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CEO Compensation and Board Structure*

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In response to the corporate scandals in 2001-2002, the major U.S. exchanges came up with new director and committee independence requirements which are intended to enhance board oversight. We use this regulation event to shed light on the effect of board structure on CEO compensation. We find that firms that were not complying with these requirements decreased their CEO compensation by between 20%-25% upon compliance, compared to firms that were already complying with them. The significant decrease in compensation is due to a decrease in the option-based portion of the compensation. The results suggest that board structure is a significant determinant of the size and structure of CEO compensation.

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The unprecedented levels of executive compensation in recent years have been a source of considerable debate (e.g., Bebchuk and Fried 2003, 2004; Hall and Murphy, 2003; Spatt, 2006; Jensen et al. 2004; Bebchuk and Grinstein, 2005). Some critics of these compensation schemes put the blame on the board of directors. They argue that inefficiencies in the structure and operation of boards lead to ineffective negotiation process which leads to too-large compensation packages and inefficient incentive schemes (Bebchuk and Fried 2003, 2004).

How important is the structure of the board of directors in setting CEO compensation? In what ways does the structure of the board affect compensation decisions? The purpose of this article is to examine these questions. We use the new U.S. legislations as a unique laboratory to shed light on this issue. As a response to the corporate scandals in the U.S. in 2001-2002, the Sarbanes Oxley law and the legislations of the major exchanges have put in place new restrictions on the structure and operations of boards. The main provisions of these rules include new director nomination processes so that nomination of new directors is done by independent directors only, requirements for director independence on the compensation and audit committees, and a requirement for a majority of independent directors on the board.

The legislation has affected different corporate boards in different ways. Some boards have been already complying with the rules even before they were announced (the unaffected group), while others were not complying with the rules and had to change their board structure (the affected group). Using the difference in differences approach, we test whether CEO compensation arrangements in the affected group have changed

upon compliance with the rules, compared to changes in the compensation arrangements in the unaffected group.

We find that the affected group has significantly decreased the CEO compensation upon compliance with the rules, compared to the unaffected group. The decrease is in the order of 20%-25%, after taking into account performance, size, industry effects, and other variables that changed during that time and that affect compensation. Moreover, from all the different provisions, the one provision of the rules that made a significant impact on the compensation is the requirement for a majority of independent directors on the board.

We also look into the effect of board structure on the different components of executive compensation. We find that the significant relative drop in the compensation comes from the decrease in the equity-based portion of the compensation, particularly the decrease in option grants.

This study belongs to a long line of studies which looks at the effect of board structure on executive compensation, (e.g., Yermack, 1996; Angbazo and Narayanan, 1997; Hallock, 1997; Core, Holthausen, and Larcker, 1999; Cyert, Kang and Kumar, 2002; Vafeas, 2003; Bertrand and Mullainathan, 2004; and Grinstein and Hribar, 2004). By and large, these studies show that, controlling for the economic determinants of executive compensation, board structure does help explain cross-sectional variation in CEO compensation. However, such evidence is often criticized as being inconclusive, since board structure is an endogenous variable, determined by unobservable firm and CEO characteristics which, in turn, determine CEO compensation (e.g., Thorburn, 1997; Hermalin and Weisbach, 2003).

Unlike the above studies, this study looks at the effect of director regulation on executive compensation. A look at a regulation event helps mitigating the endogeneity problem, since changes to board structure can often be attributed to the rulings rather than to unobservable firm and CEO characteristics. By using the difference-in-differences approach we also control for any economic shocks that occurred during the legislation event and that could have affected the compensation levels in all firms.

The rest of the study continues as follows. In the next section we describe the empirical literature on board and compensation and the recent legislations. Section II describes the data and the variables. Section III has the results and Section IV has the robustness tests. Section V provides a discussion and section VI concludes.

I. Review of the literature and recent legislations

In most public corporations, compensation decisions are made by the board of directors, who is the representative of the shareholders. Several scholars have pointed to the potential agency conflicts that directors face when making decisions such as compensation decisions. For example, Fama (1980), and Fama and Jensen (1983), argue that compensation decisions should be delegated to outside directors, (directors who do not work for the firm or have an affiliation with the officers of the firm), so that they can make unbiased judgments about the quality of the CEO and make efficient compensation, hiring, and firing decisions. Jensen (1993), argues that there are major problems with the quality of monitoring by board members in public U.S. firms. These problems arise because CEOs in public U.S. firms have a great influence over the nomination of new directors and directors who are nominated by the CEO feel obligated to the CEO.

Directors also have often very little time to monitor managers effectively, and in many cases they have very little stake in the corporation. Jensen also argues that CEOs often control the board agenda, making it even harder to question them, and boards are often very large, creating coordination problems among directors.[1] Bebchuk and Fried (2003, 2004) argue that such problems have a significant effect on compensation arrangements and that lack of board oversight could lead to suboptimal compensation arrangements such as overcompensation. Spatt (2006) also points to the agency conflict of directors and argues that giving boards incentive compensation could make them become more engaged.

Several studies have shown that board structure explains cross sectional variations in CEO compensation. For example, Hallock (1997) looks at Forbes 500 firms in 1992 and finds that when the board has directors with interlocking relations (i.e., the CEO of company A sits on the board of company B and the CEO of company B sits on the board of company A), the compensation to the CEO is higher. Core, Holthausen, and Larcker (1999), look at the level of compensation to CEOs in large U.S. firms in the mid 1980's and they find that the level of CEO compensation is higher when the CEO is involved in the nomination of new directors, when the percentage of affiliated directors on the board is higher, when there is no director who holds a substantial stake in the firm, when the CEO is also the chairman of the board, and when the number of directors on the board is larger. They find that each of the above variables is significantly positively related to the level of CEO compensation. Cyert, Kang, and Kumar (2002), look at the determinants of

[1] For supporting evidence of managerial power over the nomination decisions of directors, see, for example, Shivdasani and Yermack (1999). For supporting evidence of the adverse effect of busy directors on firms see, for example, Fich and Shivdasani (2005). For supporting evidence of the adverse effect of large boards on firms, see, for example, Yermack (1996).

executive compensation in the early 1990's in a large sample of U.S. public firms and they find that CEOs who are also the chairmen of their boards receive higher compensation. Grinstein and Hribar (2004) look at the effect of CEOs' board power on the levels of the bonuses they receive for acquiring other firms. They find that the level of the bonus is higher when the CEO is involved in the nomination process of new directors and when the CEO is also the chairman of the board.

While the association between board structure and compensation practices is by and large established in the above literature, it is harder to establish from that literature that board structure has a causal effect on compensation practices. The reason is that compensation practices and board structure are both endogenous variables determined by (possibly unobservable) firm and CEO characteristics. To illustrate this endogeneity problem, consider, for example, the model of Hermalin and Weisbach (1998) which explains the determinants of board structure. According to their model, managerial talent increases managerial bargaining power over the filling of vacancies on the board of directors. Thus, firms in which CEOs are more talented will tend to have directors that are more linked to the CEO. But since talent is a variable that determines compensation, we should observe a positive relation between linked directors on the board and compensation levels. Yet, this association does not imply that board structure affects compensation decisions. To establish such association, one has to control for the talent variable. But since talent is a partly unobservable variable, one has to make implicit assumptions about the relation between observable CEO and firm characteristics and talent. The accuracy of the tests will crucially depend on the validity of these assumptions.

In this study, we use a U.S. legislation event to overcome this identification issue. In structure, our study is reminiscent of Bertrand and Mullainathan (1999), who study the effect of anti-takeover legislations on executive compensation. We, however, focus on the effect of board structure on executive compensation. Since our study looks at the effect of an external intervention to board structure on executive compensation, the endogeneity problem is mitigated.

In February, 2002, two months after the Enron scandal, the SEC chairman at that time, Mr. Harvey Pitt, requested that the NYSE and NASDAQ look for ways to improve their governance listing standards.[2] In response, NYSE and NASDAQ came up with proposed changes which they sent to the SEC in August 2002 (NYSE) and October 2002 (NASDAQ). The SEC approved these proposals with minor changes in November 2003.[3]

The main provisions of the final NYSE rule are:[4]

1. All firms must have a majority of independent directors.

2. Independent director is a director that has no material relationship with the listed company (directly, or as a partner, shareholder, or officer of an organization that has a relationship with the company) (NYSE 303A.1). In addition, the rules point to certain director ties that disqualify board members from being independent, such as current employees or recent former employees of the firm, family affiliation with the executives of the firm, substantial business ties with the firm, or family affiliation with persons that have such ties with the firm. In general, a director is considered affiliated until three years after the termination of such affiliation.

