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Powerfully Independent Directors

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Abstract

In social psychology, *agentic behavior* connotes excessive obedience to a proximate authority, and is mitigated by a rival authority or peer voicing dissent. Corporate governance reformers advocate non-CEO chairs and independent directors, respectively, as potential rival authorities and dissenting peers – plausibly to mitigate excessive director loyalty to errant CEOs. Measuring director power by social network power centrality, elevated market valuation is linked to powerfully independent directors' constituting a majority of independent directors and, less robustly, to a powerful director serving as the non-CEO chair. Sudden deaths of powerfully independent directors significantly reduce shareholder value, consistent with independent director power "causing" shareholder value. Further empirical tests associate powerfully independent directors with fewer value-destroying M&A bids, more high-powered CEO compensation and accountability for poor performance, and less earnings manipulation. These results suggest that independent directors and non-CEO chairs can be effective if they have sufficient power to challenge the CEO.

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1. Introduction

CEOs need broad discretionary powers because they have unique insights that others, including public shareholders, do not have. Such discretion creates scope for *agency* problems – CEOs maximizing their private utility, rather than acting as shareholders' faithful agents and maximizing shareholder value (Jensen and Meckling 1976). Finance theory posits that corporate governance regulations empower public shareholders to limit agency problems. In practice, key governance reforms focus on independent directors – mandating their minimal numbers and proportions, and granting them exclusive writ over key decisions such as nominating new directors, setting executive pay, and overseeing audits – and on preventing the CEO from chairing the board. Such measures are conceptually somewhat oblique routes to empowering public shareholders, and have limited empirically discernible effect (Weisbach 1988; Adams, Hermalin and Weisbach 2010).

This absence of evidence is puzzling because self-interested board chairs and directors, independent or not, have little to gain and much to lose from letting an errant CEO destroy economically significant shareholder value. Personal liability can leave directors mired for years in multimillion dollar lawsuits. Abruptly aware of the limitations of liability insurance, inattentive directors of AIG, Enron, Lehman Brothers, and other corporate governance shipwrecks hardly maximized their personal wealth. *Post mortem* accounts allege corporate cultures equating dissent with disloyalty. An Enron executive describes an "atmosphere of intimidation" in which many could see problems looming, but no-one dared confront the CEO (Cohan 2002). One dissenter might be fired, but a majority of self-interested directors arguably should have fired the CEO and avoided the lawsuits.[1]

Such post mortems suggest a behavioral justification for policies focusing on independent directors. Social psychology also employs the term *agency*: defining an *agentic shift* as a deviation from rational decision-making to conform to a group opinion (Janis 1982), especially in the presence of an authority figure (Milgram 1974).[2] Economics thus links agency problems to insufficiently loyal agents, while social psychology links agency problems to socially excessively loyalty. Corporate governance shipwrecks might reflect agentic shifts, where directors disengage their rational self-interest to become pliant agents of an errant CEO, as well as conventional economics agency problems, where CEOs put their private utility ahead of shareholder value.

Powerfully independent directors and chairs other than the CEO make plausible policy sense as a remedy for agentic shift problems. Variants of Milgram's (1974) study show the agentic shift weakened by the physical absence of the authority figure, further weakened by dissenting peers, and interrupted entirely by a rival authority figure openly disagreeing.[3] Excluding the CEO from meetings of the board's audit, compensation, and nominating committees renders the CEO physically absent. Powerfully independent directors might serve as dissenting peers, mitigating agentic shift problems and bestirring other director' rational decision-making faculties. A powerful director chairing the board might serve as a rival

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1 Lone "whistle blowers" are often punished with ruined careers, even if proven right (Alford 2000).

2 The closest approximation to this in economics is models of information cascades, in which individuals opt not to pay for information and instead follow others they believe to be well-informed (Banerjee 1992; Bikhchandaqni et al. 1992).

3 One interpretation of these findings is that reflexive obedience and conformity exemplify Khaneman and Twersky's (2011) bounded rationality concept of "fast thinking", and that voiced dissent activates what they dub "slow thinking" – the actual estimation and weighing of outcomes and probabilities.

authority, able to interrupt any agentic shift entirely.

If independent directors and non-CEO chairs protect shareholders interests, as well as their own, by checking agentic shift problems, firms with non-CEO chairs or independent directors better suited to this task ought to exhibit higher shareholder value. We posit that the efficacy of independent directors or a non-CEO chair depends on their power – their ability to stand up to an errant CEO and bring a majority of the board along with them.

In the social psychology literature, proxies for an individual's social power are constructed from social network graphs (Proctor and Loomis 1951; Sabidussi 1966; Bonacich 1972; Freeman 1977, 1979; Watts and Strogatz 1998; Hanneman and Riddle 2005; Jackson 2008).[4] These *power centrality measures* gauge the number and importance of the person's direct and indirect connections to others in the network. More or more important connections provide more access to information, more resources to fall back on, more ability to influence events, and thus more power. Applying these measures to networks of connections reflecting past *curriculum vitae* commonalities, we construct four measures of the *power centrality* for every director. We say a director is *powerful* if and only if she scores in the top quintiles in three of four tests of power centrality.[5] Independent directors and independent non-CEO chairs who are powerful are designated *powerfully independent directors* (PIDs) and *powerfully independent non-CEO chairs* (PINCs), respectively. We say a firm has a *powerfully independent board* (PIB) if a majority of its independent directors are PIDs.

Firms with PIBs have highly economically and statistically significantly elevated shareholder valuations (*Tobin's average Q*). An event study of PID sudden deaths reveals that PIDs cause changes in shareholder value. Granger causality tests affirm this causal direction. We tentatively conclude that powerfully independent directors can cause high shareholder value.

Powerful people at the helm of a company might elevate shareholder value by dint of their networks and connections, not because they induce rational disloyalty to an errant CEO. If so, powerful insider directors, powerful insiders other than the CEO as chair, or even powerful CEOs per se should elevate shareholder value as effectively as powerfully independent directors do. Powerful CEOs are not correlated with elevated shareholder valuations; and while powerfully non-independent directors and a powerfully non-independent director as chair both correlate with elevated shareholder valuations; Granger causality tests affirm reverse causality only: more prosperous firms attract more powerful CEOs, more powerfully insider directors, and more powerfully insiders to chair their boards.

