Executive Suite Independence: Is It Related to Board Independence?

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Abstract

The executive suite and the board are closely bound to each other through their fiduciary responsibility to same shareholders. With CEOs' prominent role in both governing bodies, their independence from CEOs' self-serving behavior might be related to each other. We explore the interdependence using an external shock increasing board independence. The shock weakens executive suite independence by increasing CEO connectedness within executive suites through appointments and pre-existing social ties. We also uncover interesting dynamics between the two governing bodies: (1) the spillover does not occur when treated firms increase CEO-independent director social ties, suggesting CEO-executive connections and CEO-director connections are substitutes; (2) consistent with theories of board independence, when information environment calls for dependent boards, increasing CEO-executive connections, which helps negate the shock effect on the board, has positive marginal effects on firm performance. Our findings are not driven by the Sarbanes-Oxley Act and are robust to a battery of other tests. We conclude that independence in the board and executive suite are inversely related; inferring the overall independence from board independence alone can be highly misleading.

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1. Introduction

Corporations have two main governing bodies: the board of directors and the executive suite of the CEO and her top lieutenants. Numerous papers are devoted to studying whether and how board independence helps protect shareholder interest from CEOs' self-serving behavior.[1] Studies on executive suite independence include Landier, Sraer, and Thesmar (2009), who argue that the presence of more top executives with different preferences and dissenting views—independent executives—strengthens governance and steers CEOs toward more shareholder-friendly decisions. Acharya, Myers, and Rajan (2011) show how self-serving actions of CEOs are limited by potential reactions of other top executives. These two studies suggest executive suite independence also matters.

There is a gap in this governance literature. To the best of our knowledge, no empirical study examines the interrelation between board independence and executive suite independence. The board's primary function is to monitor and advise the executive team, the chief of which is the CEO, who also serves on the board, often as the chair. With such interactions between the two governing bodies with fiduciary responsibilities to the same shareholders, independence in one governing body is likely to be related to the other. In this paper we explore whether and how board and executive suite independence are interrelated. It is an important issue, because if the relation is negative, inferring the overall governance independence from board independence alone can be highly misleading.

Both board and executive suite independence are endogenous; thus to investigate a causal relation, we rely on an external shock *on board independence*, the independent board requirement for NYSE- and NASDAQ-listed firms, which forces dependent boards to become independent. How the shock will affect executive suite independence is not obvious. If the newly independent board has sufficient influence over top executive personnel decisions and believes independent top executives are good for shareholders, the executive suite will become more independent.

[1] So many papers study board independence that a complete list of the papers is too long for the limited space here. However, the reader can find most of them in reference sections of papers we cite later in this study.

An opposing prediction emerges, however, when we extend Adams and Ferreira's model (2007) to allow for a CEO affected by the shock to influence executive suite composition. In the model, CEOs resent monitoring but value board advising. CEOs may withhold information from an independent board to make monitoring less effective. But board advising is more valuable when the board is better informed. To derive full benefits from board advising, shareholders may decide to have a dependent board in order to increase CEOs' optimal level of information sharing. A CEO who had a dependent board prior to the shock, therefore, will consider the newly independent board after the shock too independent and withhold more information than before (Adams and Ferreira, 2007). The CEO also may take other actions to weaken monitoring, such as undertaking more CEO-specific investments and activities that provide greater informational advantage over the board (Shleifer and Vishny, 1989; Edlin and Stiglitz, 1995; Baldenius, Melumad, and Meng, 2014).

Withholding information from the board or taking information asymmetry-increasing projects cannot be done by the CEO alone. Other top executives may possess the relevant information and leak it to the board. If the CEO wants to take information asymmetry-increasing projects, independent-minded top lieutenants may dissent in the implementation stage (Landier et al, 2009) and/or exert insufficient efforts (Acharya et al., 2011). To obtain the necessary cooperation from other top executives and have them dissent less, the CEO may make the executive suite more dependent by increasing her connectedness in the executive suite through appointment decisions and social ties. This may be possible because, in practice, CEOs have large degrees of freedom to decide the executive suite composition. Although the board heads the organization chart and possesses the authority to appoint or dismiss CEOs, it typically meets only a few times a year and independent directors work part-time. CEOs, by contrast, work full time and have employees at their disposal to perform the necessary footwork to make their cases to their boards. That is, CEOs may have effective control over top executive personnel decisions.

To investigate which of the two predictions prevail in the data, we estimate differences-in-differences in executive suite independence using the independent board requirement for NYSE- and NASDAQ-listed firms as an exogenous shock. The estimation relies on variation in the pre-regulation

board composition. The treatment (control) group is firms without (with) a majority of independent directors prior to the shock. Treatment and control groups show parallel trends in our measure of executive suite dependence prior to the shock. We construct a control group using propensity-scores (PS) to improve comparability and report estimates based on both unmatched and PS-matched samples.

We measure executive suite dependence by the fraction of top-four non-CEO executives appointed (FT4A) during a CEO's tenure and the CEO's pre-existing social ties with the appointees. Higher FT4A helps increase what social psychologists refer to as "social influence," which relies on norms of reciprocity, liking, and social consensus to shape management's decision making (Cialdini, 1984). CEOs are heavily involved in recruiting, nominating, and appointing their top lieutenants, so their appointees are more likely to share similar briefs and preferences with, and may be more beholden to, the CEO in comparison to those appointed by a previous CEO (Landier, Sauvagnat, Sraer, and Thesmar, 2013).[2] Morse, Nanda, and Seru (2011) and Coles, Daniel, and Naveen (2014) rely on a similar notion of reciprocity between directors and the CEO when they measure how "co-opted" a board is by the fraction of directors appointed during a CEO's tenure.[3] We also measure social ties between CEOs and their appointees because the familiarity acquired through prior social interactions helps a CEO select individuals who are more closely aligned and less likely to dissent (Fracassi and Tate, 2012).

We find the shock significantly increases FT4A, suggesting a shakeup in executive suites amid the mandated board transition. Most treated firms achieve higher FT4A without costly severance packages or losing firm-specific knowledge. The vast majority of executives who lost positions on the top-four list remain with the firm following the regulation. The higher FT4A seems largely a result of appointing executives to positions of higher rank than previous CEOs' appointees. Our results are not driven by longer tenure of previous CEOs' appointees, inside director turnovers, or CEO turnovers.

[2] A previous CEO's appointee also may feel grateful if a CEO decides to retain her. However, new appointment through hiring and promotion requires greater engagement and commitment on the part of the CEO than retaining someone from the previous team; hence, the connectedness will be closer with one's own appointees than with previous CEO' appointees.

[3] Independent directors appointed during the shock might be co-opted, weakening the real effect of the shock on board independence. If so, the spillover to the executive suite also will be weaker, leading to smaller increases in FTA and CEO-executive social ties in favor of the null hypothesis of no shock effect.

A closer look at turnovers in the top-four list during the board transition reveals CEOs' strong influence on who stays on the list and who remains as an inside director—their own appointees. While longer tenure works against previous CEOs' appointees, it helps current CEOs' appointees remain on the top-four list. Inside directors who are current CEOs' appointees also emerge largely intact from the board restructuring. In addition, we find executives newly appointed to the top-four list at treated firms are more socially pre-connected to the CEO, as measured by network ties formed during overlapping years prior to their appointments through past employment, education, and membership in social organizations.

Closer CEO connectedness with top executives may not be the only means treated firms counter the shock. If regulation forces a board to appoint more independent directors than endogenously determined, the firm may recruit independent directors with more "disutility for monitoring" (Hermalin and Weisbach, 1998). Fracassi and Tate (2012) find that powerful CEOs are more likely to appoint directors with whom they have social ties and that CEO-director social ties weaken the intensity of board monitoring. We find weak evidence of the shock increasing CEO-independent director social ties, indicating some CEOs influence director appointment decisions even when nominating committees consist entirely of independent directors. More important, when CEO-director ties increase, we find no changes in FT4A. Only when CEO-director ties do not increase do we observe significant increases in FT4A. CEO-director ties and FT4A appear substitutes. Perhaps CEOs increase FT4A only when they are unable to increase social dependency of the board.

How does increasing CEO connectedness affect firm performance? The answer may depend on why a firm chose a dependent board prior to the shock. Duchin, Matsusaka, and Ozbas (2010) present a model which shows that when outsiders' cost to acquire information is high, an outsider controlled board is ineffective and an insider controlled board—dependent board in our dichotomy—is optimal for shareholders. Consistent with the prediction, they find that the shock hurts shareholder value for firms with high information costs.

Our estimation takes a step further, estimating how increases in FT4A affect firm performance. We find higher FT4As have positive marginal effects on both operating performance and shareholder

value for firms in high information cost environments. That is, when the regulation can hurt firm value, increasing CEO connectedness in response to the regulation helps mitigate the negative impact.

Our findings of higher FT4A are not driven by the enactment of Sarbanes-Oxley Act (SOX) in 2002 or by other confounding events. Placebo tests using "controlled" firms that are exempt from the independent board requirement but subject to the SOX requirements and other confounding events show no increase in FT4A. Reestimation of the baseline regression for firms exempt from Section 404 of the SOX shows significant increases in FT4A. Our results are also robust to a compensation-weighted FT4A allowing for differences in influence across rank among those on the top-four list, abnormal measures of FT4A (residuals of regression relating FT4A to CEO tenure and other factors mechanically correlated to FT4A). We also check robustness to an alternative measure of treatment effects, major structural changes in the firm, and an alternative sample construction. None alters our conclusion.

This paper contributes to the literature by investigating dynamics between the executive suite and the board, an issue overlooked by previous researchers. We find independence in the board and executive suite is inversely related; thus, inferring the overall governance independence from board independence alone will be highly misleading. Also important, weakening executive suite independence is not necessarily bad; it could help or hurt firm performance depending on the information environment.

This study also fills a void in the literature on CEO influence and involvement in the selection of top echelon players governing the firm. Previous studies examine CEO influence on selecting board members (e.g., Shivdasani and Yermack, 1999; Hwang and Kim, 2009; Fracassi and Tate, 2012; Coles et al., 2014). We add to this literature by studying CEO influence on the appointment and composition of the other corporate governing body—the executive suite.

The next section develops hypotheses. Section 3 describes empirical design and data. Section 4 presents our main findings on CEO-executive connections. Section 5 investigates how the shock's effect on CEO-executive connections interacts with CEO-independent director social ties. Section 6 presents firm performance analysis. Section 7 conducts robustness tests. Section 8 concludes.

