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THREE ESSAYS ON COMPENSATION AND THE BOARD OF DIRECTORS

by

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A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
in the Department of Finance  
in the College of Business Administration  
at the University of Central Florida  
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## **ABSTRACT**

In my first essay, I find a statistically and economically significant director-specific component in CEO pay following the enactment of the Sarbanes-Oxley Act of 2002 (SOX). In the cross-section of firms, directors that award relatively higher (lower) CEO pay in one firm also award relatively higher (lower) CEO pay in other firms of whose boards they are members during the year. Based on my estimates, the director-specific component is responsible for around  $\pm 3.5\%$  of total CEO pay or around  $\pm \$230,000$  per CEO-year on average. In addition to affecting CEO pay levels, the director-specific component also has a significant effect on the changes and the composition of CEO pay, thus affecting CEO incentives. I pursue two potential explanations for our findings—changes in board composition and changes in director behavior after SOX. I do not find evidence that the director-specific component in CEO pay is due to changes in board composition. Instead, I find evidence that the director-specific component in CEO pay is due to changes in director behavior related to the additional risks and employment concerns imposed on directors after SOX. My findings are consistent with the view that SOX discourages directors from taking risks when awarding CEO pay and so directors award CEO pay that they can more easily justify through direct experiences in other firms. These findings have wide implications about the importance of directors in setting CEO pay, the existence of agency problems within the board, and the consequences of regulation in general and SOX in particular.

My second essay concerns the compensation of directors themselves. I find that institutional ownership is positively related to the level of director compensation and the proportion of equity based compensation that directors receive. These results are consistent with the interpretation that institutions prefer stronger links between firm performance and board compensation and are willing to pay higher levels of compensation for better governance. I also investigate the difference between the effects of active versus passive institutional investment and find that active institutions appear to have a larger economic impact on director compensation. However, I do not find a statistical difference between the effects of active and passive ownership.

My third essay studies the strategies that firms follow when apportioning incentive compensation within the board of directors. Firms tend to preserve the structure of director incentives over time so that firms using equal (variable) incentives in one year are more likely to use equal (variable) incentives in the following year. I further examine whether the structure of director incentives within the board affects acquirer performance in corporate acquisitions. I find that the five-day announcement returns of firms awarding equal director incentives are around 1% higher than the returns of firms that award variable director incentives within the board. These results are robust to standard controls related to acquirer returns, to different lengths of the announcement window, and to alternative incentive strategy classification schemes. Overall, my findings are consistent with the idea that director incentives play a significant role in corporate performance and with the idea that equal director incentives dominate variable incentives in circumstances where the success of the outcome is likely to depend on the board as a whole.

For Jessica and Cass, without whom I would not be.

## **ACKNOWLEDGMENTS**

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# ESSAY ONE: WHEN IN DOUBT - WHY IS THERE A DIRECTOR SPECIFIC COMPONENT IN CEO PAY AFTER SOX?

## 1. Introduction

There is little doubt that the Sarbanes-Oxley Act (SOX) of 2002 and the accompanying changes in listing standards on the New York Stock Exchange (NYSE) and Nasdaq, while changing the composition and the structure of corporate boards, also significantly increased the costs and risks to directors serving on the boards of public companies. The new rules increased the disclosure requirements and the scrutiny on directors, imposed new responsibilities on directors to justify their decisions, and increased director personal liability and penalties if directors are found in violation of U.S. securities laws.<sup>1</sup>

Yet financial researchers are still trying to develop a clear picture of whether and how directors have changed their behavior in response to the higher costs and risks after SOX.<sup>2</sup> In this study, we use a novel approach to examine the determinants of CEO pay and present evidence consistent with directors attempting to avoid the increased costs and risks following SOX by awarding CEO pay that they can more easily justify through direct experiences on other boards.

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<sup>1</sup> See, for example, Linck, Netter, and Yang (2008), Barger, Lehn, and Zutter (2010), and the references therein. Consistent with an increase in director liability and penalties, Linck, Netter, and Yang (2008) find that Director and Officer (D&O) insurance premiums have doubled after SOX.

<sup>2</sup> Consistent with numerous prior studies, we will use SOX to encompass the Sarbanes-Oxley Act of 2002, SEC rules that implement SOX, and changes in NYSE and Nasdaq listing standards associated with SOX.

Several considerations motivate our interest in CEO pay. First, CEO pay was at the center of the 2001-2002 corporate governance scandals that led to SOX. In most of the scandals, CEOs and other executives had received substantial compensation prior to the collapses of their firms.<sup>3</sup> The apparent discrepancy between the fortunes of executives and other stakeholders pointed to a link between executive pay and fraud and focused the attention of regulators, commentators, and academic researchers on executive pay. For instance, in October 2002, NYSE and Nasdaq proposed rules requiring shareholder approval of most equity-based compensation plans.<sup>4</sup> Executive pay, especially CEO pay, is thus a highly visible aspect of corporate governance that is likely to be heavily scrutinized after SOX. Moreover, scrutiny on how directors award CEO pay could be accompanied by additional scrutiny of other director duties. Under these circumstances, directors would be especially sensitive to CEO pay and may change how they award CEO pay after SOX. Second, the board of directors is the key decision-maker when it comes to awarding CEO pay. For other aspects of corporate behavior (e.g., investment and financial policies), decisions may be in the hands of managers as well as directors. Examining CEO pay, therefore, allows us to reach direct conclusions about changes in the behavior of directors. And third, because CEO actions could significantly affect firm value, understanding the determinants of CEO incentives in general, and CEO pay in particular, is important and is the subject of an active area of research.

Using a sample of 12,188 firm-years between 1996 and 2011, we find that following the enactment of SOX there is a statistically and economically significant director-specific component in CEO pay; that is, after controlling for firm, CEO, and board characteristics known

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<sup>3</sup> The most notorious of these scandals was the collapse of Enron. In 2000, Enron's then chairman and CEO received a total pay valued at around \$30 million and additionally exercised options in excess of \$124 million. In contrast, in the ensuing bankruptcy, ordinary shareholders lost the bulk of their Enron investments, and thousands of Enron workers lost their jobs and much of their retirement savings.

<sup>4</sup> SEC approved these rules on June 30, 2003.

to affect CEO pay, directors who award relatively higher (lower) CEO pay in one firm also award relatively higher (lower) CEO pay in the other firms of whose boards they are members during the year. Based on our estimates, after 2002 around  $\pm 3.5\%$  of total CEO pay, or around  $\pm \$230,000$  per CEO-year on average, is awarded as a consequence of this director-specific component. Moreover, the director-specific component in CEO pay is also significant in the year-over-year changes in a CEO's pay as well as in the proportion of a CEO's equity-based pay. To the extent that pay changes and equity-based pay provide CEOs with incentives for performance (e.g., Jensen and Murphy, 1990 and Core and Guay, 1999), the director-specific component in CEO pay significantly influences CEO performance incentives.

In order to better understand the source of the documented director-specific component in CEO pay after SOX, we perform additional analysis. For the sake of tractability, we group the potential explanations for our findings into two categories: explanations based on changes in board composition and explanations based on changes in director behavior after SOX.

Our findings do not support the explanation that the director-specific component in CEO pay is a consequence of the changes in board composition following SOX. Specifically, we examine whether a director-specific component in CEO pay exists prior to SOX for a sub-sample of firms that even prior to 2002 satisfied the board independence requirements imposed by the new exchange listing standards. We do not find evidence of a director-specific component in CEO pay before SOX in the sub-sample of firms that already satisfied the new standards or, for that matter, in the sub-sample of firms that did not satisfy these standards. In similar tests, we examine whether the director-specific component in CEO pay exists prior to SOX for firms with larger boards, non-dual CEOs, low proportions of current executives, and high proportions of

lawyers—i.e., boards that are similar in composition to post-SOX boards.<sup>5</sup> We do not find evidence of a director-specific component in CEO pay in any of these sub-samples prior to SOX.

To determine whether the director-specific component in CEO pay is related to increased director costs and risks after SOX, we examine whether the effect varies with director risk-taking incentives as measured by excess director option-based pay, expected director turnover, and director reputation concerns in the market for directors. All else equal, if director option-based pay is low relative to expectations then directors are less likely to take on additional risks, including risks stemming from SOX. Because director option-based pay is endogenous, we first estimate a model that explains director option-based pay. Using the residuals from this model, we form two sub-samples based on whether director option-based pay is below-expectations or above-expectations. We find that the director-specific component in CEO pay is more pronounced when director option-based pay is low relative to expectations. In similar tests we find that the director-specific component in CEO pay is mostly evident when expected director turnover (as measured by the firm's historic turnover) is relatively high and when directors have high reputation concerns (as measured by the number of boards a director serves). Overall, our findings are consistent with the idea that, after SOX, directors with relatively low risk-taking incentives try to avoid taking risks by awarding similar CEO pay across the different boards they serve.

Our study provides several notable contributions to the literature. First, our study contributes to the standing question of whether CEO pay is mostly determined in the labor

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<sup>5</sup> After SOX, board composition itself may have changed as a response to the increased costs and risks after SOX. For instance, as discussed by Linck, Netter, and Yang, (2008), the increase in lawyers and the reduction in current executives may be one such response. Consistent with this reasoning, we find that the director-specific component in CEO pay is mostly evident for firms that have followed the general trend and have increased the proportion of lawyers and/or reduced the proportion of current executives in their boards. In contrast, firms that have kept a high proportion of current executives and a low proportion of lawyers in their boards do not exhibit a significant director-specific component in CEO pay.

market for CEO talent (e.g., Rosen, 1990; Himmelberg and Hubbard, 2000; Hubbard, 2005; Gabaix and Landier, 2008; Terviö, 2008) or whether agency problems within the board may lead to CEO pay that reflects the preferences of directors (e.g., Fama, 1980; Fama and Jensen, 1983; Jensen, 1993; Hall and Murphy, 2003; Bebchuk and Fried, 2003). Existing empirical research on the relevance of the board for CEO pay examines mainly the importance of board structure and composition.<sup>6</sup> However, director costs and risks, while more difficult to observe, also play a central role in agency theory. The exogenous shock to director costs and risks after SOX, therefore, provides a unique opportunity to examine whether and how CEO pay depends on the board of directors.<sup>7</sup> Our findings are consistent with the predictions of agency theory where directors' decisions on CEO pay are, at least in part, driven by directors' own preferences.

Second, our study contributes to the literature examining the effects of SOX and the accompanying changes in exchange listing requirements on corporate behavior. For example, Chhaochharia and Grinstein (2009) find a significant decrease in CEO pay in firms that are most affected by the new exchange requirements while Barger, Lehn, and Zutter (2010) find that U.S. firms, when compared to non-U.S. firms, experience a decline in risk-taking after SOX as evidenced by a decline in capital and R&D expenditures, an increase in corporate cash holdings, and an overall decline in stock volatility.<sup>8</sup> We present evidence of another, likely unintended, consequence of SOX that is consistent with the view that SOX discourages risk taking by directors.

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<sup>6</sup> See, among others, Yermack (1996), Hallock (1997), Core, Holthausen, and Larcker (1999), Bertrand and Mullainathan (2001), Grinstein and Hribar (2004), and Chhaochharia and Grinstein (2009).

<sup>7</sup> Other studies also use SOX as an exogenous event to examine the effect of outside directors on firm performance (Duchin, Matsusaka, and Ozbas, 2010) and on CEO pay (Chhaochharia and Grinstein, 2009).

<sup>8</sup> Guthrie, Sokolowsky, and Wan (2012) re-examine the results of Chhaochharia and Grinstein (2009) and find that the majority of the decline in CEO pay after SOX is attributable to two outlier CEOs--Steve Jobs at Apple and Kosta Kartotlis at Fossil. Dey (2010) questions the interpretation of Barger, Lehn, and Zutter (2010) that the decline in risk-taking of U.S. firms is due to SOX and instead suggests that general market trends may be behind their findings.

Third, the findings have more general implications about regulating the internal governance of firms. Because regulation is usually intended to change the incentives of those being regulated, it is important to better understand what incentives exactly are being changed. The substantive corporate governance regulations imposed by SOX are unprecedented in the history of federal securities regulation, which provides a unique opportunity to examine the effects of such regulations on corporate behavior. The lessons learned from SOX indicate that increasing the costs and risks of internal governance, instead of resolving agency problems, may in fact exacerbate them.<sup>9</sup>

Finally, our study also contributes to the literature on the existence of “styles” in corporate decisions. Most notably, Bertrand and Schoar (2003) track top managers over time as they manage different firms and provide evidence for manager fixed effects for a wide range of corporate decisions. Bertrand and Schoar (2003) contribute these findings to heterogeneity in manager “styles”. Fee, Hadlock, and Pierce (2013) propose two distinct hypotheses for the findings of Bertrand and Schoar (2003): (i) the idiosyncratic style hypothesis, according to which unanticipated managerial-style effects cause firm policies and (ii) the selected style hypothesis, according to which directors deliberately select a manager “style” to induce the firm to move in a certain direction. Fee, Hadlock, and Pierce (2013) present evidence consistent with the selected style hypothesis but inconsistent with the idiosyncratic style hypothesis. Our findings raise another possibility: the evidence of “styles” may be contextual and may not reflect the existence of actual “styles”. Specifically, directors may not have their own “styles” in awarding CEO pay, yet in an attempt to reduce the risk of being scrutinized, directors may tend to award similar CEO

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<sup>9</sup> The objective of this study is not to provide a complete cost-benefit analysis of SOX. Zhang (2007), for example, studies the overall economic consequence of SOX and finds that U.S. firms experienced a statistically significant negative cumulative abnormal return around key SOX events.

pay across all boards they serve. In this case the heterogeneity across directors is due to directors serving on different boards and not due to differences in actual “styles”.

Our paper is somewhat related to studies that examine the effect of peer groups on CEO pay (e.g., Bizjak, Lemmon, and Naveen, 2008; Albuquerque, 2009) and studies that examine network effects in corporate governance (e.g., Bouwman, 2011). While existing studies on peer group effects use mainly industry- and size-based peer groups, our study explicitly accounts for industry and size effects and focuses on the importance of specific directors in determining CEO pay.<sup>10</sup> In addition, we demonstrate that our findings are not driven by a wider network of directors sharing information about optimal CEO pay but instead are isolated to the one director who serves on several boards.

The remainder of the paper is organized as follows. Section 2 proposes and motivates two explanations for the director-specific component in CEO pay after SOX. Section 3 describes our sample and variables. Section 4 presents our main findings for a director-specific component in CEO pay. Section 5 examines whether our findings are due to a wider network effect while Section 6 examines whether our findings are due to changes in board composition. Section 7 examines how director risks affect the director-specific component in CEO pay. Section 8 concludes the paper.

## 2. What could explain a director-specific component in CEO pay?

Existing theoretical and empirical research on the determinants of executive compensation has ignored the possibility that a director-specific component may affect CEO pay.

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<sup>10</sup> Moreover, most directors who serve on multiple boards serve on boards across different industries. This fact also makes it highly unlikely that our findings are a result of industry peer effects. Our findings may indicate that post-SOX directors choose peer groups from the set of firms on whose boards they sit. This interpretation of the results relies on endogenously chosen peer groups and is still consistent with our overall conclusion of a director-specific component in CEO pay after SOX.

Under optimal contracting, CEO pay is determined by the characteristics of the firm, the information environment, the competition for human capital among firms, the competition for jobs among CEOs, and the abilities and risk-preferences of the CEO so that equilibrium CEO pay does not depend on who awards the pay. Even in settings where CEO compensation depends on the governance of the firm, and thus on the board of directors, board and director characteristics are considered to be confined within each firm so that a director-specific component would not manifest itself across different firms.<sup>11</sup> In this section we propose and motivate two possible explanations for a director-specific component in CEO pay after SOX.

### *2.1 Changes in board composition*

Different directors may have different bargaining skills, different assessments of what constitutes optimal CEO pay or simply different “styles” when awarding CEO pay. Such differences across directors may lead to a director-specific component in CEO pay but only if directors are the ones who set the pay of the CEO. Existing studies conducted prior to SOX, however, present evidence that CEO pay may effectively be set by the CEO and not by the board (see Bebchuk, Fried, and Walker, 2002, and Bertrand and Mullainathan, 2001 for the “managerial power” and “skimming” hypotheses).

After the enactment of SOX, there is an increase in board size, board independence, and the proportion of lawyers in the board and a decrease in CEO duality and the proportion of current executives on the board (Linck, Netter, and Yang, 2008).<sup>12</sup> All of these changes provide a strong indication that, after SOX, boards have become more independent from the CEO of the firm. It is, therefore, possible that our findings of a director-specific component in CEO pay

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<sup>11</sup> A comprehensive review of the literature on executive compensation is beyond the scope of this study. For a review of the literature, the reader is referred to Murphy (1999) and Aggarwal (2008) and the references therein.

<sup>12</sup> The increase in board size seems to be a consequence of firms hiring new outside directors to satisfy the new requirements while not letting go of insiders (see, Linck, Netter, and Yang, 2008).

after SOX are due to the changes in board composition following SOX and are simply an indication that before SOX directors had less influence on CEO pay than after SOX.

## *2.2 Changes in board behavior*

Director behavior also may have changed in response to changes in director costs and risks after SOX. Linck, Netter, and Yang (2008) find that boards meet more often after SOX and that Director and Officer (D&O) insurance premiums have doubled, findings that are consistent with an increase in director costs and risks. In addition, Linck, Netter, and Yang (2008) find that director turnover has increased after SOX. Because relatively higher turnover means relatively lower job security and because director dismissal would likely have an adverse effect on director reputational capital, an increase in director turnover also points to an increase in director risks after SOX.

Overall, when considering CEO pay after SOX, directors concerned with their own welfare would prefer CEO pay that minimizes these additional costs and risks. Such concerns may lead to a director-specific component in CEO pay in at least two ways. First, to reduce exposure to the higher risks after SOX, directors may award CEO pay that they find relatively easy to justify through direct experiences on other boards. Second, if different directors have different assessments of or sensitivities to the additional costs and risks stemming from SOX, then a director-specific component in CEO pay may emerge, i.e., directors less (more) sensitive to these costs and risk would tend to award higher (lower) CEO pay.

## **3. Sample description**

In this section we describe the data, define the main variables, and provide summary statistics for the sample of firms used in the study. Of special interest is the construction of the variable that we use to measure the director-specific component in CEO pay.

### 3.1 Data

The main sample for this study is an intersection of Compustat's Execucomp database and RiskMetrics Director and Governance data. Starting from 1992, Execucomp provides detailed executive compensation data mainly for firms in the S&P 1500 index. The CEO compensation data is matched with RiskMetrics Director and Governance data which provides director data for firms in the S&P 1500 index beginning in 1996. As a result, our base sample consists of firms publicly traded between 1996 and 2011.

To form the final dataset used in our analysis, we obtain additional firm data from the Compustat annual files, the CRSP monthly files, and Thomson Reuters' CDA/Spectrum Institutional Holdings files. The sample is restricted to firm-years with CEOs for whom we have a complete set of components comprising the total compensation variable in Execucomp (*tdc1*).<sup>13</sup> If the net value of the sum of all components is not within \$1,000 of the reported total compensation, then the observation is dropped from our sample. To eliminate spurious effects that CEO turnover may have on observed CEO pay, we also remove from our sample any firm-years where the CEO left office during the fiscal year. Furthermore, when examining changes in CEO pay, we ensure that the year  $t-1$  CEO and the year  $t$  CEO is the same person. CEO compensation and all other dollar figures are adjusted for inflation with Consumer Price Index data from the United States Bureau of Labor Statistics, with 2012 as the base year.

Our starting sample consists of 17,395 firm-year observations with available data in both the Riskmetrics and the Execucomp databases. Additional data requirements from CRSP and Compustat reduce the sample size to 14,987 firm-years. For 2,799 of these observations, firms

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<sup>13</sup> Prior to December 2006, *tdc1* was defined as the sum of salary, bonus, *rstkgmnt*, *ltip*, *option\_awards\_blk\_value*, *othann*, and *allothtot*. After December 2006, *tdc1* is defined as the sum of salary, bonus, *noneq\_incent*, *stock\_awards\_fv*, *option\_awards\_fv*, and *othcomp*. These changes came as a result of the 2004 revision of FASB FAS 123.

do not share directors with other firms within the same year and so we are unable to calculate our measure of director-linked CEO pay. The final sample thus consists of 12,188 firm-year observations (2,056 unique firms) between 1996 and 2011 with an average of around 762 firms per year. The sample is fairly balanced over time, with a minimum of 607 firms in 1996 and a maximum of 937 firms in 2011.

### *3.2 Measuring director-specific CEO pay*

To test for a director-specific component in CEO pay, we examine how the pay that directors award to the CEO of one firm is related to the CEO pay of other firms on whose boards these same directors serve.<sup>14</sup> Our general approach is similar to the approach employed by Bertrand and Schoar (2003) and in Fee, Hadlock, and Pierce (2013) to examine how a CEO's style at the new employer relates to the style of the same CEO at her previous employer. Our analysis is not based on director fixed effects (another approach used in Bertrand and Schoar, 2003) for two critical reasons. First, Fee, Hadlock, and Pierce (2013) present significant evidence of serious underlying methodological difficulties in using dummy variables to identify CEO-specific effects, difficulties that would also be present when examining director-specific effects. And second, by construct director-fixed effects are constant over time and forward-looking from the standpoint of a given year. However, when trying to justify CEO pay in a given year directors would be most interested in the pay of other CEOs during the same year since such pay is directly observed and most likely to be used as a comparison. Conceptually, whereas director-fixed effects may help capture heterogeneity in unobserved (or latent) director-specific styles in awarding CEO pay, our focus is on CEO pay that directors can more easily

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<sup>14</sup> As a source of information, directors may also want to use CEO pay in firms on whose boards they do not serve. However, fiduciary duties, boardroom confidentiality policies, insider trading laws, and verification frictions may prevent directors from sharing and learning about contemporaneous CEO pay in these firms before CEO pay is publicly disclosed.

justify and in that sense using observed contemporaneous CEO pay dominates using unobserved director-fixed effects.

Specifically, for each firm-year observation, we form a sample of director-linked firms consisting of all other firms in our dataset that share board members with the base firm during the fiscal year. The sample of director-linked firms contains one observation for each board member link, so a firm may be represented multiple times in the case of interlocking boards (i.e., more than one shared board member with the base firm). Taking an average of the CEOs' total pay within this director-linked sample of firms gives us a measure of director-linked CEO pay for each firm-year. Figure 1.1 presents a simple example for the identification of director-linked firms.

