CEO Pay Disparity and Firm Value

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Prior studies have reported mixed results with regard to the effect of CEO pay disparity on firm value. While one stream of studies provides evidence that, based on tournament theory, a higher wage difference between CEOs and VPs positively affects firm value, other studies refer to the managerial power theory and show that the relationship is in fact negative. In this study, I investigate the roots of prior mixed findings to identify what the true effect is, if any. I conclude that the findings of prior studies have been biased due to 1) the existence of biased observations in the ExecuComp database, 2) incomplete research models, and 3) the choices of sample period. I replicate prior studies, properly adjust their models, and identify biased observations in their sample to analyze how CEO pay disparity can affect firm value. I find that firm value is positively affected by the difference between the salary of CEOs and that of their VPs, which could also justify one of the reasons behind the increase in CEO pay disparity in recent years.

Keywords: pay disparity, firm value, backfilling

INTRODUCTION

In recent years, the ratio of CEOs' salary to the average employees' salary has increased from 40:1 in the early 1980s to more than 350:1 after 2010 (AFL-CIO, 2013). Regulators have not remained silent in response to the increase in executives' pay, and, through the Dodd-Frank Wall Street Reform and Consumer Protection Act, require firms to disclose the ratio of their CEO's salary to their median employee salary. As CEOs' salaries have increased, market participants and academic researchers have also become more and more focused on the effects of the gap between the salaries of CEOs and the salaries of VPs.

The vast increase in CEOs' compensation has raised questions regarding the roots of this change and the effects it can have on different aspects of the firm and its market performance. As a result, researchers have tested whether the increase in the salary of CEOs in recent years could be related to changes in firm value. Investigating the relationship between a CEO's salary and company value, researchers refer to two different theories, with contrasting arguments, to clarify how changes in firm value may be due to the change in CEO pay disparity (the gap between the CEO's salary and salary of VPs). On the one hand, studies like Kale et al. (2009) report that there is a significant positive contemporaneous relationship between pay disparity measure and company value, while, on the other hand, Bebchuk et al. (2011) argue that the intertemporal relationship is negative.

In this study, I aim to resolve the mixed findings of prior studies investigating the true relationship between pay disparity measure and company value. While one research stream has found that pay disparity increases firm value by incentivizing VPs to work harder to be promoted to the CEO position with its higher salary (Lazear & Rosen, 1981; Kale et al., 2009), other studies have found that pay disparity is value-

diminishing, as the market generally reacts negatively to an increase in pay disparity (Bebchuk et al., 2011). Further investigating the findings of prior studies, I modify prior models by 1) adding additional control variables documented in prior studies, 2) excluding biased observations present in the ExecuComp database as demonstrated by Gillan et al. (2018), and 3) extending the sample period to test if the findings of prior studies remain statistically significant.

The results of my analyses indicate that the relationship between pay disparity measure and company value is significantly positive, and my findings do not support a value-diminishing effect of CEO pay disparity on firm value. I find that the existence of biased observations in the ExecuComp database is critical in these models, and prior studies' results documenting a negative relationship between pay disparity measure and company value do not remain statistically significant after the exclusion of biased observations present in the ExecuComp database.

Academic researchers use empirical analysis to test their hypotheses. In order to make sure that the findings of such studies are reliable, researchers need to ensure that their sample observations are bias-free. One of the main sources of executives' compensation data that accounting and finance researchers use in their studies is the S&P ExecuComp dataset, which provides salary and compensation information for companies' top executives. A recent study by Gillan et al. (2018) finds that some of the observations in the ExecuComp database have been backfilled. They argue that such backfilled observations are added systematically to the ExecuComp in a non-random procedure. Such backfilled observations pertain to specific types of firms (mostly firms with high growth rates), resulting in the systematic inclusion of biased observations in the database. Therefore, oversampling of certain types of firms in the ExecuComp database over time can affect the findings of empirical studies. Gillan et al. (2018) argue that researchers should be aware of these observations and remove them from their sample before testing their hypotheses to make sure that their findings are not biased. Otherwise, the validity of their findings is questionable, due to the existence of backfilled, biased observations in the sample under study.

Investigating the effect of backfilled observations, I first replicate prior studies that document both positive and negative relationship between pay disparity measure and company value. Using the sample selection, model, and analyses of prior studies, I observe that prior studies' findings are significant if biased observations are present in their samples. Next, I eliminate the backfilled observations identified by the work of Gillan et al. (2018) to see if the findings are changed. After so doing, I find that the results of only one stream of studies remain significant, while the findings of the other stream lose their statistical significance. My additional analyses further shed light on the positive relationship between pay disparity measure and company value and demonstrate the importance of removing biases in the sample under investigation.

According to Gillan et al. (2018), backfilled observations are introduced to the ExecuComp database because S&P attempts to add historical observations to ExecuComp to cover more executive salary information over time. However, the method that S&P uses to add more observations is the key to understanding why backfilled data are biased and to what degree they may affect the results. Looking deeply to investigate whether backfilled observations are biased or not, and if so, which firm-specific variables and measures are most affected by the inclusion of backfilled observation in the ExecuComp database, Gillan et al. (2018) demonstrate that backfilled data are systematically included in the ExecuComp database, and such observations are mostly related to high-growth firms. Therefore, I expect that findings of studies relating executive salary information to firm value and stock price will likely be affected by the inclusion of backfilled observations in the S&P ExecuComp database.

Comparing samples with and without backfilled observations, I find that the significant negative relationship between the lag CEO pay slice (CPS) and firm value measured by the Tobin's Q become insignificant after removing the backfilled observations. To more deeply investigate the relationship between firm value and CPS, I extend the sample period in additional analyses and include observations from more recent years, as prior studies are limited to the 2006 fiscal year. Moreover, I advance my analysis by using a comprehensive model that includes additional control variables to test the relationship between the variables under study. While I have been able to find a significant positive contemporaneous relationship between the firm value and CEO pay disparity measures, in none of the additional tests is the

intertemporal negative relationship between pay disparity measure and company value significant. Therefore, the findings indicate that the negative relationship between firm value and CPS may be driven by to the existence of biased observations in the ExecuComp database, lack of adequate control variables, and the short time period used in the sample.

On the other hand, Kale et al. (2009) show that there is a significant positive contemporaneous relationship between the gap in the executives' salary and firm value measured by the Tobin's Q and Return on Assets (ROA). While Bebchuk et al. (2011) focus on the intertemporal relationship, Kale et al. (2009) document a positive contemporaneous relationship between the test variables. Similar to the analysis performed on Bebchuk et al. (2011), I extend the work of Kale et al. (2009) by eliminating biased observations, improving their model, and extending the sample period.

The results of my analyses confirm that the contemporaneous relationship between the firm value and CEO pay disparity is indeed positive and remain significant even after the elimination of biased observations, the inclusion of more control variables, and the extension of sample period. Therefore, I conclude that while the negative intertemporal relationship between executive pay disparity and firm value is not statistically supported according to my analyses, the positive contemporaneous relationship is indeed valid and statistically significant.

In Chapter 2, I review prior studies and discuss how this study contributes to the literature. Chapter 3 talks about the sample selection, research design, and the model used to test the hypotheses. In Chapter 4, I provide the results of replicating Bebchuk et al. (2011), as well as the additional tests to investigate the intertemporal relationship between firm value and CPS. Chapter 5 presents the replication results of Kale et al. (2009) and the extended tests focusing on the contemporaneous relationship. Finally, conclusion of the analyses and the findings is presented in Chapter 6.

INSTITUTIONAL BACKGROUND

Tournament theory as well as managerial power theory are the two schools of thought with regard to the relationship between pay disparity measure and company value. On the one hand, beginning with the work of Lazear and Rosen (1981), tournament theory argues that the higher pay disparity between CEOs and VPs is considered to be the prize of a tournament in which players (senior executives of a firm) compete with each other to be promoted to the CEO position. Numerous studies - like Lasear and Rosen (1981), Prendergast (1999), Bognanno (2001), and Kale et al. (2009) - demonstrate that, as pay disparity increases (that is, the salary of CEOs increases more relative to the salary of VPs), VPs will have greater incentive to work harder to become CEO. At the same time, CEOs will also work harder to keep their jobs as their VPs become more and more qualified to take their positions. Therefore, senior executives of a company have more incentives to work harder due to higher CEO pay disparity. As a result, the risks of entrenchment of the current CEO and CEO succession are reduced, and such risk reduction can decrease investors' rate of return and ultimately increase the firm value.

Supporters of managerial power theory, on the other hand, argue that not only does CEO pay disparity not reduce the risk of CEO entrenchment, but it is in fact an indication of an entrenched CEO (Bebchuk & Fried, 2003). The basis of the managerial power theory is the simple idea that, in order to keep his job, an entrenched CEO with a high salary may take actions to eliminate highly skilled VPs that are likely to take his position. Therefore, smart and skillful VPs that could help CEOs to make value-increasing decisions are removed from the firms, which could hurt the firm value in the long term (Rajan & Wulf, 2006; Masulis & Mobbs, 2011). Also, according to Moody's comment that high pay disparity between the CEO and the executives of a firm is considered a red flag of credit risk (Moody, 2006), it can also be inferred that high CEO pay disparity is value-diminishing. Investigating the effect of CPS on firm value, Bebchuk et al. (2011) also report that firms with high CPS face agency problems, resulting in negative effects on their values. Balsam et al. (2016) also refer to both theories and argue that the pay disparity can be both value increasing and decreasing.

Tournament Theory

Market participants and scholars argue that, in a competitive economy, one of the most efficient compensation system's is the one that determines employees' and managers' salaries based on their relative performance, in comparison to their peers, rather than their absolute performance, and tournaments are planned to incentivize people to make their optimal level of effort (Lazear & Rosen, 1981; Lazear, 1999; Harford, 2006). In other words, absolute differences between the work of managers may be small, while their respective compensation plans can differ widely. This is called tournament theory, and its rigidity and testability are some of the main reasons for its popularity, as it relates managers' pay differences to their rank-orders in a firm (Becker & Huselid, 1992; Eriksson, 1999; Rosen, 1986). In simple terms, tournament theory argues that CEOs should have higher pay than other managers because they have been able to win against all the other employees to be in this position. Accordingly, the rewards of tournament participants are at their optimal level when the tournament participants total output is maximized (Knoeber, 1989; Knoeber & Thurman, 1994).

Analytically modeling to capture the rewards in the contracting perspective, Taylor (1995) argues that contracting procedure is not necessarily an optimal solution to incentivize players to make unobservable investments in order to gain unobservable outcomes. Similarly, Schwarz and Severinov (2010) focus on the "investment tournament" as a decision-making problem to allocate limited resources among several alternative choices. Their main analysis concerned the career choice problem—which can be extended to several different scenarios—and authors show that succession risk would be lower in a situation in which candidates work under a tournament reward basis.

