival times. In particular, we document that IPO companies with high pay disparities are more likely to survive in the market for longer periods than firms with low pay disparities. More specifically, a unit increase in total CEO compensation increases the firm's survival by 14.7 months. Overall, the results from the baseline tests suggest the compensation packages of IPO firms are effective in mitigating agency conflicts between managers and shareholders, which is consistent with the efficient contracting view rather than the managerial power view.

These results are robust once we use different methods, including industry and year fixed effects and sample selection bias. However, to establish our support to the optimal contracting hypothesis, we repeat the above analysis in sub-samples according to a wide set of CEO and governance characteristics. The results `show that the association between total CEO compensation and IPO survivorship is strengthened among founder-led firms with young CEOs with firm-specific managerial skills who are graduated from a Top30 institution. Moreover, using various variables to

measure agency conflicts and monitoring we find that positive relation between total CEO compensation and survival time is more pronounced in firms with high board and compensation committee quality with non-powerful and overconfident CEOs. Finally, we document that IPO firms with high pay gaps have lower failure risk among companies with old and non-founder CEOs who have general managerial skills.

Our study provides several contributions to the literature on IPO survival. First and most importantly, this is the first paper — to the best of our knowledge — to examine the effects on firm mortality of total CEO compensation and firm pay gap. Prior research has mostly focused on the role of underwriters (Schultz, 1993), audit quality (Jain and Martin, 2005; Demers and Joos, 2007), venture capitalists (Jain and Kini, 2000; Bhattacharya et al., 2015), reputational markets (Espenlaub et al., 2012), earning management (Alhadab et al. 2015), CEO skills (Gounopoulos and Pham, 2018). However, these studies have largely linked IPO survival with financial intermediaries, earnings management and CEO skills, leaving the empirical evidence of the impact of total CEO remuneration and firm pay gap on the long-term survivability of IPO firms is scarce. In addition, our paper offers to the debate on the relation between compensation and survivorship providing empirical evidence of a positive association between executive compensation and pay disparities around IPOs. Concurrent work examines their relation with IPO first-day returns. Moreover, our empirical results provide new empirical evidence to the executive compensation literature. Lastly, our conceptual framework and empirical findings are relevant to academic researchers, government regulators, policy makers, and business executives.

Our study is most closely related to the work of Hensler et al., (1997), Jain and Kini (2000), Jain and Martin, (2005), Demers and Joos, (2007), Jain and Kini, (2008), Kale et al., (2009), Carpentier and Suret (2011), Amini and Keasey (2012), Chahine and Goergen (2011), Espenlaub et al., (2012), Ahmad and Jelic (2014), Bhattacharya et al., (2015), Alhadab et al., (2015), and Gounopoulos and Pham, (2018). Demers and Joos (2007) examine the impact of financial intermediaries and other IPO characteristics on IPO survival. We update their work by using a comprehensive sample of IPO companies and show that only underwriter prestige and not venture capitalists significantly improve IPO survivability. Chahine and Goergen (2011) investigate the relation between compensation and IPO first-day returns using option grants of all executive as compensation measure. We extend their work by examining the remuneration on IPOs survivorship. Moreover, Kale et al. (2009) examine the relationships between firm pay disparity and firm performance. We complement and extend their work by investigating the impact of firm pay gap on IPO survival. Finally, our study expands and complements the work of Gounopoulos and Pham

(2018) by adding a new dimension on survivorship, namely, the executive compensation and conducting various tests using special set of skills and other characteristics.

The rest of the study is organized as follows. The subsequent section discusses the related literature and hypothesis development. Section 3 gives an overview of the sample selection procedure and explains the survival analysis methodology. Section 4 presents preliminary statistics as well as the empirical findings of the impact of total CEO compensation and firm pay disparities on the probability of failure and time to survive of IPO firms in periods subsequent to the offering. Section 5 provides several robustness tests. Section 6 presents discussion and analyses of cross-sectional tests on different CEO and governance characteristics and finally Section 7 concludes the paper.

## 2. Related Literature and Hypothesis Development

In this section, we briefly review the existing literature on IPO survival and executive compensation, and put forth several hypotheses regarding the effect of executive remuneration and pay disparities on firm mortality.

### 2.1 IPO Survivorship

A limited number of studies deal with the survival IPO firms so far. One the first studies is the work of Hensler et al. (1997) who find that IPO survival increases with size, age of the firm and initial aftermarket returns. A comprehensive study on the survival predictability of IPOs is conducted by Jain and Kini (2000). The authors suggest that VC involvement improves the survival profile of IPO issuing firms. The study of Fama and French (2004) document a decline Consistent with this interpretation of VCs, Demers and Joos (2007) evidence significant differences for the role of financial intermediaries, such as the venture capitalists, which influence IPO survival of tech and non-tech firms. Using the same approach, Bhattacharya et al. (2015) findings are in line with the prior literature about the importance of VCs and mention that the first 3 years of public life are critical. These studies demonstrate that financial intermediaries provide valuable information about the firm's quality.[5]

Another stream of literature focuses on another set of indicators such as earnings management, and CEO skills. For example, Jain and Kini (2008) indicate that R&D intensity enhance survivorship, while Alhadab et al. (2015) using U.K. data find that high levels of real and accrual earnings management increase the IPO survival. Furthermore, Carpentier and Suret (2011)

[5] Regarding the survival rates of IPO firms the study of Fama and French (2004) documents a decline over the past several decades.

study the survival of penny stock IPOs and report significantly higher hazard rate for penny stocks s rather than for ordinary stocks. A further study of Ahmad and Jelic (2014) examines the role of lockup agreements and their analysis suggest that the failure rates for IPOs with shorter lockups are higher than the failure rates for IPOs with longer lockups. Recently, Gounopoulos and Pham (2018) document that CEOs with special skills have lower probabilities of failure and longer time to survive in the periods following the offering.

### 2.2 Executive Compensation

Prior literature has mostly focused on the role of compensation-related incentives on large established firms. Two of the most comprehensive empirical studies on this topic are the seminal works on executive compensation by Murphy (1999; 2013), which provide a detailed analysis of pay structure. In the same spirit, Conyon (2006) examines and explains the changes in executive pay and incentives, indicating that boards and remuneration committees have become more independent over time. Bebchuk and Fried (2004) highlight the important role of managerial power and rent extraction on executive compensation and their implications for corporate governance. Another study which is considered as benchmark in executive compensation is the work of Frydman and Saks (2010). These authors find a weak association between compensation and firm growth. Their results also show that compensation arrangements can help to align managerial incentives with those of shareholders.

Regarding the pay disparities, there are two key papers. First, Kale et al. (2009) investigates the impact of firm pay gap on firm performance, while Kini and Williams (2012) examine the association between internal tournament incentives and firm risk and find that greater firm gap is related with higher R&D, firm focus and leverage, but lower capital expenditures. With respect to the compensation issue around IPOs, three of the most popular papers are those of Certo et al. (2003), Lowry and Murphy (2007), and Chahine and Goergen (2011). It is worth noting that the main measure of compensation that these author use is IPO options. For instance, Lowry and Murphy (2007) do not manage to find any empirical evidence between IPO options and initial returns to investors, while Chahine and Goergen (2011) indicate that this relation may hold under the presence of VCs.

### 2.3 Hypotheses Development

The purpose of this study is to investigate how CEO compensation affects the survivability of IPO firms. However, as explained below, the CEO pay should not be considered in isolation but rather in conjunction with the remuneration of the subordinate executive members, since pay

disparities within the boardroom could also affect the behavior and decision making of the top management team. Accordingly, we organize our discussion about the implications of CEO compensation and pay disparities based on the dominant views of executive compensation, namely, the efficient contracting view and the managerial power view (Frydman and Jenter, 2010).

### *A. Efficient Contracting View*

According to the efficient-contracting view, the level and composition and composition of CEO pay is shaped by an efficient process, which is presumably driven by competitive market forces (Gabaix and Landier, 2008). Proponents of the efficient contracting view of compensation advocate that chief executives are paid the going fair-market rate. Thus, if reward levels are high, this is simply a reflection of the scarcity of CEO talent and/or the demands of a position that requires considerable time, skill, and attention (Tervio, 2008). Furthermore, this view maintains that incentives are structured in a way that motivates managers to optimize firm value. In this respect, apart from the composition of total compensation, of particular importance, is the level of CEO pay relative to that of the other top executives (Rosen, 1986).

To the extent that pay disparities between the CEO and the other executives reflect differences in managerial talent, ability and effort, a large pay gap within the boardroom may represent a huge incentive for those competing for the CEO position to work harder and more efficiently in order to increase their chances of promotion (Lazear and Rosen, 1981). As a consequence, this tournament view of pay gap, implies lower monitoring costs for shareholders and pay-setting mechanisms that better align principal-agent interests, especially in firms where agency costs of managerial discretion can be hazardous (Lee et al., 2008 Kale et al., 2009; Chen et al., 2013). Taken together, a large CEO pay or pay gap represents a more efficient pay-setting process, which in turn implies lower agency costs and greater chances of survivability.

**H1: Efficient Contracting Hypothesis**. The level of CEO pay as well as the magnitude pay gap between the CEO and the other executives is positively associated with the IPO survival.

### *B. The Managerial Power View*

As opposed to the efficient contracting hypothesis, the managerial power view posits that the level and structure of CEO pay does not reflect a competitive equilibrium in the market for managerial talent, neither incentives designed to optimize firm value. In particular, the managerial power approach acknowledges that managers are self-interested and adds a new element to the agency problem: the ability of executives to influence both the level and composition of their own

compensation packages, often (if not invariably) at the expense of other executives and the shareholders. Core et al. (1999) argue that powerful CEOs can exert greater influence large boards, extract more compensation, and thereby creating a large gap between their pay and that of other board members. In this regard, large CEO compensation and pay disparities are contributing factors to agency conflicts (Bebchuk and Fried, 2003).

Apart from the insufficient link between CEO pay and performance, due to the exercise of the bargaining strength of the CEOs over their boards, it is important to understand why a large pay gap might not serve the interests of the shareholders. Several researchers argue that tournament incentives as captured by the magnitude of pay gap, may not always result in a healthy competition between executives. Particularly, in order to increase the likelihood of being promoted to the CEO position, senior executive may undertake unnecessary risk (Kini and Williams, 2012) or be even engaged in fraudulent activities (Hass et al., 2015). Therefore, according to the managerial power view, large CEO pay reflects excessive pay and an insufficient relation between CEO awards and performance, whereas large disparities may also promote greater risk-taking at the expense of the shareholders.

**H2: Managerial Power Hypothesis**. The level of CEO pay as well as the magnitude pay gap between the CEO and the other executives is positively associated with the IPO failure risk.

## 3. Sample Selection and Methodology

Our sample selection starts with retrieving all the initial public offerings (IPOs) between 2000 and 2012 from the U.S. Common Stock Data File of Securities Data Company (SDC) database. Following the common filtering criteria in the IPO literature, we eliminate financial institutions, American Depository Receipts (ADRs), closed-end funds, unit offers, and any other non-common stock type of shares. In addition, we eliminate any IPOs with offer price below. We obtain IPO background and issuance information from the SDC, including the issue data, offer price, total proceeds raised, whether the firm is backed by venture capital and the prestige of underwriters. For underwriter prestige ranking, the study employs Loughran and Ritter's (2004) measures of underwriter quality. Accounting data are retrieved from the Compustat database, and public trading prices are from the Center for Research and Security Prices (CRSP).

Data regarding the executive compensation (e.g. salary, bonus, restricted stock, options, non-equity incentive plans, and total compensation) of the CEOs of IPOs are carefully hand collected from firm prospectuses (S-1) on Securities and Exchange Commission (SEC)'s EDGAR. Also, we use the IPO prospectuses to construct the biographical profiles of CEOs (e.g., CEO

duality, tenure) and for information about their work experience we use the BoardEx database. After merging the data from the above databases and eliminating observation with missing values, our final sample consists of 1,128 IPO firms.

We track each firm from the IPO date to the earlier of the delisting date or the end of 2017. CRPS provides delisting codes to indicate the status of the issuing firm, specifically, whether the firm is still trading and specific reasons for delisting such as failure to meet listing standards, corporate governance violation, liquidation, insufficient capital, bankruptcy, etc. Based on the CRPS delisting codes, we distinguish the IPO firms into five groups based on its 3-digit CRSP delisting code: acquired (200-290), exchanged (300-390), liquidated (400-490), dropped (500-591) and survived. Survived firms are defined as firms that continue to operate independently as public corporations and appeared on the CRSP tape from the IPO date to at least five years after the offering. Our sample of 1,128 IPOs is comprised of 764 survived firms, 274 acquired firms, 82 dropped firms, 6 exchanged firms and 2 liquidated firms.[6]

## 3.1 Survival Analysis Methodology

### 3.1.1 Cox Proportional Hazard Model

Survival analysis is a statistical technique for analyzing the expected duration of time until one or more events happen (such as death of a firm) that has been used extensively in prior research to examine determinants of IPO survival (e.g., Keasey et al., 1990; Hensler et al., 1997; Jain and Kini, 2000; Carpentier and Suret, 2011; Alhadab et al., 2014; Gounopoulos and Pham, 2018). Its primary benefit over ordinary least square (OLS) and binary dependent variable model is that it allows us to take into account the length of time that a company survives.

Additionally, survival analysis is useful to examine censored data that represents event (delisting of IPOs) that has not yet occurred and with time-series data with different time horizons. In our study, the survival time of IPO firms is right censored because many firms that went public are still trading. Also, the time window is different for each firm depending on the IPO date. For example, in our analysis, IPO firms are tracked until the end of 2017. Thus, a firm that went public in 2000 is tracked for 17 years compare to 5 years for a firm that went public in 2000.