Further tests to explore channels through which PIBs increase shareholder valuations reveal firms with PIBs manipulating earnings less aggressively, undertaking fewer value-destroying takeovers, firing under-performing CEOs more readily, and hiring new CEOs from outside more often. Firms with PIBs also pay their CEOs more generously, but link CEO pay to performance more reliably.

The remainder of the paper is organized as follows. Section 2 links relevant social psychology work to a behavioral theory of corporate governance. Section 3 describes the data

[4] A second line of Milgram's (1967) work helped develop the notion of a social network. Milgram mailed randomly selected people in Omaha, Nebraska packages, each with a note asking the recipient to forward the package (and note) to the "first name basis" acquaintance most likely able to forward it to a specified addressee in Boston. The packages passed through an average of 5.2 acquaintances of acquaintances. If individuals are nodes in a network, with lines between nodes denoting acquainted individuals, this exercise reveals about six mutual acquaintance pairs – "6º of separation" – linking a random Omahan to a Bostonian.

[5] This approach reflects the Pareto or power law distributions power centrality measures typically obey, whereby e.g. 20% of the individuals have 80% of the power.

and variables. Section 4 presents the results and robustness checks. Section 5 concludes.

2. A Behavioral Theory of Corporate Governance

Behavioral finance applies findings from social psychology – prospect theory, salience, etc. – to augment rational agent models of financial markets (Shleifer (2000)). A different set of social psychology results, primarily due to Milgram (1967, 1974), suggests a behavioral theory of corporate governance.

2.1 Rational Disloyalty and Good Corporate Governance[6]

Milgram (1974) sought to understand Nazi concentration camp guards, who met charges of mass murder by explaining "I was only obeying orders". To see if Germans were more obedient to authority than Americans, he conducted an experiment. Milgram asked "real" subjects to "assist" by acting as a "teacher", and introduced them to the "learner", actually a professional actor, who posed as the experiment's subject. The purpose the experiment, Milgram falsely explained to the "teacher", was to measure how being punished for errors affects the "learner's" concentration. Milgram explained that he would ask a series of questions, and each time "learner" answered incorrectly, he would gesture to the "teacher", seated in front of a panel of switches marked with voltages increasing to potentially lethal levels, to give the "learner" a larger electric shock. The "learner" was scripted to feign worse pain as the "teacher" increased the voltage.

The real purpose of the experiment was to see if the real subjects would electrocute a total stranger merely because they were so instructed. Milgram planned to run the experiment in Connecticut and then in Germany to test for differences. In fact, he was so appalled by ordinary Americans obediently electrocuting screaming "learners" that he never repeated the experiments in Germany. One hundred percent of "teachers" obediently administered shocks up to 150 volts, whereupon the "learner" screamed in agony. Some eighty percent obediently continued administering shocks up to 300 volts, after which the "learner" demanded to be released and refused to answer more questions. About 63% of "teachers" continued administering shocks all the way up to 400 volts, the final few switches being marked "XXX".

Milgram's findings are robust. Yale students and middle class Connecticut residents, males and females, blue and white collar workers, educated and uneducated subjects all exhibit similar obedience patterns. Others replicate his general findings across a wide range of experimental settings and subject groups (Merritt and Helmreich 1996; Blass 1998, 2000, 2004; Tarnow 2000; Burger 2009), including Germans (Miller 1986). To ensure that subjects did not see through the actors' pretense of pain, Sheridan and King (1972) replicate the experiment using real shocks to a puppy.

These experiments were widely condemned for eliciting sadism. This seriously misapprehends their actual findings.[7] Milgram (1974, 188) despairs that the

> *"virtues of loyalty, discipline, & self-sacrifice that we value so highly in the individual are the very properties that create destructive engines of war & bind men to malevolent*

[6] This subsection and the next both draw heavily on material presented in more detail, and with more complete references to the psychology literature, in Morck (2009), and recast as teaching material in Morck (2010). To avoid clutter, a pervasive reference to these sources is extended across the subsequent pages.

[7] This debate led to university ethics review committees, which prevent complete replications of the Milgram's experiment at present (Blass (1991, 1996, 2000)).

systems of authority."

That is, he concludes that humans have a 'loyalty reflex', not a sadistic bent. Martin *et al.* (1976) affirm this interpretation by replicating Milgram's approximate results in a variant of the experiment where "teachers" punish "learners" by activating a noise maker at levels marked "50% risk of permanent hearing damage". Although the "teachers", seated only feet away from the "learner", obviously risked damaging their own hearing too, similar obedience ensues.[8]

Many of Milgram's subjects were visibly shaken, and clearly disliked inflicting pain, but did so anyway (Blass 2000, 2004).[9] In exit interviews, after the experiment was explained, Milgram (1974) found that "People … asked to render a moral judgment on what constitutes appropriate behavior … unfailingly see disobedience as proper." Asked why they behaved inappropriately, the subjects advanced excuses such as politeness, the importance of keeping a promise, the awkwardness of disagreement,[10] absorption in technical details of the experiment, or a belief that a greater good, such as the advancement science, must justify the learner's pain. But the most universal response was a sense of loyalty to the experimenter.

Thus, Milgram (1974, p. 7-8) concludes

> *"The typical subject did not lose his moral sense; instead, it acquires a radically different focus. He does not respond with a moral sentiment to the actions he performs, Rather, his moral concern now shifts to a consideration of how well he is living up to the expectations that the authority has of him."*

He summarizes the exit interview results by noting that virtually every subject indicated disobedience as morally right choice, yet few disobeyed. Asked why they obeyed, subjects stressed loyalty (I agreed to obey instructions); duty (my role in the experiment); honor (I made a promise to the experimenter); trust (I presumed experimenter acting for the greater good); and fitting in (I felt discomfort about creating a scene).