Furthermore, focusing on the arguments surrounding the optimal contracting and agency theory, Masulis and Mobbs (2011) aim to delineate the benefits of inside versus outside directors. Consistent with tournament theory, they find that, when companies have several highly skilled internal directors as potential candidates for the CEO position, the current CEOs act less opportunistically for their own personal benefit, and the board will also have greater bargaining power. In addition, Raheja (2005) compares the information asymmetry between inside and outside directors and note that boards can benefit from tournament competition among inside directors when revealing their information.

Prior studies also point to both the size of a prize and the likelihood of winning in a tournament and argue that if the likelihood of receiving a prize or promotion is similar or immeasurable, then companies can incentivize their employees by increasing the size of the rewards (Prendergast, 1999; Kale et al., 2009). Similarly, in a study outside the scope of corporate executives, Ehrenberg and Bognanno (1990) focus on the performance of professional golf players and observe that as the size of the prize increases, players' performance is also improved. Furthermore studies provide evidence that when companies would like to incentivize their executives to work harder and to improve their performance then firms increase the pay disparity between their CEOs and their other top executives and therefore there pay disparity has a positive effect on firm value (Zhang, 2014; Cheng et al., 2017).

Researchers have also documented the relationship between pay for performance on output and how managers may work differently in response to their compensation plans (Groves et al., 1994; Lazear, 2000; Banker, Lee & Potter, 1996; Boning, Ichnowski & Shaw, 1998; Bognanno, 2001). For example, Bognanno (2001) examines the relationships between executives' salary and their position in the organization's hierarchy and, consistent with tournament theory, documents that as the managers move toward higher positions in the organizational chart, the gap between their salaries increases. Also, as the number of people competing for the CEO position increases, CEO's salary also increases. In addition, studies like Bothner et al. (2007), Boudreau et al. (2011), Gillis et al. (2011), and Morgan and Wang (2010) focus on tournament theory to investigate different types of relative (versus absolute) performances. Cappelli and Cascio (1991) and DeVaro (2006) also argue that, aside from its great influence on compensation schedules, tournaments are hard to capture, invisible, and integral procedures.

Summing up ideas related to tournament theory, researchers discuss both pros and cons of tournament theory. While tournament theory may incentivize managers and VPs to work hard to be promoted to the CEO position with its higher compensation plans, it can also create a deadweight loss due to the creation

of an unhealthy competition between rival managers to get to the CEO position, for which they may harm each other or even the company (Milgrom & Roberts, 1992; Bebchuk et al., 2011).

Managerial Power Theory

Bebchuk and Fried (2003) discuss different aspects of the separation of management and ownership in firms and the effects on the CEOs' compensation plans. They argue that higher salaries of CEOs is an indication of their bargaining power, because boards allow higher salaries for them. According to the authors' argument, the high bargaining power of CEOs is indeed an indication of an entrenched CEO, which can be seen as an agency problem in the firm during the CEO tenure time period.

Succession risk is generally defined as the risk associated with replacement of the CEO. According to prior studies, one of the main challenges and risks companies face in their operations is in the time during which their CEOs are changed and the board is required to find and appoint a new CEO who may be chosen either internally from the existing lower-level managers or externally. Therefore, firms may experience uncertainty and instability during the CEO succession period.

As managers' power increases—indicated by higher pay disparity—managers may seek to keep office by eliminating other internal VPs, thereby increasing succession risk. So as managers become more entrenched, firm value decreases because succession risk increases. In order to ease the succession planning and lower the risk associated with that, companies can select internal director candidates while current CEO cooperates in training the future CEO to gain required knowledge and firm information (Vancil, 1987; Hermalin & Weisbach, 1988; Bower, 2007).

Moreover, discussing the issues related to the entrenched CEOs, Rajan and Wulf (2006) investigate organizations' hierarchical structure and find out that organizations have become flatter over time. As organizations flatten, the number of managers reporting directly to the CEO increases while more and more authority for decision-making is granted to lower level managers and VPs. When CEOs face an increase in the number of senior managers with greater responsibilities closed to them—and who may be possible future candidates for their position—they may take action to block the growth of internally-prepared successor candidates. Therefore, CEOs' actions can lower the work quality of internal managers, which can increase the firm's succession risk—a major agency problem at firms with entrenched CEOs (Masulis & Mobbs, 2011).

Jensen and Meckling (1976) also argue that as entrenchment of CEOs increases and firms face more severe succession risk, investors' cost of equity and return rate also increase, leading to higher investment cost for firms. Albuquerque and Wang (2008) focus on the separation of management and ownership in different countries and find that, as agency conflict increases and investors' protection decreases, expected return increases and firm value decreases. They provide evidence that numerous factors related to firm value and firm riskiness indicate that firms face higher risk when CEOs become more involved in entrenchment activities for their own personal benefit. Similarly, Garmaise and Liu (2005), in a cross-country study, find that increase in systematic risk due to CEOs' dishonesty (corruption) is higher in countries with lower shareholder rights, and in firms with more entrenched CEOs.

A series of studies look in greater detail at the different effects of entrenched CEOs and how shareholders and investors may react to this phenomenon. For example, Lombardo and Pagano (2000; 2002) provide a model for the law enforcement mechanisms that affect firm riskiness and rate of return. They show that, with lower monitoring mechanisms, shareholders require higher rate of return to be compensated against the entrenched CEO. Similarly, Fields et al. (2001), Francis et al. (2004) and Bowen et al. (2008) discuss the association between governance quality and accounting discretion and relate such relationships to the cost of equity financing. They argue that, with the existence of entrenched CEOs and their opportunistic behavior for their personal benefit, the cost of equity financing increases, while CEOs may engage in misleading financial reporting activities to prevent disclosure of their opportunistic activities. Additionally, according to the incomplete market hypothesis, shareholders' expected rate of return increases if shareholders are unwilling to invest in companies with greater possibilities of CEO entrenchment activities.

Finally, Bebchuk et al. (2011) investigate the effect of CEO pay disparity on firm value. According to the managerial power theory, higher CEO pay disparity (as an indication of an agency problem) is related to increased succession and entrenchment risk. Stemming from the managerial power theory and agency problem, Bebchuk et al. (2011) report that lag CEO pay disparity is negatively related to firm value. Also investigating the means by which CEO pay disparity decreases firm value, Chen et al. (2013) attribute the negative relationship in part to the cost of equity and find that CEO pay disparity affects company value by the means of cost of equity channel. In other words, CEO pay disparity affects the firm's riskiness, which causes the implied cost of equity to increase. Therefore, as implied cost of equity increases, firm value is diminished due to the higher discount factor by which future cash flows are discounted.

Backfilling in the ExecuComp Database

As empirical analysis investigates the relationship between variables to find out if they are related to or affect each other, it is important to make sure that the sample of observations under study is randomly selected and not biased. Otherwise, the results of the analysis, even if statistically significant, will not be reliable and will be prone to errors if the results may be driven by the small number of biased observation present in the sample. Therefore, researchers and empirical analysts need to be careful with the way their samples are collected and make sure that there are no systematically-biased observations with abnormally high or low values in their samples.

ExecuComp is one of the databases most commonly used by academic researchers to gather information about the salary and compensation of corporate managers and executives. Murphy (1999; 2012) discuss the increased interest in executive compensation and why researchers have become more and more focused on the different effects of increases in corporate executives' salary and compensation. Since ExecuComp is one of the main sources for gathering managers' salary information for empirical analysis, the existence of biased observations in the ExecuComp database has the potential to throw into question the findings of studies that use this dataset to collect information for their sample. As a result, one of the main assumptions that researchers have in their analysis is that their sample is randomly selected and free of the systematic inclusion of biased observations.

However, a recent study by Gillan et al. (2018) indicates the existence of backfilled observations in the ExecuComp database, which results in the systematic inclusion of high-growth firms in the dataset that could have affected the findings of prior studies. Similarly Cadman et al. (2010) have also tested the differences between the findings of studies that used ExecuComp to collect sample information and those that use non-ExecuComp database information in order to test the validity of using ExecuComp data.

ExecuComp provides information about the salary and compensation information of the five most highly-paid corporate executives and managers since 1994. Companies can also elect to provide salary information for more than five of their highest paid executives, and in that case, the ExecuComp database keeps records of up to nine of the highest paid managers. According to Gillan et al. (2018), prior to 2006, companies could decide not to reveal their executive's information if their salary was lower than $200,000, but this situation rarely happens. More importantly, due to ExecuComp's practice of providing salary information for more and more executives over time, some of the observations in the ExecuComp dataset are backfilled and not randomly selected.

As mentioned in Gillan et al. (2018), backfilling is a systematic method used by ExecuComp to complete its database by adding more observations to it, which ultimately results in increasing the power of empirical tests. However, if such observations are biased and increase the likelihood of the existence of specific type of firms in the database, then the inclusion of such observations could be problematic.

In general, there are three main scenarios, according to Gillan et al. (2018), that result in the inclusion of the salary information of an executive that had not been previously reported in the ExecuComp dataset: 1) The company is newly added to the S&P 1500 listing (index backfilling); 2) a manager has become one of the top five highest paid executives, for example by being promoted (manager backfilling); and 3) a company is added to the ExecuComp dataset due to reasons other than being listed in the S&P 1500 (other backfilling). As found by Gillan et al. (2018), observations that are backfilled due to index or other backfilling have significantly higher cumulative stock return over the two year period following the year

that the observation was added to the database (backfilled). Such backfilled observations are generally from high-growth firms and not randomly added to the ExecuComp dataset. This systematic selection and inclusion of backfilled observations to the ExecuComp database results in the creation of a database that includes biased observations that have higher than average growth rates (Gillan et al., 2018).

The process by which backfilled observations are identified is straightforward. In general, firms file their proxy statements to the Securities and Exchange Commission within 120 days of their fiscal year end. Proxy statements contain information about the executives' salaries and compensation, which is reported in the ExecuComp database. ExecuComp updates its database multiple times every year (different vintages) based on the release of the firms' proxy statements. The key to identify whether an observation is backfilled or not is related to the mismatching between compensation year and the vintage year. Specifically, a normal, non-backfilled salary observation of a manager related to year t should appear in the next year's vintage of ExecuComp (year t+1 vintage) for the first time. However, if the year t salary does not appear in the year t+1 vintage, but instead appears in later years' vintages, then the year t salary observation (released in year t+2 vintage or later) is backfilled.

The reason is that when ExecuComp starts covering a manager's salary information for the first time, it also gathers compensation information for the same manager for the previous two years as well. As mentioned above, if the reason for which ExecuComp starts covering the manager's compensation information is index addition (the firm has been newly added to the S&P 1500 index), then chances are that the firm had been performing very well in the past few years to be included in the S&P 1500 listing. Also, if the reason for covering the salary is "other" reasons (probably as requested by S&P's clients), then the firm has probably been performing well enough to capture clients' attention. In either of these cases, the company would likely have performed well in the years prior to being added to the ExecuComp database for the first time. Therefore, backfilled salary observations (salaries related to the two years prior to the firm being listed in the ExecuComp database for the first time) are related to time periods in which the firm had been performing well (to either become one of the S&P 1500 listing firms or to capture S&P clients' attention). For more detailed information about the process of identifying backfilled observations in the ExecuComp database and how such observations can affect inferences from financial accounting research, please refer to Gillan et al. (2018).

