Powerful CEOs and Corporate Governance

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Abstract

Excessive CEO power is often regarded as value-destroying. We use a quasi-exogenous regulatory shock to analyze whether forced changes in board composition help to rein in powerful CEOs. We find that post-regulation, firms led by powerful CEOs increase innovation inputs (R&D expenditures) and produce more innovation outputs (patents) that are scientifically more important and economically more valuable, are more likely to pay dividends and reduce investments in capital expenditures. Investment quality also improves, manifesting in better takeover performance. Our results suggest that improved governance can ameliorate value destruction by powerful CEOs.

Keywords: Powerful CEOs, Corporate Governance, R&D, Innovation, Takeovers

JEL: G18, G30, G31, G32, G35, G38, K22, M48

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1 Introduction

Prior studies suggest that powerful CEOs negatively affect corporate outcomes[1]. Top executives need some level of power to lead their organizations ((Bennis & Nanus, 1985), (Pfeffer, 1993)). However, as powerful CEOs gain more control, agency problems may lead to empire-building and complacency, resulting in overinvestment in low-quality projects and a reduction in shareholder wealth (Pan, Wang, & Weisbach, 2016). Against this backdrop, we focus on the role of the board of directors as a governance mechanism that may effectively rein in powerful CEOs and mitigate distorted investment policies.

The board of directors could potentially restrain and discipline powerful CEOs. Without the presence of strong independent directors, powerful CEOs may have more control over the board, and be given more authority to make decisions By contrast, an empowered board could potentially reduce the incentives to make sub-optimal investments ((Mace, 1979), (Fama & Jensen, 1983), (Holmstrom & Milogrom, 1991)). Directors may also block CEOs' proposals when they are not in the best interest of the firms' shareholders ((Tang, Crossan, & Rowe, 2011), (Knyazeva, Knyazeva, & Masulis, 2013), (Masulis & Mobbs, 2014), (Fogel, Ma, & Morck, 2014)). This benefit would concentrate in independent directors, who are less beholden to CEOs than are executive directors.

A complicating factor, however, is that board governance is endogenous,[2] particularly in the context of powerful CEOs. Powerful CEOs can use their influence to select pliable directors ((Fama, 1980), (Mace, 1986), (Shivdasani & Yermack, 1999)), and increase firm-specific information asymmetry to reduce board scrutiny ((Hermalin & Weisbach, 1998), (Raheja, 2005), (Adams & Ferreira, 2007), (Masulis & Mobbs, 2011), (Baldenius, Melumad, & Meng, 2014)). As powerful CEOs may have higher bargaining power and influence, directors could be less diligent in monitoring ((Zajac & Westphal, 1996), (Hermalin & Weisbach, 1988), (Cohen, Frazzini, & Malloy, 2012), (Bebchuk &

[1] See, for example, (Belliveau, O'Reilly, & Wade, 1996), (Bebchuk, Fried, & Walker, 2002), (Ryan & Wiggins, 2004), (Grinstein & Hribar, 2004), (Adams, Almeida, & Ferreira, 2005), (Faulkender & Yang, 2010), (Bebchuk, Cremers, & Peyer, 2011), (Morse, Nanda, & Seru, 2011), (Landier, Sauvagnat, Sraer, & Thesmar, 2013), (Khanna, Kim, & Lu, 2015), (Han, Nanda, & Silveri, 2016).

[2] See, for example, (Demsetz & Lehn , 1985), (Hermalin & Weisbach, 1988), (Hermalin & Weisbach, 1998), (Himmelberg, Hubbard, & Palia, 1999), (Palia, 2001), (Bhagat & Jefferis, 2002), (Becht, Bolton, & Röell, 2003), (Adams, Hermalin, & Weisbach, 2010), (Morse et al., 2011), (Coles, Daniel, & Naveen, 2014).

Hamdani, 2017)). Additionally, a lack of a financial stake in the firm may further trigger a free-rider problem among board members ((Perry, 2000), (Harris & Raviv, 2008)) resulting in passive corporate boards.

We investigate the moderating effect of improved governance on the corporate policies of powerful CEO led firms. We use the concurrent passage of regulations targeting independent corporate boards (Sarbanes-Oxley Act and NYSE/NASDAQ listing regulations, collectively referred to as "SOX") as a quasi-exogenous natural experiment.[3] These regulations force some, but not all, U.S. companies to change their board composition to (inter alia) have a majority independent board and a fully independent audit committee [4]. Some firms had already satisfied these requirements before the regulatory change, whereas others had not. The change in regulations is unlikely to be an "exogenous shock" for the pre-regulation Compliant Firms.[5] Thus, these firms, irrespective of whether they are managed by a powerful CEO, are unlikely to experience significant moderation in governance after these regulations.

We focus on pre-regulation Non-Compliant Firms. Since the non-compliant firms were, presumably, more exposed to agency conflicts due to the absence of independent boards, the transition to an independent board is more likely to bring an exogenous variation in their governance in the post-regulation period. [6] We argue that the impact of this shock to non-compliant firms will differ depending on whether the firm is managed by a powerful CEO and thus needed additional monitoring and governance control.[7] We take steps to mitigate other econometric concerns and alternative explanations, which we detail below.

[3] Guo and Masulis (2015) argue that SOX is an exogenous shock due to the mandatory adoption of an independent board which substantially altered board structure and that SOX should substantially improve a board's monitoring role. Average board independence is shown to have increased following the introduction of SOX (see, (Linck, Netter, & Yang, 2008), (Linck, Netter, & Yang, 2009), (Balsmeier, Fleming, & Manso, 2017), (Graham, Kim, & Leary, 2018)).

[4] See, (Song & Thakor, 2006), (Chhaochharia & Grinstein, 2007), (Linck et al., 2008, 2009), (Duchin, Matsusaka, & Ozbas, 2010), (Faleye, Hoitash, & Hoitash, 2011), (Armstrong, Core, & Guay, 2014), (Banerjee, Humphery-Jenner, & Nanda, 2015), (Guo, Lach, & Mobbs, 2015), (Guo & Masulis, 2015), (Balsmeier et al., 2017), (Graham et al., 2018).

[5] For example, the directors of the Archer-Daniels-Midland Company approved a series of proposals to turn majority control of the board over to a group of outside directors in 1996 in response to widespread criticism of insider domination of the company's board (Kurt Eichenwald, New York Times, Business Week, January 16, 1996). Similarly, companies, such as Amazon had a fully independent audit committee and majority board independence before the enactment of SOX.

[6] Armstrong et al. (2014) confirm that compliant firms experienced virtually no change in their proportion of independent directors, whereas non-complaint firms have a 45% increase in the mean proportion of independent directors after the board independence rule.

[7] Banerjee et al. (2015) follow a similar identification strategy but do not explicitly consider pre-SOX heterogeneity in firm's governance structure in their main tests. More importantly, their main variables of interest differ markedly from those used in this paper.

We examine how improvements in board independence influence powerful CEOs. We do this by using SOX as a quasi-exogenous shock. We hypothesize that improvements in board governance brought about by more independent boards, will encourage powerful CEOs to focus on long-term value-creation. Specifically, we find that among the non-compliant firms, powerful CEO managed firms increase R&D investment after the regulatory changes. While suggestive, increased investment in R&D may not result in value enhancement for shareholders. Therefore, we examine the innovation success of the powerful CEO managed non-compliant firms relative to other non-compliant firms. We find that, in the post-regulation period, non-compliant firms run by powerful CEOs obtain more patents that are scientifically more valuable that was the case before SOX. The patents of powerful CEO managed firms are cited more often, on average, and are more likely to be radical or breakthrough in nature. More importantly, from the shareholders' perspective, these patents are economically more valuable (more positive market reaction to the grant of patents). The value creation is also supported by the market reaction to the announcements of new products by powerful CEO managed firms. We find that product announcements made by powerful CEO run firms have more positive abnormal market returns in the post-regulation period.

We also explore whether powerful CEO managed non-compliant firms moderate misaligned corporate policies through the reallocation of resources. We find that the takeover performance of powerful CEO managed firms in the post-regulation period has significantly improved, relative to that of other non-compliant firms. The evidence on takeover performance suggests that the post regulation increased board oversight encourages powerful CEOs to focus more on value-creating investments and less on marginal investments.

We take steps to mitigate concerns surrounding our identification strategy. First, one concern is that CEO power – in addition to governance – changes upon SOX's enactment. Thus, our results might be attributable to a diminution in CEO power rather than a change in corporate governance. We address this concern by constructing our measure of CEO power from sources that are unlikely to be affected by board-composition. Specifically, we do not include any source of CEO power that

emanates directly from board structure (e.g., board co-option or CEO connectedness, dual-class stock structure, and anti-takeover provision among others) as the CEO power measure would then mechanically be affected by these regulatory changes. Nonetheless, we control for other sources of CEO power such as issuance of dual-class stock (Masulis, Wang, & Xie, 2009), extracting a higher pay slice by the CEO (Bebchuk, Cohen, & Ferrell, 2009), and whether the CEO is the only insider on the board (Adams et al., 2005) in our robustness tests and find similar results. In addition, we control for external governance quality (e.g., institutional holdings) following Aghion, Reenen, & Zingales (2013) as another driver of CEO power. Second, outside dominated boards may remove the CEO in the post-regulation period (Weisbach, 1988). Thus, changes in corporate policies may be driven by new CEOs where the power structure, leadership style and choice of corporate policies differ significantly from those of the replaced powerful CEO from the pre-regulation period. We address this concern in a robustness test and show that our main results are similar after excluding firms from our analysis that experience turnover of CEOs around the regulation change in 2002.

We consider additional tests to demonstrate identification and causality. These include placebo and falsification tests. We find that the regulatory changes had less of an impact on non-powerful CEOs, who arguably were less apt to directly benefit from its exogenous improvements in corporate governance as they were already more susceptible to board scrutiny. We also do not observe any discernible strategic shift in resource reallocation for powerful CEOs in firms that had already complied with the requirements of the regulations before their passage. These results support our conjecture that regulation-driven improvement in firm-level governance is beneficial for firms that were more in need of such an exogenous shock, that is, pre-regulation non-compliant firms with powerful CEOs. The analysis of the effect of regulatory changes on powerful CEOs in non-compliant firms vis-à-vis compliant firms in a triple-difference test further supports our argument.

A relevant concern in this study is that some powerful CEOs could also be overconfident CEOs. Although the measures of CEO overconfidence used in the literature (such as holding in-the-money

options and presence in media[8]) differ from the standard measures of CEO power[9], suboptimal corporate policies of powerful CEOs in the absence of board oversight could be driven by CEO overconfidence. As a robustness test, we control for CEO overconfidence in the specifications. We also exclude highly overconfident CEOs from the analysis (included in appendix). We find similar results in both cases suggesting that our results are not significantly driven by CEO overconfidence.

Our study contributes to the unsettled debate on whether CEO power is always detrimental to shareholders.[10] We argue that powerful CEOs coupled with poor governance drive the negative views about powerful CEOs. We show that the presence of an empowered board can help to realize the upside potential of a powerful CEO, while curbing their downside risk (consistent with Tang et al. (2011)). For example, we find significant improvements in powerful CEOs' innovativeness and takeover performance after governance improves. Thus, contrary to the popular perception of the self-serving nature of CEO power, we argue that powerful CEOs are not necessarily always detrimental but may use their power for organizational success.[11] Our study fills this gap by showing that the improvement in governance induced by exogenous regulatory changes benefits poorly governed firms with powerful CEOs in the post-regulation period.

We contribute to the innovation literature where previous studies show the impact of CEO overconfidence ((Galasso & Simcoe, 2011), (Hirshleifer, et al., 2012)) and risk-taking (Sunder, Sunder, & Zhang, 2017) on corporate innovation. We show that powerful CEOs governed by the independent oversight of an empowered board can generate value-enhancing innovation. Thus, we extend the literature that discusses how managerial preferences and interaction between CEOs and the board

[8] See, (Malmendier & Tate, 2008), (Campbell, Gallmeyer, Johnson, Rutherford, & Stanley, 2011), (Hirshleifer, Low, & Teoh, 2012).
[9] See, (Finkelstein, 1992), (Daily & Johnson, 1997), (Bebchuk et al., 2002), (Adams et al., 2005), (Morse et al., 2011), (Li, Lu, & Phillips, 2018), (Graham et al., 2018).
[10] Previous literature suggests that powerful CEOs may influence the board to extract high compensation ((Belliveau et al., 1996), (Bebchuk et al., 2002), (Ryan & Wiggins, 2004), (Bebchuk & Fried, 2005), (Faulkender & Yang, 2010), (Morse et al., 2011), (Bebchuk et al., 2011), private benefits from more and less valuable M&A deals (Grinstein & Hribar, 2004), and can affect board decision, firm performance and firm's governance adversely ((Adams et al., 2005), (Landier et al., 2013), (Khanna et al., 2015), (Han et al., 2016)).
[11] Bennis and Nanus (1985) argue that "power [is] the basic energy to initiate and sustain action translating intention into reality, the quality without which leaders cannot lead". Li et al., (2018) also claim that powerful CEOs are beneficial for firms operating in dynamic and competitive markets.

influence corporate investment decisions ((Bertrand & Schoar, 2003), (Malmendier & Nagel, 2011), (Malmendier, Tate, & Yan, 2011), (Graham, Harvey, & Puri, 2013)).

Finally, we contribute to the corporate governance literature by analyzing how the regulatory changes forcing the mandatory adoption of an independent board impacts a set of firms that could benefit from improved governance: those run by powerful CEOs. The empirical evidence on the effect of these regulatory changes in board structure on corporate policies is inconclusive and contextual ((Perino, 2002), (Holmstrom & Kaplan, 2003), (Romano, 2005), (Song & Thakor, 2006), (Coates, 2007), (Hochberg, Sapienza, & Vissing-Jørgensen, 2009), (Duchin et al., 2010), (Srinivasan & Coates, 2014)). The mixed findings may be potentially attributable to the heterogeneity in underlying firm governance mechanisms at the time of enactment of these regulations, the differences in how regulation affected different types of firms. We focus on powerful CEOs in poorly governed firms in the pre-regulation period and provide evidence that the exogenous improvement in corporate decision-making or reduction in self-serving behavior by powerful CEOs was concentrated among pre-regulation non-compliant firms. The result does not consistently hold for pre-regulation compliant firms. Thus, we argue that the enactment of these regulations has had a significant impact in governing the unbridled power of CEOs in poorly governed firms.

The rest of the paper is organized as follows: Section 2 represents the motivation of the study. We describe variable construction, methodology, and sample in Section 3. Empirical analyses are in Section 4. Section 5 includes robustness checks of our main analysis and Section 6 concludes the paper.

2 Motivation and Hypothesis Development

Managers may act self-interestedly, especially in the presence of ineffective oversight. The classical agency conflicts due to lack of monitoring may take several forms, for example, “shirking”, whereby managers exert less effort than is desirable (Bertrand & Mullainathan, 2003). Managers could also involve in over-investment or value-destroying investments due to the well-documented

evidence that managers are disproportionately rewarded from investment successes but are not penalized for failures (Harford & Schonlau, 2013).

The enactment of regulatory changes around 2002 (the Sarbanes-Oxley Act and the changes to the NYSE/NASDAQ listing rules, hereafter, "SOX") introduces a quasi-exogenous variation to the board composition of pre-regulation *non-compliant firms*. Since prior literature suggests that pre-regulation *non-compliant firms* experience a significant change in board composition (see, (Harris & Raviv, 2008), (Armstrong etl., 2014), (Balsmeier et al., 2017)), we expect that increased board independence will benefit *non-compliant firms*, especially those with powerful CEOs. While independent directors can be co-opted and thus can be friendly towards CEOs, they are incrementally less so than are executive directors, who are tautologically the CEO's subordinates. Evidence suggests that the introduction of board independence regulations has improved disclosure, and subsequently, governance and monitoring; and thus, is beneficial to individual investors and investor groups[12]. These changes in regulatory requirements have also increased the personal responsibility of corporate leaders ((Faleye et al., 2011), (Baloria, Marquardt, & Wiedman, 2017)) and have increased the diversity of opinion at board level (Linck et al., 2009). Thus, the regulatory change is likely to have a stronger disciplining effect on powerful CEOs of *non-compliant firms*. In this study, we explore whether the regulatory changes initiate a strategic shift in the investment decisions of powerful CEOs *in non-compliant firms*. We outline the ways in which the regulatory changes could specifically influence powerful CEOs' decisions in the following sections.

2.1 Innovation Inputs and Outputs

Innovation can drive corporate growth ((Geroski, Machin, & Reenen, 1993)). However, R&D investments, the input of innovation, is often risky with distant and uncertain cash flows, and has a high failure rate ((Nelson & Winter, 1982), (Fleming, 2001)). This is especially so when seeking 'breakthrough' innovations (Sanders & Hambrick, 2007). Overinvestment in R&D and failed

[12] See, for example, (Brickey, 2003), (Coates, 2007), (Chhaochharia & Grinstein, 2007), (Li, Pincus, & Rego, 2008), (Karolyi, 2009), (Hochberg et al., 2009), (Ashbaugh-Skaife, Collins, Kinney, & Lafond, 2009).

innovations can lead the market to discount innovative investments ((Martin, 2012), (Ahuja & Novelli, 2017)). Nevertheless, breakthrough innovations-measures of R&D success and valuable intangible assets, especially, have a strategic importance that may improve long-term corporate performance ((Tushman & Anderson, 1986), (Bushee, 1998), (Schilling & Hill, 1998), (Ahuja & Lampert, 2001)).

CEO characteristics such as tenure, stock ownership, preferences, and incentives can shape a firm's commitment to R&D investments and innovation (Barker & Mueller, 2002). Successful innovation also requires a corporate culture that allows for the freedom to experiment, tolerance for failure and diversity in the top management team to motivate innovation among employees ((Finkelstein & Hambrick, 1996), (Sutton, 2002), (Manso, 2011)).

