

AN EXAMINATION OF DIRECTOR STOCK OWNERSHIP REQUIREMENTS

A Dissertation

by

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ABSTRACT

Consistent with agency theory, corporate governance best practices encourage the use of a director stock ownership requirement (SOR) as a tool to align directors' incentives with shareholders' interests. Using a sample of 714 firms that adopt a director SOR from 1998 to 2013, I analyze the determinants of SOR adoption and find that firms with larger boards, lower outside director ownership, and higher institutional ownership are more likely to implement a director SOR. I then show that firms adopting a director SOR demonstrate improved monitoring over financial reporting. However, I find no evidence indicating that adopting firms have greater CEO performance-turnover sensitivity after director SOR adoption. Further, it appears that firms adopting a director SOR have greater excess CEO compensation. Finally, I classify adopted plans as substantial or symbolic and show that substantial adopters demonstrate improved financial reporting monitoring while symbolic adopters do not. My results suggest that a director SOR can be effective in improving board financial reporting monitoring performance when the requirement is substantial. However, many firms appear to adopt symbolic requirements, possibly as a form of corporate governance window-dressing, rather than as an effective tool to increase the alignment between directors and shareholders.

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1. INTRODUCTION

Many companies require outside directors to own a specified amount of stock in the company, known as a director stock ownership requirement (SOR). This practice is consistent with agency theory, which suggests that greater financial ties can mitigate conflicts of interests by aligning agents' incentives with principals' desires (e.g., Fama, 1980; Jensen and Meckling, 1976; Eisenhardt, 1989).¹ Prior research has shown that director stock ownership is associated with more effective board monitoring (e.g., Beasley, 1996; Bhagat, Carey and Elson, 1999; Ertugrul and Krishnan, 2011; Bhagat and Bolton, 2008; Zerni, Kallunki and Nilsson, 2010). However, research on whether director SORs are effective in aligning outside directors' incentives with shareholders' interests is limited. Additionally, some practitioners have voiced concerns that director stock ownership requirements are too low, suggesting that director SORs as currently implemented do not induce incentive alignment (Barton and Wiseman, 2015). In this study, I empirically examine whether the adoption of a director SOR serves to align directors' incentives with shareholders interests' or alternatively, serves as a form of corporate governance window-dressing. Specifically, I address three key research questions: (1) what are the board- and firm-level characteristics that influence a firm's

¹ Larcker and Tayan (2012) suggest that if the monitor's objective is to detect and mitigate agency problems, and success of the objective is defined as error prevention, then monitors should be paid on a fixed-salary basis, with significant punishment for failures. However, an entirely fixed compensation package may not provide sufficient incentive (e.g., Kumar and Sivaramakrishnan, 2008; Archambeault, DeZoort and Hermanson, 2008), particularly if director concerns extend beyond compensation to retention and reputation (Yermack, 2004). Research that focuses on the alignment of long-term interests recommends compensating outside directors with stock (e.g. Shleifer and Vishny, 1988; Yermack, 2004). In contrast, Drymiotis and Sivaramakrishnan (2012) argue that long-term incentives may be beneficial for board advising, but not for corporate governance.

adoption of a director SOR; (2) is the adoption of a director SOR associated with improved board monitoring (e.g., lower likelihood of subsequent financial irregularities, greater likelihood of CEO turnover given poor firm performance, and lower excess CEO compensation); and (3) does the effectiveness of a director SOR vary based on whether the requirement is substantial?

Understanding whether the adoption of a director SOR is associated with improved board performance is important because effective monitoring by the board is an essential component of corporate governance (e.g., Adams, Hermalin and Weisbach, 2008; Masulis, Wang and Xie, 2012). Following major corporate scandals in the 2000s (e.g., WorldCom, Tyco and Enron), board oversight as a governance mechanism attracted considerable attention. Regulatory solutions for improving board oversight have focused on increasing the proportion of independent directors on the board. (U.S. House of Representatives 2002, §301.B; NYSE 2003, §303A.7a; NASDAQ 2010, §5605.c.2).² While independence improves directors' abilities to monitor the firm free of manager's influence, independent board members by definition have less information about the firm than inside board members, resulting in increased costs to provide monitoring (e.g., Berle and Means, 1991; Fama and Jensen, 1983; Jensen, 1993). Further, independent directors typically own fewer shares in the firm than inside

² The NYSE mandates and the NASDAQ recommends that the compensation, nominating, and audit committees be entirely staffed with independent directors. The Sarbanes-Oxley Act of 2002 (SOX) requires that the audit committee is comprised entirely of independent directors, including at least one financial expert. Independence is typically determined as having no significant relationship with the company beyond being directors. In the U.S., ownership is not necessarily considered a deterrent to independence.

directors. Higher costs to attain relevant information and lower financial alignment contributes to a secondary agency issue at the board level between outside directors and shareholders (e.g., Core, Holthausen and Larcker, 1999; Bebchuk, Grinstein and Peyer, 2010; Brickley and Zimmerman, 2010).

One mechanism used to mitigate the potential misalignment between outside directors' and shareholders' interests is to institute a director SOR for outside directors. Similar to an executive target ownership plan ("TOP"), a director SOR mandates a minimum level of stock ownership that outside directors are expected to acquire and hold until retirement.³ Prior research provides evidence that executive TOPs are effective in increasing executive stock ownership and diffusing agency conflicts between managers and shareholders (e.g., Core and Larcker, 2002; Quinn, 2015). However a key difference is that the board of directors defines and implements director SORs for themselves. This decision-making authority creates potential confounds to what we know about ownership requirements as the board has the decision to adopt a substantial policy or a symbolic policy.⁴ Prior studies have not investigated whether the adoption of a director SOR is associated with an improvement in board performance nor have prior studies addressed the variability in implementation of director SORs.

Utilizing a unique sample of 714 firms adopting a director SOR from 1998 to 2013, I first examine the determinants of a firm's decision to adopt a director SOR. I

³ Inside directors typically own more shares in the company through employee stock ownership plans (ESOPs). Additionally, executive TOPs are set as a multiple of salary. As executive salaries are typically much higher than director salaries, executive TOPs are typically much higher than director SORs.

⁴ Similarly, some firms have been shown to adopt a corporate code of conduct as "window dressing" (Clarkson, 1995).

find that firms with a higher percentage of outside directors and lower outside director ownership are more likely to adopt a director SOR. I also find evidence that firms with other external monitors and better information environments (e.g., firms with higher institutional ownership, firms with higher analyst following) are more likely to adopt a director SOR, suggesting that firms do not necessarily use a director SOR as a substitute for other monitoring mechanisms.

I then examine whether the adoption of a director SOR is associated with effective board monitoring. I proxy for effective board monitoring using three outcomes: financial irregularities, CEO performance-turnover sensitivity, and excess CEO compensation. Using a difference-in-differences design along with propensity score matching to address sample selection bias, I document evidence of a negative association between the likelihood of subsequent financial irregularities after the adoption of a director SOR, suggesting that adopting firms exhibit improved financial reporting monitoring. In contrast, I find evidence suggesting a positive association between the adoption of a director SOR and excess CEO compensation, indicating that directors do not exhibit improved compensation monitoring after the adoption of a director SOR. However, I do not find any evidence indicating that firms adopting a director SOR exhibit greater CEO performance-turnover sensitivity.

I next examine whether the effectiveness of the director SOR varies based on whether the director SOR is substantial. I consider ownership requirements that are compelling and material to be *substantial* while ownership requirements that are either not compelling or immaterial are characterized as *symbolic*. I define a director SOR as

compelling if less than 75 percent of the board met the director SOR in the year prior to adoption. I classify the materiality of a director SOR as robust, standard, or sub-standard based on the ownership requirement as a multiple of director fees.⁵ The resulting analysis indicates a lower likelihood of subsequent financial irregularities after the adoption of a compelling director SOR, suggesting that firms adopting a compelling SOR exhibit improved financial reporting monitoring. I also find that this result is stronger for firms adopting a compelling SOR relative to firms that adopt a non-compelling SOR. I find cross sectional variation in the effect of a director SOR on board monitoring. Specifically, I document that firms adopting a compelling and robust director SOR or a compelling and standard director SOR are less likely to experience a financial irregularity than firms adopting a compelling yet sub-standard director SOR. Overall, the results suggest that the adoption of a compelling and material (at least three times the annual director retainer) director SOR is effective in improving board financial reporting monitoring performance. In contrast, I do not find evidence indicating that the adoption of a non-compelling or immaterial director SOR is any more or less effective in improving CEO performance sensitivity or CEO compensation monitoring.

In additional analysis, I re-examine the determinants of director SOR adoption to differentiate between substantial adopters and symbolic adopters. Using a generalized ordered logistic regression, I show that firms with fewer outside directors, lower outside

⁵ This classification is based on ISS Governance Quick Score 3.0 methodology, which considers a firm's stock ownership requirement as a multiple of director retainer. A director SOR is considered robust if the ownership guideline is five times or more of the director's annual retainer, standard if the guideline is less than five but greater than three times the director's annual retainer, and sub-standard if the guideline is less than three times the director's annual retainer (Institutional Shareholder Services, 2014).

director ownership and lower tenure are more likely to implement a substantial director SOR than a symbolic director SOR.

This paper makes several contributions to the corporate governance and director incentives literature. The study contributes to the literature on director incentives by examining an additional tool that can be used to align directors' incentives. Additionally, this study contributes to the literature on stock ownership requirements (e.g., Core and Larcker, 2002; Quinn, 2015; Bhagat and Tookes, 2012). As one of the few studies to examine a director SOR in the context of board monitoring, I provide some initial evidence that the adoption of a substantial director SOR is effective in aligning directors' incentives with shareholders' interests while the adoption of a symbolic director SOR may not be.

The remainder of this paper is organized as follows. Section 2 discusses background information and prior research. Section 3 presents the hypotheses development. Section 4 discusses research design choices and variable definitions. Section 5 provides information on the sample selection and descriptive statistics. Section 6 provide results to hypotheses tests while Section 7 provides additional analysis and Section 8 concludes.

2. BACKGROUND AND PRIOR LITERATURE

2.1 Background on Director SORs

Numerous shareholder groups and business associations strongly encourage the use of a director SOR in order to align directors' interests with shareholders' interests (e.g., Institutional Shareholder Services (ISS), 2014; Meridian, 2011; Business Roundtable, 2012). In Meridian's 2011 report on director compensation, firms are encouraged to implement a director SOR,

“to create alignment between individual wealth and the long-term performance of the firm; to minimize excessive risk-taking that might lead to short-term returns at the expense of long-term value creation; to build an ownership mentality among executives and to align with good governance principles supporting many shareholder groups.” (p.1).

Accordingly, many firms adopting a director SOR indicate their motivation is better alignment of directors' and shareholders' interests. For example, the section titled “Corporate Governance” in SkyWork Solution's 2011 proxy statement states their intention for requiring director stock ownership:

“We have adopted Executive Officer and Director Stock Ownership programs that require our executive officers (including our Named Executive Officers) and non-employee directors to hold a significant equity interest in Skyworks with the objective of more closely aligning the interests of our executive officers and directors with those of our stockholders...”(p.21).

Director SORs are disclosed in firms' proxy statements and/or corporate guidelines. For fiscal years ending after December 15, 2006, the SEC requires disclosure

of both executive and director SORs.⁶ However, prior to this date many firms with a director SOR voluntarily disclosed its adoption.⁷ In my sample of the largest 750 firms by market capitalization at any point from 1998 to 2013, I find that 64.7 percent of firms utilize a director SOR in 2013, up from 2.2 percent in 1998.⁸

Similar to an executive TOP, a director SOR specifies a minimum amount of firm stock to be acquired over a specific time period following initial appointment. The compensation or governance committee is typically responsible for recommending the adoption of a director SOR, as well as setting the ownership requirement, the length of time allowed to achieve the ownership requirement and the types of equity that qualify for inclusion. Ownership requirements are typically specified as a “multiple of retainer” (i.e., level of ownership is as a multiple of the annual director retainer); “dollar value” (i.e., level of ownership is a specific dollar value amount); “shares” (i.e., level of ownership is a fixed number of shares); or some combination of the three. The most common type of director SOR is the multiple of retainer, while the average time allowed to acquire the required ownership ranges from three to five years. Most firms consider all of the following to qualify as equity for purposes of a director SOR: shares owned outright or beneficially by directors (or immediate family members), stock units held

⁶ While disclosure of ownership requirements is now mandatory, the actual content of the disclosure is not prescribed. The majority of adopting firms in the sample provide detail on the form of ownership requirement (multiple of retainer, fixed shares, and fixed dollar value), amount, and time allowed to meet the ownership requirement. However, not all firms provide detail on the assessment period for a director SOR or the forms of stock ownership that count towards meeting an ownership requirement.

⁷ Bhagat and Tookes (2012) argue that there is not likely a reason why firms would *not* want to disclose ownership requirements.

⁸ Equilar (2011) reports that 76 percent of Fortune 100 firms in 2010 use a director SOR. Equilar’s findings are likely higher than mine due to their smaller sample biased toward larger firms.

under a non-qualified deferred compensation plan, and restricted stock or restricted stock units. Some firms additionally allow vested but unexercised options to qualify and a few also allow unvested and unexercised options.

In addition to defining and implementing a director SOR, the board of directors is also responsible for assessing compliance with the director SOR. Many firms assess compliance at least annually, typically at the end of the year or prior to the issuance of the proxy statement. Stated consequences for non-compliance typically include a prohibition on sales, payment of annual retainer in equity instead of cash, and mandatory retention of annual equity grants until compliance is met (Equilar, 2013).⁹ The board has discretion to temporarily suspend the director SOR either for all directors during times of deteriorating economic conditions or for particular directors in cases of personal hardship.