Consistent with this argument, Gillan et al. (2018) find that backfilled observations are not randomly selected, resulting in the oversampling of firms with high growth rate in the ExecuComp database. They show that firms with backfilled observations due to index addition or other reasons have significantly higher cumulative stock returns prior to being covered by ExecuComp than non-backfilled observations. In addition, managers with backfilled observations have lower salaries and compensation and higher stock ownership. But backfilled observations due to manager addition do not show significantly higher cumulative stock return than non-backfilled firms, because the firm had already been included in the S&P 1500 and only the new manager's salary information is backfilled, not the firm.

So now the question is that how are ExecuComp's backfilled observations related to the findings of this study? As noted earlier, the main focus of this study is to identify the relationship between executive compensation and firm value. Since prior studies have documented both positive and negative relationships between the variables, I test if the backfilled observations could explain the mixed findings of prior studies. More specifically, I test if the findings of prior studies would be different if a sample of unbiased, non-backfilled observations is compared with a sample of backfilled observations.

The reason is that, as prior studies have shown, backfilled observations have significantly different executive compensation levels, as well as different stock returns (as a measure of a firm's performance). Therefore, the inclusion of such biased observations in the sample of a study testing the relationship between pay disparity measure and company value can significantly affect the results. Hence, it is necessary to eliminate the effect of such observations (if any) prior to empirically testing the relationship between the variables. So I test if the backfilled biased observations included in the sample of prior studies are the driver of the mixed findings.

DATA AND RESEARCH DESIGN

Sample Selection

I obtain variables to test my hypotheses from different sources, all of which are publicly available. CEO and executive compensation information is obtained from the Standard and Poor's (S&P) ExecuComp database, which covers firms from the S&P 500, S&P SmallCap 600, and S&P MidCap 400 indices. I consider executives to be CEOs in my sample if they are the chief executive officer of the firm in the ExecuComp database, indicated by the CEOANN variable equal to "CEO." Other executives in a given firm year are considered as VPs. Also, I limit the sample to firms that have at least five executives in a given year.

To be consistent with other studies, if more than five executives have salary information reported in ExecuComp, then I keep only the five highest paid executives. Stock return data are gathered from the Center for Research in Security Prices (CRSP), and firms' financial information is obtained from Compustat Industrial and Segment files. I use different sample periods depending on the specifics of the analysis and the replication purposes. For the replication of papers discussed in this dissertation, I use the same sample period as the original papers—from 1993 to 2004 for replication of Kale et al. (2009) and Bebchuk et al. (2011)—and 1993 to 2015 for the additional tests. Furthermore, I restrict the sample to observations in which the CEO has been in office for the whole year, as the CEO's annual salary could be lower if the CEO have received compensations for only part of the year.

The descriptive statistics of the full sample are presented in Table 1. As shown in this table, the full sample includes 9,880 observations, out of which 530 are backfilled. The average CPS is 0.37, indicating that CEOs received 37% of the total salary and compensation of highest paid executives. Also, on average, firms have total book asset value of $7.4 billion dollars, are 21% levered, and are 22 years old.

Research Design and Definition of Variables

In my analysis, I use the following regression model to test the relationship between pay disparity measure and company value:

$$Firm\,Value_{it} = \alpha_0 + \beta_1\, CEO\ Pay\ Disparity_{it} + \Sigma Controls + \mathcal{E}_{it} \quad (1)$$

There are two measures of CEO pay disparity used in my analyses, CPS and pay Total Gap. CPS (as used in Bebchuk et al. (2011)) is the ratio of the CEO's total compensation to the total compensation of the top five highest paid executives reported in the ExecuComp database. In other words, what portion of the total compensation of the top five executives goes into the CEO's pocket? The higher the ratio, the higher the pay disparity. Total Gap (as used in Kale et al. (2009)), on the other hand, is the natural log of the difference between the CEO's total compensation and the median total compensation of the other four executives in a given firm-year.

To be consistent, I use the total compensation as the measure of executives' salary (TDC1 variable in ExecuComp), which is the summation of salary, bonuses, and all other annual compensation such as stock option grants (I also use salary only as an alternative measure of compensation, SALARY variable in ExecuComp, and the results are qualitatively similar). In some observations, the median salary of other executives is higher than the CEO's salary, resulting in a negative value for Total Gap before natural log transformation. Similar to prior studies like Kale et al. (2009), Hartman (1984), Slemrod (1990), and Cassou (1997), I add a constant value to the pay total gap to monotonically transform total pay gap measure before applying natural logarithm (I add a constant value of $810,000 to the pay total gap variable). Also to eliminate the effect of outliers, all continues variables are winsorized at 1st and 99th percentile levels.

With regards to the measure of firm performance as the independent variable of my analyses, I use Tobin's Q (both with and without industry adjustment) to investigate how CEO pay disparity affects firm value. I calculate Tobin's Q as the market value of equity plus total assets minus the sum of book value of equity and deferred taxes divided by total assets. To calculate industry adjustment, I subtract the median industry Tobin's Q at a given year from that of each single firm by using the four-digit Standard Industry

Classification (SIC) code to specify each industry. ROA is defined as operating income divided by total assets and is the alternative measure of firm performance in some tests.

The E index is the entrenchment index related to the six shareholder rights as provided in Bebchuk, Cohen, and Ferrell (2009). E index ranges from 0 to 6, and higher values indicate more entrenched corporate governance and management, with lower shareholder rights.

Book Value is the natural logarithm of the total assets. Insider Ownership is the total percentage of shares held by insiders of the company as recorded in ExecuComp. Capex to Assets is the ratio of total capital expenditure during the year to total assets. Leverage is the ratio of long term debt to total assets. R&D to Sales is the ratio of total research and development expenditure during the year to total revenue and zero otherwise. R&D Missing is an indicator variable equal to one if research and development expenditure is missing and zero otherwise.

Firm Age is calculated as the difference between the current firm year observation and the first year for which the firm's information is available in CRSP. Founder is an indicator variable equal to one if the first year for which the firm's information is available in CRSP is later than or equal to the first year in which the CEO was in office, according to ExecuComp, and zero otherwise.

Abnormal Total Comp. is the residual of regressing natural logarithm of the total compensation of the top five highest paid executives on a constant and natural logarithm of total assets in an industry and year fixed effect regression model. Relative Equity Comp. is calculated as EBC/TDC1, where EBC is the equity-based compensation calculated as the sum of the total value of restricted shares granted plus the Black and Scholes value of options granted, and TDC1 is the total compensation available in ExecuComp.

CEO Own >= 20% is an indicator variable equal to one if CEO owns 20 percent of the firm or more and zero otherwise. CEO Tenure is the number of years since the current CEO became CEO, and CEO Tenure Missing is an indicator variable equal to one if the tenure variable is missing in the dataset and zero otherwise. Diversified is an indicator variable equal to one if the firm has more than one segment reported in the Compustat's segment database and zero otherwise. CEO Outsider is an indicator variable equal to one if the CEO had joined the company less than one year before becoming CEO and zero otherwise. CEO Is Chair is also an indicator variable equal to one if the CEO is the chairman of the board according to the ExecuComp database and zero otherwise.

CEO Alignment is the sensitivity of stock and option to the $100 change in stockholder wealth (Aggarwal & Samwick, 2003). It is calculated as the number of shares plus the number of stock options held by the manager times the option delta divided by the number of shares outstanding. VP Alignment is the median of the four VPs' alignment value. Σ VP Comp. is the natural logarithm of the standard deviation of the four VPs' total compensation.

CEO Age is the natural logarithm of the age of the CEO for each firm year in a given year as reported in the ExecuComp. Industry Homogeneity, according to Parrino (1997), is the mean partial correlation between the firm's returns and an equally weighted industry index for all firms in the same two-digit SIC industry code, holding market return constant. Total Sales is the natural logarithm of the firm's total revenue.

Stk. Return Volatility is the standard deviation of the firm's stock price in the last 60 months. Capital to Sales is the ratio of total property plant and equipment to total revenue. R&D to Capital is the ratio of research and development expenditure to total property plant and equipment. Advertising to Capital is the ratio of advertisement expenses to total property plant and equipment, and finally, Dividend Yield is the ratio of dividend amount to stock price, as reported in CRSP.

INTERTEMPORAL ANALYSIS

Replication of Bebchuk et al. (2011)

In this chapter, I test the relationship between lag CPS and current firm value, as studied by Bebchuk et al. (2011). To do so, I test the following model used in the Bebchuk et al. (2011) study to analyze the intertemporal relationship between the test variables:

$$Ind.Adj.Tobin's\ Q_{it} = \alpha_0 + \beta_1\ CPS_{it-1} + \beta_2\ Ind.Adj.Tobin's\ Q_{it-1} + \Sigma Controls + \mathcal{E}_{it} \quad (2)$$

I first replicate Bebchuk et al. (2011) study, and I present the results in Table 2 (control variables are also shown in this table). The first column presents the findings of Bebchuk et al. (2011), while the second column shows the replication results. As shown in this table, the replication sample includes 8,385 observations, compared to the original paper's sample of 8,077 observations, and the coefficients and the t-statistics of the replicated results are close to the original paper. More specifically, the replicated coefficient and t-statistics of lag CPS variable are -0.26 and -2.04, respectively, in comparison to -0.229 and -2.347 in the original paper. This indicates that the replication is performed well to narrow down the replicated sample to the sample of the original paper and that the test-statistics are close to those of Bebchuk et al. (2011).

Column 3 tests the effect of removing backfilled observations when testing the relationship between lag CPS and firm value. This removal reduces the sample size to 7,987 observations, indicating that 398 backfilled observations existed in the sample. Comparing the results of Columns 2 and 3 of this table indicates that, after removing the backfilled observations, the coefficient and t-statistics of lag CPS decrease to -0.19 and -1.53, which are statistically and economically smaller than those of Column 2. The results indicate that, after the removal of backfilled observation, not only is the coefficient of lag CPS decreased, but it also loses its significance level.

Comprehensive Model

Next, I test whether I would be able to find significant intertemporal relationship between pay disparity and company value using the comprehensive model with additional control variables proposed in Chapter 3. In this model, I examine the intertemporal relationship between CPS and firm value while adding additional control variables documented in other studies that may play a role in the relationship. In other words, I investigate whether the exclusion of sufficient control variables could also be the driver of the significant intertemporal relationship between CPS and firm value documented in Bebchuk et al. (2011). Table 3 reports the results of the inclusion of additional control variables in the model. In Column 1, the firm's Tobin's Q is the dependent variable, while Column 2 uses the industry adjusted Tobin's Q (the firm's Tobin's Q minus the median industry Tobin's Q in a given year) as the dependent variable.