Since substantial firm-specific knowledge is required for undertaking innovative projects (Coles et al., 2008), powerful CEOs, particularly those who are founders or long-tenured, may possess better firm-specific knowledge and be more likely to invest in innovative projects. Moreover, a powerful CEOs' ability to deter fraud may drive 'stealing effect' motivated R&D overinvestment (Denicolò & Zanchettin, 2014). In contrast, powerful CEOs with larger ownership stakes might drive underinvestment in R&D and innovation due to the high probability of failure ((Holmstrom, 1989), (Kim & Lu, 2011)). R&D investment and innovation may not be compatible with the inflexible strategies which are more often prevalent in powerful (long-tenured) CEOs managed firms (Grimm & Smith, 1991). Thus, the opposing findings in the literature on the impact of powerful CEOs on R&D investment and innovation is an open empirical question.

We explore the exogenous variation in board governance and analyze the impact of powerful CEOs on innovation inputs and outputs. The prior literature provides mixed evidence on the effects of board independence on R&D and innovation. Bargeron, Lehn, & Zutter (2010) show that SOX discourages risk-taking of the firm leading to a reduction in R&D investments. However, Balsmeier et al. (2017) show that the exogenous transition to board independence is unrelated to the level of R&D investment though it improves innovation. Faleye et al. (2011) claim that intense board monitoring after SOX reduces the firm's R&D and innovations.

We suggest that compared to their non-powerful peers, powerful CEOs might derive more disutility from R&D investment and innovation as they value control over larger resources. Failed investments in R&D and innovation may dissipate those resources. Nevertheless, an independent board can discipline managerial discretions and thus mitigate agency problems in *non-compliant firms*. Thus, we expect that the enhanced board oversight resulting from the regulatory change, will increase R&D investment and innovation in *non-compliant firms* with powerful CEOs, bringing them more in line with that of other CEOs.

Improved governance should also improve the quality of the innovation investment, in addition to the quantity of investment. We expect that improved oversight would encourage CEOs to focus the firm's innovative activities on value-creating and beneficial R&D investments, rather than enabling a disorganized approach to innovation. This should manifest in greater patenting activity and improved patent quality. Ultimately, this should result in an improved market reaction to new product announcements. Thus, we make the following hypotheses.

Hypothesis 1: Improved governance increases powerful CEOs' expenditure on innovation (i.e., R&D expenditure).

Hypothesis 2: Improved governance increases powerful CEOs' patent output and patent quality.

Hypothesis 3: Improved governance is associated with powerful CEOs' new product announcements experiencing higher announcement returns.

2.2 Investments in Tangible Assets, Payout Policy, and Takeovers

Powerful CEOs have a stronger incentive to engage in empire building (Baldenius et al., 2014) as they, arguably, would like to lead larger firms (Jensen, 1986). The empire-building motive may distort corporate capital allocations via increased spending in capital expenditures (CAPEX) (Jensen & Meckling, 1976) and value destroying M&A deals (Grinstein & Hribar, 2004). For example, CEO power increases with CEO tenure (Pan et al., 2016) and the board often permits long-tenured powerful CEOs to overinvest or engage in empire building (Jensen, 1993). A lack of oversight and stronger disciplining

mechanism could enable managers to spend money on acquisitions and CAPEX ((Harford, Mansi, & Maxwell, 2008), (Harford & Schonlau, 2013)). Weaker governance might encourage empire building, especially for powerful CEOs who are less likely to be removed for doing so. This could also cause powerful CEOs to overpay for targets or select targets that they erroneously believed were synergistic. Such decision failures may at least partially explain why powerful CEOs' takeovers underperform (Grinstein & Hribar, 2004).

A firm's payout policy may also reflect agency conflicts. Limited payout of dividends leads to the availability of free cash flows which could result in distorted corporate investments, e.g., wasteful investments. Since powerful CEOs have a strong incentive for empire building, they could retain free cash flow rather than distribute it as dividends. Further, whereas CEOs might use dividends to placate activist investors and stave off disciplinary action (e.g., (Zwiebel, 1996), (Fluck, 1999), (Allen, Bernardo, & Welch, 2000)), powerful CEOs will be less motivated to pay dividends because they would be less vulnerable to such disciplinary action.

The increased oversight and accountability of CEOs brought about by regulatory change could discourage overinvestment in CAPEX and takeovers. Further, independent board members are less likely to be co-opted by powerful CEOs. Thus, they are more likely to critically evaluate investment policies and expose CEOs to independent viewpoints.

Thus, we expect that the *non-compliant firms* led by powerful CEOs will reduce investments in CAPEX relative to firms led by less powerful CEOs in the post-regulation period. The regulatory changes will also improve takeover quality and increase the value of takeovers undertaken by powerful CEOs in *non-compliant firms*. We also expect that improvements in board governance will mitigate the overinvestment problem and encourage higher dividend payments. Reducing investment gives firms more cash to pay as dividends. Further, increased oversight will encourage CEOs to engage in shareholder focused policies such as increased dividend payments. Often, better-governed firms generally pay higher dividends (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000). Therefore, we

expect that increased independent oversight will help to encourage powerful CEOs to pursue shareholder focused policies and increase dividend payout.

Hypothesis 4: Improved governance is associated with a reduction in powerful CEOs' capital expenditure.

Hypothesis 5: Improved governance increases powerful CEOs' dividend payout ratios.

Hypothesis 6: Improved governance increases powerful CEOs' takeover announcement returns.

3 Variable Construction, Sample, and Methodology

3.1 Variable Construction: CEO Power

CEOs may derive power from their status as a founder of the firm or from retaining significant holdings of the firm's equity (See, (Finkelstein, 1992); (Daily & Johnson, 1997); (Adams et al., 2005); (Han et al., 2016); (Li, et al., 2018)). Prior studies show that CEOs, through their status as founders or with significant shareholdings can influence firm's operating, capital allocation and strategic decision, prevent involuntary dismissal and thus are likely to be more powerful (see, (Holderness & Sheehan, 1988), (Daily & Johnson, 1997), (Villalonga & Amit, 2006), (Anderson, Duru, & Reeb, 2009), (Fahlenbrach, 2009)).

We hand-collect information on founders such as names and number of founders of each firm and founding year. We use several sources, including 10-K filings of the firms with the SEC available in Electronic Data-Gathering, Analysis, and Retrieval (EDGAR), the Funding Universe website, company websites, and other internet resources including Wikipedia, Forbes pages, Bloomberg's Business Week website, among others. 'Founder-CEO' in a given year is an indicator variable that equals one if any source explicitly mentions that the current CEO is one of the original founders of the firm or was the main executive at the time the company was founded (Adams, Almeida, & Ferreira, 2009). Additionally, using Execucomp ownership data, we construct 'CEO Ownership above Industry Median' variable that represents CEOs with ownership above the industry (2-digit) median (See: Han et al., 2016).

Prior research posits that CEOs may increase their power through holding the position of chairman of the board and/or holding the titles of other top corporate executives such as President or Chief Operating Officer thereby dominating the decision-making forum[13]. These sources capture a CEO's structural power and thus reflect their influential leadership ability within the firm (Finkelstein, 1992). Morck, Shleifer, & Vishny (1988) define CEOs as powerful when no other person holds the title of president or chairman and no other person co-signs the letter to the shareholders in the annual report. The regulatory changes of 2002 do not contain provisions directly targeting CEO-Chair duality or title concentration. As such these components of CEO power are not expected to be affected by these regulations. Although these sources of power could reduce the presence or influence of independent directors (see, (Westphal & Zajac, 1995), (Morse et al., 2011))[14], this is less of a concern in our study as we concentrate on *non-compliant firms* who had to comply with the mandatory adoption of independent directors after the regulatory changes.

A CEO's experience, firm-specific knowledge, and expertise accumulated with tenure can influence a firm's corporate policy (Hermalin & Weisbach, 1991). CEO's tenure allows us to capture both expert and prestige power (Finkelstein, 1992). CEOs with tenure that is longer than the median tenure of the managers of the same industry would be more powerful than other CEOs (see: Han et al., 2016). This is in part because they gather firm-specific knowledge and influence corporate development to cater to their own personal expertise, thereby making them more difficult to replace. Longer-tenured CEOs may hire supportive executives, form a co-opted board and influence firm policy, further entrenching them. Graham et al. (2018) show that CEOs with high bargaining power due to their longer tenure significantly reduce board independence. However, after the regulatory changes of 2002, they document an insignificant effect of long-tenured CEOs on board independence. Thus, the director's bargaining power in *non-compliant firms* is less likely to be affected by long-tenured CEOs. We collect CEO tenure data from Execucomp. However, CEO-tenure constructed using the

[13] See, for example, ((Finkelstein, 1992), (Jensen, 1993), (Finkelstein & D'aveni, 1994), (Westphal & Zajac, 1995), (Brickley, Coles, & Jarrell, 1997), (Grinstein & Hribar, 2004), (Adams et al., 2005), (Morse et al., 2011), (Li et al., 2018), (Han et al., 2016).

[14] Even if powerful CEOs limit the bargaining power of directors, the strategic shift in the corporate policy of powerful CEO managed firms after these regulations are expected to be underestimated.

Execucomp data (variable '*became CEO'*) could be problematic for a set of CEOs who leave their managerial position and return to the focal firms of analysis later during the sample period. For these CEOs, we use hand-collected tenure data from a variety of sources including those described above.

We construct the measure of CEO power index ('CEO Power') which consists of 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median'. Additionally, we also use a binary measure of CEO power – 'CEO Power TOP-Q', which equals one if 'CEO Power' index is in the top 25% of the industry-year distribution of 'CEO Power'.

Our identification strategy involves mandatory changes in board composition that moderates CEO action. The difference of means tests on CEO power measures between pre and post-shock periods is not statistically significant in our sample. This evidence mitigates the concern that these regulations are directly affecting CEO Power. Additionally, while dual-class structures can increase CEO power (Masulis et al., 2009), the mandatory adoption of board independence reduced firms' incentives to use a dual-class structure (Arugaslan, Cook, & Kieschnick, 2010). Similarly, the presence of staggered boards or anti-takeover provisions (ATP) could be altered through board monitoring and a strong board could be a potential substitute for the takeover market (see, (Brickley & James, 1987), (Shivdasani, 1993), (Brickley, Coles, & Terry, 1994), (Bebchuk & Cohen, 2005))[15]. Thus, we do not include dual-class structures, staggered boards or anti-takeover provisions in constructing the 'CEO Power' index. as these sources of power could be meaningfully affected by the regulatory requirements of 2002.

3.2 Sample and Data Description

We construct our primary dataset combining the universe of firms contained in the Standard and Poor's Executive Compensation (Execucomp) database and Compustat. Following the standard

[15] Our CEO power measure also excludes any SOX reform requirements directed at CEOs, e.g. certification requirements of financial reports, restrictions on loans and trading (see (Li et al., 2008) for details).

literature, we exclude financial firms (Standard Industrial Classification [SIC] codes 6000-6999) and regulated industries (SIC codes 4900-4949). The Centre for Research in Security Prices (CRSP) dataset provides stock price information. Most of the CEO characteristics are from Execucomp. We collect corporate board data from the Institutional Shareholder Services (ISS) Directors database. The primary dataset includes 2,622 unique firms and 27,585 firm-year observations during 1992-2011 for which we have data on 'CEO Power' measures[16]. We merge the primary dataset with ISS dataset to identify pre-regulation *non-compliant firms*.

To identify pre-regulation *non-compliant firms,* we first focus on the firms with available data on both fully independent audit committee and majority board independence during 1998-2001. We then use the pre-regulation 4-year rolling average of these indicators to track firms that had complied with the requirements of these regulations[17]. The merged primary-ISS dataset consists of 1,070 unique firms. Among these firms, we identify 524 pre-regulation *non-compliant firms*.

3.2.1 Dependent Variables

As the measure of innovation inputs, we use the firm's R&D expenditures$_{(t+1)}$ scaled by total assets$_{(t)}$. Following prior literature (e.g. Hirshleifer et al., 2012), we use the natural logarithm of one plus number of patents applied for (and subsequently granted) as a proxy for the quantity of innovation. To distinguish major technological breakthroughs from incremental technological improvements, we use the citations received by these patents to measure the quality of innovation.[18] Since citations may only reflect technological value rather than market value of innovation (Almeida, Hsu, Li, & Tseng, 2017), we also explore the economic value of innovation through the market reaction to patent grants. Finally, we examine whether powerful CEOs can spur radical innovation of firms in the presence of a powerful board. To measure radical innovation, we first identify the patents of the

[16] The Year 1992 is the first year for available data in ExecuComp. We end the sample in 2011 in order to have a balanced pre (10 years) and post-regulation (10 years) period.

[17] The rolling average of indicators reluctant our exposure to any of the pre-shock period while identifying *non-compliant firms*. Though Chhaochharia and Grinstein (2009) and Duchin et al. (2010) discuss the timelines of these regulations, prior studies use different periods to identify the *non-compliant firms* (See, (Armstrong et al., 2014), (Guo & Masulis, 2015), (Balsmeier et al., 2017)).

[18] Studies employing these two variables to measure innovation performance include among others (Hirshleifer et al., 2012), (Atanassov, 2013), (He & Tian, 2013), (Tian & Wang, 2014).

firms cited in the 90th (95th) percentile of technology-class-year citation distribution. Then, we construct a continuous variable 'Radical_90' ('Radical_95') that distinguishes the firm's radical innovation by adding the patents of the firms cited in the 90th (95th) percentile of technology-class-year citation distribution. We use these innovation measures to analyze whether powerful CEO managed firms experience better innovation after the improvement in board governance.

The patent data are from the Kogan, Papanikolaou, Seru, and Stoffman (2017) (henceforth KPSS) patent dataset. The KPSS patent dataset provides data for all patents that are granted by the U.S. Patent and Trademark Office (USPTO) over 1926-2010. We follow the innovation literature and date the patents by the year of their application (Hall, Griliches, & Hausman, 1986). We restrict the sample to patents applications up to 2008 as patents applied for after 2008 may not appear in the dataset because of the time lag in granting patents. We use the KPSS (2017) patent data instead of the NBER patent data as it allows us to identify comprehensive patent portfolios up to 2008, compared to 2004 for the NBER patent data. After merging our final dataset with KPSS (2017), the sample consists of 1,049 unique firms. Out of the 1,049 matched firms, 510 firms are non-compliant firms. Since innovation outputs (i.e., patents and citations generated from R&D investment) require considerable time to occur, we examine the effect of powerful top executives on innovation outcomes at the time t+2.

We also analyze the product market conditions of the firms which could be influenced by corporate innovation. We use '75th Percentile Return' and 'Product Announcement Return' to measure the market reaction to the announcement of new products. The variable 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. This allows us to analyze the product market conditions of the firms which could be influenced by corporate innovation.

We obtain new product data from Mukherjee, Singh, & Žaldokas, (2017) during 1992-2006. Mukherjee et al. (2017) created this dataset by searching the LexisNexis News database for company

press releases that are tagged under the subject “New Products” and where their headlines include keywords (with the roots of words) such as “Launch,” “Product,” “Introduce,” “Begin,” “Unveil”. They use a standard event study methodology to calculate cumulative abnormal returns (CARs) over the three (-1, 1) day period around the press release of the product announcement. Due to data constraints, our merged dataset includes 711 unique firms for which we could obtain the market reaction to a product announcement. The data includes 328 unique *non-compliant firms* with 1,762 firm-year observations.

We examine a firm’s investment in capital expenditures measured by capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$ and the likelihood of paying dividend-an indicator equals one if the firm pays the dividend in the year (t+1). We also calculate the market reaction to the takeover announcement using CARs over the three-day event window (we check that the results are robust to longer 4-day event window). We measure buy and hold return where the estimation window starts 210 days prior to the announcement date and ends 11 days prior to the announcement date (-210, -11) since the market may react prior to the announcement of merger (see: Harford et al., 2012). We calculate abnormal return based on the difference between the market’s predicted return and actual stock return. Following Masulis, Wang, and Xie (2007), we only include completed deals with a value of more than one million dollars in the analysis. The target firms used in the analysis are US firms. We exclude government, joint-venture and mutual targets. We also require that the acquirers must control less than 50% of the target company before acquisition and control 100% of the target after the acquisition. We exclude deals with missing transaction value and CRSP price data. Finally, we require that the deal value must be at least 1% of the acquirer's market value of equity measured on the 11th trading day prior to the announcement date. The merged dataset includes 3,638 unique deals for which we had a market reaction to M&A deals. Out of 3,638 firms, we find 1,706 unique deals initiated by *non-compliant firms*.

3.2.2 Independent Variables

We control for variables that are standard in the literature. The firm-level controls include firm size, as proxied by the natural logarithm of the book value of assets. We also control for firm age in all our specifications as older firms' may experience less growth through takeovers, explore different technological innovation and pay more dividends. Firm's age may also influence the propensity to continue to have powerful (founder) CEOs. Firm's profitability, market performance, and debt ratio influence the firm's access to funds and subsequent investment ((Bushee, 1998), (Kaplan & Zingales, 1997), (Fama & French, 2016)). Thus, we also control for profitability, Tobin's Q and leverage in our specifications.

3.3 Summary Statistics

We report descriptive statistics of the variables in Table 1. Panel (A) of Table 1 reports descriptive statistics for the full sample. The average firm size in our sample is large since the sample consists of S&P1500 firms. As in Armstrong et al. (2014) and Balsmeier et al. (2017), we find that *non-compliant firms* are smaller compared to compliant firms. The average age of *non-compliant firms* is 24 years, which is significantly lower than that of compliant firms. *Compliant* and *non-compliant firms* are similar in terms of profitability, Tobin's Q, capital expenditures, R&D, dividend and leverage (consistent with Armstrong et al. (2014), Balsmeier et al. (2017), Duchin et al. (2010)). *Compliant firms*, on average, have higher patents, citations and patent value.

The percentage of founder CEOs in *non-compliant firms* is 22.4% compared to 12.9% in *compliant firms*. We document the prevalence of CEO-Chair duality and title concentration in *compliant firms*. The average tenure of the CEOs in *non-compliant* (*compliant*) firms is around 9 (8) years. Moreover, CEOs of *non-compliant firms* have greater ownership and are more powerful.