2.2 Prior Literature on Director Ownership

Consistent with agency theory, prior empirical research supports the view that director stock ownership is associated with more effective monitoring (lower likelihood of financial statement fraud (Beasley, 1996); more timely decisions to replace CEO (Bhagat et al., 1999; Ertugrul and Krishnan, 2011); higher probability of forced CEO turnover after poor performance (Bhagat and Bolton, 2008); and more stringent auditing requirements (Zerni et al., 2010). However, more recent behavioral studies suggest that director ownership can induce self-interested behavior that may be detrimental to the

⁹ Limited information or cases are available at this point to further study enforcement. As indicated by the rate of adoption of non-compelling SORs, non-compliance is unlikely at most firms.

firm's long-term value (e.g., Magilke, Mayhew and Pike, 2009). These studies suggest that equity ownership may also motivate individuals to focus on short-term performance rather than long-term performance.¹⁰ Carcello and Neal (2003) find that director ownership is positively associated with the likelihood of auditor dismissal following the issuance of a going concern opinion; arguing that directors who own more company stock are likely to suffer losses if the going-concern report triggers a negative stock price response, so directors with more ownership are more willing to accede to auditor dismissals in such cases.

However, these studies focus on the association between director ownership and board performance where the director ownership is assumed to be endogenous. The decision to implement a director stock ownership requirement may obscure the signal of director ownership. Thus, it is important to examine the determinants and consequences of imposing director stock ownership requirements.

2.3 Prior Literature on SORs

Studies examining the effect of adopting executive TOPs are relevant, with the caveat that executives do not have the authority to set their own targets. Core and Larcker (2002) is one of the first studies to document the use of executive TOPs during 1996 and 1997 and find that managerial stock ownership, excess accounting returns, and

¹⁰ Research that focuses on the alignment of long-term interests recommends compensating outside directors with stock (e.g. Shleifer and Vishny, 1988; Yermack, 2004). In contrast, Drymiotes and Sivaramakrishnan (2012) argue that long-term incentives may be beneficial for board advising, but not necessarily for corporate governance; while Larcker and Tayan (2012) suggest that if the monitor's objective is to detect and mitigate agency problems, and success of the objective is defined as error prevention, then monitors should be paid on a fixed-salary basis with significant punishment for failures.

excess stock returns are all higher following the adoption of an executive TOP. More recently, Quinn (2015) finds that earnings management significantly declines in firms that adopt an executive TOP, relative to a propensity score-matched control sample. Bhagat and Tookes (2012) (“BT”) is the only other study to empirically examine director SORs. Using a two-year sample of firms in the S&P 500, BT find that required director stock ownership has no association with future firm performance, but voluntary director ownership is positively associated with one-year ahead return on assets. These results confirm prior literature on the beneficial effects of director stock ownership; yet provide no evidence of benefits associated with director SORs.

This study differs from BT in three important aspects. First, BT assume that a director SOR reflects optimal ownership levels, based on Demsetz’s (1983) argument that observed managerial ownership reflects equilibrium outcomes. While BT acknowledge ownership requirements may reflect a ‘minimum’ level, they reject this argument since firms allow directors several years to accumulate ‘required’ holdings. In contrast, I provide evidence that many director SORs are not optimal and are instead set at minimum levels that do not require directors to acquire additional stock ownership. Second, I identify a much larger and broader sample of firms with a director SOR. BT’s sample includes firms that voluntarily disclose the presence of a director SOR in 2003 and 2005, prior to regulations mandating disclosure. In contrast, I examine a broad sample of firms that adopt a director SOR over a period of 15 years, providing a more complete view of firms that adopt a director SOR. Third, while BT focus on firm performance, I examine whether the adoption of a director SOR improves board

performance. Finally, I extend BT's study of the determinants of a director SOR to include director-level and firm-level characteristics, and provide initial evidence of the determinants of a substantial or symbolic director SOR.

3. HYPOTHESIS DEVELOPMENT

3.1 Determinants of Director SOR Adoption

I draw on prior research on the determinants of firms' adoption of an executive SOR and other governance requirements to develop my hypotheses. Core and Larcker (2002) find that firms are more likely to adopt executive TOPs when shareholders recognize that the firm may benefit from improved board monitoring; thus the board uses executive TOPs as a method to "move the firm to a more appropriate governance structure" (Core and Larcker, 2002). Core and Larcker (2002) identify firms with lower than industry-average stock returns and low managerial ownership as firms that are likely to need improved board monitoring. I similarly predict that, if a firm has low outside director ownership or poor prior stock return performance, shareholders may infer that the level of outside director equity is insufficient to motivate effective board monitoring of the firm's performance and subsequently adopt a director SOR in order to alleviate this concern

- ***H1a: As financial performance deteriorates, firms are more likely to adopt a director SOR.***

Independent directors often have less information about the firm than inside board members, resulting in increased costs to provide monitoring (e.g., Berle and Means, 1991; Fama and Jensen, 1983; Jensen, 1993). Further, independent directors typically own fewer shares in the firm than inside directors. One concern with adding outside directors to the board is that outside directors have less company-specific knowledge; therefore, the effort required to gather and obtain information relevant to

monitoring will be greater than the benefits of monitoring. Thus, outside directors will not put forth as much monitoring effort without additional incentives. Consequently, I predict that firms with higher outside board membership and lower outside director ownership will be more likely to adopt a director SOR.

- ***H1b: As outside director ownership decreases, firms are more likely to adopt a director SOR.***
- ***H1c: As the percentage of outside directors increases, firms are more likely to adopt a director SOR.***

While the board of directors is important in monitoring the firm, external parties can also provide monitoring. Firms with other sources of external monitors may not feel the need to adopt director SORs to align director and shareholders' interests. Therefore, I expect that firms with greater institutional ownership will be less likely to adopt a director SOR.

- ***H1d: As institutional ownership increases, firms are less likely to adopt a director SOR.***

Duchin, Matsusaka and Ozbas (2010) show that when the cost of acquiring information is low, monitoring performance increases when outsiders are added to the board, but when the cost of acquiring information is high, monitoring performance deteriorates when outsiders are added to the board. If the cost of acquiring information is low for directors, then outside directors will be more likely to adequately monitor without the need to increase financial incentives. Therefore, I predict that firms with a more transparent information environment are less likely to adopt director SORs.

- *H1e: As the transparency of the information environment increases, firms are less likely to adopt a director SOR.*

3.2 Consequences of Director SOR Adoption

Because director stock ownership is generally considered to be beneficial in aligning director incentives, requiring a minimum amount of director stock ownership should encourage stock ownership amongst independent directors, and subsequently enhance the monitoring activities of the board.¹¹ I examine the association between the adoption of a director SOR and three types of monitoring activities performed by the board: financial reporting monitoring, CEO performance monitoring and CEO compensation monitoring.

Financial Reporting Monitoring

The board of directors' audit committee is responsible for monitoring the transparency and accuracy of the firm's financial reporting and internal controls. Prior research documents that outside director ownership is negatively associated with financial statement irregularities (Beasley, 1996). Beasley (1996) finds that as outside

¹¹ I make the assumption that the adoption of a director SOR causes directors' incentive alignment predominantly through financial alignment. However, it is possible that the adoption of a director SOR induces alignment by providing a signal to directors of which behaviors are valued. Adams and Ferreira (2008) find that directors are less likely to have attendance problems at board meetings when board meeting fees are higher. Board meeting fees are, on average, about \$1,000 per meeting which is a small fraction of the total wealth of a director. While the results of their study appear to show that even very small financial rewards can incentivize directors, Adams and Ferreira (2008) also suggest it is possible that a shift in more performance-based compensation signals to directors that more attention to board meeting attendance is desired. The two effects, financial incentive alignment or signaling, are difficult to disentangle. In our case, even if directors are not incentivized by the requirement of additional ownership, the adoption of a director SOR may signal to directors that more attention to shareholders' interests is desired; therefore directors may react to the signal in the adoption of a director SOR, in addition to or instead of the financial incentive.

director ownership increases, the likelihood of financial statement fraud decreases.

Zhang, Bartol, Smith, Pfarrer, and Khanin (2008) find that firms are more likely to have restatements when managers have lower stock ownership. However, it is not necessarily clear whether the directors monitor more because of their ownership or whether directors hold more stock because they feel more secure in the financial reporting.

Further, Archambeault et al. (2008) show that long-term incentive compensation for board members is associated with an increased likelihood of accounting restatements. They find that there is a higher incidence of restatements when audit committee members are granted short-term or long-term stock options. Therefore it is also possible that requiring director stock ownership could cause directors to become more focused on short-term results.

I expect that outside directors in firms with a substantial director stock ownership requirement should be incentivized to provide more effective financial reporting oversight. This increased effort and attention to monitoring should lead to a reduction in the likelihood of a financial statement irregularity.

- ***H2a: Subsequent to adoption, firms with a director SOR are less likely to experience a financial irregularity.***

In a study on executive TOPs, Quinn (2015) finds evidence of a reduction in earnings management for firms adopting executive ownership plans that require at least one executive to increase ownership, yet does not find any evidence of a similar reduction for firms adopting executive TOPs that do not require an ownership increase. This result suggests that a director SOR may similarly be more effective if the policy

requires an increase in director ownership. Further, Barton and Wiseman (2015) express concern that director SORs are not material enough to impact director incentives.¹² In order for a director SOR to be effective, it is likely that the ownership must be compelling and material. Thus, I expect that the effectiveness of a director SOR on board monitoring performance may vary based on the extent to which the requirement is substantial (i.e., compelling and material).

- ***H2b: Firms adopting a substantial director SOR are less likely to experience a financial irregularity.***

CEO Performance Monitoring

The board of directors' compensation committee is responsible for monitoring and reviewing the performance of the CEO. An important part of the board monitoring process is the replacement of the CEO when the firm is performing poorly. Prior research has shown that firms with high outside director ownership more quickly replace poorly-performing CEOs. For example, Bhagat et al. (1999) finds that directors with substantial ownership are more quick to replace CEOs and Ertugrul and Krishnan (2011) find that firms with higher independent director ownership are more likely to dismiss their CEOs early, asserting that "boards with strong incentives are more likely to be proactive and act on their private information about the CEO than boards with poor incentives." p1.

Because a substantial director SOR should increase directors' ownership in their firms, board of directors that have a substantial director SOR should be incentivized to

¹² Barton and Wiseman (2015) advocate for the use of a "material" director SOR, even as high as ten percent of each individual director's personal net worth.

monitor the performance of the CEO and actively terminate the CEO if performance is not up to par. This increased effort and attention to monitoring should lead boards with a substantial director SOR to more quickly terminate CEOs of poorly performing firms. Thus my third hypothesis is stated as follows:

- ***H3a: Subsequent to adoption, firms with a director SOR will have greater CEO performance-turnover sensitivity.***
- ***H3b: Firms adopting a substantial director SOR have greater CEO performance-turnover sensitivity.***

CEO Compensation Monitoring

The board of directors' compensation committee is also responsible for determining CEO pay. Agency theory suggests that incentive pay aligns the interests of executives and shareholders; thus by linking executive compensation to firm performance, incentive pay is expected to motivate executives to create long-term shareholder value (e.g., Fama, 1980; Jensen and Meckling, 1976; Eisenhardt, 1989). Although the CEO compensation plan is determined by the board of directors, prior research has shown that weak boards with strong CEOs may set compensation packages that are not linked to performance and therefore not in the best interest of shareholders (Adams and Ferreira, 2009).¹³

¹³ Interestingly, Kumar and Sivaramakrishnan (2008) model a situation in which board ownership may negate the positive effects of board independence, proposing that higher equity ownership for the board may actually lead to higher equity awards for managers (CEOs), without regard to performance.

CEO compensation monitoring requires accurate information about the CEO's ability and effort (Boyd, 1994; Kim, Mauldin, and Patro, 2014). This information may be difficult for an outside director to acquire. If director stock ownership requirements work to align directors' incentives with shareholders' interests, then I expect that boards with such requirements put forth more effort in gathering information that will enable better CEO compensation monitoring.

- *H4a: Subsequent to adoption, firms with a director SOR will have lower excess CEO compensation.*
- *H4b: Firms adopting a substantial director SOR have lower CEO excess compensation.*

4. RESEARCH DESIGN

4.1 Determinants of Director SOR Adoption

I use the following logistic regression model to assess the extent to which existing board and firm-level characteristics are associated with a board's decision to adopt a director SOR:

$$\begin{aligned} \text{Prob} (Adopt_t = 1) = & \beta_0 + \beta_1 ROA_{t-1} + \beta_2 Returns_{t-1} \\ & + \beta_3 Board\ outside\ ownership\ pct_{t-1} + \beta_4 Board\ outside\ director\ pct_{t-1} \\ & + \beta_5 Institutional\ ownership\ pct_{t-1} + \beta_6 Analyst\ following_{t-1} \\ & + \beta_7 Guidance\ provider_{t-1} + \beta_8 Board\ size_{t-1} + \beta_9 Board\ tenure_{t-1} \\ & + \beta_{10} Busy\ board\ pct_{t-1} + \beta_{11} CEO\ ownership\ pct_{t-1} + \beta_{12} Growth\ firm_{t-1} \\ & + \beta_{13} Std\ dev\ returns_{t-1} + \beta_{14} Firm\ age_{t-1} + \beta_{15} Firm\ size_{t-1} \\ & + Year\ fixed\ effects + Industry\ fixed\ effects + \varepsilon \end{aligned} \quad (1),$$

where the dependent variable, $Adopt_t$, is an indicator variable equal to one for firm-year observations when the firm initially adopts a director SOR; and zero otherwise. The independent variables in Equation (1) are measured in the year t-1. The model is estimated with fixed effects for year and industry and robust standard errors.