The measure of director-linked CEO pay is in effect the average level of compensation a board pays to other CEOs when its members serve on other boards during the fiscal year. For a mathematical representation, consider a market with  $I$  firms and  $J$  directors who may be shared by any of the firms. We define director-linked CEO compensation for any firm  $i$  in year  $t$ ,  $C_{i,t}^{dl}$ , as equal to:

$$C_{i,t}^{dl} = \frac{\sum_{i'=1}^I \sum_{j=1}^J C_{i',t} D_{j \in i \cap i',t}}{\sum_{i'=1}^I \sum_{j=1}^J D_{j \in i \cap i',t}} \Bigg|_{\forall i' \neq i}. \quad (1)$$

In this specification,  $C_{i',t}$  is the log total CEO compensation for firm  $i'$  in year  $t$ ,

$D_{j \in i \cap i',t} = 1$  if firm  $i$  and firm  $i'$  share director  $j$  in year  $t$ , and  $D_{j \in i \cap i',t} = 0$  otherwise.<sup>15</sup>

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<sup>15</sup> As we discuss in more detail in Section 3.4, our final variable of director-linked CEO pay is standardized within each sub-sample where sub-samples are based on the number of director-linked observations used to calculate the average director-linked CEO pay. This adjustment does not affect our findings yet it is necessary since our measure of director-linked CEO pay is an average and thus its variance is directly affected by the number of director-linked firms used to calculate that average.

The pay of the CEO in each firm depends on many factors, such as firm size and other firm characteristics as well as CEO and board characteristics. To construct a measure of director-specific CEO pay, we decompose director-linked CEO pay into two components. The first component is the director-linked CEO pay that is predicted by the firm, CEO, and board characteristics of linked firms. The second component is the director-linked CEO pay not predicted by these variables (i.e., the residual), which we use to measure director-specific CEO pay. For this purpose, we estimate the following ordinary least squares (OLS) regression model:

$$C_{i,t} = \beta X_{i,t} + 3\text{-digit SIC code} \times \text{year fixed effects}_{i,t} + v_{i,t}. \quad (2)$$

In Equation (2),  $C_{i,t}$  is the log total compensation of the CEO of firm  $i$  for year  $t$ . As explanatory variables ( $X_{i,t}$ ), we include all firm, CEO, and board characteristics used in the previous analysis.

The model in Equation (2) is estimated using all 14,987 firm-year observations in our base sample, even firm-year observations where no director is a member of other boards. The estimates from the model based on the larger sample are indistinguishable from the estimates presented in Table 1.2, discussed later in the paper. Based on the estimates, for each firm-year we compute the residual component of CEO compensation ( $v_{i,t}$ ) and the component predicted by all regressors ( $\hat{C}_{i,t} = C_{i,t} - v_{i,t}$ ). Note that by construction the two components are independent from each other. By applying Equation (1) separately to  $\hat{C}_{i,t}$  and to  $v_{i,t}$ , we effectively decompose director-linked CEO pay into its predicted and residual components ( $\hat{C}_{i,t}^{dl}$  and  $v_{i,t}^{dl}$ ). Due to the linearity of all relevant calculations, the two components add up to the director-linked CEO pay variable ( $C_{i,t}^{dl} = \hat{C}_{i,t}^{dl} + v_{i,t}^{dl}$ ). While in the subsequent analysis we examine whether and

how CEO pay is related to both components of director-linked CEO pay ( $\hat{C}_{i,t}^{dl}$  and  $v_{i,t}^{dl}$ ), our primary focus is on the measure of director-specific CEO pay ( $v_{i,t}^{dl}$ ).

### 3.3 Control variables

In the analysis that follows, we use a range of control variables that measure various firm, CEO, and board characteristics. Numerous studies on executive compensation find that CEO compensation is positively related to firm size (see, for example, Gabaix and Landier, 2008; Terviö, 2008; Frydman and Saks, 2010; and the references therein). We follow Gabaix and Landier (2008) and measure firm size as the sum of the book value of debt and market value of equity at the end of the prior fiscal year.<sup>16</sup>

Studies of executive compensation and its sensitivity to performance traditionally use annual stock returns to capture firm performance (e.g., Jensen and Murphy, 1990; Aggarwal and Samwick, 1999), where stock returns directly affect the value of CEO stock and option holdings as well as the likelihood of receiving bonuses. Annual returns for each firm are calculated for the prior fiscal year using data from the CRSP monthly files. To calculate annual returns, we require at least nine monthly return observations, and firm-years with fewer than nine return observations are dropped from the sample. In consideration of the effect that accounting performance may have on executive compensation (Murphy, 2001), we further calculate and include in our analysis the return on assets (ROA) for each firm-year.

Because firm risk may affect a CEO's compensation contract and value (Agrawal and Mandelker, 1987; Coles, Daniel, and Naveen, 2006), we also include a measure of firm risk that is calculated as the variance of monthly stock returns for the five-year window ending before the

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<sup>16</sup> See the Appendix for a detailed description of all variables used in the paper.

start of the fiscal year. When calculating the variance of stock returns, we restrict the sample to only those firm-years with at least 48 monthly stock return observations during the previous five years.

Guay (1999) and Core and Guay (1999) find that CEO compensation contracts may be influenced by the opportunity set of the firm as well as by other factors related to firm uncertainty. To further control for growth opportunities and firm uncertainty, in our regressions we include the book-to-market ratio of the firm (total assets divided by firm market value), leverage (long-term debt divided by total assets), and firm age (years since a firm's first record on CRSP).

Weak corporate governance structures may allow a CEO to extract higher levels of compensation from the firm. A large body of literature is dedicated to the study of corporate governance and its effects on compensation (see, for example, Bebchuk, Fried, and Walker, 2002; and Bertrand and Mullainathan, 2001 for the “managerial power” and “skimming” hypotheses). We include the entrenchment index of Bebchuk, Cohen, and Ferrell (2009) for each firm to account for CEO power over the board. In addition, institutional investors may provide some governance through monitoring and activism (Gillan and Starks, 2000; Hartzell and Starks, 2003), therefore, we include the percentage of stock held by institutional investors as a control variable in our empirical estimations.

CEO-specific characteristics may also play a role in determining the CEO's compensation contract. In assignment models, such as the ones developed by Gabaix and Landier (2008) and by Terviö (2008), the most skilled managers are matched to the largest firms and earn the highest pay, in part due to their better skills. We include several variables that measure CEO characteristics, specifically the CEO's age, the CEO's tenure within the firm, and

the CEO's total record as a manager. The age of the CEO is provided in Execucomp. Firm-specific tenure is calculated as the distance in years between the fiscal year end date and the hire date for the CEO at that firm. The CEO's record is the number of years Execucomp reports compensation for the CEO, independent of firm or position. The CEO record variable is intended to measure the amount of information available to the market about the CEO's skill level. If availability of information about CEO skill influences CEO pay, past executive experience at other levels and with other firms may also influence compensation level and structure.<sup>17</sup> We also include a measure of CEO firm ownership, because higher ownership results in better incentive alignment of the CEO with the owners of the firm and thus may affect the level and composition of CEO compensation.

As additional variables relevant for the compensation of the CEO we include several board characteristics. Shivdasani (1993) finds that board ownership of the firm decreases the likelihood that a firm is the target of a hostile takeover and concludes that higher levels of board ownership serve as a positive governance mechanism. Core, Holthausen, and Larcker (1999) find that CEO compensation is increasing in board size. They also find that board busyness (directors serving on multiple boards) leads to higher levels of CEO compensation, although other studies have yielded mixed results on the effects of board busyness on CEO pay (e.g., Ferris, Jagannathan, and Pritchard, 2003; Fich and Shivdasani, 2006; Perry and Peyer, 2005). In addition to board ownership and board busyness, we account for the industry focus of each board. Board industry focus represents the proportion of director-linked firms that are in the same industry as the base firm, where industries are defined at the level of three-digit SIC codes.

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<sup>17</sup> The CEO record variable may also measure the prior experience of the CEO. If there is a higher demand for prior experience, that would lead to a higher CEO pay.

All of our empirical tests adjust for year-industry effects by subtracting the year-industry mean of each variable, where industries are defined at the level of three-digit SIC codes. We note that our analysis thus accounts for industry fixed effects that are allowed to vary every year, an approach that is more conservative than the traditional approach of two separate additive effects, one for the year and the other for the industry, where industry effects are not allowed to vary over time. If directors tend to participate in boards in the same industry, this more conservative approach may bias our tests against finding evidence of a director-specific component in CEO compensation even if such an effect may in fact exist. However, the more conservative approach allows us to more rigorously control for the effects that industry peers have on CEO compensation, as documented by Bizjak, Lemmon, and Naveen (2008) and Albuquerque (2009).

### *3.4 Summary statistics*

Panel A of Table 1.1 reports summary statistics for all variables used in the analysis. As shown in Table 1.1, our final sample consists of 12,188 firm-year observations and spans the period from 1996 to 2011. The median firm in our sample has a market value of \$4.77 billion in 2012 dollars with a median annual stock return of 11.97%. The median CEO earns a total pay of \$4.09 million, is 56 years old, and has been a CEO at the current firm for six years. The median director-linked CEO pay in our sample is \$5.06 million.

Boards have a median of ten members, and directors hold 1.4 board seats on average. The number of board seats does not show a strong tendency to be held within the same industry. For directors with multiple board appointments, the median firm has no directors that serve on other boards in the same industry, and on average only 5% of directors serve on multiple boards in the same industry, where industries are defined at the level of three-digit SIC codes. The low

industry focus of directors is notable as it suggests that any potential director-specific component in CEO pay is unlikely to be related to a possible industry peer effect in CEO compensation.

Panel B of Table 1.1 presents the number of firm-year observations and the mean and standard deviation of director-linked CEO pay conditional on the number of other firms to which directors are linked. The table also presents the mean and standard deviation of the predicted and the residual director-linked CEO pay. From a total of 12,188 firm-year observations, 2,610 (or around 20%) have exactly one director who is a member of another board in our sample. The occurrence of linked directors declines by around 20% per additional director-linked firm. Yet for around 37% of the firm-years, director-linked CEO pay is based on at least five linked firms.

The mean director-linked CEO pay increases mostly monotonically with the number of linked firms used to calculate director-linked CEO pay. This feature of the variable is tied to firm size, as larger firms are more likely to have larger boards and to have directors who serve on external boards. Director-linked CEO pay is an average and its standard deviation decreases, also mostly monotonically, with the number of linked firms. This is true for the actual, predicted, and residual CEO pay. To adjust for these trends in the data, we standardize all measures of director-linked CEO pay within each group defined by the number of director-linked firms. Firms with 20 or more director-linked firms are grouped together.<sup>18</sup> For example, for boards with eight linked firms, from the actual director-linked CEO pay we subtract the mean of 1.830 and divide by the standard deviation of 0.444. This adjustment ensures that the distribution of director-linked CEO pay is not driven by the number of linked firms used in the calculation of the variable. While this adjustment leads to more accurate interpretation of the estimates (especially for interaction effects), our findings are not sensitive to the adjustment.

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<sup>18</sup> Moving this upper grouping cut off to 25 director-linked firms does not change our findings.

#### 4. The director-specific component in CEO pay

##### *4.1 The level of CEO pay*

This section focuses on the main objective of the paper and examine whether there is a director-specific component in CEO pay before and after SOX. For that purpose, we estimate regression models where the dependent variable is total CEO pay and as the main explanatory variable of interest we use the residual component of director-linked CEO pay. In the following section we further estimate models in which the dependent variable is the change in CEO pay. All models include additional controls for firm, CEO, and board characteristics. Furthermore, to account for year-industry effects, all dependent and independent variables are demeaned at the year-industry level, where industries are defined at the level of three-digit SIC codes.<sup>19</sup>

Panel A of Table 1.2 reports the estimates from these regressions. We estimate the regression models separately for the period before Sarbanes-Oxley (1996-2001) and for the period after Sarbanes-Oxley (2003-2011) while excluding 2002, the year in which Sarbanes-Oxley was passed. There is no significant relation between residual director-linked CEO pay and CEO pay prior to 2002. However, after 2002, we find a highly significant and positive relation between residual director-linked CEO pay and CEO pay. The estimated coefficient on the residual director-linked CEO pay is equal to 0.049 and has a p-value of 0.001. For further interpretation of the coefficient estimates, Table 1.2 also reports the scaled coefficients for each explanatory variable, where scaled coefficients are calculated by multiplying the coefficient by the standard deviation of the respective explanatory variable. We should note that while the director-linked CEO pay variables are standardized conditional on the number of director-linked

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<sup>19</sup> Our findings are not substantially affected by the definition of industries. We find similar results when we define industries at the level of two-digit SIC codes and when we define industries based on the 48 industries of Fama and French (1997).

firms, their standard deviations are not necessarily equal to 1.0 for sub-samples based on, for instance, different time periods. Based on the scaled coefficient, we find that a one standard deviation increase (decrease) in residual director-linked CEO pay leads to an approximately 4.6% increase (decrease) in total CEO pay.<sup>20</sup>

The above findings show that there is a statistically and economically significant director-specific component in CEO pay after SOX. But how much of a CEO's pay is awarded as a direct consequence of the director-specific component? To answer this question we compare the actual pay of each CEO in our post-SOX sample to the pay the same CEO would have received if there were no director-specific component in CEO pay. We calculate the pay that a CEO would have received without a director-specific component ( $CEO\ pay_{i,t}^*$ ) as follows:

$$CEO\ pay_{i,t}^* = Actual\ CEO\ pay_{i,t} \times e^{-0.049 \times Residual\ director-linked\ CEO\ pay_{i,t}} \quad (3)$$

This calculation is based on the assumption that without a director-specific component in CEO pay the coefficient on the residual director-linked CEO pay would equal zero while all other coefficients and the residual term would remain unchanged. For each firm-year after SOX we then compute the absolute value of the difference between a CEO's actual pay and a CEO's pay without the director-specific component, i.e.,  $|Actual\ CEO\ pay_{i,t} - CEO\ pay_{i,t}^*|$ . We find that on average around  $\pm\$230,000$  of a CEO's pay is awarded as a consequence of the director-specific component in CEO pay. Scaling the dollar amount by total CEO pay, we find that on average around  $\pm 3.5\%$  of CEO pay is director-specific.<sup>21</sup> Given that our post-SOX sample contains 7,278 firms, we find that, between 2003 and 2011, around  $\pm\$1.7$  billion has been

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<sup>20</sup> To examine the sensitivity of our findings to influential observations, in additional tests we re-estimate our model while excluding 538 firm-year observations with a Cook's D statistic greater than  $4/N$  where  $N$  is the total number of observations. We obtain a similar estimate (around 0.04) that is significant at the 0.01 level.

<sup>21</sup> Due to the skewness of CEO pay, the medians are somewhat lower with the median firm awarding around  $\pm\$110,000$  or  $\pm 2.3\%$  of CEO pay as a consequence of the director-specific component in pay.

awarded as a consequence of the tendency of directors to award similar CEO pay across the different firms they serve.

The component of director-linked CEO pay predicted by firm, CEO, and director characteristics also has a significantly positive effect on CEO pay. Moreover, the positive effect is similar over time so that the scaled coefficient is around 0.022 (p-value of 0.046) before 2002 and is around 0.026 (p-value of 0.008) after 2002. The positive coefficient on the predicted director-linked CEO pay may be a result of several factors. For example, it is possible that CEO pay in one firm directly affects CEO pay in other firms because of competition for the CEO's human capital. Current CEOs could potentially be hired as CEOs in other firms and, when directors know the CEO directly, they may be more inclined to hire the CEO due to lower asymmetric information.<sup>22</sup> It is also possible that the characteristics of other firms sharing directors provide a better measure of optimal CEO pay simply because they also provide information about the firm above and beyond the firm's own characteristics.

In an attempt to distinguish between these two possibilities we test whether CEO compensation in one firm directly affects CEO compensation in other firms using an approach similar to the one employed by Leary and Roberts (2014). In their paper, Leary and Roberts (2014) examine whether firms' capital structures are influenced by the capital structure of industry peer firms. As an exogenous shock to peer firm capital structure, Leary and Roberts (2014) use the stock returns of peer firms. Following a similar approach, as an instrumental variable of director-linked CEO pay in our setting we use the stock return of director-linked

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<sup>22</sup> In the dual scaling model of Gabaix and Landier (2008), the size of the reference firm also affects total CEO pay. Existing research provides evidence that CEO talent has a significant effect on firm performance (Kaplan, Klebanov, and Sorensen, 2012) and that firms compete for CEOs with general CEO talent (Rosen 1981; Murphy and Zabojnik, 2004; Gabaix and Landier, 2008; Terviö, 2008). Existing research indicates that this consideration may be even more relevant in more recent years. For example, Murphy and Zabojnik (2007) find that CEO hires with prior CEO experience in a publicly traded company have increased from less than 20% of all external hires in the 1970s to nearly 50% of external hires in the 1990s.

firms for year  $t-1$ . Based on our previous tests, year  $t-1$  stock returns are significantly positively related to CEO pay in year  $t$ . Using this instrumental variable approach, we do not find a significant relation between the returns of director-linked firms and CEO pay. Based on these findings, we do not find evidence that the positive relation between CEO pay and the predicted portion of director-linked CEO pay is a consequence of the compensation of one CEO directly affecting the compensation of another director-linked CEO.

When examining the rest of the explanatory variables we find that, consistent with the numerous previous studies on CEO compensation, market value is the most relevant predictor of CEO compensation. Furthermore, higher annual returns on the firm's stock predict higher CEO compensation levels, as do higher levels of institutional ownership and higher levels of CEO entrenchment (but only after 2002). We also find that board size has a large positive effect on CEO pay, although this result becomes statistically insignificant during the latter period of the sample, possibly as a consequence of SOX. Other board characteristics such as busyness and industry focus also show significant positive influence on compensation after 2002. The only variable in our regression with a significantly negative effect on CEO compensation is CEO ownership, a finding consistent with the idea that CEO pay is used to provide CEOs with incentives for performance and that, when CEO ownership is already relatively high, the need for additional incentives is lower.

To further examine the robustness of our findings, we re-estimate the model of Table 1.2 separately for each year. Figure 1.2 plots the annual coefficient estimates on director-linked CEO pay (Panel A) and on the residual portion of director-linked CEO pay (Panel B). The figure further plots the 90<sup>th</sup> (bars) and the 95<sup>th</sup> (whiskers) of the estimated coefficients.

As Panel A of Figure 1.2 shows, director-linked CEO pay is positively and significantly related to CEO pay mainly after 2002. In contrast, for the six years prior to 2002, the coefficient on total director-linked CEO pay is mostly insignificant. Examining the coefficient on the residual component of director-linked CEO pay (Panel B of Figure 1.2) we find similar results. Overall, in all but one (2007) of the nine years after 2002, we find evidence of a significant director-specific component in CEO pay.<sup>23</sup> For the six years prior to 2002, the coefficient on the residual component of director-linked CEO pay is positive and significant in two years (1997 and 1998), negative and significant in one year (1999), and insignificant in the other three years.

This section presents significant and robust evidence that after adoption of SOX, directors tend to award similar CEO compensation across all firms of whose boards they are members, leading to a director-specific component in CEO pay. With the exception of 2007, the director-specific component in CEO pay is present in every year after SOX. Our estimates indicate that there is approximately a 4.6% increase (decrease) in CEO pay for every one standard deviation increase (decrease) in CEO pay that directors award in other firms they serve.

#### *4.2 Changes in CEO pay*

In this section we further test the relation between director-linked CEO pay and total CEO pay by examining the changes in CEO pay. Panel B of Table 1.2 reports the results of a regression of the annual change in total CEO pay on covariates containing the year-over-year changes in the independent variables as well as the one year lags of those variables. We make sure that the change in CEO pay is measured for the same CEO. When we examine changes in

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<sup>23</sup> However, in Section 7 we present some evidence that even in 2007 the director-specific component in CEO pay is similar to the effect in the rest of the years after SOX but only for a sub-sample of firms with relatively low director option-based pay.

CEO pay, the sample size is reduced to 8,442 firm-years, as annual changes of CEO pay are not available for all firm-years.

We find a positive and significant (at the 0.05 level) relation between the change in total CEO pay and the change in the residual component of director-linked CEO pay for the 2003-2011 period of our sample. Examining the scaled coefficients, a one standard deviation increase in the change in residual director-linked CEO pay leads to around 2.7% increase in CEO pay. As a comparison, the scaled coefficient for firm size implies that a one standard deviation increase in the change in firm size leads to an increase in CEO pay of around 4.8% (p-value of 0.061). Therefore, the director-specific component in CEO pay has a relatively high economic significance. In contrast, the change in the predicted portion of director-linked CEO pay is not significantly related to the change in CEO pay, with a scaled coefficient equal to  $-0.002$  (p-value of 0.869). This lack of significance suggests that the positive relation between the predicted portion of director-linked CEO pay and the level of CEO pay (discussed in Panel A of Table 1.2 in the previous section) may be due to an omitted firm-specific variable that affects CEO pay for firms sharing directors, a possibility that we further investigate in subsequent tests.

The relations between the change in CEO pay and the two components of lagged director-linked CEO pay are consistent with our previous conclusions. The past level of the residual portion of director-linked CEO pay positively affects the change in CEO pay for the 2004-2011 period and is highly significant (p-value of 0.01) while the predicted portion of lagged director-linked CEO pay is not significantly related to CEO pay. These findings confirm our previous conclusions that, after the enactment of SOX, directors tend to award similar CEO pay across the different boards they serve.

In additional analysis, we perform similar tests to examine the composition of CEO pay packages granted by the board, specifically the proportion of CEO equity-based pay. For each firm-year, we calculate CEO stock-based pay as the proportion of the dollar values of restricted stock and option grants relative to total CEO compensation. We then form a director-linked average of CEO stock-based pay using the same methodology as for the measure of director-linked total CEO pay. Because the proportion of stock-based pay to total pay is inherently bounded between zero and one, to obtain an unbounded measure of CEO stock-based pay we use a logit transform of the average director-linked CEO stock-based pay.<sup>24</sup> We again find significant evidence for a director-specific component in CEO equity based pay after SOX. The director-specific component in CEO equity-based pay does not appear to be distinct from the director-specific component in total CEO pay, which may not be surprising given that the main variation in CEO pay comes from the variation in stock-based and option-based pay. Regardless of whether the two effects have the same source, a director-specific component in CEO stock-based pay would significantly affect CEO incentives.

### *4.3 Alternative specifications*

Our findings so far suggest the existence of a linkage between CEO pay of firms that share directors, a linkage that appears due to a director-specific component in CEO pay. In effect, a director-specific component in CEO pay means that, even after accounting for firm, CEO and overall board characteristics, some directors tend to award relatively lower CEO pay while other directors tend to award relatively higher CEO pay. It is possible that firms sharing a director also share a common factor that is unobserved yet affects the firms' CEO pay. If the

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<sup>24</sup> The logit transform is  $\text{logit}(x) = \ln(x/(1-x))$ . Palia (2001) uses a similar approach to transform CEO pay-performance sensitivity.

explanatory variables do not fully control for that unobserved factor, then CEO pay in one firm may contain information about the unobserved factor and thus be correlated with CEO pay in all other firms sharing directors.