3. The compensation committee, nominating committee, and audit committee shall consist of independent directors.[5]

[2] Security and Exchange Commission press release 2002-23.
[3] Security and Exchange Commission, release no. 34-48745.
[4] NASDAQ and AMEX followed with similar rulings. NASDAQ relaxes some of the NYSE provisions to fit smaller firms. The main difference is that it also allows the compensation and nomination decisions to be held by a majority of independent directors without a formal committee, and it permits in special circumstances one non-independent board member to participate in these decisions.

[5] The Sarbanes Oxley law also requires independence of the audit committee.

4. All audit committee members should be financially literate. In addition, at least one member of the audit committee would be required to have accounting or related financial management expertise.

5. Separate executive sessions: The board should hold regular sessions without management in addition to the full-board sessions.

The aim of the above rules is to ensure efficient monitoring by corporate directors, and the rules should, arguably, reduce the influence that the manager has over the board of directors. For example, the requirement for an independent nominating committee and the requirement for a majority of independent directors on the board should reduce managerial influence over the nomination of new board members and should reduce the obligation that directors feel towards the CEO. The requirement for an independent compensation committee should further remove any influence of the CEO or affiliated directors on compensation decisions. The requirement for an audit committee, while not directly related to compensation decisions, might mitigate the ability to conceal lucrative compensation arrangements from an accounting perspective.

According to the arguments of Bebchuk and Fried (2002, 2003) and Jensen (2003), these requirements should distance the directors from the CEO and will allow directors to have a harder bargaining position vis-à-vis the CEO. Thus, we should observe a reduction in the compensation levels to firms that have not been complying with the rules.

The NYSE and NASDAQ have required firms to adopt these requirements until their first annual meeting after 1/15/2004 but not later than 10/31/2004. Firms with classified boards were given until the second annual meeting but not later than 12/31/2005 to comply with these requirements.

II. Data, Variables, and Methodology

A. Data

Our data source for executive compensation is the Execucomp database, which has all compensation information about firms that belong to the S&P 1500 index, or that once belonged to this index. Our data source for board structure and director information comes from the Investor Responsibility Research Center database (IRRC), which was recently bought by the Institutional Shareholder Services (ISS) company. The database includes information about directors in firms that belong to the S&P 1500 index. In particular, the database has information about whether the director is independent, and whether the director serves on any of the three main committees (nominating, compensation, and audit committees).[6]

Our analysis spans the years 2000-2004. We use the Execucomp database for the years 2000-2004, and director information data for the years 2000 (before the rulings), 2003, and 2004 (after the rulings). To ensure that we do not capture changes in compensation due to firms entering and leaving the samples, and that the firms are subject to the rules, we include in the analysis only firms that existed in these two databases for the entire period, and are members of the NYSE, NASDAQ, or AMEX. We

[6] IRRC defines an independent director as a director who is neither affiliated nor is currently an employee of the company. An affiliated director is defined as a director who has one of the following characteristics: a former employee of the company or of a majority-owned subsidiary; a provider of professional services—such as legal, consulting or financial—to the company or an executive; a customer of or supplier to the company; a designee under a documented agreement between the company and a group, such as a significant shareholder**;** a director who controls more than 50% of the company's voting power (and thus, would not be considered to represent the broader interests of minority shareholders); a family member of an employee; an interlocking directorship or an employee of an organization or institution that receives charitable gifts from the company. This definition closely follows that of the SEC. However, it is somewhat more restrictive, since it considers business ties or former employment in the firm even if they occur more than three years back.

retrieve financial information for each of the firms from Compustat. Our final sample has 940 firms. All variables are adjusted for inflation using 2002 as the base year.

B. Variables

To measure the level of board compliance with the new regulations we look at four different compliance characteristics. These characteristics are whether the firm had before the rulings an independent nominating committee, an independent compensation committee, an independent audit committee, and a majority of independent directors on the board of directors.[7]

Our dependent variable of interest is the compensation to the CEO. We use the total compensation variable, which includes base salary, bonuses, options (Black Scholes value), restricted stocks, and other compensation. This variable is referred to as TDC1 in the Execucomp database. We also separately look at the equity-based compensation, the option compensation, and the cash-based compensation. The equity-based compensation is defined as the total value of options (Black Scholes value) and restricted stock to the CEO, and the cash based compensation is the total compensation to the CEO minus the equity-based compensation.

We use several control variables in the different tests. To control for firm size we use the sales of the corporation (in $millions). To control for performance we use two measures. The first measure is the annual stock return (dividends reinvested) of the firm. The second measure is the return on assets, which is defined as the net income before extraordinary items divided by the book value of assets. To control for CEO tenure, we

[7] These measures were also used by Chhaochharia and Grinstein (2006).

use a dummy variable NEW CEO that equals 1 if the CEO served less than 2 years. Finally, we include industry dummies, using the Fama and French (1997) 48 industry classification.

Table 1 shows summary statistics of firms in our sample for each of the years 2000-2004. Panel A shows the financial characteristics of the firms. Average sales are around $6 billion, increasing to about $7 billions in 2004. Median sales are much lower (in the order of $1.7 billion). The difference between the average and median sales suggest that the sample is skewed by several very large firms. Consistent with the downturn in the economy between the years 2000-2002 and the upturn between the years 2003-2004, market value has decreased between 2000-2002 and then increased between 2003-2004. Returns on assets and stock returns also show a similar pattern.

Table 1 panel B shows information about the compensation of CEOs in our sample. Average total compensation is $9.6 million in 2000 and then drops to $6.3 million in 2002 and to $5.5 million in 2003. The average compensation increases to $6.18 million in 2004. Median compensation, however, almost does not change over the years and is between $3 million and $4 million throughout the years. Average equity-based compensation has decreased significantly over the years from $7.3 millions in 2000 to $3.4 million in 2004.

C. Methodology

C.1 Determining when the rules took effect

Our goal is to compare compensation practices before the rules to practices after the rules. However, determining when exactly the rule had an effect on firms is non-

trivial. The legislation process started in August of 2002 with the proposed rules of NASDAQ and NYSE. It then took over one year for the SEC to approve these proposals. Once the rules were approved, firms were given time to comply with the rules until October of 2004, (firms with staggered boards could wait until 2005).

Although firms were not formally required to comply with the rules until 2004, the publication itself of the proposed recommendations has probably lead many firms to start complying already in 2003. Previous studies show that once recommendations are publicized, firms start adhering to them, even if they are not mandatory. For example, Dahya, Mcconnell, and Travlos (2002) who look at the effect of the recommendations of the Cadbury committee of corporate governance reforms in England, document a structural break in compliance upon the release of the recommendation.

To further explore when corporations started adhering to the rules, we check which of the years (2003-2004) represents a turning point in compliance. To that end, we compare the fraction of firms that were complying with the different provisions of the rules between 2000 and 2004. Since we do not have data for the years 2001 and 2002, we randomly select 100 firms from our sample and read their proxy statements in the years 2001, 2002 to determine their status of compliance for those years. We present the summary statistics of the board characteristics in table 1 panel C.

Overall, we see an increase in the percentage of firms in the sample that have independent nominating, compensation, and audit committees, and in the percentage of firms that have a majority of independent directors. Between 2000 and 2004, the percentage of firms with independent nominating committee has increased from 28% to 73%, the percentage of firms with independent compensation committee has increased

from 71% to 82%, the percentage of firms with independent audit committee has increased from 63% to 83%, and the percentage of firms with a majority of independent directors has increased from 73% to 88%. All of these increases are statistically significant at the 1% level. The score, which is defined as the sum of the four indicator variables for whether the firm has an independent compensation, nomination, and audit committees and for whether the firm has a majority of independent directors on the board, has also increased from 2.36 in 2000 to 3.26 in 2004, and the percentage of firms that have a score of 0 (not complying with any of the requirements) has decreased from 12% to 4% between 2000 and 2004.