Panel (B) of Table 1 reports summary statistics of dependent variables used in the study for the pre-regulation *compliant* and *noncompliant firm* samples. *Compliant firms* have statistically and economically indistinguishable R&D expenditures, but around 39.47% more patents, 54.43% more

citations and 58.60% more valuable innovation in the pre-regulation period[19]. The higher innovations of compliant firms without necessarily overspending in R&D, suggests that the agency problem is less of a concern for *compliant firms* ((Balsmeier et al., 2017). In addition, *compliant firms* have a significantly higher likelihood of paying dividends rather than hoarding cash which also suggests less pronounced agency problems. Hence, these firms are unlikely to benefit from the regulatory changes targeting better governance. Panel (C) of Table 1 reports the correlation matrix of the individual sources of power and the CEO power index. 'CEO Tenure above Industry Median' has the highest correlation (0.679) (among other sources of managerial power) with CEO power index[20].

<<Insert Table 1 about here>>

<<Insert Graph 1 about here>>

Since we use the regulatory changes as an identification strategy, the causal inference could be confounded if the treatment limits CEO power. To further address this concern, we plot the estimates from a fully saturated model of CEO power proxy on the *regulatory shocks* with standard errors clustered at the firm level in Figure 1. The estimates show that these quasi-exogenous regulations do not significantly curb CEO power in the post-regulation period.

3.4 Methodology

In our study, we use a Difference-in-Difference (DID) continuous design (see, (Atanasov & Black, 2016)). We examine whether the exogenous shock to governance due to the mandatory adoption of the board independence requirements, has a differing effect on the corporate policies of the pre-regulation *non-compliant firms* with powerful CEOs compared to *non-compliant firms* without powerful CEOs[21]. We estimate the following panel DID for our analysis:

$$Y_{i,t+1} = \alpha + \beta SOX_{i,t} x\ CEOPower_{i,t} + \vartheta CEOPower_{i,t} + \tau SOX_{i,t} + \delta\ \gamma_{i,t} + \lambda_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

[19] The difference of patents in the noncompliant and compliant firm is (1.117 -1.619) =-0.502 which indicates $(e^{-0.502} - 1)x100 = -39.49\%$ fewer patents. Similarly, the difference of citations (value of innovation) in noncompliant and compliant firm is 1.935 -2.721 =-0.786 (1.834-2.716=-0.882) which indicates $(e^{-0.786} - 1)x100 = -54.43\%$ ($(e^{-0.882} - 1)x100 = -58.60\%$) fewer citations (value of innovation).

[20] Later, we show that our results are not influenced by any component of 'CEO Power' index *solely*.

[21] Though in our main results we focus on the sample of *non-compliant* firms, we also explore a triple-interaction test that uses the full sample of all firms in robustness tests.

Here, $Y_{i,t+1}$ represents the corporate policy of firm *i* in year *t+1*. SOX is an indicator variable (treatment) that is equal to one for years after the passage of the Sarbanes-Oxley Act and NYSE/NASDAQ listing regulation changes and zero otherwise. τ captures the average change in corporate policies the *non-compliant firms* from pre to post-regulations periods. CEO power, a time-variant measure of managerial power is proxied by the CEO-power Index. ϑ measures the average difference in corporate policies between the powerful (treatment group) and non-powerful (control group) CEO managed firms. β is the DID continuous estimates that capture the average differential change in corporate policies from the pre to post regulation periods for the powerful CEO led firms compared to the firms without powerful CEOs. $\gamma_{i,t}$ is the vector of firm-level controls. λ_i is firm (or industry) fixed effect, that mute the concern for the firm (industry) specific omitted variable bias by controlling for any unobserved time-invariant cross-sectional heterogeneity across firms (industries). λ_t is time fixed effect, that controls for any unobserved year specific features[22]. $\varepsilon_{i,t}$ represents error terms. We cluster standard errors at the firm-level.

The fundamental requirements of a DID design are the homogeneity of the shock and comparability of treatment and control groups in the pre-regulation period. Previous studies use SOX as a novel source of exogenous variation to corporate governance. We deal with the second requirement by focusing our study on the *non-compliant firms* where our treatment and control firms are comparable at least in terms of board features or regulatory compliance in the pre-treatment period[23]. Moreover, the parallel trend assumption of the DID setup requires similar attrition in both groups but for treatment. Using a reasonably balanced panel, we also address attrition in our setup (Atanasov and Black, 2015).

Since the pre-treatment parallel trend assumption is an important condition for shock-based causal inference, we test the covariate balance between the treated and control groups in the pre-regulation period to deal with any concern for selection bias in the methodology. Using the baseline

[22] Since our methodology is based on a single shock, when we use the treatment variable 'SOX', λ_t will be meaningless as it will not vary across firms.
[23] We also introduce placebo shocks in the pre-treatment period and the analysis supports the parallel trend assumption.

control variables used in the study (Table 2), we confirm that our treated (powerful CEOs led *non-compliant firms*) and control groups (*non-compliant firms* without powerful CEOs) are similar in the pre-regulation period and thus the treatment is quasi-random for these groups.

<<Insert Table 2 about here>>

Then, by matching the firms based on pre-regulation governance structure (and also on firm characteristics), we examine the sensitivity of corporate policies to exogenous governance variation in the context of managerial power. We argue that regulations driven governance variation would bring a better strategic shift in the firms with powerful CEOs.

4 Empirical Analysis

4.1 Innovation

We start by exploring whether enhanced governance can improve powerful CEOs' innovativeness. We look at the impact on innovation inputs (i.e., R&D), innovation outputs (i.e., patents, and patent quality), and new product announcements.

4.1.1 Innovation Inputs

We first analyze whether the innovation inputs of the powerful CEO managed *non-compliant firms* change after the improvement in corporate governance of the firm. We report the results in Table 3, Columns 1–4. The dependent variable is R&D expenditures. The coefficients of 'CEO Power' are negative and significant in all specifications suggesting that powerful CEOs, generally, invest less in R&D than other CEOs. As in Balsmeier at al. (2017), we do not find any discernible pattern in the R&D investments among the *non-compliant firms* after the transition to independent boards. However, the coefficients on the interaction terms, 'SOX x CEO Power' are positive and economically and statistically significant in all models. For example, the results in column 1 (with firm fixed effects) show that powerful CEOs' R&D intensity is 0.153 points below that of other CEOs (i.e., they spend

around 3.83% less on R&D than other CEOs[24]). However, in the post-regulation period, powerful CEOs increase investment in R&D by 1.6%[25]. We also control for contemporaneous R&D investments in column 2 to show that our results are not affected by any pre-trend of R&D investments by the firms. After controlling for the pre-trend of R&D, the economic magnitude of the coefficient 'SOX x CEO Power' declines slightly and the explanatory power of the model (R-squared) improves. We use industry and year fixed effects in column 4 and find that relative to other *non-compliant firms*, the R&D intensity of the powerful CEO managed *non-compliant firms* increases by 0.131 points. Since the coefficient of 'CEO Power' is -0.141 in column 4, on average, independent boards offset around 93% (0.131/-0.141) of the negative effect of powerful CEOs on the firm's R&D investments. The results suggest that, on average, *non-compliant* firms managed by powerful CEOs initiate a strategic shift in a firm's investment policy by moderating R&D investment policy significantly in the post-regulation period.

<<<<Insert Table 3 about here>>>>>

4.1.2 Innovation Outputs

R&D can generate competitive advantages (Barker & Mueller, 2002). But this is largely premised on R&D translating into innovation outputs. Patents – especially highly cited patents – are key innovation outputs. We anticipate that improvements in governance will spur powerful CEOs to engage in higher quality R&D, which we expect will manifest in more patents, and higher quality patents.

The results for innovation outputs reported in Table 4[26] are consistent with our expectations[27]. Powerful CEOs have, on average, a negative impact on innovation performance although the effect is

[24] For non-compliant firms, the average R&D intensity is 0.04. The coefficient related to powerful CEOs in Table 3 column 1 is 0.153 and the dependent variable is R&D intensity multiplied by 100. This implies that powerful CEOs spent 0.00153/0.04, or 3.83%%, less on R&D than other CEOs.

[25] The coefficients on CEO Power, and its interaction with SOX, in Column 1 are respectively -0.153 and 0.217. Thus, in the post-regulation period, powerful CEOs invest 0.064 more in R&D than their peers. Given that the average R&D intensity is around 4.0%, powerful CEOs spent around 0.00064/0.04=1.6% more on R&D than other CEOs.

[26] Since firms generally require significant time to produce patentable innovations, we measure the innovation variables at the time (t+2). However, in the appendix, we show that our results are robust when we measure innovation at the time (t+1).

[27] We control for contemporaneous R&D expenditure (He & Tian, 2013) in some models following innovation literature. However, since we argue that powerful CEO run firms increase R&D investment in the post-shock period, R&D intensity could be a *bad control* in the analysis

not always statistically significant. For example, the coefficient of the powerful CEO indicator in model 1 (4) of Panel A suggest that firms with powerful CEOs had 3.54% (4.30%) fewer patents[28]. After the quasi-exogenous improvement in board governance, the number of patents of powerful CEO managed firms improve significantly in models 1-4. For example, we find that *non-compliant firms* with powerful CEOs generate 8% (5.44%) more patents than firms with non-powerful CEOs in the post-regulation period in models 1 and 2 (4)[29].

We next consider the quality of innovation, as measured by patent's 'Citations'. We find that, on average, the coefficients of powerful CEOs on 'Citations' are negative although the effect is only statistically significant in model 8 where we use industry and year fixed effects. On the other hand, powerful CEOs are associated with higher citations where the magnitude varies from 9.75% (model 7) to 14.91% (model 6) in the post-regulation period[30].

To further support our findings on innovation quality in powerful CEO managed firms in the post-regulation period, we use the market reaction to patent grants. The results in panel B show that powerful CEO managed firms introduce impactful innovation when governance structures become stronger. Model 1 of panel B shows that the patent value of powerful CEO managed firms is, on average, \$0.143 $(e^{0.134} - 1)$ million higher than those of other firms in the post-regulation period.

Further, we explore whether powerful CEOs are associated with radical innovation in models 5-8 of panel B Table 4. We find that, on average, powerful CEOs do not increase radical innovation. However, powerful CEOs may pursue radical innovation when they receive diverse opinions from expert board members. Particularly, we find that in the post-regulation period, powerful CEO

focusing on innovation (Angrist & Pischke, 2009). However, excluding R&D intensity in the experiment of innovation output may lead to omitted variable bias problem. So, we report analysis on innovation after controlling R&D. In unreported results, we show that our results are robust to excluding R&D intensity. On the other hand, we also didn't control CAPX in reported innovation analysis considering it as a *bad control*. However, our results are robust to controlling CAPX in innovation analysis.

[28] Since patents measures are one plus the natural logarithm, while calculating economic magnitude, we use the exponential of the coefficients less 1. Thus, for model (1) Panel A of Table 4, CEO power coefficient is -0.036 that indicates that powerful CEO led firms are associated with $(e^{-0.036} - 1)x100 = -3.54\%$ less patents, on average. Similarly, the magnitude is $(e^{-0.044} - 1)x100 = -4.30\%$ in the model (4) of Panel A.

[29] In models 1 and 2 of Table 4, the coefficient of the interaction term 'CEO power x SOX' is 0.077 which indicates that patents increase by $(e^{0.077} - 1)x100 = 8\%$. Similarly, patents of model 4 increases by $(e^{0.053} - 1)x100 = 5.44\%$.

[30] In models 7 of Table 4 Panel A, the coefficient of interaction term 'CEO power x SOX' is 0.093 which indicates that citations of powerful CEO managed firms are $(e^{0.093} - 1)x100 = 9.75\%$ higher. Similarly, citations of powerful CEO managed firms in model 6 are $(e^{0.139} - 1)x100 = 14.91\%$ higher.

managed *non-compliant firms* introduce more radical innovation relative to other *non-compliant firms*[31].

<<<<Insert Table 4 about here>>>>>

One explanation for the success in innovation could be the improvement of a sense of teamwork in the organization through better governance and monitoring in the post-regulation period. An independent board may contribute to moderating agency conflicts within the organization and encourage powerful CEOs to implement policies that achieve corporate goals of value maximization. It could also be argued that the post-regulation increase in innovation productivity of firms with powerful CEOs could come from other firm-level changes due to regulatory changes. Using alternative fixed effects (firm, industry, year), we address this concern and show that powerful CEOs' R&D expenditure becomes more productive and is more apt to translate into better innovation in the post-regulation period.

4.1.3 New Product Value

The previous results suggest that, in the post-regulation period, powerful CEOs increase R&D expenditure and generate more innovation outputs. If these patent portfolios are valuable, we would expect these firms to derive a higher market valuation of innovation and the market to respond more favorably to new product announcements (Chaney & Devinney, 1992). Additionally, they may also introduce breakthrough products into the market.

The results in Table 5 summarize the market reaction to the announcement of new products. We find that in the post-regulation period, *non-compliant firms* led by powerful CEOs introduced more breakthrough products that earned positive abnormal announcement returns that were above the 75th percentile of the abnormal return distribution (columns 1 and 2 of Table 5). We also examine total cumulative abnormal returns in columns 3 and 4 of Table 5. In every model, in the pre-regulation period, the market reactions to powerful CEOs' new product announcements vary from significantly

[31] We do not use industry fixed effects while estimating radical innovation as radical innovation is calculated by summing up the total number of patents with the citation at a certain percentile from technology-class-year citations distribution.

negative to insignificantly negative. However, for the *non-compliant firms*, in the post-regulation period, the market responds more positively to powerful CEOs' new product announcements.

<<<<Insert Table 5 about here>>>>>

The results are economically meaningful. For example, in column 1, powerful CEO managed firms are associated with 3.34% $(e^{-0.034} - 1)x100)$ fewer breakthrough product announcements than other firms. However, after the regulatory changes, powerful CEO managed firms have 6.3% $(e^{0.061} - 1)x100)$ more breakthrough product announcements relative to that of *non-compliant firms* without powerful CEOs. Column 3 shows that the product announcement returns of powerful CEO managed *non-compliant firms* are, on average, 0.70% lower than those of other *non-compliant firms*. In the post-regulation period, powerful CEO managed firms have a 1.11% greater positive market value from product announcement relative to firms without powerful CEOs[32]. This is consistent with our conjecture that improvements in governance encourage powerful CEOs to not only innovate more but to produce innovations that create value[33].

4.2 Investment in Tangible Assets, Dividend Policy, and Takeovers

4.2.1 Investment in Tangible Assets

As a measure of capital allocation policy, we examine a powerful CEO managed firm's investment in capital expenditures as a proxy for empire-building activities of CEOs ((Xuan, 2009); (Chen, Lu, & Sougiannis, 2012)). We expect that powerful CEOs may prefer making tangible investments. However, the improvements in board governance help to mitigate this agency problem and shift the firm's focus towards long-term innovation-related investment.

In table 6, we report that *non-compliant firms* led by powerful CEOs demonstrate a significant reduction in capital expenditures in the post-regulation period. For example, in column 1 of Table 6,

[32] The coefficient of 'CEO Power' in model 3 is -0.007, which indicates 'Product Announcement Return' is $(e^{-0.007} - 1)x100 = -0.698\%$. The coefficient of SOX interacted term is 0.011, which indicates $(e^{0.011} - 1)x100 = 1.106\%$ higher product announcement return.

[33] Similar to innovation, product market reactions could be significantly affected by R&D investments. We control for R&D to account for the omitted variable bias problem. However, in unreported tests, we find similar results if we do not control R&D in the models of product market reactions.

we find that powerful CEOs are associated with higher capital expenditures (coefficient 0.188). This is economically meaningful: they invest 2.7% more in capital expenditures. However, in the post-regulation period, powerful CEO managed firms invests 3.3 percentage points less capital expenditures[34].

4.2.2 Dividend Payout Policy

We also analyze the impact of the regulatory change on powerful CEOs' dividend payout policies. Given that persistently hoarding excess cash holdings tends to reduce corporate value ((Harford, 1999), (Harford et al., 2008)), we would expect that improvements in governance encourage firms to payout to shareholders as dividends.

The results are in Table 6 are consistent with expectations. Models 4 and 5 show that powerful CEO managed firms, on average, are less likely to pay dividends. However, in the post-regulation period, the likelihood of paying a dividend is higher for powerful CEO managed firms than other firms (the coefficient on the interaction term is positive and significant). For example, model (4) shows that after the enactment of regulatory changes, firms managed by powerful CEOs show a 3.6% higher probability of paying dividends. We find economically stronger results when we use a logit model (model 7) to estimate the likelihood of paying the dividend.

<<<<Insert Table 6 about here>>>>>

4.2.3 Takeovers

We further explore powerful CEOs' empire building through takeovers. We use a standard event study methodology and report the three-day announcement returns in Table 7[35]. We find some evidence that the market reacted negatively (insignificantly) to M&A announcements by powerful CEO run firms in the pre-regulation period. However, the quality of takeovers by powerful CEO managed

[34] The mean value of the capital expenditures for non-compliant firms is 0.069. As we use '$[CAPX_{(t+1)}/Asset_{(t)}]x100$' as dependent variable in model 1, coefficient of 'CEO Power'= 0.188 in model 1 indicates 0.00188/.069=0.027. Similarly, the coefficient of SOX x CEO Power=-0.226 indicates 0.00226/0.069 = 0.033 less capital expenditures.

[35] The appendix reports result for a four-day event window.

firms improved in the post-regulation period as the market reacted positively to M&A announcements by these firms.