In our study, we apply both nonparametric and semi parametric approaches. Initially, non-parametric estimates of survival and hazard probabilities allow us to compare the survival rates and risk profiles of IPO firms with a high compensated CEO and those with a low compensated CEO, thereby determining whether high compensated CEO improve issuing firms' survival profiles. The

[6] Our sample has no firms whose delisting codes are 600-900.

hazard function is the conditional failure rate given that the firm has survived up to the specified time. If high compensated CEOs can reduce the failure risk, the hazard function for IPO firms with a high compensated CEO will remain below that of firms with a low compensated CEO. We estimate the hazard functions for the two groups of IPO firms using the Nelson-Aalen estimator, which is defined as:

$$\widehat{H}(t) = \sum_{t_i<t} \frac{d_i}{n_i} \quad (1)$$

where $d_i$ is the number of failed firms at time $t_i$ and $n_i$ is the number of firms at risks at time $t_i$.

The survival function provides the probability that the firm survives up to a particular time. If high compensated CEOs can enhance the survivability of issuing firms, the survival function curve of firms with a high compensated CEO will be above that of firms with a low compensated CEO. We estimate the survival rates of the two groups of IPO firms using the Kaplan-Meier estimator which is a non-parametric maximum likelihood method and is defined as:

$$\hat{S}(t) = \prod_{t_i<t} \frac{n_i - d_i}{n_i} \quad (2)$$

where $\hat{S}(t)$ is the probability of being listed at time $t_i$, $d_i$ is the number of failed firms at time $t_i$ and $n_i$ is the number of firms at risks at time $t_i$. In addition, we use the log-rank test for testing the statistical differences between the estimated survival curves of IPO firms with a high compensated CEO and those with a low compensated CEO.

Then, we employ the Cox proportional hazard model. The advantage of this model over other hazards models is that the baseline hazard function follows the firm over a specified time period and focus at which point in time it experiences an event of interest (see for example, Allison, 2000; Shumway, 2001). We estimate the following model:

$$h(t) = h_0(t)[\beta_1 Total\ CEO\ Compensation_{i,t} + \beta_2 Control\ Variables_i + Fixed\ Effects] \quad (3)$$

where $h_0(t)$ is the baseline hazard function, and $t$ is the time to failure (i.e., the duration to the delisting date). The dependent variable indicates the failure risk; thus, a positive (negative) coefficient documents that failure is more (less) likely to happen and the survival time is shorter (longer). The hazard ratio for each independent variable is computed as the exponentiated

coefficient for the variable. It measures the increase in failure risk for a unit increase in the value of the independent variable. If the hazard ratio is above one, then an increase in the covariate increases the failure rate, while a hazard ratio of less than one indicates than an increase in the covariate decreases the failure rate.[7]

### 3.1.2 Accelerated Failure Time (AFT)

For robustness check and comparative purposes, we also use another survival model the Accelerated Failure Time (AFT) to examine the determinants of the survival rates. In contrast with Cox (1972) model, the AFT method allows the impact of the independent variables on survival time to vary over the post-IPO period depending on the length of time since listing (Hensler et al., 1997; Jain and Kini, 2000). The AFT model is typically expressed in terms of log-linear function with respect to survival time (e.g., Hensler et al., 1997; Bradburn et al., 2003):

$$Ln(T_j) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p + \varepsilon_j \quad (4)$$

where $\beta_0$, …., $\beta_p$are parameters to be estimated, $X_1$, …., $X_p$ are covariates, and $\varepsilon_j$ is the error term with a specific distributional form which determines the regression model. We estimate the following specific model where the natural logarithm of the time to delist (survival time) is presented as a linear function of the covariates[8]:

$$Ln(T_j) = \beta_0 + \beta_1 Control\ Variables_i + Fixed\ Effects + \varepsilon_j \quad (5)$$

where $Ln(T_j)$ is the natural logarithm of the survival time or time to failure (measured in months). In this model, the exponential of the coefficient is an 'acceleration factor' also known as the time ratio. Time ratio measures the extent to which changes in the independent variables speed up or slow down the occurrence of delisting. A positive coefficient implies a time ratio above one, indicating that an increase in the covariate increases survival time, while a negative coefficient (a time ratio below one) shows that an increase in the covariate decreases survival time (Bradburn et al., 2003; Espenlaub et al., 2012).

[7] In our case, we use continues variables, thus, the estimated change in the hazard rate for a unit increase in the independent variable is 100*(hazard ratio-1) (Allison, 2000; Jain and Martin, 2005; Alhadab et al., 2014).

[8] AFT models being the parametric models require specific underlying distribution (i.e., Weibull, Gama, lognormal etc.). Unreported results for Akaike's Information Criterion (AIC) identify Weibull as the most appropriate distribution with the lowest AIC value.

### 3.2 Control Variables

The main variable of interest is the total CEO compensation, which is the natural logarithm of the sum of salary, bonus, stock and option awards, non-equity incentives and other long-term incentive pay-outs. The next variable of interest is the total firm pay gap, which is the natural logarithm of the difference between CEO's total compensation and the total compensation of the median Vice Presidents following Kale et al., (2009). We control for various firm, CEO and offering characteristics that are suggested by prior literature as determinants of IPO survival. For example, Nelson (2003) finds that a CEO who also is the founder of the firm at the time IPO increases firm's valuations. Accordingly, Adams et al. (2005) document that CEOs who are not the chairman of the board have less influence over decisions, and as a result, the firm is less likely to survive. In line with these studies, Gounopoulos and Pham (2018) suggest that IPO firms with CEO-Chairman (CEO Duality), CEO-Founder and CEOs with high tenure survive longer in the following years. Thus, we include CEO duality, tenure and CEO-Founder to account for these CEO characteristics.

Also, we include proceeds and initial returns to account for the positive effects of firm size and underpricing on IPO survival as documented by Schultz (1993) and Hensler et al. (1997). Moreover, Schultz (1993) finds the positive relation between reputable underwriters and IPO survival, while Jain and Kini (2000) indicate that the involvement of venture capitalists (VCs) in the IPO process improves the survival profiles of IPO firms. Another strand of literature (e.g., Jain and Martin, 2005; Bhattacharya et al., 2015) document that IPO firms audited by high-quality accounting firms survive longer in the following years. Furthermore, Certo et al. (2001) support the opinion that the presence of venture capital seen to affect outcomes in IPO studies. To capture the impacts of these financial intermediaries on IPO survival, we include indicator variables underwriter, VC and Big 4 Auditor. Additionally, we add the variable leverage to control for the firm's leverage based on the finding of Demers and Joos (2007) that the leverage ratio of IPO firms is positively related to the probability of failure.

Moreover, Jain and Kini (2008) suggest that the probability of IPO survival is positively associated with R&D intensity. In the same spirit, the work of Demers and Joos (2007) document that R&D expenses show the firm's expenditures and hence is expected to provide an indication of the firm's riskiness. Therefore, we control for this effect by adding variables indicating strategic investment decisions of the firms, namely R&D as well as capital expenditure. In addition, Gounopoulos and Pham (2018) find a positive association between survivorship and profitability, hence, we account for the firm performance by including the variable earnings per share (EPS). We include measures of market conditions in the IPO market (market return) as well as industry

concentration and board governance quality. It is also worth noting that many firms during and after the Dot-com period are characterized as high tech or internet firms. To this end, we include Internet and Technology section and whether they are incorporated in Nasdaq. Lastly, since there may be differences in the survival profiles of IPO firms in different industries and years, we add to the model industry and year fixed effects.

## 4. Empirical Results

This section reports the results of the analysis on IPO survival. Firstly, we present the summary statistics as well as the analyzing of the dataset using the Nelson-Aalen and Kaplan-Meier methods to estimate the hazard and survival functions. The next parts demonstrate the results of the duration analysis using the Cox proportional hazard model as well as the Accelerate Failure Time (AFT) approach.

### 4.1 Descriptive Statistics

Table 1 presents the distribution by year and industry of the overall sample and the five sub-samples: dropped, acquired, exchanged, liquidated, and survived firms. Panel A shows the distribution of IPOs from 2000 to 2012. Tracking for five years after the issue date, 65.02% of the firms survived, 23.32% were acquired, 6.98% failed, 0.51% exchanged and 0.17% liquidated. Consistent with prior literature, we find that approximately 30% of IPOs either failed (dropped) or are acquired within five years after the offering. Panel B displays the distribution by year. The number of IPOs tends to decline after economic crises, as indicated by the Dot-com bubble and the Credit Crunch in 2000 and 2007, respectively. The percentage of firms being dropped is highest for firms going public in 2000 (12.21%) and 2008 (11.76%).

This is consistent with the economic crises in those years, which had an adverse impact on the IPO firms' survivability. The percentage of firms being merged in five years is highest for IPOs in 2012 (34%) and lowest in 2008 (6%). Further, the percentage of exchanged and liquidated firms is less than 1% in the most cases apart from 2008 in which there were approximately 6% exchanged firms. Generally, more than half of the firms survive for five years after the IPO. In particular, the highest proportion of survived firms is in 2011 (74%) while the lowest proportion of survived firms is in 2000 (62%).

Panel C classifies IPO firms in sectors and reveals a relatively high concentration of IPOs in computer equipment and services as well as in chemical products sectors. The industry with the highest percentage of IPOs that is acquired is scientific instruments (26.67%) followed by electronic equipment (26.23%). Furthermore, entertainment services (13.33%) and manufacturing (9.38%) are

the industries with the highest failed percentage while the percentage of survived firms in all industries is no less than 57%. Particularly, the proportion of survived firms is highest in entertainment services and transportation and public utilities industries. The sectors with the lowest proportion of failed firms are food products and wholesale and retail trade, while those with the lowest percentage of survived firms are manufacturing (57.29%) and computer and equipment services (61.57%).

Table 2 demonstrates the survival distribution by year and industry for the two groups of IPO firms: those with a high compensated CEO and those with a low compensated CEO as well as the corresponding categories for the pay gap. Panel A reports the survival distribution by year. For each year in the sample period, there are differences in the proportion of firms with a high compensated CEO and those with a low compensated CEO. From 2000 to 2003, the percentage of IPO firms with a high compensated CEO increase steadily from 34% to 53%. It is also worth noting that IPO firms with a low compensated CEO have a general decrease, however, they still account for a greater proportion in the overall sample.

On the other hand, the proportion of IPO firms with high firm pay gap becomes 60% in 2012 from around 30% in 2000, while firms with low pay disparities follow the opposite trend. The cumulative percentage of non-survived firms is higher for IPO firms with a low compensated CEO in most years. Specifically, the cumulative percentage of firms with a high compensated CEO which failing within five years after the offering is 44% compared with 46% for firms with a low remunerated CEO.

Panel B provides the survival distribution by industry. High compensated CEOs account more in manufacturing and wholesale and retail trade sectors, while they are less, in more risky industries that develop high technological products such as, computer equipment and services, electronic equipment, and chemical products. With respect to the pay disparities, the distribution by industry is almost the same as in the case of total CEO compensation. Overall, the results from five-year cumulative percentage of non-survived firms suggest that IPO firms with better compensated CEOs or higher pay disparities tend to have a lower failure rate than the others in the majority of the industries.

Panel A of Table 3 describes the average CEO profile across all the low and high compensation sub-samples. On average, a CEO is 50 years old and her tenure is approximately 4 years. 30% of CEOs are also a founder of the firm and 54% hold also a chair position (CEO duality). In addition, it seems that firms prefer to hire new CEOs with general skills. In line with the compensation literature, CEOs in the high sub-samples tend to have more experience or knowledge than CEOs in the low levels, as documented by their higher age. Furthermore, consistent with the

prior literature (Custodio et al., 2012; Gounopoulos and Pham, 2018) firms are willing to provide more generous remuneration packages to generalists as well as to CEOs who hold the role not only of CEO but also of the chairman of the board. Finally, high compensated CEOs have lower tenure than those CEOs with low remuneration and are non-founders.

Panel B presents the firm and offering characteristics for the overall sample and the sub-samples of firms with a high remunerated CEO and those with a low remunerated CEO. On average, the IPO firms are relatively young and around half of them are ventured-backed. In addition, 40% of firms are in a high-tech industry and almost 10% are characterized as internet firms. Around 35% of the IPOs are underwritten by top-tier investment banks and 47% are audited by big four auditors. Moreover, the average IPO first-day returns are 22.22%, while the vast majority of the firms (72%) are incorporated in Nasdaq.

Particularly, Panel B of Table 3 demonstrates clearly that in terms of their pre-IPO accounting-based performance measures, a much greater proportion of firms with better remunerated CEOs relative to low remunerated CEOs reports positive earnings and low leverage. Also, consistent with the prior studies (e.g., Conyon, 2006; Gabaix et al., 2008) high compensated CEOs are typically found in larger and older firms. The proceeds raised in the offering by firms with better compensated CEOs are higher compared to the others. It is also worth mentioning, that these firms are able to attract more reputable top-tier investment banks (underwriters) and auditors, but have less backing by venture capitalists. Regarding the initial returns, IPO firms with a low compensated CEO are more underpriced than those with a high compensated CEO. Also, high technology firms with more effective external (HHI) monitoring mechanisms tend to provide larger compensation packages to CEOs than firms with the opposite characteristics. Lastly, in Panel C (Table 3), we provide a detailed example of the top and bottom ten compensation awarding companies.

### 4.2 Plots of Hazard and Survival Functions

As preliminary analysis, we estimate the hazard and survival functions for both groups of IPO firms with high compensated (high firm gap) CEOs and those with low compensated (low firm gap) CEOs. The plots of Nelson-Aalen cumulative hazard and Kaplan-Meier survival estimates are provided in Figure 1 and Figure 2, respectively. In Figures 1a and 2a, the hazard function of IPO firms with a high compensated CEO as well as with high firm pay gap are below that of firms with a low compensated CEO and low firm pay gap, respectively. The gaps widen steadily as the length of time following the issue year increases. On the other hand, as can be seen from Figures 1b and 2b, the survival functions of IPO firms with a high compensated CEO and high firm pay gap are

above that of firms with a low compensated CEO and low firm pay gap. Also, the gap between the survival functions for both total compensation and firm gap is slightly larger after 2005.