Table 1 also shows that the year 2003 has been a turning point in terms of compliance with the rules. Between the years 2002 and 2003 there has been a significant increase in the percentage of firms with an independent nominating committee, with a majority of independent directors, and with an independent audit committee. In contrast, there are no significant changes in compliance between the years 2001-2002, or between the years 2000-2001. This evidence suggests that firms moved towards compliance in 2003, after the proposals of the rules were announced by the exchanges.

Other characteristics that have changed are average board size. The size of boards decreased in recent years from 9.74 to 9.36, and the percentage of firms in which the CEO is a member of the nominating committee or that there is no nominating committee decreased significantly from 52% to 3%. Unlike the significant trends in board and committee independence, there is no significant change in the percentage of firms that have a chairman CEO. In 2004, 64% of the firms in the sample have a CEO who is also the chairman of the board.

C.2. Specifications

We hypothesize that if board and committee independence have an effect on CEO compensation, then the changes in board structure and director responsibilities in response to the new rules should have an effect on CEO compensation. To test this hypothesis, we need to construct a measure of the level of board compliance with the rules before the rules were announced.

One way to measure whether boards were compliant is to use the score that summarizes the extent to which boards are compliant with the board provisions. The drawback of the score, however, is that it assigns ad-hoc weights to the different provisions. To the extent that certain provisions of the rules are more important than others in affecting compensation decisions, the score will not capture the true level of compliance. For example, if the requirement for a majority of independent directors is the most important provision, then firms that comply only with this provision might have stronger board oversight than firms that comply instead with the requirements for independent audit committee and compensation committee even though their score will be lower.

We therefore choose a different strategy in this study. First, to reduce these potential biases, and to increase the power of our tests, we define non-complying firms as firms that do not comply with any of the provisions (have a score=0). Table 1 shows that about 12% of the firms in the sample did not comply with any of the provisions in the year 2000. The advantage of focusing on these firms is that regardless of the weights that we assign to the different provisions, these firms will have the same score, and therefore

the same level of compliance.[8] We show the results of this analysis against CEO total compensation in section IIIA, and against each of the components of the CEO compensation in section IIIB.

Second, we analyze the individual effect of each of the provisions to understand their relative importance. We analyze the effect of each provision of the rules in section IIIC.

To get a sense of how firms that have score=0 differ from the rest of the firms, we show, in panels D and E, financial and compensation statistics of firms in the sample, where we separate the sample to firms with score=0 in the year 2000 and score>0.

Panel D shows that the group of firms with a score=0 in 2000 have smaller average sales and smaller average assets in place. Their average sales in 2000 is $5.098 billion, compared to $6.403 billion in the rest of the firms, and their average assets in place is $8.616 billion compared to $14.64 billion in the rest of the firms. At the same time, average ROA, average stock returns, and average market capitalization are higher in firms with score=0 in the year 2000. However, none of the differences above is statistically significant. Panel D also shows that, overall, average size and performance of firms with score=0 are not statistically different from those with a score>0, except for the year 2004, where average stock return of the group score=0 is significantly smaller than that of the group score>0 (14.3% vs. 20%).

Table 1 panel E shows the compensation variables across the two compliance groups. Average compensation to firms with score 0 is similar to the average compensation of firms with a positive score in the year 2000. The difference in

[8] We believe that such a test is more accurate than using an index, but we also ran the tests using the actual score. The use of an actual score does not change any of our results.

compensation between the two groups is not statistically significant except for the year 2004, where it becomes significantly lower. Equity compensation and option-based compensation also follow a similar pattern.

III. Results

A. Changes to total compensation

We use two regression specifications for our tests. The first specification is a fixed effect regression which explains the levels of CEO compensation. This specification is often used to analyze effects of regulations (Meyer 1995). For that specification we include the panel of firms in the years before the regulations (2000-2002) as well as after the regulation (2003-2004). We then run a panel regression to test whether compensation to CEOs who were more affected by these regulations decreased in the years 2003-2004 compared to the compensation of CEOs who were less affected by them. To that end, we include in the right hand-side of the regression a dummy variable that equals 1 in the years after the regulations if the firm had a score=0. Our control variables are firm fixed effects, year effects and other firm characteristics that change over time and which have an effect on CEO compensation. This specification is formally shown in equation (1).

$$COMP_{it}=a_0 + a_1SALES_{it-1} + a_2ROA_{it-1} + a_3RET_{it-1} + [\text{Year Dummies}] + a_4\text{Dummy2003\_2004}*\text{Score0}_i + a_5\ \text{NEW CEO}_{it} + v_i + \varepsilon_{it} \quad (1)$$

The variable COMP is the natural log of CEO total compensation in year t, SALES is the natural log of total sales, ROA is the natural log of one plus the return on assets, and RET is the natural log of the gross stock return. Dummy2003_2004*Score0$_i$ is an interaction dummy that is composed of Dummy2003_2004, which equals 1 if the year is either 2003 or 2004 and zero otherwise, and Score0, which equals 1 if the firm did not comply with any of the requirements (score=0) in the year 2000 (before the rules). NEW CEO is a dummy variable that equals 1 if the CEO tenure in the firm is less than two years. The variable v_i is a firm-level fixed effect.

If indeed compliance with the rules is going to decrease compensation, then firms that did not comply with the rules are going to decrease their compensation after the rules more than other firms. This prediction would mean that we should expect the a_4 coefficient to be significantly negative.

Table II column 1 shows the results of regression (1). As expected, size and performance have a significant positive effect on compensation. The dummy for the year 2000 is also significantly positive, suggesting that compensation in the year 2000 is also significantly higher than in the rest of the years.

The interaction dummy is marginally negative (10% significance level), with a coefficient of -0.092. This result suggests that firms with the lowest board score had decreased the compensation to their CEOs more than other firms. Since this is a log-log regression, the coefficient suggests that firms that did not comply with the rules had a drop in their compensation of 9% compared to other firms.[9]

[9] When the explanatory variable is continuous, then the coefficient represents the drop in compensation for a 1% drop in the explanatory variable. Since the dummy variable is not continuous, the coefficient represents approximately the drop in the compensation for a change in the dummy variable from 0 to 1.

We note that firms with a score=0 should decrease their compensation only to the extent that they changed their board structure in the years 2003-2004. If they did not change their structure, then we should not observe a decrease in compensation. The results in table 1 suggest a drop of 7% in the firms with a score=0 from 2000 to 2003. Thus, we should expect a decrease in compensation mostly for the group that became more compliant by 2003 than for the rest of the group.

To test this hypothesis we decompose the interaction term Dummy2003_2004*Score0$_i$ in regression (1) into Dummy2003_2004*Score0_Changed and Dummy2003_2004*Score0_Not_Changed. The variable Score0_Changed is a dummy variable that equals 1 if the firm had a score of 0 in the year 2000 but has improved in 2003. The variable Score0_Not_Changed is a dummy variable that equals 1 if the firm had a score of 0 in the year 2000 but has not improved by 2003. If the rules indeed have an effect on the compensation, then we should expect the coefficient of the group that changed to be larger in absolute values and more significant than the coefficient of the group that did not change.

Table II column 2 shows the results with the decomposition of the interaction term. Table II column 2 shows that when the interaction term is decomposed, only the interaction term of firms that became more compliant is significantly negative. Firms that did not change their governance structure did not experience a significant decrease in compensation compared to other firms. The coefficient of the dummy variable is significant at the 5% level, and is also larger than before. The coefficient suggests that firms that did not comply with the rules had a drop in their compensation of about 12%.

The sample used for the regression includes all firms that existed between 2000 and 2004. These firms include both firms whose CEO stayed throughout the period, and firms that replaced their CEO during that time. Thus, it could be that the NEW CEO dummy does not fully capture the effect of new CEOs on compensation and instead we capture a change-in-CEO effect in the interaction dummy. We therefore also run the regression above on the subsample of firms that did not replace their CEOs. This requirement reduces the sample size from 940 to 366. We show the regression results in this sample in table II columns 3 and 4.