The results in relation to the control variables are consistent with expectations. Large bidders experience lower acquirer announcement returns (per (Moeller, Schlingemann, & Stulz, 2004, 2005). Acquisitions of public targets do worse relative to acquisitions of private targets, consistent with the idea that acquiring a private target could enable the bidder to capture an illiquidity discount; and thus, achieve more value (see e.g., (Chang, 1998); (Fuller, Netter, & Stegemoller, 2002)). Cash finance acquisitions perform better than stock-for-stock deals, consistent with the idea that deciding to pay with stock might signal to the market that the bidder is overpriced (per (Dong, Robinson, & Veld, 2005)), or potentially that the bidder might use its equity as a "cheap" source of capital with which it ultimately overpays (see Jensen, 2005).

<<<<Insert Table 7 about here>>>>>

5 Robustness Tests

5.1 CEO Overconfidence and Powerful CEOs

We check that the results are robust to controlling for the impact of CEO overconfidence. This is important because Banerjee et al. (2015) show that SOX helps to restrain overconfident CEOs by (inter alia) reducing overinvestment and by improving their takeover performance. Some of the powerful CEOs in our study could also be overconfident CEOs. However, the correlation coefficient between powerful CEOs and overconfident CEOs is negative (-0.0295), suggesting that spurious correlation between CEO power and CEO overconfidence is unlikely to drive our results.

We obtain qualitatively similar results when we control for CEO overconfidence. We do this by controlling for a variable analogous to Holder67 (constructed following the approach in Malmendier et al., 2011). We also re-run the models after excluding highly overconfident CEOs (Appendix TA3). Further, we examine models that include an overconfident-CEO variable and an interaction-term of overconfident-CEO and SOX (unreported). In all cases, we find results consistent with baseline findings.

<<<<Insert Table 8 about here>>>>>

5.2 Alternative Measures of Power and Compliant Firms

In this section, we focus on highly powerful CEOs and re-estimate the models. We expect that the moderating effect of regulatory changes would be more pronounced for highly powerful CEOs given that corporate policies of highly powerful CEOs are presumably more misaligned in a poorly governed firm. We construct a binary variable "CEO Power Top Q" that equals one if powerful CEO index is in the top quartile of the industry-year distribution.

The results in Table 9 Panel A show that firms with highly powerful CEOs generally adopt similar corporate policies reported in baseline results. We note that the interaction terms, 'SOX * CEO power', representing the impact of the regulatory change on highly powerful-CEOs' corporate policies and investments are significant. More importantly, the economic magnitude of the interaction term, is on average, higher than the baseline results.

Finally, in an unreported falsification test, we re-estimate the models for the sample of compliant firms with powerful CEOs in the post-regulation period. The analysis evaluates whether powerful CEOs in compliant firms also initiate strategic shifts within their firms in the post-regulation period. We find that compliant firms with powerful CEOs generally adopt similar corporate policies to compliant firms without powerful CEOs in the post regulation period. That is, agency conflict is less of a concern in compliant firms. Thus, the marginal effect of the regulatory change on better corporate outcomes is statistically indistinguishable from zero[36].

5.3 Placebo test: Non-powerful CEOs

In addition, we conduct a placebo test where we rerun the baseline regressions using an indicator that takes the value 1 if the CEO power score is in the bottom quartile of the industry-year distribution. Thus, using the sample of non-compliant less powerful CEO managed firms as a treatment

[36] The only variables for which we get 'SOX x CEO Power' significant in the compliant firm sample are 'Patents, 'Citations' and 'Value of Innovation'. As reported in Table 1 Panels A and B, *compliant firms* have significantly higher patents, citations, and patent value not only during the sample period but also in the pre-regulation period. Since the pre-treatment trend in these outcome variables could continue without treatment, we cannot interpret these results causally (Atanasov and Black, 2016).

group (placebo treatment), we explore the sensitivity of corporate policies to the regulatory change (see, Table 9 Panel B). The results do not hold consistently for the *non-compliant firms* with less powerful CEOs (CEO Power Bottom Q) suggesting that CEOs who have limited power are less likely to adopt self-serving corporate policies. That is, the corporate policies of less powerful CEO managed firms and firms without powerful CEOs are not significantly different in the post-regulation period.

<<<<Insert Table 9 about here>>>>>

5.4 Placebo Shocks

We also introduce placebo shocks to examine the robustness of our analysis. We follow Atanasov and Black (2016) and only use pre-treatment data and apply a placebo shock at a different time (the year 1996)[37]. We document insignificant and indifferent effects of the placebo shock on the corporate policies of firms managed by powerful CEOs against firms without powerful CEOs. More importantly, this results further demonstrate that our results are not being driven by any apparent pre-treatment trends. We report these results in Table 10

<<<<Insert Table 10 about here>>>>>

5.5 SOX Induced CEO Turnover and Shorter Event Window

A concern with using regulatory changes as an identification strategy is that powerful CEOs may be replaced during the SOX period. Thus, the changes in corporate policy may be driven by a new CEO. We address this concern by excluding firms that experience turnover of CEOs around SOX in 2002 (i.e., for whom the CEO in 2001 is different from the CEO in 2003). Our main findings hold suggesting that the results are not affected by SOX induced CEO turnover. These results are in Table 11.

<<<<Insert Table11 about here>>>>>

Our analysis considers the longer-term effect of the regulatory change using a 20-year window (10 years before and 10 years after) since a strategic shift in corporate policies, such as R&D investment, innovation, takeovers and dividend policy may take longer to respond to the regulatory

[37] We also use the years 1997 and 1998 as placebo shock years and find robust outcomes.

change. However, DID estimates are more consistent when we compare outcomes just before and just after the policy change. The fundamental identifying assumption of DID is the parallel trend and this assumption is often valid for a short event window. Many confounding events may take place in a longer event window and thus distort the effect of the exogenous event. We re-estimate the analysis using a 10-year window (5 years before and 5 years after). However, we continue to find consistent results suggesting that other confounding events are less likely to drive our results. (Appendix TA4).

5.6 Other Sources of Power and Omitted Governance Variables

We also ensure that the results are robust to controlling for other governance variables. We include CEO Pay Slice (CPS) that measures the relative importance of the CEO and the extent to which the CEO may extract rents. Bebchuk et al. (2011) suggest that CPS measures the centrality of the CEO in the compensation structure and reflects the outcome of CEO power on compensation.. In addition, we include whether the CEO is the only insider on the board (Adams et al. (2005)). The results in Table 12 after controlling for these variables, are consistent with our main results.

Although our specification use firm-fixed effects which lessen the likelihood that our results may be driven by other omitted corporate governance characteristics, we control for additional corporate governance features. External governance mechanisms, such as institutional holdings of company stock, may exert influence on the CEOs' investment preferences and quality ((Edmans, 2009), (Mccahery, Sautner, & Starks, 2016), (Appel, Gormley, & Keim, 2016)). In addition, dual-class share structures can enable managers to hold greater control rights and thus may allow CEOs to pursue private benefits at shareholder's expense ((Masulis et al., 2009), (Villalonga & Amit, 2006)). We find results consistent with our baseline estimations reported in Table 12 Panel A.

<<<<Insert Table 12 about here>>>>>

Finally, previous literature suggests that dual class structure allows CEOs to engage in value-destroying acquisitions more often and firm's capital expenditures contribute less to shareholder value (Masulis et al., 2009). Gompers, Ishii, and Metrick (2010) argue that in dual-class firms, firm value is increasing in insiders' cash-flow rights and decreasing in insider voting rights. As we use CEO

ownership concentration and founder status as sources of managerial power, one plausible concern is that our results could be driven/influenced by dual-class firms. To disentangle the dual class effect in our study, we exclude all dual class firms and re-run all baseline models (Appendix TA5) and we continue to find consistent results except for takeover performance which is not statistically significant at conventional levels (significant at the 11% level).

5.7 Alternative Econometric Modelling

We also test whether the results are robust to alternative fixed effects. Specifically, industry-specific shocks in a year may affect firm-level policies. Thus, unobserved heterogeneity across industries might also correlate with corporate policies besides unobserved heterogeneity across firms. To mitigate this concern, we run the baseline specifications using (industry times year) interacted joint fixed-effects with firm fixed effects instead of the baseline year fixed-effects and industry fixed-effects or year fixed-effects and firm-fixed effects. High-dimensional fixed effects models also allow us to remove any potential firm or industry level omitted variable bias problems (Gormley & Matsa, 2014). The results in Table 12 Panel B are consistent with the baseline results suggesting that time-varying industry shocks are unlikely to drive our results.

5.8 Triple Difference Analysis

Our analysis mainly concentrates on *non-compliant firms* having weaker governance mechanisms before adopting regulatory imposed board independence. Our methodology allows us to avoid problems of DID analysis with multiple subpopulations where some firms are subject to policy intervention (here, *non-compliant firms*) and others not (here, *compliant firms*) (Athey & Imbens, 2006). Thus, model (1) allows us to get true counterfactuals (*non-compliant firms* without powerful CEOs) to analyze the effect of powerful CEOs on corporate policies (see, (Bertrand, Duflo, & Mullainathan, 2004)). However, as an additional robustness check, we perform a triple difference analysis (Diff-in-diff-in-diff) to compare the moderating effect of quasi-exogenous improvement in

board governance on powerful CEOs with *compliant firms*[38]. We find after using firm and year fixed effects, the coefficient 'SOX x Non-compliant x CEO Power' is economically and statistically significant. The results suggest that the moderating effect of the regulatory change on corporate policies is stronger for *non-compliant firms* with powerful CEOs.

<<<<Insert Table 13 about here>>>>>

5.9 CEO Power Index Composition

We follow guidance from the extant literature to construct the proxy for CEO power. One concern with adopting this approach is that one of the components may unduly drive our interpretations of the findings. To mitigate this concern, in unreported tests, we repeat our analysis by reconstructing the CEO power index by iteratively omitting one of these sources of power at a time and continue to find consistent results. We also use an alternative definition of powerful CEOs defined as an indicator dummy that equals 1 if the CEO power index score is in the top decile of the distribution and find consistent results.

6 Conclusion

This paper addresses how improvements in corporate governance can help to rein in powerful CEOs. In so doing the paper interfaces with several key issues in the literature, including how to restrain powerful CEOs and whether, and when, the governance changes mandated in SOX and the NYSE/NASDAQ listing rules, have been beneficial. Prior studies suggest that powerful CEOs might harm shareholders either through empire building or through complacency. Further, there is some controversy over the utility of regulations targeting mandatory adoption of an independent board, with some evidence that compliance costs discouraged some firms from listing in the US.

We analyze whether a quasi-exogenous increase in board independence, as mandated by regulatory changes, can mitigate the harms of powerful CEOs. In particular, the study challenges the

[38] Appendix TA6 reports the covariate balance test of the treatment and control groups of this analysis. The test shows that the treatment and control groups had balance in all covariates except firm age. We control for firm age and other covariates in the baseline specifications of all models.

notion that powerful CEOs are detrimental for all firms by exploring the heterogeneity in firms' pre-regulation governance. We show that a powerful CEO coupled with poor corporate governance drives the negative views of powerful CEOs. An exogenous improvement in the governance of the firm may bring a balance of managerial power *vis-à-vis* directors and thus a strategic shift in firms with powerful CEOs, diverting the energy and efforts of powerful CEOs to value-enhancing projects.

The study shows that after the exogenous improvement in governance, powerful CEOs in these firms reduced investment in tangible assets and powerful CEOs' acquisitions created more value. This implies that quasi-exogenous improvement in board governance helped to reduce empire building by powerful CEOs.

We also find that the adoption of an independent board encourages powerful CEOs to increase long-term strategic investments, e.g., in innovation. An increase in innovation inputs (R&D investments) then translates into an increase in innovation output quantity and quality (patents, patent citations, and patent value). Mandatory adoption of independent boards is also associated with the market reacting more positively to powerful CEOs' new product announcements. Further, dividend payout policy of these firms has improved, suggesting that increased oversight helps to prevent powerful CEOs hoarding cash. We conduct a battery of robustness tests to ensure the veracity of these results, including placebo tests and falsification tests. We find that regulatory changes mandating an independent board do not influence powerful CEOs in firms that have already complied with its requirements before its passage. Further, these regulations have less of an impact on non-powerful CEOs, who arguably are less apt to directly benefit from the exogenous improvements in corporate governance as they are already more susceptible to board scrutiny.

These results overall suggest that increased board independence can be beneficial and that it can be one way to rein in powerful CEOs. This highlights that SOX, and the NYSE /NASDAQ rule changes, have benefited some firms. Further, it suggests that companies, both in the US and elsewhere, might consider increasing independent oversight in order to rein in powerful CEOs and mitigate empire building.

7 References

Adams, R. B., & Ferreira, D. (2007). A theory of friendly boards. *The Journal of Finance, 62*(1), 217-250.

Adams, R. B., Almeida, H. A., & Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies, 18*(4), 1403-1432.

Adams, R., Almeida, H., & Ferreira, D. (2009). Understanding the relationship between founder–CEOs and firm performance. *Journal of Empirical Finance, 16*(1), 136-150.

Adams, R., Hermalin, B., & Weisbach, M. (2010). The role of boards of directors in corporate governance: a conceptual framework and survey. *Journal of Economic Literature, 48*(1), 58-107.

Aghion, P., Reenen, J. V., & Zingales, L. (2013). Innovation and institutional ownership. *American Economic Review, 103*(1), 277-304.

Ahuja, G., & Lampert, C. (2001). Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal, 22*, 521-543.

Ahuja, G., & Novelli, E. (2017). Activity overinvestment: the case of R&D. *Journal of Management, 43*(8), 2456-2468.

Allen, F., Bernardo, A. E., & Welch, I. (2000). A theory of dividends based on tax clienteles. *The Journal of Finance, 55*(6), 2499-2536.

Almeida, H., Hsu, P., Li, D., & Tseng, K. (2017). More cash, less innovation: The effect of the american jobs creation act of patent value. *Working Paper*.

Anderson, R. C., Duru, A., & Reeb, D. M. (2009). Founders, heirs, and corporate opacity in the United States. *Journal of Financial Economics, 92*(2), 205-222.

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion.* Princeton University Press.

Appel, I. R., Gormley, T. A., & Keim, D. B. (2016). Passive investors, not passive owners. *Journal of Financial Economics, 121*(1), 111-141.

Armstrong, C., Core, J., & Guay, W. (2014). Do independent directors cause improvements in firm transparency? *Journal of Financial Economics, 113*(3), 383-403.

Arugaslan, O., Cook, D. O., & Kieschnick, R. (2010). On the decision to go public with dual class stock. *Journal of Corporate Finance, 16*(2), 170-181.

Ashbaugh-Skaife, H., Collins, D. W., Kinney, W. R., & Lafond, R. (2009). The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research, 47*(1), 1-43.

Atanasov, V. A., & Black, B. S. (2016). Shock-based causal inference in corporate finance and accounting research. *Critical Finance Review, 5*, 207-304.

Atanassov, J. (2013). Do hostile takeovers stifle innovation? Evidence from antitakeover legislation and corporate patenting. *The Journal of Finance, 68*(3), 1097-1131.

Athey, S., & Imbens, G. W. (2006). Identification and inference in nonlinear difference-in-differences models. *Econometrica, 74*(2), 431-497.

Baldenius, T., Melumad, N., & Meng, X. (2014). Board composition and CEO power. *Journal of Financial Economics, 112*(1), 53-68.

Baloria, V. P., Marquardt, C. A., & Wiedman, C. I. (2017). A lobbying approach to evaluating the whistleblower provisionsnof the Dodd-Frank Reform Act of 2010. *Contemporary Accounting Research, 34*(3), 1305-1339.

Balsmeier, B., Fleming, L., & Manso, G. (2017). Independent boards and innovation. *Journal of Financial Economics, 123*(3), 536-557.

Banerjee, S., Humphery-Jenner, M., & Nanda, V. (2015). Restraining overconfident CEOs through improved governance: Evidence from the Sarbanes-Oxley Act. *Review of Financial Studies, 28*(10), 2812-2858.

Bargeron, L., Lehn, K., & Zutter, C. (2010). Sarbanes-Oxley and corporate risk taking. *Journal of Accounting and Econimics, 49*(1), 34-52.

Barker, L., & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science, 48*(6), 782-801.

Bebchuk, L. A., & Cohen, A. (2005). The costs of entrenched boards. *Journal of Financial Economics, 78*, 409-433.

Bebchuk, L. A., & Fried, J. M. (2005). Pay without performance: overview of the issues. *Journal of Applied Corporate Finance, 17*(4), 8-23.

Bebchuk, L. A., Cremers, K. M., & Peyer, U. C. (2011). The CEO pay slice. *Journal of Financial Economics, 102*(1), 199-221.

Bebchuk, L. A., Fried, J. M., & Walker, D. (2002). Managerial power and rent extraction in the design of executive compensation. *University of Chicago Law Review*, 751-846.

Bebchuk, L., & Hamdani, A. (2017). Independent directors and controlling shareholders. *University of Pennsylvania Law Review, 165*(6), 1272-1315.

Bebchuk, L., Cohen, A., & Ferrell, A. (2009). What matters in corporate governance? *The Review of Financial Studies, 22*(2), 783-827.

Becht, M., Bolton, P., & Röell, A. (2003). Corporate governance and control. In *Handbook of the Economics of Finance.*

Belliveau, M., O'Reilly, C., & Wade, J. (1996). Social capital at the top: effects of social similarity and status on CEO compensation. *Academy of Management Journal, 39*(6), 1568-1593.

Bennis, W., & Nanus, B. (1985). *Leaders: The Strategies for Taking.* Harper Collins.

Bertrand, M., & Mullainathan, S. (2003). Enjoying the quiet life? corporate governance and managerial preferences. *Journal of Political Economy, 111*(5), 1043-1075.

Bertrand, M., & Schoar, A. (2003). Managing with style: the effect of managers on firm policies. *Quarterly Journal of Economics, 118*(4), 1169-1208.

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics, 119*(1), 249-275.

Bhagat, S., & Jefferis, R. (2002). The econometrics of corporate governance studies.

Brickey, K. F. (2003). From Enron to Worldcom and Beyond: Life and crime after Sarbanes-Oxley. *Washington University Law Review, 81*(2), 357-401.