The probability of surviving 5 years after the issue is 65% (62%) for firms with a high compensated CEO (high firm gap), compared to 50% (52%) for firms with a low compensated CEO. The survival probability after 10 years following the issue decreases considerably for firms with low pay gap (low compensated CEO) 17% (20%), while this probability is 30% (30%) for firms with high pay gap (high compensated CEO). Furthermore, the log-rank test for equality of survival functions shows that the estimated survival curves of the four groups are different at the 1% significance level. Overall, the plots of survival and hazard functions document that IPO firms with a high compensated CEO and high firm gap have a lower risk profile and a higher survival profile compared to firms with a low compensated CEO and low firm gap.

### 4.3 Estimation of the Cox Proportional Hazards Model on Total CEO Compensation

Table 4 reports the results of the Cox proportional hazards model of probability of failure and time-to-failure which assesses the impact of having total CEO compensation on IPO survival on IPO survival after controlling for both cases for various firms and CEO factors influencing the survivability. Specification (1) evidences a strong and significant negative coefficient on total CEO compensation, suggesting that IPO firms with better remunerated CEOs have a lower probability of failure and a longer time to survive in the periods following the offering. This finding supports the efficient contracting hypothesis that IPO firms with a high compensated CEO survive for longer period than those with a low compensated CEO. The hazard ratio of 0.902 shows that the failure risk of IPO firms with a high compensated CEO is 90.2% of the failure risk of firms with a low compensated CEO.

In specifications (2) and (3) we examine the possibility that the coefficient of the total CEO compensation masks information embedded in the individual remuneration components. Specifically, we find that failure risk is associated with a lesser reliance on short-term compensation as companies provide more equity-based compensation and less in cash bonuses when failure risk is higher. The level of fixed salary (salary and bonus) is not associated with firm mortality. Together, these findings indicate that the failure risk is lower when compensation is paid in the form of additional equity-based compensation that provides the CEO with greater shareholder wealth-increasing and risk-taking incentives.

As for the results about the remaining control variables, in all specification their sign and significance is generally consistent with the prior literature. In particular, we find that firms with CEOs who also serves as chairman tend to have a lower probability of failure and a longer time to

survive which is in line with the study of Adams et al. (2005). By contrast, firms with CEOs with who have been serving for many years have a higher probability of failure and a shorter time to survive. Additionally, firms with higher IPO first-day returns tend to have higher failure risks in subsequent periods and survive for a shorter time. Our results are not in line with the finding of Jain and Kini (2000) who show that venture-backed firms are more likely to survive longer and have higher survival rates.

Moreover, we do not find a significant relation between IPO survival and profitability. The results regarding proceeds and its impact on IPO survival are contradict with the prior literature as there is not a statistically significant association between proceeds and survivorship. With respect to underwriters and big auditors, our results are consistent with the prior literature and suggest that only the top-underwriters are important and particularly firms that are able to attract more reputable top-tier investment banks have a lower probability of failure and survive for a longer time. Finally, we find that high-tech firms with high board governance quality and industry concentration have lower failure risks in following periods and a shorter time to survive. Therefore, it appears that board governance quality may be a channel through which high compensated CEOs influence IPO firms' survival profiles. Also, high compensated CEOs may be more risk-averse, and they may want to decrease firm riskiness through the reducing of R&D expenses.

### 4.4 Estimation of the Cox Proportional Hazards Model on Total Firm Pay Disparity

Next, we continue our analysis by replacing the total CEO compensation with the firm pay gap. Specification (1) of Table 5 indicates that, the coefficient on total firm pay gap is negative and significant. Specifications (2) and (3) of Table 5 provide further insights by examining the impact of short-term and long-term firm pay disparities on IPO survival. The estimated coefficients on short-term and long-term pay gap produce different results. In particular, the coefficient on short-term pay gap is positive and not significant, while the coefficient on long-term pay gap is negative and significant at 1% level. This suggests that IPO firms with high pay disparities have a lower probability of failure and a longer time to survive than those with low pay disparities and this relationship is strengthened mainly from the long-term pay gap.

The hazard ratio of 0.917 suggests that the failure risk of IPO firms with high pay gap is 91.7% of the failure risk of firms with low pay gap. Thus, this result confirms the efficient contracting hypothesis that firms with high pay disparities survive for longer period than those with low pay disparities. The coefficients on control variables are similar with those of the previous sub-section, consistent across all specifications and in line with prior literature on IPO survival. To summarize, the evidence in this section suggests that the survivorship is longer among firms with

high pay gaps and high compensated CEOs and these associations are more pronounced in long-term pay disparity and compensation, respectively.

### 4.5 Accelerated Failure Time (AFT) Method

The results thus far show that high CEO remuneration and firm tournament incentives increase IPO survivals. In this section, to test further our hypotheses, we estimate an AFT model of IPO mortality, which is presented in Table 6. In this method, the dependent variable is the natural logarithm of the survival time or time to failure. Therefore, a positive (negative) coefficient means that an increase in the independent variable leads to an increase (decrease) in the probability of delisting in the subsequent periods. We present both the coefficient estimates and the time ratios along with the associated p-values. The results show a positive association between total CEO compensation and the survival time. The coefficient on the total remuneration is positive, highly significant at the 1% level. In particular, the coefficient on total compensation is 0.15, which suggests that a unit increase in total compensation causes the survival time of the average firm to increase by 16.18% [=exp(0.15*1-1]. In turn, this translates to an increase in the survival time from 90.82 months (7.87 years) to 105.51 months (8.79 years).

In a similar vein, the coefficient on the firm pay disparity is strongly positive and significant. Specifically, a unit increase of the pay disparity increases the survival time of the average firm by 13.65 months. The results regarding the control variables and their impact on post-IPO survival are in line with our expectations. The findings regarding CEO duality suggest that firms with CEOs who also are chairman are more likely to survive longer and have higher survival rates. Nevertheless, we find that CEO tenure has a negative and significant impact on the survival. The coefficient on immediate aftermarket returns is negative (as expected) and statistically significant. Moreover, our findings show a negative but statistically insignificant effect of leverage on IPO survival.

The positive association between underwriter and IPO survival is consistent with Bhattacharya et al. (2015), who find that IPOs which attract top-tier investment banks have significantly increased survival times. Contrary to Jain and Kini (2000), we find an insignificant effect of venture capitalists and Big 4 auditors on survival. Our results also provide support to the argument that a firm with high board governance quality and industry concentration has much higher survival time compared to the others. Lastly, our findings document that risky firms significantly increases the survival time of the issuing firms. The estimated time ratio for the variable R&D is 0.999 which shows that the survival time for IPOs with high R&D reduces by 1% compared to IPOs with non-R&D expenses.

## 5. Robustness Analysis

### 5.1 Correction for Selection Bias using Heckman's Procedure

A CEO may be selected due to the fit between the individual and job compensation. A firm may prefer to appoint a CEO who has low or high requirements suitable to the firm's plans. This may be induces a sample selection bias. To address this concern we estimate the inverse mills ratios for both total CEO compensation and firm pay gap and include these as additional control variables in the Cox proportional hazard models. Panel A of Table 7 shows the results controlling for such possible sample selection bias. It is evident that sample selection is not a concern in our estimates, since both inverse mills ratios (total CEO compensation/firm gap) are not significant at any conventional level. Thus, our results are consistent with the results presented in the main analysis, suggesting that IPOs with high total CEO compensation and firm pay disparities tend to have lower failure risks and higher survival times than those with low total CEO remuneration and firm pay gap.

### 5.2 Other Robustness Tests

The results thus far show that remuneration and firm pay disparities are positively associated with IPO survival. In this section, we perform several supplementary tests to examine the sensitivity of our findings and to investigate further some alternative explanations for the results. Firstly, our sample is from 2000 to 2012; thus, to address any concerns about the impact of crisis periods, in untabulated results we re-estimate the main Cox proportional hazard models. The coefficients on our main variables of interest – total CEO compensation and firm pay gap-still provide support for our main hypothesis, namely, our findings reported in the main analysis still hold when we control for crisis periods.[9]

We further explore the robustness of our results by using alternative definition of the survived firms and re-run our main models, categorizing now voluntary death firms as those that are delisted from the stock exchange due to going private or being acquired or merged. Overall, the results in Panel B of Table 7 consistently show that high compensated CEOs and high firm pay disparities are negatively associated with future failure risks. The hazard ratio of the variable firm gap is 0.892 indicating that the failure risk of IPO firms with high pay disparities is around 89% the failure risk of firms with low pay disparities.

Finally, we repeat the baseline regressions using alternative industry fixed effects (i.e., Fama French 17 and Fama-French 49) to address the possibility of our results being driven by inter-

[9] Our results remain robust in both methods once we exclude from our sample the companies in which there is CEO Turnover prior to the year of IPO.

industry differences in executive compensation and/or firm pay gap. After re-estimating the basic equation, we find no evidence that affect our results. Thus, our results do not appear to be driven by individual industries. In particular, in Panel C (Table 8), we compare our results by excluding the industry fixed effects. We obtained similar evidences across all results suggesting negative and significant relationships between failure risk, compensation and pay gap. This implies that our main results are robust and consistent with our prior findings.

## 6. Cross Sectional Variation

In this section, we explore cross-sectional variations in the importance of CEO compensation and firm pay disparities on IPO survivability along the dimensions of CEO characteristics and corporate governance. An important benefit of this analysis is that it can depict a more nuanced picture of the effect of total CEO remuneration and firm gap by highlighting the settings in which their effectiveness are pronounced. If CEO compensation enhances IPO survivability, then its beneficial impact should be strengthened either in settings where the possibility of agency conflicts is relatively low or when the CEO possesses a set of attributes, skills and capabilities that are especially valuable to the firms. To test this conjecture, we initially consider alternative governance structures as well as CEOs with different characteristics in order to capture, apart from the potential agency problems, heterogeneities in managerial ability or effort.

### *6.1 Governance and Monitoring Mechanisms*

Chahine and Goergen (2011) argue that the role of incentivizing tools, such as compensation rewards, is better understood if it is studied in the context of the firm's overall corporate governance. To this end, we begin our cross-sectional analysis by examining how the role of compensation awards varies across alternative governance settings. The optimal contracting paradigm postulates that boards of directors minimize agency costs by actively monitoring the executives and optimally assigning them with incentives and responsibility (e.g., Grossman and Hart, 1983; Holmstrom, 1979). The managerial power view, on the other hand, contends that boards may fail to minimize agency costs, as they do not always bargain at arms-length or induce managers to elicit the appropriate level of effort (e.g., Bebchuk, et al., 2002; Bertrand and Mullainathan, 1999).

Hence, the central question, here, is whether the traditional agency conflicts that tend to plague the link between CEO pay and firm performance, are mitigated by the strength of corporate governance mechanisms. As Coles et al. (1999) argue the degree of agency costs within a particular firm is determined by the power structure, i.e., the balance of power between managers and

shareholders. Under strong governance schemes, the balance of control is such that it can lead to behaviors and decisions by managers that are in the (best) interests of the shareholders. By contrast, as managers gain more control, they have greater discretion to act at their personal interest at the expense of shareholders (Jensen and Meckling, 1976). Thus, we use a set of well-established indicators of corporate governance in order to investigate the role of governance in the link between CEO pay and IPO.

We begin by considering board composition, and specifically, board independence, as a proxy for overall governance quality. Prior empirical studies show that boards with independence may help mitigate the agency problems caused by the divergent objective functions between senior management and shareholders (Ryan and Wiggins, 2004; Elbadry et al., 2015). Likewise, we anticipate that IPO firms with more independent boards are more likely to ensure the effectiveness of CEO awards as an incentive mechanism, and as a consequence, improve the survival chances of the firm.

In addition to board independence, we consider the organization device most closely associated to shaping executive pay, namely, the remuneration committee. Daily et al. (1998) note that the remuneration committee should not be simply regarded as a complementary discipline mechanism performing solely a monitoring role on the growth in executive pay. Instead, it should be viewed as an organization device setting the appropriate reward structure for board members. As a result, compensation packages are more effective incentivizing devises in the presence of strong rather than weak remuneration committees.[10]

Agency theory posits that the balance of power is also determined by the roles undertaken by the CEO. In this case, the fundamental dilemma is whether to separate the CEO and chairman positions. Arguably, a CEO with a dual role in the board has greater managerial discretion and expedites the decision making process (Liu and Jiraporn, 2010). However, combining the CEO-chairman role leads to managerial power that may be excessive compared to the efficient levels suggested by optimal contracts (Bebchuk, Fried, and Walker, 2002). Possessing higher degrees of managerial power allows CEOs to act unilaterally with less input from the board or other managers, thereby reducing the board efficiency (Hermalin and Weisbach, 1998). Accordingly, excessive power allows managers to have greater influence over the level and the structure of their

[10] To do so, we construct a compensation committee quality index taking the first factor of applying principal components analysis to five proxies of remuneration committee index: the compensation committee independence, the percentage of outside directors on the compensation committee that were appointed after the current CEO took office, a dummy variable, equal to one if the majority of outside directors on the compensation committee serve on three or more other boards, and equal to one otherwise, the natural log of the number of directors serving on the compensation committee, and the number of compensation committee meetings.

compensation, leading to suboptimal contracts through contract terms that are less transparent or more difficult to value. As a consequence, we anticipate that the beneficial role of CEO pay on IPO survival is less pronounced in firms with powerful CEOs.