Based on these interviews, Milgram (1974, p. 8) proposes that the subjects experienced an *agentic shift*, which he defines thus:

> *"the essence of obedience consists in the fact that a person comes to view themselves as the instrument for carrying out another person's wishes, and they therefore no longer see themselves as responsible for their actions. Once this critical shift of viewpoint has occurred in the person, all of the essential features of obedience follow"*

Milgram's agentic shift is obverse to Jensen and Meckling's (1976) agency theory, long a workhorse model in corporate governance research. Jensen and Meckling correctly observe that problems can arise if agents, the CEOs who run widely held corporations, act in their own interests, rather than as faithful advocates of the interests of the corporation's principals, its shareholders. Milgram's agentic shift, equally correctly, sees problems arising from excessively

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[8] For further elaboration of the adverse social consequences of humans deriving utility from obeying authority, see Kelman and Hamilton (1989) and Zimbardo (2007).

[9] Consistent with this, Cheetham et al. (2009), recreating the Milgram experiment in a virtual setting with the subject in an fMRI scanner, report activation in areas of the brain associated with personal emotional distress, but not in areas associated with the representation of others' emotional state.

[10] Brown and Levinson (1987) argue that "aspects of conversational politeness" check real tolerance of dissent.

obedient agents, such as dutiful concentration camp guards.

The thesis that humans reflexively obey authority is not foreign to classical economics. Hobbes (1651) argues that people submit to the police power of the state, however capricious or tyrannical, because the anarchy is worse. Darwin (1871) argues that evolution thus favors a propensity to, among other things, loyalty and obedience:

> *"a tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to give aid to each other and to sacrifice themselves for the common good, would be victorious over other tribes; and this would be natural selection."*

Recent advances in mathematical biology demonstrate that natural selection can occur rapidly at the group level if in-group self-sacrifice is juxtaposed against continual deadly between-group warfare, now the standard model of hunter-gatherer societies in anthropology (Wilson (2012)). The depth of emotion that the concepts of loyalty, duty, and honor arouse – comparably profound in many to emotions associated with sexual reproduction and care for young – are consistent with Darwin's hypothesis of an instinctive basis. For brevity, we refer to this as *reflexive obedience*, though a broader behavioral range encompassing patriotism, fidelity, and other related concepts is intended to be implicit throughout.

Reflexive obedience appears to be an example of what Kahneman (2011) calls "fast" thinking. After an exhaustive overview of behavioral economics, Kahneman concludes that far more human behavior is, in one form or another, reflexive than was previously thought; but that humans nonetheless possess a capacity for rational decision-making – "slow" thinking – that can overrule reflexive behavior. Because slow thinking is apparently metabolically costly, though in ways not yet well understood, humans rely on what "fast" thinking by default. This entails unconscious or only marginally conscious "rules of thumb" that arise from instinct, either directly or from innate, and quite likely instinctive, learning-response mechanisms. This dichotomous model of human behavior differs from simple stimulus-response models in that, when "fast" thinking fails to converge on a decision rapidly, "slow" thinking activates. This model, though far from universally accepted, finds increasingly solid support in both neuroimaging and experimental data (reviewed in Kahneman (2011)).

Kahneman's dichotomy may explain instances in which Milgram's (1976) "teachers" decided to disobey his instructions to electrocute the "learner", as well as a very few variants of the experiment that failed to replicate the baseline results described above. "Teachers" who decided to disobey appear to have switched from "fast" thinking, in which reflexive obedience induced an agentic shift, to "slow" thinking, in which the disobedient "teachers" rationally reflected on what they were doing – perhaps weighing the legal, ethical, and financial consequences of seriously harming the "learner". This cognitive cost expended, the "teacher's" rational decision making system took charge and overruled reflexive obedience.

Those variants of the experiment that failed to replicate the baseline pattern of obedience also fit this pattern (Milgram (1965), Packer (2008)). In the baseline experiments, Milgram instructed the "teacher" while standing a few feet away. Disobedience increased if he instead stood outside the room, or instructed the "teacher" by phone. A second set of experiments, motivated by Asch's (1951) finding that dissenting peers reduce conformity, introduced additional confederates who posed as "other teachers". The "real subject" was asked to operate the electrocution switches while the "other teachers" watched. The "other teachers" were

scripted to voice dissent by criticizing the propriety of the experiment once a pre-specified voltage was reached. This induced substantial disobedience. A third variant, in which a "second psychologist", of similar heights and bearing to Milgram, and also wearing a white lab coat, entered the room partway through and criticized the experiment, induced every "teacher" to switch entirely to disobeying Milgram – 100% disobedience.[11] Each intervention was timed to correspond with the first drop in obedience evident in the baseline studies at 150 volts, when the "learner" first voiced objections, and thus can be interpreted as magnifying that effect.

In each variant, Milgram posits that changes in the setting weaken reflexive obedience. However, equally consistent with the data, these situations might strengthen rational "slow" thinking. If the authority figure is not proximate, his authority becomes less salient, but obedience is also less rational because the authority figure may not have all the information the subject has. Dissenting peers might weaken the subject's innate tendency to fall into line with what he perceives to be the behavior expected of him, but could also disrupt "fast" thinking and allow "slow thinking" to be activated. Conflicting rival authority figures likewise plausibly keep "fast" thinking due to the obedience reflex from converging, forcing the subject to snap out of her agentic shift and expend the effort necessary to make a rational decision.

Institutions – legal, economic, and social – plausibly evolve at the group-level to reinforce or damp individual behavior that is socially beneficial or harmful, respectively. For example, American soldiers in the War of 1812, allowed to elect their officers, tended to put in pacifists just before key battles (Taylor (2011)). Institutional constraints that protect reflexive obedience from rational decision-making arguably make for a more competitive army. Likewise, a communist economy demands obedient implementation of a central plan (Shleifer and Vishny (1992)), and all communist states equated rational profit-making decisions by state officials to treason. Hierarchical religions, government bureaucracies, and any number of other large organizations rely heavily on obedience to overrule the self-interested behavior of individuals. Sometimes, this is accomplished by paying the individuals for obedience – the convergence of interests Jensen and Meckling (1976) stress. However, stirring individuals' passions of patriotism, duty, loyalty, and so on may well stimulate reflexive obedience more effectively and more reliably than money (Wilson (2011)), which necessarily acts by triggering the undesirable process of rationally self-interested decision-making in the first place.