2. Theoretical Considerations and Hypotheses Development

In this section we analyze a theoretical linkage between board independence and executive suite independence by integrating existing theories on their compositions. To develop empirically testable hypotheses, we consider an exogenous shock forcing dependent boards to become independent. As such, we begin with the conceptual framework of Adams and Ferreira (2007), because it provides a theory of why some firms choose dependent boards. Then we expand the framework to examine how CEOs may change executive suite composition in response to the shock.

Adams and Ferreira (AF) assume (1) shareholders hire CEOs and boards, and determine the level of board independence; (2) non-independent directors advise and independent directors monitor; (3) CEOs dislike monitoring because they value control, from which they derive private benefits, and like advising because advice increases firm value; (4) both advising and monitoring are more effective when the board is better informed; and (5) the board depends on the CEO for firm-specific information. In this framework, CEOs face a trade-off in sharing information with the board. Sharing more information improves the value of advising but also increases the risk of board interference in decision making. The tradeoff point is affected by the level of board independence; hence, to induce CEOs to share more information, shareholders may choose a dependent board.

How would a CEO who had a dependent board react to a shock forcing the board to become independent? A direct implication of the AF model is that the CEO will withhold more information from the board than before in order to reduce the effectiveness of monitoring. The CEO may also take more CEO-specific investments the board cannot monitor effectively (Shleifer and Vishny, 1989), activities for which information asymmetries are particularly large (Edlin and Stiglitz, 1995), and projects which give the CEO more informational advantage over the board (Baldenius et al., 2014).

Withholding more information from the board or undertaking the information asymmetry-increasing activities cannot be done by the CEO alone. Other executives may also have the relevant information and leak it to the board. If the CEO decides to take information asymmetry-increasing projects, independent-minded top lieutenants may dissent in the implementation stage (Landier et al.,

2009) and/or exert insufficient efforts (Acharya et al., 2011). Preventing information leaks and implementing the projects requires cooperation from other members of the executive suite.

Other top executives may cooperate more and dissent less if they are connected to the CEO through appointments and social ties. As discussed earlier, the more top executives appointed during a CEO's tenure, the greater the CEO's social influence in the executive suite and the more cooperative his top lieutenants. The social influence will become stronger if the appointees are also socially pre-connected to the CEO. Such CEO connectedness may be viewed as a form of management entrenchment that helps control information flow to the board and implement information asymmetry-increasing activities. Consistent with this conjecture, Armstrong, Core, and Guay (2014) find that "when management is more likely to be entrenched, management forecasts become less precise, and to some extent less frequent." (p. 385). Based on the above theoretical considerations, we make:

Prediction 1: When regulation forces a dependent board to become independent, the executive suite will become more dependent as measured by the CEO's connectedness within the executive suite.

How do changes in executive suites in response to the shock affect firm performance? Consider the pros and cons of CEO connectedness from the shareholder perspective. The main benefit is better cooperation and coordination among top executives, enabling them to act and react more efficiently to internal and external challenges (Adams, Almeida, and Ferreira, 2005; Li, Lu, and Phillips, 2015; Han, Nanda, and Silveri, 2016). The costs are compromising the best combination in forming the top executive team and the risk of inadequate checks and balances.[4] An optimal level of CEO connectedness involves trading off these benefits and costs.[5]

This optimal level of CEO connectedness is likely to be perturbed by the shock, which moves the level of board independence away from the optimal level. When an endogenously determined dependent board is forced to become independent, the CEO will withhold more information from the board (Adams

[4] The risk of inadequate checks and balances due to close CEO connectedness with top executives is illuminated in Khanna, Kim, and Lu (2015), which shows that appointment-based CEO connectedness increases the likelihood of committing fraud, decreases the likelihood of detection, makes CEO dismissal less likely upon detection, and lowers the coordination costs of carrying out illegal activities.

[5] Adams et al. (2005) find powerful CEOs are associated with the best and worst firm performance.

and Ferreira, 2007), which will also make board advice less useful. To make up for the loss in the usefulness of board advice, the CEO may turn to the executive suite for more efficient internal sharing of information that can generate more valuable ideas and advice from executives. Harris and Raviv (2008) present an equilibrium model in which a dependent board is optimal when insiders' information is crucial for firm profitability, suggesting startups in high-tech industries as an example. For these firms, protecting insider information is crucial. When the board is forced to have more outsiders than endogenously determined, increasing CEO connectedness in executive suites may help insulate the decision-making process from outsiders and allow insiders to more freely exploit their collective inside information for profitability. Increasing CEO connectedness is then a step toward the new optimal level of executive suite independence, which helps mitigate the negative effect of the shock on firm value.

Duchin et al. (2010) present a model combining key features of Adams and Ferreira (2007) and Harris and Raviv (2008). The model predicts, with supporting evidence, that when outsiders' cost of acquiring information is high, an independent board is ineffective and a dependent board is optimal; hence, the shock decreases shareholder value. This helps us to make a conditional prediction based on the information environment: When the information cost is high, increasing CEO connectedness moves executive suite independence toward the new optimal level and thus will have a positive marginal effect.

When outsiders' cost of acquiring information is low, Duchin et al. (2010) argue that an independent board is optimal but entrenched CEOs may choose dependent boards for private benefits, and thus the shock will improve shareholder value. However, from the entrenched CEO's perspective, the newly independent board poses a threat to private benefits, so he may increase connectedness with top executives to present a more united front against monitoring. Such responses are likely to reduce the positive effect the shock could have had on firm performance. Thus, we make:

Prediction 2: When outsiders' cost of acquiring information is high (low), increases in CEO connectedness in response to the shock will have positive (negative) marginal effects on firm performance.

We test these predictions by first investigating whether the shock increases CEO connectedness in executive suites. Then we relate the shock-induced changes in CEO connectedness to operating performance and shareholder value under high- and low-information cost environments.

3. Empirical Design and Data

3.1. Proxies for CEO connectedness

Our primary proxy for CEO connectedness in executive suites is the connections a CEO has built through appointments of top-four non-CEO executives. It is measured by $FT4A_{it}$, the fraction of top-four non-CEO executives appointed—hired or promoted from within the firm—during the tenure of firm *i*'s CEO as of year *t*. It ranges from zero to one in increments of 0.25. Top-four non-CEO executives are identified from ExecuComp, which ranks executives by the sum of salaries and bonuses. We assume the year an executive first appears on the top-four list is the year she obtained the position. We compare this year with the year a current CEO took office to determine whether the executive is appointed during the CEO's tenure. To prevent changes in the reported number of executives from affecting within-firm variation in *FT4A*, we drop observations when ExecuComp reports fewer than four non-CEO executives.[6]

We also use CEOs' pre-exiting network ties with their appointees as another measure of CEO connectedness. We count the total number of network ties CEOs and their appointees have, *Exe_Tie*, through past employment, educational institutions, and *past* membership to social and professional organizations. To avoid reverse causality, we include only network ties formed prior to joining the company. We also require that network ties are established during overlapping years for each category of network ties; in the education category, for example, the years a CEO and an executive attended the same school must overlap. We capture the depth of past connections by counting the number of network ties for each category. Then we sum the three types of ties to arrive at the total number of ties.

3.2. Difference-in-differences Estimation

[6]Kim and Lu (2011) illustrate the importance of keeping the number of executives constant when constructing executive variables for panel regressions with firm fixed effects. Cross-checking against proxy statements shows that missing executives in ExecuComp are due to omission rather than to dismissal; hence, the restriction is unlikely to introduce a selection bias.

Because both board and executive suite compositions are endogenous, we use an exogenous shock on board independence. The shock is the requirement for a majority of independent directors for firms listed on NYSE and NASDAQ. The deadline for compliance was October 31, 2004; however, many firms that lacked a majority of independent directors began to change their board composition in 2002 when the recommendations were promulgated by NYSE and NASDAQ. The largest changes occurred in 2002 and 2003 (see Chhaochharia and Grinstein, 2009, Table 1, Panel A; and Duchin et al., 2010, Figure 1.) Thus, we use 2001 as the base-year to define which firms are affected by the regulation and 2003 as the first year of the post-regulation period. We treat 2002 as the transition period and exclude observations during that year in estimating difference-in-differences.[7] The baseline specification is

$$Y_{it} = a_i + a_t + \beta_1 Affected_i * Post_t + \beta_2 X_{it} + \varepsilon_{it} . \quad (1)$$

Y_{it} is a measure of firm i's current CEO's connectedness as of year t, as measured by either *FT4A* or pre-existing social ties. $Affected_i$ is the treatment indicator, equal to one if firm i does not have a majority of independent directors in 2001, and zero otherwise. This indicator is interacted with $Post_t$, the post-regulation indicator, equal to one if year t is 2003 or later. The regression includes firm- and year fixed effects, so it does not contain stand-alone variables $Affected_i$ and *Post*. X is time-varying control variables. When estimation is based on an unmatched sample, standard errors are clustered at the firm level. The Appendix contains definitions of all variables.

In a difference-in-differences estimation, the outcome variable of the control group is used to calculate the expected counterfactual, assuming that the treatment and control groups have the same time trend if there are no regulatory changes. Thus, we check whether FT4As of treated and control firms were following similar trends before the treatment. Figure 1 plots FT4As separately for our sample of treated and control firms from 1996 to 2006. Both groups show increasing FT4As, with remarkably parallel trends until 2002, when treated firms start to show sharper increases in FT4A, narrowing the gap with control firms. The pre-regulation trends indicate that the parallel trends assumption is valid. Also

[7] The results are robust to including 2002 observations in the pre-regulation sample.

noteworthy, control firms show higher FT4As than treated firms throughout the sample period, suggesting a negative correlation between board and executive suite independence.

3.3. Propensity-Score Matching

Although the parallel trends during the pre-shock period justify our difference-in-differences approach, to improve comparability with the treated firms, we construct a propensity-score matched control group following Rosenbaum and Rubin (1983) based on information in the base-year 2001. Linck, Netter, and Yang (2008) argue board independence is related to firm complexity, costs of monitoring, ownership incentive, and CEO characteristics. We capture firm complexity by firm size, firm age,[8] and the number of segments within a firm; costs of monitoring by EBITDA/TA, Tobin's Q, and board size; ownership incentive by a CEO's percentage share ownership; and CEO characteristics by age, gender, founder status, and board chair duality. In addition, we include the number of financial analysts covering the firm. Duchin et al. (2010) find an analyst-based variable is related to the likelihood of having a dependent board. We also include industry fixed effects.