Similar arguments can be made to another choice of organizational form, i.e., firms with founders and non-founders or professional CEOs. Compared to professional CEOS, founder CEOs are more likely to exhibit entrenchment behavior, thereby influencing negatively post-IPO economic outcomes (Shleifer and Vishny, 1989; Wasserman, 2003; Adams et al., 2009). However, research also highlights certain positive aspects of founder CEO leadership that would imply lower agency costs. In fact, researchers underscore the potential of lower agency costs in founder-led firms due to the stronger psychological attachment and identification within the organization, greater firm specific skills, and larger investment horizons relative to non-founder CEOs (Certo et al., 2001; Nelson, 2003). As a result, the potential for lower agency costs in founder-led CEO firms is likely to be particularly beneficial in setting incentive arrangements, since it can provide management greater flexibility in designing compensation contracts. This conjecture is supported by empirical evidence showing that founder-CEOs are associated with lower total compensation because of their stronger intrinsic motivation (He, 2008).

### *6.2 CEO Characteristics*

A growing body of literature concerned with the economic impact of CEO attributes demonstrates that managerial overconfidence can lead to decisions that are harmful to the firm. For instance, overconfidence may generate disagreements (i.e., agency costs) between managers and shareholders as it adversely affects the efficiency of investments (Malmedier and Tate, 2008), financial reporting quality (Schrand and Zechman, 2011), and acquisitions (Brown and Sarma, 2007). Further, Boulton and Campbell (2016) extend the above findings in equity issuance decisions by showing that higher overconfident managers are associated with greater IPO underpricing. Based on the above evidence, we hypothesize that managers' post-IPO decisions are conditional on their level of overconfidence. As such, the effectiveness of reward schemes should be distorted by overconfident CEOs.

Another managerial trait commonly used in the literature is CEO age. The advantage of age is that it captures the interplay between career concerns and real investment decisions. As Li et al. (2017) point out career concerns are of particular importance because managers are expected to deliberately adjust their investment behavior in order to influence favorably the labor market perceptions regarding their abilities, reputation and future prospects. The impact of career concerns is stronger for managers that are further away from retirements, as younger managers are more

likely to capitalize market's belief about their abilities (Gibbons and Murphy, 1992). As a consequence, the effort exerted by younger CEOs is higher than that of older CEOs, which implies a greater effectiveness of compensation schemes for young CEOs.

To proxy for managerial ability, we search whether the CEO has graduated from an elite university. Conventional wisdom suggests that academic credentials are useful for the CEO labor market, as they may serve as a screening device for talent, thereby increasing total compensation. However, the quality of education may also be beneficial for the firm as it elevates the CEO effort (through increased reputation concerns) as well as the productivity of the managers. Falato et al., (2014) confirm the above conjectures by showing that academic credentials are an important component of the rising talent premium, and importantly, that better credentials have a positive impact in firm performance, which is consistent with market based theories (e.g., Murphy and Zabojnik, 2004; 2007; Gabaix and Landier, 2008; Tervio, 2008). In line with the above, we anticipate the positive impact of CEO pay on IPO survival is pronounced for CEO with better education credentials.

### *6.3 Changes in the Nature of the CEO Job*

The discussion thus far, like most papers in the literature, has treated the efficient contracting and the managerial power approaches as competing hypotheses, with the aim of distinguishing them empirically. However, as Murphy (2013, p. 322) argues, rigidly adopting either hypothesis will inevitably result in less interesting and less realistic conclusions. Instead of viewing the two approaches as mutually exclusive, it is more productive to acknowledge that there may be other forces that come into play. In this respect, it is worth mentioning an additional view that attempts to explain trends in pay by focusing in changes in the nature of the CEO job.

Murphy and Zabojnik (2008) and Frydman (2007) document a secular increase in CEO pay over the last decades and attribute it to a gradual shift in the relative importance of general managerial capital over firm-specific capital. They note that this shift could explain the generous payouts to newly hired CEOs, especially those hired outside the firm, as appointments outside of the firm tend to be more expensive. Despite that the prevalence for hiring generalists CEO outside the firm is often cited as evidence for the efficient contracting approach (Custodio et al., 2013), generalist or outsider CEOs are often criticized enjoying overly generous packages.

Interestingly, this apparent agency problem caused by excess managerial power, since it is not created by boards captive to the CEO, rather it is the outcome of arms' length negotiation with a non-incumbent CEO candidate. The above discussion is particularly relevant for the IPO survivability context because one might expect that hiring a new CEO, presumably outsider and

with general managerial capital, could better position the firm in navigating successfully the transition of the firm from private to public, as these types of executives are typically better in adapting to turbulent environments and more experienced in leading a public company.

In particular, and in spite that firms are more willing to offer higher pay packages to generalists CEOs, recent studies demonstrate that because generalists CEOs exacerbate the agency problem, they are detrimental to the interest of shareholders. Specifically, Mishra (2014) shows that generalist CEOs are associated with higher cost of capital, where as Gounopoulos and Pham (2018) document that IPOs with generalist CEOs have shorter survivability compared to CEOs with special or firm-specific managerial skills. As a result, we anticipate that the positive relationship between CEO pay and IPO survival is weakened for firms with newly appointed and/or generalists CEOs.

### *6.4 Promotion Incentives*

In order to gain a clearer understanding of the association between firm pay gap and firm mortality, we formally test efficient contracting hypothesis in several cases which affect the probability of promotion. Kale et al. (2009) document that CEOs who are also the founder of the firm are less likely to leave the firm they started, hence, we expect that the probability of promotion should be lower in founder-led CEO firms. Also, Murphy and Zabojnik, (2004) and Bertrand (2009) note a dramatic increase over the last decades of the CEOs with general managerial skills, however, Gounopoulos and Pham (2018) support that this type of CEO skills could not led the firm to survival. Therefore, we predict that IPO firms with high pay disparities should have greater survival time among non-founder and generalist CEOs.

Prior literature mentions that when a CEO is old and, the likelihood of promotion for the other top management members should increase and, as a result, the pay gap should be lower when the firm has an old CEO. In the same spirit, Kale et al. (2009) suggest that when a firm has a non-New CEO, then the candidates have more probabilities of promotion to the position of CEO. Thus, our expectations are that the positive association between firm pay gap and firm mortality is strengthened for firms with high experienced in the position of this firm and older CEOs.

Our last set of proxies for probability of winning is related to CEO and firm characteristics. Our proxies include are whether the CEO is powerful, and the attractiveness of the CEOs as a candidate, which is defined as the firm's accounting performance. Prior studies have documented that powerful CEOs lead to larger pay gaps between them and their subordinate managers (e.g., Kale et al., 2009). Additionally, some other argue that internal tournament incentives have a positive impact on firm performance because it incentivizes top executive members to work hard in order to increase their probability of promotion (e.g., Eriksso, 1999; Kale et al., 2009). Hence, we

expect a more pronounced positive association between pay disparities and firm survivorship when firms have high performance and powerful CEOs.

### *6.5 Cross-Sectional Variation Results*

The results are reported in Table 8. Our findings suggest highly significant and negative association between total CEO compensation and IPO failure risk concentrates among firms with young, specialist, and with long tenure CEOs who also are graduated from an elite institution and are the founder of the firms. Notably, our results regarding the monitoring indicate that the relation positive relation between remuneration and survivorship is more pronounced in firms with less overconfident and less powerful CEOs with high governance quality and competition.[11] Our findings regarding the internal pay gaps show that firms with high pay disparities have lower failure rates among firms with non-founder CEOs who are experienced and have general skills. Lastly, our analysis reveals that firms with high pay gaps increase their survival rate especially when their CEOs are attractive and powerful.

## 7. Conclusion

Executive compensation is a very controversial topic that has been the subject of considerable debate in finance, however, a little research has been done about its role in the IPO market with only a few exceptions which examine the effect of some components of the remuneration on the short-run IPO performance. In this paper, we focus on the effect of executive compensation on the long-run performance, namely, its influence on the fate of an IPO firm. Particularly, we examine whether total CEO compensation and firm pay disparities are associated with the probability of failure and survivability in post-issue periods of IPO firms.

Employing the survival analysis, we document that IPO firms with high pay disparities and high compensated CEOs have a lower probability of failure and a longer time to survive. Specifically, our results indicate that the failure risk of IPO firms with a high compensated CEO is 90.2% of the failure risk of firms with a low compensated CEO. Our findings are robust to estimating our regressions using Cox and AFT models, industry and year fixed effects as well as the

[11] We also considered two monitoring mechanisms that are less subject to the control of the board or the CEO, financial leverage and product market competition. Prior research suggests that the level of financial leverage reflects the need of creditors to monitor more intensively the motives, action and behaviors of the top decision makers within the firm (Jensen, 1986). A similar discipline mechanism is the degree of concentration or the intensity of product market competition. Several studies indicate that within environments of high competition, decision making is more sensible to the interests of the providers of capital. Hence, we predict that compensation packages are more effective incentivizing devises in regimes of higher monitoring intensity, as captured by financial leverage and market competition.

Heckman (1979) two-stage model to test for sample selection bias. In subsequent tests, we find that the association between total CEO remuneration and survivorship is more pronounced in founder-led firms with non-experienced CEOs but with special skills who are graduated from a prestige institution. Furthermore, our study demonstrates that IPO firms with high compensated CEOs have longer time to survive especially in environments with lower agency conflicts. Lastly, the negative relation between total pay disparities and failure risk is stronger among firms with older CEOs with general skills which are not managed from founders.

Overall, our study provides several contributions. First, we establish a link between executive compensation, pay gaps and IPO survival. Second, we expand the literature of executive compensation around IPOs, by investigating the role of remuneration on the mortality (long-run performance) of IPO firms. Lastly, our study and findings are of relevance to future investors, academic researchers, government regulators, policy makers, business executives and other stakeholders interested in the survivability of IPOs.

**Appendix A:** Definitions of Variables

| Variable | Definition |
|---|---|
| | **Panel A:** IPO Pricing |
| Initial Returns | The difference between the first secondary market closing price available in CRSP and IPO offer price, divided by IPO offer price. |
| | **Panel B:** Compensation Variables |
| CEO Salary | The logarithmic value of cash awarded to the CEO as cash compensation in the fiscal year prior to the IPO. |
| CEO Bonus | The logarithmic value of cash awarded to the CEO as bonus in the fiscal year prior to the IPO. |
| CEO Stock Awards | The logarithmic value of stock granted to the CEO evaluated at grant date using firm estimated present value. |
| CEO Option Awards | The logarithmic value of options granted to the CEO as option awards under the year (prior to the IPO) plan in connection with his appointment as CEO. |
| CEO Non-Equity Incentive Plan Compensation | The logarithmic value of the actual amount earned under short-term, performance-based cash incentive plan for fiscal year prior to the IPO. |
| CEO All Other Compensation | The logarithmic value of all other compensation awarded to the CEO in the fiscal year prior to the IPO. |
| CEO Total Compensation | The logarithmic value of the sum of all the above compensations awarded to the CEO in the fiscal year prior to the IPO. |
| Firm Pay Gap | Firm Gap is the natural logarithm of the difference between CEO's total compensation and the total compensation of the median VP following Kale et al. (2009). |
| | **Panel C:** Governance Characteristics |
| CEO Duality | Dummy variable set to 1 if the CEO is both chairman/chairwoman and CEO, and 0 otherwise. |
| CEO Tenure | Number of years working as CEO in the firm until the IPO. |
| CEO Age | Age of CEO (in years). |
| CEO Power | CEO Power Factor score from Principle Component Analysis (PCA) using CEO tenure, CEO ownership, CEO Duality and CEO Triality (CEO, Chairman and President). |
| CEO Triality | Dummy variable set to 1 if the CEO is Chairman/Chairwoman, President, and CEO, and 0 otherwise. |
| General Ability Index | First factor of applying principal components analysis to five proxies of general managerial ability: Number of roles, Number of firms, Number of industries, CEO experience dummy, Conglomerate experience dummy (following Custodio et al., 2012). |
| Generalist | Dummy variable equal to 1 if CEO is a generalist, and 0 otherwise. CEO is classified as a generalist if CEO's general ability index is equal to or above the sample median. |
| Founder | Dummy variable equal to 1 if the CEO is both founder and CEO, and 0 otherwise. |
| New CEO | Dummy variable equal to 1 if the CEO tenure is smaller than 2 years, and 0 otherwise. |
| Powerful CEO | Dummy variable equal to 1 if the CEO Powerful Factor score is above the sample median. CEO Powerful Factor score from Principle Component Analysis (PCA) using CEO tenure, CEO ownership, CEO Duality and CEO Triality (CEO, Chairman and President). |
| Overconfident CEO | Dummy variable equal to 1 if CEO is overconfident and 0 otherwise (using the investment-based measure as well as three IPO characteristics following Boulton and Campbell (2016). |
| TOP30 Institution | Dummy variable equal to 1 if CEO is an alumnus of a TOP30 institution, and 0 otherwise. |
| High Education Quality | High education quality firms include those firms with CEOs who are graduated from a Top30 institution (provided by USNWR). |
| | **Panel D:** Firm Fundamentals |
| Firm age | The number of years elapsed since firm's foundation to IPO date, using foundation dates from Thomson Financial database as well as from the Field-Ritter dataset. The variable is transformed into the regressions by adding 1 and taking the natural logarithm. |
| VC | Dummy variable equal to 1 for venture capital-backed firms, and 0 otherwise. |
| Proceeds | The natural logarithm of gross proceeds raised by the IPO estimated as shared offered times the offer price. |
| Overhang | The ratio of shares retained by the pre-IPO shareholders over shares issued in the offering. |
| Underwriter | Dummy variable equal to 1 for most prestigious underwriters, 0 otherwise. Most reputable underwriters are those with a ranking score of 9.0 or above based on Jay Ritter's underwriter (prestige) rankings. |
| Internet | Dummy variable equal to 1 for IPOs of Internet firms, and 0 otherwise. Internet firms are classified those with business description containing any of the words "Internet", "Online", eBusiness", "eCommerce", and/or "Website". |

| | |
|---|---|
| Technology firm | Dummy variable: one for IPO firms with SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3677, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), and 7371, 7372, 7373, 7374, 7375, 7378, and 7379 (software). |
| Big 4 Auditor | Dummy variable equal to 1 if the firm is audited by a big four audit firm, and zero otherwise. Big four audit firms include Ernst & Young, Deloitte & Touche, KPMG, and PricewaterhouseCoopers. |
| Nasdaq | Dummy variable equal to 1 for NASDAQ-listed IPOs, and 0 otherwise. |
| R&D | R&D is the ratio of total R&D expense to total sales in the fiscal year prior to the IPO |
| Leverage | The ratio of total liabilities over total assets in the fiscal year prior to IPO. |
| EPS | Dummy variable equal to 1 for positive earnings per share in the fiscal year prior to IPO, and 0 otherwise. |
| | **Panel E:** Other Firm Characteristics |
| Failure | Dummy variable equal to 1 if the firm is delisted within 5 years after its IPO, and 0 otherwise. |
| Survival Time | The natural logarithm of the time to delist (survival time) which is measured in months. |
| Market Return | The compounded daily return on CRSP value-weighted index over the 20 trading days trailing the IPO. |
| Board Governance | First factor of applying principal components analysis following Laksmana (2008). |
| Board Independence | It is defined as the ratio of the number of independent outside directors to the total number of directors. |
| Compensation Committee Independence | It measures compensation committee independence defined in the same manner as Board Independence. |
| HHI | HHI (Herfindahl-Hirschman Index) is calculated by squaring the market share if each firm competing in a market and then summing the resulting numbers. |