The results are much stronger when we consider only firms in which the CEO has not been replaced. The coefficient of the interaction dummy is -0.209 and is significant at the 1% level. When we decompose the interaction dummy we find that all of the effect is coming from the firms that changed their governance structure. The coefficient is -0.249 which suggests a relative drop in the order of 25%.

The results in table II suggest that the rules had an effect on executive compensation. Firms that did not comply with the rules decreased their compensation by as much as 20%-25% upon compliance, more than firms that did comply with the rules.

The advantage of the above specification is that it includes firm fixed effects, and so it controls for any unobservable firm characteristics that affect executive compensation. However, it is still possible that our results capture industry shocks not related to the passage of the rules. For example, it is possible that certain industries experienced supply or demand shocks for managerial talent, and in those industries the compensation has decreased. Since board structure differs across industries (Chhaochharia and Grinstein

2004), we might be capturing an industry effect to the changes in the levels of compensation.

Another potential problem with the above specification, is that of correlations in errors. Bertrand, Duflo, and Mullainathan (2004) show that the difference-in-differences approach sometime suffers from correlation in errors, which results in overestimated t-statistics of the coefficients.

To overcome these shortcomings, we introduce another specification. In this specification we average the firm-level data in the two periods: pre- and post rule. We then regress the changes in average compensation from before the rules until after the rules on the dummy variable score=0, on levels and changes-in-levels of the control variables between the two periods and on industry dummies. The advantage of this specification over the previous one is that it controls for different drops in compensation across industries. Bertrand, Duflo, and Mullainathan (2004) also recommend this method to mitigate the correlation-in-error problem. This specification is presented in regression (2).

$$COMP_{i2003\text{-}2004} - COMP_{i2000\text{-}2001} = a_0 + a_1 SALES_{i1999\text{-}2000} + a_2 ROA_{i1999\text{-}2000} \quad (2)$$
$$+ a_3 RET_{i1999\text{-}2000} + a_4 (SALES_{i2002\text{-}2003} - SALES_{i1999\text{-}2000}) + a_5 (ROA_{i2002\text{-}2003} -$$
$$ROA_{i1999\text{-}2000}) + a_6 (RET_{i2002\text{-}2003} - RET_{i1999\text{-}2000}) + a_7 Score0_i + a_8 \text{ NEW } CEO_i$$
$$+ [INDUSTRY\ DUMMIES] + \varepsilon_i$$

The variable $COMP_{i2000\text{-}2001}$ is the natural log of the average compensation to the CEO over the years 2000-2001, $SALES_{i2000\text{-}2001}$ is the natural log of the average sales over these years, $RET_{i2000\text{-}2001}$ is the natural log of one plus the average gross return over these years and $ROA_{i2000\text{-}2001}$ is the natural log of one plus the average return on assets

over these years. For variables with subscripts 2002-2003, and 2003-2004, the averaging is over the years 2002-2003 and 2003-2004 respectively.

If indeed board oversight is going to affect compensation, then firms that did not comply with the rules are going to decrease their compensation after the rules more than other firms. This prediction would mean that we should expect the a_7 coefficient to be significantly negative.

Table III shows the results of regression (2) on the sample of 366 firms that did not replace their CEOs throughout the years 2000-2004. Column 1 shows that the coefficient of the dummy variable Score0 is -0.18 and is significantly negative at the 5% significance level. This result means that firms that were not complying with the rules have decreased their compensation by about 18% more than other firms. Table III column 2 shows the results where the score dummy is decomposed to a dummy of firms that changed their board structure and firms that did not change the structure. All of the effect is concentrated in firms that changed their board structure. The coefficient is -0.203 and is significantly negative at the 5% significance level. This coefficient implies that the drop in the compensation of the firms that were affected is in the order of 20%.

B. Changes to the different components of the compensation

Our next step is to explore which of the compensation components is affected by the rules. Much of the criticism over compensation practices focused on the excessive and inefficient use of stock options (e.g., Hall and Murphy, 2003; Jensen et al., 2004; Bebchuk and Fried, 2003). For example, Bebchuk and Fried (2003) argue that powerful CEOs are likely to manipulate their compensation schemes in ways that are least

transparent, in order to avoid shareholder rage. Spatt (2006) argues that too-much option-based compensation distorts incentives of CEOs towards excessive risk taking. According to these arguments, if independent boards are more effective monitors, then they will decrease these portions of the compensation.

To test which component of the compensation is affected, we repeat the analysis in section I, but this time we separately run the regressions once with the cash-based portion of the compensation as the dependent variable, and once with the equity-based portion of the compensation as the dependent variable.

Table IV shows the results where the dependent variable is the natural log of the cash-based component of the compensation. Panel A shows the results of the fixed-effect regression. The results show no significant drop in the cash portion of the compensation both in the entire sample (column 1) and in the sample of CEOs that were not replaced (column 2). The results are similar when we run the change-in-compensation regression (panel B). The Score0 coefficient is insignificant.

Table V shows the results where the dependent variable is the equity-based component of the compensation. The fixed effect regression shows a significantly negative coefficient of the interaction dummy of firms that changed their structure. The coefficient is -0.564 in the sample of all firms, and -0.65 in the sample of firms that did not replace their CEOs. Both coefficients are significant at the 5% level. The magnitude of the coefficient suggests that the decrease in equity-based compensation was in the order of 56% - 65%.

We obtain similar results when we consider the change in compensation regression (panel B). The results show a significantly negative coefficient of the interaction dummy of firms that changed their board structure.

Overall, the results suggest that firms that were less compliant reduced the equity portion of the compensation rather than the cash portion of the compensation.

Since most of the change in compensation occurred in the equity-based compensation, it is natural to explore which of the components of the equity-based compensation has decreased. We therefore decompose the equity-based compensation into option-based and stock-based compensation, and use each one separately as the dependent variable.

Table VI shows the results where the dependent variable is the natural log of one plus the option-based compensation. The fixed effect regression in panel A shows a significant effect (at the 10% level) on Dummy03_04*Score0_Changed when all firms are considered (coefficient of -0.472), and negative and insignificant effect when only the firms that were not replaced are considered. The change-in-compensation regressions also show a significant negative effect (at the 10% level).

Table VII shows the results of the stock-based compensation. The fixed-effect regression (panel A) shows that the coefficient of the interaction dummy is negative but insignificant in either case. The change in compensation regression (panel B) shows also negative but insignificant effect on the change in compensation.

Overall, the results suggest that the driver for the drop in the compensation in firms that became compliant is the drop in the option-based compensation. However, the

results are only marginally significant, and the negative effect appears also in the stock-based component of the compensation.

C. Effect of the different provisions of the rules on compensation

In the previous section we noted that different provisions of the rules could have different effect on board oversight and therefore on compensation. To illustrate the complexity of the issue, consider the provision for an independent compensation committee. Boards often delegate compensation decisions to a committee, and therefore, if board structure has an effect on compensation, it is natural to expect the composition of the compensation committee to have an effect on compensation. However, even if the committee itself is composed of independent directors, if the nomination process is influenced by the manager, the committee itself will not be truly independent. Moreover, if the majority of the directors are captured by management, then they might delegate personnel to these committees that might look independent, but would instead be captured by management.

To further analyze the effect of each provision, we perform two tests. First, we analyze each provision in isolation. We run the regressions in the previous section, but this time we separately analyze firms that did not confirm with each of the provisions: majority of independent directors, independent compensation committee, independent nominating committee, and independent audit committee. Second, we analyze all the provisions in one regression, controlling for the correlation across provisions.

Since our previous results suggest that the least noisy sample is the one where the CEO was not replaced, we run our tests on that subsample of firms.

In our first test, for each of the provisions, we construct a dummy variable which equals 1 if the firms did not confirm with the provision in the year 2000 but has become compliant by 2003, and run the regressions (1) and (2) with these dummy variables. We present the results in table VIII. Panel A shows the fixed-effect regression and panel B shows the change-in-compensation regression.

Table VIII shows that the majority-of-independent provision has a significant effect on compensation. Both the fixed-effect regression and the changes-in-compensation regression show that compliance with the majority provision is associated with a drop of about 20% in the compensation (column 1 in panel A and panel B). The audit committee provision is significantly negative in the fixed-effect regression but is not significant in the change-in-compensation regression (column 2). The nomination committee coefficient and the compensation committee coefficient are not statistically significant than zero in any of the panels (columns 3 and 4).