Landier et al. (2013) show that a measure similar to FT4A based on the fraction hired is related to CEO tenure,[9] whether the CEO is hired from outside, the average tenure of top-four non-CEO executives (*EXECSEN*), and the fraction of top-four executives appointed during a CEO's first year in office (*FT4A_1Y*). We include these variables. We also include the fraction of executives whose first year as a top-four non-CEO executive can be identified from ExecuComp (*KNOWN*).[10] This controls noise in *FT4A* and *EXECSEN* arising from the ambiguity about the precise year of some of the top-four executive appointments. To help control noise in *FT4A_1Y*, we add the fraction of top executives whom we cannot determine whether they are appointed during a CEO's first year in office (*FT4A_1Y _Unknown*).

[8] Boone, Field, Karpoff, and Raheja (2007) suggest that complexity increases with firm age, and Duchin et al. (2010) find that firm age is significantly related to the likelihood of having a dependent board.

[9] If a CEO leaves the position and returns later, ExecuComp reports only the latest appointment date. Thus simply comparing the CEO appointment date reported by ExecuComp with the current year may generate negative CEO tenure. To correct this problem, we backtrack the previous appointment year using the CEO and company names.

[10] If an executive is already one of the top four non-CEO executives at the firm's first appearance in ExecuComp, we cannot determine the year of her appointment. For such an executive, we use the year the executive joined the company as the year she was appointed as a top-four executive. This understates *FTA* and overstates *EXECSEN*, which is why we include *KNOWN* as a control variable.

Table A-1 in the Online Appendix reports estimation results of the Probit model used to compute the propensity score. Consistent with the estimates reported in Duchin et al. (2010) (Table 9, the second column), firm age, the number of segments, and the number of analysts all show negative relations to the likelihood of having a dependent board. The likelihood of having a dependent board is higher when CEOs own more shares, top executives' average tenure is longer, and CEOs do not chair the board. Log likelihood, Prob > Chi^2, and Pseudo R^2 for the propensity score estimating regression are -282.31, 0.00, and 0.14, respectively. Propensity scores calculated from the estimates are then used to match one affected firm to the three nearest unaffected firms based on the Mahalanobis distance metric. We exclude all observations that do not satisfy the common support condition. We bootstrap 200 times to correct standard errors for all OLS regressions estimated with matched samples.

3.4. Sample Construction

Our sample is constructed with NYSE- and NASDAQ-listed firms for which we have information on board composition in 2001 from RiskMetrics and on executives from ExecuComp. Other data sources include Compustat for accounting data; CRSP for stock return data; and BoardEx for pre-existing social ties. To avoid ambiguity about who constitutes the current CEO, we drop firm-year observations when a new CEO's first year overlaps with the last year of the previous CEO.

The sample period covers 1996 through 2006, excluding 2002. We begin with 1996 to include sufficient pre-regulation observations. We stop after 2006 because RiskMetrics modified the definition of independent directors in 2007 to conform to the exchanges' definition, making it difficult to compare the level of board independence before and after 2007.

Table 1 lists, by year, the number of firms in the full sample, which contains 8,975 firm-year observations associated with 1,035 unique firms. Columns (3) and (4) report the number of firms in the treatment and control group for the unmatched full sample. The number of firms increases over time due to greater firm coverage by ExecuComp in later years. Columns (5) - (7) show the propensity score matched sample. The number of affected firms in the matched sample is slightly smaller than that in the unmatched sample because some affected firms do not satisfy the common support condition. The

number of unaffected firms is substantially fewer than three times the number of affected firms because of multiple matches to the same unaffected firms.

3.5. *Descriptive Statistics*

Table 2, Panel A provides summary statistics for the unmatched full sample. The indicator *Affected* has a mean of 0.167, indicating 17% of our sample firms had a dependent board in 2001. The post regulation period indicator, *Post*, has a mean of 0.44, indicating fairly evenly distributed observations between pre- and post-regulation periods. The mean and median *FT4A* are 0.44 and 0.50, implying about half of the top-four non-CEO executives are appointed during the current CEO's tenure.

Panel B compares affected and unaffected firms for both the unmatched and propensity-score matched samples at the time of matching, the base-year 2001. Both samples show significantly smaller FT4A for firms with a dependent board than those with an independent board in 2001, suggesting an inverse relation between board and executive suite independence. For most of the other variables, the difference between treated and control firms is smaller and less significant for the propensity-score matched sample (Columns (8) and (9)) than for the unmatched sample (Columns (4) and (5)), indicating the propensity score matching improves the comparability between the treatment and control groups. The propensity score matched sample also shows insignificant differences between the treatment and control groups for the majority of firm and CEO characteristic variables, with a few exceptions that arise because the propensity-score matching is based on the overall similarity.

4. CEO Connectedness in Executive Suites

4.1. Changes in FT4A

Table 3 presents estimation results on the regulation's impact on FT4A. Time-varying control variables are similar to those used in the probit model to construct the propensity score. Odd-numbered columns report OLS estimates. The coefficient on *Affected*Post,* the estimated shock effect, is positive and significant at 1%, irrespective of whether the sample is unmatched or propensity-score matched. Ordered logistic regression estimates, reported in even-numbered columns, are consistent with the OLS

results. All estimates imply mandating an independent board significantly increases FT4A.[11] The coefficient on *Affected*Post* in Column (1) implies that the regulation increased FT4A by 0.089. This is economically meaningful, when considering the treated firms' mean FT4A in 2001 was 0.381 (See Table 2, Panel B).

Most firms achieved higher FT4A without forcing previous CEOs' appointees to leave the firm. When executives leave a firm, the firm has to provide severance packages and may lose valuable firm-specific knowledge. These costs are avoided when FT4A is increased by promoting or hiring an executive to a position higher than previous CEOs' appointees who occupy the top-four list. A closer look at executives dropped from the top-four list during the mandated board restructuring reveals that the vast majority remained with the firm post-regulation.[12]

Coefficients on control variables are largely consistent across the four regressions. As expected, FT4A is positively (negatively) related to the length of CEO' (the average non-CEO executives') tenure. Interestingly, founder CEOs and CEOs with greater share ownership are associated with lower FT4A, while older CEOs tend to have higher FT4A. Larger and older firms tend to have a higher FT4A.

4.2. Alternative Explanations for Higher FT4A

This evidence of a higher FT4A indicates a shakeup in executive suites amid the mandated board restructuring. In this section we investigate whether alternative stories related to turnovers in executive suites and board rooms can explain the higher FT4A.

4.2.1. Executive Tenure Effects

Previous CEOs' appointees tend to have longer tenure, which may make them more vulnerable during a shakeup in executive suites. To check whether this tenure bias explains the higher FT4A, we separate the executives on the top-four list into current CEO vs. previous CEO appointees. For each group,

[11] Since there might be some time-variant omitted variables which are correlated with the treatment, we re-estimate the baseline regressions while controlling for firm- and year fixed effects and firm-specific time trend effects, which are constructed based on interaction terms between firm fixed effects and the time trend variable. This controls for time-variant firm level omitted factors and allow firms to have different time trends. The results are robust.

[12] We identify 455 executives of the treated firms who were dropped from the top-four list between 2001 (pre-regulation) and 2004 (post-regulation). As of 2004, 327 of them remained with the firm, one died, 39 retired, and 88 resigned from the firm.

we estimate firm-level conditional logistic regressions at the executive level. The dependent variable is an indicator equal to one if an executive on the top-four list in year *t* is dropped in year *t+1*. Control variables include firm size, *Return*, *CEO_founder*, tenure on the top-four list, and share ownership.

The estimation results are reported in Table A-2 in the Online Appendix. Coefficients on the standalone executive tenure variable are significant for both sub-groups but with opposite signs. For previous CEOs' appointees, the longer the tenure, the more likely they will be dropped from the list. Surprisingly, the opposite holds for current CEOs' appointees; the longer the tenure, the more likely they will stay on the list. Longer tenure works against previous CEOs' appointees, but helps current CEOs' appointees to stay as CEOs' top lieutenants. The greater turnover among previous CEOs' appointees could be due to their longer tenure relative to the current CEO's appointees. Thus, we restrict each subsample to only those executives whose tenure in the top-four list is longer than the sample median and reestimate the regressions. The results, reported in the last two columns in Table A-2, are robust.

Furthermore, the results show that the regulation increased the likelihood of turnover for previous CEOs' appointees but not for the current CEO's appointees. The tenure-based story cannot explain the higher FT4A. If anything, the opposite effects of tenure between previous and current CEOs' appointees demonstrate CEOs' strong influence on who occupies executive suites.

4.2.2. Inside Director Turnovers

When a dependent board becomes independent, some inside directors may lose board seats and leave the firm for better opportunities elsewhere. If they are previous CEOs' appointees on the top-four list, FT4A will increase. However, our data show inside directors come out of the restructuring largely intact. The higher fraction of independent directors is achieved mostly by replacing "affiliated" directors, outside directors with a material relationship with the firm.[13] Between 2001 and 2004, treated firms'

[13] On average, treated firms increased the fraction of independent directors from 0.36 in 2001 to 0.56 in 2004, but kept the board size more or less the same—9.06 directors in 2001 and 9.28 in 2004. Affiliated directors are non-independent outside directors, such as a provider of professional services (legal, consulting, or financial services) to the company; a customer of, or supplier to the company; a designee, such as a significant shareholder, under a documented agreement between the company and a group; a director who controls more than 50% of the company's

average fraction of affiliated directors declined from 0.33 to 0.20, a reduction of 0.13. By contrast, the fraction of inside directors declined by only 0.07, from 0.32 in 2001 to 0.25 in 2004.

Among treated firms covered by both ExecuComp and RiskMetrics in 2001 and 2004, we identify 103 top-four non-CEO executives who sat on the board in 2001 but no longer served on the board in 2004. Most of them (84) are previous CEOs' appointees, and the majority (47) remained with the firm as of 2004, with the rest leaving the firm due to death (1), retirement (22), and resignation (14). Only 19 of the 103 are current CEO's appointees, indicating that inside directors connected to the CEO though appointments remain largely intact during the mandated board restructuring.

4.2.3. CEO Turnover

If treated firms experience greater CEO turnover and new CEOs bring their own team of top executives, their FT4As are likely to increase, which is why all regressions control for the fraction of top-four non-CEO executives appointed within the year of a new CEO appointment. To make sure, we estimate the effect of the board regulation on CEO turnover with firm-level conditional logistic regressions with year dummies. The results, reported in Table A-3, show that the regulation has insignificant effect on CEO turnover. The shakeup in the executive suite seems to be limited to non-CEO top executives. The higher FT4A among treated firms cannot be explained by the CEO turnover story.