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**Table 1:** IPO Distribution by Year and Industry

This Table presents the distribution of overall sample and the three/four groups of IPO firms: survived, acquired, exchanged, liquidated, and failed firms. Liquidated firms are those that are delisted due to company liquidation (delisting code 400 to 490). Exchanged firms are those that are delisted due to stop/change of trading on exchange (delisting code 300 to 390). Dropped firms are those that are dropped (delisting code from 500 to 599). Acquired firms are those that are delisted due to mergers and/or acquisitions (delisting code from 200 to 299). Survived firms are those that are still trading (delisting code of 100). Failed firms are those that are delisted for negative reasons (delisting code greater than or equal 300). In Panel C the IPOs are distributed by industry. In this Panel we do not include some of the industries because of their low activity of IPOs.

**Panel A:** Distribution of IPOs from 2000-2012

| | From the IPO date to five years after the offering | |
|---|---|---|
| | N | % |
| Liquidated | 2 | 0.17 |
| Exchanged | 6 | 0.51 |
| Dropped | 82 | 6.98 |
| Acquired | 274 | 23.32 |
| Survived | 764 | 65.02 |
| Total | 1,128 | |

**Panel B:** Distribution by Year

| Year | All IPOs | Dropped | Acquired | Exchanged | Liquidated | Survived |
|---|---|---|---|---|---|---|
| | N | % | % | % | % | % |
| 2000 | 264 | 12.21 | 24.04 | 0.38 | 0.38 | 62.59 |
| 2001 | 59 | 6.77 | 22.03 | 0.00 | 0.00 | 71.18 |
| 2002 | 48 | 6.25 | 22.92 | 0.00 | 0.00 | 70.83 |
| 2003 | 47 | 4.25 | 31.91 | 0.00 | 0.00 | 63.83 |
| 2004 | 129 | 2.32 | 27.90 | 0.00 | 0.00 | 68.99 |
| 2005 | 115 | 7.82 | 15.65 | 0.00 | 0.77 | 76.52 |
| 2006 | 126 | 3.97 | 24.60 | 1.58 | 0.00 | 69.84 |
| 2007 | 112 | 5.36 | 22.32 | 0.89 | 0.00 | 70.54 |
| 2008 | 17 | 11.76 | 5.88 | 5.88 | 0.00 | 76.47 |
| 2009 | 38 | 2.63 | 26.31 | 0.00 | 0.00 | 71.05 |
| 2010 | 72 | 9.72 | 16.66 | 0.00 | 0.00 | 73.61 |
| 2011 | 71 | 8.57 | 17.14 | 0.00 | 0.00 | 74.29 |
| 2012 | 80 | 2.50 | 33.75 | 1.25 | 0.00 | 61.25 |

Note: Delisting is tracked for five years after the IPO

**Panel C:** Distribution by Industry

| Industry (two-digit SIC codes) | | All IPOs | Dropped | Acquired | Survived |
|---|---|---|---|---|---|
| | | N | % | % | % |
| Oil and Gas | (13) | 47 | 6.38 | 12.77 | 74.47 |
| Food Products | (20) | 13 | 0.00 | 23.08 | 69.23 |
| Chemical Products - | (28) | 175 | 8.00 | 22.29 | 66.29 |
| Manufacturing | (30-34) | 27 | 9.38 | 23.96 | 57.29 |
| Computer Equipment & Services | (35, 73) | 336 | 7.45 | 24.85 | 61.57 |
| Electronic Equipment | (36) | 122 | 6.56 | 26.23 | 64.75 |
| Scientific Instruments | (38) | 90 | 5.56 | 26.67 | 63.33 |
| Transportation & Public Utilities | (41, 42, 44-49) | 103 | 4.32 | 14.38 | 78.57 |
| Wholesale & Retail Trade | (50-59) | 100 | 2.19 | 19.37 | 64.70 |
| Entertainment Services | (70, 78, 79) | 14 | 13.33 | 0.00 | 86.67 |

Note: Delisting is tracked for five years after the IPO

**Table 2:** Survival Distribution of IPO Firms with a High Compensated and those with a Low Compensated CEO by Year and Industry

The Table reports the comparison of the distribution and cumulative failure rates by year and industry between the two groups of IPO firms: those with a high compensated CEO and those with a low compensated CEO. Panel A reports the survival distribution by year, between those firms with high compensated CEOs and high pay gaps and those with low compensated CEOs and low pay gaps. Panel B presents the survival distribution by industry for the same categories as in Panel A. In Panels B1 and B2 we do not include some of the industries because of the low IPOs activity. Also, the total number of IPOs is 1,128.The cumulative number and percentage of failed firms are examined for five years after the offering.

**Panel A1:** Survival Distribution by Year

| Year | Level of CEO Pay | Number and Percentage of IPO Firms | | Cumulative Number and Percentage of Non-Survived Firms | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Within 1 Year | | Within 2 Years | | Within 3 Years | | Within 4 Years | | Within 5 Years | |
| | | N | % | N | % | N | % | N | % | N | % | N | % |
| 2000 | High | 89 | 33.71 | 2 | 2.25 | 14 | 15.73 | 25 | 28.09 | 27 | 30.34 | 53 | 59.55 |
| | Low | 175 | 66.29 | 6 | 3.43 | 19 | 10.86 | 38 | 21.71 | 44 | 25.14 | 105 | 60.00 |
| 2001 | High | 27 | 45.76 | 0 | 0.00 | 2 | 7.41 | 6 | 22.22 | 6 | 22.22 | 11 | 40.74 |
| | Low | 32 | 54.24 | 0 | 0.00 | 2 | 6.25 | 5 | 15.63 | 5 | 15.63 | 11 | 34.38 |
| 2002 | High | 20 | 41.67 | 0 | 0.00 | 0 | 0.00 | 4 | 20.00 | 4 | 20.00 | 10 | 50.00 |
| | Low | 28 | 58.33 | 1 | 3.57 | 3 | 10.71 | 5 | 17.86 | 6 | 21.43 | 11 | 39.29 |
| 2003 | High | 25 | 53.19 | 1 | 4.00 | 3 | 12.00 | 6 | 24.00 | 7 | 28.00 | 8 | 32.00 |
| | Low | 22 | 46.81 | 1 | 4.55 | 2 | 9.09 | 2 | 9.09 | 3 | 13.64 | 11 | 50.00 |
| 2004 | High | 55 | 42.64 | 2 | 3.64 | 2 | 3.64 | 7 | 12.73 | 9 | 16.36 | 23 | 41.82 |
| | Low | 74 | 57.36 | 0 | 0.00 | 7 | 9.46 | 10 | 13.51 | 10 | 13.51 | 26 | 35.14 |
| 2005 | High | 58 | 50.43 | 2 | 3.45 | 5 | 8.62 | 7 | 12.07 | 9 | 15.52 | 19 | 32.76 |
| | Low | 57 | 49.57 | 1 | 1.75 | 4 | 7.02 | 9 | 15.79 | 10 | 17.54 | 16 | 28.07 |
| 2006 | High | 60 | 47.62 | 1 | 1.67 | 3 | 5.00 | 5 | 8.33 | 6 | 10.00 | 18 | 30.00 |
| | Low | 66 | 52.38 | 0 | 0.00 | 7 | 10.61 | 15 | 22.73 | 15 | 22.73 | 32 | 48.48 |
| 2007 | High | 64 | 57.14 | 1 | 1.56 | 2 | 3.13 | 9 | 14.06 | 10 | 15.63 | 26 | 40.63 |
| | Low | 48 | 42.86 | 1 | 2.08 | 4 | 8.33 | 7 | 14.58 | 8 | 16.67 | 20 | 41.67 |
| 2008 | High | 11 | 64.71 | 0 | 0.00 | 1 | 9.09 | 3 | 27.27 | 3 | 27.27 | 6 | 54.55 |
| | Low | 6 | 35.29 | 0 | 0.00 | 1 | 16.67 | 1 | 16.67 | 1 | 16.67 | 1 | 16.67 |
| 2009 | High | 31 | 81.58 | 0 | 0.00 | 2 | 6.45 | 4 | 12.90 | 4 | 12.90 | 17 | 54.84 |
| | Low | 7 | 18.42 | 0 | 0.00 | 1 | 14.29 | 2 | 28.57 | 2 | 28.57 | 5 | 71.43 |
| 2010 | High | 45 | 62.50 | 4 | 8.89 | 6 | 13.33 | 6 | 13.33 | 10 | 22.22 | 19 | 42.22 |
| | Low | 27 | 37.50 | 0 | 0.00 | 0 | 0.00 | 3 | 11.11 | 3 | 11.11 | 12 | 44.44 |
| 2011 | High | 47 | 66.20 | 3 | 6.38 | 4 | 8.51 | 7 | 14.89 | 10 | 21.28 | 15 | 31.91 |
| | Low | 24 | 33.80 | 0 | 0.00 | 1 | 4.17 | 4 | 16.67 | 4 | 16.67 | 13 | 54.17 |
| 2012 | High | 57 | 71.25 | 3 | 5.26 | 6 | 10.53 | 13 | 22.81 | 16 | 28.07 | 32 | 56.14 |
| | Low | 23 | 28.75 | 0 | 0.00 | 1 | 4.35 | 2 | 8.70 | 2 | 8.70 | 11 | 47.83 |
| 2000-2012 | High | 589 | 44.82 | 19 | 3.22 | 50 | 8.49 | 102 | 17.32 | 121 | 20.54 | 257 | 43.63 |
| | Low | 589 | 55.18 | 10 | 1.85 | 52 | 8.83 | 103 | 17.49 | 113 | 19.19 | 274 | 46.52 |