We also see that when we combine all the provisions into one regression, the only coefficient that stays statistically significant in both panels is the provision for a majority of independent directors. The coefficient of the audit committee independence becomes significant in the fixed-effect regression but is not significant in the change-in-compensation regression. A possible reason for the significance of these coefficients in the fixed-effect regression only is that they are proxies for some industry related characteristics that are not captured by the fixed effect regression but are captured in the industry regression.

The results in this analysis suggest that the requirement for a majority of independent directors is the one that has a significant impact on compensation. It suggests

that board-level independence is more important than committee-level independence in affecting compensation. A potential reason for this result is that boards ultimately have an effect on the composition of committees, and on approving committee decisions. Therefore, committees will be effective only to the extent that boards as a whole are effective.

IV. Robustness checks

A. Controlling for other potential explanatory variables.

A1. Endogeneity of the passage of the rules.

One concern with the difference-in-difference approach is that the event itself might not be exogenous. If the ruling event is related to changes in market and firm-level variables and that these changes are related to governance structure, then the effect we capture is not related to the rules but to these firm-level variables (Meyer, 1995). For example, a potential reason for the change in compensation and the ruling events could be related to the fall of the high-tech industry. Although we control for the Fama-French 48 industries, this industry categorization might not capture well-enough the high-tech sector. We therefore use the categorization of the high-tech sector which was proposed by Murphy (2003). We find that all of the results follow through even when we control for such categorization.

The passage of the rules was associated also with large changes in the information structure in the market. The corporate scandals led to rulings that enhance transparency in firms, and potentially reduced risk and stock price volatility. Prior literature suggests that firms facing larger risk about their prospects tend to provide higher compensation to their

managers (e.g., Core et al. 2002). If the volatility in the prospects of firms with Score0=1 was reduced more dramatically than that of other firms, then we should expect a larger drop in compensation in Score0 firms regardless of the passage of the law. To rule out this possibility, we run the regressions in the previous sections, but this time we also include- the standard deviation of the stock return (measured monthly over the forty-eight months and twelve months ending in the beginning of the fiscal year). The inclusion of the standard deviation of the stock does not alter any of the results. Our main results do not change also when we run the option regressions using the number of options (rather than their Black Scholes value). This result suggests that the effect on the value of the options is not coming from the changes in the volatility but from the reduction in the number of options given.

A third potential reason for the change in compensation could be related to systematic differences in changes to growth opportunities over time between Score0 firms and non-Score0 firms. It is possible that the passage of the law was associated with the fall in growth opportunities in the market. Since growth opportunities are correlated with higher compensation, we could be catching this effect. We note that our fixed effect and industry effects control for growth opportunities at the firm level and changes in these opportunities at the industry level. However, as a robustness check, we include the Q ratio in the regression, which is defined as the market value of equity plus the book value of liabilities, all divided by the book value of assets. The inclusion of the Q ratio does not alter any of our results.

A.2. The confounding effect of the option expensing rules

The changes to the exchange regulations were accompanied by another event that could have had an impact on executive compensation during that period. This event is the ruling regarding expensing of options. After the collapse of Enron, voices in corporations and among regulators were calling for more precise ways to expense options from the corporate earnings. The accounting rules at that time gave great leeway to firms to decide how to expense options, and many firms were using the intrinsic value method which gave a value of zero for at-the-money options. In December of 2004, after several iterations, FASB issued a revised ruling for option expensing, requiring firms to use more accurate methods to account for option value in the financial statements.

Evidently, the expensing rule had a direct effect on corporations. Employees of Cisco, and Intel, raised their voice against expensing for fear it will cause companies to stop offering options. Several companies, such as Apple computers and Berkshire Hathaway announced that they will start expensing options. Others, such as Microsoft, announced that they will stop paying options and will move to equity-based compensation.

It is therefore plausible that the option-expensing rule has led some firms to abandon option-based compensation and to move to stock-based compensation, for fears that option expensing will adversely affect the market perception about their true cost. Consistent with this argument, our results do show an overall decrease in option-based compensation and an increase in stock-based compensation in the years 2003-2004. However, it is more difficult to relate the option-expensing rule to the relative differences in the compensation between independent boards and non-independent boards. First, it is

not clear why the option-expensing rule should decrease overall compensation. If anything, it should shift compensation from option-based to perhaps stock-based compensation. Consistent with this argument, our results in table 2 suggest that, overall, firms were not decreasing CEO compensation in the years 2003-2004, compared to 2001-2002. Rather, as table 7 and table 8 indicate, they were reducing option-based compensation and increasing stock-based compensation.

Second, we find no a priori reason to suspect that firms that did not comply with the director independence requirements should be affected differently by the option expensing rules than firms that did comply with director independence requirement, since there are no systematic differences in the way compensation is structured across compliance groups. Table IIB shows no systematic differences in the way compensation of non-complying firms is structured compared to compensation of complying firms. In the years before the rules, the average option-based compensation constitutes about the same fraction of total compensation across compliance groups.

Third, it is hard to reconcile the option expensing argument with the cross-sectional variation between firms that moved early towards compliance and firms that did not move early towards compliance. If firms that have not complied with the rules had compensation characteristics that make them different from other firms, then they should all behave similarly to the announcement of the option expensing rule. The option expensing argument cannot explain why firms that moved early towards compliance have changed their compensation while firms that did not move early towards compliance have not changed their compensation.

Therefore, while it is plausible that the option expensing rule had an effect on the move from option-based compensation to stock based compensation, it seems unlikely that it is the driver of the relative drop in compensation to CEOs in the non-complying firms.

B. Other director characteristics that change when directors become independent

The move towards compliance with the director independence requirements is likely to lead to changes in other characteristics of directors. For example, when a firm needs to have more independent directors on the board, it often replaces existing non-independent directors with new directors that are independent (Chhaochharia and Grinstein 2004). The new independent directors are new to the firm, and often have lower financial stake in the firm. Previous studies show that tenure of directors and financial stake of directors are also possible determinants of executive compensation (e.g., Core, Holthausen and Larcker 1999; Vafeas, 2003). Thus, it is possible that the relation we find is really attributed to changes in these characteristics rather than to the independence characteristic.[10]

While we cannot rule out completely this possibility, we can test whether variation over time in the financial stake of directors and in their tenure better explains the variation in the compensation than the changes to the independence measure. We therefore include in the fixed effect regressions and the changes-in-compensation regressions measures of financial stake and tenure that were found to be related to executive compensation by Core et al. (1999) and Vafeas (2003). The first measure is a

[10] We note that it is more likely that our result are driven by director tenure than by directors' financial stake, since previous studies show that shorter tenure is associated with lower compensation, but that lower financial stake is associated with higher compensation.

dummy variable for whether the firm had a non-CEO large inside director (more than 5% of the holdings) on the board before the rules, but does not have one after the rule. The second measure is a dummy for whether there was a senior director on the compensation committee before the rules, but no such director after the rules. Senior director is a director who is in the upper 33% of the distribution of director tenure in the firm in a given year.

We find that our results hold even after controlling for these variables. Thus, our measure is likely to capture the independence of board members rather than the tenure or financial stake of board members.

V. Discussion

The results establish that board structure does have an effect on executive compensation. We find that the move towards board independence has caused firms to reduce the compensation level to the CEO. In that regard, we show that board structure does play a major role in the determination of compensation practices, and that board-level independence (rather than committee-level independence) makes a big impact on compensation decisions.

An important question is whether such changes to boards are optimal, in the sense that they increase shareholder value. According to the arguments by Bebchuk and Fried (2002), and Jensen (1993), these changes should reduce the ability of managers to extract excessive compensation and will therefore enhance shareholder value. The reduction in the use of stock options is also consistent with the arguments of Bebchuk and Fried

(2003), Hall and Murphy (2003), and Jensen et al. (2004) who argued that U.S. firms had excessive and suboptimal use of executive options.[11]

However, such changes could have also a detrimental effect on shareholder value. If boards become too harsh, in the sense that they will not give CEOs the true value of their talent, then in the long run qualified CEOs might not be willing to work in these jobs, and the quality of these firms will deteriorate. Moreover, such requirements might lead to less competition from middle rank managers over CEO positions since the positions will become less lucrative. Less competition will imply a pool of lower quality managers in the future. Also, a too-much reduction in the incentive base of the compensation could make managers less willing to take risk and make their incentives less aligned with those of the firm (Spatt 2006).