4.3. Changes in CEOs' Social Connections with Top Executives Appointed during their Tenure

If the higher FT4A is a result of CEOs' attempts to increase their connectedness within executive suites, they may opt for individuals with whom they are socially pre-connected. Prior social connection per se may not necessarily help obtain a position on the top-four list, but the CEO's familiarity acquired through prior social interactions helps to select individuals more closely aligned, and less likely to dissent.

We test this prediction by estimating the baseline regressions with CEO-executive social ties as the dependent variable, log of one plus the total number of pre-existing network ties current CEOs have with their appointees on the top-four list. CEO-executive ties are obtained by manually matching

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voting power; a family member of an employee; a former employee of the company or of a majority-owned subsidiary; or an employee of an organization or institution that receives charitable gifts from the company.

individual names in ExecuComp with those in BoardEx.[14] The control variables are the same as in Table 3, except we add *FT4A* as a control because the number of network ties a CEO has with his appointees is greater the more executives appointed during his tenure. Information on network ties between an executive and the CEO is sometimes missing or incomplete because some relevant individuals are not covered by BoardEx and the information provided in BoardEx is insufficient to determine whether the connections occurred during overlapping years. To avoid reducing the sample size, we assign zero connection when the information is missing or incomplete. Because this leads to underestimation of network ties, we include the percent of executives appointed by the current CEO with missing or incomplete information on their pre-existing network ties to their CEOs. This variable is set to zero when a firm-year observation shows no executives are appointed during a current CEO's tenure.

Table 4 reports estimation results. Both unmatched and matched samples show significant increases in CEOs' network ties with top executives appointed during their tenure. Social connections play a role in appointment decisions because they provide valuable information about personal abilities and character unavailable in the public domain. However, this should apply to both treatment and control groups and thus cannot explain why the network ties increase more at treated firms post-regulation.

5. CEOs' Social Connections in the Board

Increasing CEO influence in executive suites is not the only way treated firms can counter the regulation. They may circumvent the legal requirement by recruiting legally independent but socially dependent directors.

5.1. CEOs' Social Connections with Independent Directors

We estimate the shock effect on CEO-director ties with the same baseline regression, with the dependent variable equal to the log of one plus total number of pre-existing network ties a CEO has with

[14] Coverage by BoardEx prior to 2000 is quite limited; however, the social ties for years 1996 to 1999 for individuals covered by BoardEX in later years can be obtained from BoardEx because it collects information about individuals by looking into the past. If a person is first covered in 2002, for example, her education, employment, and organization membership history before 2002 is included in the database. Nevertheless, we reestimate the baseline regressions using network tie data only from 2000 and find the results are robust.

independent directors, *Dir_Tie*, calculated following a procedure similar to that used in measuring CEO-executive ties. The control variables are similar to those in Table 4.[15]

The estimation results are reported in the first two columns of Table 5. Coefficients on *Affected*Post* are positive for both unmatched and matched samples, but significant only for the unmatched sample at the ten percent level. Estimators based on propensity score often generate more precise estimates in finite samples (Angrist and Hahn, 2004).

5.2. CEO-director Social Connections vs. CEO-Executive Appointment-based Connections

If treated firms are able to circumvent the independent board requirement by recruiting socially-dependent independent directors, would they still increase the appointment-based CEO connectedness in executive suites? To answer this question, we compare CEO-independent director social ties between 2001 and 2004 for each firm to determine whether CEO-director ties increased after the regulation. Then we divide treated firms into those with increased CEO-director ties, *Increase_Tie*, and those with no increase in the ties, *No_Increase_Tie*, and reestimate the baseline regression for FT4A while interacting these indicators with *Affected*Post*.

The estimation results are reported in the last two columns of Table 5. The effect of the regulation on FT4A is positive and significant only when CEO-director ties do not increase. When CEO-director ties increase, the regulation has no effect on FT4A. Firms do not seem to increase appointment-based CEO-executive connectedness when they are able to recruit socially-dependent independent directors to meet the regulatory requirement.

6. Firm Performance Analyses

Do changes in executive suite independence in response to the regulation affect firm performance? To address this issue, we measure firm performance by *EBITDA/TA*, EBITDA divided by

[15] Some modifications are necessary for switching from CEO-executive ties to CEO-director ties. We control for the number of independent directors, *Num_Ind_Dir*, instead of *FTA* because the number of pre-existing network ties is likely to increase with more independent directors. We also exclude variables specifically related to FTA; *FTA_1Y*, *FTA_1Y_Unknown*, *KNOWN*, *EXECSEN*, and *Pct_Miss_FTA_1Y_Tie*. And instead of *Pct_Miss_FTA_Tie*, we include *Dir_Tie_Unknown*, the percent of independent directors whose pre-existing network ties to their CEOs are either missing or incomplete.

the book value of total assets, and Tobin's Q. We compute their changes from pre-regulation to post-regulation periods, $\Delta EBITDA/TA$ and ΔQ, by taking the difference in their averages for up to four years over 1998-2001 and 2003-2006. Changes in FT4A, $\Delta FT4A_i$, are computed the same way. Only observations in which a CEO was the CEO in 2001 are included to avoid having different CEOs of a same firm in the estimation. To construct the changes, the panel data is collapsed to cross-sectional data such that each observation is associated with one firm.

Control variables include changes in firm size, $\Delta Ln(TotalAssets)$; changes in firm risk as measured by idiosyncratic risk, $\Delta Risk$; and changes in board size, $\Delta Boardsize$. To avoid reducing the sample size due to missing observations, we set $\Delta Risk$ equal to zero if they are missing, and use a dummy variable, $\Delta RiskD$, which is set to one if $\Delta Risk$ is available and zero otherwise. We do not control for CEO characteristics because we have the same CEO for each firm. Because the regressions are cross-sectional, standard errors are clustered at the industry level based on the one-digit SIC code.

Table 6 reports estimation results for the full sample in Columns (1) and (4). Coefficients on the standalone $\Delta FT4A$ are significantly negative for $\Delta EBITDA/TA$ and negative but only marginally significant for ΔQ. These results are consistent with the finding in Landier et al. (2013) that the fraction of top executives hired by current CEOs is negatively correlated to firm performance.

Our main interests are, however, on the effects of regulation-induced changes in FT4A on firm performance and how they vary across information environments. We construct an information cost index in the base year 2001. It relies on three widely-used proxies: (1) The number of analysts (source: I/B/E/S). Analyst coverage is generally believed to reduce information asymmetry. (2) Asset intangibility, as measured by intangible assets divided by total assets. Intangible assets are considered to be more difficult to evaluate than tangible assets (e.g., Harris and Raviv, 1991). (3) Stock return volatility, as measured by the standard deviation of daily stock returns. The volatility is commonly used to measure fundamental uncertainty (e.g., Boone et al., 2007). Because these three factors have different scales, we normalize them by assigning a value of one to three based on which third a firm belongs to in each factor. Higher

values indicate higher information costs. [16] Because these factors may be correlated, we follow Armstrong et al. (2014) and employ the principle component analysis to construct the information cost index, *InfoCost_Index*, for all firms in 2001.

We use this information cost index to divide the sample into high- and low information cost subsamples using the sample median. Table 6, Columns (2) and (5) report reestimation results for the high information cost subsample. The coefficient on the standalone *Affected* is negative for both Δ*EBITDA/TA* and Δ*Q* but significant only for Δ*EBITDA/TA*. These results are consistent with the findings in Duchin et al. (2010) that for firms in high information cost environments, forcing dependent boards to become independent hurts firm performance.

The variable of main interest, Δ*FT4A*Affected,* shows positive and significant coefficients for both Δ*EBITDA/TA* and Δ*Q*, supporting Prediction 2 that increases in CEO connectedness with top executives help negate the negative shock effect on firm performance in a high information cost environment. For the low information cost subsample, neither the standalone *Affected* nor Δ*FT4A*Affected* shows a significant coefficient on either performance measure.

7. The Sarbanes–Oxley Act and Other Robustness Tests

In this section we examine confounding effects of events occurred around 2002 and conduct a battery of robustness tests.

7.1. Sarbanes-Oxley Act of 2002

Our main concern is the Sarbanes-Oxley Act, which was enacted in 2002 while the independent board requirement proposal was under consideration by the SEC. If the SOX also contributed to the higher FT4A, then we over-estimate the effects of the shock. To check whether and how our results are affected by the SOX, we (1) conduct placebo tests using firms exempted from the independent board requirement but subject to other SOX requirements (2) reestimate the baseline regression with a sample of firms exempted from Section 404 of the SOX but subject to the independent board requirement.

[16] For example, we assign three to the bottom-third in the number of analysts and to the top-third in the fraction of intangible assets and in stock return volatility.

7.1.1. Placebo Tests

Our placebo tests follow Armstrong et al. (2014) and use a sample of "controlled" firms. Firms are defined as controlled when more than 50% of the voting power in electing directors is held by an individual, a group, or another company. These firms are exempted from the independent board requirement but are required to comply with other governance requirements including SOX (Armstrong et al., 2014); that is, they are not treated by the board regulation but were treated by the SOX and other possible confounding effects. We identify controlled firms by virtue of the 50% ownership rule as those in which directors and officers own more than 50% of the shares. As in Armstrong et al. (2014), firms with dual class shares are also considered controlled firms. The D&O share ownership is obtained from Compact Disclosure, and firms with dual class shares are identified using the dataset provided in Andrew Metrick's website and described in Gompers, Ishii, and Metrick (2008).

Table 7, Panel A, reports placebo test results. The first column reports reestimation of Table 3 using only controlled firms. Here treated (control) firms are controlled firms with a non-majority (majority) of independent directors in 2001. Control variables are the same as in Table 3 but not reported. The coefficient on *Affected*Post* is virtually zero.[17] In the second column, we utilize the full sample, including controlled firms and non-controlled firms matched to controlled firms using the propensity-score matching process described earlier. We then add a triple interaction term, *Affected*Post*Exempt*, where *Exempt* is an indicator for controlled firms. The coefficient on the triple interaction term is negative and significant, indicating significantly lower FT4A for controlled firms relative to non-controlled firms, which show significantly positive increases in FT4A. The magnitudes of the negative and positive coefficients are similar; indicating the net effect on controlled firms is zero. That is, firms treated by the SOX but untreated by the board regulation show no increase in FT4A, refuting the possibility that our results are affected by the SOX.