| **Panel A2:** Survival Distribution by Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Pay Gap | Number and Percentage of IPO Firms | | Cumulative Number and Percentage of Non-Survived Firms | | | | | | | | | |
| | | | | Within 1 Year | | Within 2 Years | | Within 3 Years | | Within 4 Years | | Within 5 Years | |
| | | N | % | N | % | N | % | N | % | N | % | N | % |
| 2000 | High | 64 | 30.33 | 2 | 3.13 | 11 | 17.19 | 19 | 29.69 | 21 | 32.81 | 38 | 59.38 |
| | Low | 147 | 69.67 | 5 | 3.40 | 15 | 10.20 | 30 | 20.41 | 35 | 23.81 | 87 | 59.18 |
| 2001 | High | 23 | 45.10 | 0 | 0.00 | 2 | 8.70 | 5 | 21.74 | 5 | 21.74 | 9 | 39.13 |
| | Low | 28 | 54.90 | 0 | 0.00 | 1 | 3.57 | 4 | 14.29 | 4 | 14.29 | 10 | 35.71 |
| 2002 | High | 16 | 43.24 | 0 | 0.00 | 0 | 0.00 | 2 | 12.50 | 2 | 12.50 | 8 | 50.00 |
| | Low | 21 | 56.76 | 1 | 4.76 | 3 | 14.29 | 7 | 33.33 | 8 | 38.10 | 9 | 42.86 |
| 2003 | High | 23 | 56.10 | 1 | 4.35 | 3 | 13.04 | 6 | 26.09 | 7 | 30.43 | 8 | 34.78 |
| | Low | 18 | 43.90 | 1 | 5.56 | 2 | 11.11 | 2 | 11.11 | 3 | 16.67 | 8 | 44.44 |
| 2004 | High | 44 | 40.00 | 1 | 2.27 | 1 | 2.27 | 5 | 11.36 | 6 | 13.64 | 18 | 40.91 |
| | Low | 66 | 60.00 | 1 | 1.52 | 5 | 7.58 | 7 | 10.61 | 8 | 12.12 | 23 | 34.85 |
| 2005 | High | 54 | 50.94 | 1 | 1.85 | 4 | 7.41 | 5 | 9.26 | 6 | 11.11 | 19 | 35.19 |
| | Low | 52 | 49.06 | 2 | 3.85 | 4 | 7.69 | 10 | 19.23 | 12 | 23.08 | 15 | 28.85 |
| 2006 | High | 49 | 44.55 | 1 | 2.04 | 3 | 6.12 | 5 | 10.20 | 6 | 12.24 | 17 | 34.69 |
| | Low | 61 | 55.45 | 0 | 0.00 | 5 | 8.20 | 11 | 18.03 | 11 | 18.03 | 26 | 42.62 |
| 2007 | High | 52 | 50.00 | 0 | 0.00 | 1 | 1.92 | 6 | 11.54 | 6 | 11.54 | 21 | 40.38 |
| | Low | 52 | 50.00 | 2 | 3.85 | 3 | 5.77 | 7 | 13.46 | 9 | 17.31 | 20 | 38.46 |
| 2008 | High | 8 | 53.33 | 0 | 0.00 | 1 | 12.50 | 2 | 25.00 | 2 | 25.00 | 3 | 37.50 |
| | Low | 7 | 46.67 | 0 | 0.00 | 1 | 14.29 | 2 | 28.57 | 2 | 28.57 | 4 | 57.14 |
| 2009 | High | 24 | 72.73 | 0 | 0.00 | 2 | 8.33 | 4 | 16.67 | 4 | 16.67 | 14 | 58.33 |
| | Low | 9 | 27.27 | 0 | 0.00 | 1 | 11.11 | 1 | 11.11 | 1 | 11.11 | 4 | 44.44 |
| 2010 | High | 33 | 49.25 | 3 | 9.09 | 5 | 15.15 | 5 | 15.15 | 8 | 24.24 | 13 | 39.39 |
| | Low | 34 | 50.75 | 1 | 2.94 | 1 | 2.94 | 4 | 11.76 | 5 | 14.71 | 14 | 41.18 |
| 2011 | High | 34 | 65.38 | 2 | 5.88 | 3 | 8.82 | 4 | 11.76 | 6 | 17.65 | 8 | 23.53 |
| | Low | 18 | 34.62 | 0 | 0.00 | 1 | 5.56 | 3 | 16.67 | 3 | 16.67 | 9 | 50.00 |
| 2012 | High | 40 | 61.54 | 2 | 5.00 | 5 | 12.50 | 7 | 17.50 | 9 | 22.50 | 21 | 52.50 |
| | Low | 25 | 38.46 | 0 | 0.00 | 1 | 4.00 | 7 | 28.00 | 7 | 28.00 | 15 | 60.00 |
| 2000-2012 | High | 464 | 46.31 | 13 | 2.80 | 41 | 8.84 | 75 | 16.16 | 88 | 18.97 | 198 | 42.67 |
| | Low | 538 | 53.69 | 13 | 2.42 | 42 | 7.81 | 95 | 17.66 | 108 | 20.07 | 244 | 45.35 |

**Panel B1:** Survival Distribution by Industry

| Industry (two-digit code) | Level of CEO Pay | Number and Percentage of IPO Firms | | Cumulative Number and Percentage of Non-Survived Firms | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Within 1 Year | | Within 2 Years | | Within 3 Years | | Within 4 Years | | Within 5 Years | |
| | | N | % | N | % | N | % | N | % | N | % | N | % |
| Oil and Gas (13) | High | 23 | 48.94 | 1 | 4.35 | 1 | 4.35 | 1 | 4.35 | 2 | 8.70 | 8 | 34.78 |
| | Low | 24 | 51.06 | 0 | 0.00 | 2 | 8.33 | 2 | 8.33 | 2 | 8.33 | 14 | 58.33 |
| Food Products (20) | High | 8 | 61.54 | 1 | 12.50 | 2 | 25.00 | 3 | 37.50 | 4 | 50.00 | 4 | 50.00 |
| | Low | 5 | 38.46 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 40.00 |
| Chemical Products (28) | High | 82 | 46.86 | 2 | 2.44 | 1 | 1.2 | 7 | 8.54 | 7 | 8.54 | 28 | 34.15 |
| | Low | 93 | 53.14 | 2 | 2.15 | 5 | 5.38 | 17 | 18.28 | 17 | 18.28 | 48 | 51.61 |
| Manufacturing (30-34) | High | 21 | 77.78 | 0 | 0.00 | 3 | 14.29 | 5 | 23.81 | 0 | 0.00 | 11 | 52.38 |
| | Low | 6 | 22.22 | 0 | 0.00 | 1 | 16.67 | 2 | 33.33 | 2 | 33.33 | 2 | 33.33 |
| Computer Equipment & Services (35, 73) | High | 161 | 47.92 | 12 | 7.45 | 18 | 11.18 | 34 | 21.12 | 41 | 25.47 | 77 | 47.83 |
| | Low | 175 | 52.08 | 6 | 3.43 | 23 | 13.14 | 41 | 23.43 | 46 | 26.29 | 91 | 52.00 |
| Electronic Equipment (36) | High | 41 | 33.61 | 2 | 4.88 | 4 | 9.76 | 11 | 26.83 | 13 | 31.71 | 25 | 60.98 |
| | Low | 81 | 66.39 | 4 | 4.94 | 4 | 4.94 | 10 | 12.35 | 12 | 14.81 | 28 | 34.57 |
| Scientific Instruments (38) | High | 30 | 33.33 | 2 | 6.67 | 3 | 10.00 | 8 | 26.67 | 9 | 30.00 | 12 | 40.00 |
| | Low | 60 | 66.67 | 1 | 1.67 | 6 | 10.00 | 12 | 20.00 | 13 | 21.67 | 31 | 51.67 |
| Transportation & Public Utilities (41, 42, 44-49) | High | 57 | 55.34 | 0 | 0.00 | 7 | 12.28 | 12 | 21.05 | 14 | 24.56 | 26 | 45.61 |
| | Low | 46 | 44.66 | 0 | 0.00 | 3 | 6.52 | 7 | 15.22 | 7 | 15.22 | 19 | 41.30 |
| Wholesale & Retail Trade (50-59) | High | 59 | 59.00 | 4 | 6.78 | 7 | 11.86 | 7 | 11.86 | 9 | 15.25 | 19 | 32.20 |
| | Low | 41 | 41.00 | 0 | 0.00 | 4 | 9.76 | 4 | 9.76 | 4 | 9.76 | 14 | 34.15 |
| Entertainment Services (70, 78, 79) | High | 11 | 78.57 | 1 | 9.09 | 2 | 18.18 | 2 | 18.18 | 3 | 27.27 | 4 | 36.36 |
| | Low | 3 | 21.43 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 33.33 |

**Panel B2:** Survival Distribution by Industry

| Industry (two-digit code) | Pay Gap | Number and Percentage of IPO Firms | | Cumulative Number and Percentage of Non-Survived Firms | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Within 1 Year | | Within 2 Years | | Within 3 Years | | Within 4 Years | | Within 5 Years | |
| | | N | % | N | % | N | % | N | % | N | % | N | % |
| Oil and Gas (13) | High | 20 | 44.44 | 1 | 5.00 | 1 | 5.00 | 1 | 5.00 | 2 | 10.00 | 8 | 40.00 |
| | Low | 25 | 55.56 | 0 | 0.00 | 2 | 8.00 | 2 | 8.00 | 2 | 8.00 | 13 | 52.00 |
| Food Products (20) | High | 5 | 45.45 | 1 | 20.00 | 2 | 40.00 | 3 | 60.00 | 4 | 80.00 | 4 | 80.00 |
| | Low | 6 | 54.55 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 2 | 33.33 |
| Chemical Products (28) | High | 64 | 41.83 | 0 | 0.00 | 1 | 1.56 | 4 | 6.25 | 4 | 6.25 | 24 | 37.50 |
| | Low | 89 | 58.17 | 0 | 0.00 | 1 | 1.12 | 12 | 13.48 | 12 | 13.48 | 35 | 39.33 |
| Manufacturing (30-34) | High | 18 | 75.00 | 0 | 0.00 | 3 | 16.67 | 5 | 27.78 | 5 | 27.78 | 10 | 55.56 |
| | Low | 6 | 25.00 | 0 | 0.00 | 1 | 16.67 | 1 | 16.67 | 1 | 16.67 | 2 | 33.33 |
| Computer Equipment & Services (35, 73) | High | 123 | 45.39 | 4 | 3.25 | 15 | 12.20 | 24 | 19.51 | 28 | 22.76 | 56 | 45.53 |
| | Low | 148 | 54.61 | 7 | 4.73 | 17 | 11.49 | 34 | 22.97 | 41 | 27.70 | 75 | 50.68 |
| Electronic Equipment (36) | High | 35 | 36.46 | 2 | 5.71 | 4 | 11.43 | 9 | 25.71 | 11 | 31.43 | 20 | 57.14 |
| | Low | 61 | 63.54 | 1 | 1.64 | 2 | 3.28 | 9 | 14.75 | 10 | 16.39 | 24 | 39.34 |
| Scientific Instruments (38) | High | 18 | 21.95 | 0 | 0.00 | 1 | 5.56 | 4 | 22.22 | 4 | 22.11 | 6 | 33.33 |
| | Low | 64 | 78.05 | 2 | 3.13 | 8 | 12.50 | 15 | 23.44 | 17 | 26.56 | 31 | 48.44 |
| Transportation & Public Utilities (41, 42, 44-49) | High | 45 | 51.72 | 2 | 4.44 | 6 | 13.33 | 10 | 22.22 | 12 | 26.67 | 18 | 40.00 |
| | Low | 42 | 48.28 | 1 | 2.38 | 3 | 7.14 | 7 | 16.67 | 8 | 19.05 | 24 | 57.14 |
| Wholesale & Retail Trade (50-59) | High | 53 | 60.92 | 1 | 1.89 | 1 | 1.89 | 5 | 9.43 | 6 | 11.32 | 15 | 28.30 |
| | Low | 34 | 39.08 | 1 | 2.94 | 5 | 14.71 | 6 | 17.65 | 7 | 20.59 | 13 | 38.24 |
| Entertainment Services (70, 78, 79) | High | 9 | 90.00 | 0 | 0.00 | 1 | 11.11 | 1 | 11.11 | 1 | 11.11 | 3 | 33.33 |
| | Low | 1 | 10.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |

**Table 3:** Descriptive Statistics

The Table presents descriptive statistics for the sample of U.S. IPOs over the period from 2000 to 2012. CEO's characteristics are illustrated in Panel A. Firm and offering characteristics are reported in Panel B. Tests of differences in means between the two sub-samples of IPO firms with a high compensated CEO and those with a low compensated CEO are based on t-tests. The number of observations for each variable is 1,128. All variables are defined in Appendix A.

| **Panel A:** CEO Characteristics | | | | |
|---|---|---|---|---|
| | All IPOs | IPOs with a high compensated CEO | IPOs with a low compensated CEO | Difference |
| | Mean | Mean | Mean | p-value |
| CEO Tenure | 3.97 | 3.88 | 4.10 | 0.2045 |
| CEO Duality | 0.54 | 0.62 | 0.47 | 0.0000 |
| Founder | 0.32 | 0.22 | 0.41 | 0.0000 |
| CEO Age | 49.48 | 50.66 | 48.27 | 0.0000 |
| Generalist | 0.60 | 0.63 | 0.57 | 0.0139 |
| **Panel B:** Firm and Offering Characteristics | | | | |
| Firm Age | 2.30 | 2.45 | 2.15 | 0.0000 |
| Proceeds | 4.41 | 4.84 | 3.98 | 0.0000 |
| Capital Expenditure | 0.05 | 0.05 | 0.04 | 0.0052 |
| R&D Intensity | 0.30 | 0.27 | 0.32 | 0.0176 |
| Leverage | 0.34 | 0.33 | 0.34 | 0.3819 |
| EPS | 0.50 | 0.56 | 0.44 | 0.0000 |
| Initial Returns | 22.22 | 17.51 | 26.93 | 0.0003 |
| Overhang | 4.46 | 4.19 | 4.75 | 0.0886 |
| Board Governance | -0.03 | -0.03 | -0.03 | 0.4606 |
| HHI | 0.47 | 0.48 | 0.47 | 0.2779 |
| Big 4 Auditor | 0.47 | 0.49 | 0.46 | 0.1466 |
| VC | 0.53 | 0.41 | 0.64 | 0.0000 |
| Underwriter | 0.35 | 0.47 | 0.23 | 0.0000 |
| Technology | 0.40 | 0.47 | 0.32 | 0.0000 |
| Internet | 0.11 | 0.10 | 0.12 | 0.2023 |
| Nasdaq | 0.72 | 0.60 | 0.83 | 0.0000 |
| **Panel C** Top and Bottom Ten Compensation Awarding Companies | | | | |
| **Panel C1:** Top Ten Compensation Awarding Companies | | | | |
| IPO Date | Company | Total CEO Compensation (mil.) | Survivorship | |
| 18/4/2011 | Air Lease Corp | $57,768,057 | 1 | |
| 9/3/2011 | HCA Holdings Inc | $38,201,047 | 1 | |
| 8/8/2007 | DemandTec Inc | $26,995,885 | 0 | |
| 25/1/2011 | Demand Media Inc | $25,141,924 | 1 | |
| 28/6/2010 | Tesla Motors Inc | $24,132,808 | 1 | |
| 16/11/2011 | Delphi Automotive PLC | $21,134,503 | 1 | |
| 7/2/2012 | Caesars Entertainment Corp | $17,503,197 | 1 | |
| 30/9/2009 | Talecris Biotherapeutics Hldg | $16,154,671 | 0 | |
| 20/1/2005 | Celanese Corp | $14,553,666 | 1 | |
| 24/3/2010 | Calix Inc | $13,859,389 | 1 | |
| **Panel C2:** Bottom Ten Compensation Awarding Companies | | | | |
| 24/6/2002 | BioDelivery Sciences Intl Inc | $3,404 | 1 | |
| 31/7/2000 | Western Multiplex Corp | $8,333 | 0 | |
| 14/12/2006 | US BioEnergy Corp | $15000 | 0 | |
| 14/12/2011 | Mid-Con Energy Partners LP | $15,361 | 1 | |
| 27/10/2005 | Accentia Biopharmaceuticals | $20,000 | 0 | |
| 25/10/2012 | Xplore Technologies Corp | $29,881 | 0 | |
| 13/10/2005 | PokerTek Inc | $33,333 | 1 | |
| 11/10/2012 | Workday Inc | $34,780 | 0 | |
| 8/3/2001 | Loudcloud Inc | $35,000 | 1 | |