We cannot fully resolve the optimality question in this research, partly because not enough time has passed since the legislations to check their effect on the operation of CEOs and firms. However, we point to two pieces of evidence which suggest that the potential costs are not too large. First, we examine whether CEOs in firms that become compliant decide to leave their jobs. We compared CEO turnover in firms in the Score0=1 group with that of the Score0=0 group after the legislation. We did not find any increase in incidences of CEO replacement in the affected group relative to the non affected group. Thus, at least in the short run, the reduction in compensation was not accompanied by excessive CEO attrition. Secondly, in another study (Chhaochharia and Grinstein, 2005), we looked at the announcement effect of the rules on equity value. We compared the announcement effect of the more affected firms to the announcement effect

[11] For evidence of the adverse effect of equity-based compensation on managerial earnings manipulations, see, for example, Bergstresser and Philippon (2005).

of the less affected firms. We found that, overall, the more affected firms had a positive abnormal return compared to the less affected firms, suggesting that the market viewed these requirements as enhancing firm value.[12]

VI. Conclusion

The new requirements of the exchanges from boards of directors led to significant changes in board structure of U.S. corporations. Using the difference in differences approach we find that firms that were least compliant with the rules decreased the compensation to their CEOs once they started to comply with the rules. The decrease was in the order of 20%-25% over and above the decrease in firms that were more compliant before the rules. The decrease was mainly from the option part of the compensation. We also find that the move to a majority of independent directors on the board had the most significant effect on compensation. These results corroborate the arguments by Bebchuk and Fried (2003) and Jensen (1993) that enhancement of board oversight has a significant effect on the size and structure of executive compensation.

Past studies have shown mixed results with respect to the importance of independent directors on the board to board decisions. We show that, at least for compensation decisions, independent directors do have an effect on compensation, and that having a majority of independent directors on the board is an important element of board structure.

[12] However, we also note that the effect was concentrated in large firms. In smaller firms there was no positive abnormal return. Thus, it could be that the requirement for independent directors in small firms does have a detrimental effect on compensation practices.

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Table I: Summary Statistics

The table shows financial, compensation, and governance characteristics of U.S. public firms between 2000 and 2004. The sample consists of 940 firms which have executive compensation information as well as board structure information. The numbers without parentheses are averages, and the numbers within parentheses are medians. In panel A, market value is the market capitalization of equity. Return on assets is the net income before extraordinary items and discontinued operations divided by the book value of assets, and stock return is the annual stock return (dividend reinvested). In panel B, Compensation is variable TDC1 in Execucomp, which consists of salary, bonus, value of restricted stock granted, value of options granted (using Black Scholes), long term incentive payouts and other compensation. Total Equity-based Compensation is the value of restricted stock and options granted. % Equity-based Compensation is the Equity-based Compensation as a percentage of total Compensation. In panel C, the board score is the sum of four indicator variables: existence of a majority of independent directors, existence of an independent audit committee, existence of an independent nominating committee, and existence of an independent compensation committee. The stars next to the numbers in panel C indicate a significant difference from the previous year in the sample (using non-parametric binomial test of difference in probabilities). Panels D and E are similar to panels A and B except that we separate the firms into score>0 and score=0 in the year 2000. The stars next to the numbers in panels D and E indicates a significant difference from the group of score>0 in the same year. *,**,*** indicates significance at the 10%, 5%, and 1% significance levels respectively.

Panel A: Financial characteristics

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	Year				
	2000	*2001*	*2002*	*2003*	*2004*
Sales ($million)	6248	6337	6080	6379	7166
	(1764)	(1773)	(1698)	(1850)	(2055)
Market Value ($million)	12075	10318	7977	9684	10769
	(2175)	(2284)	(1771)	(2459)	(2779)
Assets ($million)	13928	15446	16209	17241	20544
	(2019)	(2248)	(2384)	(2608)	(2932)
Return on Assets (%)	6.1	2.9	3.1	4.0	5.1
	(5.2)	(3.6)	(3.9)	(4.1)	(4.9)
Stock Return (%)	23.1	11.1	-9.8	39.6	19.3
	(12.5)	(5.9)	-(8.2)	(30.7)	(16.8)

Panel B: CEO compensation

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	Year				
	2000	*2001*	*2002*	*2003*	*2004*
Total Compensation	9638	7937	6318	5522	6180
	(3444)	(3546)	(3497)	(3265)	(4043)
Total Equity-based Comp.	7375	5706	4141	3120	3459
	(1677)	(1840)	(1725)	(1389)	(1755)
Total Option-based Comp.	6714	5064	3395	2158	2388
	(1388)	(1545)	(1362)	(1018)	(1089)

Panel C: Governance characteristics

	Year						
	2000	*2001*†	*2002*†	*2003*		*2004*	
Independent nominating committee	28%	30%	35%	57%	***	73%	***
Independent compensation committee	71%	70%	72%	77%		82%	
Independent audit committee	63%	67%	64%	76%	***	83%	***
Majority of independent directors	73%	73%	73%	83%	***	88%	***
Score (sum of the four variables)	2.36	2.40	2.44	2.93	***	3.26	***
CEO Chairman	67%	61%	69%	66%		64%	
CEO is on the nom. Committee / no nom. Committee	52%	49%	40%	14%		3%	
Board size	9.74	9.64	9.72	9.37	***	9.36	
% of firms with a score=0	12%	12%	11%	5%	***	4%	

†Based on a random subsample of 100 firms

Panel D: Financial characteristics – by governance score

	2000		2001		2002		2003		2004		
	Score>0	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**	
Sales	6403	5098	6494	5158	6194	5233	6484	5598	7277	6322	
Market value of equity	11819	13987	10240	10906	8035	7542	9654	9907	10772	10748	
Assets	14640	8616	16223	9614	16967	10551	17980	11730	21397	13934	
Return on Assets	6.00	6.7	2.7	4.6	2.9	4.5	3.9	4.7	5.0	6.1	
Stock Return	22.1	29.8	11.1	11.2	-9.7	-10.8	39.2	42.6	20.0	14.3	**

Panel E: CEO compensation – by governance Score

	2000		2001		2002		2003		2004	
	Score>0	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**	**Score>0**	**Score=0**
Total Compensation	9605	9888	8060	7010	6415	5590	5576	5124	6368	4744**
Total Equity-based Comp.	7278	8101	5745	5412	4186	3800	3118	3136	3563	2661**
Total Option-based Comp.	6726	6621	5141	4491	3436	3088	2187	1935	2477	1706**
% Equity-based Comp.	51%	51%	53%	52%	50%	49%	46%	43%	46%	43%
% Option-based Comp.	45%	44%	47%	48%	42%	43%	35%	33%	33%	31%