7.1.2. Reestimation with a Sample of Firms Exempted from Section 404 of the SOX

[17] Our sample of controlled firms is smaller than that in Armstrong et al. (2014) because we require coverage by both ExecuComp and RiskMetrics.

Another way to distinguish the effect of the board regulation from that of the SOX is to examine firms treated by the regulation but untreated by the most important component of the SOX, Section 404. Firms with public floats less than $75 million are exempt from Section 404, which is considered so onerous that Gao, Wu, and Zimmerman (2009) argue it provides an unintended incentive for small firms to stay small. If the higher FT4A were driven by the SOX, this subsample of firms should exhibit little or no treatment effects. We define public float as the market value of equity held by non-affiliates of the issuer, estimating it by the market value of common equity multiplied by (1 - D&O share ownership). We use the market cap as of the end of the second quarter of the fiscal year of 2002. [18] When D&O ownership is missing, we use the 2002 sample mean of 14%. This process yields 30 firms with estimated public floats less than $75 million.

The reestimation results of the baseline regression for this small subsample are reported in Panel B of Table 7. To make full use of the limited sample, estimation in Column (1) is done without any control variables other than firm and year fixed effects. Column (2) is estimated with the same set of control variables as before. We use only the unmatched subsample because the propensity-score matched subsample contains only six firms. In spite of the small sample size, difference-in-differences estimates for FT4A remain positive and significant in both specifications.

7.2. Other Possible Confounding Events

Other events, such as the dotcom bubble burst in 2000 and the 9/11 attack in 2001, occurred around the time the board regulation was promulgated. Those events may have led to fewer top executive hires and promotions during 2000-2002, lowering FT4A during 2000-2002, in turn leading to the appearance of higher FT4A in later years. If treated firms are more affected by these confounding effects, then our results will be overestimated. We check this possibility by following the approach used in Bertrand and Mullainathan (2003), replacing the post-regulation indicator, *Post*, with year dummies *2000*,

[18] On September 4, 2002, the SEC adopted final rules regarding the acceleration of filing deadlines, wherein the definition of non-accelerated filers is an issuer with a public float less than $75 million on the last business day of the most recent second fiscal quarter.

2001, *2003*, *2004*, and *2005 and after*. The reestimation results, reported in Table A-4, suggest that our results are not confounded by those events in 2000 and 2001.

7.3. Different Degrees of Treatment

Our estimations are based on a treatment indicator, $Affected_i$, which may be too crude. Consider two treated firms, one with 40% and another with 10% of independent directors in 2001. Clearly, the latter is more affected by the regulation and may react more strongly. We reestimate the baseline regression for FT4A with the interaction of the percentage of non-independent directors in 2001, $Pct\_Affected_i$, and the post-regulation indicator, *Post*. Estimation results, reported in Panel A of Table A-5, show that the more affected by the regulation, the greater the increase in FT4A, irrespective of whether the sample is unmatched or matched.

7.4. Alternative Definitions of FT4A

Executives with higher salaries and bonuses tend to be higher ranked and more influential; hence, connections with them may matter more. We calculate a compensation-weighted FT4A,

$$WFT4A_{it} = \sum_{k=1}^{k=n} Exe\_Com_{kit} / \sum_{j=1}^{j=4} Exe\_Com_{jit}. \quad (2)$$

Exe_Com_{kit} is the sum of salaries and bonuses of executive *k* appointed during the tenure of firm *i*'s CEO as of year *t*, and *n* is the number of top executives appointed during the CEO's tenure.

In addition, we estimate residuals of a regression relating *FT4A* to *CEOTEN*, *OUTSIDE*, *EXECSEN*, *KNOWN*, *FT4A_1Y*, and *FT4A_1Y_Unknown* with year fixed effects. The residuals are used as a measure of the abnormal fraction of top executives appointed, *AFT4A*, during a CEO's tenure. We also calculate *AFT4A* weighted by executives' salaries and bonuses, *WAFT4A*, by estimating the same regression with *WFT4A* as the dependent variable. When these abnormal measures of *FT4A* are used as dependent variables, we do not include independent variables used to estimate the residuals as control variables. Reestimation results based on these three alternative measures of *FT4A* are reported in Panel B of Table A-5. The regulatory impact variable shows a highly significant coefficient regardless of which alternative measure is used.

7.5. Corporate Organizational Structure-Changing Events

M&As, divestitures, and spinoffs are often accompanied by changes in the executive suite. Thus, we add the number of M&As and divestitures and spinoffs completed in the prior year as additional controls. The data are obtained from SDC. The reestimation results (unreported) are robust.

7.6. Alternative Sample Construction

Finally, we check the robustness to possible biases arising from an unbalanced sample by reestimating regressions with a balanced sample of 830 firms that exist over the period 1999 through 2006. We exclude observations in 2002 and 2003 so that the pre- and post-regulation periods comprise the same number of years (three years in each). In this sample, 2004 is the first year fully affected by the regulation. The rest is the same. The reestimation results (unreported) are robust.

8. Conclusions

We find that when firms experience an external shock to increase board independence, they respond by increasing CEO connectedness in the executive suite. The spillover is not limited to the executive suite, however. The shock also seems to weaken social independence of independent directors. Interestingly, these spillovers do not occur at the same time. When treated firms increase CEO-independent director social ties, they do not increase CEO connectedness in executive suites, suggesting they are substitutes.

These findings have clear implications for investors, corporate governance specialists, and policy makers: Inferring the overall independence of a firm's governing process by board independence alone is misleading. When policy makers target a specific governance mechanism for improvement, they must be aware their regulatory actions could spill over to other governing bodies and to other aspects of governance within the targeted mechanism. Such spillovers are often difficult to predict and some could be harmful. Thus, when it comes to governance reforms, the "comply or explain" approach taken in many European, and some Asian, countries presents an appealing feature absent in the legally binding regulation approach typically taken in the U.S.[19]

[19] See Kim and Lu (2013) for detailed documentation of major corporate governance reforms undertaken by 26 advanced and emerging economies.

Finally, a caveat is in order. We consider only top echelon employees of the firm—top executives and board members. The board and the executive suite are not the only governing bodies. Non-managerial employees also influence the governing process through their working relationships with management (Bertrand and Mullainathan, 2003), the collective bargaining process (Atanassov and Kim, 2009), and worker productivity and involvement in anti-takeover activities (Kim and Ouimet, 2014). The possible dynamics among the three governing bodies, with the board representing shareholders, employees representing their own collective interest, and the executive suite managing often conflicting interests between capital providers and labor suppliers, are intriguing and complex. More research is needed on the three-way dynamics for a more comprehensive understanding of how the interdependence between the three groups affect a firm's overall governing process.

Appendix:

Variable Descriptions.

Board Composition Variables	
Affected	Dependent board indicator equal to one if a firm does not have a majority of independent directors in 2001; zero, otherwise.
Pct_Dep_Dir	The percentage of non-independent directors on the board in 2001.
Executive Suite Composition Variables	
FT4A	Fraction of top-four non-CEO executives appointed during a current CEO's tenure.
AFT4A	Abnormal fraction of top-four non-CEO executives appointed during a current CEO's tenure.
WFT4A	Fraction of top-four non-CEO executives appointed during a current CEO's tenure, weighted by the sum of executives' salaries and bonuses.
WAFT4A	Abnormal fraction of top-four non-CEO executives appointed during a current CEO's tenure, weighted by the sum of executives' salaries and bonuses.
Ln(Exe_Tie+1)	Logged value of *Exe_Tie* plus one. *Exe_Tie* is the total number of pre-existing network ties a CEO has with top-four non-CEO executives appointed during his tenure through past employment (either working as an employee or serving on the board), educational institutions, and *past* membership to social and professional organizations. Only network ties established during overlapping years are included.
Ln(Dir_Tie+1)	Logged value of *Dir_Tie* plus one. *Dir_Tie* is the total number of pre-existing network ties a CEO has with his firm's independent directors through past employment (either working as an employee or serving on the board), educational institutions, and past membership to social and professional organizations. Only network ties established during overlapping years are included.
Other Variables	
Post	Post-regulation indicator, equal to one if year *t* is 2003 or thereafter; zero, otherwise.
InfoCost_Index	An index for the initial level of outsiders' cost of acquiring firm specific information in 2001. It consists of three factors related to the difficulty in acquiring firm-specific information: (1) the number of analysts covering the firm; (2) intangible assets divided by total assets; and (3) stock return volatility. Each factor is normalized to the value of one to three based on which third it belongs to (e.g., the maximum value of three is assigned to the bottom third in the number of analysts and to the top third in the fraction of intangible assets and in stock return volatility). Then we employ the Principle Component Analysis to construct InfoCost_Index for all firms in 2001. Higher index indicates higher cost for outsiders to acquire firm-specific information.
OUTSIDE	Outsider indicator equal to one, if a CEO comes from outside the firm; zero, otherwise.
FT4A_1Y	Fraction of top-four non-CEO executives appointed within the year of a new CEO appointment.
FT4A_1Y_Unknown	Fraction of top-four non-CEO executives whose information on whether they are appointed within the year of a new CEO appointment is unknown.
KNOWN	Fraction of executives whose first year on the list of the top-four non-CEO executives can be identified with data in ExecuComp.
EXECSEN	Average tenure of top-four non-CEO executives.
Female	Indicator equal to one if a CEO is female; zero, otherwise.
Ln(CEOAge)	Logged value of CEO age.
CEO_OWN	Percentage of outstanding common shares held by a CEO.

CEO_Chair	Indicator equal to one if a CEO chairs the board; zero, otherwise.
CEO_Founder	Indicator equal to one if a CEO is a founder; zero, otherwise.
Ln(TotalAssets)	Logged book value of total assets in 2000 US million dollars.
FirmAge	One plus the number of years from the firm's IPO or the number of years since its first appearance in CRSP.
Segment	Number of business segments a firm has in a given year as reported by Compustat/Segment.
Pct_Miss_FT4A_Tie	Percent of top-four non-CEO executives appointed during a CEO's tenure whose network ties to their CEO are missing or incomplete.
Tobin's Q	The market value of common equity plus the book value of total liabilities divided by the book value of total assets.
EBITDA/TA	Earnings before interest, tax, depreciation, and amortization divided by the book value of total assets.
Risk	The standard error of the residuals from a CAPM model estimated using daily data over the concurrent year. It is equal to zero, if data to construct *Risk* are unavailable.
RiskD	Dummy variable equal to one if the data required to estimate *Risk* are available; zero, otherwise.
Boardsize	Total number of directors on the board.

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Figure 1: Time Trends of FT4As of Firms Affected and Unaffected by the Independent Board Requirement.