To investigate the possibility that a common factor may be at the root of our findings, Table 1.3 presents results from two additional tests—the first test further accounts for geographic location fixed effects while the second test accounts for firm fixed effects.<sup>25</sup> For ease of comparison, Table 1.3 again reports the scaled coefficient estimates from the base model. All models control for all variables as in Table 1.2, including year-industry effects; however, to preserve space the table does not report the estimated coefficients of these variables.

One common factor across director-linked firms could be the geographic location of firms. If directors tend to serve on boards of firms that are relatively close to each other geographically, then variations in CEO compensation across different locations may be reflected in the director-specific component. Knyazeva, Knyazeva, and Masulis (2013), for example, find that a larger pool of local director talent has a significant effect on firm governance. To examine whether firm location subsumes the director-specific component in CEO pay, we estimate a model that accounts for Core Based Statistical Area (CBSA) fixed effects, where CBSAs are defined by the Office of Management and Budget and are retrieved from the ZIP code of the firm's headquarters as reported in Compustat. In our data there are 188 distinct CBSA codes and we find that there is a significant variation in CEO pay that is explained by the different CBSA codes (the F-stat of the area code fixed effect is significant at the 0.01 level).

As discussed earlier, in our base model we find that the scaled coefficient on the residual component of director-linked CEO pay is equal to 0.046. Controlling for CBSA code fixed

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<sup>25</sup> Graham, Li, and Qiu (2012), for example, present evidence of a significant firm-fixed effect in CEO pay.

effects, we find that the coefficient declines to 0.040 and remains highly statistically significant (at the 0.01 level).

The last model takes a most conservative approach and uses firm fixed effects to account for unobserved firm characteristics that may affect CEO pay. Accounting for firm fixed effects, however, may also subsume relevant information such as a director-specific component in CEO pay, and hence may bias our tests against finding significance.

Even after accounting for firm fixed effects, however, we find a significant (at the 0.01 level) and positive relation between CEO pay and the residual portion of director-linked CEO pay. The scaled coefficient is equal to 0.024 which means that a one standard deviation increase in the residual component of director-linked CEO pay is associated with a 2.4% increase in total CEO pay. While the economic significance of the director-specific component in CEO pay is lower if we control for firm fixed effects than if we do not, the economic significance with firm fixed effects is similar in magnitude to the significance we report in our tests based on changes in CEO pay, where the scaled coefficient is equal to 0.027. The similarity of the two estimates and their significance supports the conclusion that unobserved firm effects are unlikely to drive our main findings.

Similar to our findings based on the changes in CEO pay, in the firm fixed effects model, the predicted portion of director-linked CEO pay is not significantly related to CEO pay. Overall, our findings are consistent with the idea that a positive relation between the pay of director-linked CEOs is due to a director-specific component in CEO pay.

## 5. Test for a wider network effect

The findings presented in the previous sections provide a strong support for the idea that after SOX, directors tend to award similar CEO pay across the different firms they serve. One

potential source of our findings is that directors serving on the same board share information about optimal CEO compensation so that overlapping boards tend to award similar pay. Bouwman (2011) provides such evidence albeit in the context of general firm governance practices.

In this section we test whether our findings are specific to each director rather to a wider network of connected directors. To that end, we start with our main sample of firms and the sample of director-linked firms. We then identify all firms that share a director with any director-linked firm but do not share a director with the base firm. In effect, we identify firms that are indirectly linked to the base firm within a wider network. We term the average CEO pay of these firms “indirectly-linked CEO pay” and examine how the indirectly-linked CEO pay is related to CEO pay. If our main findings are due to directors sharing information about optimal CEO pay among each other within a wider network, we expect to find that indirectly-linked CEO pay is also positively related to CEO pay.

We re-estimate the previous regression models but now we examine how CEO pay is related to the measure of indirectly-linked CEO pay. To be conservative in our conclusions, the models do not include the director-linked CEO pay as an explanatory variable. The results are presented in Table 1.4. In all models, indirectly-linked CEO pay is insignificantly related to CEO pay, with p-values of 0.331 and higher. Furthermore, the residual component of director-linked pay has p-values of 0.705 and higher. These findings are consistent with the conclusion that the identified director-specific component in CEO pay is not due to a wider network effect.

## 6. Board composition

One of the sources of our findings could be the significant change in board composition brought about by SOX. The enactment of SOX and the accompanying changes in exchange

listing requirements lead to a significant increase in board independence (e.g., Linck, Netter, and Yang, 2008). One possible interpretation of our findings is that, as long as it is the board that determines CEO pay, a director-specific component would always be present in CEO pay. If CEOs prior to SOX had more power and had the ability to set their own pay, there would be no director-specific component in CEO pay. But if CEOs lost some of their power after SOX due to an increase in director independence, for example, CEO pay would be determined by the board of directors and a director-specific component in CEO pay would emerge.

To examine this possibility, we re-estimate the pre-2002 regression models for sub-samples based on several board composition variables: board independence, CEO duality, board size, and the proportion of directors that are lawyers or current executives at other firms. The results are presented in Table 1.5.

In Panel A of Table 1.5, we create two sub-samples based on whether or not more than 50% of the directors are classified as independent. If the change in board independence is behind our findings then we expect the director-specific component in CEO pay to be present, even prior to SOX, for firms with relatively high board independence. However, our evidence is not consistent with this argument. Prior to 2002, we find that the residual portion of director-linked CEO pay is insignificantly related to CEO pay for both more independent and less independent boards and that the estimates between the two sub-samples are insignificantly different from each other.

In Panel B of Table 1.5, we use a different approach to classify boards into more and less independent. Because after SOX boards are required to have 100% independent audit, nomination, and compensation committees, we estimate our model before SOX separately for firm-years that satisfy the post-Sox requirements and firm-years that do not satisfy these

requirements. We again find no evidence of a significant director-specific component in CEO pay in either sub-sample prior to 2002.

Linck, Netter, and Yang (2008) find that after SOX board composition has changed in several other dimensions. They find that CEO duality has declined, board size has increased, and the proportion of current executives in the board has declined while the proportion of lawyers has increased. To examine whether these additional changes may be at the roots of our findings, we split our sample based on whether or not (i) the firm has a dual CEO (Panel C), (ii) board size is above expected (Panel D), (iii) the proportion of current executives in the board is below the median of 52.63% (Panel E), and (iv) there are lawyers in the board (Panel F). Prior to SOX, we do not find significant evidence of a director-specific component in CEO pay in any of these sub-samples.

Overall, the findings in this section show that there is no director-specific component in CEO prior to SOX even for boards that have a composition that is similar to post-SOX boards. We conclude that the documented director-specific component in CEO pay is likely not due to changes in board composition.

## 7. Director risks and incentives

It is possible that after the adoption of SOX corporate directors have changed their behavior when awarding CEO pay. For example, an increase in board scrutiny and an increase in liability risk to individual directors may provide directors with incentives to award CEO pay that can be easily justified through direct experiences. To examine whether director risks play a role in our findings, in this section we examine whether and how the director-specific component in CEO pay is related to the risk-taking incentives of directors. Existing literature provides significant evidence that option-based pay and the resulting sensitivity to risk affects the

corporate decisions of CEOs, such as investment policy and debt policy (see Coles, Daniel, and Naveen, 2006 and the references therein). Motivated by these findings, we use director option-based pay as a proportion of total director pay to measure director risk-taking incentives. Data on director pay are available starting with 2006 and so the subsequent analysis is based on the period of 2006 to 2011 and covers a total of 4,715 firm-years.

Director option-based pay is not awarded randomly, but instead is awarded conditional on the characteristics of the firm, the CEO, and the board. We, however, are interested in director risk-taking incentives that are go beyond firm, CEO, and board characteristics. To adjust for the effects that firm, CEO, and board characteristics have on director option-based pay, we first estimate a model where the dependent variable is the proportion of director option-based pay and as explanatory variables we use year-industry effects and all additional firm, CEO, and board characteristics. We then use the residuals from these regression models to measure excess director option-based pay. In effect, the residuals measures director option-based pay that is in not predicted by firm, CEO, and board characteristics.

We then bifurcate the sample conditional on excess director option-based pay. Firm-years with a positive residual are classified as having a relatively high director option-based pay while firm-years with a negative residual are classified as having a relatively low director option-based pay. Firm-years with a residual of zero are excluded from the tests.

The findings in Panel A of Table 1.6 show that, during the period of 2006 to 2011, the residual portion of director-linked CEO pay is significantly related to CEO pay only for firm-years with a relatively low director option-based pay. Furthermore, the relation is significantly different (at the 0.05 level) between the two sub-samples. In other words, the director-specific component in CEO pay is only evident when director risk-taking incentives are relatively low.

In the previous sections of the paper we found that residual director-linked CEO pay is not significantly related to CEO pay in 2007. In light of the findings in this section, we examine 2007 separately. For the sub-sample of firms with relatively low excess director option-based pay, we find that the estimated coefficient on residual director-linked CEO pay is equal to 0.022, which is indistinguishable in magnitude to the overall estimate of 0.024, from the last model of Table 1.3. For the sub-sample of firms with relatively high director option-based pay, the coefficient is negative and equal to -0.037. The lack of an overall director-specific component in CEO pay in 2007, therefore, appears to be driven by the sub-sample of firms with directors with relatively high risk-taking incentives; directors with relatively low risk-taking incentives still exhibit a tendency to award similar CEO pay across the different boards.

In Panels B and C of Table 1.6 we also examine the director-specific component in CEO pay for sub-samples based on expected director turnover (a median of 7.5%) and director busyness in the board of directors market (a median of 1.5 boards). We measure expected director turnover using the historic director turnover of each firm. When firms have relatively high director turnover, directors have a higher risk of leaving the firm and thus lower incentives to take additional risks. In these cases, we expect the director-specific component in CEO pay to be relatively more pronounced. Additionally, if directors serve on more boards they may have higher reputation and employment concerns if their reputation is negatively affected in one firm as a consequence of SOX.

When we examine the different sub-samples, we find that the director-specific component in CEO pay is mostly evident for firm-years with relatively high expected director turnover and relatively high director busyness. Both of these findings are consistent with the conclusion that directors with relatively lower risk-taking incentives and directors with relatively

higher sensitivity to risk tend to award CEO pay that is similar across the different boards they serve.

Overall, we find evidence consistent with the idea that, after the enactment of SOX, risk-averse directors became less willing to take risks when awarding CEO pay, leading to a director-specific component in CEO pay, so that directors tend to award similar CEO pay across the different boards they serve. Relatively higher option-based pay, lower risk of leaving the firm's board, and lower reputation concerns in the market for directors appear to counterbalance this effect.

## 8. Conclusions

Corporate board and governance failures at the turn of the century cast doubt on the ability of corporate boards to effectively monitor and compensate CEOs. With the goal of improving the internal governance of U.S. firms, Congress enacted the Sarbanes-Oxley act of 2002 and NYSE and Nasdaq implemented new governance-related listing standards. While the new rules increased the costs and risks to directors and the scrutiny on director decisions, it is unclear whether the new rules made it easier to answer one of the oldest questions in corporate finance: What constitutes optimal CEO pay?

How would directors of the board behave in this environment, where optimal CEO pay is still elusive yet they may have to justify awarded CEO pay to outside stakeholders and regulators? In this paper we present significant evidence that, following the enactment of SOX, directors tend to award similar CEO pay across the different boards they serve—a finding we term “a director-specific component in CEO pay”. We find that the director-specific component in CEO pay affects the level and the year-over-year changes in CEO pay and the proportion of

equity-based CEO pay. These findings indicate that CEO incentives are significantly affected by the director-specific component present in CEO pay after SOX.

We do not find evidence that our results are a manifestation of a wider network effect or a consequence of changing board composition after SOX. Instead, we find some evidence that the director-specific component in CEO pay is related to director costs and risks after SOX. In particular, we find that the director-specific component in CEO pay is most pronounced when director option-based pay is relatively low, expected turnover is relatively high, and when directors serve on relatively more boards, i.e., when have low incentives to take on additional risks.

According to our estimates, after 2002 around  $\pm 3.5\%$  of total CEO pay, or around  $\pm \$230,000$  per CEO-year on average is awarded as a consequence of this director-specific component. For our post-SOX sample of 7,278 firm-years (i.e., firm-years between 2003 and 2011), approximately  $\pm \$1.7$  billion in aggregate CEO pay has been affected as a consequence of the tendency of directors to award similar CEO pay across the different boards they serve. The resulting inefficiencies in the allocation of capital are most likely an unintended consequence of SOX.

## Appendix: Variable definitions

Variable	Description
CEO compensation variable, measured as of fiscal year $t$	
Total CEO compensation	The sum of salary, bonus, restricted stock, options, and other compensation from Execucomp; (SALARY) + (BONUS prior to December 2006 and BONUS plus NONEQ_INCENT thereafter) + (RSTKGRNT prior to December 2006 and STOCK_AWARDS_FV thereafter) + (OPTION_AWARDS_BLK_VALUE prior to December 2006 and OPTION_AWARDS_FV thereafter) + (OTHANN + ALLOTHTOT + LTIP prior to December 2006 and OTHCOMP thereafter)
Firm characteristics, measured at end of fiscal year $t-1$	
Market value of the firm	Market value of common stock (Compustat items PRCC_F times CSHO) plus total assets (AT) minus book value of equity (CEQ+TXDB)
12 month return	Return for the fiscal year using CRSP monthly returns and firm-years with 9 or more monthly returns during the year
Return on assets	Net income divided by total assets (Compustat items NI divided by AT)
Book-to-market	Total assets (Compustat item AT) divided by the market value of the firm
Std. dev. of returns	Standard deviation of monthly returns during the 60-month window (with at least 48 observations) preceding the fiscal year
Leverage	Long-term debt divided by total assets (Compustat items LT divided by AT)
Firm age	Years since the firm has data in the CRSP files (year $t$ minus the year of BEGDAT)
E-index	Sum of Riskmetrics items CBOARD, LABYLW, LACHTR, PPILL, GPARACHUTE, and SUPERMAJOR (set to 1 if more than 50% of votes required by board and 0 otherwise); items are set to 0 when missing
Institutional ownership	The sum of all shares reported by institutions in CDA/Spectrum (for last quarter of year $t-1$ ) divided by the total shares outstanding (Compustat item CSHO)
CEO characteristics, measured as of fiscal year $t$	
CEO age	Age of CEO in years, Execucomp item AGE
CEO tenure	Years since the executive became a CEO (Execucomp item BECAMECEO)
CEO record	The number of years prior to year $t$ , for which the CEO has total compensation reported on Execucomp, regardless of position and company of employment
CEO ownership	Shares owned by CEO (Execucomp item SHROWN_EXCL_OPTS) divided by total shares outstanding (Compustat item CSHO)
CEO duality dummy	Equal to 1 if the CEO serves as the chairman of the board for the given year
Board characteristics, measured as of fiscal year $t$	
Board ownership	Total shares owned by board members (Riskmetrics NUM_OF_SHARES) divided by total shares outstanding (Compustat CSHO)
Board size	The number of directors for each firm, using data from Riskmetrics
Board busyness	Average number of directorships held by a firm's board, not including base firm, using the sample in Riskmetrics
Board industry focus	The number of board memberships in the industry of firm $i$ divided by the total number of board memberships, excluding firm $i$ , using data from Riskmetrics
Board independence	The percent of directors classified as "I" (independent) in Riskmetrics
Director age	Age of directors in the board, using data from Riskmetrics
Director options pay	The proportion of director option-based pay relative to total pay from Execucomp

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## Figures and Tables

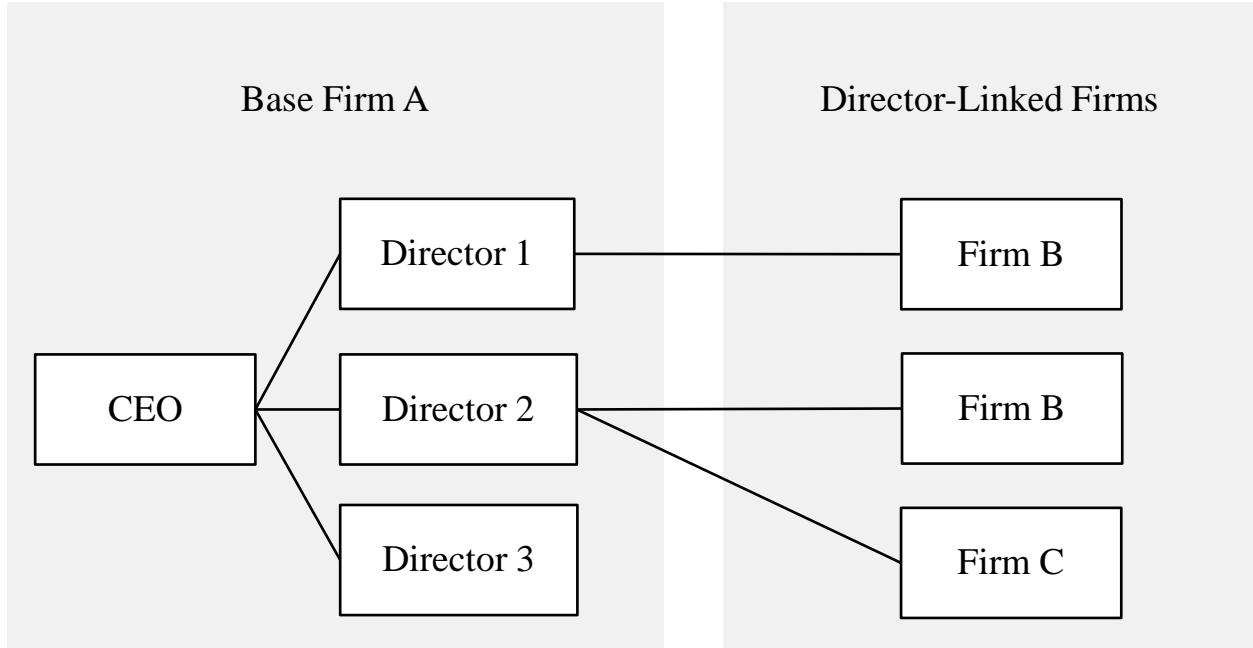
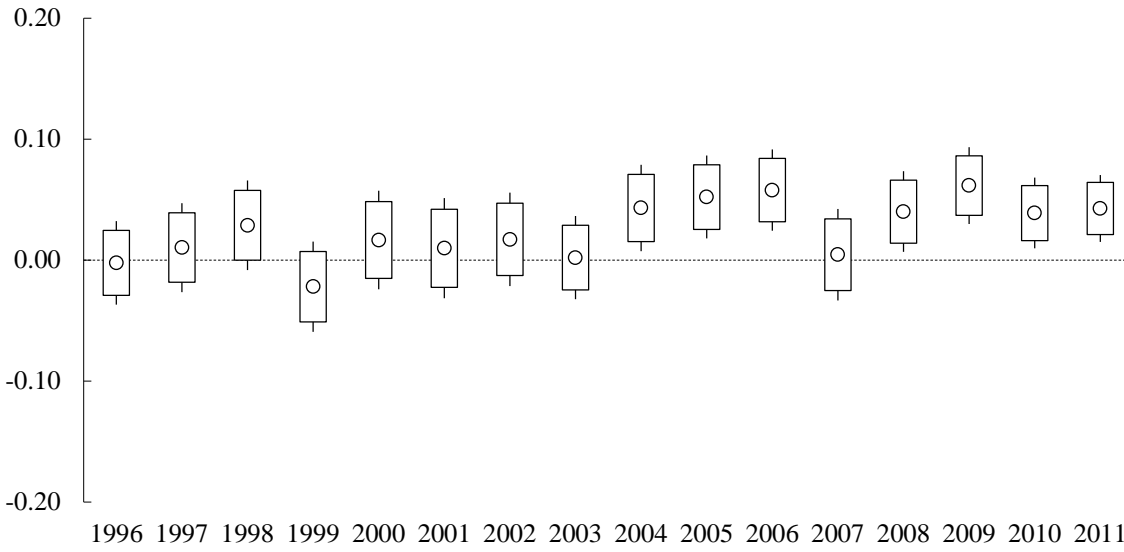


Figure 1.1 - An example of director-linked firms

The figure shows a simple example of director-linked firms. The Base Firm A has three directors—1, 2, and 3. Director 1 further serves on the board of Firm B while Director 2 serves on the boards of Firm B and Firm C. The director-linked CEO pay for the Base Firm A is the average CEO pay across all director-linked firms. In this example the CEO pay of Firm B enters twice in the average calculation.

Panel A: Coefficient on director-linked CEO pay



Panel B: Coefficient on residual director-linked CEO pay

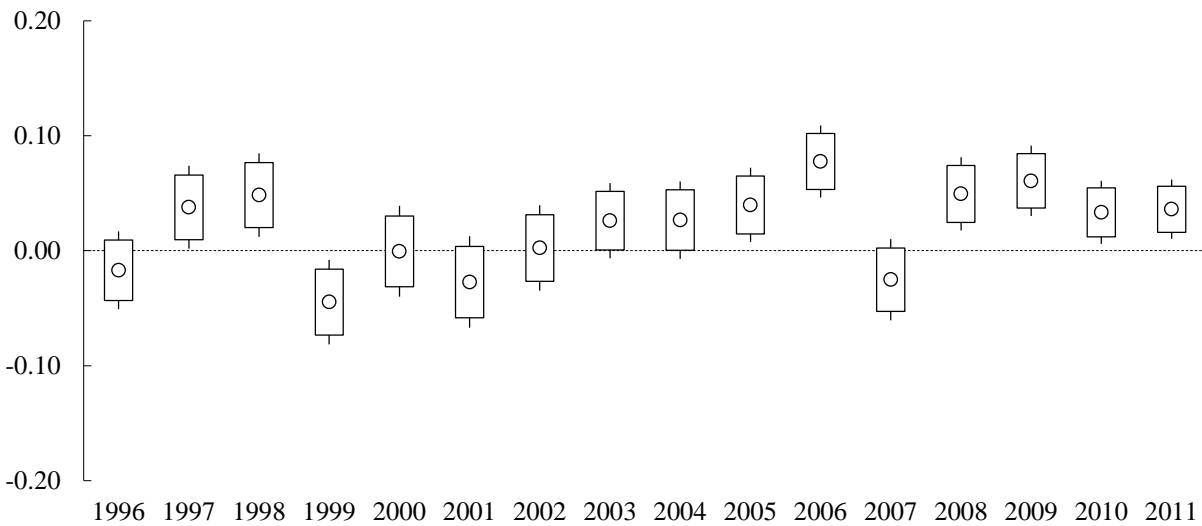


Figure 1.2 - The director-specific component in CEO pay

The figure plots the coefficient estimates on director-linked CEO pay (Panel A) and residual director-linked CEO pay (Panel B) from annual regressions where the dependent variable is total CEO pay. As additional explanatory variables the regression models include firm, CEO, and board characteristics. To calculate residual director-linked CEO pay, we first estimate annual regression models to explain total CEO pay as a function of all firm, CEO, and board characteristics, including year-industry effects. We then use the residuals from this model to construct a measure of residual director-linked CEO pay. The circles mark the estimated coefficients, while the bars and the whiskers define the 90 percent and the 95 percent confidence intervals.