Table II: CEO compensation and board compliance - fixed effect regression

The table shows the results of a fixed-effect regression, where the dependent variable is the natural log of total CEO compensation. Columns 1 and 2 show the results of the entire sample of 940 firms that existed in the IRRC and Execucomp databases throughout the period 2000-2004. Columns 3 and 4 show the results of a subsample of 366 firms where the CEO has not been replaced during the period 2000-2004. SALES is the natural log of the company sales (Compustat data item 12), ROA is the natural log of one plus the net income before extraordinary items and discontinued operations divided by the book value of assets - all measured in (t-1). RET is the natural log of the annual gross stock return (dividend reinvested), measured in year (t-1). Dummy NEW CEO equals 1 if the CEO tenure is less than two years. Score0 is a dummy variable that equals 1 if the firm had a governance score of 0 in the year 2000 and 0 otherwise. Score0_Changed equals 1 if the firm did not comply with any of the provisions in 2000 and had become more compliant by 2003. Dummy 03_04 is a dummy variable that equals 1 if the current year is 2003 or 2004 and 0 otherwise. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Variable	(1)	(2)	(3)	(4)
SALES	0.353 ***	0.352 ***	0.420 ***	0.419 ***
	(0.046)	(0.046)	(0.059)	(0.059)
ROA	0.343 ***	0.343 ***	0.349	0.339
	(0.109)	(0.109)	(0.233)	(0.233)
RET	0.166 ***	0.166 ***	0.181 ***	0.181 ***
	(0.021)	(0.021)	(0.028)	(0.028)
Dummy year 2000	0.058 **	0.058 **	-0.046	-0.047
	(0.028)	(0.028)	(0.036)	(0.036)
Dummy year 2001	0.026	0.026	-0.062 *	-0.062 *
	(0.027)	(0.027)	(0.035)	(0.035)
Dummy year 2002	0.011	0.010	-0.059 *	-0.059 *
	(0.027)	(0.027)	(0.035)	(0.035)
Dummy year 2003	-0.015	-0.015	0.001	0.001
	(0.027)	(0.027)	(0.034)	(0.034)
Dummy 03_04*Score0	-0.092 *		-0.209 ***	
	(0.054)		(0.065)	
Dummy 03_04*Score0_Changed		-0.118 *		-0.249 ***
		(0.061)		(0.072)
Dummy 03_04*Score0_Not Changed		-0.010		-0.068
		(0.105)		(0.131)
Dummy NEW CEO	0.030	0.029	-0.078 *	-0.077
	(0.025)	(0.025)	(0.046)	(0.046)

Table III: Changes in CEO compensation and board compliance – regression results

The table shows the results of an ordinary least-square regression, where the dependent variable is the log(average total CEO compensation in the years 2003-2004) – log(average total CEO compensation in the years 2000-2001). The sample includes 366 firms in which the CEO has not been replaced during the period 2000-2004. $SALES_{1999\text{-}2000}$ is the natural log of the average company sales over the years 1999-2000 (Compustat data item 12). $ROA_{1999\text{-}2000}$ is the natural log of one plus the average ROA of the firm over the years 1999-2000 where ROA is the net income before extraordinary items and discontinued operations divided by the book value of assets - all measured in the beginning of the fiscal year. $RET_{1999\text{-}2000}$ is the natural log of the average annual gross stock return (dividend reinvested), over the two years that end in the fiscal year 2000. All the above variables with a subscript of 2002-2003 are averages over the years 2002-2003. Dummy NEW CEO equals 1 if the CEO tenure is less than two years. Score0 is a dummy variable that equals 1 if the firm had a governance score of 0 in the year 2000 and 0 otherwise. Score0_Changed equals 1 if the firm had a score of 0 in 2000 and had increased its score by 2003. Score0_Not Changed equals 1 if the firm had a score of 0 both in 2000 and in 2003. Score0 is a dummy variable if in the year 2000 the firm did not comply with any of the provisions (majority of independent directors on the board, an independent compensation committee, an independent nominating committee, and an independent audit committee). Dummy 03_04 is a dummy variable that equals 1 if the current year is either 2003 or 2004 and 0 otherwise. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)
Intercept	0.302	0.290
	(0.247)	(0.247)
$SALES_{1999-2000}$	-0.010	-0.008
	(0.022)	(0.022)
$RET_{1999-2000}$	0.539 **	0.542 **
	(0.224)	(0.224)
$ROA_{1999-2000}$	0.077	0.026
	(0.56)	(0.564)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	0.393 ***	0.396 ***
	(0.104)	(0.104)
$RET_{2002-2003}$ - $RET_{1999-2000}$	0.652 ***	0.650 ***
	(0.183)	(0.183)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	0.479	0.442
	(0.675)	(0.677)
Dummy Score0	-0.180 **	
	(0.088)	
Dummy Score0_Changed		-0.203 **
		(0.092)
Dummy Score0_Not Changed		0.034
		(0.263)
Dummy NEW CEO	0.082	0.081
	(0.065)	(0.065)
Industry Dummies (48)	+	+
R Square	23%	23%

TABLE IV: Changes in cash-based Compensation and Board Compliance

Panel A shows the results of a fixed-effect regression, where the dependent variable is the natural log of the cash-based portion of total compensation of the CEO. Panel B shows the results of an ordinary least square regression where the dependent variable is the log(average cash-based compensation in the years 2003-2004) – log(average cash-based compensation in the years 2000-2001). In panel A, Column 1 shows the results of the entire sample of 940 firms that existed in the IRRC and Execucomp databases throughout the period 2000-2004. Column 2 shows the results of a subsample of 366 firms where the CEO has stayed the entire period. The definition of variables is as in table II and table III. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Panel A: Fixed effect regression

Variable	(1)	(2)
SALES	0.421 ***	0.242 ***
	(0.05)	(0.06)
ROA	-0.153	-0.292 **
	(0.196)	(0.14)
RET	0.136 ***	0.117 ***
	(0.024)	(0.027)
Dummy year 2000	-0.204 ***	-0.157 ***
	(0.031)	(0.036)
Dummy year 2001	-0.253 ***	-0.258 ***
	(0.029)	(0.035)
Dummy year 2002	-0.181 ***	-0.148 ***
	(0.029)	(0.035)
Dummy year 2003	-0.033	-0.066 *
	(0.029)	(0.035)
Dummy 03_04*Score0_Changed	-0.049	0.032
	(0.061)	(0.079)
Dummy 03_04*Score0_Not Changed	-0.153	-0.166
	(0.11)	(0.135)
Dummy NEW CEO	-0.141	-0.176
	(0.038)	(0.032)

Panel B: Change-in-compensation regression

Variable	Estimate
Intercept	-0.295
	(0.195)
$SALES_{1999-2000}$	0.056 ***
	(0.017)
$RET_{1999-2000}$	0.643 ***
	(0.178)
$ROA_{1999-2000}$	0.099
	(0.456)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	0.167 **
	(0.082)
$RET_{2002-2003}$ - $RET_{1999-2000}$	0.745 ***
	(0.147)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	0.621
	(0.551)
Dummy Score0_Changed	-0.052
	(0.078)
Dummy Score0_Not Changed	-0.109
	(0.143)
Dummy NEW CEO	0.124 **
	(0.051)
Industry Dummies (48)	+

TABLE V: Changes in equity-based compensation and board compliance

Panel A shows the results of a fixed-effect regression, where the dependent variable is the natural log of the equity-based portion of total compensation of the CEO. Panel B shows the results of an ordinary least square regression where the dependent variable is the log(average equity-based compensation in the years 2003-2004) – log(average equity-based compensation in the years 2000-2001). In panel A, Column 1 shows the results of the entire sample of 940 firms that existed in the IRRC and Execucomp databases throughout the period 2000-2004. Column 2 shows the results of a subsample of 366 firms where the CEO has stayed the entire period. The definition of variables is as in table II and table III. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Panel A: Fixed-effect regression

Variable	(1)	(2)
SALES	0.346 *	0.104
	(0.187)	(0.26)
ROA	1.630 ***	2.327 **
	(0.44)	(01.024)
RET	0.177 **	0.141
	(0.086)	(0.123)
Dummy year 2000	0.202 *	0.368 **
	(0.112)	(0.16)
Dummy year 2001	0.163	0.145
	(0.111)	(0.154)
Dummy year 2002	0.107	0.132
	(0.111)	(0.152)
Dummy year 2003	-0.086	-0.009
	(0.11)	(0.15)
Dummy 03_04*Score0_Changed	-0.564 **	-0.650 **
	(0.245)	(0.317)
Dummy 03_04*Score0_Not Changed	0.205	0.813
	(0.424)	(0.577)
Dummy NEW CEO	0.440 ***	-0.166
	(0.1)	(0.201)

Panel B: Change-in-compensation regression

Variable	Estimate
Intercept	0.738
	(0.926)
$SALES_{1999-2000}$	-0.035
	(0.082)
$RET_{1999-2000}$	0.745
	(0.844)
$ROA_{1999-2000}$	-2.251
	(2.147)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	0.432
	(0.389)
$RET_{2002-2003}$ - $RET_{1999-2000}$	0.445
	(0.689)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	-0.817
	(2.588)
Dummy Score0_Changed	-1.020 ***
	(0.369)
Dummy Score0_Not Changed	1.013
	(0.678)
Dummy NEW CEO	-0.052
	(0.243)
Industry Dummies (48)	+