Brickley, J. A., & James, C. M. (1987). The takeover market, corporate board composition, and ownership structure: the case of banking. *The Journal of Law and Economics, 30*(1).

Brickley, J. A., Coles, J. L., & Jarrell, G. (1997). Leadership structure: Separating the CEO and Chairman of the board. *Journal of Corporate Finance, 3*(3), 189-220.

Brickley, J. A., Coles, J., & Terry, R. L. (1994). Outside directors and the adoption of poison pills. *Journal of Financial Economics, 35*(3), 371-390.

Bushee, B. J. (1998). The influence of institutional investors on myopic R&D investment behavior. *The Accounting Review, 73*(3), 305-333.

Campbell, T., Gallmeyer, M., Johnson, S., Rutherford, J., & Stanley, B. (2011). CEO optimism and forced turnover. *Journal of Financial Economics, 101*(3), 695-712.

Chaney, P. K., & Devinney, T. M. (1992). New product innovations and stock price performance. *Journal of Business Finance & Accounting, 19*(5), 677-695.
Chang, S. (1998). Takeovers of Privately Held Targets, Methods of Payment, and Bidder Returns. *The Journal of Finance, 53*(2), 773-784.
Chen, C. X., Lu, H., & Sougiannis, T. (2012). The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs. *Contemporary Accounting Research, 29*(1), 252-282.
Chhaochharia, V., & Grinstein, Y. (2007). Corporate governance and firm value: the impact of the 2002 governance rules. *The Journal of Finance, 62*(4), 1789-1825.
Coates, J. C. (2007). The goals and promise of the Sarbanes-Oxley Act. *Journal of Economic Perspectives, 21*(1), 91-116.
Cohen, L., Frazzini, A., & Malloy, C. J. (2012). Hiring cheerleaders: board appointments of "independent" directors. *Management Science, 58*(6), 1039-1058.
Coles, J., Daniel, N., & Naveen, L. (2014). Co-opted Boards. *The Review of Financial Studies, 27*(6), 1751-1796.
Daily, C. M., & Johnson, J. L. (1997). Sources of CEO power and firm financial performance: A longitudinal assessment. *Journal of Management, 23*(2), 97-117.
Demsetz , H., & Lehn , K. (1985). The structure of corporate ownership: causes and consequences. *Journal of Political Economy, 93*(6), 1155-1177.
Denicolò, V., & Zanchettin, P. (2014). What causes over-investment in R&D in endogenous growth models? *The Economic Journal, 124*(581), 1192-1212.
Dong, M., Robinson, C., & Veld, C. (2005). Why individual investors want dividends. *Journal of Corporate Finance, 12*(1), 121-158.
Duchin, R., Matsusaka, J., & Ozbas, O. (2010). When are outside directors effective? *Journal of Financial Economics, 96*(2), 195-214.
Edmans, A. (2009). Blockholder trading, market efficiency, and managerial myopia. *The Journal of Finance, 64*(6), 2481-2513.
Fahlenbrach, R. (2009). Founder-CEOs, investment decisions, and stock market performance. *Journal of Financial and Quantitative Analysis, 44*(2), 439-466.
Faleye, O., Hoitash, R., & Hoitash, U. (2011). The costs of intense board monitoring. *Journal of Finance, 101*(1), 160-181.
Fama, E. (1980). Agency problems and the theory of the firm. *Journal of Political Economy, 88*(2), 288-307.
Fama, E. F., & French, K. R. (2016). Dissecting anomalies with a five-factor model. *Review of Financial Studies, 29*(1), 69-103.
Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law & Economics, 26*(2), 301-325.
Faulkender, M., & Yang, J. (2010). Inside the black box: The role and composition of compensation peer groups. *Journal of Financial Economics, 96*(2), 257-270.
Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal, 35*(3), 505-538.
Finkelstein, S., & D'aveni, R. A. (1994). CEO duality as a double-edged sword: how boards of directors balance entrenchment avoidance and unity of command. *Academy of Management Journal, 37*(5), 1079-1108.
Finkelstein, S., & Hambrick, D. (1996). *Strategic leadership: top executives and their effects on organizations.* St. Paul, MN: West Educational.
Fleming, L. (2001). Recombinant uncertainty in technological search. *Management Science, 47*, 117-132.
Fluck, Z. (1999). The dynamics of the management-shareholder conflict. *The Review of Financial Studies, 12*(2), 379-404.
Fogel, K., Ma, L., & Morck, R. (2014). Powerful independent directors. *Unpublished Working Paper*.
Fuller, K., Netter, J., & Stegemoller, M. (2002). What Do Returns to Acquiring Firms Tell Us? Evidence from Firms That Make Many Acquisitions. *The Journal of Finance, 57*(4), 1763-1793.
Galasso, A., & Simcoe, T. S. (2011). CEO overconfidence and innovation. *Management Science, 57*, 1469-1484.
Geroski, P., Machin, S., & Reenen, J. V. (1993). The profitability of innovating firms. *RAND Journal of Economics, 24*(2), 198-211.
Gompers, P. A., Ishii, J. L., & Metrick, A. (2003). Corporate governance and equity prices. *Quarterly Journal of Economics, 118*(1), 107-155.
Gormley, T. A., & Matsa, D. A. (2014). Common errors: How to (and not to) control for unobserved heterogeneity. *The Review of Financial Studies, 27*(2), 617-661.
Graham, J., Kim, H., & Leary, M. (2018). CEO-board dynamics. *Unpublished Working Paper*.
Graham, R. J., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics, 109*(1), 103-121.
Grimm, C. M., & Smith, K. G. (1991). Research notes and communications management and organizational change: A note on the railroad industry. *Strategic Management Journal, 12*(7), 557-562.
Grinstein, Y., & Hribar, P. (2004). CEO compensation and incentives: Evidence from M&A bonuses. *Journal of Financial Economics, 73*(1), 119-143.
Guo, L., & Masulis, R. W. (2015). Board structure and monitoring: new evidence from CEO turnovers. *The Review of Financial Studies, 28*(10), 2770-2811.
Guo, L., Lach, P., & Mobbs, S. (2015). Trade-offs between internal and external governance: evidence from exogenous regulatory shocks. *Financial Management, 44*(1), 81-114.
Hall, B., Griliches, Z., & Hausman, J. (1986). Patents and R and D: Is There a Lag? *International Economic Review, 27*(2), 265-283.
Han, S., Nanda, V. K., & Silveri, S. (. (2016). CEO power and firm performance under pressure. *Financial Management, 45*(2), 369-400.
Harford, J. (1999). Corporate cash reserves and acquisitions. *The Journal of Finance, 54*(6), 1969-1997.
Harford, J., & Schonlau, R. J. (2013). Does the director labor market offer ex post settling-up for CEOs? The case of acquisitions. *Journal of Financial Economics, 110*(1), 18-36.
Harford, J., Humphery-Jenner, M., & Powell, R. (2012). The sources of value destruction in acquisitions by entrenched managers. *Journal of Financial Economics, 106*(2), 247-261.
Harford, J., Mansi, S. A., & Maxwell, W. F. (2008). Corporate governance and firm cash holdings in the US. *Journal of Financial Economics, 87*(3), 535-555.
Harris, M., & Raviv, A. (2008). A Theory of Board Control and Size. *The Review of Financial Studies, 21*(4), 1797-1832.
He, J., & Tian, X. (2013). The dark side of analyst coverage: The case of innovation. *Journal of Financial Economics, 109*(3), 856-878.
Hermalin, B. E., & Weisbach, M. S. (1991). The effects of board composition and direct incentives on firm performance. *Financial Management, 20*(4), 101-112.
Hermalin, B., & Weisbach, M. (1988). The determinants of board composition. *The Rand Journal of Economics, 19*(4), 589-606.
Hermalin, B., & Weisbach, M. (1998). Endogenously chosen boards of directors and their monitoring of the CEO. *The American Economic Review, 88*(1), 96-118.

Himmelberg, C., Hubbard, R., & Palia, D. (1999). Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics, 53*(3), 353-384.
Hirshleifer, D., Low, A., & Teoh, S. H. (2012). Are overconfident CEOs better innovators? *Journal of Finance, 5*(3), 1457-1498.
Hochberg, Y., Sapienza, P., & Vissing-Jørgensen, A. (2009). A lobbying approach to evaluating the Sarbanes-Oxley Act of 2002. *Journal of Accounting Research, 47*(2), 519-583.
Holderness, C. G., & Sheehan, D. P. (1988). The role of majority shareholders in publicly held corporations: An exploratory analysis. *Journal of Financial Economics, 20*(1-2), 317-346.
Holmstrom, B. (1989). Agency costs and innovation. *Journal of Economic Behavior and Organization, 12*(3), 305-327.
Holmstrom, B., & Kaplan, S. N. (2003). The state of U.S. corporate governance: What's right and what's wrong? *Journal of Applied Corporate Finance, 15*, 8-20.
Holmstrom, B., & Milogrom, P. (1991). Multitask principla agent analyses: incentive contracts, asset ownership, and job design. *Journal of Law, Economics, and Organization*, 24-52.
Jensen, M. C. (1986). The agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review, 76*, 323-329.
Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance, 48*, 831-880.
Jensen, M. C. (2005). Agency Costs of Overvalued Equity. *Financial Management, 34*(1), 5-19.
Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics, 3*, 305-360.
Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics, 112*(1), 169-215.
Karolyi, G. A. (2009). Discussion of a lobbying approach to evaluating the Sarbanes-Oxley Act of 2002. *Journal of Accounting Research, 47*(2), 585-595.
Khanna, V., Kim, E. H., & Lu, Y. (2015). CEO connectedness and corporate fraud. *The Journal of Finance, 70*(3), 1203-1252.
Kim, E. H., & Lu, Y. (2011). CEO ownership, external governance, and risk-taking. *Journal of Financial Economics, 102*(2), 272-292.
Knyazeva, A., Knyazeva, D., & Masulis, R. W. (2013). The supply of corporate directors and board independence. *The Review of Financial Studies, 26*(6), 1561–1605.
Kogan, L., Papanikolaou, D., Seru, A., & Stoffman, N. (2017). Technological innovation, resource allocation, and growth. *The Quarterly Journal of Economics, 132*(2), 665-712.
La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (2000). Agency problems and dividend policies around the world. *The Journal of Finance, 55*(1), 1-33.
Landier, A., Sauvagnat, J., Sraer, D., & Thesmar, D. (2013). Bottom-up corporate governance. *Review of Finance, 17*(1), 161-201.
Li, H., Pincus, M., & Rego, S. O. (2008). Market reaction to events surrounding the Sarbanes-Oxley act of 2002 and earnings management. *The Journal of Law and Economics, 51*(1), 111-134.
Li, M., Lu, Y., & Phillips, G. (2018). CEOs and the product market: when are powerful CEOs beneficial? *Journal of Financial and Quantitative Analysis*, Forthcoming.
Linck, J. S., Netter, J. M., & Yang, T. (2009). The effects and unintended consequences of the Sarbanes-Oxley Act on the supply and demand for directors. *The Review of Financial Studies, 22*(8), 3287-3328.
Linck, J. S., Netter, M., J., & Yang, T. (2008). The determinants of board structure. *Journal of Financial Economics, 87*(2), 308-328.
Mace, M. L. (1979). Directors: myth and reality - ten years later. *Rutgers Law Review, 32*(2), 293-311.
Mace, M. L. (1986). Directors: Myth and reality. *Harvard Business School Press, Boston*.
Malmendier, U., & Nagel, S. (2011). Depression babies: do macroeconomic experiences affect risk taking? *The Quarterly Journal of Economics, 126*(1), 373–416.
Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics, 89*, 20-43.
Malmendier, U., Tate, G., & Yan, J. (2011). Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. *The Journal of Finance, 66*(5), 1687-1733.
Manso, G. (2011). Motivating Innovation. *The Journal of Finance,* 66(5), 1823-1860.
Martin, I. (2012). On the valuation of long-dated assets. *Journal of Political Economy* , 346–358.
Masulis, R. W., Wang, C., & Xie, F. (2007). Corporate governance and acquirer returns. *The Journal of Finance, 62*(4), 1851-1889.
Masulis, R., & Mobbs, S. (2011). Are all inside directors the same? Evidence from the external directorship market. *The Journal of Finance, 66*(3), 823-872.
Masulis, R., & Mobbs, S. (2014). Independent director incentives: Where do talented directors spend their limited time and energy? *Journal of Financial Economics, 111*(2), 406-429.
Masulis, R., Wang, C., & Xie, F. (2009). Agency problems at dual-class companies. *The Journal of Finance, 64*(4), 1697-1727.
Mccahery, J. A., Sautner, Z., & Starks, L. T. (2016). Behind the scenes: The corporate governance preferences of institutional investors. *The Journal of Finance, 71*(6), 2905-2932.
Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2005). Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave. *The Journal of Finance, 60*(2), 757-782.
Moeller, S. B., Schlingemann, F., & Stulz, R. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics, 73*(2), 201-228.
Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: an empirical analysis. *Journal of Financial Economics, 20*, 293-315.
Morse, A., Nanda, V., & Seru, A. (2011). Are incentive contracts rigged by powerful CEOs? *Journal of Finance, 66*(5), 1779-1821.
Mukherjee, A., Singh, M., & Žaldokas, A. (2017). Do corporate taxes hinder innovation? *Journal of Financial Economics, 124*(1), 195-221.
Nelson, R., & Winter, S. (1982). An evolutionary theory of economic change. *Harvard University Press*.
Palia, D. (2001). The endogeneity of managerial compensation in firm valuation: A solution. *The Review of Financial Studies, 14*(3), 735-764.
Pan, Y., Wang, T. Y., & Weisbach, M. S. (2016). CEO investment cycles. *Review of Financial Studies, 29*, 2955–2999.
Perino, M. (2002). Enron's legislative aftermath: some reflections on the deterrence aspects of the Sarbanes-Oxley Act of 2002. *Columbia Law and Economics Working Paper; St. John's Legal Studies Research Paper*.
Perry, T. (2000). Incentive compensation for outside directors and CEO turnover. *Unpublished Working Paper*.
Pfeffer, J. (1993). *Managing with power: politics and influence in organizations.* Harvard Business Review Press.

Raheja, C. G. (2005). Determinants of board size and composition: A theory of corporate boards. *The Journal of Financial and Quantitative Analysis, 40*(2), 283-306.
Romano, R. (2005). The Sarbanes-Oxley Act and the making of quack corporate governance. *The Yale Law Journal, 114*, 1521-1611.
Ryan, H., & Wiggins, R. (2004). The interaction between R&D investment decisions and compensation policy. *Financial Management, 73*(3), 497-524.
Sanders, W., & Hambrick, D. (2007). Swinging for the fences: The effects of CEO stock options on company risk taking and performance. *Academy of Management Journal, 50*, 1055-1078.
Schilling, M., & Hill, C. (1998). Managing the new product development process: Strategic imperatives. *Academy of Management Executive, 12*, 67-81.
Shivdasani, A. (1993). Board composition, ownership structure, and hostile takeovers. *Journal of Accounting and Economics, 16*(1-3), 167-198.
Shivdasani, A., & Yermack, D. (1999). CEO involvement in the selection of new board members: an empirical analysis. *The Journal of Finance, 54*(5), 1829-1853.
Song, F. & Thakor, A V. (2006). Information Control, Career Concerns, and Corporate Governance. *The Journal of Finance, 4, 1845-1896.*
Srinivasan, S., & Coates, J. C. (2014). SOX after ten years: a multidisciplinary review. *Accounting Horizons, 28*(3), 627-671.
Sunder, J., Sunder, S. V., & Zhang, J. (2017). Pilot CEOs and corporate innovation. *Journal of Financial Economics, 123*(1), 209-224.
Sutton, R. I. (2002). Weird ideas that spark innovation. *MIT Sloan Management Review*.
Tang, J., Crossan, M., & Rowe, W. G. (2011). Dominant CEO, deviant strategy, and extreme performance: the moderating role of a powerful board. *Journal of Management Studies, 48*, 1479-1503.
Tian, X., & Wang, T. Y. (2014). Tolerance for failure and corporate innovation. *The Review of Financial Studies, 27*(1), 211-255.
Tushman, M., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly, 31*, 439-465.
Villalonga, B., & Amit, R. (2006). How do family ownership, control, and management affect firm value? *Journal of Financial Economics, 80*, 385-417.
Weisbach, M. S. (1988). Outside directors and CEO turnover. *Journal of Financial Economics, 20*, 431-460.
Westphal, J. D., & Zajac, E. J. (1995). Who shall govern? CEO/board power, demographic similarity, and new director selection. *Administrative Science Quarterly, 40*(1), 60-83.
Xuan, Y. (2009). Empire-building or bridge-building? Evidence from new ceos' internal capital allocation decisions. *The Review of Financial Studies, 22*(12), 4919-4948.
Zajac, E. J., & Westphal, J. D. (1996). Who shall succeed? how CEO/board preferences and power affect the choice of new CEOs. *The Academy of Management, 39*(1), 64-90.
Zwiebel, J. (1996). Dynamic capital structure under managerial entrenchment. *American Economic Review, 86*(5), 1197-1215.