Table 1.1 - Summary of variables

The main sample consists of the intersection of Riskmetrics and Execucomp. We require additional data from the CRSP monthly files, the Compustat annual files, and CDA/Spectrum. The base sample consists of 17,395 firm-years with data on Riskmetrics and Execucomp. Requiring additional CRSP and Compustat data reduces the sample to 14,987 firm-years. For 2,799 of the firm-years, no director holds a seat on other boards and so requiring that at least one director participates on at least one other board during the year further reduces our sample to 12,188 firm-years. Panel A reports the mean, median, standard deviation, and the 5<sup>th</sup> and 95<sup>th</sup> percentiles of variables measuring firm, CEO, and board characteristics. Panel B reports the number of firm-years and the mean, median, and standard deviation of director-linked CEO pay, conditional on the number of linked firm observations used to calculate director-linked CEO pay. All dollar amounts are in millions of 2012 U.S. dollars. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Panel A: Summary statistics of variables

Variable	Mean	5 <sup>th</sup> pctl	Median	95 <sup>th</sup> pctl	Std. dev.
Compensation variables					
Total CEO pay (mill.)	6.581	0.875	4.086	21.023	7.626
Total CEO pay (mill., log)	1.419	− 0.133	1.408	3.046	0.962
Director-linked CEO pay (mill.)	6.135	1.446	5.064	14.085	4.709
Director-linked CEO pay (mill., log)	1.583	0.369	1.622	2.645	0.695
Firm characteristics					
Market value (bill.)	23.025	0.535	4.771	105.345	59.125
Market value (mill., log)	8.629	6.283	8.470	11.565	1.598
12-month return (%)	16.110	− 46.990	11.968	93.586	46.993
Return on assets (%)	4.483	− 7.021	4.633	15.560	8.056
Book-to-market (log)	− 0.485	− 1.441	− 0.375	0.080	0.479
Standard deviation of returns (%)	11.074	5.183	9.975	21.106	4.974
Leverage (log)	− 0.662	− 1.645	− 0.563	− 0.084	0.467
Firm age (log)	3.092	1.792	3.178	4.290	0.721
E-index	2.010	0.000	2.000	5.000	1.373
Institutional ownership (%)	69.690	35.427	71.458	99.547	18.882
CEO characteristics					
CEO age (log)	4.019	3.807	4.025	4.205	0.118
CEO tenure (log)	1.770	0.406	1.791	3.091	0.803
CEO record (log)	1.542	0.693	1.609	2.485	0.637
CEO duality dummy	0.633				
CEO ownership (%)	1.546	0.007	0.281	9.024	3.853
Board characteristics					
Board ownership (%)	5.751	0.000	1.849	26.844	10.383
Board size (log)	2.254	1.792	2.303	2.708	0.259
Board busyness (log)	0.375	0.105	0.336	0.799	0.219
Board industry focus (%)	5.191	0.000	0.000	50.000	17.803
Board independence (%)	71.944	42.857	75.000	90.910	15.521
Director age (log)	4.100	3.991	4.104	4.193	0.061

Panel B: Summary statistics of director-linked CEO pay by number of linked firms

Number of linked firms	Firm-years	Actual		Predicted		Residual	
		Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
1	2,610	1.346	0.940	1.363	0.764	– 0.016	0.548
2	2,098	1.458	0.710	1.466	0.578	– 0.008	0.405
3	1,663	1.529	0.612	1.525	0.523	0.004	0.321
4	1,324	1.607	0.553	1.604	0.477	0.003	0.274
5	999	1.653	0.545	1.661	0.466	– 0.008	0.269
6	780	1.729	0.525	1.714	0.466	0.015	0.228
7	570	1.778	0.490	1.762	0.438	0.016	0.224
8	440	1.830	0.444	1.826	0.413	0.005	0.202
9	359	1.841	0.447	1.839	0.422	0.002	0.196
10	306	1.907	0.491	1.898	0.452	0.009	0.176
11	235	1.845	0.451	1.851	0.431	– 0.006	0.166
12	160	1.896	0.448	1.892	0.414	0.003	0.181
13	151	1.952	0.417	1.935	0.404	0.017	0.142
14	115	1.880	0.440	1.887	0.407	– 0.007	0.168
15	106	1.983	0.455	1.982	0.393	0.002	0.145
16	71	1.992	0.426	1.986	0.382	0.006	0.145
17	50	1.845	0.432	1.883	0.425	– 0.038	0.122
18	31	2.053	0.392	2.078	0.383	– 0.025	0.150
19	31	1.968	0.357	1.959	0.346	0.009	0.144
≥ 20	89	1.911	0.361	1.923	0.368	– 0.012	0.115

Table 1.2 - The director-specific component in CEO pay

The main sample consists of firm-years with available data on Riksmetrics, Execucomp, the CRSP monthly files, and the Compustat annual files where there is no change in the CEO. Panel A reports estimates from regression models explaining total CEO pay while Panel B reports estimates from regression models explaining the year-over-year change in total CEO pay. As explanatory variables in Panel A we use the predicted and residual director-linked CEO pay as well as additional firm, CEO, and board characteristics. As explanatory variables in Panel B we use the change and lagged level of director-linked CEO pay as well as changes and lagged levels of additional firm, CEO, and board characteristics. In Panel B we omit changes in variables that measure firm age and CEO age, tenure, and record because the year-over-year increments of these variables are fixed at one. The construction of each variable is described in the Appendix. To measure the economic effect that each variable has on CEO pay, the last column of the table reports the coefficient estimate times the standard deviation of each variable. All models adjust for year-industry effects. Industries are defined based on three-digit SIC codes. The reported p-values (in parenthesis) are based on standard errors that adjust for firm-level and year-level clustering (Petersen, 2009). The last row reports the adjusted R-squared of each model.

Panel A: Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)

	1996-2001			2003-2011		
	Coeff.	p-value	Scaled coeff.	Coeff.	p-value	Scaled coeff.
Director-linked CEO pay, predicted	0.020	(0.046)	0.022	0.028	(0.008)	0.026
Director-linked CEO pay, residual	0.002	(0.927)	0.002	0.049	(0.001)	0.046
Market value (mill., log)	0.429	(0.001)	0.701	0.383	(0.001)	0.601
12-month return (%)	0.001	(0.094)	0.018	0.002	(0.001)	0.078
Return on assets (%)	0.001	(0.997)	0.001	-0.001	(0.731)	-0.005
Book-to-market (log)	0.025	(0.652)	0.013	0.073	(0.051)	0.032
Standard deviation of returns (%)	0.026	(0.001)	0.131	-0.001	(0.874)	-0.006
Leverage (log)	-0.016	(0.831)	-0.007	0.065	(0.017)	0.031
Firm age (log)	-0.030	(0.339)	-0.022	-0.028	(0.130)	-0.020
E-index	-0.002	(0.863)	-0.002	0.037	(0.001)	0.053
Institutional ownership (%)	0.005	(0.001)	0.088	0.006	(0.001)	0.102
CEO age (log)	0.132	(0.502)	0.016	0.146	(0.270)	0.017
CEO tenure (log)	-0.001	(0.984)	0.001	0.052	(0.078)	0.041
CEO record (log)	0.119	(0.005)	0.067	0.005	(0.892)	0.003
CEO ownership (%)	-0.035	(0.001)	-0.153	-0.028	(0.001)	-0.095
CEO duality dummy	0.138	(0.001)	0.062	0.085	(0.002)	0.042
Board ownership (%)	-0.003	(0.157)	-0.037	0.001	(0.518)	0.013
Board size (log)	0.761	(0.095)	0.221	0.402	(0.573)	0.094
Board busyness (log)	0.093	(0.221)	0.023	0.325	(0.001)	0.063
Board industry focus (%)	0.002	(0.123)	0.032	0.002	(0.001)	0.041
Board independence (%)	0.001	(0.691)	0.008	0.004	(0.001)	0.057
Number of observations	4,133			7,278		
Adjusted R-squared	55.69%			55.87%		

Panel B: Dependent variable is the change in total CEO pay (mill 2012 U.S. dollars, log)

	1996-2001			2003-2011		
	Coeff.	p-value	Scaled coeff.	Coeff.	p-value	Scaled coeff.
Changes in variables						
Director-linked CEO pay, predicted	0.002	(0.920)	0.001	-0.002	(0.869)	-0.002
Director-linked CEO pay, residual	-0.001	(0.928)	-0.001	0.025	(0.043)	0.027
Market value (mill., log)	0.327	(0.051)	0.101	0.173	(0.061)	0.048
12-month return (%)	-0.001	(0.297)	-0.106	0.002	(0.028)	0.104
Return on assets (%)	-0.002	(0.624)	-0.012	-0.002	(0.371)	-0.014
Book-to-market (log)	-0.108	(0.624)	-0.029	0.045	(0.684)	0.010
Standard deviation of returns (%)	0.026	(0.112)	0.033	-0.015	(0.197)	-0.026
Leverage (log)	-0.223	(0.013)	-0.036	0.035	(0.613)	0.006
E-index	0.075	(0.297)	0.030	0.025	(0.195)	0.028
Institutional ownership (%)	0.006	(0.079)	0.047	0.003	(0.002)	0.023
CEO ownership (%)	-0.005	(0.825)	-0.006	0.010	(0.421)	0.013
CEO duality dummy	0.104	(0.001)	0.028	-0.011	(0.775)	-0.003
Board ownership (%)	-0.006	(0.024)	-0.044	-0.002	(0.475)	-0.009
Board size (log)	0.156	(0.886)	0.017	-0.547	(0.353)	-0.058
Board busyness (log)	0.050	(0.574)	0.006	0.057	(0.210)	0.007
Board industry focus (%)	0.001	(0.892)	0.001	0.001	(0.193)	0.010
Board independence (%)	0.001	(0.879)	-0.004	0.001	(0.101)	0.010

Panel B (continued): Dependent variable is the change in total CEO pay (mill 2012 U.S. dollars, log)

	1996-2001			2003-2011		
	Coeff.	p-value	Scaled coeff.	Coeff.	p-value	Scaled coeff.
Lagged variables						
Total CEO pay (mill., log)	- 0.571	(0.001)	- 0.562	- 0.479	(0.001)	- 0.434
Director-linked CEO pay, predicted	0.024	(0.037)	0.026	0.014	(0.219)	0.013
Director-linked CEO pay, residual	0.011	(0.564)	0.011	0.036	(0.001)	0.036
Market value (mill., log)	0.235	(0.001)	0.376	0.172	(0.001)	0.270
12-month return (%)	- 0.001	(0.255)	- 0.069	0.002	(0.081)	0.067
Return on assets (%)	0.003	(0.157)	0.018	0.001	(0.715)	0.007
Book-to-market (log)	0.031	(0.501)	0.016	0.054	(0.037)	0.024
Standard deviation of returns (%)	0.016	(0.032)	0.066	- 0.004	(0.279)	- 0.017
Leverage (log)	- 0.039	(0.267)	- 0.016	0.068	(0.001)	0.033
Firm age (log)	0.004	(0.809)	0.003	- 0.026	(0.129)	- 0.018
E-index	- 0.001	(0.943)	- 0.001	0.008	(0.456)	0.012
Institutional ownership (%)	0.002	(0.022)	0.035	0.004	(0.001)	0.064
CEO age (log)	- 0.045	(0.698)	- 0.005	0.181	(0.033)	0.021
CEO tenure (log)	- 0.020	(0.565)	- 0.016	0.001	(0.986)	0.001
CEO record (log)	0.087	(0.042)	0.047	- 0.005	(0.830)	- 0.003
CEO ownership (%)	- 0.021	(0.017)	- 0.091	- 0.011	(0.015)	- 0.039
CEO duality dummy	0.068	(0.001)	0.030	0.040	(0.049)	0.019
Board ownership (%)	- 0.002	(0.511)	- 0.019	0.001	(0.549)	0.009
Board size (log)	0.380	(0.066)	0.110	- 0.039	(0.934)	- 0.009
Board busyness (log)	0.181	(0.218)	0.044	0.190	(0.007)	0.039
Board industry focus (%)	0.001	(0.526)	0.013	0.002	(0.014)	0.027
Board independence (%)	0.001	(0.684)	0.007	0.002	(0.001)	0.032
Number of observations	2,530			5,329		
Adjusted R-squared	27.75%			28.40%		

Table 1.3 - The director-specific component for different specifications

The main sample consists of 7,278 firm-years between 2003 and 2011 with available data on Riksmetrics, Execucomp, the CRSP monthly files, and the Compustat annual files. The table reports scaled coefficient estimates (coefficient estimates times the standard deviation of each variable) for models examining the relation between CEO pay and director-linked CEO pay. All models adjust for year-industry effects, where industries are defined based on three-digit SIC codes. Furthermore, all models control for additional firm, CEO, and board characteristics as in Table 1.2, Panel A. The construction of each variable is described in the Appendix. Apart from reporting the estimates from the base model, we also estimate models that control for area code fixed effects and models that control for firm fixed effects. The p-values (in parenthesis) are based on standard errors that adjust for firm-level and year-level clustering.

	Base model		With CBSA code fixed effects		With firm fixed effects	
Director-linked CEO pay	0.049 (0.001)		0.041 (0.001)		0.027 (0.003)	
Director-linked CEO pay, predicted		0.026 (0.008)		0.023 (0.061)		0.012 (0.324)
Director-linked CEO pay, residual		0.046 (0.001)		0.036 (0.001)		0.024 (0.010)
All other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year-industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	7,278	7,278	7,278	7,278	7,278	7,278
p-value of CBSA code fixed effects			0.001	0.001		
p-value of firm fixed effects					0.001	0.001
Adjusted R-squared	55.81%	55.87%	57.79%	57.81%	75.39%	75.40%

Table 1.4 - Tests for a wider network effect

The starting sample consists of 7,278 firm-years between 2003 and 2011 with available data on Riksmetrics, Execucomp, the CRSP monthly files, and the Compustat annual files. The table reports scaled coefficient estimates (coefficient estimates times the standard deviation of each variable) for models examining the relation between CEO pay of firm  $i$  and the pay of CEOs that do not share directors with firm  $i$  but share directors with firm  $i$ 's director-linked firms. We term this variable non-linked CEO pay, and we are able to calculate it for 6,909 firm-years. All models adjust for year-industry effects, where industries are defined based on three-digit SIC codes. Furthermore, all models control for additional firm, CEO, and board characteristics as in Table 1.2, Panel A. The construction of each variable is described in the Appendix. Apart from reporting the estimates from the base model, we also estimate models that control for CBSA code fixed effects and models that control for firm fixed effects. The p-values (in parenthesis) are based on standard errors that adjust for firm-level and year-level clustering.

	Base model		With CBSA code fixed effects		With firm fixed effects	
Non-linked CEO pay	0.010 (0.331)		0.008 (0.433)		0.004 (0.663)	
Non-linked CEO pay, predicted		0.010 (0.345)		0.009 (0.384)		0.006 (0.568)
Non-linked CEO pay, residual		0.003 (0.828)		0.001 (0.975)		− 0.003 (0.705)
All other control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year-industry effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	6,909	6,909	6,909	6,909	6,909	6,909
p-value of CBSA code fixed effects			0.001	0.001		
p-value of firm fixed effects					0.001	0.001
Adjusted R-squared	55.27%	55.25%	57.32%	57.32%	75.70%	75.70%

Table 1.5 - Pre-SOX tests conditional on board composition

The main sample consists of 4,133 firm-years between 1996 and 2001 with available data on Riksmetrics, Execucomp, the CRSP monthly files, and the Compustat annual files. The table reports scaled coefficient estimates (coefficient estimates times the standard deviation of each variable) for models examining the relation between CEO pay and director-linked CEO pay for two sub-samples based on board independence and CEO duality. All models adjust for year-industry effects, where industries are defined based on three-digit SIC codes, and firm fixed effects. Furthermore, all models control for additional firm, CEO, and board characteristics as in Table 1.2, Panel A. The construction of each variable is described in the Appendix. In Panel A, the sub-samples of low and high board independence are formed based on whether or not the proportion of independent directors is less than 1/2. In Panel B, boards with high independence are those with a majority of independent directors and 100% independent audit, compensation, and nomination/governance committees. The remaining boards are classified as having low board independence. Since data on board independence by committee is not available for the full sample, in Panel B there are fewer observations than in Panel A. In Panel C we split the sample based on whether or not the CEO is also the chairman of the board (COB). In Panel D we split the sample based on board size, where we first estimate a regression model with board size as the dependent variable and firm and CEO characteristics as the independent variables. If the residual of this regression is negative we classify firms as having relatively low board size, and if the residual is positive we classify the firm as having relatively high board size. In Panel E we split the sample based on whether the proportion of current executives in the board is less than the median of 52.63%, and in Panel F we split the sample based on whether the proportion of lawyers in the board is 0% (the median) or above 0%. The p-values (in parenthesis) are based on standard errors that adjust for firm-level and year-level clustering. The last column reports the difference (p-values in parenthesis) between the estimates for the two sub-samples.

Panel A: Board independence based on whether or not 50% of all directors are independent

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)			
	Low board independence	High board independence	Diff. in scaled coefficients
Director-linked CEO pay, predicted	- 0.012 (0.529)	0.005 (0.623)	0.017 (0.457)
Director-linked CEO pay, residual	- 0.021 (0.452)	- 0.007 (0.605)	0.014 (0.677)
Number of observations	678	3,455	

Panel B: Board independence based on whether or not 50% of all directors and 100% of the audit, compensation, and nomination committees are independent

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)			
	Low board independence	High board independence	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.013 (0.100)	– 0.002 (0.709)	– 0.015 (0.008)
Director-linked CEO pay, residual	– 0.012 (0.233)	0.009 (0.590)	0.021 (0.059)
Number of observations	2,076	644	

Panel C: CEO duality

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)			
	CEO is chairman of the board	CEO is not chairman of the board	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.001 (0.958)	0.009 (0.566)	0.008 (0.658)
Director-linked CEO pay, residual	– 0.002 (0.905)	– 0.022 (0.237)	– 0.020 (0.411)
Number of observations	2,757	1,376	

Panel D: Board size

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)			
	Lower than expected board size	Higher than expected board size	Diff. in scaled coefficients
Director-linked CEO pay, predicted	– 0.005 (0.677)	0.007 (0.587)	0.012 (0.532)
Director-linked CEO pay, residual	– 0.025 (0.244)	0.005 (0.664)	0.030 (0.261)
Number of observations	1,967	1,689	

Panel E: Percent directors that are current executives (median is 52.63%)

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)

	Lower than median current executives	Higher than median current executives	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.011 (0.325)	0.002 (0.810)	– 0.009 (0.205)
Director-linked CEO pay, residual	0.006 (0.790)	– 0.038 (0.003)	– 0.044 (0.060)
Number of observations	1,426	1,428	

Panel F: Percent directors that are lawyers (median is 0%)

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)

	0% lawyers	Higher than 0% lawyers	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.004 (0.818)	0.012 (0.346)	0.009 (0.697)
Director-linked CEO pay, residual	– 0.032 (0.109)	0.009 (0.499)	0.041 (0.116)
Number of observations	1,832	1,022	

Table 1.6 - Post-SOX tests conditional on director incentives

The main sample consists of 7,278 firm-years between 2003 and 2011 with available data on Riksmetrics, Execucomp, the CRSP monthly files, and the Compustat annual files. The table reports scaled coefficient estimates (coefficient estimates times the standard deviation of each variable) for models examining the relation between CEO pay and director-linked CEO pay for two sub-samples based on excess director option-based compensation (Panel A), year  $t-1$  to year  $t$  director turnover (Panel B), and director busyness (Panel C). We have director compensation data starting with 2006 and thus Panel A uses 4,715 firm-years between 2006 and 2011. Availability of the sorting variables dictates the sample size for the other panels. We adjust for year-industry effects, where industries are defined based on three-digit SIC codes, and for firm fixed effects. Furthermore, all models control for additional firm, CEO, and board characteristics as in Table 1.2, Panel A. The construction of each variable is described in the Appendix. In Panel A, to construct the two sub-samples, we first estimate a regression model where the dependent variable is the option-based compensation of all directors relative to their total compensation. As explanatory variables we use year-industry effects as well as all other firm, CEO, and director characteristics. Firm-years with a negative residual are classified as having low excess director option-based compensation while firm-years with a positive residual are classified as having high excess director option-based compensation. We exclude 934 firm-years with a residual equal to 0. In Panel B, firms with year  $t-1$  to year  $t$  director turnover less than or equal to (greater than) 7.5% are classified as low (high) director turnover firm-years. In Panel C, boards with directors that on average serve on fewer than 1.5 boards are classified as having less busy directors. The p-values (in parenthesis) are based on standard errors that adjust for firm-level and year-level clustering. The last column reports the difference (p-values in parenthesis) between the estimates for the two sub-samples.

Panel A: Director option-based pay

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)			
	Lower than expected director option-based pay	Higher than expected director option-based pay	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.009 (0.134)	0.008 (0.493)	– 0.001 (0.897)
Director-linked CEO pay, residual	0.021 (0.003)	– 0.008 (0.581)	– 0.029 (0.025)
Number of observations	2,192	1,589	

Panel B: Director turnover (median is 7.5%)

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)

	Lower than median director turnover	Higher than median director turnover	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.001 (0.842)	0.009 (0.373)	0.008 (0.424)
Director-linked CEO pay, residual	0.008 (0.287)	0.020 (0.001)	0.012 (0.040)
Number of observations	3,425	3,286	

Panel C: Director busyness (median 1.5 boards)

Dependent variable is total CEO pay (millions of 2012 U.S. dollars, log)

	Lower than median director busyness	Higher than median director busyness	Diff. in scaled coefficients
Director-linked CEO pay, predicted	0.001 (0.892)	0.010 (0.199)	0.009 (0.513)
Director-linked CEO pay, residual	0.010 (0.306)	0.022 (0.013)	0.012 (0.325)
Number of observations	3,605	3,617	

## ESSAY TWO: WHO WATCHES THE WATCHMEN? DIRECTOR PAY AND INSTITUTIONAL INVESTORS

Quis custodiet ipsos custodes? – Juvenal, Satire VI.