Competition between economies, or even economic systems, arguably selects for institutions that allow reflexive obedience to play out in situations where obedience is generally socially beneficial, but that trigger rational decision-making in situations where society benefits from individuals thinking for themselves. Hobbes (1651), presaging Nash's (1950) concept of a low-level equilibrium in arguing that life in nature is "every man against every other man" and inevitably leads to live that are "solitary, nasty, brutish, and short", posits that people prefer universal obedience to an absolute monarch because this leads to less awful outcomes. Thus, Hobbes' Leviathan – the monster that is the State's monopoly on the legal use of deadly force, and perhaps the most fundamental of institutions (North, Wallis and Weingast (2009)), arguably arises from economy-level competition of this sort.

Institutions that activate rational decision-making likewise persist where they augment group survival odds. An important achievement of the 1688 Glorious Revolution was the creation of position of Leader of His Majesty's Loyal Opposition – a leader-in-waiting duty-

[11] Burger (2009) fails to replicate this disobedience. However, because these subjects may administer shocks up to 150 volts only, not greatly above household AC current in the United States and below the 220 volt standard elsewhere, disobedience may have less obvious justification to them.

bound to criticize the decisions of the Prime Minister and government. In other words, the leader of the opposition demonstrates loyalty to the country by playing the role of an outspoken rival authority figure, often even in situations where a government he led would do no different. Some variant of this Westminster system, with at least two parties and institutionalized rival authority figures, is now considered an integral part of every democracy. Perhaps the sight of rival authority figures, volubly criticizing each other in Parliaments and Congresses throughout the developed world, induces "slow thinking" in elected representatives and thus elicits better quality legislation. Perhaps the sole authority figures who dominate the governments of authoritarian states, however well-intentioned and competent, elicit reflexive obedience that lets errors go uncorrected and lowers the quality of government. Official harmony might then be a sign of bad government, and argument a sign of broader rational decision-making. To the extent that democracy has gained ground against authoritarianism, dissent-induced rational decision-making in governments is arguably a group survival trait.

A major difference between Common Law and Napoleonic Code legal systems is procedural: In Common Law courts, rival lawyers attack each-others' arguments as a disinterested judge and jury, both explicitly neutral, watch. In Napoleonic Code courts, in contrast, a judge magistrate directs the police, calls and grills witnesses, consults experts, and decides the case as the interested parties' lawyers, who occasionally interject respectfully, remain largely passive. The large empirical literature correlating superior economic outcomes with Common Law legal systems may have less to do with the laws per se than with these procedural differences: Common Law courts feature rival authority figures, whose discord can activate rational decision-making in the judge and jury; Civil Code courts feature a single authority, the judge magistrate, conducive to reflexive obedience.

Academic journals and conferences draft referees and discussants, respectively, whose duty is to serve as rival authorities. The effect is presumably to activate "slow" thinking, rational decision making, in editors and conference attendees. These practices arose recently, in the mid-20th century in most disciplines, and science advanced at unprecedented rates in subsequent decades. Argument from authority, once a crucial means of persuasion, is now risible in research universities.

All of these institutional innovations create an official "devil's advocate", duty-bound to criticize the authority at hand. In each case, this criticism arguably leads to better decision making by those watching on – backbenchers in Parliament, Common Law judges and juries, journal editors, or academic researchers. Indeed, the term derives from the Holy Office of the Devil's Advocate (*Advocatus Diaboli*), a Vatican position established in the Counterreformation by Pope Sixtus V to rebuild respect for the Roman Catholic Church by exposing sham sainthood nominees. For centuries, the Devil's Advocate was a top Canon Law expert duty-bound to contest the character and miracles of prospective saints. The office was abolished by John Paul XXIII, who created more saints that all previous 20th century pontiffs combined.

2.2 Corporate Governance Reforms

Corporate governance reforms, from a behavioral perspective, can then be viewed as attempts to inject a Devil's Advocate into key forums of corporate decision-making: boardrooms and annual general shareholders meetings. Corporate CEOs are, of necessity, powerful authority figures because business corporations are hierarchies, in which decisions at the top must be carried out below (Coase (1937)). This validates the view of many corporate executives that loyalty is an essential virtue in middle managers and employees. As Milgram (1974, p. 145-6) explains,

"The most far-reaching consequence of the agentic shift is that a man feels responsibility to the authority directing him, but feels no responsibility for the content of the actions that the authority prescribes."

Neither an army nor a business corporate could function if every decision had to be justified economically and ethically to every employee before any action could ensue. The information and coordination costs would be immense and the speed of implementation glacial, if not sessile. The corporation is a command and control mechanism because obedience to an authority is less inefficient than information gathering, cost benefit analysis, and rational decision making throughout (Williamson (1979)).

But like absolute monarchs, judge magistrates, and prominent academics, CEOs can err. Various corporate governance mechanisms appear designed to interrupt reflexive obedience in specific ways. For example, some recent reforms seek to distance the CEO from key decision makers by, for example, excluding her from key board subcommittee meetings. Recall that obedience decreased if Milgram stepped outside the room, or issued instructions by phone. Efforts to increase the number and powers of independent or outside directors can be seen as efforts to encourage dissent among directors' peers. Recall that Milgram's experimental variants featuring dissenting peers reduced obedience. Designating a Lead Independent Director, like mandating that an independent director chair the board, arguably creates a Leader of His Majesty's Loyal Opposition in the boardroom. Recall that rival authority figures entirely eliminated obedience in those variants of Milgram's experiments.

Empowered institutional investors might similarly serve as vocal dissenting peers at annual general meetings or shareholder, which otherwise can resemble one-position-one-candidate elections in Soviet Socialist Republics. Dissident slates of candidates in proxy battles can be thought of as rival authorities.