8 Tables and Graphs

Table 1: Summary Statistics

This table reports summary statistics of the firms. The sample consists of publicly traded, non-regulated S&P1500 firms from1992 to 2011. The non-compliant firm sample is a sub-sample of the full sample and consists of firms without a fully independent audit committee or majority board independence before the year 2002. 'Founder-CEO' in a given year is an indicator variable that equals one if any source explicitly mentions that the current CEO is one of the original founders of the firm or was the main executive at the time the company was founded. 'CEO-Chair' is an indicator of powerful-CEO and equals one if CEO is also the chairman of the board. 'CEO Title Concentration' is a dummy variable which is one if CEO holds more than two titles. The percentage of ownership held by CEOs is represented by 'CEO Ownership'. 'CEO Ownership above the Industry Median' is an indicator equals one if the CEO's ownership is above the median ownership of CEOs in the industry-year distribution of ownership. 'CEO Tenure' is the number of years the CEO has served as 'CEO' of the firm. 'CEO Tenure above the Industry Median' is one if the CEO's tenure is above the median tenure of CEOs in the industry-year distribution of tenure. 'CEO Power' is an index which is an aggregate measure of the five components of CEO power and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by total assets. 'Leverage' is the long-term debt scaled by $assets_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. '$R\&D_{(t)}$' is the value of R&D $expenditures_{(t)}$ scaled by $assets_{(t-1)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time (t+2). 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time (t+2). 'Value of Innovation' is the natural logarithm of one plus the average value of $patents_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of $patents_{(t+2)}$ with citations in the 90^{th} percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of $patents_{(t+2)}$ with citations in the 95^{th} percentile of the technology-class-year citations distribution. '75^{th} Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75^{th} percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. '$CAPX_{(t)}$' is the firm's capital expenditures scaled by $assets_{(t-1)}$. '$Dividend_{(t)}$' is the total dividend scaled by $asset_{(t-1)}$. '$RD_{(t+1)}/Asset_{(t)}$' is the R&D $expenditures_{(t+1)}$ scaled by $assets_{(t)}$. '$CAPX_{(t+1)}/Asset_{(t)}$' is the value of capital $expenditures_{(t+1)}$ scaled by $assets_{(t)}$. '$Dividend\ Payer_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day (-1,1) cumulative abnormal return calculated using the market model. Standard errors are clustered at the firm-level for the t-test. Panel A reports summary statistics of non-compliant and compliant firms. Panel B reports summary statistics of the dependent variables in the pre-regulatory period. Panel C reports Pearson correlation coefficients of the components of CEO power in non-compliant firms.

Panel A: Summary Statistics							
	Non-compliant Firm Sample			**Compliant Firm Sample**			**t-test**
Variables	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	
Firm Characteristics							
Firm Size	7.119	6.967	1.557	7.368	7.282	1.578	-2.74**
Firm Age	24.108	20.000	17.885	28.929	24.000	21.707	-3.93***
Profitability	0.040	0.055	0.117	0.039	0.054	0.113	0.33
Leverage	0.181	0.150	0.196	0.192	0.173	0.173	-1.31
Tobin's Q	0.592	0.497	0.515	0.589	0.491	0.502	0.11
$R\&D_{(t)}$	0.040	0.000	0.099	0.045	0.014	0.087	-1.14
$CAPX_{(t)}$	0.069	0.048	0.074	0.065	0.047	0.069	1.60
$Dividend_{(t)}$	0.013	0.003	0.046	0.014	0.006	0.031	-0.78
CAR	0.003	0.002	0.064	0.001	0.00	0.058	-1.24
Measures of Innovation							
Patents	0.945	0.000	1.538	1.366	0.000	1.770	-4.14***
Citations	1.385	0.000	2.259	1.937	0.000	2.555	-4.08***
Value of Innovation	1.498	0.000	2.500	2.205	0.000	2.862	-4.72***
Radical_90	0.151	0.000	0.625	0.175	0.000	0.639	-0.69
Radical_95	0.111	0.000	0.510	0.130	0.000	0.516	-0.67
75^{th} Percentile Return	0.599	0.693	0.712	0.529	0.000	0.674	1.32
Product Announcement Return	0.097	0.037	0.153	0.083	0.030	0.139	1.12
Measures of CEO Power							
Founder CEO	0.224	0.000	0.417	0.129	0.000	0.336	4.73***

CEO-Chair	0.607	1.000	0.488	0.649	1.000	0.477	-2.07**
Title Concentration	0.233	0.000	0.423	0.275	0.000	0.446	-2.38**
CEO Tenure	9.494	7.000	8.794	7.866	6.000	6.977	4.39***
CEO Ownership	0.037	0.005	0.075	0.017	0.003	0.045	6.58***
CEO Power	2.076	2.000	1.438	1.940	2.000	1.326	2.38**

Panel B: Summary Statistics of Dependent Variables in the Pre-regulation Period

	Non-compliant Firm Sample			Compliant Firm Sample			t-test
Variables	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	
$RD_{(t+1)}/Asset_{(t)}$	0.039	0.000	0.071	0.045	0.013	0.073	-1.53
Patents	1.117	0.000	1.622	1.619	1.099	1.855	-4.15***
Citations	1.935	0.000	2.587	2.721	2.197	2.852	-4.25***
Value of Innovation	1.834	0.000	2.693	2.716	1.709	3.042	-4.78***
Radical_90	0.175	0.000	0.684	0.201	0.000	0.683	-0.59
Radical_95	0.131	0.000	0.560	0.151	0.000	0.559	-0.58
75^{th} Percentile Return	0.671	0.693	0.736	0.593	0.693	0.706	1.34
Product Announcement Return	0.110	0.045	0.166	0.094	0.036	0.154	1.13
$CAPX_{(t+1)}/Asset_{(t)}$	0.081	0.060	0.075	0.077	0.059	0.068	1.30
$Dividend\ Payer_{(t+1)}$	0.501	1.000	0.500	0.583	1.000	0.493	-2.70**
CAR	0.005	0.002	0.074	-0.000	0.000	0.066	1.41

Panel C: Correlation Metrics of the Components of Powerful CEO Index in Non-compliant Firms

Variables	**Founder CEO**	**CEO-Chair Duality**	**Title Concentration**	**CEO Tenure above the Industry Median**	**CEO Ownership above the Industry Median**	**CEO Power**
Founder CEO	1					
CEO-Chair duality	0.160* (0.000)	1				
Title Concentration	0.011 (0.316)	0.444* (0.000)	1			
CEO Tenure above the Industry Median	0.307* (0.000)	0.279* (0.000)	0.086* (0.000)	1		
CEO Ownership above the Industry Median	0.345* (0.000)	0.166* (0.000)	0.051* (0.000)	0.353* (0.000)	1	
CEO Power	0.574* (0.000)	0.671* (0.000)	0.495* (0.000)	0.679* (0.000)	0.642* (0.000)	1

Graph 1: Distribution of Powerful CEOs

Figure 1 represents the timing of changes in the powerful CEO index around the changes in regulations. The sample consists of publicly traded, non-regulated firms with available data from Execucomp. The CEO power index includes five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. Standard errors are clustered at the firm-level.

Figure 1: Timing of Changes in Powerful CEO Index around the Regulations

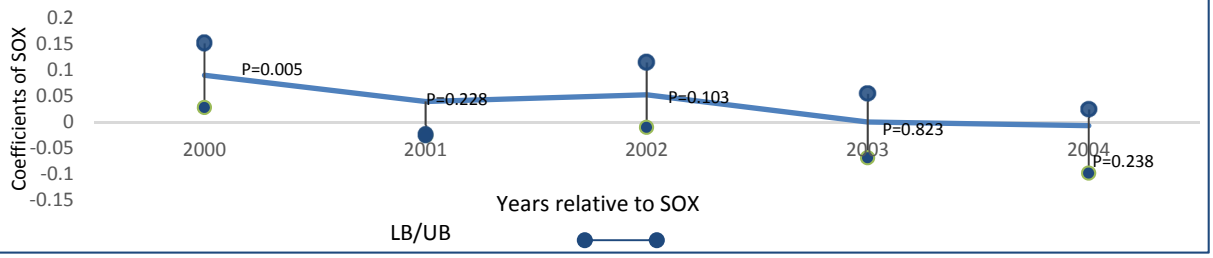

Table 2: Covariate Balance Test

This table reports the balance of covariates between treatment and control firms during the pre-regulatory period. The sample consists of publicly traded, non-regulated, non-compliant S&P1500 firms. The non-compliant firms are the firms without a fully independent audit committee or majority board independence before the year 2002. The CEO power index includes five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'Treatment Firms' are the non-compliant firms with positive value of powerful CEO index. 'Control Firms' are the non-compliant firms with powerful CEO index equals zero. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. Standard errors are clustered at the firm-level for t-test.

	Treatment Firms			Control Firms			t-test
Variables	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	
Firm Size	6.985	6.779	1.462	6.838	6.741	1.456	1.08
Firm Age	20.811	15.000	17.801	19.126	15.000	13.944	1.48
Profitability	0.036	0.052	0.125	0.037	0.050	0.127	-0.05
Leverage	0.197	0.169	0.189	0.195	0.164	0.195	0.08
Tobin's Q	0.647	0.528	0.603	0.674	0.535	0.628	-0.41

Table 3: Powerful CEOs and R&D Investment

*This table represents the results of the impact of improved governance on the R&D investments of non-compliant firms with powerful CEOs. The sample consists of publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2011. 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. 'R&D$_{(t)}$' is the value of R&D expenditures$_{(t)}$ scaled by assets$_{(t-1)}$. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent Variable	**[RD$_{(t+1)}$/Asset$_{(t)}$] x 100**			
Models	**(1)**	**(2)**	**(3)**	**(4)**
SOX x CEO Power	0.217***	0.157***	0.172***	0.131**
	[0.005]	[0.008]	[0.004]	[0.014]
CEO Power	-0.153**	-0.134***	-0.143***	-0.141***
	[0.034]	[0.009]	[0.006]	[0.004]
SOX	-0.280	-0.138		
	[0.180]	[0.427]		
Firm Size	-1.310***	-0.974***	-1.052***	-0.322***
	[0.000]	[0.000]	[0.000]	[0.000]
Firm Age	0.044**	0.049***	0.014**	0.009**
	[0.023]	[0.002]	[0.019]	[0.048]
Profitability	-0.423	-1.528*	-1.469*	-4.027***
	[0.685]	[0.066]	[0.077]	[0.000]
Leverage	-0.286	-0.619*	-0.634*	-0.375
	[0.714]	[0.097]	[0.096]	[0.349]
Tobin's Q	0.676***	0.567***	0.580***	1.162***
	[0.005]	[0.003]	[0.003]	[0.000]
R&D$_{(t)}$		33.054***	32.917***	57.729***
		[0.000]	[0.000]	[0.000]
Firm FE	Y	Y	Y	N
Year FE	N	N	Y	Y
Industry FE	N	N	N	Y
Observations	7,128	7,128	7,128	7,128
R-squared	0.848	0.858	0.859	0.771

Table 4: Powerful CEOs and Innovation

*This table represents results of examining the effect of improved governance on the innovation of non-compliant firms with powerful CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2008. The dependent variables of panel A are 'Patents' and 'Citations'. The dependent variables of panel B are 'Value of Innovation', 'Radical_90' and 'Radical_95'. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time$_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time$_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. 'R&D$_{(t)}$' is the value of R&D expenditures$_{(t)}$ scaled by assets$_{(t-1)}$. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Panel A:

Dependent Variables	**Patents**				**Citations**			
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
SOX x CEO Power	0.077***	0.077***	0.046**	0.053**	0.137***	0.139***	0.093**	0.117***
	[0.002]	[0.001]	[0.048]	[0.037]	[0.002]	[0.002]	[0.032]	[0.004]
CEO Power	-0.036**	-0.036**	-0.027	-0.044*	-0.048	-0.047	-0.035	-0.082**
	[0.028]	[0.029]	[0.117]	[0.062]	[0.131]	[0.137]	[0.261]	[0.032]
SOX	-0.418***	-0.418***			-1.117***	-1.115***		
	[0.000]	[0.000]			[0.000]	[0.000]		
Firm Size	0.122**	0.128**	0.222***	0.375***	-0.012	0.008	0.243***	0.367***
	[0.035]	[0.026]	[0.000]	[0.000]	[0.906]	[0.932]	[0.005]	[0.000]
Firm Age	-0.039***	-0.039***	0.000	0.001	-0.051**	-0.052**	0.013**	0.004
	[0.007]	[0.007]	[0.959]	[0.716]	[0.033]	[0.033]	[0.026]	[0.319]
Profitability	-0.808**	-0.780**	-0.151	-0.737*	-0.375	-0.285	-0.205	-0.887*
	[0.011]	[0.014]	[0.608]	[0.052]	[0.426]	[0.544]	[0.651]	[0.081]
Leverage	0.217	0.226	-0.119	-0.487**	-0.029	0.001	-0.193	-0.711***
	[0.220]	[0.202]	[0.486]	[0.015]	[0.921]	[0.996]	[0.489]	[0.008]
Tobin's Q	0.207***	0.194***	0.012	0.354***	0.183*	0.141	0.096	0.460***
	[0.001]	[0.002]	[0.848]	[0.000]	[0.068]	[0.168]	[0.350]	[0.000]
R&D$_{(t)}$		0.606***	0.804***	2.496***		1.943***	2.052***	3.552***
		[0.006]	[0.000]	[0.000]		[0.001]	[0.000]	[0.000]
Firm FE	Y	Y	Y	N	Y	Y	Y	N
Year FE	N	N	Y	Y	N	N	Y	Y

Industry FE	N	N	N	Y	N	N	N	Y
Observations	5,472	5,472	5,472	5,472	5,472	5,472	5,472	5,472
R-squared	0.798	0.799	0.827	0.648	0.733	0.735	0.757	0.618

Panel B

Dependent Variables	**Value of Innovation**				**Radical_90**		**Radical_95**	
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
SOX x CEO Power	0.134***	0.134***	0.079**	0.078*	0.020**	0.020**	0.018**	0.018**
	[0.000]	[0.000]	[0.026]	[0.086]	[0.042]	[0.042]	[0.037]	[0.037]
CEO Power	-0.024	-0.023	-0.005	-0.029	-0.007	-0.006	-0.006	-0.006
	[0.361]	[0.400]	[0.854]	[0.491]	[0.391]	[0.407]	[0.364]	[0.375]
SOX	-0.575***	-0.569***			-0.077***	-0.077***	-0.065**	-0.065**
	[0.000]	[0.000]			[0.007]	[0.008]	[0.010]	[0.011]
Firm Size	0.057	0.070	0.108	0.600***	0.031*	0.033*	0.021	0.022*
	[0.478]	[0.381]	[0.109]	[0.000]	[0.079]	[0.065]	[0.106]	[0.090]
Firm Age	-0.067***	-0.067***	-0.014**	0.003	-0.007***	-0.007***	-0.005**	-0.005**
	[0.001]	[0.001]	[0.011]	[0.531]	[0.010]	[0.009]	[0.019]	[0.019]
Profitability	-0.987**	-0.925**	-0.298	-0.536	-0.331***	-0.324***	-0.251***	-0.246**
	[0.024]	[0.033]	[0.478]	[0.310]	[0.005]	[0.006]	[0.009]	[0.011]
Leverage	0.076	0.097	-0.305	-0.539**	0.003	0.005	0.019	0.020
	[0.769]	[0.707]	[0.221]	[0.031]	[0.963]	[0.933]	[0.727]	[0.705]
Tobin's Q	0.434***	0.398***	0.219***	0.912***	0.091***	0.087***	0.064***	0.061**
	[0.000]	[0.000]	[0.007]	[0.000]	[0.002]	[0.003]	[0.009]	[0.011]
$R\&D_{(t)}$		1.615***	1.801***	3.723***		0.181		0.123
		[0.000]	[0.000]	[0.000]		[0.147]		[0.280]
Firm FE	Y	Y	Y	N	Y	Y	Y	Y
Year FE	N	N	Y	Y	N	N	N	N
Industry FE	N	N	N	Y	N	N	N	N
Observations	5,472	5,472	5,472	5,472	5,472	5,472	5,472	5,472
R-squared	0.781	0.782	0.803	0.655	0.745	0.745	0.729	0.729

Table 5: Powerful CEO and Product Market Reaction

*This table represents the results of examining the effect of better governance on the powerful CEO managed non-compliant firm's value creation through product announcements. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2006. The dependent variables are '75th Percentile Return' and 'Product Announcement Return'. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. 'R&D$_{(t)}$' is the value of R&D expenditures$_{(t)}$ scaled by assets$_{(t-1)}$. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**75th Percentile Return**		**Product Announcement Return**	
Model	**(1)**	**(2)**	**(3)**	**(4)**
SOX x CEO Power	0.061***	0.046**	0.011**	0.009**
	[0.009]	[0.040]	[0.022]	[0.049]
CEO Power	-0.034**	-0.021	-0.007*	-0.005
	[0.047]	[0.161]	[0.067]	[0.151]
SOX	-0.460***		-0.088***	
	[0.000]		[0.000]	
Firm Size	0.110**	0.016	0.022*	0.006
	[0.022]	[0.725]	[0.058]	[0.593]
Firm Age	0.020*	0.006***	0.005*	0.001**
	[0.050]	[0.000]	[0.076]	[0.020]
Profitability	-0.952***	-0.810***	-0.257***	-0.212***
	[0.000]	[0.002]	[0.000]	[0.001]
Leverage	0.228	0.010	0.039	-0.003
	[0.164]	[0.951]	[0.123]	[0.891]
Tobin's Q	0.076	0.077	0.010	0.010
	[0.170]	[0.151]	[0.362]	[0.372]
R&D$_{(t)}$	1.013**	0.984**	0.213*	0.195*
	[0.024]	[0.024]	[0.075]	[0.083]
Firm FE	Y	Y	Y	Y
Year FE	N	Y	N	Y
Observations	1,762	1,762	1,762	1,762
R-squared	0.615	0.651	0.687	0.718