### 1. Introduction

Directors are appointed to oversee the management of public firms and protect the interests of owners who are not able to conduct such oversight themselves. Board members do not have direct control of most firm assets nor do they have the direct authority to guide operations. Instead, the board controls executive salaries and appointments, and they oversee financial reporting and disclosure for the firm in order to ensure that accurate information is communicated to firm owners. Directors also function in determining the addition or replacement of members of the board itself, as well as the compensation board members receive<sup>1</sup>. This self-determination in pay serves to weaken the alignment between director and firm owner objectives. Research on CEO and executive compensation often examines the possibility that the board will simply bow to the whims of powerful executives in order to retain their directorships and gain financial benefits, with the result that the interests of investors are not adequately served (Bebchuck, Fried, and Walker [2002]).

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<sup>1</sup> Detailed analysis of board activities and features can be found in Hermalin and Weisbach (2003); Adams, Hermalin, and Weisbach (2010); and Schwartz-Ziv and Weisbach (2012).

Retail investors, bearing relatively low levels of financial risk and having little voting power in any individual firm due to their small financial scale, may not have the incentive or the power to directly monitor or influence the management of a firm. Large institutional investors, however, often have large financial stakes in firms, and thus have substantial financial incentive and a larger share of voting rights that make more direct oversight of firm activity possible (Shleifer and Vishny [1986]; Admati et al. [1994]). Gillan and Starks (2000) find that shareholder proposals sponsored by institutions or coordinated groups of investors generally receive more votes than proposals sponsored by individual activist investors. Hartzell and Starks (2003) find that both the level and concentration of institutional ownership in a firm affects executive pay level and pay-performance sensitivity<sup>2</sup>. Investing firms may, however, choose not to influence the governance of firms they invest in directly. Parrino, Sias, and Starks (2003) find that institutional ownership decreases prior to forced CEO turnover, suggesting that investment firms may choose to exit a stock rather than attempt to change firm behavior.

The monitoring incentives of institutional investors likely varies, as supported by the work of David, Kochhar, and Levitas (1998) who find the effect of institutional ownership on CEO compensation depends on the type of institutions involved. Chen, Hartford and Li (2007) find that institutions with longer investment horizons tend to have a stronger effect on post-merger performance than the ownership of firms with shorter investment horizons. Almazan, Hartzell, and Starks (2005) find that ownership by institutions classified as “potentially active investors” appears to have stronger effects on executive pay levels and pay-performance sensitivity than ownership by more passive firms. Brav, Jiang, Partnoy, and Thomas (2008) find that activism by hedge funds is at least partially successful in two-thirds of cases and that

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<sup>2</sup> These conclusions have been questioned by Smith and Swan (2013), as the results are not found if one does a simple log transform on the firm size variable used in the analysis.

targeted firms increase operating performance and see higher CEO turnover as a result. Greenwood and Schor (2009) find that hedge funds are more likely to initiate events associated with shareholder activism and that firms targeted by activist investors are more likely to be acquired. Ertimur, Feri, and Muslu (2014) examine a sample of shareholder proposals related to executive pay and find that union pension funds sponsor most of these activist proposals. Further, they find that firms with excess CEO pay appear to be affected by these proposals and decrease CEO compensation significantly.

There is potential for both the board of directors and institutional owners to contribute to the governance of the firm. The interaction between these internal and external governance mechanisms is not straightforward, as illustrated in the model of Cohn and Rajan (2013) which predicts that internal and external governance mechanisms can be either substitutes or complements depending on the severity of agency conflicts within the firm.

The financial literature has largely focused on executive and CEO compensation for analyzing the effects of the quality of governance on a firm<sup>3</sup>. This is not without reason, as the CEO generally represents the largest salary expense for the firm, and other non-CEO executives also receive high levels of compensation. Executive compensation also receives high levels of public scrutiny and is the subject of much governmental regulation. The CEO and other executives are also tasked with managing the day to day operations of the firm. Directors are compensated at lower levels compared to firm executives and are not directly involved in day to day operations, and so it may be thought that their pay is relatively inconsequential. In our sample, the average sum of compensation for the entire board is roughly comparable to the

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<sup>3</sup> For example, Bebchuck and Weisbach's 2010 summary of corporate governance literature only discusses the compensation of firm executives, and boards are only examined in their composition or discussed as bargaining parties in the determination of executive compensation.

compensation for an average non-CEO executive, and the annual compensation for a CEO in our sample is around 3.5 times that of the pay for the entire board.

Even at these lower relative levels, director compensation may yield insights as to the governance of the firm as a whole. As noted in Adams, Hermalin, and Weisbach (2010), directors serve as advisors for the managers of the firm and are involved in setting overall firm strategy. The board also wields the power to dismiss the CEO. Further, the actions of directors may be influenced by even small changes in compensation levels. Adams and Ferreira (2008) find that director meeting attendance increases with the amount of meeting fees they are paid, even though the average meeting fee was only \$1,000 in their sample. Abnormally high director compensation can also be an indicator of weak governance in a firm. Brick, Palmon, and Wald (2006) find evidence that excess director compensation is related to firm underperformance and that this excess director compensation may coincide with higher CEO compensation as a result of mutually beneficial cronyism. The compensation of directors, despite being lower than executive pay, can thus influence the strategic direction and performance of the entire firm.

Firms frequently use equity based compensation in order to better align director incentives with owner interests. Yermack (2004) analyzes the pay-performance relationship for directors and finds that a large portion of pay-performance sensitivity comes through the increased likelihood of obtaining outside board seats for directors of firms with high stock returns. Becher et al. (2005) find a shift toward equity based compensation for directors in the U.S. banking industry following deregulation. Farrell, Firesen, and Hersch (2008) find evidence that firms use fixed-value equity compensation for directors. Dong (2012) argues that the use of equity based compensation for board members is more important when directors are friendly with CEOs and less important when there is more competition in the firm's industry.

The compensation of directors and the level of institutional investment in a firm may be linked in several possible ways. High levels of institutional investment would incentivize institutions to become more involved in the oversight of a firm. This increased oversight might reduce any excess pay directors had been receiving, thus lowering total compensation. This would be consistent with a similar effect in CEO compensation, documented in Fahlenbrach (2009). On the other hand, governance may be an expensive good worth paying for, and higher levels of owner involvement might lead the firm to pay more for better directors. Chhaochharia and Grinstein (2009) find that firms affected by new board requirements in 2001 and 2002 tended to see reductions in CEO compensation following these changes in board structure. The effect was largest when firms had low concentrations of institutional investors, suggesting that there is an interaction between inside and outside monitoring in the governance of the firm. However, further analysis by Guthrie, Sokolowsky, and Wan (2012) attribute much of the decrease in CEO compensation following these board changes to two observations in the sample, and they conclude that board independence does not affect CEO compensation. They also find that independence requirements for compensation committees actually increase CEO compensation. There is no standard prediction for the relationship between institutional ownership and director compensation, and we are left to empirical methods to determine the functional relationship between these two variables.

Little research has been done specifically concerning the effect of institutional ownership on director pay. Cordeiro, Veliyath, and Erasmus (2000) examine a small sample of firms and do not find any relationship between institutional ownership and director compensation in their multivariate tests. We examine a much larger sample and find that higher levels of institutional ownership are correlated with higher levels of director pay. We also find that institutional

ownership levels are positively correlated with the use of equity based compensation for directors. Even after accounting for firm size, past performance, firm risk, and several board characteristics, both of these results are highly statistically significant. This suggests a strong association between the levels of institutional investment and the amount and type of compensation that directors receive. Institutional investors appear to be willing to pay higher amounts for directors, but also appear to use higher levels of equity based pay to strengthen the relationship between firm performance and director wealth. Further, we find that active institutional investors appear to have a larger impact than passive institutions on the pay level and composition of directors. This suggests that the investment level of active firms is more important in setting the compensation of directors; however, post-regression testing reveals that we cannot distinguish between the two effects statistically. Thus, we conclude that there is no statistical difference in the effects of active and passive institutional investors in our sample.

## 2. Data

Our sample is constructed using Compustat's Directorcomp file, Thompson Reuters Institutional Holdings data, and RiskMetrics Director and Governance data. The Directorcomp database begins in 2006, coinciding with an SEC rule change which required firms to disclose director pay in a manner similar to prior executive compensation disclosure. Thus, our sample spans from 2006 to 2012. Further, we include firm level financial data from Compustat's annual file and stock return data from CRSP. The final testing sample contains 6,286 firm-year observations, and we winsorize the sample at the 1st and 99th percentile tails.

Our main tests are for the relationship between the level of institutional ownership in a firm and that firm's director pay and equity based compensation. Institutional ownership is measured as the proportion of a firm's shares that are held by institutions as reported in 13F

reports. We use the average pay of directors for each firm as the measure of total director compensation, and consistent with Becher et al. (2005), we use equity based compensation, the value of stock plus option grants divided by total compensation, as a measure of performance related compensation for directors in our sample<sup>4</sup>.

Research has shown that some institutions may be more active in monitoring firm behavior than others. We construct measures of active and passive institutional ownership levels by using the type coding found in 13f filings in the Institutional Holdings data. Using updated coding data<sup>5</sup>, we follow the methods of Almazan, Hartzell, and Starks (2005) and classify investment companies and independent investment advisers as active institutions. Firms that are coded as bank trusts, insurance companies, pension funds, endowments, or miscellaneous are categorized as passive institutions. The differentiation is driven by an assumption about the differences in monitoring costs among the various types of institutions. Banks, insurance firms, and pension funds face higher regulatory and legal restrictions on their investments, while investment companies and independent investment advisers are not as restricted in their investment options. Further, Almazan, Hartzell, and Starks (2005) make the claim that investment companies and advisory firms likely have more skilled employees and are likely to collect more information.

The average firm in our sample pays its directors \$186,438, with 50.6% of this compensation coming in the form of stock or option grants. The average total board pay for our firms is around \$1.7 million. For comparison, the average CEO of firms in our sample receives \$5.8 million in total compensation, and the average non-CEO executive receives total pay of

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<sup>4</sup> Pay-performance sensitivity of total wealth is the standard measure of performance based pay for executives (see Yermack [1995], for example). However, Directorcomp and Riskmetrics data is insufficient to calculate firm specific wealth for directors, as it lacks the appropriate detail on accumulated options holdings.

<sup>5</sup> Available from Brian Bushee's website, <http://acct3.wharton.upenn.edu/faculty/bushee/>.

\$2.1 million. Institutions own 78.9% of the average firm in our sample, with an active ownership level of 56.6% and a passive ownership level of 22.3%.

We control for several firm and board specific factors. Firm market value is one of the largest predictors of compensation for all executives, and we calculate this variable as the sum of the value of debt and equity for each firm at the end of the previous fiscal year. Firm value is highly skewed; the average firm in our sample has a market value of \$18 billion, while the median firm has a market value of only \$4.5 billion. We use a log transform of this market value in our regressions, as this is more consistent with the empirical distribution of firm size and is the focus of Smith and Swan's (2013) critique of Hartzell and Starks (2003). We measure firm performance with annual stock returns calculated from the CRSP monthly file, and we also include a measure of accounting performance by calculating each firm's return on assets for each year.

Since director compensation often contains equity based components to achieve incentive alignment, directors bear some portion of firm risk. We account for this factor by controlling for the standard deviation of monthly stock returns during a five-year window ending before the start of the fiscal year. Our sample contains only firms that have at least 48 monthly observations during this window. Linn and Park (2005) find that director compensation is positively related to the investment opportunity set of the firm, and so we also include the book to market value of firms' assets in our tests.

The characteristics of the board itself may influence compensation. In the model of Adams and Ferreira (2007), board independence is positively correlated with shareholder value. Ryan and Wiggins (2004) find that board size and independence are negatively related to average director pay and equity based compensation, and we include both the log number of board

members and the proportion of independent board members in our regressions. We also include a measure of board busyness, as it has been examined in the context of governance quality (Core, Holthausen, Larcker [1999]; Ferris, Jagannathan, and Pritchard [2003]; Fich and Shivdasani [2006]). Further, we control for other director-specific characteristics by including the average director stock ownership in the firm, the proportion of female board members, the proportion of board members with financial expertise, and the average director age for the board in our regressions.

The average board in our sample contains 9.4 members, 78.7% of whom are independent outside directors. 12.2% of board members are female, and 13.2% have financial experience in their background. Directors in our sample hold 0.819 external board seats on average. The average director is 62 years old, and owns 0.5% of the firm's stock.

In addition, to control for possible indications of CEO entrenchment (signaling lower incentives for boards to monitor), we include a variable indicating whether a board is classified (staggered elections) or not. While this variable is subsumed by the E-Index of Bebchuk, Cohen, and Ferrell (2008), irregularities in the reporting of governance components make the E-Index unreliable during our years of observation. In unreported tests, we find that the classified board indicator is the most significant of the individual E-Index components, and we use it instead of the full E-Index. 49.7% of the firms in our sample have a classified board.

### 3. Results

Our primary tests concern the effects of institutional ownership on the level and composition of director pay. For our main analysis, we estimate the following two regression models:

$$\text{Log Avg. Compensation}_{i,t} = \beta * \text{INSTOWN}_{i,t} + \delta * \text{Z}_{i,t} + \text{YEAR} + \text{INDUSTRY} + \mu_{i,t} \quad (1)$$

$$EBC_{i,t} = \beta * INSTOWN_{i,t} + \delta * Z_{i,t} + YEAR + INDUSTRY + \mu_{i,t} \quad (2)$$

We use the log average total director pay as the dependent variable in our first regression and the average proportion of equity based compensation (EBC) in our second regression. In addition to institutional ownership, our independent variable of interest, we also include in our regressions firm and board characteristics as explanatory variables ( $Z_{i,t}$ ) and use fixed year and industry (3 digit SIC) effects and clustered standard errors at the firm level.

Institutional ownership and total director compensation could be related in two ways in our regression. A positive sign on the ownership coefficient would reflect that institutional investors prefer to pay directors more, with the assumption being that this higher pay would result in better governance. A negative coefficient would be consistent with the theory that institutional investors serve to reign in directors paying themselves excessive salaries.

For the second regression, our ex-ante prediction is that institutional investors would prefer a stronger pay-performance link for directors, and we expect the coefficient on institutional ownership to have a positive influence on equity based compensation proportions. This test is analogous to Hartzell and Starks (2003), which finds a positive relation between institutional ownership levels and the pay-performance sensitivity of executives.

Our results in Table 2.2 show that higher levels of institutional ownership are correlated with higher average levels of director pay. At the mean director pay level, a one standard deviation increase in lagged institutional ownership would correspond to an increase in average director pay of about \$13,000 or around a 7.9% increase in compensation, and this coefficient is highly statistically significant in our regressions. The only larger economic effect we find in our first regression is due to the market value of the firm, with a standard deviation in

log market value corresponding to a 34.73% increase in average director compensation. Institutional investors appear to prefer to pay directors higher levels of compensation.

Our second regression uses the average proportion of director pay that is based on equity (stock and options) as the dependent variable. As expected, we find that lagged institutional ownership is positively correlated to the proportion of equity based compensation that directors receive, as shown in Table 2.3. The proportion of EBC directors receive increases about 3.5% for every standard deviation increase in lagged institutional ownership. The only larger economic impact we find in our regressions is due to the book to market ratio for the firm. A standard deviation increase in log book to market corresponds to a decrease of 5.1% in EBC for directors. As with firm executives, institutions appear to prefer stronger links between compensation and performance for directors.

Thus far, our results suggest that there is a statistically strong relationship between the level of institutional ownership in a firm and the level and composition of director pay for that firm. We also examine the possible differences between the effects of different types of institutional ownership. Works by David, Kochhar, and Levitas (1998) and Almazan, Hartzell, and Starks (2005) find that the effect of institutional ownership on executive compensation levels and structure depends on the type of institutions that have invested in a firm. Based on the assumption that active institutions have lower monitoring costs than passive institutions, we expect that active ownership would have a stronger effect on director compensation than passive ownership.

Decomposing the institutional ownership variable into active and passive institutions in Table 2.4, we find that active ownership has a larger and more statistically significant relationship with both the level and composition of director compensation than passive

institutional ownership. For each standard deviation increase in the proportion of active ownership, average total director compensation increases by about \$12,800, which is about the same economic impact as the overall level of institutional ownership. A one standard deviation increase in passive ownership would correspond to around a \$4,100 increase in total compensation. Further, a standard deviation increase in active ownership would predict a 2.6% increase in the proportion of EBC directors receive, again similar to the result for overall institutional ownership. In contrast, a standard deviation increase in passive ownership would only predict an increase in EBC of around 0.6%, and the coefficient is not statistically significant.

These results suggest that active ownership is more highly correlated with director compensation than the ownership of potentially passive investors, and indeed, the economic interpretations suggest that active ownership changes can account for the entire effect of overall institutional ownership. However, tests for equality between the coefficients in both regressions of Table 2.4 fail to find a statistically significant difference between the effects of active and passive institutional ownership. Further refining the distinction between active and passive investment types may yield clearer results, but in our tests, we cannot conclude that there is a difference between our classifications. These results are partially consistent with the findings of Almazan, Hartzell, and Starks (2005) who find qualitatively similar results, but their coefficients are statistically separable.

#### 4. Instrumental Variable Estimation

The main complication in interpreting our results is the possibility that endogeneity exists between director monitoring levels and the choice institutions make when they invest in a firm. Thus far, our regression formulations assume that institutional investors affect director pay, but

the reverse could just as easily be true. Institutions may select firms for investment based upon certain board or firm characteristics that also lead to higher pay and EBC levels. If higher board pay and EBC is thought to be a proxy for better monitoring and governance, then institutions would favor investment in firms with those features, *ceteris paribus*. This is the case in Chung and Zhang (2011), who find that the level of institutional investment in a firm tends to increase with measures of governance quality derived from the ISS Governance database.

We estimate an instrumental variable to address this endogeneity concern. In an approach similar to that used in Kale, Reis, and Venkateswaran (2009), we use the median institutional investment of other firms in the same SIC two-digit industry and size quartile as our instrument. Institutional investment will vary exogenously between industries due to the presence of sector and capitalization based mutual funds, providing a source of variation to firms' institutional ownership levels unrelated to director compensation.

Table 2.5 contains the results from this regression. The industry median values are statistically significant in the first stage regression, supporting its relevance as an instrument for institutional ownership. The Anderson-Rubin F-statistic is highly statistically significant, and the Cragg-Donald Wald F-statistic is larger than the 10% critical value suggesting that our instrument is not weak. The results of the second stage regression show that institutional ownership does have a positive and statistically significant effect on the average level of director pay. Our IV coefficients are similar in magnitude to those from an ordinary least squares regression, reducing the concern that endogeneity is heavily influencing the results of our previous single stage regressions.

## 5. Conclusion

Our analysis finds that there is a positive and significant relationship between the level of institutional ownership in a firm and the level and composition of director compensation for that firm. We find that both active and passive institutional ownership is positively related to director total pay and EBC. Economic impacts suggest that active ownership has a much stronger relation with both pay level and EBC than passive ownership, however no statistical difference can be found between the two in our regressions. These results are further confirmed by IV regressions accounting for the endogeneity between institutional investment and director compensation levels, and these results are similar in magnitude and significance to single stage regressions.

One potential interpretation of our results is that institutional investors are willing to pay more for good governance. This would further predict that firms with more highly paid board members would have better performance than other firms with underpaid directors. Such conclusions require further testing of firm performance as it relates to governance and institutional investment levels.

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## Tables

Table 2.1 - Summary of variables

Our sample consists of data from Directorcomp, Riskmetrics, and the Thompson/CDA/Spectrum files. Our regression sample consists of 6,286 firm-year observations. Some items in the table are lagged in our regressions, and this results in the small variation in observation number reported here. All dollar amounts are in 2012 U.S. dollars. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Variable	N	Mean	5th Pctl	Median	95th Pctl	Std. Dev.
Avg. Director Pay (\$, thousands)	6,286	186.438	58.686	173.913	360.308	97.033
Avg. Director Equity Based Pay	6,286	0.506	0.000	0.521	0.820	0.206
Institutional Ownership	6,286	0.789	0.511	0.807	1.000	0.147
Active Inst. Ownership	6,286	0.566	0.321	0.573	0.772	0.135
Passive Inst. Ownership	6,286	0.223	0.118	0.219	0.339	0.067
Return on Assets	6,286	0.043	-0.080	0.044	0.159	0.082
12 Month Stock Return (%)	6,286	8.689	-51.978	6.864	75.947	40.279
Market Value of Assets (\$,millions)	6,286	18,306.590	450.385	4,453.680	81,326.900	44,143.280
Standard Deviation of Stock Returns (%)	6,286	10.517	4.952	9.949	18.372	4.209
Book to Market	6,286	0.737	0.289	0.743	1.142	0.268
Board Size	6,286	9.429	6.000	9.000	13.000	2.284
Independence	6,286	0.787	0.571	0.800	0.917	0.108
Proportion Female	6,286	0.122	0.000	0.111	0.300	0.099
Finance Experience	6,286	0.132	0.000	0.111	0.375	0.125
Average Director Age	6,286	62.289	56.143	62.400	68.167	3.568
Busyness	6,286	0.819	0.077	0.778	1.700	0.495
Avg. Director Ownership	6,286	0.005	0.000	0.001	0.028	0.011
Classified Board Indicator	6,286	0.497	0.000	0.000	1.000	0.500

Table 2.2 - Regression of total director pay

This table reports coefficients from a regression model explaining average total director pay. As explanatory variables, we use the lagged proportion of institutional ownership in the firm as well as other firm and board characteristics. The model adjusts for year and industry fixed effects. Reported p-values are based on standard errors adjusted for firm-level clustering. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Dependent variable is Average Total Director Pay (thousands of 2012 dollars, log)

	Coefficient	p-value
Institutional Ownership (proportion,t-1)	0.519	(0.000)
Return on Assets	-0.503	(0.000)
12-month return (%)	0.001	(0.000)
Market Value (mill., log, t-1)	0.194	(0.000)
Standard Deviation of Returns (%)	0.011	(0.000)
Book-to-market (log, t-1)	-0.080	(0.015)
Board size (log, t-1)	-0.072	(0.203)
Board independence (proportion, t-1)	0.132	(0.178)
Board gender (proportion female, t-1)	-0.141	(0.180)
Board financial experience (proportion, t-1)	0.058	(0.439)
Board member age (t-1)	-0.003	(0.321)
Board busyness (t-1)	0.086	(0.000)
Board ownership (proportion, t-1)	-5.009	(0.000)
Classified board (t-1)	0.018	(0.338)
Intercept Suppressed		
Fixed effects	Year, Industry	
Cluster	Firm	
Adjusted R-squared	43.19%	
Number of Observations	6,286	
Years	2006-2012	