In each case, these corporate governance reforms track results from Milgram's experiments and subsequent related studies that expose situations likely to interrupt a subject's agentic shift and restore individual responsibility and economic rationality. They deter Kahneman's (2011) reflexive "fast" thinking, decision making via reflexive obedience, and promote his "slow" thinking, costly and time consuming decision-making requiring the gathering and processing of information and the calculation of a rational decision to stop the CEO before directors' lives are destroyed by lawsuits and criminal charges, before middle managers' and employees' jobs are lost in corporate bankruptcies, and before shareholders' wealth is demolished.

This behavioral perspective on corporate governance thus views excessive or misplaced loyalty to the CEO as a potential problem for self-interested directors, officers, middle managers, employees, and shareholders. This perspective in no way eclipses Jensen and Meckling's (1976) theory that top managers' insufficient loyalty to shareholders also causes problems. Rather, good corporate governance would appear to require attention to both. Thus, Jensen and Meckling (1976) argue that social welfare maximization requires that CEOs be loyal to shareholders, but ensuring this loyalty may require institutions that promote disloyalty to CEOs. Fama (1980), building on Jensen and Meckling (1976), argues that directors increase their pay by building reputations "as effective monitors", but behavioral considerations suggest a reputation for "loyalty" might be more valuable if CEOs select directors, and that Fama's argument might therefore be contingent on CEOs' absence in nominating committees.

Empirical studies present, at best, mixed evidence as to the efficacy of independent directors or non-executive chairs in affecting corporate governance (Hermalin and Weisbach (2003), Adams, Hermalin, and Weisbach (2010)). Weisbach (1988) finds that boards containing predominantly independent directors are more apt to replace the CEO after prolonged sub-par financial performance. However, the ultimate test of independent directors' contribution to governance would be a clear causal link to superior share valuations (Rosenstein and Wyatt (1990), Shleifer and Vishny (1997), Rhoades et al. (2000), Perry and Shivdasani (2005), Jackling and Johl (2009)). However, the preponderance of empirical studies find no correlation between board independence and firm performance (Daily and Dalton (1992), Yermack (1996), Dalton et al. (1998), Heracleous (2001), Bhagat and Black (2002), Shivdasani and Zenner (2002), Dulewicz and Herbert (2004), Erickson et al. (2005), Weir and Laing (2001), Hsu (2010)). Bhagat and Black (1999) even report a negative correlation. The conclusion of Hermalin and Weisbach (2003) that the extant empirical literature forces the conclusion that "there does not appear to be an empirical relationship between board composition and firm performance" remains essentially unchallenged, though Duchin et al. (2010) find evidence of an effect in inverse proportion to information costs.

Fama and Jensen (1983), Jensen (1993) and others similarly argue that separating the roles of CEO and board chair improves governance, and thus ought to elevate share valuations. Morck, Shleifer and Vishny (1989), Finkelstein and D'Aveni (1994), and others link CEOs chairing their own boards to low shareholder value. However, Anderson and Anthony (1986), Stoeberl and Sherony (1985), Faleye (2007), and Coles et al. (2010) reported positive effects, whereas Brickley, Coles, and Jarrell (1997), Rechner and Dalton (1991), Baliga, Moyer, and Rao (1996), Dalton et al. (1998), and Dahya (2004) dispute these findings.

One explanation of this paucity of evidence, suggested by Higgs (2003, p. 39) in a report on British corporate governance, is that most independent directors and non-executive chairs are not, in fact, very independent. Rather, Higgs explains that

> *"Almost half of the non-executive* [independent] *directors surveyed for the Review were recruited to their role through personal contacts or friendships. Only four per cent had had a formal interview, and one per cent had obtained their job through answering an advertisement. This situation was widely criticised in responses to consultation, and I accept that it can lead to an overly familiar atmosphere in the boardroom."*

In the United States, an independent director has "no relationship with the company, except the directorship and inconsequential shareholdings, that could compromise independent and objective judgment" (Securities and Exchange Commission (1972)). This definition was adopted in response to a study by Mace (1971), who found that U.S. directors "do not establish objectives, strategies, and policies" and refrain from "asking discerning questions - inside and outside the board meetings". The current reincarnation of these rules for NYSE listed firms is as follows:

> *An Independent Director must not, within the past three years, have been any of the following:*
>
> 1. *An employee (exception: Employment as an interim Chairman or CEO does not count) of this company.*
> 2. *The recipient of over $100,000 in direct compensation, excluding director fees, from*

this company.

3. *Affiliated with this company's internal or external auditor.*
4. *An executive director of another company, whose compensation committee included any present executives of this company (exception: directorships of charities do not count).*
5. *An executive officer of a supplier or customer of this company (exceptions: business amounting to less than $1M or less than 2% of the other firm's sales does not count, nor do executive positions with charities)*
6. *The immediate relative of someone who would be disqualified as an independent director on any of the above grounds.*

Higgs (2003) suggests that CEOs simply comb through lists of their friends until they find ones who satisfy such a checklist of independence requirements. Consistent with this, Hwang and Kim (2009) find informal ties – a common *alma mater*, hometown, military service, and the like – pervasive between CEOs and legally independent directors. They further find that such ties correlate with higher CEO pay, lower CEO turnover, and lower firm operating performance. Such problems with the legal definition of director independence also loom large in recent litigation. For example, in a case against the independent directors of DHB Industries for knowingly selling the US military defective body armour, the SEC alleges the independent directors "were [the CEO] Brooks' long-time friends and neighbors, with personal relationships with Brooks that spanned decades. Chasin lived close to Brooks, and he and his family went out to dinner with Brooks and the Brooks family two or three times a month. Nadelman and his family had a social relationship with Brooks and the Brooks family, and regularly attended Brooks' family social functions. Krantz had a relationship with Brooks starting in 1998 or 1999, and was Brooks' insurance agent before Brooks asked him to join DHB's board."[12]

3. Data and Variables

This section describes the social connection data and the mathematics we use to calculate these centrality measures. We then define a powerfully independent director (PID) as an individual with at least three of these four centrality measures falling in their top quintiles of the distributions of the centrality measures of all officers and directors of listed firms included in Boardex.