Table 6: Powerful CEO, Capital Expenditures, and Dividend

*This table represents results of examining the effect of improved governance on the capital expenditures and dividend payout policy of the non-compliant firms with powerful CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2011. The dependent variables are 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' and 'Dividend Payer$_{(t+1)}$'. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the firm's capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends at the period$_{(t+1)}$, zero otherwise. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. 'Models (1)-(6) include OLS regressions. Model (7) includes logit regression. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100**			**Dividend Payer$_{(t+1)}$**			
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
SOX x CEO Power	-0.226**	-0.201**	-0.189**	0.036***	0.036***	0.022*	0.202**
	[0.022]	[0.043]	[0.030]	[0.001]	[0.001]	[0.085]	[0.046]
CEO Power	0.188**	0.159*	0.110	-0.017**	-0.018***	-0.011	-0.114
	[0.026]	[0.063]	[0.147]	[0.016]	[0.008]	[0.210]	[0.119]
SOX	0.445			-0.057*			
	[0.108]			[0.058]			
Firm Size	-1.351***	-1.129***	-0.281***	0.063***	0.098***	0.064***	0.484***
	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Firm Age	-0.049*	0.007	-0.004	-0.003	0.005	0.004**	0.022**
	[0.069]	[0.695]	[0.446]	[0.338]	[0.192]	[0.011]	[0.024]
Profitability	2.454***	1.956***	2.243***	0.257***	0.213***	0.415***	6.872***
	[0.000]	[0.000]	[0.000]	[0.001]	[0.006]	[0.000]	[0.000]
Leverage	-6.302***	-5.854***	-1.890***	-0.115**	-0.105**	-0.139**	-1.310**
	[0.000]	[0.000]	[0.010]	[0.017]	[0.022]	[0.023]	[0.010]
Tobin's Q	2.382***	2.411***	1.898***	0.008	0.008	0.023	-0.150
	[0.000]	[0.000]	[0.000]	[0.653]	[0.662]	[0.375]	[0.545]
Firm FE	Y	Y	N	Y	Y	N	N
Year FE	N	Y	Y	N	Y	Y	Y
Industry FE	N	N	Y	N	N	Y	Y
Observations	7,184	7,184	7,184	7,122	7,122	7,122	5,529
R-squared	0.699	0.704	0.658	0.770	0.777	0.520	

Table 7: Powerful CEO and M&A

*This table represents the estimates of the effect of better governance on the market reaction to the announcement of M&A deals by the non-compliant firms with powerful CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2011. The dependent variable is 'CAR' which is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline controls. Models (4)-(6) additionally control for deal features. 'Relative Deal Size' is the transaction value over acquirer's market capitalization on 11 days before the announcement date. 'Friendly Deal' is an indicator equals one if the deal is friendly, zero otherwise. 'Subsidiary Target' is an indicator equals one if the target company is a subsidiary company, zero otherwise. 'Public Target' is an indicator equals one if the target company is a public company, zero otherwise. 'All Cash Deal' is an indicator equals one if the deal is fully cash financed. 'Stock Deal' is an indicator equals one if the acquirer pays a positive fraction of the transaction value using stocks. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**CAR**					
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SOX x CEO Power	0.006**	0.006**	0.004**	0.005**	0.005**	0.005**
	[0.019]	[0.023]	[0.042]	[0.034]	[0.034]	[0.047]
CEO Power	-0.004	-0.003	-0.002	-0.003	-0.004	-0.002
	[0.117]	[0.173]	[0.246]	[0.137]	[0.109]	[0.238]
SOX	0.000			-0.003		
	[0.997]			[0.685]		
Firm Size	-0.013***	-0.010**	-0.002	-0.012**	-0.011**	-0.003
	[0.007]	[0.020]	[0.206]	[0.011]	[0.046]	[0.201]
Firm Age	-0.000	0.000	0.000	-0.000	-0.000	0.000
	[0.637]	[0.852]	[0.575]	[0.635]	[0.226]	[0.172]
Profitability	-0.002	-0.004	-0.016	-0.024	-0.032	-0.013
	[0.944]	[0.628]	[0.496]	[0.484]	[0.389]	[0.541]
Leverage	0.065***	0.083**	0.021	0.063**	0.066***	0.022
	[0.008]	[0.013]	[0.192]	[0.010]	[0.007]	[0.257]
Tobin's Q	0.008	0.013**	0.007	0.009	0.010	0.006
	[0.342]	[0.043]	[0.264]	[0.236]	[0.208]	[0.329]
Relative Deal Size				-0.019	-0.019	-0.019
				[0.111]	[0.119]	[0.104]
Friendly Target				-0.013	-0.012	-0.018
				[0.521]	[0.526]	[0.379]
Subsidiary Target				-0.008**	-0.009**	-0.008*
				[0.037]	[0.024]	[0.053]
Public Target				-0.024***	-0.024***	-0.027***
				[0.000]	[0.000]	[0.000]
All Cash Deal				0.012***	0.013***	0.011***
				[0.002]	[0.002]	[0.004]
Stock Deal				-0.005	-0.005	0.001
				[0.376]	[0.414]	[0.822]
Firm FE	Y	Y	N	Y	Y	N
Year FE	N	Y	Y	N	Y	Y
Industry FE	N	N	Y	N	N	Y
Observations	1,706	1,706	1,706	1,706	1,706	1,706
R-squared	0.255	0.260	0.059	0.289	0.300	0.172

Table 8: Powerful CEOs and Overconfident CEOs

*This table represents the results of examining the effect of better governance on the non-compliant firms with powerful CEOs after controlling CEO's overconfidence. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. Models (1), (9), (10), and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Holder67' is an indicator equals one if the average vested option of the CEO is at least 67% in the money on at least two occasions, otherwise zero. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical_ 90**	**Radical_ 95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power	0.187**	0.069***	0.141***	0.093***	0.016*	0.018**	0.065***	0.012**	-0.221**	0.034***	0.005**
	[0.023]	[0.003]	[0.001]	[0.002]	[0.061]	[0.041]	[0.008]	[0.022]	[0.025]	[0.002]	[0.039]
CEO Power	-0.183***	-0.034**	-0.052	-0.016	-0.005	-0.006	-0.036**	-0.007	0.174**	-0.016**	-0.002
	[0.009]	[0.030]	[0.101]	[0.466]	[0.587]	[0.381]	[0.039]	[0.108]	[0.043]	[0.028]	[0.390]
SOX	-0.224	-0.368***	-1.089***	-0.412***	-0.062**	-0.061**	-0.473***	-0.099***	0.449	-0.052*	-0.006
	[0.301]	[0.000]	[0.000]	[0.000]	[0.021]	[0.013]	[0.000]	[0.000]	[0.103]	[0.060]	[0.425]
Holder67	0.267	-0.057	-0.219	0.020	-0.025	-0.022	0.081	0.010	0.051	-0.030	0.008
	[0.141]	[0.464]	[0.130]	[0.839]	[0.535]	[0.450]	[0.252]	[0.377]	[0.844]	[0.173]	[0.224]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	6,658	5,301	5,301	5,301	5,301	5,301	1,718	1,718	6,761	6,702	1,630
R-squared	0.853	0.789	0.738	0.738	0.745	0.728	0.619	0.724	0.699	0.780	0.286

Table 9: High vs Less Powerful CEOs

*This table represents the results of examining the effect of better governance on the non-compliant firms with highly powerful CEOs and less powerful CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. Models (1), (9), (10), and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. Panel A includes 'CEO Power Top Q' which is an indicator equals one if CEOs belong to the top 25% of the CEO power index distribution. Panel B includes 'CEO Power Bottom Q' which is an indicator equals one if CEOs belong to the bottom 25% of the CEO power index distribution. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Panel A: Highly Powerful CEOs

Dependent variables	[RD(t+1)/ Asset(t)] x 100	Patents	Citations	Value of Innovation	Radical_ 90	Radical_ 95	75th Percentile Return	Product Announcement Return	[CAPX(t+1)/ Asset(t)] x 100	Dividend Payer$_{(t+1)}$	CAR
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power Top Q	0.446**	0.163**	0.297**	0.236**	0.055*	0.052**	0.143*	0.027*	-0.575**	0.101***	0.019**
	[0.025]	[0.026]	[0.033]	[0.043]	[0.056]	[0.038]	[0.052]	[0.062]	[0.041]	[0.002]	[0.048]
CEO Power Top Q	-0.118	-0.097**	-0.151	-0.026	-0.007	-0.010	-0.033	-0.009	0.402	-0.027	-0.007
	[0.423]	[0.047]	[0.141]	[0.744]	[0.712]	[0.546]	[0.516]	[0.414]	[0.109]	[0.220]	[0.323]
SOX	0.076	-0.305***	-0.960***	-0.723***	-0.090***	-0.071***	-0.395***	-0.079***	0.136	-0.013	0.006
	[0.571]	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.516]	[0.562]	[0.370]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	7,128	5,472	5,472	5,472	5,472	5,472	1,762	1,762	7,184	7,122	1,706
R-squared	0.872	0.798	0.745	0.781	0.745	0.729	0.615	0.687	0.699	0.770	0.288

Panel B: Less powerful CEOs

Dependent variables	[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100	Patents	Citations	Value of Innovation	Radica_9 0	Radica_ 95	75th Percentile Return	Product Announcement Return	[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100	Dividend Payer$_{(t+1)}$	CAR
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power Bottom Q	-0.415**	-0.065	-0.192	-0.189	0.014	0.004	-0.068	-0.022	0.461	-0.064***	-0.013
	[0.011]	[0.374]	[0.130]	[0.101]	[0.652]	[0.895]	[0.321]	[0.112]	[0.125]	[0.006]	[0.108]
CEO Power Bottom Q	0.392***	0.085*	0.126	0.046	-0.001	-0.000	0.023	0.015	-0.326	0.038**	0.010

	[0.003]	[0.054]	[0.122]	[0.451]	[0.967]	[0.977]	[0.618]	[0.144]	[0.164]	[0.010]	[0.120]
SOX	0.287**	-0.243***	-0.828***	-0.346***	-0.049**	-0.058***	-0.359***	-0.066***	-0.134	0.032	0.010
	[0.022]	[0.005]	[0.000]	[0.001]	[0.013]	[0.004]	[0.000]	[0.000]	[0.534]	[0.165]	[0.119]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	7,128	5,472	5,472	5,472	5,472	5,472	1,762	1,762	7,184	7,122	1,706
R-squared	0.873	0.798	0.745	0.781	0.745	0.729	0.615	0.687	0.699	0.770	0.287

Table 10: Powerful CEOs and Corporate Policies: Placebo Shock

*This table represents the results of the effect of a placebo shock on the firms with powerful CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms for 1992-2001. 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'Placebo shock' is an indicator that equals one if the observation occurs in 1996 or later but before 2002 and zero if the observation occurs before 1996. All models include baseline control variables and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical_90**	**Radical_95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Placebo Shock x CEO Power	0.172	0.021	0.061	0.023	-0.001	0.002	-0.052	-0.001	-0.041	0.012	-0.002
	[0.125]	[0.387]	[0.158]	[0.487]	[0.952]	[0.826]	[0.241]	[0.973]	[0.808]	[0.168]	[0.768]
CEO Power	-0.207*	-0.019	-0.028	-0.005	-0.002	-0.003	0.009	-0.001	0.051	-0.011	-0.006
	[0.075]	[0.477]	[0.544]	[0.884]	[0.859]	[0.712]	[0.827]	[0.920]	[0.773]	[0.182]	[0.279]
Placebo Shock	0.091	-0.100	-0.361***	-0.019	-0.035	-0.030	0.243**	0.023	-0.280	-0.076***	0.017
	[0.752]	[0.187]	[0.005]	[0.837]	[0.308]	[0.263]	[0.044]	[0.550]	[0.554]	[0.006]	[0.383]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	2,679	2,515	2,515	2,979	2,979	2,979	767	767	3,298	3,283	689
R-squared	0.897	0.929	0.881	0.864	0.905	0.901	0.673	0.780	0.740	0.777	0.373

Table 11: Powerful CEOs and Corporate Policies: After Excluding Firms Experiencing CEO Turnover around SOX

*This table represents the results of examining the effect of better governance on the non-compliant firms with powerful CEOs after excluding firms that experienced CEO turnovers during 2002-2003. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. Models (1), (9), (10), and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent Variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical_ 90**	**Radical_ 95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power	0.211***	0.074***	0.143***	0.130***	0.023**	0.020**	0.051**	0.012**	-0.259**	0.042***	0.005*
	[0.003]	[0.006]	[0.006]	[0.002]	[0.044]	[0.049]	[0.048]	[0.049]	[0.016]	[0.001]	[0.064]
CEO Power	-0.174***	-0.029	-0.026	-0.010	-0.011	-0.011	-0.039*	-0.008	0.186*	-0.020**	-0.003
	[0.001]	[0.111]	[0.493]	[0.743]	[0.199]	[0.152]	[0.059]	[0.109]	[0.056]	[0.015]	[0.264]
SOX	-0.280	-0.425***	-1.212***	-0.589***	-0.088***	-0.071**	-0.439***	-0.099***	0.540*	-0.060*	-0.001
	[0.189]	[0.000]	[0.000]	[0.000]	[0.008]	[0.017]	[0.000]	[0.000]	[0.078]	[0.075]	[0.918]
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,532	4,320	4,320	4,320	4,320	4,320	1,406	1,406	5,573	5,529	1,313
R-squared	0.871	0.796	0.745	0.787	0.763	0.743	0.633	0.735	0.712	0.776	0.301

Table 12: Alternative Sources of CEO Power and Concern for Omitted Variable Bias

*This table represents the results of the effect of better governance on the non-compliant firms with powerful CEOs after addressing other potential sources of CEO power and concern for omitted variables bias. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Only Insider' is an indicator equals one if the CEO is the only insider in the corporate board of the firm, zero otherwise. 'CPS' is the CEO pay slice- the percentage of the total compensation of the top five executives received by the CEO. 'Institutional holdings' is the proportional ownership of institutional investors. 'Dual Class' is an indicator equals one for firms with dual-class shares, zero otherwise. All models include baseline controls and firm fixed effects. Panel B also includes industry-year interacted joint fixed effects. Standard errors are clustered at the firm-level in panel A. Standard errors are clustered at the industry-year level in panel B. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Panel A: Alternative Sources of Executive Power and Governance Measures

Dependent variables	[RD(t+1)/ Asset(t)] x 100	Patents	Citations	Value of Innovation	Radical_ 90	Radical_ 95	75th Percentile Return	Product Announcement Return	[CAPX(t+1)/ Asset(t)] x 100	Dividend Payer$_{(t+1)}$	CAR
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power	0.211**	0.043*	0.097**	0.126***	0.021*	0.016*	0.049*	0.009*	-0.264***	0.032***	0.008*
	[0.011]	[0.054]	[0.029]	[0.001]	[0.066]	[0.090]	[0.071]	[0.095]	[0.006]	[0.006]	[0.083]
CEO Power	-0.187**	-0.033	-0.052	-0.072**	-0.011	-0.005	-0.036	-0.005	0.204**	-0.018**	-0.005
	[0.012]	[0.107]	[0.233]	[0.042]	[0.378]	[0.603]	[0.103]	[0.205]	[0.027]	[0.042]	[0.226]
SOX	-0.427*	0.069	-0.406***	-0.096	-0.024	-0.020	-0.363***	-0.076***	0.788***	-0.026	-0.008
	[0.062]	[0.371]	[0.006]	[0.510]	[0.476]	[0.454]	[0.000]	[0.000]	[0.001]	[0.293]	[0.529]
Only Insider	-0.082	0.136***	0.117	0.304***	0.058	0.046	-0.078*	-0.021**	-0.215	-0.007	-0.006
	[0.415]	[0.010]	[0.144]	[0.001]	[0.101]	[0.132]	[0.072]	[0.018]	[0.154]	[0.662]	[0.280]
CPS	-0.196	-0.051	0.025	0.052	0.058	0.007	-0.296*	-0.065*	-0.181	-0.022	-0.011
	[0.619]	[0.712]	[0.918]	[0.837]	[0.530]	[0.923]	[0.064]	[0.093]	[0.728]	[0.647]	[0.540]
Dual Class	-0.615	-0.073	-0.207	-0.029	-0.101	-0.095	0.244	0.026	-1.185**	-0.025	0.005
	[0.117]	[0.594]	[0.401]	[0.910]	[0.206]	[0.156]	[0.156]	[0.285]	[0.047]	[0.453]	[0.824]
Institutional Holdings	-0.769	-0.497**	-0.443	-0.384	-0.131	-0.083	-0.435**	-0.090***	0.674	0.044	0.006
	[0.136]	[0.010]	[0.227]	[0.268]	[0.176]	[0.287]	[0.016]	[0.007]	[0.328]	[0.417]	[0.856]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Observations	4,249	3,464	3,464	3,464	3,464	3,464	1,159	1,159	4,250	4,205	1,081
R-squared	0.896	0.804	0.755	0.783	0.725	0.705	0.686	0.758	0.726	0.823	0.303

Panel B: High Dimensional Fixed Effects

Dependent variables	**[RD(t+1)/ Asset(t)] x 100**	**Patents**	**Citations**	**Value of Innovation**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX(t+1)/ Asset(t)] x 100**	**Dividend Payer(t+1)**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
SOX x CEO Power	0.161***	0.028*	0.055**	0.050*	0.060***	0.016***	-0.240***	0.035***	0.006*
	[0.000]	[0.090]	[0.031]	[0.063]	[0.009]	[0.002]	[0.002]	[0.000]	[0.079]
CEO Power	-0.136***	-0.017	-0.019	0.022	-0.027	-0.006	0.182***	-0.015***	-0.002
	[0.003]	[0.161]	[0.332]	[0.240]	[0.146]	[0.134]	[0.005]	[0.000]	[0.568]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry x Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	6,998	5,211	5,211	5,211	1,344	1,344	7,067	7,003	1,443
R-squared	0.881	0.879	0.843	0.843	0.729	0.798	0.755	0.803	0.402

Table 13: Powerful CEOs and Corporate Policies: Generalized Triple-difference

*This table presents the regression estimates capturing the differential effects of improved governance on firm's corporate policies for powerful CEO managed non-compliant firms relative to powerful CEO managed compliant firms. Models include publicly traded, non-regulated S&P1500 firms. Models (1), (9), (10), and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. 'Non-compliant' is an indicator equals one for the firms which did not have the fully independent audit committee or majority board independence before 2002. All models include baseline control variables, firm fixed effects, and interactions between year fixed effects and 'CEO Power'. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical _90**	**Radical_ 95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x Non-compliant x CEO Power	0.228***	0.093***	0.309***	0.168***	0.025**	0.023**	0.088***	0.016**	-0.272**	0.022*	0.006*
	[0.008]	[0.002]	[0.000]	[0.001]	[0.042]	[0.030]	[0.003]	[0.012]	[0.042]	[0.078]	[0.088]
Non-compliant x CEO Power	-0.178**	-0.055***	-0.110***	-0.080**	-0.019*	-0.017*	-0.042*	-0.007	0.206*	-0.008	-0.002
	[0.026]	[0.007]	[0.009]	[0.013]	[0.059]	[0.054]	[0.052]	[0.179]	[0.074]	[0.352]	[0.615]
SOX x Non-compliant	-0.090	-0.149*	-0.492***	-0.214	-0.057*	-0.049*	-0.212***	-0.043***	0.572*	-0.039	-0.013
	[0.687]	[0.082]	[0.008]	[0.104]	[0.075]	[0.075]	[0.001]	[0.004]	[0.061]	[0.151]	[0.125]
CEO Power x Year	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	14,987	11,883	11,883	11,883	11,883	11,883	3,992	3,992	14,896	14,782	3,638
R-squared	0.850	0.838	0.772	0.824	0.760	0.740	0.609	0.682	0.674	0.790	0.292

9 Appendix

The appendix contains the variable definitions and additional robustness tests. A summary is as follows:

- TA1: This table estimates the impact of better governance on the innovation of powerful CEO managed *non-compliant firms* at time$_{(t+1)}$.
- TA2: This table estimates the effect of better governance on the market reaction to the announcement of M&A deals by the *non-compliant firms* with powerful CEOs using a 4-day event window.
- TA3: This table estimates the impact of better governance on powerful CEO managed *non-compliant firms* after excluding highly overconfident CEOs.
- TA4: This table contains results for the shorter event window (1997-2006).
- TA5: This table excludes dual-class firms from the sample.
- TA6: This table reports covariate balance test between treatment firms (*non-compliant firms*) and control firms (other firms).
- TA7: This table contains the variable definitions.