Table 2.3 - Regression of equity based compensation

This table reports coefficients from a regression model explaining the average proportion of equity based compensation that directors receive. As explanatory variables, we use the lagged proportion of institutional ownership in the firm as well as other firm and board characteristics. The model adjusts for year and industry fixed effects. Reported p-values are based on standard errors adjusted for firm-level clustering. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Dependent variable is average proportion of Equity Based Compensation		
	Coefficient	p-value
Institutional Ownership (proportion,t-1)	0.171	(0.000)
Return on Assets	-0.177	(0.000)
12-month return (%)	0.000	(0.000)
Market Value (mill., log, t-1)	0.019	(0.000)
Standard Deviation of Returns (%)	0.004	(0.001)
Book-to-market (log, t-1)	-0.117	(0.000)
Board size (log, t-1)	-0.009	(0.679)
Board independence (proportion, t-1)	0.151	(0.000)
Board gender (proportion female, t-1)	-0.116	(0.011)
Board financial experience (proportion, t-1)	0.000	(0.993)
Board member age (t-1)	-0.008	(0.000)
Board busyness (t-1)	0.030	(0.004)
Board ownership (proportion, t-1)	-1.301	(0.004)
Classified board (t-1)	-0.005	(0.513)
Intercept Suppressed		
Fixed effects	Year, Industry	
Cluster	Firm	
Adjusted R-squared	27.77%	
Number of Observations	6,286	
Years	2006-2012	

Table 2.4 - Test for ownership type

This table reports coefficients from a regression model explaining average total director pay and the average proportion of equity based compensation that directors receive. We include the lagged proportion of active and passive institutional ownership as our main explanatory variables as well as other firm and board characteristics. The model adjusts for year and industry fixed effects. Reported p-values are based on standard errors adjusted for firm-level clustering. F-test [F(1,1452)] tests the equality of the coefficients of active and passive institutional ownership. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Dependent variable	Log Total Compensation		EBC	
	Coefficient	p-value	Coefficient	p-value
Active Inst. Ownership ( proportion ,t-1)	0.557	(0.000)	0.195	(0.000)
Passive Inst. Ownership ( proportion ,t-1)	0.370	(0.014)	0.084	(0.189)
Return on Assets	-0.491	(0.000)	-0.169	(0.000)
12-month return (%)	0.001	(0.000)	0.000	(0.000)
Market Value (mill., log, t-1)	0.196	(0.000)	0.020	(0.000)
Standard Deviation of Returns (%)	0.011	(0.000)	0.004	(0.001)
Book-to-market (log, t-1)	-0.078	(0.017)	-0.116	(0.000)
Board size (log, t-1)	-0.069	(0.224)	-0.007	(0.747)
Board independence (proportion, t-1)	0.132	(0.178)	0.151	(0.000)
Board gender (proportion female, t-1)	-0.142	(0.177)	-0.116	(0.011)
Board financial experience (proportion, t-1)	0.056	(0.452)	-0.001	(0.979)
Board member age (t-1)	-0.003	(0.313)	-0.008	(0.000)
Board busyness (t-1)	0.087	(0.000)	0.031	(0.004)
Board ownership (proportion, t-1)	-5.091	(0.000)	-1.344	(0.003)
Classified board (t-1)	0.018	(0.343)	-0.005	(0.505)
F-test: Active = Passive	Prob. > F = 0.2397		Prob. > F = 0.1070	
Intercept Suppressed				
Fixed effects	Year, Industry		Year, Industry	
Cluster	Firm		Firm	
Adjusted R-squared	43.21%		27.86%	
Number of Observations	6,286		6,286	
Years	2006-2012		2006-2012	

Table 2.5 - Instrumental variable regression

This table reports coefficients from an instrumental variable regression model explaining average total director pay. The endogenous variable in this model is institutional ownership. We use each firm's industry median value as the exogenous instrument. The model adjusts for year fixed effects in director pay. All variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles.

Dependent variable	OLS		First stage		Second stage	
	Log Total Comp.		Inst. Own. (t-1)		Log Total Comp.	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Institutional ownership (t-1)	0.486	(0.000)			0.573	(0.000)
Inst. Own. size/ind. median (t-1)	0.030	(0.591)	0.351	(0.000)		
Log total pay size/ind. med. (t-1)	0.400	(0.000)	0.028	(0.000)	0.398	(0.000)
Return on assets (%)	-0.521	(0.000)	-0.066	(0.010)	-0.515	(0.000)
12-month return (%)	0.001	(0.000)	0.000	(0.040)	0.001	(0.000)
Market value (log, t-1)	0.111	(0.000)	-0.016	(0.000)	0.113	(0.000)
Standard dev. returns (%)	0.012	(0.000)	0.003	(0.000)	0.011	(0.000)
Book-to-martket (log, t-1)	-0.127	(0.000)	-0.022	(0.000)	-0.125	(0.000)
Board size (log, t-1)	-0.146	(0.000)	-0.100	(0.000)	-0.137	(0.000)
Board ind. (% , t-1)	0.193	(0.001)	0.097	(0.000)	0.185	(0.001)
Board gender (% fem., t-1)	-0.104	(0.095)	-0.034	(0.066)	-0.101	(0.106)
Board fin. exp. (% , t-1)	0.066	(0.137)	0.057	(0.000)	0.061	(0.175)
Board member age (t-1)	-0.003	(0.056)	-0.002	(0.000)	-0.003	(0.084)
Board busyness (t-1)	0.143	(0.000)	0.017	(0.000)	0.142	(0.000)
Board ownership (% , t-1)	-4.604	(0.000)	-2.577	(0.000)	-4.381	(0.000)
Classified board (t-1)	0.013	(0.245)	-0.002	(0.479)	0.013	(0.237)
Intercept Suppressed	Yes		Yes		Yes	
Fixed Effects	Year		Year		Year	
Cluster	No		No		No	
Adj. R-squared	36.87%					
Centered R-squared			27.36%		37.04%	
Number of Observations	6,286		6,286		6,286	
Years	2006-2012		2006-2012		2006-2012	
Weak Instrument Tests						
First stage F-statistic			460.270	(0.000)		
Anderson-Rubin F-statistic			13.250	(0.000)		
C-D Wald F-statistic			460.270			
S-Y 10% critical value			16.380			

## ESSAY THREE: DOES IT MATTER HOW FIRMS APPORTION DIRECTOR INCENTIVES? EVIDENCE FROM ACQUISITIONS

### 1. Introduction

How best to provide outside directors with incentives to monitor and govern the firm? Financial economists interested in this question (e.g., Fama and Jensen, 1983) have identified two main sources of director incentives: reputation in the market for directors and direct incentives from compensation. Yermack (2004) estimates that equity-based compensation, such as shares of stock and stock options, “account for more than half of total director incentives, with most of the balance related to the increased possibility of obtaining more board seats if the firm performs well” (p. 2282).<sup>1</sup>

The major role of equity-based compensation in motivating outside directors necessitates a detailed understanding of how firms award such compensation and of its effects on the firm. To date, studies on director incentives keep the focus on the board as a whole, thus analyzing variations in aggregate incentives across different boards, while variations within each board are overlooked (see, for example Yermack, 2004; Ryan and Wiggins, 2004; Linn and Park, 2005).

This study contributes to the literature by first examining how incentives are awarded within the board. We find that, when structuring incentive compensation packages for outside

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<sup>1</sup> Director incentives from equity-based compensation, while substantially lower than the corresponding incentives of CEOs, are economically significant (e.g., Yermack, 2004). Furthermore, Adams and Ferreira (2008) find that even small amounts of financial incentives motivate outside directors to act in the interests of the shareholders.

directors, firms take one of two distinct approaches: an equal incentives approach or a variable incentives approach.<sup>2</sup> Firms following the equal incentives approach grant equal annual incentive compensation to each and every outside director serving on the board. For example, in 2012 3M awarded an amount of \$130,000 worth of stock to each and every outside director, while varying the cash retainer conditional on a director's activities within the board (see Table A1 in Appendix A). Firms following the variable incentives approach grant annual incentive compensation that varies across directors. Variable incentives firms can have more complicated schedules for determining outside director incentive compensation. As shown in Table A1, Monsanto and Oracle both used compensation policies that led to variable incentives across their outside directors for 2012. Monsanto granted pay according to committee participation and leadership with all compensation to be evenly divided between cash and stock. Oracle also allocated total pay according to committee membership; however, instead of specifying a percentage value, a share number was used conditional on each director's activities within the board, and the value was determined ex post.<sup>3</sup>

From an optimality standpoint, a case could be made both for the equal incentives approach and for the variable incentives approach. On one hand, all outside members of the board, while heterogeneous in their experiences and skills, bear equal responsibility for monitoring and governing the firm, and all directors are considered equals when it comes to certain decisions. For example, such is the case when votes are taken at the board level rather than at the committee level. Unlike the hierarchy that exists among firm executives, each member of the board may have equal influence over general business decisions, and the firm's

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<sup>2</sup> There are relatively few firms in our sample that do not grant any incentive compensation to the board.

<sup>3</sup> Farrell, Friesen, and Hersch (2008) refer to these schedules as fixed-value and fixed-number equity grants, respectively. In addition, it is not uncommon for firms to allow directors some choice in how their compensation is structured. Such is the case in both Monsanto, which we would classify as a variable incentives firm, and 3M, which appears to grant ex ante equal equity-based incentives to all directors.

interests may best be served when outside directors receive equal incentives. In this environment, unequal incentive compensation may reduce overall board function.<sup>4</sup>

On the other hand, a wide body of literature argues that the most talented decision makers should, *ceteris paribus*, receive the most incentives. For example, the talent assignment model of Gabaix and Landier (2008) predicts that the most talented managers should be assigned to the largest firms, thus producing the highest marginal products of effort and consequently receiving the largest compensation packages as a reward. In such an environment, Edmans, Gabaix, and Landier (2009) show that, for a given cost of effort, an increase in total compensation predicts higher dollar values for the performance based portion of compensation. Applying the same logic to the assignment of directors to board activities within the firm predicts that the most talented directors should (i) be most active within the firm and thus receive the highest compensation and (ii) receive the most incentives for performance. Resonating with this logic, Oracle's 2012 proxy, for example, states that "(a)nnual cash retainers and formula stock option grants to the non-employee directors are intended to correlate to the responsibilities of each such director."<sup>5</sup>

We construct a base sample of 14,464 firm-year observations from 2006 to 2013 to study board compensation and incentive structures. Firms in this sample tend to use stable compensation strategies for the board. Those firms that do not grant their directors any incentive compensation in one year continue to not grant incentive compensation to any board members in the following year over 64% of the time. Similarly, firms that utilize either equal or variable

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<sup>4</sup> To better understand board function, Schwartz-Ziv and Weisbach (2013) examine the minutes of board meetings and board committee meetings of eleven firms. They find that for most of the time boards take on a "supervisory" role, as in the approaches of Hermalin and Weisbach (1998), Almazan and Suarez (2003), and Raheja (2005). However, in a significant number of situations, boards also take on a "managerial" role as in the approaches of Song and Thakor (2006), Adams and Ferreira (2007), and Harris and Raviv (2008).

<sup>5</sup> See Table A1.

within-board incentive strategies in one year continue to use the same incentive strategy in the following year in the majority of cases. Further, for firms that use varying levels of incentives for directors within the board, the rank correlation between cash and incentive compensation within boards is positive on average and tends to continue to be either positive or negative from one year to the next in the majority of cases.

The second objective of this study is to examine whether and how the structure of director incentive compensation within the boards of acquiring firms affects the performance of corporate acquisitions, where acquisition performance is measured by the acquirer's stock return around the acquisition announcement. Corporate acquisitions provide suitable grounds for testing board performance for several reasons. Acquisitions usually represent significant expenditures in relation to firm value and, as such, are subject to board approval. One of the responsibilities of the board, for example, is to ensure that a proposed acquisition complements the overall strategy of the firm and that it is in the best interest of the firm's shareholders. Many studies have offered merger and acquisition performance as an appropriate environment to measure the influence of the board of directors and of governance on firm decisions. Byrd and Hickman (1992) find that firms with majority independent boards have higher abnormal acquisition returns than other bidders. Masulis, Wang, and Xie (2007) study a sample of 3,333 completed acquisitions from 1990 through 2003 and find that abnormal acquisition returns are negatively correlated with antitakeover provisions. Bebchuck, Cremers, and Peyer (2011) find that firms where CEO pay is high relative to other top management experience lower announcement returns. Lin, Officer, and Zou (2011) study the effects of director and officer liability insurance and find that firms that have higher levels of D&O insurance also pay higher premiums during acquisitions and experience lower post-merger ROA.

Using a collection of 2,239 acquisitions made by firms in our base sample, we find that the allocation of director incentives within the board has a significant effect on acquirer performance. Firms that give all directors equal incentive compensation have five-day announcement window returns 0.963% higher than firms that vary director incentive levels within the board. Higher levels of average director total compensation are associated with lower announcement window returns in our test sample. These results are robust to changes in the length of the announcement window and a multi-year incentive strategy classification scheme. As noted in Lin, Officer, and Zou (2011), the question of endogeneity is perhaps less problematic here than in other areas of corporate finance since the announcement window return is a very short duration market-based measure. Also, as incentive compensation strategies are relatively stable from year to year in our sample, the concern for endogeneity between compensation structure and any particular acquisition is low, as the compensation package is similar even in non-acquisition years.

Our work is related to the literature studying the determinants of director compensation and incentives. Ryan and Wiggins (2004) find that total director compensation and the proportion of equity-based compensation granted to directors decreases in the presence of entrenched managers. Yermack (2004) finds that pay-performance sensitivities for outside directors are lower than for CEOs. However, the financial incentives generated by director equity holdings are much larger than those generated by reputational concerns, which was the focus of earlier literature on director incentives. Farrell, Friesen, and Hersch (2008) find a trend towards firms using fixed-value rather than fixed-number equity compensation from 1998-2004. Nguyen (2014) concludes that firms use meeting fees and equity-based compensation as substitutes and that meeting fees lead to more active boards. Fedaseyeu, Linck, and Wagner

(2014) show that outside director total compensation increases with director skills, committee involvement, and experience. Our paper contributes to the above literature by studying the allocation of incentives within the board rather than attempting to model the determinants of individual director or board-level compensation.

Our findings have implications for the literature on director incentives, the literature on the relation between corporate governance and firm performance, the literature on the performance of mergers and acquisitions which has mostly focused on the role of the CEO while ignoring the board, and the literature examining the overall relevance of the board of directors.

The remainder of the paper is organized as follows. Section 2 contains information about the construction and attributes of our sample. Section 3 describes the way firms in our sample structure director compensation. Section 4 studies the effects of these compensation structures on acquisition performance, and Section 5 concludes.

## 2. Sample

### *2.1 Base sample*

The base sample for our study comes from the Execucomp Directorcomp file. We examine all firms with more than one director listed in the Directorcomp database. The sample is restricted to include only directors for which Directorcomp lists a positive total compensation and where the total compensation is within \$1,000 of the sum of the listed compensation components<sup>6</sup>. We find 14,698 firm-years in Directorcomp that meet these criteria.

We then match this sample to Compustat for market capitalization data, constructed as the end of year stock price multiplied by shares outstanding. This requirement reduces the

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<sup>6</sup>  $\text{Total\_Sec} = \text{sum}(\text{Cash\_Fees}, \text{Stock\_Awards}, \text{Option\_Awards}, \text{Noneq\_Incent}, \text{Pension\_Chg}, \text{Othcomp})$ .

sample to 14,464 firm-year observations spanning from 2006 to 2013. All dollar values are converted to 2013 U.S. dollars using the Bureau of Labor Statistics Consumer Price Index.

For our preliminary analysis, we construct variables for firm board size, average director total pay, and the average level of director incentives as a percentage of total pay. Because only outside directors receive compensation listed in the Directorcomp file, our measure of board size is the number of outside directors on a firm's board in a given year. The average director total pay is the simple average of the total listed compensation for all directors of a firm during the year. For each director within a firm, we calculate incentive compensation as the sum of the value of stock awards, option awards, and non-equity incentives for the year. Dividing this incentive level by the director's total pay for the year gives the incentive percentage for the director, and we average this within the board to form the average director incentive level for that firm-year.

In Panel A of Table 3.1, we see that the median firm in our sample has a market capitalization of \$1.84 billion and has a board which consists of 8 members. Each board member receives \$170.45 thousand in total compensation per year, with 50.67% of this total being comprised of incentivizing compensation.

## *2.2 Test sample*

The testing sample contains data on acquisitions undertaken during our sample time period. We collect all acquisitions available from the SDC Platinum database. We follow the methodology of Masulis, Wang, and Xie (2007) and limit our sample to only completed mergers with a deal value of over \$1,000,000 as reported in SDC. Further, we require that the reported deal value be over 1% of the bidding firm's end of year market capital for the fiscal year of the

acquisition. The bidding firm must have owned less than 50% of the target firm prior to the acquisition, and the bidder must own 100% of the target following the acquisition.

Our main variable of interest is the 5-day (-2,+2) cumulative abnormal return (CAR) for the bidding firm during the acquisition announcement window. Because the CAR is market adjusted, our sample requires that bidding firms have price information available from CRSP during the announcement window and at least 100 days of pricing information during the 200 day (-210,-11) estimation period. We match our firm compensation and financial data to acquisitions which occurred during the appropriate fiscal year. The final testing sample contains 2,239 acquisitions between 2006 and 2013 conducted by firms for which we have full compensation, financial, and stock return data<sup>7</sup>.

Descriptive statistics for the acquisition sample can be found in Table 3.5 Panel A. The median bidder in our test sample has a market capitalization of \$1.91 billion, a board consisting of 8 outside directors, and pays its directors an average of \$178.55 thousand, 53.07% of which is in incentive pay. We see that acquiring firms tend to be slightly larger than the median firms in our base sample, and they tend to give their directors slightly higher total pay and slightly higher proportions of incentive pay.

### 3. Structure of Director Pay

#### *3.1 Firm types*

Firms' strategies with respect to incentive pay can be categorized into three groups, outlined in Table 3.1. Approximately 6% (865 firm-year observations) of our sample consists of firms that do not grant any directors any form of incentive compensation, as shown in Panel B.

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<sup>7</sup> We remove the 2013 acquisition of WorkflowOne by Standard Register from our sample due to a five-day announcement CAR of 367%.

These firms tend to be the smallest firms and grant the lowest levels of pay in the sample. No-incentive firms have a median market capitalization of \$1.11 billion and pay directors median of \$75.02 thousand per year, compared to the median firm in the full sample which has market capitalization of \$1.84 billion and pays directors \$170.45 thousand per year.

The next distinct strategy firms take regarding incentives is to grant an equal incentive structure to all directors, summarized in Panel C. That is, firms give each director of the firm identical, non-zero levels of incentive pay. These types of firms compose 26% (3,811 firm-year observations) of our sample, and they tend to have smaller boards, with a median board size of 7 directors compared to the full sample median of 8 directors per board. Equal incentive firms have a median market capitalization of \$1.60 billion which is also smaller than the full sample median, however they grant a similar level of total pay with a sub-sample median of \$170.19 thousand per director. Additionally, because these firms do grant incentives, we can measure the average proportion of pay that directors receive in incentive compensation for this sub-sample. The average proportion of incentive pay is not highly skewed in our sample, and directors of equal incentive firms on average receive 52.01% of their total compensation in incentives, which is very similar to variable incentive structure firms. The full sample average for this variable is a less apt comparison and biased on the low end, since it contains many observations for firms which pay directors no incentives at all.

Firms which pay directors variable levels of incentives make up the remaining 68% (9,788 firm-year observations) of our base sample, finalized in Panel D of Table 3.1. These firms pay at least some of their directors non-zero levels of incentives, however not all the directors of the firm receive identical levels of incentives. Variable incentive firms tend to be larger than average, with a median market capitalization of \$2.07 billion. However, variable

incentive firms are not substantially different from equal incentive firms with regards to director compensation. The median variable incentive firm pays its directors \$177.4 thousand of which 51.59% is incentives.

We also classify the bidder firms in our test sample using the same categorization scheme. As shown in Panel B of Table 3.5, bidders that do not use incentive pay form 3.6% (81 observations) of the acquisition sample. These firms have a median board size of 9 directors, market capitalization of \$1.22 billion, and give a median of \$69.88 thousand to their directors in average total compensation. This level of total compensation is quite low compared to the other firms in our sample.

Panel C of Table 3.5 summarizes bidders that use an equal incentive scheme for their board, which represents 25.5% (570 observations) of our test sample. These firms have a median firm size of \$1.88 billion, slightly smaller boards consisting of a median of 7 directors, and median total compensation of \$187.79 thousand per director, 54.18% of which is given through incentive pay.

Finally, in Panel D, we find that variable incentive bidders in our test sample tend to be relatively large, with a median market capitalization of \$1.99 billion. These firms have a median board size of 8 outside directors, and pay their directors a median of \$179.40 thousand, 53.74% of which is incentives. Variable incentive bidders make up the final 70.9% (1,588 observations) of our sample of acquisitions.

Overall, the sample of acquisitions tends to follow similar distributions as the base sample, with the exception that firms tend to be a little larger. This is unsurprising as, all else equal, larger firms would be expected to perform more acquisitions than smaller firms.

### *3.2 Correlation of incentives and total pay*

Our starting view of director compensation is rooted in the idea that the board of directors is a team of equals. A common descriptive is that all directors start with the same base retainer fee and are paid extra fees for attending meetings and chairing or serving on committees. Within this framework, the highest paid director for a firm will be the one with the most access to the decision making processes of the board and its committees. Given this inference that the highest paid directors would have the most influence within the board, we would expect that the highest paid directors should also be the most heavily incentivized to perform in the firm's best interest. A positive correlation should therefore exist between the level of incentive pay a director receives and the level of cash pay that director receives. More specifically, this view suggests that there should be an order where the highest paid director within a board should also be the director with the highest value of incentive compensation. We examine this incentive alignment problem with Spearman rank-correlation coefficients measured between the ranks of cash fees and incentive levels within the firm. Without variation in both cash fees and incentive levels among board members, correlations between the two variables do not exist, and so we can only calculate rank-correlations for the variable incentive sub-sample of firms.

Table 3.2 summarizes the annual distribution of the Spearman correlations for the variable incentive firms in our sample. The median firm in our sample has experienced a slight increase in the rank correlation between cash fees and incentive levels throughout our sample time span, with an average value of 0.35, showing that, for most firms, those directors receiving higher levels of cash fees within the firm also receive higher levels of incentive pay.

We further divide the variable incentive sample to examine the differences between firms that appear to align the rankings of cash and incentive pay for directors and those firms that do

not. Table 3.3 provides detail on the average level of director total compensation, average market capitalization, and average percentage incentive pay for the variable incentive firms in our sample. Firms with zero or negative rank correlation between cash and incentive rankings make up approximately one third of the variable incentive sub-sample, but do not appear to be substantially different from those firms which have positive rank correlations with respect to incentive levels, firm size, or total director compensation.

Moving to our test sample, we see in Table 3.6 that the distribution of Spearman correlations in the bidder firms is similar to that in the base sample, with a positive median correlation of 0.37.