As indicated in Hypothesis 1a and 1b, I expect that, all else being equal, firms with poor financial performance and low director ownership will be more likely to adopt a director SOR. I measure firm performance in two ways, ROA and $Returns$, and expect a negative coefficient on β_1 and β_2 , where ROA is defined as net income divided by assets and $Returns$ is defined as the prior 12-month cumulative stock return. I measure director ownership, $Board\ outside\ ownership\ pct$ as the percentage of ownership held by the median outside director and expect a negative coefficient on β_3 . Additionally, as per Hypothesis 1c, I expect that firms with more outside directors will be more likely to

adopt a director SOR. I measure *Board outside pct* as the percentage of the board that are identified as outside board members and expect a negative coefficient on β_4 .

Hypothesis 1d predicts that firms with greater institutional ownership are less likely to adopt a director SOR. I measure *Institutional ownership pct* as the percentage of stock held by institutional owners as defined by Thomson Reuters and expect a negative coefficient on β_5 . Hypothesis 1e predicts that firms with more transparent information environments will be less likely to require director SOR, as greater information asymmetry requires more effort by the director to effectively monitor. I include two variables, *Analyst following* and *Guidance provider*, to proxy for the information environment of the firm. I measure *Analyst following* as the number of analysts that provided an EPS estimate for the firm in the prior year; *Guidance provider* is an indicator variable set to one if the firm provided either annual or quarterly EPS guidance in the prior year and zero otherwise. As both of these variables indicate a more transparent information environment, I expect a negative coefficient on both β_6 and β_7 .

I include additional board-level characteristics as control measures. *Board size* is defined as the number of total directors on the board; *Board tenure* is defined as the average tenure of the outside directors on the board; and *Busy board pct* is defined as the percentage of outside directors that sit on three or more boards. Larger boards may need to increase outside director ownership in order to incentivize directors. Longer-tenured board members have a tendency to become entrenched; thus firms with longer board tenure may also be more likely to adopt director SOR in order to ensure interest

alignment. Board members who sit on multiple boards may be too busy to pay attention to the desires of shareholders or may be more willing to rely on management.

Finally, I include firm level characteristics as controls. *CEO ownership pct* is the percentage of stock held by the CEO; *Growth firm* is an indicator variable equal to one if the firm's book-to-market ratio is higher than the median for the year; *Std dev returns* is defined as the standard deviation of the prior 12 months stock price return; *Firm size* is defined as the natural log of assets and *Firm age* is the age of the firm according to Compustat.

4.2 Consequences of Director SOR Adoption

To examine the consequences of director SOR adoption, I use a difference-in-difference design to capture the effect of the change from the pre- to the post- period for treatment and control firms. $Adopter_t$ is an indicator variable equal to one for all observations of treatment firms (i.e., firms that adopt a director SOR) and zero for all observations of control firms (i.e., firms that do not adopt a director SOR). $Post_t$ is an indicator variable equal to one for firm-year observations including and after the match year and zero for firm-years prior to the match year. The event year is the year of director SOR adoption for treatment firms ($Adopter=1$), and a randomly selected year for each available control firm ($Adopter=0$).

Additionally, I employ a propensity score matching approach to create a matched sample of firms with a director SOR (treatment) and firms without a director SOR (control). I base the propensity score matching model on several factors affecting the decision to have a director SOR. Estimation of a causal effect in observational studies

may be biased because firms choose ownership requirements endogenously. Therefore, any differences in outcome may be attributed to factors that affect the likelihood of choosing to have a director SOR rather than the actual SOR. Propensity score matching addresses sample selection bias by creating a matched sample of adopting and non-adopting firms based on their propensity to have a director SOR (Dehejia and Wahba, 2002; Rosenbaum and Rubin, 1983).

I estimate propensity scores using a logistic regression that includes board and firm factors that may affect the decision to use a director SOR. I match firms with a director SOR (treatment) to firms without a director SOR (control) with replacement based on the closest propensity score match and a caliper width equal to 0.044, which is 20 percent of the standard deviation of the propensity score. Because this matching approach depends on the order of observations, I randomize the order prior to propensity score matching. See Appendix B for the regression results of the propensity score matching and Table 3, Panel B for comparisons of the mean and medians of treatment and control groups.

Financial Reporting Monitoring

To test Hypothesis 2a, I use the following logit regression:

$$\text{Prob}(\text{Financial irregularity}_{t+1, t+2}) = \beta_0 + \beta_1 \text{Adopter}_t + \beta_2 \text{Post}_t + \beta_3 \text{Adopter}_t \times \text{Post}_t + \text{Controls}_t \quad (2)$$

where *Financial irregularity*_{t+1, t+2} is defined as an indicator variable equal to one when a firm experiences a financial restatement due to fraud, an SEC investigation, or a board initiated investigation according to Audit Analytics; and zero otherwise. I expect a negative coefficient on β_3 , the interaction of *Adopter*_t *Post*_t, indicating that firms are

less likely to have a financial irregularity after the adoption of a director SOR. I include controls for *Board size_t*, *Board outside pct_t*, *Busy board pct_t*, *Board tenure_t*, and *Board outside ownership pct_t*. I include return on assets (*ROA_t*) as a measure of firm accounting performance and proxy for growth opportunities using the book-to-market ratio (*BTM_t*) and change in sales (*Sales growth_t*). I include an indicator for whether the firm was involved in M&A activity during the previous fiscal year (*M&A_t*). All models are estimated with fixed effects for year and industry and robust standard errors.

CEO Performance Monitoring

To test Hypothesis 3a, I use the following OLS regression of forced CEO turnover conditional on firm performance:¹⁴

$$\begin{aligned}
 \text{Forced CEO Turnover}_{t+1} = & \beta_0 + \beta_1 \text{ Adopter}_t + \beta_2 \text{ Post}_t + \beta_3 \text{ Poor performance}_t \\
 & + \beta_4 \text{ Adopter}_t \times \text{ Post}_t + \beta_5 \text{ Post}_t \times \text{ Poor performance}_t \\
 & + \beta_6 \text{ Adopter}_t \times \text{ Post}_t \times \text{ Poor performance}_t \\
 & + \text{ Controls}_t
 \end{aligned} \tag{3}$$

where I define *Forced CEO turnover_{t+1}* as a change in CEO when the CEO is less than 65 years old. *Poor performance_t* is a measure of the firm's financial performance and is an indicator variable equal to one if the firm's *ROA* is less than the industry median *ROA* for that year. I expect to find a positive coefficient on the interaction of *Adopter_t* x *Post_t* x *Poor performance_t* ($\beta_6 > 0$) indicating that firms adopting a director SOR have greater CEO performance-turnover sensitivity.

¹⁴ In this regression the dependent variable is dichotomous; however, given the problems of trying to interpret interaction terms in nonlinear models, as well as the problems with including fixed effects, I estimate this specification using OLS techniques, consistent with recent research (Atanassov, 2013; Cornelli, Kominek, and Ljungqvist, 2013; Becker and Milbourn, 2011).

I include controls for several board characteristics because prior studies find that the CEO performance-turnover sensitivity increases when there are more outsiders on the board (Weisbach, 1988) and decreases with greater presence of busy directors on the board (Fich and Shivdasani, 2006) and with larger board size (Faleye, 2004). Additionally, I include a control for firm size as prior studies find that turnover increases as the size of the firm increases (e.g., Huson, Parrino and Starks, 2001). I measure *Board size_t*, *Board outside pct_t*, *Board outside ownership pct_t*, *Board tenure_t*, *Busy board pct_t*, and *Firm size_t* as defined in Equation (1).

CEO Compensation Monitoring

To test Hypothesis 4a, I use the following OLS regression:

$$\begin{aligned} Excess\ compensation_{t+1} = & \beta_0 + \beta_1 Adopter_t + \beta_2 Post_t + \beta_3 Adopter_t \times Post_t \\ & + Controls_t \end{aligned} \quad (4)$$

where *Excess compensation_{t+1}* is used to capture CEOs' potential rent extraction via compensation that is above their economic wage (Core et al., 1999). Following Kim et al. (2014), I estimate excess CEO compensation as residuals from regressions of expected total, cash and equity compensation.¹⁵ The estimation results are reported in Appendix C. I expect a negative coefficient on β_3 , the interaction of *Adopter_t* \times *Post_t*, indicating that firms pay less in excess CEO compensation after the adoption of a director SOR. I include controls for *Board size_t*, *Board outside pct_t*, *Busy board pct_t*,

¹⁵ Following Kim et al. (2014), I estimate compensation residuals using the natural log of total compensation, cash compensation and equity compensation. Because Incentive Lab uses equity compensation as reported by firms in their proxy statements, the passage of SFAS 123R creates a discontinuity in the reported values of equity-based compensation during my sample period. To account for this discontinuity and consistent with Kim et al. (2014), I separately estimate excess compensation regressions for the pre-SFAS 123R and the SFAS 123R periods. See Appendix C for regressions.

Board tenure_t, and *Board outside ownership pct_t*. All models are estimated with fixed effects for year and industry and robust standard errors.

4.3 Substantial and Symbolic Director SOR Adoption

My next set of tests examine whether the association between the adoption of a director SOR and board monitoring performance varies based on the whether the director SOR is compelling and material. To identify adoptions of compelling director SORs, I first compare the required director ownership in the year of adoption to the ex-ante director ownership in the year prior to adoption for each individual director. I then determine the percentage of directors that met or exceeded the director SOR in the year prior to adoption. I classify a firm as a *Compelling adopter* if less than 75 percent of the directors on the board met the ownership requirement in the year prior to adoption. Conversely, I classify ownership requirements as *Non-compelling adopter* if more than 75 percent of the directors on the board met the ownership requirement in the year prior to adoption.¹⁶

To identify adoptions of material director SORs, I classify each adopting firm as either robust, standard or sub-standard according to ISS (2014). The ISS criterion is based on the amount of required ownership as a multiple of annual director retainer. A director SOR is considered robust if the required ownership is at least five times the annual director retainer; standard if the required ownership is at least three times the

¹⁶ In additional tests, I also use 50 percent as a threshold for identifying compelling adopters and alternatively, use a continuous variable *Met prior pct*. My results are not robust to these alternative measures. This could be due to the high proportion of firms (53 percent) in which more than 75 percent of the directors meet the ownership requirement in the year prior to adoption.

annual director retainer but less than five times the annual director retainer; and sub-standard if the required ownership is less than three times the annual director retainer.

I include indicator variables for *Compelling adopters* and *Non-compelling adopters* in Equations 2, 3 and 4 and interact these variables with an indicator variable for $Post_t$. I then further separate compelling adopters into three categories based on the materiality of the ownership requirement: *Compelling robust adopters*; *Compelling standard adopters*; and *Compelling sub-standard adopters*.

For Hypothesis 2b, I expect that the coefficient on the interaction of *Compelling adopter_t x Post_t* will be significantly less than the coefficient on the interaction of *Non-compelling adopter_t x Post_t*, indicating that compelling adopters will be less likely to experience a financial irregularity after adoption than non-compelling adopters. I expect to find a positive coefficient on the interaction of *Substantial Adopter_t x Post_t x Poor Performance_t* ($\beta_4 > 0$), indicating that firms adopting a compelling director SOR have greater CEO performance-turnover sensitivity. Further, I expect that the coefficient on the interaction of *Substantial Adopter_t x Post_t x Poor Performance_t* will be significantly more than the coefficient on the interaction of *Symbolic Adopter_t x Post_t x Poor Performance_t* ($\beta_4 > \beta_8$), indicating that compelling adopters will have greater CEO performance-turnover sensitivity after adoption than non-compelling adopters.

For Hypothesis 3b, I expect to find a positive coefficient on the interaction term of *Compelling adopter_t x Post_t x Poor performance_t*. I also expect a significant difference between coefficients on *Compelling adopter_t x Post_t x Poor performance_t* and *Non-compelling adopters x Post_t x Poor performance_t*. I expect to find a positive

coefficient on the interaction of *Compelling, Robust Adopter_t x Post_t x Poor Performance_t*, indicating that firms adopting a compelling and robust director SOR have greater CEO performance-turnover sensitivity. Further, I expect that the coefficient on the interaction of *Compelling Robust Adopter_t x Post_t x Poor Performance_t* will be significantly more than the coefficients on the interaction of *Non- Compelling Adopter_t x Post_t x Poor Performance_t*, and the interaction of *Compelling, Sub-standard Adopter_t x Post_t x Poor Performance_t*, indicating that compelling robust adopters will have greater CEO performance-turnover sensitivity after adoption than non-compelling adopters and compelling sub-standard adopters.

For Hypothesis 4b, I expect to find a negative coefficient on the interaction term of *Compelling adopter_t x Post_t*. I also expect to a significant difference between coefficients on *Compelling adopter_t x Post_t* and *Non-compelling adopters x Post_t*. Further, I expect that the coefficient on the interaction of *Substantial Adopter_t x Post_t* will be significantly more than the coefficient on the interaction of *Symbolic Adopter_t x Post_t* ($\beta_4 > \beta_8$), indicating that compelling adopters will have less excess CEO compensation after adoption than non-compelling adopters.

5. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Table 1, Panel A summarizes the sample selection. I start with 21,387 firm-year observations (1,048 adopting firms) from the intersection of Incentive Lab and Compustat from 1998 to 2013. I exclude 611 firm-year observations (13 adopting firms) missing data from Compustat; 1,319 observations (77 adopting firms) missing return data from the Center for Research in Security Prices (CRSP) database; 3,618 observations (168 adopting firms) missing board or CEO data from Incentive Lab and ExecuComp and 2,543 observations (76 adopting firms) missing data from one year lag and leads. The full sample includes 13,296 firm year observations, including 714 observations of director SOR adoption. After propensity-score matching, the sample includes 8,418 firm year observations and 481 adopting firms. I obtain irregularity data from Audit Analytics and CEO turnover data from Incentive Lab. Table 1, Panel B summarizes observations by firm-year. The number of firm observations per year ranges from 686 to 1,002 with an average of 886 firms per year.

Figure 1 shows the trend in the number of firms utilizing a director SOR over the past fifteen years, as well as the number of firms adopting a director SOR each year.¹⁷

¹⁷To identify the year of director SOR adoption, I use Incentive Lab holding requirements data. I classify a firm's initial year with a director SOR as the year of adoption. Since Incentive Lab provides detail on director SORs for years ending after December 15, 2006, I hand collect the year of adoption for 516 firms with a director SOR in fiscal year 2006. I examine prior year's proxy statements to identify ownership requirements previously disclosed. I use the search terms: "ownership guidelines", "ownership requirements", "ownership policy" and "target ownership", as well as simply "ownership". I document that 389 firms (75.4 percent) voluntarily disclose the presence of a director SOR in years prior to 2006; 78 firms (15.1 percent) explicitly state 2006 as the adoption year; and 49 firms (9.5 percent) neither disclose the presence of a director SOR in a prior year's proxy statement nor explicitly state the adoption year. As there is little reason to believe firms would not disclose the presence of a director SOR, I assume the adoption year is the year in which the director SOR is first disclosed.

The dark portions of the bars indicate the number of firms continuing the use of a director SOR while the light portions indicate the number of firms adopting a director SOR in the period. Only 39 (2 percent) of the sample firms had a director SOR in 1998, while 893 (65 percent) had a director SOR in 2013. It is interesting to note that the first significant increase in director SORs can be seen in 2003, shortly after the implementation of board independence requirements by the NYSE and SOX, and continues through 2007, after the implementation of SEC regulations mandating the disclosure of director SORs. In untabulated results, I find that the average dollar value of required ownership has also risen from \$157,055 in 1998 to \$391,250 in 2013.¹⁸

For firms adopting a director SOR, I determine the dollar value of the director SOR in the year of adoption. Table 2, Panel A (Panel B) reports the number of firms in the full (propensity-score matched) sample that adopt a director SOR in the form of a multiple of retainer, shares, dollar value or combination. For adopting firms that use multiple of retainer approach (n=454), I calculate the dollar value requirement as the required multiple times the director's annual retainer.¹⁹ For adopting firms that use a fixed number of shares approach (n=152), I calculate the dollar value requirement as the number of shares required multiplied by the stock price at the end of the fiscal year. For adopting firms that use a dollar value approach (n=81), the requirement is simply the

¹⁸ Morningstar Inc. has the highest director SOR in my sample. According to the Morningstar Inc.'s 2011 proxy statement, its directors are required to hold "shares with a value of \$5,000,000 or generally speaking, a number of Morningstar shares and share equivalents that is greater than or equal to the sum of 12.5 percent of the total number of exercisable stock options and 25 percent of the total number of vested restricted stock units that he or she has been granted." (p.21).

¹⁹ I use the individual director's retainer (cash fees), if provided by Incentive Lab; otherwise, I use the average director retainer provided by ExecuComp.

dollar value as specified in the proxy statement. For adopting firms that use a combination of methods (n=27), I use the lesser of the values as calculated above, unless otherwise specified in the proxy statement. Table 2 also reports the actual outside director ownership in the year of adoption. I determine actual dollar value ownership using the reported number of shares held by each director multiplied by the share price at the close of the fiscal year.²⁰

As shown in Table 2, on average, the dollar value of required director stock ownership is lower than the actual dollar value of director stock ownership. In Panel A, the mean (median) retainer multiple is 3.88X (4.00X) and the mean (median) ownership requirement is \$244,600 (\$200,000); yet the mean (median) of actual outside director ownership for adopting firms is \$2,030,200 (\$993,500). This data shows that average director ownership is more than ten times greater than the ownership requirement, suggesting that director SORs may not be compelling for directors. Similar results are shown in Panel B using the propensity-score matched sample.

To investigate further whether director SORs are compelling, Figure 2 shows the average director SOR for adopting firms in each year, as well as the minimum and median actual director stock ownership for adopting firms. The median director owns significantly more than required in the year of adoption, while the minimum director owns slightly more than required in all years except 2002.

²⁰ Stock ownership of each board member is disclosed in the annual proxy statement and provided by Incentive Lab. While there is variation in whether firms consider deferred shares or unvested options in meeting the director SOR requirement; for the purposes of these tests, I have included all shares reported as beneficially owned in Incentive Lab.

Table 3, Panel A presents descriptive statistics for adopting firms (treatment) and firms that do not adopt a director SOR in my sample (controls). The descriptive statistics indicate that firms adopting a director SOR have larger boards with a higher percentage of outside directors; directors of firms with a director SOR tend to have longer tenure and are more likely to sit on three or more other boards. Firms with a director SOR have less CEO ownership and greater institutional ownership, as well as a larger analyst following. These firms also tend to be larger and older than firms not adopting a director SOR.

Tests of differences in the means and medians indicate the treatment and control firms have significant differences. Table 3, Panel A shows significant differences in the means and medians across all variables, with the exception of mean *Returns*. Table 3, Panel B provides descriptive statistics for the propensity score-matched firms. Matching on propensity score removes much of the bias between the adopting and non-adopting sample. However, the means (medians) of five (six) of the fifteen variables are statistically different after propensity-score matching; therefore, in further tests I include these variables to control for any residual bias.²¹

²¹ I examine the covariate balance between the treatment firms and control firms and test whether the systematic differences in the full sample are reduced in the propensity score-matched sample.

6. RESULTS

6.1 Determinants of Director SOR Adoption

To test Hypothesis 1a-e, I examine the likelihood of a firm adopting a director SOR. Table 4, Column 1 presents results from the logistic model specified in Equation (1).²² For H1a, I expect to find a negative coefficient on variables that proxy for firm performance (ROA_{t-1} and $Returns_{t-1}$), indicating that a firm is more likely to adopt a director SOR when performance has been lower. However, the coefficients on both ROA_{t-1} ($\beta_1 = 0.027$, p-value > 0.10) and $Returns_{t-1}$ ($\beta_2 = 0.257$, p-value > 0.10) are positive but not significant. In tests of H1b and H1c, I document a negative and significant coefficient on *Board outside ownership pct*_{t-1} ($\beta_3 = -0.668$, p-value < 0.01) and positive and significant coefficient on *Board outside director pct* ($\beta_4 = 1.154$, p-value < 0.05), as expected. These results indicate that boards with lower outside director ownership and a higher percentage of outsiders on the board are more likely to adopt a director SOR.

For H1d, I expect that institutional ownership may be seen as a substitute for board monitoring; thus, I expect a negative coefficient on *Institutional ownership pct*_{t-1}. However, I find a positive and significant coefficient on *Institutional ownership pct*_{t-1} ($\beta_5 = 0.546$, p-value < 0.05), indicating that as institutional ownership increases, firms are more likely to adopt a director SOR, suggesting that institutional ownership serves a complement to board monitoring.

²² In untabulated results, I also run Equation (1) as an OLS regression and find consistent results across all hypotheses, including control variables.

For H1e, I expect to find a negative coefficient on variables that proxy for the transparency of a firm's information environment performance (*Analyst following_{t-1}* and *Guidance provider_{t-1}*), indicating that a firm is less likely to adopt a director SOR when directors' already have sufficient information to monitor. However, I find a positive and significant coefficient on *Analyst following_{t-1}* ($\beta_6 = 0.047$, p-value < 0.01) and a positive but insignificant coefficient on *Guidance provider_{t-1}* ($\beta_7 = 0.287$, p-value > 0.10). This result indicates that firms with a large analyst following are more likely to adopt a director SOR than firms with a small analyst following.

In addition, I find that the coefficients on *CEO ownership pct* ($\beta_{11} = -4.549$, p-value < 0.01) and *Std deviation of returns* ($\beta_{13} = -17.576$, p-value < 0.05) are negative and significant, indicating that as CEO ownership decreases and as the volatility of the stock price decreases, firms are more likely to adopt a director SOR. Finally, the coefficients on *Growth firms* ($\beta_{12} = 0.311$, p-value < 0.10) and *Firm age* ($\beta_{14} = 0.023$, p-value < 0.01) are positive and significant, indicating that a growth firm is more likely to adopt a director SOR yet older firms are also more likely to adopt a director SOR.²³

Other board and firm characteristics such as *Board size_{t-1}* ($\beta_8 = 0.019$, p-value > 0.10), *Board tenure_{t-1}* ($\beta_9 = 0.010$, p-value > 0.10), *Busy board pct_{t-1}* ($\beta_{10} = -0.447$, p-value > 0.10) and *Firm size_{t-1}* ($\beta_{15} = 0.133$, p-value > 0.10) are not significantly associated with the likelihood of adopting a director SOR.

²³ In robustness tests, I also run Equations (1) including *PastIRR_{t-1}* as an independent variable. *PastIRR_{t-1}* is an indicator variable equal to one if the firm has had a financial irregularity in any of the prior three years; otherwise zero. The coefficient on this variable is positive but not significant, indicating that the occurrence of a financial irregularity does not influence a firm's likelihood of adopting a director SOR.

Alternative Methods of Modeling Director SOR Adoption

An alternative method for analyzing the determinants of director SOR adoption is to use a hazard regression. In the hazard regression, adoption of a director SOR is modeled as the “failure” event, (i.e., the dependent variable is the time to director SOR adoption.) The hazard regression estimates the impact of board and firm characteristics on adoption, accounting for the relative timing of that adoption. I use the first year of the sample (1998) as my starting year and calculate T as the “survival” time, (i.e., the number of years until the firm adopts a director SOR.)²⁴ Thus, T=1 if a firm adopts a director SOR in 1998, T=2 if adoption occurs in 1999, and so on. For firms that do not adopt by 2013, T is set to 15 for year 2013 and the dependent variable is treated as censored.

Table 4, Column 2 reports the beta coefficients for the results of a hazard model. The results are consistent with logistic regression with one exception. I find a positive and significant coefficient on $Returns_{t-1}$ ($\beta_2 = 0.159$, p-value < 0.05) in the hazard model, indicating that as a firm’s stock market return increases, so does the likelihood of adopting a director SOR.

6.2 Consequences of Director SOR Adoption

Financial Reporting Monitoring

To test Hypothesis 2a, I examine the likelihood of financial irregularities following the adoption a director SOR. Table 5, Panel A presents logistic regression

²⁴ If the firm is incorporated after 1998, then I use the year of incorporation as the start date.

results from the models specified in Equation (2). Panel A, Column 1 presents the coefficients from the regression using the full sample, or all available firm years for treatment and control firms with at least three consecutive firm-year observations (t-1 to t+1) while Column 2 presents the coefficient from the regression using the propensity score-matched sample with at least three consecutive firm-year observations (t-1 to t+1). In Table 5, Panel A, Column 1, I find a negative and marginally significant coefficient for the interaction term of $Adopter_t \times Post_t$ ($\beta_4 = -0.184$, p-value < 0.10), indicating that firms with a director SOR are less likely to experience a financial irregularity in the years after adoption. This result also holds when using the smaller, propensity score matched sample in Column 2 ($\beta_4 = -0.237$, p-value < 0.10). This result supports H2a that predicts firms will have a lower likelihood of financial irregularities after adopting a director SOR compared to firms that do not adopt a director SOR.

To test Hypothesis 2b, I examine whether the effect of director SOR on board monitoring is stronger for compelling ownership requirements as compared to non-compelling ownership requirements. Table 5, Panel B presents logistic regression results from the models specified in Equation (2b). For Panel B, Column 1a and 1b present the coefficients from the regression using the full sample, or all available firm years for treatment and control firms with at least three consecutive firm-year observations (t-1 to t+1) while Columns 2a and 2b present the coefficients from the regression using the propensity score-matched sample with at least three consecutive firm-year observations (t-1 to t+1). In Table 5, Panel B, Columns 1a and 2a, I find a negative and significant coefficient for the interaction term of $Compelling Adopter_t \times Post_t$ ($\beta_8 = -0.297$, p-value <

0.05), indicating that firms that adopt a compelling director SOR are less likely to experience a financial irregularity in the two years after adoption than firms that do not adopt a director SOR. Additionally, I find that the coefficient on the interaction term *Compelling Adopter_t x Post_t* is significantly less than the coefficient on the interaction term of *Non-compelling Adopter_t x Post_t* ($\beta_8 < \beta_7$, $\chi^2 = 3.36$, p-value < 0.10), indicating that firms adopting compelling director SORs are less likely to have a financial irregularity than even firms that adopt non-compelling director SOR. These results also hold when using the smaller, propensity-score match sample in Column 2a ($\beta_8 = -0.371$, p-value < 0.05) and ($\beta_8 < \beta_7$, $\chi^2 = 3.04$, p-value < 0.10).