This figure plots the yearly mean FT4As of firm affected and unaffected during the sample period of 1996 through 2006.

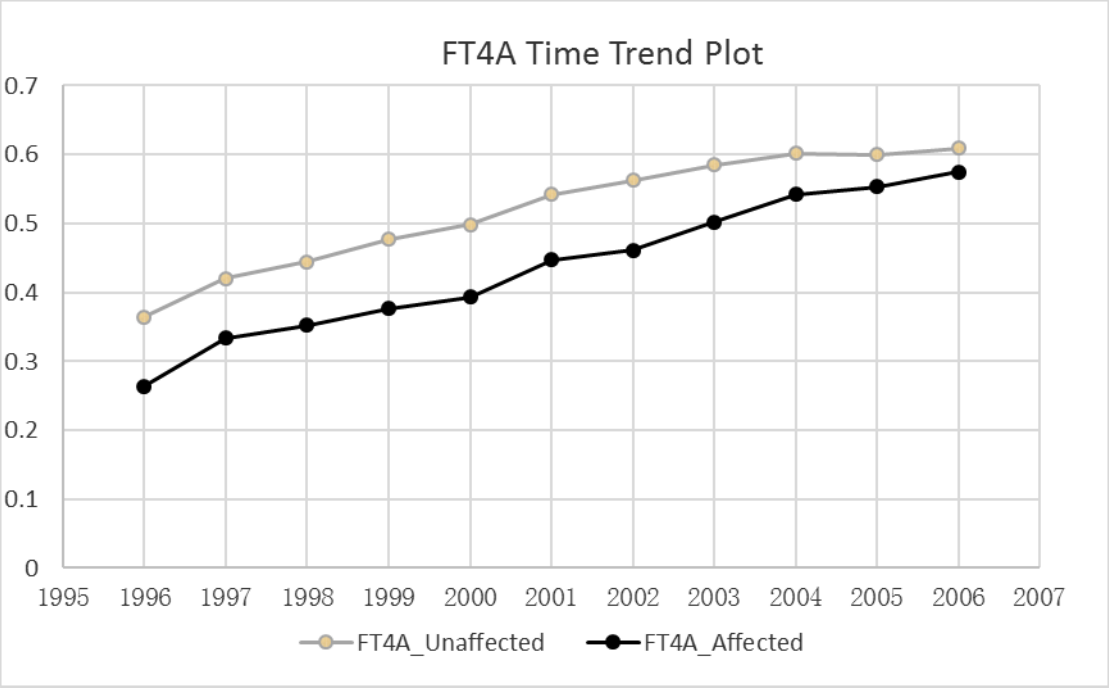

Table 1: Sample Description.

This table shows, by year, the number of observations for unmatched and propensity-score matched samples. Columns (2) and (5) report the number of firms for which we have information on both board composition in 2001 and the fraction of top-four non-CEO executives appointed (FT4A) during a CEO's tenure. Columns (3) and (6) report the number of firms without a majority of independent directors in 2001 and, hence, affected by the regulation. Columns (4) and (7) show the number of firms unaffected by the regulation.

	Unmatched Sample			**Propensity-score Matched Sample**		
Year	**Full**	**Affected**	**Unaffected**	**Full**	**Affected**	**Unaffected**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
1996	691	106	585	267	102	165
1997	755	113	642	292	108	184
1998	825	128	697	332	123	209
1999	913	147	766	368	143	225
2000	946	156	790	382	151	231
2001	944	157	787	387	155	232
2003	958	164	794	378	150	228
2004	969	171	798	382	152	230
2005	978	171	807	378	150	228
2006	996	182	814	374	152	222
Total	8,975	1,495	7,480	3,540	1,386	2,154

Table 2: Descriptive Statistics.

Panel A reports summary statistics of key variables for the full sample. Panel B compares affected firms with unaffected firms in the unmatched and the propensity-score (PS) matched sample, respectively. The comparison is based on the mean values of variables in the base-year 2001. Definitions of the variables are provided in the Appendix.

Panel A: Summary Statistics for the Full Sample

Variables	Mean	Median	Std. Dev.	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
Board Composition Variables					
Affected	0.167	0.000	0.373	0.000	1.000
Pct_Dep_Dir	0.351	0.333	0.176	0.063	1.000
Executive Suite Composition Variables					
FT4A	0.437	0.500	0.334	0.000	1.000
Ln(Exe_Tie+1)	0.064	0.000	0.237	0.000	2.639
Pct_Miss_FT4A_Tie	0.041	0.000	0.181	0.000	1.000
Other Variables					
Post	0.435	0.000	0.496	0.000	1.000
CEOTEN	6.920	5.000	7.334	0.000	55.000
OUTSIDE	0.142	0.000	0.349	0.000	1.000
CEO_Founder	0.090	0.000	0.286	0.000	1.000
FT4A_1Y	0.538	0.500	0.399	0.000	1.000
KNOWN	0.973	1.000	0.093	0.000	1.000
EXECSEN	4.350	4.000	1.872	0.000	14.750
FT4A_1Y_Unknown	0.001	0.000	0.021	0.000	0.500
Female	0.013	0.000	0.113	0.000	1.000
Ln(CEOAge)	4.015	4.025	0.135	3.466	4.511
CEO_OWN	0.023	0.003	0.060	0.000	0.638
CEO_Chair	0.657	1.000	0.475	0.000	1.000
Ln(TotalAssets)	7.765	7.599	1.657	2.227	14.291
FirmAge	26.830	23.000	19.571	1.000	82.000
Segment	15.036	14.000	9.695	1.000	87.000
Tobin's Q	2.195	1.564	2.899	0.475	105.090
Risk	0.022	0.019	0.013	0.000	0.196
RiskD	0.936	1.000	0.245	0.000	1.000
Boardsize	9.795	9.000	2.842	4.000	30.000
Ln(Dir_Tie+1)	0.481	0.000	0.702	0.000	3.332
Dir_Tie_Unknow	0.048	0.000	0.158	0.000	1.000

Panel B: Comparison between Affected and Unaffected Firms in Unmatched and PS-matched Samples.

	Unmatched Sample				PS-matched Sample			
	Affected	**Unaffected**	**(2)-(3)**	**P-Value**	**Affected**	**Unaffected**	**(6)-(7)**	**P-Value**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
FT4A	0.381	0.470	-0.090	0.002	0.381	0.457	-0.076	0.019
Ln(Exe_Tie+1)	0.070	0.061	0.009	0.673	0.070	0.069	0.002	0.952
Pct_Miss_FT4A_Tie	0.017	0.029	-0.012	0.334	0.017	0.023	-0.006	0.649
CEOTEN	9.847	6.050	3.798	0.000	9.594	6.784	2.809	0.002
OUTSIDE	0.191	0.141	0.050	0.108	0.181	0.129	0.051	0.166
CEO_Founder	0.205	0.070	0.136	0.000	0.195	0.121	0.074	0.048
FT4A_1Y	0.572	0.512	0.059	0.083	0.573	0.524	0.049	0.235
KNOWN	0.971	0.976	-0.004	0.589	0.973	0.986	-0.013	0.089
EXECSEN	4.909	4.193	0.716	0.000	4.880	4.348	0.532	0.004
FT4A_1Y_Unknown	0.002	0.002	0.000	0.999	0.002	0.000	0.002	0.222
Female	0.006	0.014	-0.008	0.438	0.006	0.013	-0.006	0.538
Ln(CEOAge)	4.034	4.002	0.032	0.011	4.032	3.997	0.035	0.019
CEO_OWN	0.052	0.019	0.033	0.000	0.048	0.021	0.027	0.000
CEO_Chair	0.605	0.685	-0.080	0.052	0.600	0.655	-0.055	0.271
Ln(TotalAssets)	7.400	7.813	-0.414	0.004	7.420	7.443	-0.023	0.881
FirmAge	19.541	27.314	-7.773	0.000	19.594	21.940	-2.346	0.128
Segment	14.929	17.949	-3.020	0.000	15.046	16.767	-1.721	0.036
Tobin's Q	2.127	2.034	0.093	0.510	2.131	1.882	0.249	0.074
EBITDA/TA	0.133	0.122	0.012	0.248	0.134	0.135	-0.001	0.897
Risk	0.032	0.030	0.002	0.123	0.032	0.032	-0.001	0.657
RiskD	0.936	0.939	-0.003	0.898	0.935	0.991	-0.056	0.002
Boardsize	9.599	9.668	-0.070	0.787	9.626	9.392	0.234	0.411
Ln(Dir_Tie+1)	0.193	0.557	-0.364	0.000	0.195	0.428	-0.232	0.000
Dir_Tie_Unknow	0.005	0.019	-0.014	0.131	0.005	0.019	-0.014	0.128

Table 3: Impact of the Independent Board Requirement on the Fraction of Top Executives Appointed (FT4A) during a CEO's Tenure.