3.1. Social Network Centrality as A Measure of Power

Milgram's finding that reflexive obedience is interrupted by distance, dissenting peers, and rival authorities suggests that more powerfully independent directors and board chairs might promote better corporate decision-making. But what makes one a credible rival authority figure to the CEO? Intelligence, prestigious degrees, breeding, height, a baritone voice, hair, and power all come to mind.

Oddly, power is arguably among the more readily measurable of these traits. Decades of work in graph theory and social network theory (Milgram (1967), Proctor and Loomis (1951), Sabidussi (1966), Bonacich (1972), Freeman (1977, 1979), Watts and Strogatz (1998)) provides a set of network centrality measures, which in different ways measure a person's power. These measures, computed from ties between thousands of individuals, are intuitively plausible and

[12] SEC v. Krantz *et al*. (USDC FL docket 02/28/2011),

empirically validated in diverse contexts (Padgett and Ansell (1993), Banerjee et al. (2012)).

A social network, representing individual as nodes, social connections as lines between nodes, and the quickest routes for one individual to reach another as geodesic distances (shortest paths) between nodes, allows the calculation of each individual's centrality, and thus her social power. Four measures of power centrality arguably apply in the present context.

The simplest of these is an individual's *degree centrality* (D), the number of direct connections that individual has with other people. Thus, D is an integer between 0 and N-1. Intuitively, a director with more connections may have more direct sources of information and more friends to fall back onto.

A second measure, called *betweenness centrality* (B) is the number of shortest paths between the $(N\text{-}1)\times(N\text{-}2)/2$ possible pairs of other people that pass through the individual in question. Intuitively, a director with a higher B has more power to connect people with each other and more power to provide information about people to each other. Padgett and Ansell (1993) use high betweenness to explain the Medici family dominance in 15th century Florence: other elite families generally connected to each other only through the Medicis, who had direct times to most elite families.

A third measure, *closeness centrality* (C) averages the degrees of separation – that is, the number of links in the shortest paths – between the individual in question and every one of the other $N - 1$ individual in the network. Closeness centrality is defined as $N - 1$ divided by the sum of these degrees of separation. Intuitively, having closer connections to more people makes an individual transmit information to others faster, and thus having greater influence on others'.

A fourth measure, *eigenvector* centrality (E) is recursively calculated. Intuitively, E is a weighted average of the importance of the individual's direct contacts, with weights determined by the importance of their direct connections, with weights … and so on.

Taken together, these centrality measures can readily be interpreted as meaningfully measuring the individual's power (Hanneman and Riddle (2005, Chapter 10)). High centrality individuals are more able to receive information, and to pass information along or not strategically. More connections and more central network positions mean more resources, more friends to fall back on, and more powerful friends, all of which lessen the downside of acting as a "Devil's advocate", enhancing a director's credibility as a rival authority in the board room.

We use relational data reported in BoardEx from 1996 through 2010 to approximate the social network of executives and directors of over 8,000 U.S. public and private firms. These data include background information that let us estimate both current business relationships and common backgrounds potentially indicating relationships going back many decades. Each individual in the network is a node, and each connection (past and current) is a link. These connections are all professional: through overlaps in graduate and professional education, prior or current common work experience in listed and unlisted firms, and shared board membership in non-profit organizations. Obviously, a director's network would ideally also include links from her social life – connections through family, neighbors, and friends – but these data cannot be collected systematically without self-reporting and self-selection biases. In contrast, information on professionally formed connections is from proxy statements and annual reports, and thus is likely to be more objective, comparable across individuals, and free of self-selection bias. In total, our data include roughly 12 million pairs of connections formed through positions at listed firms, and another 9 million pairs formed through education and positions at unlisted

firms and non-profit organizations.[13] This includes all reported individuals in BoardEx with at least one connection to the rest of the network. Table 1 reports the number of nodes in each year's network

[Table 1 about here]

For each year, using an IBM iDataPlex supercomputer, we calculate four measures of network centrality to capture the importance of each individual connected in the network. As detailed below, some measures of centrality are based on the shortest social distances between pairs of individuals. Not including individuals from unlisted firms and firms outside the list of S&P 1500 could miss prominent individuals, such as bankers and hedge fund managers, who serve as bridges to shorten one's social distance to many parts of the network. The four measures are *degree centrality*, *betweenness centrality*, *closeness centrality*, and *eigenvector centrality* (Proctor and Loomis (1951), Sabidussi (1966), Freeman (1977), and Bonacich (1972)).

For each individual, *degree centrality* is simply the number of unique and direct connections; that is

$$D_i \equiv \sum_{j \neq i} x_{ij}$$

where $x_{ij} = 1$ if individuals *i* and *j* has a connection, and zero otherwise.

The first step for calculating both closeness and betweenness centralities is to identify the shortest social distance (or geodesic distance, *g*) between any pair of individuals in the network. If *i* does not know *j* directly, but knows *k* who knows *j*, then the shortest social path from *i* to *j* is *i* – *k* – *j*, and thus *i* and *j* have a shortest distance of 2.

Closeness centrality is the inverse of the sum of the shortest distances between one individual and every other individual in the network:

$$Closeness_i = \frac{n-1}{\sum_{i \neq j \in N} g_{ij}}$$

This definition assumes that the entire network is connected: that is, there exists at least one path between any two nodes. However, our data on business professionals contain a number of small sub-networks not connected to the rest of the nodes. Setting the shortest distance between two unconnected nodes to $g_{ij} = \infty$ in such a case is untenable because one infinite value in the denominator reduces all closeness measures to zero. Excluding infinite g_{ij} from the calculation is also problematic. Individual A in a small network might have a much higher *Closeness* than individual B in a large network, but A might have much less power than B, whose influence extends across many more people. As an extreme case, consider a sub-network with two connected individuals. Dropping all unconnected nodes leaves each has the highest possible Closeness value, one; yet they have negligible social influence because they are unconnected to the remaining 300,000+ business professionals.