Using the same time period employed in Bebchuk et al. (2011), I observe that the lag CPS variable loses its significance level when additional control variables are added to the model. This further indicates the importance of using a complete model and adding more control variables to make sure that the coefficients are unbiased and significant. Overall, the results from this table indicate that it is essential to use a complete model with all the possible control variables suggested by prior studies to examine the effect of executive pay disparity on firm value. Using the complete model, I did not find the significant negative intertemporal relationship between pay disparity measure and company value proposed by Bebchuk et al. (2011).

In the next step, I focus on the effect of backfilled observations in the ExecuComp database. As proposed by Gillan et al. (2018), I remove the backfilled observations from the sample of the comprehensive model to make sure that the observations in the sample are not biased. As discussed before, Gillan et al. (2018) argue that, due to the S&P's practice of increasing the number of observations in the ExecuComp database by covering more managers' salary information in the ExecuComp database, high-growth firms' observations are systematically added to the database and such observations are not random. As a result, I exclude such observation and test how the results would be affected in comparison to those reported in Table 3.

Table 4 presents the results of removing biased observations from the sample for the complete model from 1993 to 2004. As shown in this table, the total number of observations is reduced to 7,341 due to the exclusion of 386 biased backfilled observations. Comparing the results in Tables 3 and 4, I observe that both the coefficients and t-statistics of the pay disparity measure (lag CPS) become smaller. This further indicates that the results in Table 3 are biased and that the removal of biased observations reduces the

significance of the results. Therefore, it is important that researchers exclude backfilled observations from their sample before testing their models to make sure their results are not biased.

Extension of Sample Period

Finally, to further investigate the intertemporal relationship between pay disparity measure and company value, I extend the sample period from 2004 to 2015. One could argue that the insignificant results in Table 4 are due to the small number of observations in a short period of time. Extending the sample period increases the total number of observations from 7,341 in Table 4 to 16,783 in Table 5. However, the increase in the number of observations comes at the cost of including observations from the recession period of 2006-2008, which may also bias the findings.

Table 5 reports the results of testing the intertemporal relationship between pay disparity and firm value for a sample without backfilled observations from 1993 to 2015. Comparing the results in Table 5 with those of Table 4 indicates that extending the sample period and adding more observations make the coefficient and t-statistics become more negative, but the relationship is still insignificant. Therefore, I did not find a significant negative relationship between lag CEO pay disparity and firm value.

Overall, Chapter 4 investigates the intertemporal relationship between pay disparity measure and company value. Adjusting the work of Bebchuk et al. (2011) by removing biased observations, adding more control variables, and extending the sample period, I am not able to find a significant negative relationship between pay disparity measure and company value. My findings shed light on the importance of paying attention to the methodology and choosing the right model and a sample without biased observations to make sure that the findings are valid.

CONTEMPORANEOUS ANALYSIS

Replication of Kale et al. (2009)

Following Kale et al. (2009), I use the following regression model to test the contemporaneous relationship between CEO pay disparity measure (Total Gap) and firm value measure (ROA and Tobin's Q).

$$\begin{aligned} Firm\ Value_{it} = {} & \alpha_0 + \beta_1\ Total\ Gap_{it} + \beta_2\ CEO\ Alignment_{it} + \beta_3\ VP\ Alignment_{it} + \\ & \beta_4\ \sigma\ VP\ Comp_{it} + \beta_5\ CEO\ Age_{it} + \beta_6\ Industry\ Homogeneity_{it} + \beta_7\ Total\ Sales_{it} + \\ & \beta_8\ Total\ Sales\ Squared_{it} + \beta_9\ Stk.Return\ Volatility_{it} + \beta_{10}\ Capital\ to\ Sales_{it} + \\ & \beta_{11}\ Leverage_{it} + \beta_{12}\ R\&D\ to\ Capital_{it} + \beta_{13}\ Advertising\ to\ Capital_{it} + \\ & \beta_{14}\ Dividend\ Yield_{it} + \mathcal{E}_{it} \end{aligned} \quad (3)$$

Tables 6 and 7 provide the replication results of Kale et al. (2009). As noted earlier, Kale et al. (2009) find that pay disparity—measured as the gap between the salary of the CEO and the median salary of VPs—is positively related to ROA. Accordingly, as the pay gap increases, vice presidents have more incentive to work harder, which can increase firm value consistent with the tournament theory. Column 1 of Table 6 shows the original results of Kale et al. (2009), while the second column shows the replication results. As shown in this table, the coefficients and the t-statistics of the replicated results are positive and significant, which are close to those of the original paper. More specifically, the coefficient and t-statistics of Total Gap, as the measure of CEO pay disparity, are 0.917 and 5.15, respectively, in comparison to 0.429 and 4.74 in the original paper.

The main results of Table 6 are shown in Column 3, which tests the effect of excluding backfilled observation from the replication of Kale et al. (2009) to test whether such exclusion would affect the findings. This exclusion reduces the sample size to 14,124 (from 14,570), indicating that 446 observations are backfilled. Also, after the removal of backfilled observations, the coefficient and t-statistics of Total Gap are 0.80 and 4.90, respectively. Comparison of the results in Columns 2 and 3 indicates that the positive contemporaneous relationship between pay disparity and ROA holds even after removing backfilled observations from the sample although the coefficient and t-statistics of Total Gap become slightly smaller.

Table 7, I test the effect of Total Gap on Tobin's Q as performed in Kale et al. (2009). This table is similar to Table 6 with the different dependent variable. Column 1 shows the original results of Kale et al. (2009), and the second column shows the replication results. As shown in this table, the replication sample has 14,566 observations, which is close to the original paper's sample of 17,987 observations. Also, the coefficients and t-statistics are close to those of the original paper. Similar to Table 6, the removal of backfilled observations in Column 3 of Table 7 did not significantly change the results, and the coefficients and t-statistics in Column 3 are close to those of Column 2. So, in both Tables 6 and 7, I observe that the contemporaneous relationship between pay disparity measure and company value (measured by ROA and Tobin's Q) remains significant and positive after the exclusion of backfilled observations.

Comprehensive Model

Next, I test the effect of control variables on the model studied in Kale et al. (2009) and investigate whether the lack of sufficient control variables is the driver of the contemporaneous relationship between Total Gap and firm value. To do so, I add additional control variables identified in prior studies and test how the coefficients and the t-statistics change in comparison with the ones reported in Tables 6 and 7. Results are presented in Table 8. In the first model, Tobin's Q is the dependent variable, while the industry adjusted Tobin's Q (the firm's Tobin's Q minus the median industry's Tobin's Q in a given year) is the dependent variable in the second model.

Overall, the results from this analysis indicate that, while it is important to use a complete model with sufficient control variables to test the relationship between the variables, the coefficient and t-statistics of the Total Gap variable remain significant even after the inclusion of additional control variables as shown in Table 8.

In the next step, I focus on the effect of biased backfilled observations in the ExecuComp database on the model used in Table 8. As proposed by Gillan et al. (2018), I remove the backfilled observations from the sample to make sure that the observations in the sample are not biased. Gillan et al. (2018) argue that, due to the S&P's practice of increasing the number of observations in the ExecuComp database, high-growth firms are systematically added to the database, and such observations are not random. As a result, I exclude backfilled observation from the comprehensive model shown in Chapter 3 and test how the results are changed in comparison to those reported in Table 8. I hypothesize that if the existence of backfilled observations have biased the coefficient of Total Gap (as argued earlier), then the removal of backfilled observations would decrease the coefficient and t-statistics of Total Gap.

Table 9 presents the results of removing biased observations from the sample for a complete model from 1993 to 2004. Tables 8 and 9 use the exact same model and time period; the only difference between the two is the exclusion of the backfilled observations in Table 9. As shown in Table 9, the total number of observations is 7,278, which is 385 observations less than Table 8. Comparing the results in Tables 8 and 9, I observed that both the coefficients and t-statistics of the pay disparity measures (CPS and total gap) become smaller but still significant. Accordingly, Table 9 results indicate that the findings of Table 8 are biased and that the removal of biased observations reduces the coefficient and t-statistics. Therefore, it is important that researchers remove such observations from their sample before testing their models to make sure their results are not biased.

Extension of Sample Period

Finally, to further investigate the contemporaneous relationship between pay disparity measure and company value, I extend the sample period from 2004 to 2015. One can argue that the significant results in Table 9 are due to the short time period employed in the analysis and the results may be different if longer time periods are used. Extending the sample period to 2015 increases the total number of observations from 7,278 in Table 9 to 16,691 in Table 10. However, as mentioned earlier this increase in the number of observations comes at the cost of including observations related to the 2006-2008 recession period which potentially can also bias the findings.

Table 10 reports the results of testing the effect of pay disparity on firm value for a sample of unbiased observations (backfilled observations are removed) from 1993 to 2015. Comparing the results in this table

with those in Table 9 indicates that extending the sample and adding more observations increase the coefficients and the t-statistics.

Overall, Chapter 5 investigates the contemporaneous relationship between pay disparity measure and company value. Extending the work of Kale et al. (2009) by removing biased observations, using a complete model, and extending the sample period, I am able to find a significant positive relationship between CPS and firm value, as proposed by Kale et al. (2009). The results validate the positive relationship between pay disparity measure and company value and also indicate the importance of paying attention to the methodology and choosing the right model and sample to make sure that the findings are not biased.

Thus far, I have provided evidence that the contemporaneous relationship between Total Gap and firm value is significant and positive after the removal of biased observation; meanwhile, according to my analysis, I did not observe a significant negative intertemporal relationship between CPS and firm value. As noted earlier, I argue that the validity of prior studies, as well as the significance of the positive vs. negative relationships provided in my analysis, are due to the existence of backfilled observations, as well as the difference in the timing of the variables. However, comparing Tables 5 and 10, both the independent variable measure (Total Gap vs. CPS) and the timing of the relationship (contemporaneous vs. intertemporal) are changed in my analysis. As a result, one could argue that the independent variable measure (CPS vs. Total Gap) can be the main driver of the significant contemporaneous and insignificant intertemporal relationship rather than the timing (rather than the timing of the relationship).

To address this concern, in Table 11 I test the intertemporal and contemporaneous relationship between pay disparity and firm value while using current CPS and lag Total Gap as the independent variables. If, in contrast to my hypotheses, the independent variable measure is the main driver of the significant relationship (rather than the timing), then I should find a significant negative coefficient for the lag Total Gap and a positive insignificant one for current CPS, which contradicts my hypotheses. However, consistent with my hypotheses, I expect to find results similar to those in Tables 5 and 10, independent of the change in pay disparity measurement variable.