In Table 5, Panel B, Columns 1b and 2b, I further investigate whether the effect of director SOR on board monitoring is stronger for compelling ownership requirements, conditional on whether the amount is material. The coefficients on the interaction terms of *Compelling, Robust Adopter_t x Post_t* ($\beta_{11} = -0.496$, p-value < 0.01) and *Compelling, Standard Adopter_t x Post_t* ($\beta_{10} = -0.268$, p-value < 0.01) are both negative and significant, indicating that firms with a compelling and material director SOR are less likely to experience a financial irregularity in the two years after adoption. However, the coefficients on the interaction terms of *Compelling, Sub-standard Adopter_t x Post_t* ($\beta_9 = -0.039$, p-value > 0.10) and *Non-Compelling, Adopter_t x Post_t* ($\beta_7 = 0.095$, p-value > 0.10) are both insignificant. Moreover, using an Wald χ^2 test, the coefficient on *Compelling, Robust Adopter_t x Post_t* is statistically significantly less than the coefficients on *Non-Compelling Adopter_t x Post_t* ($\beta_9 < \beta_6$, $\chi^2 = 6.92$, p-value < 0.01) and *Compelling, Symbolic Adopter_t x Post_t* ($\beta_9 < \beta_7$, $\chi^2 = 4.75$, p-value < 0.05). These results also hold

when using the propensity-score match sample in Column 2a ($\beta_9 < \beta_6$, $\chi^2 = 2.94$, p-value < 0.05) and ($\beta_9 < \beta_7$, $\chi^2 = 4.02$, p-value < 0.05).

CEO Performance Monitoring

To test Hypothesis 3a, I examine the likelihood of CEO performance-turnover sensitivity following the adoption a director SOR. Table 6, Panel A presents OLS regression results from the models specified in Equation (3). Panel A, Column 1 presents the coefficients from the regression using the full sample, or all available firm years for treatment and control firms with at least three consecutive firm-year observations (t-1 to t+1) while Column 2 presents the coefficient from the regression using the propensity score-matched sample with at least three consecutive firm-year observations (t-1 to t+1). In Table 6, Panel A, Column 1, I find a positive and insignificant coefficient for the three-way interaction term of *Adopter_t x Post_t x Poor performance_t* ($\beta_7 = 0.002$, p-value > 0.10) using the full sample and a negative but still insignificant coefficient ($\beta_7 = -0.005$, p-value > 0.10) using the propensity-score match sample.

To test Hypothesis 3b, I examine the association between the adoption of a compelling director SOR and CEO performance-turnover sensitivity. In Table 5, Panel B, Columns 1a and 2a, the coefficients for the interaction term of *Adopter_t x Post_t x Poor performance_t* are not significant (Column 1a: $\beta_{21} = -0.002$, p-value > 0.10 ; Column 2a: $\beta_3 = -0.005$, p-value > 0.10). Further, using an F-test on the difference between the coefficients on the three way interaction of *Compelling Adopter_t x Post_t x Poor Performance_t* (β_{21}) and *Non-Compelling Adopter_t x Post_t x Poor Performance_t* (β_{20}) and do not find any evidence that $\beta_{21} < \beta_{20}$. Further, I find no significant differences in the

effect of a compelling director SOR, conditional on the amount of the requirement and forced CEO turnover. The coefficients on the interaction terms *Compelling, Robust Adopter_t x Post_t x Poor Performance_t* and *Compelling, Standard Adopter_t x Post_t x Poor Performance_t* are both insignificant in columns 1b and 2b. In conclusion, I find no evidence that firms that adopt a director SOR demonstrate improved board monitoring, as measured by CEO performance-turnover sensitivity.

CEO Compensation Monitoring

To test Hypothesis 4a, I examine the association between the adoption of a director SOR and excess CEO compensation. Table 7, Panel A presents OLS regression results from the models specified in Equation (4) with CEO total compensation, cash compensation and equity compensation as the dependent variables. Panel A, Columns 1-3 present the coefficients from the regression using the full sample, or all available firm years for treatment and control firms with at least three consecutive firm-year observations (t-1 to t+1) while Columns 4-6 present the coefficient from the regression using the propensity score-match sample with at least three consecutive firm-year observations (t-1 to t+1). In Table 7, Panel A, Columns 1-3, I find a positive and significant coefficient for the interaction term of *Adopter_t x Post_t* ($\beta_4 = 0.303$, p-value < 0.01; $\beta_4 = 0.172$, p-value < 0.05; $\beta_4 = 0.836$, p-value < 0.05), indicating that firms with a director SOR have higher excess CEO compensation after adoption, compared to firms without a director SOR. Using the propensity-score match sample, the coefficients on the interaction term are consistent for the regressions of excess total compensation (Column 4: $\beta_4 = 0.275$, p-value < 0.01) and excess equity compensation (Column 6: $\beta_4 =$

1.155, p-value < 0.05), but the coefficient on the interaction term for the regression of excess cash compensation is no longer significant (Column 5: $\beta_4 = 0.109$, p-value > 0.10). This result fails to support H4a and indicates that rather than improving compensation monitoring after adoption, the adoption of a director SOR may be associated with excess CEO compensation.

To test Hypothesis 4b, I examine whether the effect of director SOR on board compensation monitoring is stronger for compelling ownership requirements as compared to non-compelling ownership requirements. Table 7, Panel B presents OLS regression results from the models specified in Equation (4b). For Panel B, Columns 1-4 present the coefficients from the regression using the full sample, or all available firm years for treatment and control firms with at least three consecutive firm-year observations (t-1 to t+1) while Columns 5-8 present the coefficients from the regression using the propensity score-matched sample with at least three consecutive firm-year observations (t-1 to t+1). In Table 7, Panel B, Columns 1 and 2, I find a positive and significant coefficient for the interaction term of *Compelling Adopter_t x Post_t* (Total Comp: $\beta_8 = 0.287$, p-value < 0.01; Equity Comp: $\beta_8 = 0.881$, p-value < 0.05), indicating that firms that adopt a compelling director SOR have more excess CEO compensation than firms that do not adopt a director SOR. However, I find that the coefficient on the interaction term *Compelling Adopter_t x Post_t* is not significantly less than the coefficient on the interaction term of *Non-compelling Adopter_t x Post_t* ($\beta_8 < \beta_7$, Total Comp: F-test = 0.28, p-value > 0.10; Cash Comp: F-test = 0.02, p-value > 0.10), indicating that the a compelling director SOR has no incremental effect on board compensation monitoring.

These results are confirmed using the propensity-score match sample in Columns 5 and 6 (Total Comp: $\beta_8 = 0.286$, p-value < 0.01 ; Equity Comp: $\beta_8 = 1.283$, p-value < 0.05) and ($\beta_8 < \beta_7$, Total Comp: F-test = 0.10, p-value > 0.10 ; Cash Comp: F-test = 0.14, p-value > 0.10).

Finally, in Table 7, Panel B, Columns 3 and 4, I further investigate whether the effect of director SOR on board monitoring is stronger for compelling ownership requirements, conditional on whether the amount is material. The coefficients on the interaction terms of *Compelling, Robust Adopter_t x Post_t* (Total Comp: $\beta_{11} = 0.338$, p-value < 0.01 ; Equity Comp: $\beta_{11} = 0.1.016$, p-value < 0.10) are positive and significant, indicating that firms that adopt a compelling and material director SOR have more excess CEO compensation than firms that do not adopt a director SOR. However, again I find that the coefficient on the interaction term *Compelling, Robust Adopter_t x Post_t* is not significantly less than the coefficient on the interaction term of *Non-compelling, Robust Adopter_t x Post_t* ($\beta_{11} < \beta_7$, Total Comp: F-test = 0.04, p-value > 0.10 ; Cash Comp: F-test = 0.14, p-value > 0.10), using either the full sample or the propensity-score match sample.

7. ADDITIONAL ANALYSIS

Given that the effect of a director SOR on board monitoring varies for substantial and symbolic adopters, it is interesting to consider the choice to adopt a substantial or symbolic adoption rather than simply the choice to adopt a director SOR. To do so, I create a variable *Type of SOR* equal to zero if the firm does not adopt a director SOR, one if the director SOR is symbolic (either not compelling or compelling sub-standard) and equal to two if the director SOR is substantial (either compelling robust, or compelling standard.) As I have no particular reason to anticipate such stability in factors explaining the choice of director SOR, I use a generalized ordered logit regression. This method developed by Fu (1998) is similar to an ordered logit regression, but relaxes the proportional odds assumption on the data and produces two sets of coefficients that correspond to each cut-point. The first set of coefficients refers to the odds that the number of choice of director SOR falls into categories 1 or 2 (symbolic or substantial) instead of category 0 (no director SOR). Similarly, the second set refers to the odds that the choice of director SOR falls into category 2 instead of 0 or 1.

The first set of regression coefficients from the generalized ordered logistic regression in Table 8 is consistent with the results from the simple logistic regression. The second set of regression coefficients in Table 7 show several variables that can explain firms' decisions to adopt a substantial director SOR rather than a symbolic director SOR. The following variables are negative and significant: *Board outside director pct_{t-1}* (p-value < 0.10); *Board outside ownership pct_{t-1}* (p-value < 0.01); and *Board tenure_{t-1}* (p-value < 0.01). *Firm age_{t-1}* is positive and significant (p-value < 0.05).

These results suggest that older firms with more outside directors, lower outside director ownership and less experienced directors are more likely to adopt a substantial SOR. In summary, the generalized ordered logistic regression provides further enlightenment on the distinguishing features of firms that chose to adopt a symbolic or substantial director SOR.

8. CONCLUSION

While many firms have been responsive to calls to improve corporate governance by implementing a director SOR, wide-spread adoption now warrants further scholarly attention. This study examines whether director SORs are effective in aligning director and shareholder interests, or alternatively, represent the latest option for corporate governance window-dressing. Using a unique sample firms adopting a director SOR from 1998 to 2013, I examine whether the adoption of a director SOR is associated with improved board monitoring. I show that, on average, firms adopting a director SOR exhibit improved monitoring over financial reporting. Not surprisingly, these results are driven primarily by firms that adopt a substantial director SOR, rather than a symbolic SOR. In contrast, it appears that firms adopting a director SOR exhibit decreased compensation monitoring. Additionally, I find no evidence indicating that firms adopting a substantial director SOR exhibit greater CEO performance-turnover sensitivity or less excess CEO compensation.

I also find evidence suggesting that firms do not necessarily use the adoption of a director SOR as a substitute for other monitoring mechanisms. Results from a generalized ordered logistic regression show that firms with other external monitors and better information environments are no more likely to adopt a substantial director SOR than a symbolic director SOR. However, boards with fewer outside directors, lower outside director ownership, and less tenure are more likely to adopt a substantial director SOR than a symbolic SOR.

This study contributes to the literature on director incentives (e.g., Kumar and Sivaramakrishnan, 2008; Archambeault, DeZoort and Hermanson, 2008; Yermack, 2004; Drymiotes and Sivaramakrishnan, 2012) by examining an additional tool that can be used to incentivize directors. Additionally, this study contributes to the literature on stock ownership requirements (e.g., Core and Larcker, 2002; Quinn, 2015; Bhagat and Tookes, 2012) by providing initial evidence that the adoption of a substantial director SOR is effective in aligning directors' incentives with shareholders' interests. However, this study shows that many firms adopt a symbolic director SOR; thus, without understanding the variances in adoption of a director SOR, one cannot broadly assume that a director SOR has a meaningful impact on director incentives and board monitoring performance.

These findings suggest areas for future research. Research may examine the effect of a director SOR on the boards' advising performance. For example, does adoption of director SORs lead to improved board advising (e.g., likelihood and frequency of mergers and acquisitions (M&A) activity, the abnormal market return around M&A announcements, or the likelihood that the firm is subject to a hostile takeover or activist intervention)? Continued research in this area will be beneficial to establish director SORs as a useful tool in addressing agency issue and encouraging active monitoring by the board of directors.

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APPENDIX A

<u>Variable Name</u>	<u>Definition</u>
<i>Director SOR</i>	= Indicator variable equal to one if the firm has director stock ownership requirements in effect as of the last day of the firm fiscal year; otherwise zero.
<i>Adopter</i>	= Indicator variable equal to one if the firm adopted a director stock ownership requirement (SOR) in the current fiscal year; otherwise zero.
<i>Compelling adopter</i>	= Indicator variable equal to one if the firm adopted a compelling director SOR (i.e., at least 25 percent of the outside directors must increase shareholdings to meet the requirement, based on outside director ownership in the year prior to adoption); otherwise zero.
<i>Non-compelling adopter</i>	= Indicator variable equal to one if the firm implemented a non-compelling director SOR (i.e., less than 25 percent of the outside directors must increase shareholdings to meet the requirement, based on outside director ownership in the year prior to adoption); otherwise zero.
<i>Robust adopter</i>	= Indicator variable equal to one if the firm implemented a robust director SOR (i.e., greater than five times the annual director retainer); otherwise zero.
<i>Standard adopter</i>	= Indicator variable equal to one if the firm implemented a standard director SOR (i.e., more than three times but less than five times the annual director retainer); otherwise zero.
<i>Sub-standard adopter</i>	= Indicator variable equal to one if the firm implemented a sub-standard director SOR (i.e., less than three times the annual director retainer); otherwise zero.
<i>Financial irregularity</i>	= Indicator variable equal to one if the firm experiences a financial restatement due to fraud, GAAP error or other issue, an SEC investigation, or a board initiated investigation (according to Audit Analytics); and zero otherwise.
<i>Forced CEO turnover</i>	= Indicator variable set to one if there has been a change in the Chief Executive Officer (CEO) position in the current fiscal year and the CEO is less than 60 years of age; otherwise zero.