TABLE VI: Option-based compensation and board compliance

Panel A shows the results of a fixed-effect regression, where the dependent variable is the natural log of the option-based portion of total compensation of the CEO. Panel B shows the results of an ordinary least square regression where the dependent variable is the log(average option-based compensation in the years 2003-2004) – log(average option-based compensation in the years 2000-2001). In panel A, Column 1 shows the results of the entire sample of 940 firms that existed in the IRRC and Execucomp databases throughout the period 2000-2004. Column 2 shows the results of a subsample of 366 firms where the CEO has stayed the entire period. The definition of variables is as in table II and table III. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Panel A: Option-based compensation – fixed effect regression

Variable	(1)	(2)
SALES	0.271	-0.142
	(0.192)	(0.292)
ROA	1.427 ***	2.064 *
	(0.502)	(01.151)
RET	0.238 **	0.270 *
	(0.097)	(0.138)
Dummy year 2000	0.762 ***	0.673 ***
	(0.127)	(0.18)
Dummy year 2001	0.835 ***	0.667 ***
	(0.122)	(0.173)
Dummy year 2002	0.606 ***	0.424 **
	(0.121)	(0.171)
Dummy year 2003	0.205	0.261
	(0.124)	(0.168)
Dummy 03_04*Score0_Changed	-0.472 *	-0.427
	(0.276)	(0.357)
Dummy 03_04*Score0_Not Changed	0.123	0.683
	(0.478)	(0.648)
Dummy NEW CEO	0.493 ***	-0.129
	(0.112)	(0.226)

Panel B: Option-based compensation – change-in-compensation regression

Intercept	0.726
	(1.042)
$SALES_{1999-2000}$	-0.083
	(0.092)
$RET_{1999-2000}$	0.978
	(0.948)
$ROA_{1999-2000}$	-0.091
	(2.414)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	-0.114
	(0.438)
$RET_{2002-2003}$ - $RET_{1999-2000}$	0.800
	(0.774)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	1.473
	(2.911)
Dummy Score0_Changed	-0.699 *
	(0.415)
Dummy Score0_Not Changed	0.297
	(0.763)
Dummy NEW CEO	-0.082
	(0.274)
Industry Dummies (48)	+

TABLE VII: Stock-based compensation and board compliance

Panel A shows the results of a fixed-effect regression, where the dependent variable is the natural log of the stock based part of compensation of the CEO. Panel B shows the results of an ordinary least square regression where the dependent variable is the log(average stock based compensation in the years 2003-2004) – log(average stock based compensation in the years 2000-2001). In panel A, Column 1 shows the results of the entire sample of 940 firms that existed in the IRRC and Execucomp databases throughout the period 2000-2004. Column 2 shows the results of a subsample of 366 firms where the CEO has stayed the entire period. The definition of variables is as in table II and table III. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Panel A: Stock based compensation – fixed effect regression

SALES	-0.004	0.268
	(0.207)	(0.32)
ROA	-0.116	-0.683
	(0.542)	(1.262)
RET	0.183 *	0.099
	(0.105)	(0.152)
Dummy year 2000	-1.476 ***	-0.962 ***
	(0.137)	(0.198)
Dummy year 2001	-1.458 ***	-1.195 ***
	(0.132)	(0.19)
Dummy year 2002	-1.191 ***	-0.910 ***
	(0.131)	(0.188)
Dummy year 2003	-0.537 ***	-0.250
	(0.134)	(0.184)
Dummy 03_04*Score0_Changed	-0.001	-0.241
	(0.298)	(0.391)
Dummy 03_04*Score0_Not Changed	0.028	0.272
	(0.516)	(0.711)
Dummy NEW CEO	0.441 ***	-0.181
	(0.121)	(0.248)

Panel B: Stock based compensation – change-in-compensation regression

Intercept	2.901 *
	(1.724)
$SALES_{1999-2000}$	0.060
	(0.152)
$RET_{1999-2000}$	-2.004
	(1.569)
$ROA_{1999-2000}$	-6.037
	(3.996)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	1.468 **
	(0.725)
$RET_{2002-2003}$ - $RET_{1999-2000}$	-1.170
	(1.281)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	-8.062 *
	(4.817)
Dummy Score0_Changed	-0.164
	(0.686)
Dummy Score0_Not Changed	1.945
	(1.263)
Dummy NEW CEO	0.245
	(0.453)
Industry Dummies (48)	+

TABLE VIII: Effect of the different provisions of the rules on compensation

Panel A shows the results of a fixed-effect regression, where the dependent variable is the natural log of the total compensation of the CEO. Panel B shows the results of an ordinary least square regression where the dependent variable is the log(average compensation in the years 2003-2004) – log(average compensation in the years 2000-2001). The sample consists of 366 firms that existed in the sample throughout the period and where the CEO has stayed the entire period. Majority_Changed is a dummy variable which equals 1 if the firm did not comply with the requirement for majority of independent directors in the year 2000 but became compliant in 2003. Audit_Changed, Nominating_Changed, and Compensation_Changed are constructed in a similar way for the requirements of independent audit, nominating and compensation committees. The definition of the rest of the variables appears in table II and table III. The intercept is omitted from the table. *,**,*** indicates significance at the 10%, 5%, and 1% levels respectively.

Panel A: Fixed-effect regression

	(1)	(2)	(3)	(4)	(5)
SALES	0.424 ***	0.412 ***	0.412 ***	0.410 ***	0.433 ***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
ROA	0.412 *	0.383	0.411 *	0.418 *	0.413 *
	(0.232)	(0.233)	(0.233)	(0.233)	(0.233)
RET	0.188 ***	0.190 ***	0.190 ***	0.191 ***	0.187 ***
	(0.029)	(0.029)	(0.029)	(0.029)	(0.028)
Dummy03_04*Majority_Changed	-0.189 ***				-0.199 ***
	(0.058)				(0.062)
Dummy03_04*Audit_Changed		-0.120 **			-0.099 *
		(0.052)			(0.056)
DUMMY03_04*Nominating_Changed			-0.029		-0.019
			(0.043)		(0.044)
DUMMY03_04*Compensation_Changed				0.036	0.124 **
				(0.054)	(0.058)
Dummy NEW CEO	-0.073	-0.074	-0.072	-0.072	-0.073
	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
Year fixed effect	+	+	+	+	+

Panel B: Change-in-compensation regression

	(1)	(2)	(3)	(4)	(5)
$SALES_{1999-2000}$	-0.009	-0.011	-0.011	-0.009	-0.007
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
$RET_{1999-2000}$	0.498 **	0.482 **	0.478 **	0.514 **	0.523 **
	(0.223)	(0.225)	(0.225)	(0.226)	(0.226)
$ROA_{1999-2000}$	0.069	0.105	0.131	0.051	0.238
	(0.56)	(0.567)	(0.57)	(0.566)	(0.566)
$SALES_{2002-2003}$ - $SALES_{1999-2000}$	0.380 ***	0.383 ***	0.383 ***	0.382 ***	0.386 ***
	(0.104)	(0.105)	(0.105)	(0.105)	(0.104)
$RET_{2002-2003}$ - $RET_{1999-2000}$	0.650 ***	0.633 ***	0.633 ***	0.649 ***	0.687 ***
	(0.183)	(0.184)	(0.184)	(0.184)	(0.183)
$ROA_{2002-2003}$ - $ROA_{1999-2000}$	0.524	0.644	0.690	0.496	0.675
	(0.676)	(0.687)	(0.692)	(0.694)	(0.692)
Dummy Majority_Changed	-0.204 **				-0.369 **
	(0.104)				(0.173)
Dummy Audit_Changed		-0.048			0.295
		(0.118)			(0.206)
Dummy Nominating_Changed			-0.006		0.379
			(0.142)		(0.252)
Dummy Compensation_Changed				-0.147	-0.333
				(0.123)	(0.262)
Dummy NEW CEO	0.084	0.079	0.077	0.082	0.074
	(0.065)	(0.065)	(0.065)	(0.065)	(0.065)
Industry dummies	+	+	+	+	+