**Table 4:** Estimation of Cox Proportional Hazards Model of Probability of Failure and Time-to Failure

The Table illustrates the estimation of Cox proportional hazards model of probability of failure and time-to failure. Our dependent variable is whether or not a firm survived 5 years after its IPO. Regression control for industry and year fixed effects whose coefficients are suppressed. T-statistics are included in the parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio |
| Total CEO Compensation | -0.10** (-2.26) | 0.902 | | | | |
| Short-Term CEO Compensation | | | 0.06 (0.95) | 1.062 | | |
| Long-Term CEO Compensation | | | | | -0.09*** (-3.85) | 0.913 |
| CEO Tenure | 0.05*** (6.26) | 1.051 | 0.04*** (5.77) | 1.047 | 0.05*** (6.44) | 1.055 |
| CEO Duality | -1.63*** (-4.02) | 0.195 | -1.64*** (-4.10) | 0.195 | -1.74*** (-3.90) | 0.176 |
| Founder | 0.03 (0.33) | 1.034 | 0.03 (0.32) | 1.033 | -0.09 (-0.83) | 0.908 |
| Initial Returns | 0.01*** (3.71) | 1.003 | 0.01*** (4.13) | 1.003 | 0.01*** (3.74) | 1.003 |
| Big 4 Auditor | -0.13 (-1.56) | 0.874 | -0.16* (-1.90) | 1.030 | -0.15 (-1.64) | 0.857 |
| Leverage | 0.03 (0.26) | 1.030 | 0.03 (0.26) | 1.030 | 0.06 (0.52) | 1.063 |
| Proceeds | 0.07 (1.23) | 1.069 | -0.01 (-0.27) | 0.985 | -0.02 (-0.33) | 0.979 |
| EPS | -0.02 (-0.18) | 0.982 | 0.02 (0.17) | 1.016 | 0.06 (0.60) | 1.065 |
| VC | 0.01 (0.12) | 1.013 | -0.01 (-0.15) | 0.983 | -0.07 (-0.59) | 0.931 |
| Technology | -0.25* (-1.94) | 0.779 | -0.28** (-2.13) | 0.757 | -0.24* (-1.72) | 0.783 |
| Internet | -0.21 (-1.31) | 0.805 | -0.22 (-1.32) | 0.800 | -0.25 (-1.40) | 0.775 |
| Underwriter | -0.37*** (-3.48) | 0.689 | -0.42*** (-3.93) | 0.659 | -0.41*** (-3.68) | 0.662 |
| Nasdaq | 0.12 (1.04) | 1.131 | 0.15 (1.32) | 1.169 | 0.03 (0.22) | 1.028 |
| Overhang | 0.01 (1.58) | 1.009 | 0.01 (1.03) | 1.006 | 0.01 (1.12) | 1.007 |
| Market Return | -1.92* (-1.81) | 0.146 | -2.03* (-1.91) | 0.132 | -2.48** (-2.24) | 0.083 |
| Board Governance | -1.60*** (-2.96) | 0.200 | -1.67*** (-3.05) | 0.188 | -2.20*** (-3.46) | 0.110 |
| HHI | -0.33** (-2.24) | 0.718 | -0.31** (-2.11) | 0.732 | -0.35** (-2.15) | 0.703 |
| Capital Expenditure | -0.40 (-0.71) | 0.672 | -0.27 (-0.49) | 0.760 | -0.12 (-0.20) | 0.886 |
| R&D Intensity | 0.37*** (3.76) | 1.450 | 0.34*** (3.47) | 1.412 | 0.33*** (2.99) | 1.385 |
| Industry & Year FE | Y | | Y | | Y | |
| Chi-Square | 430.48 | | 428.31 | | 403.45 | |
| Number of Observations | 926 | | 917 | | 780 | |

**Table 5:** Estimation of Cox Proportional Hazards Model of Probability of Failure and Time-to Failure

The table illustrates the estimation of Cox proportional hazards model of probability of failure and time-to failure. Our dependent variable is whether or not a firm survived 5 years after its IPO. Regression control for industry and year fixed effects whose coefficients are suppressed. T-statistics are included in the parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio |
| Total Firm Gap | -0.08**<br>(-2.55) | 0.917 | | | | |
| Short-Term Firm Gap | | | 0.02<br>(0.42) | 1.018 | | |
| Long-Term Firm Gap | | | | | -0.06***<br>(-3.62) | 0.940 |
| CEO Tenure | 0.05***<br>(5.40) | 1.048 | 0.05***<br>(5.10) | 1.047 | 0.05***<br>(4.62) | 1.050 |
| CEO Duality | -1.62***<br>(-4.50) | 0.196 | -1.81***<br>(-4.30) | 0.164 | -1.68***<br>(-3.95) | 0.185 |
| Founder | -0.02<br>(-0.19) | 0.978 | 0.03<br>(0.25) | 1.029 | 0.01<br>(0.01) | 1.000 |
| Initial Returns | 0.01***<br>(2.96) | 1.002 | 0.01***<br>(3.32) | 1.003 | 0.01***<br>(2.54) | 1.005 |
| Big 4 Auditor | -0.17*<br>(-1.84) | 0.841 | -0.17*<br>(-1.68) | 0.844 | -0.13<br>(-1.03) | 0.882 |
| Leverage | 0.05<br>(0.40) | 1.049 | 0.01<br>(0.11) | 1.014 | 0.20<br>(1.40) | 1.223 |
| Proceeds | 0.04<br>(0.65) | 1.041 | 0.03<br>(0.47) | 1.028 | -0.01<br>(-0.14) | 0.988 |
| EPS | -0.01<br>(-0.04) | 0.996 | -0.08<br>(-0.71) | 0.922 | 0.01<br>(0.08) | 1.010 |
| VC | 0.06<br>(0.46) | 1.058 | -0.07<br>(-0.56) | 0.928 | -0.01<br>(-0.04) | 0.993 |
| Technology | -0.24*<br>(-1.73) | 0.782 | -0.20<br>(-1.37) | 0.813 | 0.07<br>(0.41) | 1.007 |
| Internet | -0.14<br>(-0.73) | 0.870 | -0.29<br>(-1.44) | 0.745 | -0.19<br>(-0.83) | 0.827 |
| Underwriter | -0.42***<br>(-3.74) | 0.655 | -0.45***<br>(-3.75) | 0.633 | -0.43***<br>(-2.99) | 0.648 |
| Nasdaq | 0.04<br>(0.29) | 1.038 | 0.14<br>(0.98) | 1.148 | 0.05<br>(0.33) | 1.054 |
| Overhang | 0.01<br>(0.84) | 1.006 | 0.01<br>(1.37) | 1.015 | 0.01<br>(0.31) | 1.003 |
| Market Return | -1.85<br>(-1.60) | 0.157 | -1.81<br>(-1.48) | 0.163 | -2.54*<br>(-1.83) | 0.078 |
| Board Governance | -2.05***<br>(-3.38) | 0.128 | -2.31***<br>(-3.54) | 0.099 | -2.56***<br>(-3.13) | 0.077 |
| HHI | -0.34**<br>(-2.20) | 0.709 | -0.36**<br>(-2.16) | 0.698 | -0.43**<br>(-1.99) | 0.649 |
| Capital Expenditure | 0.02<br>(0.04) | 1.025 | 0.48<br>(0.75) | 1.627 | -0.48<br>(-0.62) | 0.619 |
| R&D Intensity | 0.40***<br>(3.72) | 1.486 | 0.27**<br>(2.32) | 1.311 | 0.40***<br>(2.81) | 1.486 |
| Industry & Year FE | Y | | Y | | Y | |
| Chi-Square | 369.74 | | 372.48 | | 244.54 | |
| Number of Observations | 783 | | 700 | | 469 | |

**Table 6:** Accelerated Failure Time (AFT) Model

This Table shows the estimation results of the Accelerated Failure Time (AFT) model. Our dependent variable is the natural logarithm of the time to delist (survival time) which is measured in months. The Weibull distribution was selected based on the Akaike Information Criterion (AIC). Time ratios are the exponentiated coefficients, exp(β), and measure the extent to which changes in covariates accelerate or decelerate the occurrence of event (delisting). A time ratio of above (below) one indicates that an increase in the covariate increases (reduces) the survival time. T-statistics are included in the parentheses and are adjusted for heteroskedasticity robust standard errors clustered by industry and year. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

| | Coefficient | Time Ratio | Coefficient | Time Ratio |
|---|---|---|---|---|
| Total CEO Compensation | 0.15*** | 1.010 | | |
| | (4.23) | | | |
| Total Firm Gap | | | 0.14*** | 1.010 |
| | | | (5.02) | |
| CEO Tenure | -0.03*** | 0.999 | -0.03*** | 0.999 |
| | (-4.25) | | (-3.56) | |
| CEO Duality | 1.82*** | 1.020 | 1.76*** | 1.020 |
| | (5.10) | | (4.55) | |
| Founder | 0.03 | 1.001 | 0.10 | 1.001 |
| | (0.34) | | (1.17) | |
| Initial Returns | -0.01*** | 0.999 | -0.01*** | 0.999 |
| | (-4.27) | | (-2.62) | |
| Big 4 Auditor | 0.15** | 1.001 | 0.26*** | 1.001 |
| | (2.21) | | (3.40) | |
| Leverage | -0.06 | 0.999 | -0.15 | 0.999 |
| | (-0.69) | | (-1.59) | |
| Proceeds | -0.05 | 0.999 | -0.07 | 0.999 |
| | (-1.30) | | (-1.30) | |
| EPS | 0.11 | 1.010 | 0.14* | 1.001 |
| | (1.43) | | (1.69) | |
| VC | -0.05 | 0.999 | -0.03 | 0.999 |
| | (-0.56) | | (-0.34) | |
| Technology | 0.10 | 1.001 | 0.13 | 1.001 |
| | (0.95) | | (1.14) | |
| Internet | -0.05 | 0.999 | -0.17 | 0.999 |
| | (-0.45) | | (-1.28) | |
| Underwriter | 0.42*** | 1.001 | 0.49*** | 1.001 |
| | (4.82) | | (5.27) | |
| Nasdaq | -0.38*** | 0.999 | -0.41*** | 0.999 |
| | (-3.93) | | (-3.86) | |
| Overhang | -0.01 | 0.999 | -0.01 | 0.999 |
| | (-1.34) | | (-1.40) | |
| Market Return | 1.59* | 1.002 | 1.56* | 1.001 |
| | (1.85) | | (1.67) | |
| Board Governance | 1.26*** | 1.010 | 1.73*** | 1.020 |
| | (2.75) | | (3.33) | |
| HHI | 0.32*** | 1.001 | 0.36*** | 1.001 |
| | (2.64) | | (2.73) | |
| Capital Expenditure | -0.69 | 1.001 | 0.08 | 1.001 |
| | (-1.38) | | (0.16) | |
| R&D Intensity | -0.52*** | 0.999 | -0.52*** | 0.998 |
| | (-6.35) | | (-5.79) | |
| Industry & Year FE | Y | | Y | |
| LR (Prob.> chi)$^2$ | 774.11 | | 652.43 | |
| Number of Observations | 926 | | 783 | |

**Table 7:** Robustness Analysis

This Table displays the multivariate analysis using Cox Proportional Hazards Models with the Inverse Mills Ratios from the Heckman Two-Stage Model and the Cox Models with alternative industry definitions. Panel A shows the second-stage results from the Heckman Two-Stage Model. Panel B presents the estimation of Cox Proportional Hazards Models of Probability of failure and time-to-failure. Voluntary death firms include those delisted from the stock exchange due to going private or being acquired or merged. Panel C illustrates the estimation of Cox models using alternative industry definitions. Models (1) and (2) (Panel C) are results using alternative industry classifications. Model (3) (Panel C) shows the result without industry fixed effects. The sample consists of IPOs from 2000 to 2012 in the U.S. stock market. T-statistics are included in the parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

**Panel A:** Endogeneity Control

| | (1) | | (2) | |
|---|---|---|---|---|
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio |
| Total CEO Compensation | -0.10** (-2.29) | 0.901 | | |
| Total Firm Gap | | | -0.08** (-2.54) | 0.917 |
| Inverse Mills (Total Compensation) | 0.87 (0.88) | | | |
| Inverse Mills (Total Firm Gap) | | | 0.08 (0.06) | |
| Control Variables | Y | | Y | |
| Industry & Year FE | Y | | Y | |
| Chi-Square | 431.23 | | 369.74 | |
| Number of Observations | 926 | | 783 | |

**Panel B:** Other Robustness Tests

| | **Voluntary Deaths** | | | |
|---|---|---|---|---|
| | (1) | | (2) | |
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio |
| Total CEO Compensation | -0.12* (-1.78) | 0.884 | | |
| Total Firm Gap | | | -0.11** (-2.32) | 0.892 |
| Control Variables | Y | | Y | |
| Industry & Year FE | Y | | Y | |
| Chi-Square | 300.16 | | 265.41 | |
| Number of Observations | 926 | | 783 | |

**Panel C1:** Alternative Industry Definitions

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio | Coefficient. | Hazard Ratio |
| Total CEO Compensation | -0.09** (-2.15) | 0.907 | -0.11** (-2.52) | 0.889 | --0.07* (-1.82) | 0.927 |
| Control Variables | Y | | Y | | Y | |
| Industry & Year FE | Y | | Y | | Y | |
| Chi-Square | 427.79 | | 386.92 | | 403.77 | |
| Number of Observations | 926 | | 783 | | 926 | |