<i>Board size</i>	= Total number of directors on the firm's board (from Incentive Lab).
<i>Outside director pct</i>	= Number of outside directors on the company's board (derived from Incentive Lab) / total number of outside directors on the company's board.
<i>Outside ownership pct</i>	= Percentage of stock held by firm's outside directors.
<i>Board tenure</i>	= Average number of years outside directors have served on the board.
<i>Busy board pct</i>	= Percentage of outside directors that sit on three or more other boards.
<i>CEO ownership pct</i>	= Percentage of stock held by the CEO.
<i>Institutional ownership pct</i>	= Percentage of stock held by institutional owners from Thomson Reuters.
<i>Analyst following</i>	= Number of analysts that provided an EPS estimate for the firm in the last annual period.
<i>Growth firm</i>	= Indicator variable equal to one if the firm's book-to-market ratio is higher than the median for the year; zero otherwise.
<i>Guidance provider</i>	= Indicator variable equal to one if the firm provided managerial guidance in the past year.
<i>ROA</i>	= Net income divided by assets (ib/at).
<i>Returns</i>	= Firm's stock returns over the fiscal year.
<i>Std dev returns</i>	= Standard deviation of returns over the fiscal year.
<i>Firm age</i>	= Age of the firm as of the end of the fiscal year (determined from Compustat).
<i>Firm size</i>	= Natural log of assets.
<i>BTM</i>	= Book value of assets divided by market value of equity.
<i>Sales growth</i>	= Percentage change in sales from prior year.
<i>MA</i>	= Indicator variable equal to one if firm was part of a merger and acquisition in the current period; otherwise zero.
<i>Leverage</i>	= Firm's long-term liabilities divided by total assets (lt/at).
<i>Litigious</i>	= Indicator variable equal to one if firm is in a litigious industry based on the following SIC codes: 2833-2836,

3570-3577, 3600-3674, 5200-5961, 7370-7374, 8731-8734; otherwise zero.

Big N

= Indicator variable equal to one if the firm is audited by one of the Big N public accounting firms; otherwise zero.

APPENDIX B

This table reports the results of a logistic regression where the dependent variable is *Director SOR*, equal to one if the firm has a director SOR in the current fiscal year and 0 otherwise. All variables are defined in Appendix A. Continuous variables are winsorized at the top and bottom 1%. The regression includes year and industry (i.e., Fama-French 12 industry portfolios) fixed effects. Statistical significance of the coefficients is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

Dependent variable = <i>Director SOR</i>	Coef	SE
Intercept	-7.1131***	0.3366
Board size _{t-1}	0.0747***	0.00876
Outside director p	1.7685***	0.2012
Outside ownership pct _{t-1}	-0.7489***	0.1311
Board tenure _{t-1}	0.0114*	0.00629
Busy board pct _{t-1}	0.1542	0.2088
CEO ownership pct _{t-1}	-4.5808***	0.4581
Institutional ownership	0.347***	0.0732
Analyst following _{t-1}	0.0274***	0.00346
Growth firms _{t-1}	0.074	0.0488
Provides guidance _{t-1}	0.1589***	0.0568
ROA _{t-1}	0.3332	0.2519
Returns _{t-1}	-0.0012	0.0498
Standard deviation of	-4.6087**	2.1854
Firm age _{t-1}	0.00886***	0.00156
Firm size _{t-1}	0.1143***	0.022
Year and Industry FE	Yes	
Observations	13,296	
LR χ^2	7,357***	
Area under the ROC curve	0.868	

APPENDIX C

Panel A of this table reports estimates of excess CEO compensation as reported by Kim et al. (2014). Panel B reports estimates of a replication of Kim et al. (2014) using compensation data for the fiscal years 2001 to 2013. Dependent variables are natural log-transformed Total Compensation, Total Cash and Equity Compensation from Incentive Lab for the fiscal years 2001 to 2013. The Pre-SFAS 123R period includes compensation years prior to 2006, and the SFAS123R period includes compensation years from 2006 to 2013. See Appendix A for variable definitions. Continuous variables are winsorized at the top and bottom 1%. The regression includes industry (i.e., Fama-French 48 industry portfolios) fixed effects. Statistical significance of the coefficients is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests. T-statistics are based on standard errors that clustered at the firm level.

Panel A: Kim et al. (2014) using Morningstar from 2004 to 2008

	Pre-SFAS123R Period			SFAS 123R Period		
	Total Comp _t	Cash Comp _t	Equity Comp _t	Total Comp _t	Cash Comp _t	Equity Comp _t
Intercept	10.319***	10.715***	-1.775***	10.188***	11.326***	-1.034***
ROA _{t-1}	0.152**	0.191*	-0.479	-0.230	0.036	-3.826***
Returns _{t-1}	0.225***	0.210***	0.180	0.162***	0.073**	0.029
Irisk _{t-1}	0.473**	-0.615**	-4.806**	-0.327	-1.718***	2.768**
LnAssets _{t-1}	0.430***	0.338***	0.883***	0.479***	0.243***	1.282***
MTB-Equity _{t-1}	0.040***	0.026***	0.058***	0.031***	3.7E -5	0.069***
Leverage _{t-1}	0.133***	0.086	1.734***	0.055	-0.192***	0.923***
Cash Surplus _{t-1}			-1.115*			3.225***
Mtax-Effect _{t-1}			-6.8E -5			6.3E -4*
Industry FE?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,717	7,717	6,988	9,692	9,692	9,492
Adjusted R ²	0.5050	0.2371	0.1366	0.3620	0.1217	0.1848

Panel B: Replication of Kim et al. (2014) using Incentive Lab from 2001 to 2013

	Pre-SFAS123R Period			SFAS 123R Period		
	Total Comp _t	Cash Comp _t	Equity Comp _t	Total Comp _t	Cash Comp _t	Equity Comp _t
Intercept	10.795***	11.696***	-9.329***	12.268***	12.513***	6.014***
ROA _{t-1}	0.838***	0.666***	1.053	0.247	0.222	-0.361
Returns _{t-1}	0.143***	0.136***	0.079	0.133***	-0.009	0.471***
Irisk _{t-1}	-0.535*	-0.374	-6.330***	0.249	0.537	-5.496***
LnAssets _{t-1}	0.414***	0.281***	1.396***	0.356***	0.157***	0.918***
MTB-Equity _{t-1}	0.000	0.000	-0.002	-0.000***	-0.000***	-0.000***
Leverage _{t-1}	0.535***	0.437***	1.694***	0.234	0.433**	0.561
Cash Surplus _{t-1}			-0.000			-0.000**
Mtax-Effect _{t-1}			0.000*			0.000
Industry FE?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,357	7,357	7,357	8,187	8,187	8,187
Adjusted R ²	0.2800	0.2150	0.1720	0.1430	0.0803	0.0738

FIGURE 1
ADOPTION OF DIRECTOR STOCK OWNERSHIP REQUIREMENTS (SORs)

This figure depicts trends in the number of firms employing a director stock ownership requirements (SOR) from 1998 to 2013 in Incentive Lab (n=1,048). The dark portions of the bars indicate the number of firms continuing the use of a director SOR while the light portions indicate the number of firms adopting a director SOR in the period.

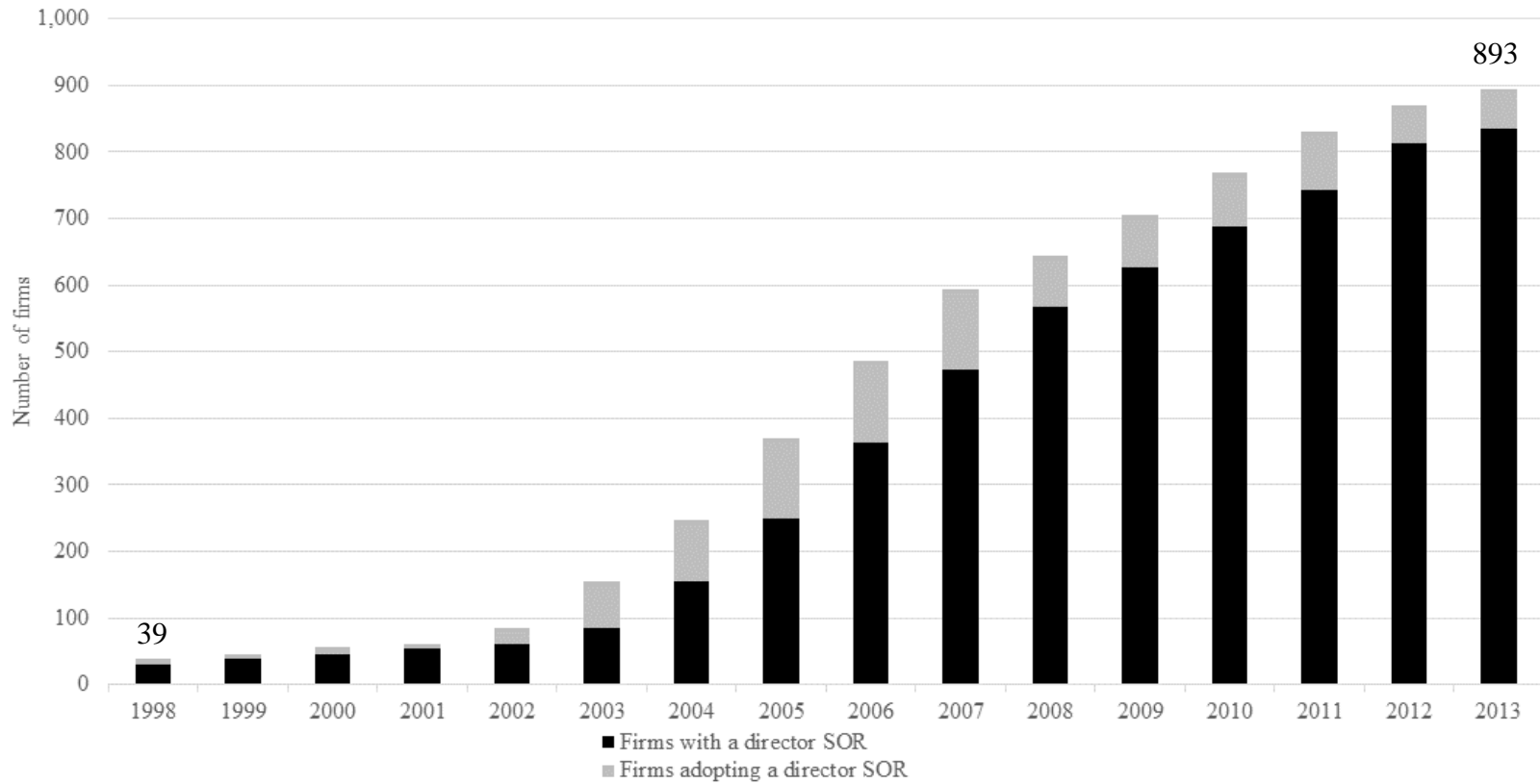


FIGURE 2
DIRECTOR SOR COMPARED TO ACTUAL DIRECTOR OWNERSHIP

This figure compares required director stock ownership to the actual minimum and median director stock ownership in the year of adoption. The line with diamond markers represents the average director ownership requirement for all adopting firms in a given year. The solid (patterned) grey portion of the bar represents the average minimum (median) director ownership for all adopting firms in a given year.