In Column 1 of Table 11, I test the same model as the one used in Table 5, but I replace the lag CPS variable with lag Total Gap. Similarly, in Column 2, I replace current Total Gap with current CPS and run the same model as the one used in Table 10. As expected, regardless of the independent variable measure, I still find a positive and significant contemporaneous relationship between pay disparity of executives and the company value (consistent with the tournament theory argument), while the negative intertemporal relationship (according to the managerial power theory argument) is not significant. Therefore, independent of the pay disparity measure (CPS or Total Gap), the results in Table 11 also confirm the validity of my prior analyses and are consistent with a positive significant contemporaneous relationship and an insignificant negative intertemporal one.

CONCLUSION

In this study, I focus on prior studies' mixed results with regard to the effect of CEO pay disparity on firm value. More specifically, earlier research studies report that CEO pay disparity (measured by CPS and Total Gap) can have both positive and negative effect on firm value (measured by Tobin's Q and ROA). On the one hand, based on the tournament theory, VPs will have greater incentive to work harder in order to be promoted to the CEO position when they realize the possibility of a significant increase in their salary. Accordingly, Kale et al. (2009) demonstrate that CEO pay disparity contemporaneously increases firm value. On the other hand, Bebchuk et al. (2011) focus on the intertemporal relationship between CPS and firm value and find that higher CPS is value-diminishing, which is consistent with the managerial power theory. Therefore, I aim to understand what the true effect of CEO pay disparity on firm value is and to clarify the forces behind the mixed findings of prior studies.

To do so, I improve the models used in prior studies by 1) removing the biased backfilled observations in the ExecuComp database, 2) adding additional required control variables to the research model, and 3) extending the sample period from 2006 to 2015. The results of my analysis indicate that CEO pay disparity is in fact positively related to firm value. Therefore, after adjusting the prior studies' models, I realize that

the negative intertemporal relationship between CPS and firm value did not remain significant when adjustments are added to the model, while the contemporaneous relationship between pay disparity measure and company value reported by Kale et. al. (2009) remains positive and significant. Overall, the results indicate that the backfilled observations in the ExecuComp database play a critical role in deriving the negative relationship between lag CPS and Tobin's Q, and it is necessary that researchers make sure that they use a sample free of biased observations when preforming empirical analysis.

TABLE 1
DESCRIPTIVE STATISTICS

Variable	N	Mean	Std. Dev.	Min	Max
Tobin's Q	9,880	1.92	1.31	0.73	7.42
Ind Adj Tobin's Q	9,880	0.34	1.12	-1.73	5.13
CPS	9,880	0.37	0.11	0.10	0.70
Ind Med CPS	9,880	0.16	0.02	0.11	0.20
Book Value	9,880	7.44	1.61	4.45	12.14
E index	9,880	1.89	1.53	0.00	5.00
Capex to Assets	9,880	0.06	0.05	0.00	0.27
Leverage	9,880	0.21	0.16	0.00	0.75
R&D to Sales	9,880	0.04	0.09	0.00	0.60
Firm Age	9,880	22.14	20.07	0.00	79.00
Relative Equity Comp.	9,880	0.19	0.12	0.00	0.47
CEO Tenure	9,880	8.20	7.25	0.00	35.00
Number of VPs	9,880	3.20	1.13	0.00	6.00
Altman Z	8,963	4.64	4.84	-2.24	27.22
Founder	9,880	0.30	0.46	0.00	1.00
CEO Outsider	9,880	0.65	0.48	0.00	1.00
Diversified	9,880	0.96	0.20	0.00	1.00
CEO Is Chair	9,880	0.71	0.45	0.00	1.00
CEO Alignment	8,219	11.56	29.61	0.00	192.84
VP Alignment	8,316	0.53	1.13	0.00	7.30
Stk. Return Volatility	8,957	0.12	0.06	0.04	0.36
Capital to Sales	8,843	0.50	0.64	0.01	3.53
R&D to Capital	8,801	0.26	0.68	0.00	5.74
Advertising to Capital	8,801	0.07	0.22	0.00	2.09
Dividend Yield	8,962	0.00	0.00	0.00	0.02

Variables' definition is provided in Appendix A.

TABLE 2
REPLICATION OF BEBCHUK ET AL. (2011)

Dependent Variable: *Ind. Adj. Tobin's q*	Original Paper Results	Replication Results	Replication Results after Removing Backfiled Observations
Lag CPS	**-0.229****	**-0.26****	**-0.19**
	(-2.347)	**(-2.04)**	**(-1.53)**
Lag Ind Adj Tobin's Q	0.287***	0.299***	0.314***
	(11.1)	(11.48)	(12.12)
E index	0.00855	-0.01	-0.003
	(0.459)	(-0.35)	(-0.11)
Book Value	-0.399***	-0.415***	-0.392***
	(-9.949)	(-10.3)	(-10.04)
Insider Ownership	0.564	-34.425	49.085
	(-1.284)	(-0.42)	(1.34)
Insider Ownership Squared	-0.85	2061.304	-3698.024
	(-1.535)	(0.36)	(-1.35)
ROA	1.47***	1.136***	1.073***
	(5.841)	(4.78)	(4.28)
Capex to Assets	0.00387	0.588	0.583
	(1.412)	(1.44)	(1.42)
Leverage	-0.402***	-0.44***	-0.44***
	(-3.07)	(-2.69)	(-2.91)
R&D to Sales	0.00357	0.085	0.277
	(0.622)	(0.12)	(0.35)
R&D Missing	0.0193	-0.1	-0.07
	(0.301)	(-1.18)	(-0.86)
Firm Age	0.0322***	0.032***	0.032***
	(6.672)	(6.44)	(6.3)
Founder	-0.0187	0.202***	0.169**
	(-.302)	(2.75)	(2.2)
Abnormal Total Comp.	0.0113	0.081***	0.068**
	(0.611)	(2.65)	(2.45)
Lag Relative Equity Comp.	0.00131	-0.011	-0.04
	(0.126)	(-0.11)	(-0.43)
CEO Own >= 20%	-0.0569	-0.099	-0.053
	(-1.14)	(-1.15)	(-0.66)
CEO Tenure 1	-0.0766**	-0.011	-0.006
	(-2.216)	(-0.26)	(-0.15)
CEO Tenure 2	-0.0545*	-0.019	-0.024
	(-1.678)	(-0.48)	(-0.6)
CEO Tenure 3-4	-0.0497	0.013	0.014
	(-1.478)	(0.33)	(0.38)
CEO Tenure 5-6	-0.0415	0.007	0.008
	(-1.54)	(0.2)	(0.25)

CEO Tenure Missing	-0.0578	-0.048	-0.06
	(-0.786)	(-0.67)	(-0.85)
Diversified	-0.0162	-0.137	-0.159
	(-0.521)	(-1.32)	(-1.44)
CEO Outsider	0.0304	-0.028	-0.032
	(-0.438)	(-0.57)	(-0.65)
CEO Is Chair	-0.0249	-0.037	-0.034
	(-0.737)	(-0.95)	(-0.88)
Intercept	No	No	No
Firm Fixed Effect	YES	YES	YES
R-squared	0.27	0.22	0.23
# of Observations	8,077	8,385	7,987
# of Clusters		1,868	1,808

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.
Standard errors are clustered by firm, and t-stats are shown in the parentheses.
Variables' definition is provided in the Appendix A.

TABLE 3
INTERTEMPORAL RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004

	Tobin's Q			Ind Adj Tobin's Q		
Independent Variable	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Lag CPS	**-0.095**	**-0.73**		**-0.172**	**-1.34**	
CEO Alignment	0.001	2.39	**	0.001	1.84	*
VP Alignment	0.109	5.96	***	0.091	4.64	***
σ VP Comp.	0.034	2.50	**	0.021	1.51	
CEO Age	-0.482	-2.37	**	-0.202	-1.07	
Industry Homogeneity	0.002	0.01		0.009	0.03	
Total Sales	-0.059	-0.31		-0.039	-0.20	
Total Sales Squared	0.031	2.83	***	0.029	2.50	**
Stk. Return Volatility	-0.461	-0.76		-0.264	-0.46	
Capital to Sales	0.062	0.95		0.149	1.97	**
R&D to Capital	0.177	2.20	**	0.103	1.16	
Advertising to Capital	0.116	1.05		0.160	1.33	
Dividend Yield	-17.760	-3.58	***	-13.969	-2.65	***
Lag Ind Adj Tobin's Q	0.271	11.65	***	0.280	11.89	***
Book Value	-0.782	-10.84	***	-0.780	-10.33	***
Ind Adj ROA	0.966	4.58	***	1.059	4.86	***
Capex to Assets	0.442	1.05		0.038	0.09	
Leverage	-0.602	-3.63	***	-0.395	-2.39	**
R&D to Sales	-0.837	-1.01		0.083	0.09	
R&D Missing	-0.072	-0.77		-0.077	-1.04	
Firm Age	0.080	3.06	***	-0.015	-0.57	
Founder	0.159	2.12	**	0.108	1.47	
Abnormal Total Comp.	0.076	2.91	***	0.072	2.80	***
Lag Relative Equity Comp.	-0.041	-0.45		-0.049	-0.55	
CEO Tenure 1	-0.089	-1.74	*	-0.083	-1.70	*
CEO Tenure 2	-0.083	-1.87	*	-0.079	-1.83	*
CEO Tenure 3-4	-0.031	-0.81		-0.029	-0.73	
CEO Tenure 5-6	-0.013	-0.40		-0.008	-0.25	
CEO Tenure Missing	-0.157	-2.09	**	-0.143	-1.94	*
Diversified	-0.174	-1.64		-0.185	-1.85	*
CEO Outsider	-0.024	-0.45		-0.052	-1.05	
CEO Is Chair	-0.044	-1.08		-0.050	-1.25	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.29			0.29	
# of Observations		7,727			7,727	
# of Clusters		1,675			1,675	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

TABLE 4
INTERTEMPORAL RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004 AFTER REMOVING BIASED OBSERVATIONS

	Tobin's Q			Ind Adj Tobin's Q		
Independent Variable	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Lag CPS	**-0.048**	**-0.37**		**-0.105**	**-0.80**	
CEO Alignment	0.001	2.54	**	0.001	1.90	*
VP Alignment	0.093	5.11	***	0.074	3.76	***
σ VP Comp.	0.030	2.23	**	0.017	1.26	
CEO Age	-0.468	-2.21	**	-0.183	-0.94	
Industry Homogeneity	-0.127	-0.48		-0.086	-0.32	
Total Sales	0.017	0.09		0.058	0.30	
Total Sales Squared	0.024	2.28	**	0.021	1.93	*
Stk. Return Volatility	-0.238	-0.38		-0.058	-0.10	
Capital to Sales	0.052	0.78		0.146	1.93	*
R&D to Capital	0.149	1.62		0.082	0.84	
Advertising to Capital	0.139	1.18		0.138	1.11	
Dividend Yield	-16.995	-3.60	***	-11.755	-2.26	**
Lag Ind Adj Tobin's Q	0.282	11.99	***	0.295	12.60	***
Book Value	-0.725	-9.81	***	-0.736	-9.56	***
Ind Adj ROA	0.985	4.52	***	1.033	4.57	***
Capex to Assets	0.435	1.04		0.040	0.10	
Leverage	-0.634	-4.11	***	-0.423	-2.72	***
R&D to Sales	-0.349	-0.40		0.590	0.60	
R&D Missing	-0.062	-0.64		-0.058	-0.76	
Firm Age	0.084	3.25	***	-0.011	-0.42	
Founder	0.131	1.67	*	0.093	1.21	
Abnormal Total Comp.	0.080	3.15	***	0.073	2.96	***
Lag Relative Equity Comp.	-0.076	-0.81		-0.074	-0.80	
CEO Tenure 1	-0.074	-1.42		-0.067	-1.38	
CEO Tenure 2	-0.088	-2.01	**	-0.077	-1.80	*
CEO Tenure 3-4	-0.034	-0.89		-0.021	-0.55	
CEO Tenure 5-6	-0.009	-0.28		-0.002	-0.06	
CEO Tenure Missing	-0.167	-2.24	**	-0.146	-2.00	**
Diversified	-0.182	-1.67	*	-0.204	-2.03	**
CEO Outsider	-0.019	-0.35		-0.053	-1.05	
CEO Is Chair	-0.035	-0.87		-0.048	-1.22	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.28			0.27	
# of Observations		7,341			7,341	
# of Clusters		1,623			1,623	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.
Standard errors are clustered by firm.
Variables' definition is provided in the Appendix A.