This table reports estimates of the impact of the independent board requirement on the fraction of top-four non-CEO executives appointed (FT4A) during a CEO's tenure. Columns (1)-(2) and (3)-(4) report estimation results with the unmatched and propensity-score (PS) matched sample, respectively. The sample period is 1996 – 2006, excluding 2002. Columns (1) and (3) are OLS estimates; Columns (2) and (4), estimates by ordered logistic regressions. Definitions of all variables are provided in the Appendix. Regressions in Columns (1) and (3) control for year- and firm fixed effects and regressions in Columns (2) and (4) control for year- and firm dummies. The regression does not include Affected and Post as separate controls because of firm- and year fixed effects. Robust standard errors reported in parentheses are clustered at the firm level in Columns (1)-(2) and are corrected by bootstrapping 200 times in Columns (3)-(4). Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	FT4A			
	Unmatched		**PS-Matched**	
	OLS	**Ologit**	**OLS**	**Ologit**
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Affected*Post	0.089***	1.049***	0.043***	0.444**
	(0.022)	(0.307)	(0.014)	(0.222)
CEOTEN	0.023***	0.390***	0.020***	0.375***
	(0.003)	(0.055)	(0.002)	(0.052)
OUTSIDE	0.012	-0.053	-0.069**	-1.506***
	(0.033)	(0.479)	(0.035)	(0.511)
CEO_Founder	-0.313***	-4.642***	-0.184***	-2.946***
	(0.064)	(0.997)	(0.044)	(0.739)
FT4A_1Y	0.051	0.468	0.066*	0.842
	(0.037)	(0.577)	(0.037)	(0.571)
KNOWN	-0.306***	-4.395***	-0.462***	-7.878***
	(0.059)	(0.806)	(0.058)	(0.899)
EXECSEN	-0.092***	-1.375***	-0.096***	-1.619***
	(0.003)	(0.063)	(0.003)	(0.071)
FT4A_1Y_Unknown	0.818	5.944	-0.617***	-13.317***
	(0.594)	(19.557)	(0.230)	(3.494)
Female	-0.092	-1.411	0.018	-0.131
	(0.094)	(1.302)	(0.115)	(1.920)
Ln(CEOAge)	0.268***	3.896***	0.234***	2.512**
	(0.095)	(1.318)	(0.080)	(1.191)
CEO_OWN_{t-1}	-0.277*	-3.658	-0.541***	-7.738***
	(0.161)	(2.273)	(0.158)	(2.619)
CEO_Chair	0.023	0.193	0.023	0.034
	(0.028)	(0.406)	(0.025)	(0.457)
$Ln(TotalAsset)_{t-1}$	0.045**	0.754***	0.049***	1.001***
	(0.018)	(0.202)	(0.014)	(0.192)
FirmAge	0.003**	0.033**	0.003*	0.049**
	(0.001)	(0.016)	(0.002)	(0.024)
$Segment_{t-1}$	-0.001	-0.016	0.000	0.004
	(0.001)	(0.011)	(0.001)	(0.012)
Constant1	-0.288	4.063	0.013	-5.552
	(0.427)	(5.449)	(0.316)	(5.010)
Constant2		7.084		-2.299
		(5.458)		(5.000)
Constant3		10.212*		1.412
		(5.462)		(4.981)
Constant4		13.857**		5.631
		(5.476)		(4.966)
Firm FE & Year FE (Dummies)	Y	Y	Y	Y
Observations	6,304	6,304	2,695	2,695
Adjusted R^2	0.701	(0.4663)	0.742	(0.5166)

Table 4: Impact of the Independent Board Requirement on the Social Ties between a CEO and Top-four Non-CEO Executives Appointed during the CEO's Tenure.

This table estimates the impact of the independent board requirement on the social ties between a CEO and top-four non-CEO executives appointed during the CEO's tenure. Columns (1) and (2) report estimation results with the unmatched and propensity-score (PS) matched sample, respectively. The sample period is 1996 – 2006, excluding 2002. Definitions of all variables are provided in the Appendix. All regressions control for firm- and year fixed effects. The regression does not include Affected and Post as separate controls because of firm- and year fixed effects. Robust standard errors reported in parentheses are clustered at the firm level in Columns (1) and are corrected by bootstrapping 200 times in Columns (2). Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

VARIABLES	**Ln(Exe_Tie+1)**	
	Unmatched	**PS-Matched**
	(1)	**(2)**
Affected*Post	0.038*	0.051***
	(0.020)	(0.017)
CEOTEN	0.006***	0.007***
	(0.002)	(0.002)
OUTSIDE	0.053**	0.046
	(0.023)	(0.029)
CEO_Founder	0.043	0.026
	(0.033)	(0.035)
FT4A_1Y	-0.001	0.026
	(0.025)	(0.023)
FT4A_1Y_Unknown	-0.272	-0.046
	(0.253)	(0.180)
KNOWN	-0.058	-0.150**
	(0.053)	(0.071)
EXECSEN	-0.004	-0.006
	(0.003)	(0.005)
Female	0.085***	-0.015
	(0.031)	(0.015)
Ln(CEOAge)	-0.042	-0.068
	(0.063)	(0.083)
CEO_OWN_{t-1}	-0.070	-0.150
	(0.107)	(0.146)
CEO_Chair	-0.022	-0.016
	(0.013)	(0.018)
$Ln(TotalAsset)_{t-1}$	0.018**	0.017
	(0.009)	(0.014)
FirmAge	-0.000	-0.003
	(0.002)	(0.002)
$Segment_{t-1}$	-0.001	-0.000
	(0.001)	(0.001)
Pct_Miss_FT4A_Tie	-0.023	-0.031
	(0.021)	(0.029)
FT4A	0.034*	-0.001
	(0.021)	(0.025)
Constant	0.125	0.403
	(0.282)	(0.383)
Firm FE & Year FE	Y	Y
Observations	6,304	2,695
Adjusted R^2	0.436	0.471

Table 5: CEO-Independent Director Social Ties and the Fraction of Top Executives Appointed (FT4A) during the CEO's Tenure.

This table estimates the impact of the independent board requirement on pre-existing network ties between the CEO and independent directors and how the impact on FT4A is related to the changes in CEO-director ties. The first two columns estimate the impact of the regulation on CEO-independent director social ties. The last two columns estimate the interactive effects of the regulation and changes in CEO-director ties on FT4A. Increase_Tie is an indicator equal to one, if CEO-director ties increased from 2001 to 2004; No_Increase_Tie is an indicator equal to one, if there is no increase in CEO-director ties over the same period. The sample period is 1996 – 2006, excluding 2002. Definitions of all variables are provided in the Appendix. All regressions control for firm- and year fixed effects. The regression does not include Dep_Board2001 and Post as separate controls because of firm- and year fixed effects. Robust standard errors reported in parentheses are clustered at the firm level in Columns (1) and (3) and are corrected by bootstrapping 200 times in Columns (2) and (4). Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	Ln(Dir_Tie+1)		**FT4A**	
	Unmatched	**PS-matched**	**Unmatched**	**PS-matched**
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Affected*Post	0.021	0.041*		
	(0.042)	(0.024)		
Increase_Tie*Affected*Post			0.044	-0.012
			(0.089)	(0.047)
No_Increase_Tie*Affected*Post			0.090***	0.040**
			(0.022)	(0.016)
Increase_Tie*Post			-0.002	0.036
			(0.036)	(0.034)
CEOTEN	0.005	0.006***	0.023***	0.019***
	(0.004)	(0.002)	(0.003)	(0.002)
OUTSIDE	0.035	0.058	-0.004	-0.105***
	(0.063)	(0.037)	(0.035)	(0.032)
CEO_Founder	-0.190**	-0.198***	-0.299***	-0.148***
	(0.096)	(0.050)	(0.069)	(0.044)
FT4A_1Y			0.023	0.054
			(0.038)	(0.038)
KNOWN			-0.319***	-0.484***
			(0.064)	(0.051)
EXECSEN			-0.090***	-0.095***
			(0.003)	(0.003)
FT4A_1Y_Unknown			-0.103	-0.828***
			(0.591)	(0.256)
Female	0.136	0.449***	-0.032	0.236
	(0.119)	(0.145)	(0.134)	(0.144)
Ln(CEOAge)	0.621***	0.552***	0.311***	0.346***
	(0.179)	(0.087)	(0.103)	(0.081)
CEO_OWN_{t-1}	0.475**	0.670***	-0.294	-0.649***
	(0.237)	(0.211)	(0.194)	(0.200)
CEO_Chair	-0.034	-0.038	0.014	0.014
	(0.051)	(0.027)	(0.029)	(0.027)
$Ln(TotalAsset)_{t-1}$	0.009	0.011	0.038*	0.037***
	(0.028)	(0.020)	(0.020)	(0.014)
FirmAge	0.004	0.004	0.003**	0.003*
	(0.003)	(0.003)	(0.001)	(0.002)
$Segment_{t-1}$	0.001	0.000	-0.001	0.000
	(0.002)	(0.001)	(0.001)	(0.001)
Dir_Tie_Unknow	-0.461***	-0.355***		
	(0.127)	(0.058)		
Num_IndDir	0.048***	0.061***		
	(0.008)	(0.005)		
Constant	-2.647***	-2.547***	-0.395	-0.301
	(0.741)	(0.372)	(0.469)	(0.312)
Firm FE & Year FE	Y	Y	Y	Y
Observations	5,739	2449	5,589	2,448
Adjusted R^2	0.795	0.786	0.698	0.745

Table 6: Performance Analyses.

This table estimates how changes in FT4A, ΔFT4A, attributable to the independent board requirement affect firm performance, separately for high- and low-information cost environment. The dependent variables are changes in EBTDA/TA in Columns (1)-(3); Tobin's Q in Columns (4)-(6). The sample is cross-sectional and each observation is the difference in the averages of up to four years over 1998-2001 and 2003-2006 that overlap with the tenure of each CEO who was the CEO in 2001. Regressions in Columns (1) and (4) are estimated on the full sample. Columns (2)-(3) and (5)-(6) are estimated on subsamples, separated into firms with high- and low-information costs by the sample median of InfoCost index, which measures the initial level of outsiders' cost of acquiring firm specific information in 2001. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the industry level, as defined by one-digit SIC code. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	ΔEBITDA/TA			**ΔTobin's Q**		
	Full	**High_InfoCost**	**Low_InfoCost**	**Full**	**High_InfoCost**	**Low_InfoCost**
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ΔFT4A*Affected	0.052	0.085**	-0.056	1.062	2.172***	1.043
	(0.031)	(0.032)	(0.038)	(0.662)	(0.595)	(1.287)
Affected	-0.012	-0.032*	0.022	-0.212	-0.395	-0.116
	(0.009)	(0.017)	(0.019)	(0.150)	(0.232)	(0.244)
ΔFT4A	-0.022***	-0.036	-0.015	-1.234	-0.816*	-1.995*
	(0.007)	(0.019)	(0.010)	(0.699)	(0.411)	(1.141)
Δn(TotalAsset)	-0.012	-0.011	-0.008	-1.517***	-1.493***	-1.648**
	(0.014)	(0.024)	(0.012)	(0.387)	(0.236)	(0.626)
ΔRisk	-0.677	-0.487	-0.615	-19.029	21.877	-91.648
	(0.383)	(0.889)	(0.396)	(32.507)	(34.940)	(98.993)
ΔRiskD	0.027	0.032	0.026**	-1.019	-2.240	0.497
	(0.019)	(0.052)	(0.009)	(0.978)	(1.874)	(0.679)
ΔBoardsize	-0.000	-0.000	-0.000	-0.005	-0.008	0.046
	(0.001)	(0.002)	(0.002)	(0.074)	(0.091)	(0.048)
Constant	-0.010	-0.010	-0.009	0.254*	0.279**	0.162
	(0.009)	(0.013)	(0.005)	(0.113)	(0.111)	(0.261)
Observations	739	313	317	644	293	256
Adjusted R^2	0.000	-0.012	-0.007	0.097	0.112	0.116

Table 7: Placebo Tests: Firms Exempted from the Independent Board Requirement and Firms Exempted from Section 404 of the Sarbanes-Oxley Act.