**Panel C2:** Alternative Industry Definitions

| | (1) | | (2) | | (3) | |
|---|---|---|---|---|---|---|
| | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio | Coefficient | Hazard Ratio |
| Total Firm Gap | -0.08** (-2.45) | 0.922 | -0.09** (-2.59) | 0.913 | -0.08*** (-2.65) | 0.918 |
| Control Variables | Y | | Y | | | |
| Industry & Year FE | Y | | Y | | | |
| Chi-Square | 365.30 | | 386.92 | | 345.83 | |
| Number of Observations | 783 | | 783 | | 783 | |

**Table 8:** Cross-Sectional Tests

The Table illustrates the estimation of Cox Proportional Hazards Models of Probability of failure and time-to-failure. T-statistics are included in the parentheses. Hazard Ratios are included in the parentheses below the t-statistics.***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

**Panel A1:** Effect of CEO Attributes on Total CEO Compensation

| | (1) | | (2) | | (3) | | (4) | | (5) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Over. CEOs | Non-Over. CEOs | Generalist | Specialist | Short Ten. | Long Ten. | Young | Old | High Educ. Quality | Low Educ. Quality |
| Total CEO Compensation | -0.09<br>(-0.98)<br>[0.907] | -0.19***<br>(-2.86)<br>[0.823] | -0.08<br>(-1.49)<br>[0.917] | -0.15*<br>(-1.83)<br>[0.859] | -0.23***<br>(-3.30)<br>[0.790] | -0.06<br>(-0.94)<br>[0.937] | -0.22***<br>(-3.02)<br>[0.797] | -0.05<br>(-0.69)<br>[0.953] | -0.22**<br>(-2.50)<br>[0.802] | -0.15**<br>(-1.98)<br>[0.858] |
| Control Variables | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry & Year FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Chi-Square | 200.46 | 210.67 | 237.11 | 251.52 | 266.43 | 209.05 | 292.36 | 189.59 | 300.16 | 254.62 |
| Number of Observations | 325 | 406 | 549 | 377 | 429 | 497 | 490 | 384 | 926 | 453 |

**Panel A2:** Effects of Governance Characteristics on Total CEO Compensation

| | (1) | | (2) | | (3) | | (4) | |
|---|---|---|---|---|---|---|---|---|
| | Founder | Non-Founder | Powerful CEOs | Non-Powerful CEOs | High Board Indep. | Low Board Indep. | High Comp. Committee Quality | Low Comp. Committee Quality |
| Total CEO Compensation | -0.25**<br>(-2.43)<br>[0.779] | -0.10*<br>(-1.87)<br>[0.903] | -0.11*<br>(-1.67)<br>[0.893] | -0.16**<br>(-2.15)<br>[0.846] | -0.22**<br>(-3.229)<br>[0.800] | -0.08<br>(0.77)<br>[0.919] | -0.14**<br>(-2.16)<br>[0.790] | -0.08<br>(-1.14)<br>[0.919] |
| Control Variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry & Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Chi-Square | 194.53 | 275.94 | 307.24 | 175.62 | 337.00 | 175.61 | 261.76 | 226.53 |
| Number of Observations | 291 | 635 | 533 | 393 | 634 | 292 | 467 | 459 |

**Panel B1:** Cross-Sectional Tests: Total Firm Pay Gap

| | (1) | | (2) | | (3) | | (4) | |
|---|---|---|---|---|---|---|---|---|
| | Founder | Non-Founder | Generalist | Specialist | Short Ten. | Long Ten. | Young | Old |
| Total Firm Pay Gap | -0.07<br>(-1.10)<br>[0.927] | -0.10**<br>(-2.53)<br>[0.900] | -0.11**<br>(-2.48)<br>[0.892] | -0.08<br>(-1.44)<br>[0.918] | -0.06<br>(-1.23)<br>[0.939] | -0.12**<br>(-2.51)<br>[0.884] | -0.07<br>(-1.45)<br>[0.930] | -0.11**<br>(-2.06)<br>[0.894] |
| Control Variables | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry & Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Chi-Square | 158.39 | 243.35 | 214.74 | 213.85 | 169.90 | 237.68 | 221.38 | 175.27 |
| Number of Observations | 228 | 555 | 478 | 305 | 410 | 373 | 399 | 342 |

**Panel B2:** Cross-Sectional Tests: Total Firm Pay Gap

| | (5) | | (6) | |
|---|---|---|---|---|
| | High ROA | Low ROA | Powerful CEOs | Non-Powerful CEOs |
| Total Firm Pay Gap | -0.24***<br>(-3.10)<br>[0.788] | -0.10**<br>(-1.09)<br>[0.904] | -0.11*<br>(-1.70)<br>[0.894] | -0.04<br>(-0.47)<br>[0.962] |
| Control Variables | Y | Y | Y | Y |
| Industry & Year FE | Y | Y | Y | Y |
| Chi-Square | 131.42 | 88.29 | 124.01 | 213.85 |
| Number of Observations | 385 | 382 | 443 | 340 |

**Figure 1a**

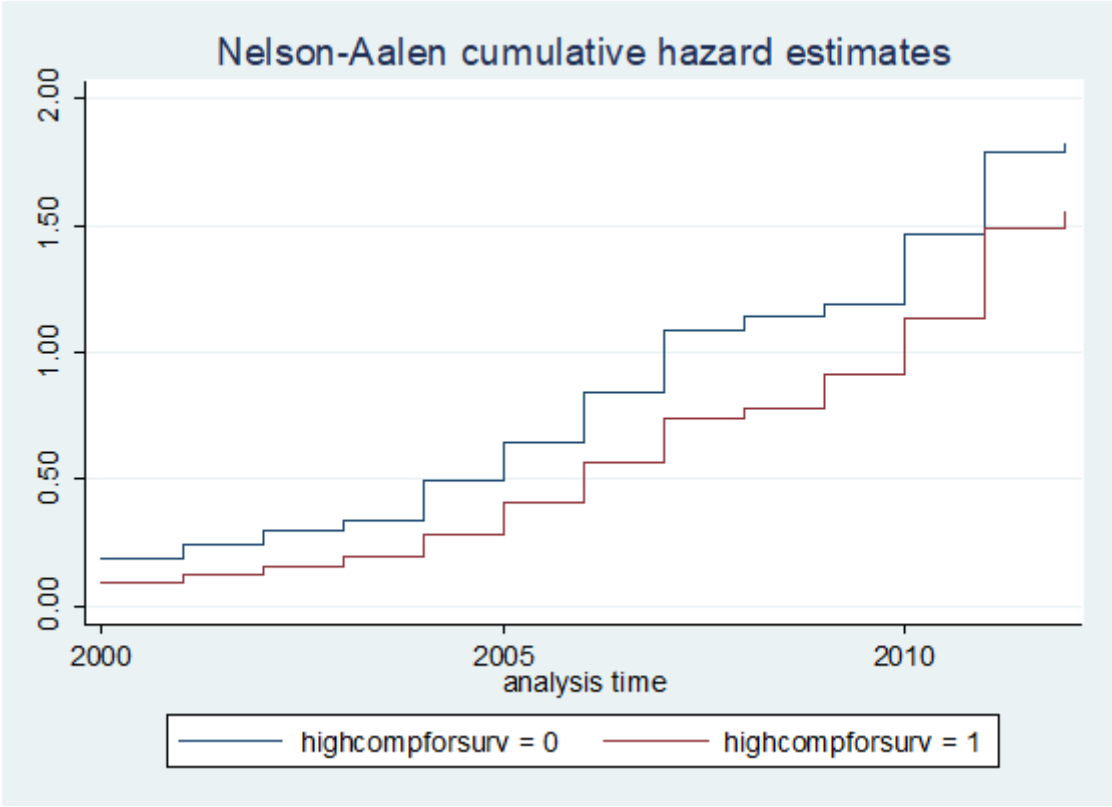


**Figure 1b**

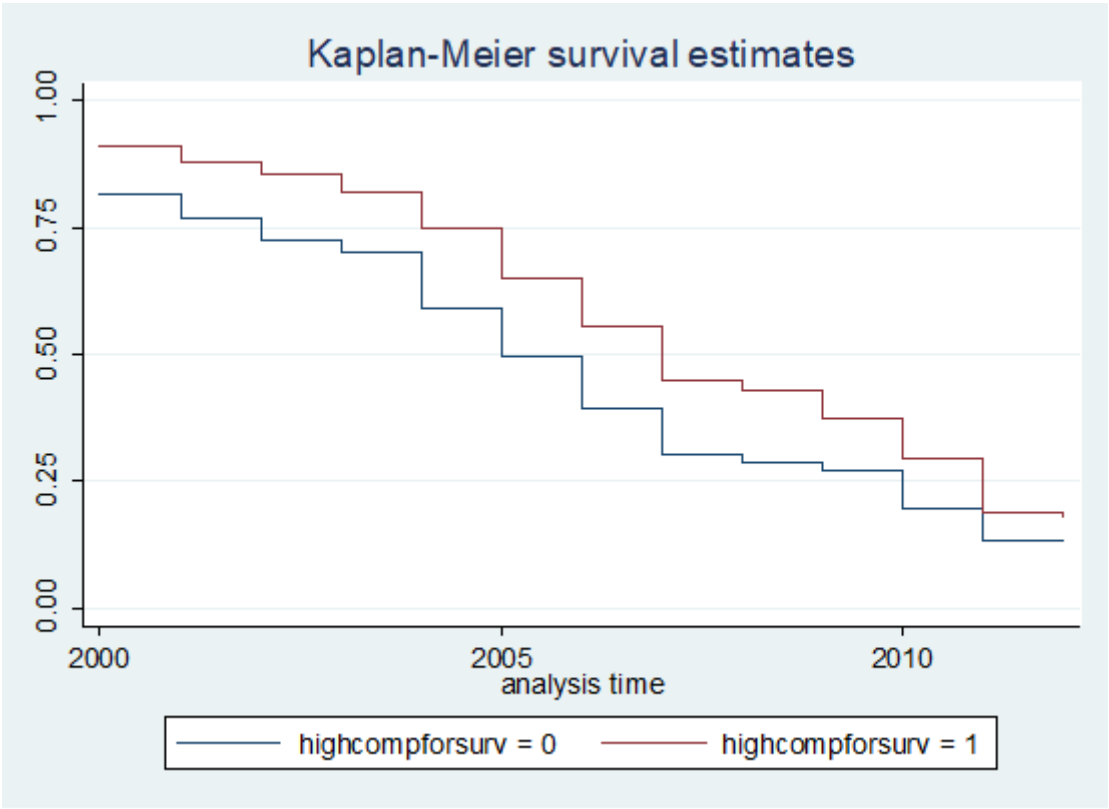

**Figure 2a**

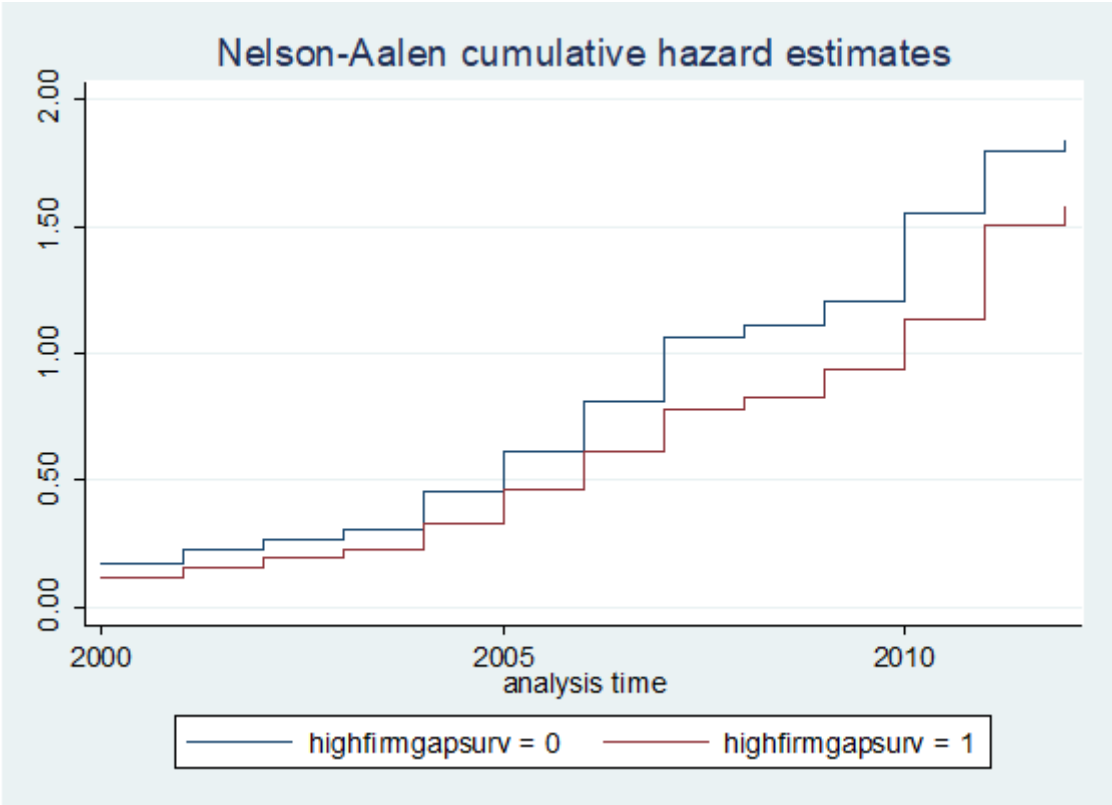


**Figure 2b**