Table 3.7 compares positive rank correlation firms and negative or zero correlation firms. Again, the bidders in this sub-sample are all variable incentive firms. Zero or negative rank correlation firms make up approximately one third of our acquisition sample. These firms appear to be larger than the positive rank correlation bidders in the sample, with an average market capitalization of \$11.32 billion compared to \$8.84 billion for positive correlation firms. Correspondingly, the zero or negative rank correlation firms in the test sample pay their directors higher total compensation, with a median value of \$200.47 thousand per director, which is slightly higher than the \$195.12 thousand paid by positive correlation firms. The zero or negative bidders also use higher proportions of incentives, with 58.53% of total pay being paid in incentives on average compared to an average of 51.20% for positive rank correlation bidders.

### *3.3 Contingency analysis*

In order to make claims about how a firm's compensation structure affects director performance, one must first show that firms are actually utilizing a consistent strategy when setting director compensation. One source of evidence that firms do not randomly assign

director pay structure is to examine how firms change from one year to the next. We perform contingency analysis to see if firms choose their incentive variation strategy and rank correlations randomly each year or if these characteristics are persistent.

Table 3.4 summarizes the changes from one year to the next for our base sample of firms. In Panel A, firm incentive structure classification in one year is associated with the incentive structure that firm uses in the next year. Firms that do not use incentive pay in one year also do not use any incentive pay during the next year in 64% of cases. Equal incentive firms persist in their strategy during the next year in 53% of cases, and variable incentive firms continue in almost 75% of cases. A chi-square test for independence shows that this persistence is highly significant, and it does not appear that firms are randomly choosing to use or vary incentives.

Panel B of Table 3.4 summarizes a similar test on the variable incentive firms in our sample. Firms in this table are classified according to their Spearman rank correlation. Firms with a positive rank correlation in one year continue to have a positive rank correlation during the next year over 57% of the time, and firms with zero or negative rank correlations continue in over 66% of cases. The chi-square test for independence shows that this persistence in rank correlations is highly significant. The combination of these two tests supports the idea that firms are utilizing purposeful, persistent strategies when setting director compensation.

## 4. Acquisition Announcement Returns

### *4.1 Control variables*

We follow the methodology used in Masulis, Wang, and Xie (2007) to construct the controls for our acquisition announcement return regressions. We broadly separate our control variables into two groups, bidder characteristics and deal characteristics, to capture information that may influence announcement returns for acquirers. In addition to the previously mentioned

board size and market capitalization variables, we also calculate Tobin's q, free cash flow as a percentage of total assets, and leverage for the bidder characteristics<sup>8</sup>. From the SDC data, we calculate the relative deal size and formulate dummy variables to identify high-tech-industry bidders and the target's status as a public, private, or subsidiary firm. We also create dummy indicators to identify each deal as all-cash or stock financed.

Several variables used in our controls contain significant outlying observations that may distort our results. We take the natural logarithm of market capitalization to adjust for non-normality. Also, we winsorize all variables in the sample at the 1<sup>st</sup> and 99<sup>th</sup> percentile, with the exception of the dependent CAR variables, dummy variables, rank correlations, and the incentive proportions.

Table 3.8 summarizes the test sample used in our analysis. The median five-day CAR in the sample is 0.709%, suggesting that acquisitions during this time period were generally received favorably by the bidding firms' investors. There was no appreciable stock price runup for the average firm, with a median estimation period CAR of 0.000%. Values for Tobin's q, free cash flow, and leverage are all comparable to values found in the sample of Masulis, Wang, and Xie (2007), thus the firms in our sample do not appear to be extraordinary in any way. The deals in our sample also appear to be fairly typical. The targets are about 6% of the size of the bidder for the median deal. Most targets appear to be private firms, and a majority of acquirers finance the deals using only cash.

#### *4.2 Regression results*

Evaluating board performance can be a difficult proposition. Many firm performance measures are primarily driven by manager and employee efforts, and using such measures is a

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<sup>8</sup> The Appendix provides detailed variable descriptions.

very noisy signal of board quality. In order to better estimate the performance of the board, outcomes that are directly influenced by the decisions of the board are preferred. Acquisitions have the ability to quickly create or destroy value for the firm, and merger and acquisition activity typically requires board approval unless the deal value is relatively insignificant. Thus, we focus on the market perception of firm acquisitions as our primary test of board performance.

Our primary variables of concern are dummy indicators for director compensation structure (equal or variable incentives), the natural log of total pay per bidder director, the within firm coefficient of variation for director total pay, the average level of incentive pay for bidder firms, and the bidder Spearman rank correlation between cash fees and incentive pay for directors. These variables capture several dimensions through which firms may attempt to influence director behavior through compensation policy.

The results from our main regressions are found in Table 3.9. All regressions control for year fixed effects with robust standard errors corrected for firm level clustering. Regression (1) uses only incentive structure dummies, with variable incentives being the base comparison case. Acquisitions by equal incentive firms have a 0.975% higher average CAR over the five-day announcement window compared to acquisitions by firms with variable director incentives. This coefficient is highly statistically significant, and it is also quite large economically, given that the average acquisition in our sample has a CAR of 0.956%. Acquisitions by firms that do not use incentive compensation for their directors do not perform significantly differently than acquisitions by variable incentive firms. Regression (2) includes our other compensation characteristics, and the coefficient for the equal incentive dummy increases to 1.079%. Of the other compensation factors, only the log of director total compensation appears to significantly

affect announcement returns. Bidders with more highly paid boards appear to have significantly lower CARs over the five-day announcement window.

Regressions (3) and (4) add our bidder and deal characteristics to control for factors known to influence acquisition announcement returns. The equal incentive coefficient remains economically large and statistically significant at the 5% level, and the log of director pay remains marginally significant in the full model of regression (4).

Our results suggest that the structure and level of board pay can affect the quality of board decisions as measured by the market reaction to the announcement of acquisitions. Acquisitions by firms that use equal incentive structures appear to be perceived as value creating, while acquisitions made by firms with more highly paid boards are associated with poorer market perceptions. We do not find that the variability of pay within the board or the rank correlation between cash and incentive pay for a board have any significant effects on acquisition announcement returns.

#### *4.3 Robustness testing*

In our first robustness test, we perform regressions on a wider eleven-day announcement window. Table 3.10 contains the results of these tests which largely mirror those found in our previous analysis. Acquisitions by equal incentive firms show a large and statistically significant positive announcement return during the eleven-day window, and director total pay levels negatively influence CARs. Further, in the longer window, the average incentive proportion for bidder directors appears to have a positive and marginally statistically significant effect on announcement returns. It does not appear that our results are sensitive to the announcement window length that we have chosen for our tests.

Our second concern is that our classifications of director incentive strategies may be wrong. We classify firms as equal or variable incentive based on ex-post data. Under our initial classification scheme, it only takes one director with a unique incentive level to lead to a variable incentive designation for a given firm. Typically when a new director is added to the board, they receive a pro-rata allocation of cash fees and incentive pay rather than the normal annual incentive grants that the incumbent directors receive. Thus, if a new director is added during the course of the year, director incentives may appear to be variable for the firm even though the company may actually follow an equal incentive strategy for typical grants. A second issue is that changes in accounting rules may require firms to report value adjustments to past incentive grants for some directors, contributing to a variability in director pay that is not actually due to a strategic firm choice. Both of these situations would lead to false classifications for firms as using a variable incentive structure when they may in fact be equal incentive structure firms. Our classification of equal incentive firms, on the other hand, is robust to these issues, as all directors must have exactly the same incentive levels in this classification.

We develop an alternative classification scheme relying on two years of data to address these concerns. Since the equal incentive classification is more reliable, we classify any firm that uses equal incentives in either year  $t$  or  $t-1$  as an equal incentive structure firm. To increase the certainty that variable incentive firms are classified correctly, we designate a firm as having a variable incentive structure only when that firm uses variable incentives in both year  $t$  and year  $t-1$ . Firms that did not use incentives for both years are classified as no incentive firms. We lose 405 observations compared to our earlier regression due to the requirement of two years of data for this secondary classification scheme.

Regression (5) in Table 3.9 contains the results from this classification robustness test. For completeness, this regression also includes dummy variables to capture firms that have more ambiguous classifications, namely those that switched from variable to no incentives or from no incentives to variable incentives. The classification coefficients in this regression are thus interpreted as acquisitions by each group of firms compared to the group of firms which used a variable incentive structure in both the current and previous year. We find that our results are largely unchanged even when following this more strict classification system, as the coefficient for equal incentive firms shows that the acquisitions in this group had a five-day announcement window CAR 0.961% higher than the acquisitions made by variable incentive firms. Testing the secondary classification scheme using  $[-5,+5]$  window CARs leads to similar results, as shown in regression (5) of Table 3.10. The equal incentive coefficient in both of these regressions is highly statistically significant, and so we do not believe that errors in our classification system are influencing our results.

## 5. Conclusion

Our sample exhibits evidence that firms utilize consistent strategies when setting director compensation. Firms that use equal, variable, or no incentives in one year are more likely to use that same strategy in the next year than switch to another strategy. We study several measures related to the structure of compensation for boards, and find that the acquisitions made by firms that grant all of their outside directors equal incentives exhibit announcement window CARs 0.963% higher than acquisitions made by firms that use variable incentives for their directors. Further, higher average levels of director pay are associated with lower CARs during the announcement window for all acquisitions. We find these results even after controlling for bidder and deal characteristics known to influence announcement returns. Our tests do not

appear to be sensitive to the length of the announcement window used in our tests, nor do our results appear to be driven by spurious firm classifications.

Because directors do not directly influence the day to day operations of the firms they oversee, it can be difficult to capture the impact they may have on firm value. Our results demonstrate that directors do affect some firm policies, specifically policies regarding mergers and acquisitions. Firms with equal incentive compensation policies for directors show much higher announcement day returns for acquisitions compared to firms with variable director incentives. The structure of director incentives impacts the creation or destruction of firm value via acquisitions. This research has implications for the literature in director compensation, mergers and acquisitions, incentive policy, and corporate governance.

One important caveat of our findings is that we cannot reach a general conclusion that equal director incentives are always better than variable director incentives. Decisions on corporate acquisitions usually involve all decision makers within the firm, the CEO as well as all directors, and therefore, providing equal incentives to all directors may optimize board performance. However, it is possible that some board decisions depends only on a subset of all directors (for example, perhaps only directors serving on the auditing committee influence the choice of a “good” auditor). In such circumstances, it may be optimal to apportion incentive compensation to better align the incentives of the relevant subset of directors. Thus, the search for a one-size-fits-all incentive compensation structure for outside directors may be futile.

One possible extension of our study is to examine why some firms may switch from one type of incentive policy to another, and what effects these policy changes may have on board functions. Additionally, in this work we have crudely classified director compensation as cash and incentive based; however, a careful reading of proxy statements reveals a much more

complex environment. Firms may use various restrictions and deferments on cash, stock, and options which we have not examined here. Some firms allow directors limited amounts of individual choice in the allocation of their pay among these various forms of compensation. Incorporating more detailed information to more precisely categorize firm compensation policies may lead to additional insights into board function.

Finally, our work can be extended to other outcomes to determine what effects director compensation has on firm policies. We have limited our study here to acquisition performance, but the board also influences firm decisions regarding CEO and executive compensation, turnover, and financial reporting. Investigation in these areas of board influence would help form a more complete understanding of the influence of board compensation on firm behavior.

## Appendix A: Example Firms

Table A1

The table reports the 2012 director compensation structure for three companies: 3M, Monsanto, and Oracle. The data is obtained from the DEF 14a filings of each firm.

### 3M

	Cash <sup>a</sup>	Stock <sup>b</sup>
Annual Retainer	\$115,000	\$130,000
Lead Director	\$25,000	
Chair		
Finance Committee	\$15,000	
Nominating and Governance Committee	\$15,000	
Audit Committee	\$20,000	
Compensation Committee	\$20,000	

<sup>a</sup> Directors can choose between current cash, deferred cash, restricted stock, and deferred stock

<sup>b</sup> Deferred stock

### Monsanto

	Amount	Cash <sup>a</sup>	Stock <sup>b</sup>
Annual Retainer	\$215,000	50%	50%
Lead Director	\$25,000		
Chair			
Audit and Finance Committee	\$35,000	50%	50%
Nominating and Governance Committee	\$25,000	50%	50%
People and Compensation Committee	\$25,000	50%	50%
Science and Technology Committee	\$20,000	50%	50%
Sustainability and Corporate Responsibility Committee	\$20,000	50%	50%
Member			
Audit and Finance Committee (excl chair)	\$15,000		
Nominating and Governance Committee (excl chair)	\$15,000	50%	50%
People and Compensation Committee (excl chair)	\$15,000	50%	50%
One-time Grant for New Directors <sup>c</sup>	\$195,000		100%

<sup>a</sup> Director can choose between current cash, deferred cash, restricted stock, and deferred stock

<sup>b</sup> Deferred stock, except for new directors (footnote c)

<sup>c</sup> Restricted stock that vests in 3 years

Oracle <sup>a</sup>

	Cash	Options <sup>b</sup> (# of shares)	Options (\$ value)
Annual Retainer	\$52,500	45,000	\$330,876
Chair			
Audit and Finance Committee	\$25,000	45,000	\$330,876
Compensation Committee	\$25,000	45,000	\$330,876
Governance Committee	\$15,000	15,000	\$110,292
Independence Committee	\$15,000	15,000	\$110,292
Vice Chair			
Audit and Finance Committee	\$25,000	30,000	\$220,584
Member			
Audit and Finance Committee	\$25,000		
Compensation Committee	\$25,000		
Governance Committee	\$15,000		
Independence Committee	\$15,000		
Fee per Board Meeting			
Regular Meeting	\$3,000		
Special Meeting	\$2,000		
Fee per Committee Meeting			
Audit and Finance Committee (earnings review meetings)	\$2,000		
Audit and Finance Committee (excl earnings review meetings)	\$3,000		
Compensation Committee (excl stock option grant meetings)	\$3,000		
Governance Committee	\$2,000		
Independence Committee	\$2,000		
One-time Grant for New Directors		60,000	\$441,168

<sup>a</sup> The following is an excerpt from Oracle's 2012 DEF 14a filing: "Annual cash retainers and formula stock option grants to the non-employee directors are intended to correlate to the responsibilities of each such director."

<sup>b</sup> Options vest 25% per year and are granted to directors serving for at least six months

## Appendix B: Variable Definitions

Variable	Description
<b>Main Sample (firm-year observations)</b>	
Board size	Number of directors with full compensation data in Execucomp's Directorcomp file
Market cap	Market value of common stock (Compustat items PRCC_F time CSHO, if PRCC_F is missing then PRCC_C is used)
Average director total pay	Average of Directorcomp item Total_Sec within each firm-year
Average director incentives	Firm-year average of incentives divided by total pay, with incentive level calculated as the sum of Directorcomp stock_awards, option_awards, and noneq_incent.
No Incentive Firms	Firms which grant no director any incentive pay during the fiscal year
Equal Incentive Firms	Firms which grant all directors equal values of incentives during the fiscal year
Variable Incentive Firms	Firms which grant some or all directors incentives during the fiscal year, but the incentive values are not equal for all directors.
Spearman rank correlation	Firm-year Spearman rank correlation between director cash compensation and incentive compensation levels
Director pay coefficient of variation	Firm-year coefficient of variation of Directorcomp Total_Sec
<b>Test sample (acquisition observations)</b>	
CAR [-2,+2]	Five-day cumulative abnormal return for bidder calculated using the market model. Market model parameters are estimated over the [-210,-11] period, with the CRSP equally-weighted return as the market index
CAR [-5,+5]	Ten-day cumulative abnormal return for bidder calculated using the market model
Tobin's q	Bidder market value of assets (sum of Compustat AT,-CEQ, and market cap) divided by book value of assets (AT)
Free cash flow	Bidder (sum of Compustat items OIDBP, -XINT, -TXT,-CAPX) divided by total assets (AT)
Leverage	Bidder debt (Compustat item DLTT plus DLC )divided by assets (AT minus CEQ plus market cap)
Stock price runup	Percentage cumulative abnormal return in bidder stock price during pre-announcement estimation window [-210,-11]
Relative deal size	Deal size divided by end of fiscal year bidder market cap
High tech firm	Bidder Compustat SIC in (3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 5045, 4961, 7370, 7371, 7372, 7373)
Public target	Dummy variable: 1 for public targets, 0 otherwise from SDC
Private target	Dummy variable: 1 for private targets, 0 otherwise from SDC
Subsidiary target	Dummy variable: 1 for subsidiary targets, 0 otherwise from SDC
All-cash deal	Dummy variable: 1 for deals with only cash financing, 0 otherwise from SDC
Stock deal	Dummy variable: 1 for deals with at least partial stock financing, 0 otherwise from SDC

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## Tables

Table 3.1 - Descriptive Statistics

The base sample originates with Execucomp. We find 14,698 firm-year observations for firms with more than one outside director listed from 2006-2013. Requiring market capitalization data from Compustat reduces the sample to 14,464 firm-years, and this is our beginning sample of study. Panel A reports the mean, median, and standard deviation of the variables measuring board size, market capitalization, average director total compensation, and the average percentage of total pay that is due to incentive compensation. Panel B reports descriptive statistics for the sub-sample of firm-year observations in which board members did not receive any incentive compensation. Incentive compensation is defined as the sum of the value of restricted stock, option, and non-equity incentive compensation as reported in Execucomp. Panel C reports descriptive statistics for the sub-sample of firm-years in which all directors receive identical positive values of incentive compensation for that firm-year. Panel D reports descriptive statistics for the sub-sample of firm-years in which directors receive variable positive values of incentive compensation for that firm-year. All dollar amounts are in 2013 U.S. dollars.

Panel A. Full Sample

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	1,587	8.37	8.00	2.80	9.86	2.32	29.82	184.52	153.23	171.03	47.48	49.39	28.18
2007	2,019	8.16	8.00	2.79	9.15	1.81	28.89	183.58	156.79	136.75	47.87	50.68	26.63
2008	1,936	8.11	8.00	2.79	5.76	1.15	20.14	177.20	158.00	114.93	46.04	49.86	53.91
2009	1,888	8.14	8.00	2.73	6.95	1.50	21.19	175.26	156.92	116.20	46.64	48.45	22.13
2010	1,860	8.18	8.00	2.70	8.12	1.91	23.93	187.27	173.48	118.99	48.88	50.84	21.22
2011	1,804	8.21	8.00	2.63	8.02	1.77	24.56	193.18	181.84	108.12	50.49	51.76	20.58
2012	1,749	8.31	8.00	2.59	9.16	1.99	29.07	194.28	182.15	112.25	50.48	51.69	19.44
2013	1,621	8.46	8.00	2.61	11.87	2.80	32.80	200.60	192.82	102.05	51.62	52.44	18.70
All	14,464	8.23	8.00	2.71	8.52	1.84	26.48	186.62	170.45	124.01	48.61	50.67	28.94

Panel B. No Incentive Firms

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	99	7.47	7.00	3.27	6.12	1.41	21.18	83.45	64.42	74.34
2007	126	7.70	8.00	3.03	6.78	0.97	28.10	87.66	71.60	58.37
2008	93	7.90	8.00	2.80	5.47	0.63	22.78	91.33	72.80	68.24
2009	133	7.65	7.00	2.85	6.06	0.86	24.33	90.75	72.10	67.37
2010	136	7.70	7.00	3.28	6.23	1.03	25.59	96.94	77.53	73.60
2011	109	7.76	8.00	3.13	7.92	1.08	30.67	100.12	78.75	70.69
2012	94	7.74	8.00	2.79	10.58	1.23	35.42	104.39	80.07	72.52
2013	75	7.95	8.00	3.04	14.13	1.93	44.45	108.39	89.92	75.81
All	865	7.72	8.00	3.03	7.56	1.11	29.00	94.69	75.02	69.96

Panel C. Equal Dollar Incentive Firms

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	245	7.14	7.00	2.34	6.16	1.89	14.06	163.96	144.14	105.63	49.30	48.18	19.65
2007	315	6.91	7.00	2.45	7.29	1.60	23.54	174.26	144.24	119.64	49.35	50.15	19.43
2008	321	6.92	7.00	2.47	5.03	0.90	19.78	164.43	146.81	109.05	48.33	48.38	19.20
2009	588	7.30	7.00	2.43	5.23	1.29	14.06	174.60	154.87	124.23	49.45	50.23	17.01
2010	625	7.29	7.00	2.36	5.55	1.61	13.12	184.28	172.18	95.49	53.24	53.32	15.24
2011	601	7.18	7.00	2.30	6.33	1.51	23.23	191.82	175.56	100.83	53.93	52.78	15.14
2012	562	7.35	7.00	2.21	6.12	1.71	15.65	190.50	182.92	84.88	53.10	52.55	13.97
2013	554	7.48	7.00	2.27	9.88	2.52	30.33	202.53	194.11	99.61	54.96	53.67	13.84
All	3,811	7.24	7.00	2.35	6.47	1.60	20.17	183.74	170.19	104.94	52.01	52.01	16.36

Panel D. Variable Dollar Incentive Firms

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	1,243	8.68	8.00	2.76	10.89	2.55	32.51	196.62	161.50	183.53	50.90	51.34	27.31
2007	1,578	8.44	8.00	2.76	9.71	1.96	29.90	193.10	164.65	141.31	51.40	52.54	25.23
2008	1,522	8.38	8.00	2.78	5.93	1.24	20.05	185.15	167.09	116.07	48.37	51.70	59.02
2009	1,167	8.62	8.00	2.75	7.91	1.73	23.61	185.22	169.43	112.49	50.53	49.49	19.48
2010	1,099	8.74	9.00	2.66	9.82	2.32	28.01	200.14	183.21	130.16	52.45	51.99	17.63
2011	1,094	8.82	9.00	2.56	8.96	2.07	24.56	203.19	190.35	110.65	53.63	52.67	17.39
2012	1,093	8.85	9.00	2.60	10.60	2.38	33.36	203.96	186.97	123.39	53.47	52.74	16.51
2013	992	9.05	9.00	2.59	12.80	3.08	33.08	206.50	196.69	101.88	53.67	52.98	15.89
All	9,788	8.67	8.00	2.70	9.40	2.07	28.30	195.86	177.74	131.03	51.59	52.06	30.19

Table 3.2 - Annual distribution of rank correlations firms with variable incentives

This table reports the annual distribution of the Spearman rank correlation between cash compensation and incentive compensation for directors within each firm-year observation. Rank correlations are zero for all firm-years in which firms either did not grant any director incentives or all directors received identical values of incentives, and thus only variable incentive structure firms are presented.