To account for these data issues, we modify closeness centrality to

[13] We lack information on the quality of these 21 million pairs of connections. For example, we do not know whether the individuals at each end of the link are friendly or hostile, close friends or just acquaintances, talk daily or every ten years or never. We assume that, once one person knows another, the connection lasts until one dies.

$$C_i \equiv \frac{n-1}{\sum_{i \neq j \in N} g_{ij}} \times \frac{n}{N}$$

where *n* is the size of the sub-network (or component) individual *i* belongs to, and *N* is the total number of individuals in the entire network. Such definition scales the original closeness measures with the size of the component one belongs to in order to more accurately reflect one's overall social power. It follows that individuals in a larger network usually has a higher closeness value than those in smaller networks.

Betweenness is the incidence of an individual lying on the shortest path between pairs of other members of the network. For every possible triplet of individuals *i*, *j* and *k*, we define the indicator variable

$$m_{i,j}(k) = \begin{cases} 1 & \text{if } k \text{ is a node on a geodesic linking } i \text{ and } j \\ 0 & \text{otherwise} \end{cases}$$

The *betweenness centrality* of *k* is then

$$B_i \equiv \sum_{i<j \neq k \in N} \frac{m_{i,j}(k)/m_{i,j}}{(n-1)(n-2)/2}$$

where $m_{i,j}$ is the number of geodesics linking *i* and *j*. This adjustment is necessary because, while the length of the shortest path between two individuals is unique, they may be linked by more than one shortest path.

Eigenvector centrality is recursively calculated. Individual *i*'s eigenvector centrality is his importance, weighed by the similarly calculated importance of all his direct contacts, each weighted by the importance of their direct connections, and so on. More formally, assume the existence of this measure for person *i*, and denote it E_i. In matrix notation, with $\mathbf{E} \equiv [E_1, \ldots E_i, \ldots E_N]$, the recursions collapse into the condition that $\lambda \mathbf{E}' \mathbf{E} = \mathbf{E}' \mathbf{A} \mathbf{E}$. Thus, **E** is an eigenvector of the matrix of connections **A**, and λ *is* its associated eigenvalue. To ensure that $E_i \geq 0$ for all individuals, the modified Perron-Frobenius theorem is invoked and the eigenvector centrality values of the individuals in the network are taken as the elements of the *eigenvector* $\mathbf{E}^*$ associated with **A**'s *principal eigenvalue*, λ^*.

To make the centrality measures comparable with each other and over time, we rank the raw values of each centrality of all individual for each year and assign a percentile value, with 1 the lowest and 100 the highest, to each individual's centrality measures for that year. In other words, regardless of the size of the network, a person with a higher valued centrality percentile is more centrally positioned in the network than a person with lower value. We denote these rank-transformations of D_i, B_i, C_i, and E_i as d_i, b_i, c_i, and e_i respectively.

[Tables 2 about here]

Table 2 presents summary statistics for the power centrality measures. Panel A presents the raw figures. The mean CEO *betweenness* of 0.00455% indicates that the mean CEO in our sample lies on just under 0.005% of the shortest paths between all pairs of individuals in the network. Note that the mean exceeds the 75th percentile and the maximum is 0.362%. Loosely speaking, the great majority of the connectedness power in the network is in the hands of the

most connected individuals. The typical director's mean closeness is 25.3%, indicating that the typical director is about four (1 / 0.253 = 3.94) degrees of separation from any other randomly chosen individual. The median degree centrality of 78 for CEOs indicates that the median CEO has direct ties with 78 other individuals in the network. The raw eigenvector centrality measures are not readily amenable to intuitive explanation.

The four centrality measures are highly correlated, with correlation coefficients averaging 79%, and statistical significance under 0.001. For example, Jeffrey Garten, served at BlackStone and Lehman Brothers, as Dean of Yale's School of Management, and in the Nixon, Ford, Carter, and Clinton administrations, exhibits high centrality by all four measures: his mean d_i over the sample period is at the 94th percentile, his b_i is at the 98th, his c_i, at the 93rd, and his is also e_i at the 93rd percentile. The correlations are imperfect, largely because some individuals are connected directly to only a handful of others (low degree centrality), but these connect to highly powerful people (high betweenness or eigenvector centrality). Thus, Ray Wilkins Jr., a director of H&R Block in 2000, ranks only in the 66th percentile in degree centrality, but the importance of some of those connections push his betweenness, centrality up to the 93th percentile.

Hereafter, we focus in on officers and directors of S&P 1500 firms, as provided by Risk Metrics. That is, we merge the percentile centrality measure data described in Panel B of Table 2 with BoardEx date on the names of the CEOs and directors of listed firms, matching by individual's first, middle, last names; company names, and years. This generates a final panel containing 132,020 individual-years from 1999-2010. The mean percentile centrality within this group is 78, the maximum is 100, the minimum is 1, and the standard deviation is 22.6.

We define *Powerfully Independent Directors* (PIDs) as legally independent directors with at least three centrality measures falling above the 80th percentiles of their full distributions across all CEOs and directors (not just those in S&P1500 firms).[14] Directors are defined as independent if so-designated by the firm. To identify independent directors who are also powerful, we define four dummy variables, one for each percentile centrality measure, set to one if that measure falls in the top quintile of its distribution across all the executives and directors included in Tables 1 and 2, and to zero otherwise. Thus, we denote whether or not individual *i* is powerful in terms of her degree centrality using

$$\delta(d_i \geq 80) \equiv \begin{cases} 1 & \text{if } d_i \geq 80 \\ 0 & \text{otherwise} \end{cases}$$

and define $\delta(b_i \geq 80)$, $\delta(c_i, \geq 80)$, and $\delta(e_i \geq 80)$ analogously.

Our empirical networks, like many complex networks, are locally dense and globally sparse. The network is also highly clustered, forming pockets of densely connected individuals

[14] The tables below define a powerful independent director (PID) as one with at least three of the four centrality measures lying in the top quintiles of distributions based on the centrality measures of all officers and directors of listed firms covered by BoardEx. Qualitatively similar results ensue, by which we mean identical patterns of signs, significance, and rough coefficient magnitudes to those in the tables, if use top quintiles of distributions based on all officers and directors of listed and unlisted firms. Using the top 15% or 25%, rather than top quintiles, of the distributions also generates qualitatively similar results.