TABLE 5
INTERTEMPORAL RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004 AFTER REMOVING BIASED OBSERVATIONS

	Tobin's Q			Ind Adj Tobin's Q		
Independent Variable	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Lag CPS	**-0.015**	**-0.19**		**-0.034**	**-0.44**	
CEO Alignment	0.002	4.18	***	0.002	3.54	***
VP Alignment	0.091	6.16	***	0.072	4.46	***
σ VP Comp.	0.042	5.40	***	0.030	4.06	***
CEO Age	-0.158	-1.34		-0.009	-0.09	
Industry Homogeneity	-0.054	-0.31		-0.084	-0.53	
Total Sales	0.146	1.28		0.179	1.53	
Total Sales Squared	0.008	1.20		0.005	0.70	
Stk. Return Volatility	0.555	2.04	**	0.242	0.98	
Capital to Sales	0.024	0.69		0.086	2.12	**
R&D to Capital	0.128	3.19	***	0.130	3.27	***
Advertising to Capital	-0.033	-0.50		0.035	0.56	
Dividend Yield	-11.058	-4.26	***	-7.640	-3.11	***
Lag Ind Adj Tobin's Q	0.395	23.57	***	0.429	25.60	***
Book Value	-0.541	-12.07	***	-0.501	-11.26	***
Ind Adj ROA	0.873	6.21	***	0.761	5.13	***
Capex to Assets	0.706	2.69	***	0.179	0.69	
Leverage	-0.471	-5.38	***	-0.390	-4.55	***
R&D to Sales	-0.470	-1.01		-0.068	-0.15	
R&D Missing	-0.022	-0.44		-0.042	-0.99	
Firm Age	0.020	0.93		0.016	0.51	
Founder	0.016	0.37		-0.020	-0.49	
Abnormal Total Comp.	0.077	4.53	***	0.043	2.64	***
Lag Relative Equity Comp.	-0.059	-0.78		-0.060	-0.85	
CEO Tenure 1	-0.040	-1.43		-0.021	-0.84	
CEO Tenure 2	-0.033	-1.40		-0.022	-0.99	
CEO Tenure 3-4	-0.026	-1.35		-0.013	-0.73	
CEO Tenure 5-6	-0.031	-1.87	*	-0.027	-1.65	*
CEO Tenure Missing	-0.067	-1.65	*	-0.050	-1.25	
Diversified	-0.102	-1.51		-0.086	-1.28	
CEO Outsider	0.053	2.01	**	0.019	0.82	
CEO Is Chair	-0.001	-0.06		-0.016	-0.77	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.39			0.37	
# of Observations		16,783			16,783	
# of Clusters		2,382			2,382	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

TABLE 6
REPLICATION OF KALE ET AL. (2009) – *ROA* AS THE DEPENDENT VARIABLE

Dependent Variable: *ROA*	Original Paper Results	Replication Results	Replication Results after Removing Backfiled Observations
Total Gap	**0.429**	**0.917*** **	**0.8*** **
	(4.74)	**(5.15)**	**(4.9)**
CEO Alignment	0.128***	-0.01	-0.01
	(4.67)	(-1.47)	(-1.24)
VP Alignment	2.429***	0.47***	0.43***
	(5.63)	(4.86)	(4.53)
σ VP Comp.	0.021	-0.06	-0.05
	(0.21)	(-0.58)	(-0.51)
CEO Age	-2.657***	-1.56	-1.3
	(-2.74)	(-1.45)	(-1.2)
Industry Homogeneity	5.419***	3.43***	3.75***
	(2.97)	(2.98)	(3.31)
Total Sales	9.139***	5.82***	6.85***
	(6.32)	(4.14)	(4.84)
Total Sales Squared	-0.491***	-0.32***	-0.39***
	(-5.31)	(-3.58)	(-4.34)
Stk. Return Volatility	-70.667***	-8.83	-8.79
	(-3.28)	(-1.64)	(-1.61)
Capital to Sales	-3.255***	-4.1***	-4.18***
	(-6.58)	(-8.46)	(-8.32)
Leverage	-19.314***	-15.17***	-15.85***
	(-14.72)	(-11.37)	(-12.08)
R&D to Capital	-3.372***	-2.48***	-2.42***
	(-4.05)	(-3.57)	(-3.39)
Advertising to Capital	0.063	0.64	0.8
	(0.05)	(0.5)	(0.64)
Dividend Yield	-0.500***	-3.97	4.01
	(-7.13)	(-0.11)	(0.11)
Intercept	YES	YES	YES
Year Dummies	YES	YES	YES
Firm Fixed Effect	YES	YES	YES
R-squared	0.15	0.12	0.13
# of Observations	17,987	14,570	14,124
# of Clusters	2,367	2,308	2,250

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.
Standard errors are clustered by firm, and t-stats are shown in the parentheses.
Variables' definition is provided in the Appendix A.

TABLE 7
REPLICATION OF KALE ET AL. (2009) – *TOBIN'S Q* AS THE DEPENDENT VARIABLE

Dependent Variable: *Tobin's Q*	Original Paper Results	Replication Results	Replication Results after Removing Backfiled Observations
Total Gap	**0.059*** **	**0.07*** **	**0.068*** **
	(4.68)	**(3.31)**	**(3.25)**
CEO Alignment	0.015***	0.001*	0.001*
	(3.76)	(1.68)	(1.74)
VP Alignment	0.151***	0.143***	0.134***
	(2.93)	(8.8)	(8.24)
σ VP Comp.	0.110***	0.05***	0.053***
	(9.33)	(4.24)	(4.61)
CEO Age	-0.281**	-0.253**	-0.258**
	(-2.43)	(-2.01)	(-2.04)
Industry Homogeneity	0.463-	0.333**	0.332**
	(1.91)	(2.33)	(2.31)
Total Sales	-0.650***	-0.718***	-0.631***
	(-3.25)	(-3.98)	(-3.51)
Total Sales Squared	0.029**	0.035***	0.029**
	(2.07)	(2.81)	(2.4)
Stk. Return Volatility	-9.906***	-0.526*	-0.413
	(-4.35)	(-1.71)	(-1.35)
Capital to Sales	-0.328***	-0.389***	-0.384***
	(-4.49)	(-4.95)	(-4.86)
Leverage	-1.027***	-1.139***	-1.179***
	(-6.66)	(-6.9)	(-7.13)
R&D to Capital	0.053	-0.005	0.007
	(0.57)	(-0.08)	(0.09)
Advertising to Capital	0.109	0.172	0.165
	(0.70)	(1.39)	(1.34)
Dividend Yield	-0.110***	-25.607***	-24.406***
	(-11.34)	(-5.33)	(-5.09)
Intercept	YES	YES	YES
Year Dummies	YES	YES	YES
Firm Fixed Effect	YES	YES	YES
R-squared	0.13	0.14	0.14
# of Observations	17,987	14,566	14,120
# of Clusters	2,367	2,308	2,250

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.
Standard errors are clustered by firm, and t-stats are shown in the parentheses.
Variables' definition is provided in the Appendix A.

TABLE 8
CONTEMPORANEOUS RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004

Independent Variable	Tobin's Q			Ind Adj Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Total Gap	**0.105**	**3.83**	***	**0.074**	**2.65**	***
CEO Alignment	0.000	0.34		0.000	0.24	
VP Alignment	0.108	5.66	***	0.093	4.63	***
σ VP Comp.	0.024	1.78	*	0.016	1.13	
CEO Age	-0.447	-2.19	**	-0.166	-0.88	
Industry Homogeneity	-0.023	-0.08		-0.004	-0.01	
Total Sales	-0.036	-0.19		-0.006	-0.03	
Total Sales Squared	0.029	2.65	***	0.026	2.31	**
Stk. Return Volatility	-0.424	-0.68		-0.213	-0.37	
Capital to Sales	0.061	0.92		0.148	1.93	*
R&D to Capital	0.155	1.92	*	0.075	0.85	
Advertising to Capital	0.099	0.88		0.132	1.09	
Dividend Yield	-16.830	-3.42	***	-13.455	-2.56	**
Lag Ind Adj Tobin's Q	0.266	10.99	***	0.276	11.32	***
Book Value	-0.790	-10.77	***	-0.788	-10.25	***
Ind Adj ROA	0.933	4.40	***	1.014	4.63	***
Capex to Assets	0.381	0.90		0.000	0.00	
Leverage	-0.573	-3.41	***	-0.385	-2.29	**
R&D to Sales	-0.689	-0.82		0.233	0.25	
R&D Missing	-0.072	-0.75		-0.075	-0.99	
Firm Age	0.070	2.69	***	-0.022	-0.80	
Founder	0.166	2.20	**	0.108	1.46	
Abnormal Total Comp.	0.072	2.78	***	0.065	2.55	**
Lag Relative Equity Comp.	-0.062	-0.72		-0.102	-1.24	
CEO Tenure 1	-0.073	-1.44		-0.066	-1.35	
CEO Tenure 2	-0.075	-1.69	*	-0.070	-1.61	
CEO Tenure 3-4	-0.026	-0.68		-0.022	-0.55	
CEO Tenure 5-6	-0.012	-0.38		-0.008	-0.25	
CEO Tenure Missing	-0.147	-1.93	*	-0.135	-1.82	*
Diversified	-0.162	-1.51		-0.171	-1.69	*
CEO Outsider	-0.036	-0.68		-0.064	-1.30	
CEO Is Chair	-0.041	-1.01		-0.049	-1.23	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.28			0.26	
# of Observations		7,663			7,663	
# of Clusters		1,665			1,665	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