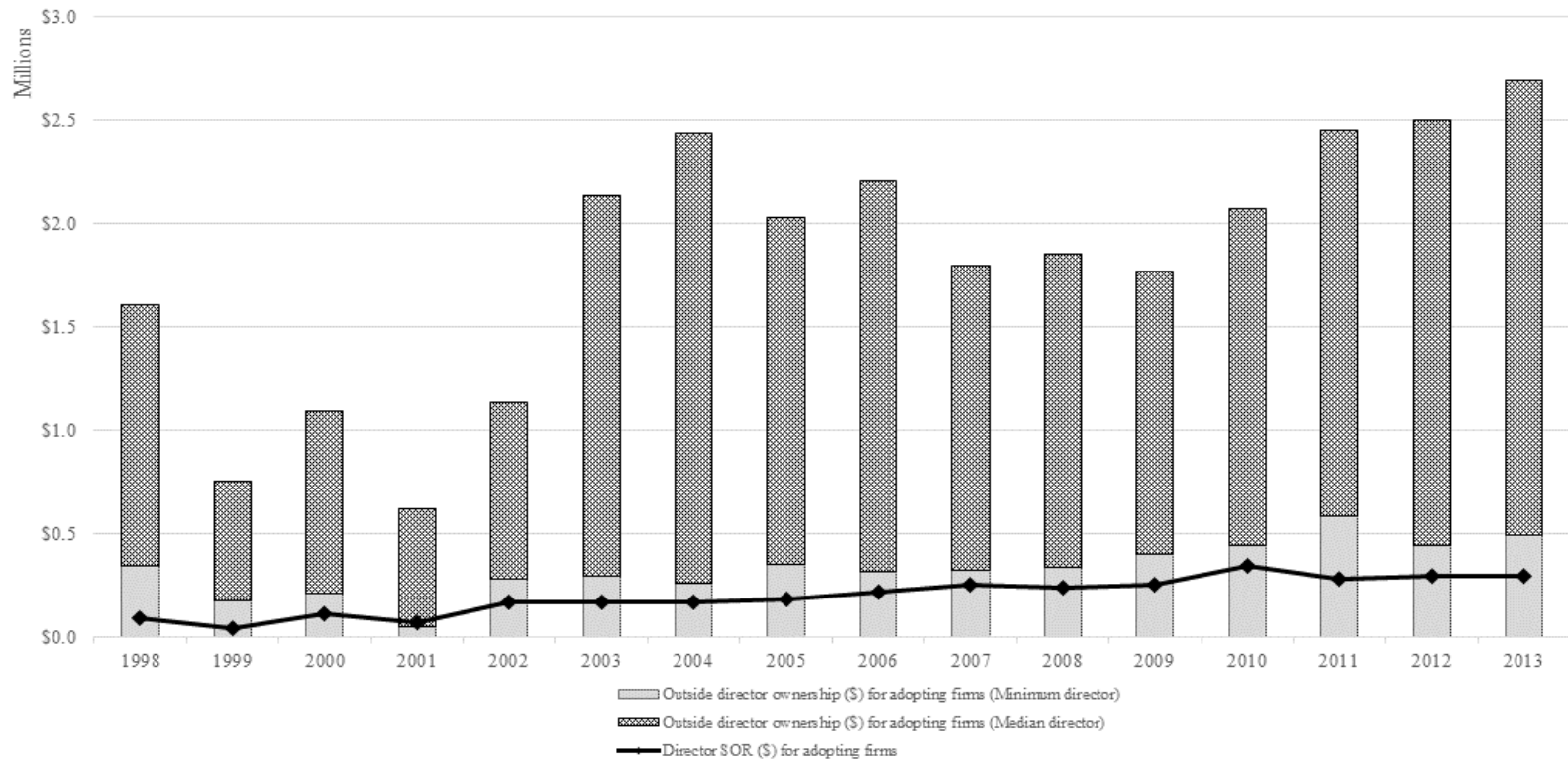


TABLE 1
SAMPLE SELECTION

Panel A: Sample selection

	Firm- years: All	Firm- years: SOR=1	Firm- years: Adopt=1
Intersection of Incentive Lab and Compustat	21,387	6,892	1,048
<i>Less:</i> Firms missing variables from Compustat	(611)	(37)	(13)
<i>Less:</i> Firms missing variables from CRSP	(1,319)	(142)	(77)
<i>Less:</i> Firms missing variables for CEO or	(3,618)	(700)	(168)
<i>Less:</i> Firms missing t-1 or t+1	(2,543)	(1,471)	(76)
Full Sample	13,296	4,542	714
Propensity Score Matched (PSM) Sample	8,418	3,442	481

Panel B: Sample by year

Year	Full Sample			PSM Sample		
	Firm- years: All	Firm- years: SOR=1	Firm- years: Adopt=1	Firm- years: All	Firm- years: SOR=1	Firm- years: Adopt=1
1998	0	0	0	0	0	0
1999	686	0	0	402	0	0
2000	886	5	5	506	5	5
2001	961	8	3	542	8	3
2002	988	28	20	569	28	20
2003	1,002	82	54	593	81	53
2004	987	155	73	596	152	71
2005	951	251	96	600	236	84
2006	902	340	92	602	298	62
2007	875	424	90	597	359	67
2008	889	457	53	603	360	17
2009	899	497	57	602	366	22
2010	878	535	60	591	384	35
2011	845	584	68	575	395	22
2012	810	607	43	549	401	20
2013	737	569	0	491	369	0
Total	13,296	4,542	714	8,418	3,442	481

TABLE 2
DIRECTOR SORs AT TIME OF ADOPTION

This table provides a summary of director SORs adopted by Incentive Lab firms. A **Multiple of Retainer** requirement is defined as a policy requiring directors to hold a multiple of x times their annual retainer or base fees. A **Shares** requirement is defined as a policy requiring directors to hold a fixed amount of shares. A **Dollar Value** requirement is defined as a policy requiring non-employee directors to hold a fixed dollar value of shares. A **Combination** requirement indicates that the amount of stock a director is required to own is based on a combination of Multiple of Retainer, Dollar Value and Shares requirements, typically in the form of the lesser of two requirements. Ownership requirement (\$) is the equivalent dollar value of ownership required for the median outside director. Actual ownership is the median outside director's ownership calculated as the number of shares held multiplied by the share price at the close of the fiscal year.

Panel A: Full sample (n=714)

Type of Requirement	Firms	Ownership requirement		Ownership requirement (\$000s)		Actual ownership (\$000s)	
	N	Mean	Median	Mean	Median	Mean	Median
Multiple of Retainer	454	3.88x	4.00x	\$246.5	\$210.0	\$1,846.3	\$989.3
Shares	152	7,415	5,000 shares	\$240.6	\$184.4	\$2,755.4	\$1,305.1
Dollar Value (\$000s)	81	\$257,300	\$200,000	\$257.3	\$200.0	\$1,871.7	\$887.2
Combination	27	-	-	\$196.8	\$177.6	\$1,514.6	\$919.3
Total	714	-	-	\$244.6	\$200.0	\$2,030.2	\$993.5

Panel B: PSM sample (n=481)

Type of Requirement	Firms	Ownership requirement		Ownership requirement (\$000s)		Actual ownership (\$000s)	
	N	Mean	Median	Mean	Median	Mean	Median
Multiple of Retainer	303	3.86x	4.00x	\$216.4	\$180.0	\$1,890.7	\$1,079.1
Shares	112	7,495	5,000 shares	\$238.6	\$176.2	\$2,839.1	\$1,305.1
Dollar Value (\$000s)	52	\$276,600	\$187,500	\$276.6	\$187.5	\$1,815.9	\$853.1
Combination	14	-	-	\$168.9	\$154.9	\$1,525.2	\$818.6
Total	481	-	-	\$226.7	\$177.5	\$2,092.8	\$1,079.1

TABLE 3
DESCRIPTIVE STATISTICS

This table compares the mean and median values of the selection variables in the propensity-score model. Panel A provides descriptive statistics for sample firms (with and without a director stock ownership requirement (SOR)). Panel B provides descriptive statistics for all matched (treatment and control) firms. Variables are defined in Appendix A. All continuous variables are winsorized at the top and bottom one percent.

Panel A: Difference in means and medians for selection variables prior to matching

Variable	Firms adopting a director SOR n = 714			Firms without a director SOR n = 516			Difference in Means	Difference in Medians
	Mean	Median	St Dev	Mean	Median	St Dev		
Board size _t	10.441	10.000	2.857	9.438	9.000	3.361	***	***
Outside director pct _t	0.844	0.875	0.116	0.810	0.843	0.153	***	***
Outside ownership pct _t	0.077	0.024	0.859	0.294	0.038	2.425	**	***
Board tenure _t	4.119	3.500	4.102	3.002	0.000	4.406	***	***
Busy board pct _t	0.075	0.000	0.116	0.060	0.000	0.125	**	***
CEO ownership pct _t	0.018	0.007	0.045	0.058	0.012	0.310	***	***
Institutional ownership	0.706	0.785	0.318	0.552	0.626	0.345	***	***
Analyst following _t	11.881	11.000	8.041	7.533	6.000	7.954	***	***
Guidance provider _t	0.256	0.000	0.437	0.142	0.000	0.349	***	***
ROA _t	0.051	0.050	0.088	0.005	0.029	0.169	***	***
Returns _t	0.169	0.111	0.447	0.137	0.025	0.696		***
St dev of returns _t	0.023	0.020	0.013	0.031	0.027	0.017	***	***
Firm size _t	8.632	8.480	1.448	7.822	7.717	1.684	***	***
Firm age _t	29.810	24.000	17.271	20.333	14.000	15.308	***	***

(continued on next page)

TABLE 3 (continued)

Panel B: Difference in means and medians for selection variables after propensity-score matching

Variable	Firms adopting a director SOR			Firms without a director SOR			Difference in Means	Difference in Medians
	Mean	Median	St Dev	Mean	Median	St Dev		
Board size _{t-1}	10.085	10.000	2.881	10.450	10.000	3.802		
Outside director pct _{t-1}	0.824	0.857	0.128	0.843	0.875	0.121	*	*
Outside ownership pct _{t-1}	0.123	0.025	1.433	0.237	0.022	2.606		
Board tenure _{t-1}	3.963	3.000	4.236	3.307	1.000	4.707	*	***
Busy board pct _{t-1}	0.080	0.000	0.120	0.062	0.000	0.116	*	**
CEO ownership pct _{t-1}	0.021	0.008	0.049	0.028	0.008	0.060		
Institutional ownership pct	0.646	0.741	0.326	0.592	0.708	0.359	*	
Analyst following _{t-1}	10.572	10.000	7.979	9.536	9.000	8.477		*
Guidance provider _{t-1}	0.236	0.000	0.425	0.177	0.000	0.383	*	*
ROA _{t-1}	0.045	0.048	0.093	0.048	0.047	0.083		
Returns _{t-1}	0.248	0.147	0.851	0.185	0.148	0.541		
St dev of returns _{t-1}	0.023	0.021	0.011	0.024	0.021	0.015		
Firm size _{t-1}	8.408	8.217	1.4584	8.369	8.141	1.618		
Firm age _{t-1}	26.855	20.500	16.787	24.659	18.000	16.540		*

TABLE 4
DETERMINANTS OF DIRECTOR SOR ADOPTION

This table reports the results of regressions where the dependent variable is *Adopter*, equal to one if the firm adopts a director SOR in the current fiscal year and 0 if the firm never adopted a director SOR. Column (1) presents coefficients from a logistic regression with year and industry (i.e., Fama-French 12 industry portfolios) fixed effects while Column (2) presents coefficients from a Cox proportional hazard model with industry fixed effects. All variables are defined in Appendix A. Continuous variables are winsorized at the top and bottom 1%. Statistical significance of the coefficients is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

		Logistic model	Hazard model
		(1)	(2)
Intercept		-5.309***	
Variables of interest			
ROA _{t-1}	H1a -	0.027	0.148
Returns _{t-1}	H1a -	0.257	0.159**
Board outside ownership pct _{t-1}	H1b -	-0.668***	-0.509**
Board outside director pct _{t-1}	H1c +	1.154**	1.369***
Institutional ownership pct _{t-1}	H1d -	0.546**	0.374***
Analyst following _{t-1}	H1e -	0.047***	0.015**
Guidance provider _{t-1}	H1e -	0.287	0.078
Other board and firm			
Board size _{t-1}		0.019	0.017
Board tenure _{t-1}		0.010	-0.005
Busy board pct _{t-1}		-0.447	-0.483
CEO ownership pct _{t-1}		-4.549***	-3.534***
Growth firm _{t-1}		0.311*	0.102
Standard deviation of returns _t		-17.576**	-9.340**
Firm age _{t-1}		0.023***	0.000
Firm size _{t-1}		0.133	0.097**
Fixed Effects?		Industry & Year	Industry
Observations		1,230	9,417
Observations with director SOR adoption		714	714
LR χ^2		276.0***	

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TABLE 5
CONSEQUENCES OF DIRECTOR SOR ADOPTION:
FINANCIAL REPORTING MONITORING

This table reports the results of logistic regressions of the likelihood of financial irregularities. The dependent variable in all models is *Financial irregularity*, defined as equal to one if the firm experienced a restatement due to fraud, GAAP error or other restatement, or if the firm was involved in an SEC investigation or a board instigated investigation according to Audit Analytics; otherwise zero. Column 1 (2) presents results using the full (propensity-score match) sample of firm-years where each treatment and control firm has at least three years of data (t-1 to t+1). Treatment firms refer to firms that have adopted a director SOR (*Adopter=1*) and control firms refer to firms that have not adopted a director SOR (*Adopter=0*). The indicator variable *Post* is equal to one for firm-years including or after the event year and zero for firms-years prior to the event year. All other variables are defined in Appendix A. To reduce the influence of outliers, continuous variables are winsorized at the top and bottom 1%. All regressions include year and industry (i.e., Fama-French 12 industry portfolios) fixed effects. Statistical significance is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

Panel A: Test of H2a	Full sample (1)	PSM sample (2)
Intercept	-1.787***	-1.657***
Adopter _t	0.133**	0.124
Post _t	-0.242***	-0.189
Adopter_t x Post_t	-0.184*	-0.237*
Board size _t	-0.027***	-0.015
Outside director pct _t	-0.265	-0.532**
Outside ownership pct _t	0.003	0.001
Board tenure _t	-0.003	-0.005
Busy board pct _t	-0.417**	-0.163
Firm size _t	-0.028	-0.045*
ROA _t	-0.162	-0.412*
BTM _t	0.336***	0.376***
Sales growth _t	-0.001**	-0.042
MA _t	0.011	-0.079
CEO ownership pct _t	0.305*	-0.229
Institutional ownership pct _t	-0.178**	-0.336***
Leverage _t	0.763***	0.714***
Firm age _t	-0.005***	-0.001
Litigious _t	0.081	0.032
Big N _t	0.570***	0.486***
Year and Industry FE included?	Yes	Yes
Observations	13,261	8,393
LR χ^2	583.0***	421.5***
Area under the ROC curve	0.6582	0.6665

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TABLE 5 (continued)