Panel A reports results of placebo tests using "controlled" firms, which are exempt from the independent board requirement but are required to comply with other governance requirements of the Sarbanes-Oxley Act. Firms are considered "controlled" if directors and officers own more than 50% of outstanding shares or if a firm has ducal class shares. Column (1) reestimates the baseline regression in Table 3 using only firms exempted from the board regulation. Column (2) utilizes the full sample, including exempt firms and non-exempt firms matched to the exempt firms by propensity scores. Exempted is an indicator for firms classified as "controlled" in 2001. The regressions contain the same control variables as in Table 3 but are not reported.

Panel B reestimates the impact of the independent board requirement on FT4A using a subsample of firms with public float less than $75 Million in 2002. These firms are exempted from Section 404 of the SOX. Column (1) does not include any control variables except fixed effects, while Column (2) includes the same control variables as in Table 3 (unreported). Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

Panel A: Placebo Tests Using Controlled Firms exempt from the Independent Board Requirement.

	FT4A	
	Controlled Firms Only	**Controlled_Matched Sample**
VARIABLES	**(1)**	**(2)**
Affected*Post	-0.001	0.102***
	(0.044)	(0.031)
Affected*Post*Exempted		-0.083**
		(0.041)
Post*Exempted		0.024
		(0.020)
Firm FE & Year FE	Y	Y
Observations	647	1,810
Adjusted R^2	0.803	0.763

Panel B: Reestimation of the Baseline Model for Firms Exempt from Section 404 of the Sarbanes-Oxley Act.

	FT4A	
VARIABLES	**(1)**	**(2)**
Affected*Post	0.426**	0.136*
	(0.161)	(0.081)
Firm FE & Year FE	Y	Y
Observations	120	95
Adjusted R^2	0.274	0.859

Online Appendix to:

Executive Suite Independence: Is It Related to Board Independence?

E. Han Kim and Yao Lu

Table A-1: The Matching Regression

This table estimates the regression for constructing the propensity score matched sample based on observations in 2001. The dependent variable, Affected, is an indicator equal to one if a firm does not have a majority of independent directors in 2001; zero otherwise. The regression controls for industry fixed effects at the one-digit SIC code level. Definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	Affected
VARIABLES	**(1)**
CEOTEN	0.019
	(0.012)
OUTSIDE	-0.073
	(0.191)
CEO_Founder	-0.005
	(0.265)
FT4A_1Y	-0.222
	(0.184)
KNOWN	0.896
	(0.846)
EXECSEN	0.118***
	(0.036)
FT4A_1Y_Unknown	0.466
	(2.347)
Female	-0.418
	(0.599)
Ln(CEOAge)	0.279
	(0.479)
CEO_OWN_{t-1}	3.796***
	(1.079)
CEO_Chair	-0.315**
	(0.132)
$Ln(TotalAsset)_{t-1}$	-0.031
	(0.057)
FirmAge	-0.013***
	(0.004)
$Segment_{t-1}$	-0.014*
	(0.008)
EBITDA/TA	0.312
	(0.632)
TobinQ	-0.008
	(0.051)
Boardsize	0.041
	(0.028)
Ln(Num_Analyst)	-0.062
	(0.071)
Constant	-3.083
	(2.074)
Industry FE	Y
Log likelihood	-282.314
Prob > chi2	0.0000
Observations	718

Table A-2: The Likelihood an Executive Will Be Dropped from the Top-Four List: Current CEOs' Appointees vs. Previous CEOs' Appointees.

This table estimates the impact of the independent board requirement on the likelihood a top-four non-CEO executive will be dropped from the top-four list, separately for current CEOs' appointees, AppointCurCEO, and previous CEOs' appointees, AppointPrevCEO. The dependent variable is an indicator equal to one if an executive on the top-four list in year t is not on the list in year t+1. Columns (1) and (2) utilize the full executive panel data, while Columns (3) and (4) include only executives whose tenure on the list of top-four non-CEO executives are above the sample median, EXETEN > Median. The sample period is 1996 – 2006, excluding 2002. Definitions of all variables are provided in the Appendix. All regressions are estimated by the firm level conditional logistic regressions and control for year dummies. Because the propensity score is matched at the firm level, not at the executive level, our estimation is based only on the unmatched sample. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	Exe_Turnover			
	AppointCurCEO	**AppointPrevCEO**	**AppointCurCEO EXETEN > Median**	**AppointPrevCEO EXETEN > Median**
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**
Affected*Post	-0.009	0.249**	-0.008	0.363***
	(0.132)	(0.111)	(0.281)	(0.124)
EXETEN	-0.012**	0.027***	-0.001	0.032***
	(0.005)	(0.004)	(0.009)	(0.004)
EXE_OWN	1.521	-1.798	-0.185	-1.413
	(1.070)	(1.185)	(0.973)	(1.178)
Return	-0.150***	-0.087***	-0.273***	-0.109***
	(0.049)	(0.025)	(0.096)	(0.037)
Ln(TotalAsset)	0.140**	0.160***	0.085	0.096
	(0.063)	(0.059)	(0.162)	(0.074)
CEO_Founder	0.552***	0.556***	0.317	0.365**
	(0.194)	(0.126)	(0.440)	(0.170)
Year Dummies	Y	Y	Y	Y
Observations	15,100	19,816	4,590	14,258
Prob> Chi^2	0	0	0	0
Wald	58.99	152.5	40.53	127.0
pseudo-R^2	0.00509	0.00977	0.0120	0.0125

Table A-3: CEO Turnovers and the Independent Board Requirement.

This table estimates the impact of the independent board requirement on CEO turnovers. The dependent variable is an indicator for CEO turnover, equal to one if a CEO in year *t* is not the same as the CEO in year *t-1*. Control variables include *Return*, one year buy-and-hold stock returns because CEO turnovers are likely to be related to firm performance. We also control for indicators for CEO-Chair and CEO-founder because they may affect CEOs' ability to remain in the job. Other control variables include firm size, and CEOs' tenure and share ownership. (In unreported regressions, we include a triple interaction, *Affected*Post*Return*$_{t-1}$, to control for possible changes in turnover-performance sensitivity for CEOs. The coefficients on the triple interaction term are significantly negative, indicating newly independent boards increase CEO turnover-performance sensitivity. More important, the coefficient on *Affected*Post* remains insignificant.) All control variables are lagged by one year. Columns (1) and (2) report estimation results with the unmatched and propensity-score (PS) matched sample, respectively. The sample period is 1996 – 2006, excluding 2002. Definitions of all variables are provided in the Appendix. Regressions are estimated by the firm level conditional logit model with year dummies. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	CEO_Turnover	
	Unmatched	**PS-matched**
VARIABLES	**(1)**	**(2)**
Affected*Post	0.495	0.377
	(0.327)	(0.332)
$Return_{t-1}$	-0.307***	-0.363**
	(0.100)	(0.179)
$Ln(TotalAsset)_{t-1}$	-0.003	-0.059
	(0.136)	(0.219)
$Founder_{t-1}$	-1.638***	-1.176*
	(0.632)	(0.644)
$CEOTEN_{t-1}$	0.296***	0.226***
	(0.031)	(0.040)
CEO_OWN_{t-1}	-2.568	-5.253*
	(2.517)	(2.988)
CEO_Chair_{t-1}	-0.119	0.214
	(0.235)	(0.391)
Year Dummies	Y	Y
Observations	5,203	2,102
Prob> Chi^2	0	0
Wald	177.3	75.40
pseudo-R^2	0.190	0.166

Table A-4: Confounding Effects.

This table reestimates the regulatory effects using a series of year indicator variables for pre- and post-regulation periods to test for confounding effects of pre-regulation events on the fraction of top-four non-CEO executives appointed during a current CEO's tenure (*FT4A*). Dummy variables *2000, 2001, 2003, 2004*, and *2005 and after* are equal to one if the observation is in 2000, 2001, 2003, 2004, and 2005-2006, respectively. Columns (1) and (2) results estimated with the unmatched and the propensity-score (PS) sample. The sample period is 1996 – 2006, excluding 2002. Definitions of variables are provided in the Appendix. The regressions control for year- and firm fixed effects and include the same control variables as in Table 3 but are not reported. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	FT4A	
	Unmatched	**PS-Matched**
	(1)	**(2)**
Affected*2000	-0.000	-0.008
	(0.022)	(0.020)
Affected*2001	0.024	0.012
	(0.024)	(0.021)
Affected*2003	0.066**	0.021
	(0.026)	(0.021)
Affected*2004	0.088***	0.036*
	(0.029)	(0.020)
Affected*2005andafter	0.113***	0.061***
	(0.030)	(0.020)
Firm FE & Year FE	Y	Y
Observations	6,304	2,695
Adjusted R^2	0.701	0.742

Table A-5: Other Robustness Checks.

Panel A estimates how the degree to which a firm is affected by the independent board requirement is related to changes in the fraction of top-four non-CEO executives appointed (FT4A) during a CEO's tenure. The key independent variable is Pct_Dep_Dir*Post, the percentage of non-independent directors in 2001 interacted with the post-regulation indicator. The regression does not include Pct_Dep_Dir and Post as separate controls because of firm- and year fixed effects.

Panel B reestimates the OLS regressions in Table 3 with three alternative measures of FT4A. WFT4A is FT4A weighted by the sum of executives' salaries and bonuses; AFT4A, an abnormal measure of FT4A; and WAFT4A, an abnormal measure of WFT4A. Columns (1)-(3) and Columns (4)-(6) report results estimated with the unmatched sample and the propensity-score (PS) matched sample, respectively. The sample period is 1996 – 2006, excluding 2002. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

Panel A: Heterogeneity in the Treatment Effects.

	FT4A	
	Unmatched	**PS-Matched**
VARIABLES	**(1)**	**(2)**
Pct_Dep_Dir*Post	0.243***	0.136***
	(0.052)	(0.039)
Observations	6,304	2,695
Adjusted R^2	0.703	0.743

Panel B: Alternative Definitions of FT4A.

	Unmatched			**PS-Matched**		
	WFT4A	**AFT4A**	**WAFT4A**	**WFT4A**	**AFT4A**	**WAFT4A**
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Affected*Post	0.081***	0.071***	0.065***	0.029**	0.044***	0.039***
	(0.022)	(0.021)	(0.021)	(0.015)	(0.013)	(0.015)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	N	N	Y	N	N
Observations	6,304	6,304	6,304	2,695	2,695	2,695
Adjusted R^2	0.702	0.512	0.521	0.741	0.555	0.559