TABLE 9
CONTEMPORANEOUS RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004 AFTER REMOVING BIASED OBSERVATIONS

Independent Variable	Tobin's Q			Ind Adj Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Total Gap	**0.083**	**3.16**	***	**0.053**	**1.94**	*
CEO Alignment	0.001	0.72		0.000	0.57	
VP Alignment	0.092	4.86	***	0.077	3.77	***
σ VP Comp.	0.024	1.72	*	0.014	1.03	
CEO Age	-0.452	-2.12	**	-0.168	-0.86	
Industry Homogeneity	-0.133	-0.50		-0.082	-0.30	
Total Sales	0.018	0.10		0.066	0.35	
Total Sales Squared	0.023	2.21	**	0.020	1.84	*
Stk. Return Volatility	-0.221	-0.35		-0.029	-0.05	
Capital to Sales	0.050	0.76		0.148	1.94	*
R&D to Capital	0.146	1.57		0.079	0.81	
Advertising to Capital	0.139	1.17		0.131	1.04	
Dividend Yield	-15.904	-3.38	***	-11.682	-2.27	**
Lag Ind Adj Tobin's Q	0.282	11.63	***	0.297	12.38	***
Book Value	-0.725	-9.64	***	-0.735	-9.37	***
Ind Adj ROA	0.952	4.33	***	0.985	4.34	***
Capex to Assets	0.383	0.91		0.023	0.05	
Leverage	-0.610	-3.91	***	-0.424	-2.69	***
R&D to Sales	-0.254	-0.28		0.671	0.67	
R&D Missing	-0.063	-0.64		-0.057	-0.75	
Firm Age	0.075	2.91	***	-0.016	-0.60	
Founder	0.147	1.84	*	0.107	1.39	
Abnormal Total Comp.	0.074	2.92	***	0.063	2.57	***
Lag Relative Equity Comp.	-0.077	-0.87		-0.095	-1.11	
CEO Tenure 1	-0.064	-1.24		-0.056	-1.16	
CEO Tenure 2	-0.087	-1.98	**	-0.075	-1.76	*
CEO Tenure 3-4	-0.033	-0.86		-0.017	-0.44	
CEO Tenure 5-6	-0.010	-0.32		-0.003	-0.10	
CEO Tenure Missing	-0.164	-2.16	**	-0.143	-1.94	*
Diversified	-0.178	-1.63		-0.201	-1.99	**
CEO Outsider	-0.025	-0.47		-0.058	-1.14	
CEO Is Chair	-0.031	-0.75		-0.046	-1.17	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.28			0.27	
# of Observations		7,278			7,278	
# of Clusters		1,611			1,611	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

TABLE 10
CONTEMPORANEOUS RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2015 AFTER REMOVING BIASED OBSERVATIONS

Independent Variable	Tobin's Q			Ind Adj Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Total Gap	**0.086**	**5.67**	***	**0.060**	**4.01**	***
CEO Alignment	0.001	2.25	**	0.001	2.05	**
VP Alignment	0.089	5.82	***	0.073	4.40	***
σ VP Comp.	0.034	4.33	***	0.026	3.44	***
CEO Age	-0.145	-1.23		-0.010	-0.10	
Industry Homogeneity	-0.082	-0.47		-0.106	-0.66	
Total Sales	0.172	1.49		0.203	1.74	*
Total Sales Squared	0.006	0.91		0.003	0.43	
Stk. Return Volatility	0.582	2.13	**	0.282	1.15	
Capital to Sales	0.029	0.81		0.090	2.21	**
R&D to Capital	0.128	3.19	***	0.129	3.23	***
Advertising to Capital	-0.035	-0.51		0.040	0.64	
Dividend Yield	-10.860	-4.20	***	-7.518	-3.09	***
Lag Ind Adj Tobin's Q	0.393	23.20	***	0.430	25.49	***
Book Value	-0.557	-12.36	***	-0.511	-11.43	***
Ind Adj ROA	0.841	5.92	***	0.723	4.85	***
Capex to Assets	0.680	2.57	***	0.152	0.59	
Leverage	-0.448	-5.11	***	-0.382	-4.46	***
R&D to Sales	-0.396	-0.83		0.047	0.10	
R&D Missing	-0.025	-0.50		-0.046	-1.08	
Firm Age	0.019	0.88		0.015	0.51	
Founder	0.023	0.52		-0.011	-0.27	
Abnormal Total Comp.	0.069	4.06	***	0.033	2.09	**
Lag Relative Equity Comp.	-0.055	-0.75		-0.066	-0.97	
CEO Tenure 1	-0.029	-1.05		-0.013	-0.52	
CEO Tenure 2	-0.031	-1.31		-0.021	-0.94	
CEO Tenure 3-4	-0.029	-1.52		-0.016	-0.86	
CEO Tenure 5-6	-0.034	-2.03	**	-0.030	-1.82	*
CEO Tenure Missing	-0.059	-1.45		-0.047	-1.16	
Diversified	-0.112	-1.64		-0.101	-1.49	
CEO Outsider	0.052	1.96	**	0.018	0.78	
CEO Is Chair	0.000	-0.02		-0.014	-0.68	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.39			0.37	
# of Observations		16,691			16,691	
# of Clusters		2,376			2,376	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

TABLE 11
ADDITIONAL TESTS OF RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2015 AFTER REMOVING BIASED OBSERVATIONS

Independent Variable	Tobin's Q			Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Lag Total Gap	**-0.009**	**-0.40**				
CPS				**0.238**	**3.00**	***
CEO Alignment	0.002	3.96	***	0.002	3.13	***
VP Alignment	0.094	6.47	***	0.094	6.38	***
σ VP Comp.	0.041	5.25	***	0.048	5.86	***
CEO Age	-0.164	-1.40		-0.152	-1.30	
Industry Homogeneity	-0.063	-0.36		-0.068	-0.39	
Total Sales	0.152	1.28		0.143	1.24	
Total Sales Squared	0.008	1.15		0.008	1.23	
Stk. Return Volatility	0.579	2.17	**	0.566	2.09	**
Capital to Sales	0.024	0.68		0.026	0.73	
R&D to Capital	0.120	2.99	***	0.127	3.17	***
Advertising to Capital	-0.035	-0.51		-0.035	-0.52	
Dividend Yield	-11.089	-4.27	***	-10.991	-4.25	***
Lag Ind Adj Tobin's Q	0.396	23.14	***	0.395	23.58	***
Book Value	-0.539	-11.80	***	-0.543	-12.14	***
Ind Adj ROA	0.860	6.06	***	0.860	6.14	***
Capex to Assets	0.701	2.66	***	0.700	2.66	***
Leverage	-0.477	-5.63	***	-0.464	-5.31	***
R&D to Sales	-0.438	-0.93		-0.443	-0.95	
R&D Missing	-0.023	-0.46		-0.022	-0.45	
Firm Age	0.021	0.96		0.018	0.85	
Founder	0.017	0.40		0.022	0.51	
Abnormal Total Comp.	0.084	3.60	***	0.074	4.36	***
Lag Relative Equity Comp.	-0.059	-0.79		-0.062	-0.85	
CEO Tenure 1	-0.037	-1.34		-0.035	-1.25	
CEO Tenure 2	-0.034	-1.43		-0.031	-1.33	
CEO Tenure 3-4	-0.025	-1.31		-0.026	-1.37	
CEO Tenure 5-6	-0.030	-1.84	*	-0.032	-1.91	*
CEO Tenure Missing	-0.079	-2.04	**	-0.062	-1.52	
Diversified	-0.099	-1.50		-0.105	-1.55	
CEO Outsider	0.053	1.99	**	0.052	1.95	*
CEO Is Chair	-0.001	-0.02		-0.001	-0.05	
Intercept		Yes			Yes	
Year Dummies		Yes			Yes	
Firm Fixed Effect		Yes			Yes	
Adj. R squared		0.39			0.39	
# of Observations		16,689			16,783	
# of Clusters		2,377			2,382	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

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APPENDIX A: VARIABLE DEFINITION

Variable Name	Definition	Source
Tobin's Q	Market value of equity plus book value of assets minus the sum of book value of equity and deferred taxes divided by total assets	Compustat
Ind Adj Tobin's Q	Industry adjusted Tobin's Q measured as the difference between the firm's Tobin's Q and the median industry Tobin's Q in a given year	Compustat
CPS	Ration of CEO's total compensation to the sum of total compensation of top five executives of a company in a given year	ExecuComp
Total Gap	Natural logarithm of the difference between the CEO's total compensation and the median manager's total compensation for any given firm-year observation	ExecuComp
CEO Alignment	Number of shares held by the CEO plus delta of options times number of options held by CEO divided by the total number shares outstanding	ExecuComp
VP Alignment	Median of the alignment values of the four VPs while alignment for each VP is calculated similar to the way it is calculated for CEO	ExecuComp
σ VP Comp.	Natural logarithm of standard deviation of the four VP's total compensation	ExecuComp
CEO Age	Natural logarithm of the CEO age as reported in the ExecuComp database	ExecuComp
Industry Homogeneity	Mean partial correlation between firm's returns and an equally weighted industry index, for all firms in the same two-digit SIC industry code, holding market return constant	CRSP
Total Sales	Natural logarithm of total revenue	Compustat
Total Sales Squared	Natural logarithm of total revenue squared	Compustat
Stk. Return Volatility	Standard deviation of the last 60 months stock return	CRSP
Capital to Sales	Ratio of ratio of total property plant and equipment to total revenue in a given year	Compustat

R&D to Capital	Ratio of research and development expenditure to total property plant and equipment	Compustat
Advertising to Capital	Ratio of advertisement expense to total property plant and equipment	Compustat
Dividend Yield	Ratio of dividend amount to stock price	CRSP
E index	Entrenchment index (Bebchuk, Cohen and Ferrell (2009))	Other
Book Value	Natural logarithm of firm's total assets	Compustat
ROA	return on assets computed as operating income divided by book value of assets	Compustat
Insider Ownership	Fraction of shares held by all insiders as reported by ExecuComp	ExecuComp
Insider Ownership Squared	Squared of total percentage of executives stock ownership	ExecuComp
Capex to Assets	Ratio of capital expenditures over book value of assets in a given year	Compustat
Leverage	Ratio of long-term debt to assets	Compustat
R&D to Sales	Ratio of total research and development expenditure during the year to total revenue. If R&D is missing, it is set to zero	Compustat
R&D Missing	Indicator variable equal to one if the R&D expenditure is missing and zero otherwise	Compustat
Firm Age	Difference between the year of the observation and the first year that the firm data available in CRSP	CRSP
Founder	Indicator variable equal to one if the manager is also founder of the firm and zero otherwise	ExecuComp
Abnormal Total Comp.	Residual of a regression of total compensation of the top five executives on a constant and natural logarithm of total assets with industry and year fixed effect	ExecuComp
Relative Equity Comp.	Calculated as EBC/TDC1, where EBC is the equity-based compensation calculated as the sum of the total value of restricted shares granted plus the Black and Scholes value of options granted, and TDC1 is the total compensation available in ExecuComp	ExecuComp
CEO Own >= 20%	Indicator variable equal to one if the CEO owns at least 20% of the firm and zero otherwise	ExecuComp
CEO Tenure	Number of years since becoming CEO	ExecuComp
CEO Tenure Missing	Indicator variable equal to one if the tenure variable is missing and zero otherwise	ExecuComp
Diversified	Indicator variable equal to one if the firm reports more than one segment on Compustat's segment database and zero otherwise	Compustat