Year	Obs.	5th pctl	25th pctl	50th pctl	75th pctl	95th pctl	Mean
2006	1,243	-0.74	-0.15	0.32	0.61	0.87	0.21
2007	1,578	-0.73	-0.11	0.32	0.64	0.88	0.22
2008	1,522	-0.78	-0.18	0.31	0.65	0.87	0.20
2009	1,167	-0.77	-0.31	0.34	0.61	0.86	0.17
2010	1,099	-0.82	-0.34	0.35	0.61	0.83	0.15
2011	1,094	-0.78	-0.27	0.41	0.62	0.85	0.19
2012	1,093	-0.79	-0.26	0.41	0.62	0.86	0.19
2013	992	-0.78	-0.16	0.45	0.63	0.86	0.23
All	9,788	-0.78	-0.21	0.35	0.62	0.87	0.20

Table 3.3 - Comparison correlations for firms with variable incentives

Starting with the sub-sample of firm-years with variable incentive compensation structures, we classify firms based on their Spearman rank correlation. There are 3,452 variable incentive firm-year observations with a Spearman rank correlation that is less than or equal to zero, and there are 6,336 firm-year observations with positive Spearman rank correlations. This table provides annual averages of incentive percentage of total pay, market capitalization, and total director compensation for firms in each of these sub-samples. All dollar values are in 2013 U.S. dollars.

Panel A. Firms with Zero or Negative Rank Correlation

Year	Obs.	Average director incentives (% of total pay)	Average market cap (billions 2013 \$US)	Average director total pay (thousands 2013 \$US)
2006	416	54.92	11.18	197.18
2007	518	54.96	10.40	195.40
2008	532	46.14	6.91	182.69
2009	429	55.18	8.74	185.12
2010	424	58.00	10.40	208.57
2011	405	58.74	7.36	207.87
2012	395	59.12	10.93	208.89
2013	333	59.79	11.56	217.14
All	3,452	55.38	9.57	199.10

Panel B. Firms with Positive Rank Correlation

Year	Obs.	Average director incentives (% of total pay)	Average market cap (billions 2013 \$US)	Average director total pay (thousands 2013 \$US)
2006	827	48.88	10.75	196.34
2007	1,060	49.66	9.37	191.98
2008	990	49.57	5.40	186.47
2009	738	47.83	7.43	185.28
2010	675	48.96	9.46	194.85
2011	689	50.62	9.91	200.44
2012	698	50.27	10.41	201.17
2013	659	50.57	13.43	201.11
All	6,336	49.52	9.31	194.10

Table 3.4 - Contingency Analysis

This table presents contingency analysis based on firm classification and incentive alignment structure to examine the persistence of firm compensation strategy. Panel A compares firm incentive structure classification year-over-year changes for the full sample. Panel B compares Spearman rank correlation classification year-over-year changes for the sub-sample of firm-years with variable incentive structures. Because two years of data are necessary for these comparisons, the sample spans from 2006-2012 in these tables. Individual sub-class frequency and percentage of totals are given in the tables. Results of chi-square test for independence listed below.

Panel A. Firm Incentive Structure Class

Class in Year t	Year t Totals	Class in Year t+1			
		Missing	No Incentives	Equal Incentives	Variable Incentives
No Incentives	790 6.15%	54 6.84%	507 64.18%	81 10.25%	148 18.73%
Equal Incentives	3,257 25.36%	192 5.89%	70 2.15%	1,717 52.72%	1,278 39.24%
Variable Incentives	8,796 68.49%	443 5.04%	141 1.60%	1,620 18.42%	6,592 74.94%
Year t+1 Totals	12,843 100.00%	689 5.36%	718 5.59%	3,418 26.61%	8,018 62.43%
Chi-square	7,054				
p-value	0.00				

Panel B. Spearman Rank Correlation Class

Spearman Rank Correlation Year t	Year t Totals	Spearman Rank Correlation Year t+1		
		Missing	Correlation > 0	Correlation <= 0
Correlation > 0	5,677 64.54%	278 4.90%	3,255 57.34%	2,144 37.77%
Correlation <= 0	3,119 35.46%	165 5.29%	895 28.70%	2,059 66.01%
Year t+1 Totals	8,796 100.00%	443 5.04%	4,150 47.18%	4,203 47.78%
Chi-square p-value	687 0.00			

Table 3.5 - Test Sample Descriptive Statistics

The test sample originates with the base sample of 14,464 firm-year observations. Requiring full Compustat data items reduces this sample to 14,459 firm-year observations. This sample is used to identify all SDC listed acquisitions that occurred during the fiscal year for these observations. We use CRSP data to calculate the cumulative abnormal return (market adjusted) for each acquisition. This requires that bidder firms have at least 100 observations in the -210 to -11 day window leading up the announcement date of the acquisition. Our final testing sample contains 2,239 acquisitions filtered on the following criteria: the acquisition must have completed, the deal value must be at least \$1m as listed in SDC and at least 1% of bidder end of year market capitalization, bidding firms must control less than 50% of the target's shares prior to the acquisition, and bidders must own 100% of the target firm following the acquisition. Panel A reports the mean, median, and standard deviation of the variables measuring board size, market capitalization, average director total compensation, and the average percentage of total pay that is due to incentive compensation. Panel B reports descriptive statistics for the sub-sample of firm-year observations in which board members did not receive any incentive compensation. Incentive compensation is defined as the sum of the value of restricted stock, option, and non-equity incentive compensation as reported in Execucomp. Panel C reports descriptive statistics for the sub-sample of firm-years in which all directors receive identical positive values of incentive compensation for that firm-year. Panel D reports descriptive statistics for the sub-sample of firm-years in which directors receive variable positive values of incentive compensation for that firm-year. All dollar amounts are in 2013 U.S. dollars.

Panel A. Full Test Sample

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	288	8.29	8.00	2.89	10.31	2.47	28.73	189.68	153.31	192.63	49.28	50.11	22.80
2007	396	8.15	8.00	2.84	10.56	1.69	33.56	190.45	156.86	143.90	51.86	54.06	22.49
2008	306	8.02	8.00	2.66	5.13	1.19	15.13	190.25	174.66	125.73	51.42	52.07	21.77
2009	177	8.17	8.00	2.60	12.12	1.95	34.95	198.05	178.55	104.00	52.93	55.72	19.03
2010	274	8.70	9.00	2.61	12.64	2.66	28.12	204.52	194.48	100.70	51.16	52.87	20.03
2011	284	8.15	8.00	2.66	8.06	1.93	23.09	202.24	194.50	120.79	52.88	53.89	17.64
2012	284	8.27	8.00	2.38	6.03	1.74	12.63	197.63	185.38	93.90	53.30	52.37	16.71
2013	230	8.53	8.00	2.64	8.21	2.33	25.79	190.82	185.91	91.06	52.19	53.47	18.07
All	2,239	8.28	8.00	2.68	9.03	1.91	26.28	195.09	178.55	128.43	51.81	53.07	20.18

Panel B. No Incentive Test Sample

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	11	7.09	6.00	3.33	3.88	1.15	7.80	122.14	59.51	177.48
2007	18	8.94	8.50	3.28	2.05	1.17	3.17	85.07	67.05	60.20
2008	10	8.30	8.00	2.45	2.58	1.13	3.53	114.41	79.70	78.84
2009	3	8.33	9.00	2.08	57.12	3.92	95.33	74.61	39.07	92.98
2010	17	9.76	10.00	2.31	6.19	0.48	15.66	106.77	40.42	86.84
2011	8	8.25	8.50	1.83	26.95	2.12	68.25	94.11	70.51	70.86
2012	5	8.80	9.00	4.32	1.06	1.34	0.49	123.69	123.41	80.47
2013	9	9.44	9.00	3.09	23.39	1.72	65.40	110.09	86.44	84.85
All	81	8.74	9.00	2.90	10.04	1.22	35.90	103.95	69.88	93.95

Panel C. Equal Dollar Incentive Test Sample

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	41	7.05	7.00	2.59	5.53	1.93	8.02	187.96	166.70	116.58	47.20	46.61	21.20
2007	60	6.50	6.00	1.93	8.79	1.87	24.09	204.25	167.83	153.90	54.53	54.63	20.23
2008	44	7.16	6.50	2.87	9.03	0.89	27.68	220.10	181.66	227.00	49.67	47.84	24.20
2009	66	7.11	7.00	2.01	5.29	1.71	10.09	190.59	186.67	88.28	53.88	56.18	18.03
2010	94	7.60	7.00	2.53	9.39	2.14	15.90	212.02	198.81	89.83	56.57	54.44	12.93
2011	98	6.71	6.00	2.47	7.11	1.58	22.85	198.88	191.69	98.16	54.85	54.49	14.13
2012	85	7.00	7.00	2.18	5.74	1.59	10.11	201.38	187.08	98.28	55.06	55.05	15.03
2013	82	7.59	7.00	1.90	5.66	2.82	8.10	206.18	199.32	78.11	54.33	54.03	12.75
All	570	7.11	7.00	2.32	7.07	1.88	17.08	202.93	187.79	116.31	53.99	54.18	16.72

Panel D. Variable Dollar Incentive Test Sample

Year	Obs.	Board size			Market cap (billions 2013 \$US)			Average director total pay (thousands 2013 \$US)			Average director incentives (% of total pay)		
		Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.	Mean	Median	Std. dev.
2006	236	8.56	8.00	2.86	11.44	2.66	31.42	193.13	153.31	203.56	51.94	51.30	20.90
2007	318	8.42	8.00	2.86	11.37	1.71	35.91	193.81	160.94	143.25	54.29	55.72	19.85
2008	252	8.16	8.00	2.62	4.55	1.21	11.97	188.04	174.66	98.83	53.77	53.53	19.08
2009	108	8.81	8.50	2.73	15.05	2.60	41.03	206.04	182.00	111.22	53.82	56.25	17.83
2010	163	9.23	9.00	2.49	15.19	3.07	33.85	210.39	196.31	103.16	53.37	52.87	16.83
2011	178	8.94	9.00	2.47	7.73	2.08	19.11	208.96	198.92	131.41	54.17	54.93	16.06
2012	194	8.81	9.00	2.21	6.29	1.85	13.74	197.90	185.62	91.88	53.91	52.01	15.35
2013	139	9.04	8.00	2.83	8.73	2.22	28.24	186.98	182.62	95.82	54.30	54.17	16.17
All	1,588	8.67	8.00	2.67	9.68	1.99	28.32	196.93	179.40	132.35	53.67	53.74	18.22

Table 3.6 - Annual distribution of rank correlations for acquisitions by variable incentive firms  
This table reports the annual distribution of the Spearman rank correlation between cash compensation and incentive compensation for directors within each firm-year observation. Rank correlations are zero for all firm-years in which firms either did not grant any director incentives or all directors received identical values of incentives, and thus only variable incentive structure firms are presented.

Year	Obs.	5th pctl	25th pctl	50th pctl	75th pctl	95th pctl	Mean
2006	236	-0.74	-0.05	0.30	0.60	0.85	0.23
2007	318	-0.73	-0.05	0.37	0.65	0.87	0.25
2008	252	-0.80	-0.34	0.24	0.65	0.86	0.15
2009	108	-0.82	-0.48	0.15	0.61	0.86	0.11
2010	163	-0.82	-0.27	0.30	0.58	0.78	0.13
2011	178	-0.78	-0.21	0.49	0.68	0.89	0.25
2012	194	-0.77	-0.14	0.45	0.64	0.83	0.24
2013	139	-0.74	-0.21	0.46	0.61	0.90	0.24
All	1,588	-0.77	-0.17	0.37	0.62	0.86	0.21

Table 3.7 - Comparison correlations for acquisitions by variable incentive firms

Starting with the sub-sample of firm-years with variable incentive compensation structures, we classify firms based on their Spearman rank correlation. There are 536 acquisitions by firms with a Spearman rank correlation that is less than or equal to zero, and there are 1,052 acquisition by firms with positive Spearman rank correlations. This table provides annual averages of incentive percentage of total pay, market capitalization, and total director compensation for the acquisitions in each of these sub-samples. All dollar values are in 2013 U.S. dollars.

Panel A. Acquisitions by Firms with Zero or Negative Rank Correlation

Year	Obs.	Average director incentives (% of total pay)	Average market cap (billions 2013 \$US)	Average director total pay (thousands 2013 \$US)
2006	73	60.96	13.03	215.33
2007	95	56.12	13.65	198.44
2008	97	54.10	4.75	167.74
2009	43	58.34	20.50	199.48
2010	63	57.76	20.86	221.53
2011	56	60.48	6.45	210.63
2012	63	62.29	5.01	210.74
2013	46	62.64	10.60	195.74
All	536	58.53	11.32	200.47

Panel B. Acquisitions by Firms with Positive Rank Correlation

Year	Obs.	Average director incentives (% of total pay)	Average market cap (billions 2013 \$US)	Average director total pay (thousands 2013 \$US)
2006	163	47.91	10.72	183.19
2007	223	53.51	10.40	191.83
2008	155	53.55	4.43	200.75
2009	65	50.83	11.44	210.38
2010	100	50.61	11.62	203.36
2011	122	51.27	8.31	208.19
2012	131	49.88	6.90	191.73
2013	93	50.17	7.81	182.66
All	1,052	51.20	8.84	195.12

Table 3.8 - Summary statistics for test sample

The test sample contains 2,239 acquisitions made between 2006 and 2013 by firms in our base sample. This table presents the mean, median, and standard deviation of the variables used in our regression analysis. We use dummy variables to indicate a bidder firm's board compensation strategy as equal incentive, variable incentive, or no incentive. We include the natural log of the average director pay for the bidding firm, the coefficient of variation of total pay within the board of the bidding firm, the average percentage of total pay that is due to incentives for directors of the bidding firm, and the Spearman rank correlation between cash compensation and incentive compensation within the board of the bidding firm. To control for firm factors, we calculate the board size as the number of directors listed in Execucomp for the firm-year of the acquisition. We also include the market capital, calculated as the year end common stock price time shares outstanding from Compustat, as well as Tobin's q, free cash flow as a percentage of total assets, leverage, and the stock price runup during a 200 day window [-210,-11] prior to the acquisition. We additionally control for the deal characteristics of the acquisition, including the relative deal size, dummy indicators for high-tech industry firms, target status as public, private, or subsidiary, and dummy indicators for all-cash or partial stock acquisitions. Variable definitions can be found in the appendix. All variables have been winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile with the exception of the dependent variable (CAR), dummy variables, the Spearman correlations, and the average incentive percentage of pay for bidder directors.

Variable	Mean	Median	Std. dev.
Compensation Characteristics			
Equal incentives (dummy)	0.255	0	0.436
No incentives (dummy)	0.036	0	0.187
Log director pay	5.109	5.185	0.578
Director pay coefficient of variation	0.300	0.241	0.282
Average incentive pct. of pay	51.813	53.075	20.184
Spearman rank correlation	0.147	0.000	0.454
Bidder Characteristics			
Board size	8.275	8.000	2.683
Log market capitalization	7.739	7.556	1.516
CAR [-2,+2] (%)	0.956	0.709	6.709
CAR [-5,+5] (%)	0.998	0.652	8.701
Tobin's q	1.726	1.490	0.861
Free cash flow (% of total assets)	4.316	4.940	6.841
Leverage (%)	15.842	13.314	13.278
Stock price runup (%)	-0.013	0.000	0.206

Variable	Mean	Median	Std. dev.
Deal Characteristics			
Relative deal size	0.150	0.060	0.275
High tech (dummy)	0.358	0	0.479
Public target (dummy)	0.339	0	0.474
Private target (dummy)	0.578	1	0.494
Subsidiary Target (dummy)	0.078	0	0.268
All-cash deal (dummy)	0.563	1	0.496
Stock deal (dummy)	0.205	0	0.404

Table 3.9 - Regression Analysis - 5 Day Window

This table presents the result of our main regressions. The test sample contains 2,239 acquisitions by firms for which we have full director compensation, bidder financial, acquisition, and bidder return information from Execucomp, Compustat, SDC, and CRSP. All regressions use the 5-day cumulative abnormal (market adjusted) return as the dependent variable. Regression (1) includes only firm compensation strategy classification variables as independent variables, while Regression (2) adds a larger set of compensation based explanatory factors. Regressions (3) and (4) include our full set of bidder and deal characteristic control variables. Regression (5) contains results from a robustness test utilizing multi-year firm classification dummy variables. The reported p-values (in parenthesis below coefficients) based on robust standard errors adjusted for firm-level clustering. Observation, adjusted R-squared values, and other regression detail can be found below each model.

Dependent variable: CAR [-2,+2]	(1)	(2)	(3)	(4)	(5)
Compensation Characteristics					
Equal incentives (dummy)	0.975 (0.006)	1.079 (0.005)	0.824 (0.023)	0.963 (0.013)	
No incentives (dummy)	0.095 (0.875)	-0.063 (0.933)	0.073 (0.903)	-0.185 (0.804)	
Equal incentives (either year)					0.961 (0.012)
No incentives (both years)					0.693 (0.555)
Variable incentives to no incentives					-0.445 (0.710)
No incentives to variable incentives					2.339 (0.145)
Log director pay		-0.836 (0.007)		-0.688 (0.054)	-0.868 (0.047)
Director pay coefficient of variation		0.663 (0.253)		0.902 (0.113)	1.035 (0.104)
Average incentive pct. of pay		0.010 (0.289)		0.004 (0.689)	0.013 (0.298)
Spearman rank correlation		-0.440 (0.194)		-0.428 (0.198)	-0.537 (0.157)

Dependent variable: CAR [-2,+2]	(1)	(2)	(3)	(4)	(5)
Bidder Characteristics					
Board size			-0.024 (0.687)	-0.050 (0.411)	-0.053 (0.461)
Log market capitalization			-0.333 (0.003)	-0.160 (0.226)	-0.152 (0.340)
Tobin's q			0.422 (0.058)	0.400 (0.073)	0.444 (0.143)
Free cash flow (% of total assets)			0.021 (0.448)	0.019 (0.500)	0.021 (0.533)
Leverage (%)			0.023 (0.084)	0.022 (0.092)	0.027 (0.062)
Stock price runup (%)			0.332 (0.467)	0.253 (0.599)	-2.087 (0.093)
Deal Characteristics					
Relative deal size			0.423 (0.664)	0.607 (0.532)	0.481 (0.620)
High tech (dummy)			-0.516 (0.115)	-0.462 (0.171)	-0.690 (0.080)
High tech x relative deal size			-4.062 (0.020)	-4.152 (0.017)	-2.842 (0.185)
Public target x all-cash deal			0.328 (0.457)	0.329 (0.454)	0.335 (0.505)
Public target x stock deal			-2.308 (0.000)	-2.477 (0.000)	-2.523 (0.001)
Private target x all-cash deal			-0.661 (0.064)	-0.637 (0.073)	-0.532 (0.179)
Private target x stock deal			0.310 (0.642)	0.159 (0.813)	0.223 (0.775)
Subsidiary target x all-cash deal			1.091 (0.060)	1.092 (0.061)	0.972 (0.108)
Intercept	1.765 (0.000)	5.385 (0.000)	4.021 (0.000)	6.011 (0.000)	6.128 (0.002)
Number of obs.	2,239	2,239	2,239	2,239	1,834
Adjusted-R squared	0.41%	0.72%	3.60%	3.73%	3.47%
Fixed Effects	Year	Year	Year	Year	Year
Clustering	Firm	Firm	Firm	Firm	Firm

Table 3.10 - Regression Analysis - 11 Day Window

The test sample contains 2,239 acquisitions by firms for which we have full director compensation, bidder financial, acquisition, and bidder return information from Execucomp, Compustat, SDC, and CRSP. All regressions use the 11-day cumulative abnormal (market adjusted) return as the dependent variable. Regression (1) includes only firm compensation strategy classification variables as independent variables, while Regression (2) adds a larger set of compensation based explanatory factors. Regressions (3) and (4) include our full set of bidder and deal characteristic control variables. Regression (5) contains results from a robustness test utilizing multi-year firm classification dummy variables. The reported p-values (in parenthesis below coefficients) based on robust standard errors adjusted for firm-level clustering. Observation, adjusted R-squared values, and other regression detail can be found below each model.

Dependent variable: CAR [-5,+5]	(1)	(2)	(3)	(4)	(5)
Compensation Characteristics					
Equal incentives (dummy)	1.345 (0.003)	1.441 (0.003)	1.224 (0.007)	1.400 (0.005)	
No incentives (dummy)	0.616 (0.459)	0.896 (0.403)	0.481 (0.554)	0.696 (0.507)	
Equal incentives (either year)					1.299 (0.008)
No incentives (either year)					0.258 (0.862)
Variable incentives to no incentives					0.239 (0.890)
No incentives to variable incentives					3.377 (0.029)
Log director pay		-1.535 (0.000)		-1.570 (0.003)	-1.710 (0.005)
Director pay coefficient of variation		0.405 (0.597)		0.705 (0.372)	0.694 (0.448)
Average incentive pct. of pay		0.027 (0.036)		0.023 (0.095)	0.030 (0.072)
Spearman rank correlation		-0.265 (0.510)		-0.284 (0.473)	-0.270 (0.549)

Dependent variable: CAR [-5,+5]	(1)	(2)	(3)	(4)	(5)
Bidder Characteristics					
Board size			-0.027 (0.735)	-0.048 (0.553)	-0.079 (0.413)
Log market capitalization			-0.340 (0.047)	-0.012 (0.954)	0.151 (0.534)
Tobin's q			0.291 (0.330)	0.217 (0.475)	-0.003 (0.994)
Free cash flow (% of total assets)			0.029 (0.456)	0.025 (0.516)	0.026 (0.551)
Leverage (%)			-0.011 (0.520)	-0.010 (0.566)	-0.002 (0.925)
Stock price runup (%)			0.616 (0.425)	0.490 (0.552)	-3.287 (0.138)
Deal Characteristics					
Relative deal size)			1.524 (0.136)	1.823 (0.077)	1.675 (0.097)
High tech (dummy)			-0.649 (0.133)	-0.564 (0.202)	-0.774 (0.126)
High tech x relative deal size			-5.585 (0.001)	-5.752 (0.001)	-3.962 (0.042)
Public target x all-cash deal			-0.263 (0.673)	-0.294 (0.636)	-0.086 (0.905)
Public target x stock deal			-2.194 (0.005)	-2.441 (0.002)	-2.547 (0.005)
Private target x all-cash deal			-0.644 (0.177)	-0.608 (0.200)	-0.353 (0.508)
Private target x stock deal			0.195 (0.802)	-0.082 (0.918)	0.222 (0.811)
Subsidiary target x all-cash deal			1.470 (0.065)	1.482 (0.063)	1.217 (0.149)
Intercept	1.084 (0.036)	7.421 (0.000)	4.142 (0.003)	8.475 (0.000)	7.800 (0.002)
Number of obs.	2,239	2,239	2,239	2,239	1,834
Adjusted-R squared	0.22%	0.83%	2.29%	2.65%	1.83%
Fixed Effects	Year	Year	Year	Year	Year
Clustering	Firm	Firm	Firm	Firm	Firm