Appendix TA1: Robustness Test on Firm's Innovation$_{(t+1)}$

*This table represents results of examining the effect of better governance on the innovation of the firms with powerful CEOs at the time$_{(t+1)}$. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2008. The dependent variables are 'Patents', 'Citations', 'Value of Innovation', 'Radical_90' and 'Radical_95'. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time$_{(t+1)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time$_{(t+1)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+1)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+1)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents$_{(t+1)}$ with citations in the 95th percentile of the technology-class-year citations distribution. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline control variables and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**Patents**	**Citations**	**Value of Innovation**	**Radical_90**	**Radical_95**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
SOX x CEO Power	0.044**	0.125***	0.070**	0.013*	0.015**
	[0.036]	[0.003]	[0.025]	[0.081]	[0.016]
CEO Power	-0.026*	-0.037	-0.002	-0.008	-0.010**
	[0.089]	[0.225]	[0.941]	[0.177]	[0.038]
SOX	-0.241***	-0.991***	-0.373***	-0.044**	-0.052***
	[0.002]	[0.000]	[0.001]	[0.032]	[0.003]
Baseline Controls	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
Observations	5,609	5,609	5,609	5,609	5,609
R-squared	0.855	0.782	0.830	0.7835	0.7677

Appendix TA2: Robustness Test on M&A Deals

*This table represents the estimates of the effect of better governance on the market reaction to the announcement of M&A deals by the firms with powerful CEOs for four-day event window. Models include publicly traded, non-regulated, non-compliant S&P1500 firms from 1992 to 2011. The dependent variable is 'CAR' which is four-day (-1,2) cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline controls. Models (4)-(6) additionally control deal features. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**CAR**					
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SOX x CEO Power	0.008***	0.007**	0.004*	0.007**	0.007**	0.005*
	[0.007]	[0.014]	[0.088]	[0.012]	[0.014]	[0.094]
CEO Power	-0.006**	-0.004	-0.002	-0.006**	-0.005*	-0.002
	[0.029]	[0.114]	[0.345]	[0.031]	[0.051]	[0.344]
SOX	-0.004			-0.007		
	[0.686]			[0.441]		
Baseline Controls	Y	Y	Y	Y	Y	Y
Deal Features	N	N	N	Y	Y	Y
Firm FE	Y	Y	N	Y	Y	N
Year FE	N	Y	Y	N	Y	Y
Industry FE	N	N	Y	N	N	Y
Observations	1,706	1,706	1,706	1,706	1,706	1,706
R-squared	0.254	0.271	0.057	0.287	0.306	0.169

Appendix TA3: Powerful CEOs, and Corporate Policies: After Excluding Highly Overconfident CEOs

*This table represents results for examining the effect of better governance on the firms with powerful CEOs after excluding highly overconfident CEOs. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. Models (1), (9), (10), and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time$_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time$_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. Confidence measures how in the money the CEO's stock option is (Malmendier et al., 2011). All models exclude highly overconfident CEOs-CEOs holding at least 95% in the money average vested option. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical_ 90**	**Radical_ 95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power	0.205**	0.085***	0.171***	0.147***	0.026**	0.025**	0.043*	0.010*	-0.176*	0.035***	0.006*
	[0.022]	[0.002]	[0.000]	[0.000]	[0.037]	[0.022]	[0.076]	[0.068]	[0.084]	[0.002]	[0.098]
CEO Power	-0.128	-0.034*	-0.038	-0.012	-0.004	-0.005	-0.020	-0.004	0.153*	-0.014*	-0.002
	[0.121]	[0.083]	[0.302]	[0.679]	[0.622]	[0.531]	[0.296]	[0.348]	[0.066]	[0.052]	[0.466]
SOX	-0.262	-0.404***	-1.193***	-0.585***	-0.077**	-0.069**	-0.405***	-0.077***	0.167	-0.071**	0.002
	[0.246]	[0.000]	[0.000]	[0.000]	[0.028]	[0.023]	[0.000]	[0.000]	[0.561]	[0.012]	[0.888]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,642	4,384	4,384	4,384	4,384	4,384	1,372	1,372	5,657	5,606	1,371
R-squared	0.861	0.798	0.746	0.782	0.744	0.728	0.590	0.689	0.702	0.800	0.295

Appendix TA4: Powerful CEOs and Corporate Policies: Using Shorter Event Window

*This table represents results of examining the effect of better governance on the firms with powerful CEOs during 1997-2006. Models include publicly traded, non-regulated, non-compliant S&P1500 firms. 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time$_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time$_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. p-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Patents**	**Citations**	**Value of Innovation**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX$_{(t+1)}$/ Asset$_{(t)}$] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
SOX x CEO Power	0.201***	0.037*	0.120***	0.083**	0.066***	0.010**	-0.162*	0.031***	0.006**
	[0.001]	[0.064]	[0.004]	[0.011]	[0.006]	[0.032]	[0.079]	[0.005]	[0.045]
CEO Power	-0.155**	-0.020	-0.043	-0.035	-0.033*	-0.005	0.134*	-0.014**	-0.006**
	[0.014]	[0.230]	[0.204]	[0.209]	[0.065]	[0.235]	[0.099]	[0.040]	[0.047]
SOX	-0.305	-0.316***	-1.066***	-0.524***	-0.356***	-0.060***	0.965***	-0.022	-0.002
	[0.123]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.445]	[0.888]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	4,094	3,781	3,781	3,781	1,547	1,547	4,356	4,311	1,085
R-squared	0.883	0.917	0.841	0.886	0.647	0.748	0.729	0.820	0.345

Appendix TA5: Powerful CEOs, and Corporate Policies: After Excluding Dual Class Firms

*This table represents results of examining the effect of better governance on the firms with powerful CEOs after excluding firms with the dual-class structure. Models include publicly traded, non-regulated, non-compliant, non-dual class S&P1500 firms. Models (1), (9), (10) and (11) include analyses during 1992-2011. Models (2)-(6) include analyses for the available information on innovation from Kogan et al. (2017) during 1992-2008. Models (7)-(8) include analyses during 1992-2006 with available data on the market reaction to a new product announcement from Mukherjee et al. (2017). 'RD$_{(t+1)}$/Asset$_{(t)}$] x 100' is the R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Patents' are the natural logarithm of one plus number of patents applied by the firms at the time $_{(t+2)}$. 'Citations' are the natural logarithm of one plus number of citations attributed to the firms' patents at the time $_{(t+2)}$. 'Value of Innovation' is the natural logarithm of one plus the average value of patents$_{(t+2)}$. 'Radical_90' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. 'Radical_95' is the natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. '75th Percentile Return' is the natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. 'Product Announcement Return' is the natural logarithm of the sum of all positive cumulative abnormal returns over the year. 'CAPX$_{(t+1)}$/Asset$_{(t)}$] x 100' is the value of capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. 'Dividend Payer$_{(t+1)}$' is an indicator equals one if the firm pays dividends, zero otherwise. 'CAR' is the three-day cumulative abnormal return calculated using the market model. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median' and thus the index value ranges from 0 to 5. 'SOX' is an indicator that equals one if the observation occurs in 2002 or later and zero otherwise. All models include baseline controls and firm fixed effects. Standard errors are clustered at the firm-level. P-values are in parentheses. Significance levels: *=10%; **=5%; ***=1%.*

Dependent variables	**[RD(t+1)/ Asset(t)] x 100**	**Patents**	**Citations**	**Value of Innovation**	**Radical_ 90**	**Radical_ 95**	**75th Percentile Return**	**Product Announcement Return**	**[CAPX(t+1)/ Asset(t)] x 100**	**Dividend Payer$_{(t+1)}$**	**CAR**
Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
SOX x CEO Power	0.173**	0.049*	0.111**	0.093**	0.023*	0.022*	0.055**	0.009*	-0.187*	0.030**	0.007
	[0.013]	[0.093]	[0.032]	[0.049]	[0.086]	[0.068]	[0.049]	[0.095]	[0.091]	[0.011]	[0.104]
CEO Power	-0.131**	-0.039*	-0.048	-0.008	-0.013	-0.010	-0.032	-0.004	0.126	-0.011	-0.006*
	[0.039]	[0.076]	[0.259]	[0.827]	[0.227]	[0.286]	[0.118]	[0.313]	[0.189]	[0.152]	[0.076]
SOX	-0.281	-0.144	-0.735***	-0.335	-0.077*	-0.066*	-0.359***	-0.078***	0.379	-0.045	-0.013
	[0.203]	[0.271]	[0.005]	[0.108]	[0.072]	[0.074]	[0.000]	[0.000]	[0.221]	[0.200]	[0.290]
Baseline Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	4,826	3,820	3,820	3,820	3,820	3,820	1,300	1,300	4,716	4,813	1,191
R-squared	0.888	0.832	0.795	0.807	0.768	0.750	0.615	0.741	0.734	0.799	0.289

Appendix TA6: Covariate Balance Test for Generalized Triple-difference

This table reports the balance of covariates between treatment and control firms during the pre-regulatory period. The sample consists of publicly traded, non-regulated firms that were available from Execucomp. The sample excludes missing data on CEO power components and firms with missing information of corporate board structure before the year 2002. The non-compliant firms are the firms without a fully independent audit committee or majority board independence before the year 2002. 'CEO Power' is an index: the sum of five indicators- 'Founder CEO', 'CEO-Chair Duality', 'Title Concentration', 'CEO Tenure above Industry Median' and 'CEO Ownership above Industry Median'

and thus the index value ranges from 0 to 5. Treatment firm sample includes the non-compliant firms. Control firm sample includes the other firms. 'Firm size' is the natural logarithm of the asset. 'Firm age' is the difference between the current year and the year of firm's incorporation. 'Profitability' is the earnings before interest and tax (EBIT) scaled by assets. 'Leverage' is the long-term debt scaled by assets$_{(t-1)}$. 'Tobin's Q' is the natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. Standard errors are clustered at the firm-level for t-test.

	Treatment Firms			Control Firms			t-test
Variables	**Mean**	**Median**	**SD**	**Mean**	**Median**	**SD**	
Firm Size	6.984	6.774	1.455	7.079	6.912	1.518	-1.08
Firm Age	21.028	15.000	17.951	23.970	17.000	20.290	-2.55**
Profitability	0.037	0.053	0.123	0.035	0.051	0.124	0.43
Leverage	0.196	0.166	0.189	0.203	0.181	0.187	-0.62
Tobin's Q	0.650	0.535	0.602	0.672	0.512	0.631	-0.66

Table TA7: Variable Definition

Powerful CEO Index	
Founder CEO	Indicator variable that equals one if any source explicitly mentions that the current CEO is one of the original founders of the firm or was the main executive at the time the company was founded. Source: hand-collected from several sources including 10-K filings of the SEC available through Electronic Data-Gathering, Analysis, and Retrieval (EDGAR), Funding Universe website, company websites, Wikipedia, Bloomberg website and other Internet sources.
CEO-Chair Duality	Indicator variable taking the value of one if the CEO is also the chairman of the firm and zero otherwise. Source: Execucomp.
Title Concentration	Indicator variable taking the value of one if the CEO, who is also the chairman of the firm, additionally holds any one, or more, other senior posts (titles), including COO, President, and CFO. Source: Execucomp.
CEO Tenure	CEO tenure in years. Source: Execucomp and hand-collected from several sources including 10-K filings of the SEC available through Electronic Data-Gathering, Analysis, and Retrieval (EDGAR), Funding Universe website, company websites, Wikipedia, Bloomberg website and other Internet sources.
CEO Tenure above the Industry Median	Indicator variable taking the value of one if the tenure is above the median tenure of CEOs in the industry-year distribution of tenure where the industry is defined using 2-digit SIC code, zero otherwise.
CEO Ownership	Percentage of share ownership held by CEOs. Source: Execucomp.
CEO Ownership above the Industry Median	Indicator variable taking the value of one if the ownership is above the median ownership of CEOs in the industry-year distribution of ownership where the industry is defined using 2-digit SIC code, zero otherwise.
CEO Power	An index which is an aggregate measure of the five components of CEO power-Founder CEO, CEO-Chair Duality, Title Concentration, CEO Tenure above Industry Median and CEO Ownership above Industry Median and thus the index value ranges from 0 to 5.
CEO Power Top Q	Indicator variable taking the value of one if the CEO power index is in the top 25% of the industry-year distribution, zero otherwise.
CEO Power Bottom Q	Indicator variable taking the value of one if the CEO power index is in the bottom 25% of the industry-year distribution, zero otherwise.
Firm Characteristics and Control Variables	
Firm Size	The natural logarithm of the book value of the total assets. Source: Compustat.
Firm Age	Firm's age since incorporation. Sources: CRSP.
Profitability	Earnings before interest and tax scaled by book value of a firm's total assets. Source: Compustat.
Leverage	Firms total debt in the year t scaled by book value of total assets in the year t-1. Source: Compustat.
Tobin's Q	The natural logarithm of the book value of debt plus the market value of equity scaled by the book value of assets. Source: Compustat.
$RD_{(t)}$	Research and development expenditures in the year t scaled by total assets in the year t-1. Sources: Compustat.
CPS	The percentage of the total compensation of the top five executives that goes to the CEO. Source: Execucomp.
Only Insider	An indicator equals one if CEO is the only insider on the board, zero otherwise. Source: ISS.
Dual Class	An indicator equals one for firms with dual-class shares, zero otherwise. Source: ISS.
Institutional Holdings	Proportional ownership of institutional investors. Source: Thomson 13f Institutional holdings.
SOX	The indicator that equals one if the observation occurs in 2002 or later, zero otherwise.
Placebo Shock	The indicator that equals one if the observation occurs during 1996-2000 and zero if the observation occurs before 1996.
Holder67	The indicator equals one if the average vested option of the CEO is at least 67% in the money on at least two occasions, zero otherwise. Source: Execucomp and CRSP (See, Malmendier et al., 2011).
Highly Overconfident CEOs	The indicator equals one if CEOs belong to the top 5% of the *Holder67* measure, zero otherwise. Source: Execucomp and CRSP.
Dependent Variables	
$RD_{(t+1)}/\ Asset_{(t)}$	R&D expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. Source: Compustat.

$CAPX_{(t+1)}$/ $Asset_{(t)}$	Capital expenditures$_{(t+1)}$ scaled by assets$_{(t)}$. Source: Compustat.
CAR	The three-day cumulative abnormal return (-1,1) calculated using the market model. Source: SDC platinum and CRSP.
Dividend Payer$_{(t+1)}$	The indicator equals one if firm pays dividends at the period (t+1), zero otherwise. Source: Compustat.
Patent	The natural logarithm of one plus number of patents applied by the firms at the time (t+2). Source: KPSS (2017).
Citations	The natural logarithm of one plus number of citations attributed to the firms' patents at the time (t+2). Source: KPSS (2017).
Patent Value	The natural logarithm of one plus the average value of patents$_{(t+2)}$. Source: KPSS (2017).
Radical_90	The natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 90th percentile of the technology-class-year citations distribution. Source: KPSS (2017).
Radical_95	The natural logarithm of one plus number of patents $_{(t+2)}$ with citations in the 95th percentile of the technology-class-year citations distribution. Source: KPSS (2017).
Product Announcement Return	The natural logarithm of the sum of all positive cumulative abnormal returns over the year. Source: Mukherjee et al. (2017).
75th Percentile Return	The natural logarithm of one plus the number of announcements with the cumulative abnormal returns above the 75th percentiles. Source: Mukherjee et al. (2017).
Deal Specific Features	
Relative Deal Size	The transaction value over acquirer's market capitalization on 11 days before the announcement date. Source: SDC platinum.
Friendly Deal	The indicator equals one if the deal is friendly, zero otherwise. Source: SDC platinum.
Subsidiary Target	The indicator equals one if the target company is a subsidiary company, zero otherwise. Source: SDC platinum.
Public Target	The indicator equals one if the target company is a public company, zero otherwise. Source: SDC platinum.
All Cash Deal	The indicator equals one if the deal is fully cash financed, zero otherwise. Source: SDC platinum.
Stock Deal	The indicator equals one if the acquirer pays a positive fraction of the transaction value using stocks, zero otherwise. Source: SDC platinum.