CEO Outsider	Indicator variable equal to one if the CEO has been working at the firm for less than one year before becoming CEO and zero otherwise	ExecuComp
CEO Is Chair	Indicator variable equal to one if the CEO is also the chairman of the board and zero otherwise	ExecuComp

APPENDIX B: INTERTEMPORAL RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004 BEFORE AND AFTER REMOVING BIASED OBSERVATIONS

Independent Variable	Before removing biased observations						After removing biased observations					
	Tobin's Q			Ind Adj Tobin's Q			Tobin's Q			Ind Adj Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
Lag Total Gap	**-0.051**	**-1.38**		**-0.046**	**-1.24**		**-0.044**	**-1.18**		**-0.037**	**-1.01**	
CEO Alignment	0.001	2.10	**	0.001	1.52		0.001	2.28	**	0.001	1.63	
VP Alignment	0.112	6.07	***	0.098	5.03	***	0.095	5.24	***	0.081	4.13	***
σ VP Comp.	0.032	2.38	**	0.020	1.43		0.027	2.00	**	0.014	1.03	
CEO Age	-0.461	-2.25	**	-0.189	-1.00		-0.475	-2.24	**	-0.208	-1.10	
Industry Homogeneity	-0.006	-0.02		0.011	0.04		-0.137	-0.52		-0.084	-0.31	
Total Sales	-0.067	-0.35		-0.050	-0.26		0.026	0.14		0.073	0.39	
Total Sales Squared	0.032	2.89	***	0.029	2.54	**	0.024	2.26	**	0.020	1.84	*
Stk. Return Volatility	-0.477	-0.77		-0.232	-0.40		-0.249	-0.39		-0.023	-0.04	
Capital to Sales	0.065	0.99		0.147	1.96	**	0.053	0.81		0.142	1.90	*
R&D to Capital	0.171	2.12	**	0.094	1.07		0.138	1.46		0.065	0.66	
Advertising to Capital	0.100	0.91		0.144	1.19		0.129	1.09		0.125	1.01	
Dividend Yield	-17.827	-3.61	***	-14.163	-2.70	***	-16.939	-3.60	***	-11.734	-2.27	**
Lag Ind Adj Tobin's Q	0.272	11.45	***	0.284	11.80	***	0.285	11.87	***	0.301	12.68	***
Book Value	-0.775	-10.44	***	-0.763	-9.97	***	-0.715	-9.46	***	-0.718	-9.24	***
Ind Adj ROA	0.933	4.35	***	1.012	4.60	***	0.958	4.34	***	0.995	4.37	***
Capex to Assets	0.403	0.95		0.011	0.03		0.417	1.00		0.034	0.08	
Leverage	-0.601	-3.59	***	-0.391	-2.35	**	-0.643	-4.15	***	-0.438	-2.83	***
R&D to Sales	-0.863	-1.03		0.073	0.08		-0.310	-0.35		0.668	0.68	
R&D Missing	-0.074	-0.78		-0.077	-1.03		-0.064	-0.65		-0.058	-0.76	
Firm Age	0.081	3.10	***	-0.012	-0.44		0.085	3.30	***	-0.006	-0.23	
Founder	0.140	1.86	*	0.098	1.33		0.121	1.52		0.095	1.26	
Abnormal Total Comp.	0.111	3.10	***	0.095	2.75	***	0.111	3.07	***	0.093	2.67	***
Lag Relative Equity Comp.	-0.027	-0.30		-0.058	-0.67		-0.048	-0.51		-0.059	-0.65	
CEO Tenure 1	-0.086	-1.69	*	-0.069	-1.43		-0.078	-1.52		-0.064	-1.33	
CEO Tenure 2	-0.085	-1.92	*	-0.080	-1.86	*	-0.096	-2.18	**	-0.086	-2.02	**
CEO Tenure 3-4	-0.031	-0.81		-0.028	-0.71		-0.038	-1.01		-0.025	-0.67	
CEO Tenure 5-6	-0.010	-0.31		-0.006	-0.18		-0.010	-0.32		-0.005	-0.15	
CEO Tenure Missing	-0.179	-2.55	**	-0.164	-2.39	**	-0.194	-2.81	***	-0.174	-2.59	***
Diversified	-0.163	-1.52		-0.177	-1.76	*	-0.173	-1.58		-0.197	-1.95	*
CEO Outsider	-0.019	-0.36		-0.046	-0.93		-0.015	-0.28		-0.049	-0.97	
CEO Is Chair	-0.036	-0.89		-0.039	-0.98		-0.028	-0.69		-0.038	-0.98	
Intercept		Yes			Yes			Yes			Yes	
Year Dummies		Yes			Yes			Yes			Yes	
Firm Fixed Effect		Yes			Yes			Yes			Yes	
Adj. R squared		0.29			0.27			0.28			0.27	
# of Observations		5,690			5,690			5,402			5,402	
# of Clusters		1,397			1,397			1,356			1,356	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.

APPENDIX C: CONTEMPORANEOUS RELATIONSHIP BETWEEN PAY DISPARITY MEASURE AND COMPANY VALUE FROM 1993 TO 2004 BEFORE AND AFTER REMOVING BIASED OBSERVATIONS

Contemporaneous relationship between additional CEO pay disparity measure and firm value from 1993-2004 before and after removing biased observations (similar to Tables 7 and 8 but using *CPS* as the explanatory variable).

Independent Variable	**Before removing biased observations**						**After removing biased observations**					
	Tobin's Q			Ind Adj Tobin's Q			Tobin's Q			Ind Adj Tobin's Q		
	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.	Coef.	t-stat	Sign.
CPS	**0.284**	**2.23**	**	**0.147**	**1.15**		**0.211**	**1.70**	*	**0.068**	**0.53**	
CEO Alignment	0.001	1.33		0.001	1.20		0.001	1.65	*	0.001	1.47	
VP Alignment	0.113	6.14	***	0.093	4.72	***	0.096	5.29	***	0.075	3.83	***
σ VP Comp.	0.042	2.91	***	0.025	1.72	*	0.037	2.49	**	0.019	1.32	
CEO Age	-0.472	-2.32	**	-0.197	-1.04		-0.460	-2.18	**	-0.180	-0.93	
Industry Homogeneity	-0.002	-0.01		0.005	0.02		-0.126	-0.48		-0.085	-0.32	
Total Sales	-0.062	-0.33		-0.042	-0.22		0.015	0.08		0.056	0.29	
Total Sales Squared	0.032	2.86	***	0.029	2.54	**	0.024	2.31	**	0.021	1.96	**
Stk. Return Volatility	-0.452	-0.74		-0.251	-0.44		-0.237	-0.37		-0.052	-0.09	
Capital to Sales	0.064	0.97		0.151	1.99	**	0.053	0.80		0.147	1.94	*
R&D to Capital	0.175	2.18	**	0.102	1.15		0.148	1.60		0.081	0.83	
Advertising to Capital	0.117	1.06		0.162	1.34		0.139	1.17		0.139	1.11	
Dividend Yield	-17.313	-3.53	***	-13.769	-2.63	***	-16.555	-3.54	***	-11.601	-2.23	**
Lag Ind Adj Tobin's Q	0.271	11.59	***	0.280	11.85	***	0.282	11.97	***	0.295	12.60	***
Book Value	-0.788	-10.92	***	-0.784	-10.37	***	-0.728	-9.86	***	-0.738	-9.57	***
Ind Adj ROA	0.947	4.52	***	1.049	4.85	***	0.970	4.48	***	1.028	4.58	***
Capex to Assets	0.422	1.00		0.019	0.05		0.423	1.01		0.032	0.08	
Leverage	-0.593	-3.58	***	-0.388	-2.35	**	-0.629	-4.08	***	-0.421	-2.71	***
R&D to Sales	-0.798	-0.96		0.112	0.12		-0.318	-0.36		0.608	0.62	
R&D Missing	-0.071	-0.74		-0.074	-1.00		-0.062	-0.63		-0.057	-0.75	
Firm Age	0.078	2.99	***	-0.017	-0.61		0.082	3.18	***	-0.012	-0.45	
Founder	0.174	2.31	**	0.119	1.61		0.141	1.79	*	0.099	1.28	
Abnormal Total Comp.	0.073	2.81	***	0.067	2.63	***	0.077	3.10	***	0.070	2.86	***
Lag Relative Equity Comp.	-0.065	-0.76		-0.106	-1.29		-0.087	-0.99		-0.110	-1.28	
CEO Tenure 1	-0.080	-1.57		-0.072	-1.48		-0.067	-1.31		-0.060	-1.26	
CEO Tenure 2	-0.079	-1.77	*	-0.075	-1.73	*	-0.085	-1.93	*	-0.074	-1.74	*
CEO Tenure 3-4	-0.029	-0.76		-0.027	-0.68		-0.032	-0.85		-0.019	-0.51	
CEO Tenure 5-6	-0.012	-0.38		-0.007	-0.23		-0.008	-0.26		-0.001	-0.05	
CEO Tenure Missing	-0.146	-1.93	*	-0.133	-1.81	*	-0.160	-2.14	**	-0.141	-1.93	*
Diversified	-0.177	-1.67	*	-0.186	-1.87	*	-0.184	-1.70	*	-0.205	-2.04	**
CEO Outsider	-0.027	-0.51		-0.054	-1.11		-0.021	-0.38		-0.055	-1.08	
CEO Is Chair	-0.045	-1.11		-0.051	-1.29		-0.036	-0.88		-0.049	-1.25	
Intercept		Yes			Yes			Yes			Yes	
Year Dummies		Yes			Yes			Yes			Yes	
Firm Fixed Effect		Yes			Yes			Yes			Yes	
Adj. R squared		0.29			0.27			0.28			0.27	
# of Observations		7,727			7,727			7,341			7,341	
# of Clusters		1,675			1,675			1,623			1,623	

***, **, and * indicate significance at the 1%, 5%, and 10% level respectively.

Standard errors are clustered by firm.

Variables' definition is provided in the Appendix A.