Panel B: Test of H2b	Full sample		PSM sample	
	(1a)	(1b)	(2a)	(2b)
Intercept	-1.798***	-1.820***	-1.655***	-1.711***
Non-Compelling Adopter _t	0.053	0.052	0.087	0.086
Compelling Adopter _t	0.237***		0.175*	
Compelling, Substandard Adopter _t		0.372***		0.268
Compelling, Standard Adopter _t		0.158		0.191
Compelling, Robust Adopter _t		0.228**		0.098
Non-Compelling Adopter_t x Post	-0.094	-0.095	-0.135	-0.133
Compelling Adopter_t x Post	-0.297**		-0.371**	
Compelling, Sub Adopter_t x Post_t		-0.039		0.066
Compelling, Standard Adopter_t x Post_t		-0.268*		-0.582***
Compelling, Robust Adopter_t x Post_t		-0.496***		-0.458**
Post _t	-0.245***	-0.245***	-0.189	-0.193
Board size _t	-0.027***	-0.027***	-0.014	-0.014
Board outside pct _t	-0.247	-0.230	-0.531**	-0.509**
Board outside ownership pct _t	0.002	0.002	0.001	0.000
Board tenure _t	-0.003	-0.003	-0.006	-0.006
Busy board pct _t	-0.435**	-0.415**	-0.174	-0.134
Firm size _t	-0.031	-0.030	-0.046*	-0.048*
ROA _t	-0.158	-0.153	-0.412*	-0.387*
BTM _t	0.334***	0.336***	0.375***	0.379***
Sales growth _t	-0.001*	-0.001*	-0.041	-0.042
MA _t	0.013	0.010	-0.081	-0.086
CEO ownership pct _t	0.306*	0.323*	-0.221	-0.150
Institutional ownership pct _t	-0.174**	-0.175**	-0.331***	-0.325***
Leverage _t	0.761***	0.774***	0.719***	0.760***
Firm age _t	-0.005***	-0.005***	-0.001	-0.001
Litigious _t	0.087	0.079	0.034	0.023
Big N _t	0.573***	0.567***	0.480***	0.478***
Year and Industry FE Included?	Yes	Yes	Yes	Yes
Observations	13,261	13,261	8,393	8,393
LR χ^2	589.1***	601.9***	424.0***	431.7***
Area under the ROC curve	0.6589	0.6607	0.6675	0.6710

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TABLE 5 (continued)

H2b: Compelling Adopter _t x Post _t < Non-Compelling Adopter _t x Post _t		
Wald $\chi^2 =$	3.36*	3.04*
H2b: Compelling, Robust Adopter _t x Post _t < Non-Compelling Adopter _t x Post _t		
Wald $\chi^2 =$	6.92***	2.94**
H2b: Compelling, Robust Adopter _t x Post _t < Compelling, Substandard Adopter _t x		
Wald $\chi^2 =$	4.75**	4.02**

TABLE 6
CONSEQUENCES OF DIRECTOR SOR ADOPTION:
CEO PERFORMANCE MONITORING

This table reports the results of OLS regressions of the likelihood of forced CEO turnover. The dependent variable in all models is *Forced CEO turnover*, defined as equal to one if the firm experiences a change in CEO when the CEO is less than 60 years old; otherwise zero. Column 1 (Column 2) presents results using the full (propensity-score match) sample of firm-years where each treatment and control firm has at least three years of data (t-1 to t+1). Treatment firms refer to firms that have adopted a director SOR (*Adopter=1*) and control firms refer to firms that have not adopted a director SOR (*Adopter=0*). The indicator variable *Post* is equal to one for firm-years including or after the event year and zero for firms-years prior to the event year. The event year is year of adoption for treatment firms and randomly selected for control firms in the full sample. All other variables are defined in Appendix A. To reduce the influence of outliers, continuous variables are winsorized at the top and bottom 1%. All regressions include year and industry (i.e., Fama-French 12 industry portfolios) fixed effects. Statistical significance is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

Panel A: Test of H3a

	Full sample (1)	PSM sample (2)
Intercept	0.037*	0.016
Adopter _t	0.005	0.010
Post _t	0.013	0.002
Poor performance _t	0.000	0.005
Adopter _t x Post _t	-0.010	-0.008
Post _t x Poor performance _t	0.004	0.015
Adopter_t x Post_t x Poor performance_t	0.002	-0.005
Board size _t	0.000	-0.000
Board outside pct _t	-0.011	-0.007
Board outside ownership pct _t	-0.001*	0.001
Board tenure _t	-0.001**	-0.002***
Busy board _t	0.004	0.000
Ln MVE _t	0.005***	0.008***
Year and Industry FE included?	Yes	Yes
Observations	12,285	7,829
Adjusted R ²	0.007	0.007

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TABLE 6 (continued)

Panel B: Test of H3b	Full sample		PSM sample	
	(1a)	(1b)	(2a)	(2b)
Intercept	0.038*	0.038*	0.016	0.015
Non-Compelling Adopter _t	-0.001	-0.001	0.007	0.007
Compelling Adopter _t	0.009		0.014	
Compelling, Substandard Adopter _t		0.028		0.034
Compelling, Standard Adopter _t		0.006		0.017
Compelling, Robust Adopter _t		-0.001		0.001
Post _t	0.011	0.011	0.002	0.002
Poor performance _t	-0.002	-0.002	0.005	0.005
Non-Compelling Adopter _t x Post _t	-0.005	-0.004	-0.006	-0.005
Compelling Adopter _t x Post _t	-0.013		-0.014	
Compelling, Substandard Adopter _t x Post _t		-0.002		-0.019
Compelling, Standard Adopter _t x Post _t		-0.003		-0.004
Compelling, Robust Adopter _t x Post _t		-0.023		-0.016
Non-Compelling Adopter _t x Poor perf _t	-0.000	-0.000	-0.007	-0.007
Compelling Adopter _t x Poor perf _t	0.006		0.005	
Compelling, Substandard Adopter _t x Poor perf _t		0.005		0.005
Compelling, Standard Adopter _t x Poor perf _t		-0.003		-0.025
Compelling, Robust Adopter _t x Poor perf _t		0.019		0.032
Post _t x Poor performance _t	0.007	0.007	0.014	0.015
Non-Compelling Adopter_t x Post_t x Poor perf_t	-0.001	-0.001	-0.002	-0.002
Compelling Adopter_t x Post_t x Poor perf_t	-0.002		-0.005	
Compelling, Sub_t x Post_t x Poor perf_t		-0.015		-0.018
Compelling, Standard_t x Post_t x Poor perf_t		-0.015		-0.002
Compelling, Robust_t x Post_t x Poor perf_t		0.011		-0.007
Board size _t	0.000	0.000	-0.000	-0.000
Board outside pct _t	-0.009	-0.008	-0.006	-0.005
Board outside ownership pct _t	-0.001*	-0.001**	0.001	0.001
Board tenure _t	-0.001**	-0.001**	-	-
Busy board _t	0.003	0.005	-0.002	0.003
Ln MVE _t	0.004***	0.004***	0.007***	0.007***
Year and Industry FE included?	Yes	Yes	Yes	Yes
Observations	12,285	12,285	7,829	7,829
Adjusted R ²	0.011	0.013	0.013	0.014

TABLE 7
CONSEQUENCES OF DIRECTOR SOR ADOPTION: CEO COMPENSATION MONITORING

This table reports the results of OLS regressions of excess CEO compensation. The dependent variables are excess total compensation, excess cash compensation, and excess equity compensation, measured as the residuals from regressions in Appendix C, following Kim et al. (2014). Columns 1-3 (4-6) present results using the full (propensity-score match) sample of firm-years where each treatment and control firm has at least three years of data (t-1 to t+1). Treatment firms refer to firms that have adopted a director SOR (*Adopter=1*) and control firms refer to firms that have not adopted a director SOR (*Adopter=0*). The indicator variable *Post* is equal to one for firm-years including or after the event year and zero for firms-years prior to the event year. The event year is year of adoption for treatment firms and randomly selected for control firms in the full sample. All other variables are defined in Appendix A. To reduce the influence of outliers, continuous variables are winsorized at the top and bottom 1%. All regressions include year and industry (i.e., Fama-French 48 industry portfolios) fixed effects. Statistical significance is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

Panel A: Test of H4a

	Full sample			PSM sample		
	Total Comp (1)	Cash Comp (2)	Equity Comp (3)	Total Comp (4)	Cash Comp (5)	Equity (6)
Intercept	-0.491*	-0.395	-2.408***	-0.214	-0.070	-2.840***
Adopter _t	0.107*	0.065	0.779***	0.040	0.029	0.404
Post _t	-0.105	-0.068	0.022	-0.091	0.011	-0.151
Adopter_t x Post_t	0.303***	0.172**	0.836**	0.275***	0.109	1.155**
Board size _t	0.041***	0.036**	0.157***	0.016**	0.012*	0.128***
Board outside pct _t	0.444	0.298	2.275***	0.075	-0.120	2.729***
Board outside ownership pct _t	-0.006*	-0.001	-0.051	0.002	-0.000	-0.016***
Board tenure _t	0.009	0.012	-0.028	-0.001	0.004	-0.043
Busy board _t	0.604***	0.291**	2.882***	0.541***	0.214*	3.167***
Ln MVE _t	-0.075**	-0.057*	-0.317***	-0.027	-0.016	-0.216**
Year and Industry FE included?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,043	13,043	13,043	8,278	8,278	8,278
Adjusted R ²	0.032	0.022	0.042	0.026	0.017	0.041

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TABLE 7 (continued)

	Full sample				PSM sample			
	Total Comp (1)	Equity Comp (2)	Total Comp (3)	Equity Comp (4)	Total Comp (5)	Equity Comp (6)	Total Comp (7)	Equity Comp (8)
Intercept	-0.519**	-0.64***	-0.522**	-2.64***	-0.410**	-3.01***	-0.404**	-2.93***
Non-Compelling Adopter _t	0.085	0.797**	0.085	0.795**	0.042	0.432	0.042	0.431
Compelling Adopter _t	0.119*	0.684*			0.033	0.331		
Compelling, Substandard Adopter _t			0.248**	1.576**			0.117	1.379
Compelling, Standard Adopter _t			0.092	0.262			0.013	-0.309
Compelling, Robust Adopter _t			0.081	0.655			0.010	0.440
Non-Compelling Adopter_t x Post	0.323***	0.823**	0.323***	0.820**	0.265***	1.103**	0.266***	1.104**
Compelling Adopter_t x Post	0.287***	0.881**			0.286***	1.283**		
Compelling, Substandard Adopter_t x Post_t			0.216*	0.452			0.228	0.560
Compelling, Standard Adopter_t x Post_t			0.265**	0.919*			0.266**	1.553**
Compelling, Robust Adopter_t x Post_t			0.338***	1.016*			0.332***	1.333*
Post _t	-0.111	0.003	-0.112	-0.003	-0.104	-0.202	-0.104	-0.205
Board size _t	0.032**	0.115***	0.032**	0.116***	0.008	0.099***	0.008	0.100***
Board outside pct _t	0.429	2.193***	0.434	2.207***	0.079	2.664***	0.080	2.678***
Board outside ownership pct _t	-0.005*	-0.049	-0.006*	-0.052	0.002	-0.01***	0.002	-0.01***
Board tenure _t	0.009	-0.028	0.009	-0.027	-0.002	-0.043	-0.002	-0.043
Busy board _t	0.600***	2.846***	0.600***	2.848***	0.470***	3.177***	0.477***	3.308***
Ln MVE _t	-0.059*	-0.23***	-0.060*	-0.23***	0.010	-0.153	0.008	-0.167*
Year and Industry FE included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,043	13,043	13,043	13,043	8,278	8,278	8,278	8,278
Adjusted R ²	0.030	0.040	0.032	0.042	0.025	0.040	0.026	0.041

(continued on next page)

TABLE 7 (continued)

H4b: Compelling Adopter_t x Post_t < Non-Compelling Adopter_t x Post_t

F-test = 0.28 0.02 0.10 0.14

H4b: Compelling, Robust Adopter_t x Post_t < Non-Compelling Adopter_t x Post_t

F-test = 0.04 0.14 0.69 0.11

H4b: Compelling, Robust Adopter_t x Post_t < Compelling, Substandard Adopter_t x Post_t

F-test = 0.28 0.02 0.10 0.14

TABLE 8
DETERMINANTS OF SUBSTANTIAL AND SYMBOLIC
DIRECTOR SOR ADOPTION

This table reports the results of a generalized-ordered logistic regression where the dependent variable is *Type of SOR* is equal to zero if the firm does not adopt a director SOR, one if the firm adopts a symbolic director SOR, and two if the firm adopts a substantial director SOR. All variables are defined in Appendix A. Continuous variables are winsorized at the top and bottom 1%. The regression includes year and industry (i.e., Fama-French 12 industry portfolios) fixed effects. Statistical significance of the coefficients is indicated at the 1%, 5%, and 10% levels by ***, **, and *, respectively, in two-tailed tests.

	Symbolic (1)	Substantial (2)
Intercept	-5.539***	-3.938***
Variables of interest		
ROA _{t-1}	0.301	0.529
Returns _{t-1}	0.251	0.109
Board outside director pct _{t-1}	1.047*	-1.135*
Board outside ownership pct _{t-1}	-0.720**	-5.003***
Institutional ownership pct _{t-1}	0.703***	0.231
Analyst following _{t-1}	0.044***	0.012
Guidance provider _{t-1}	0.224	-0.016
Other board and firm characteristics		
Board size _{t-1}	0.025	0.007
Board tenure _{t-1}	0.014	-0.080***
Busy board pct _{t-1}	-0.871	1.026
CEO ownership pct _{t-1}	-5.100***	-0.827
Growth firm _{t-1}	0.300*	-0.145
Standard deviation of returns _{t-}	-15.986**	2.062
Firm age _{t-1}	0.024***	0.012**
Firm size _{t-1}	0.131*	0.107
Year and Industry FE	Yes	
Observations	1,230	
Obs with adoption	454	260
LR χ^2	633.8***	
Pseudo R ²	0.243	