Also, in constructing the power centrality measures, we assume that, once one person knows another, the connection persists until one of them dies. As robustness checks, we construct alternative versions of the network, and recalculate the power centrality measures assuming connections form only after three years of overlap, and assuming connections break after five years of non-overlap, and both. Qualitatively similar results to those in the tables ensue in each case.

within the community most of whom have relatively few links to the outside. How this affects the different power centrality measures depends on the underlying economics. If power is primarily access to information, the different measures can produce very different rankings (Freeman 1979; Freeman, et al. 1980; Hossain et al. 2007; Kiss and Bichler 2008. For example, degree centrality implicitly assumes that information decays completely after one degree of separation (Bolard 1988), while the closeness and eigenvector measures assume a gradual decay as degrees of separation increases. Betweenness is then interpretable as capturing the number potentially distinct information flows the individual can tap. In contrast, if power is primarily ability to influence other people's decisions, different considerations arise. For example, Borgatti (2006) argues that, while individuals with higher closeness power centrality might be better at diffusing information, those with higher betweenness power centrality are better at disrupting the flow of information to others in the network. Thus, Lee et al (2010) argue that betweenness best captures "power as influence". However, the number of one's direct connections is the number of people with whom one can directly communicate ones view, and the closeness and eigenvector measures potentially capture how easily one can persuade friends to influence friends. Still other issues arise in empirical work. Most importantly, potential sampling omissions tend to destabilize some measures more than others. Costenbader and Valente (2003) show degree centrality to be the most stable and eigenvector centrality the least stable. Given these conflicting and incompletely resolved issues, we follow Hossain et al (2007) and employ a composite measure that defines power centrality based on each individual's three largest centrality measures, and also provide robustness checks using alternative composite measures and each measures separately.

We say independent director *i* is powerful, setting her value of *PID* to one, if three or more of her power centrality measures fall into the top quintiles of their distributions. That is,

$$PID_i \equiv \begin{cases} 1 & \text{if } \delta(d_i \geq 80) + \delta(b_i \geq 80) + \delta(c_i \geq 80) + \delta(e_i \geq 80) \geq 3 \\ 0 & \text{otherwise} \end{cases}$$

We aggregate individual data to the firm-level, and set the indicator variable *powerfully independent board* (PIB) to one if a majority of firm *h*'s independent directors are PIDs, and to zero otherwise.

$$PIB_h \equiv \begin{cases} 1 & \text{if a majority of firm } j\text{'s independent directors are PIDs} \\ 0 & \text{otherwise} \end{cases}$$

For comparison, we define firm *h* as having an independent board by setting IB_h to one if a majority of its directors are designated independent in its financial statements and to zero otherwise.

Also for comparison, we say a firm has a non-CEO chair of the board and NCC_h to be one if firm *h*'s CEO is does not also chair its board of directors, but set NCC_h to zero otherwise. We then designate firm *h* as having a powerful non-CEO chair if $NCC_h = 1$ and the person serving as chair is powerful, in that at least three of her four centrality measures fall into the top quintiles of their distributions. That is, we say firm *h* has a powerful non-CEO chair as

$$PNC_h \equiv \begin{cases} 1 & \text{if } h'\text{s board is chaired by individual } i \text{ who is not its CEO \& has} \\ & \quad \delta(d_i \geq 80) + \delta(b_i \geq 80) + \delta(c_i \geq 80) + \delta(e_i \geq 80) \geq 3 \\ 0 & \text{otherwise} \end{cases}$$

Finally, we analogously identify a firm as having a powerful CEO (PCEO) if at least three of its CEO's four centrality measures in the top quintiles of their distributions. Thus, we say firm *h* has a powerful CEO as

$$PCEO_h \equiv \begin{cases} 1 & \text{if } h'\text{s CEO is individual } i \text{ and has} \\ & \quad \delta(d_i \geq 80) + \delta(b_i \geq 80) + \delta(c_i \geq 80) + \delta(e_i \geq 80) \geq 3 \\ 0 & \text{otherwise} \end{cases}$$

The average CEO centrality is the 74th percentile, and the median is the 80th percentile, indicating that half of S&P 1500 CEOs are *powerful CEOs*.

We require all firms to have a minimum of three years in the sample. Our final sample includes 15,889 firm-years for 1956 unique firms. Table 3 lists the names and definitions of the variables that used in the tables to follow.

[Table 3 about here]

Table 4 tallies the percentages of boards with a majority of independent directors and powerfully independent directors, the percentages of firms that separate the CEO and chair jobs and that appoint a powerful director as the non-CEO chair. Over our sample period of 1999 to 2009, boards with independent directors increase monotonically, as do boards with a majority of PIDs. Likewise, an increasing fraction of firms separate the CEO and board chair jobs and name a powerful director as the non-CEO chair. The importance of powerfully independent directors on key board committees also rises steadily through time.

[Table 4 about here]

3.2. Firm Governance and Financial Variables

We obtain financial accounting data from Compustat and stock return data from CRSP for our sample of S&P 1500 firms from 1999 to 2009. CEO compensation data are taken from ExecuComp and additional information on each director of the S&P 1500 boards are obtained from Risk Metrics. This includes a director's age, and her assignments to the audit, nominating, and compensation committees.

We measure shareholder valuation by a firm's *Tobin's Q*, the sum of book value of total assets and market equity of common shares, minus book value of equity and deferred taxes, all divided by total book assets.[15]

We also include control variables known to affect Tobin's Q. The control variables include various firm characteristics: *size*, the logarithm of total assets; *leverage*, defined as total debt over total assets; *profitability*, net operating cash flow plus depreciation and amortization; *growth*, net capital expenditure scaled by previous year's net property, plant and equipment (Yermack (1996)); and intangibles, *advertising* and *R&D* expenditure, each scaled by total assets and set to zero if not reported (Morck et al. (1988)). We also control for key corporate

[15] Using Compustat variable names, $Q = [at + (prcc\_f \times csho) - ceq - txdb]/at$. As a robustness check, we also calculate the numerator as the sum of market value of common shares, book value of short-term and long-term debts, liquidating value of preferred shares, and deferred taxes and investment tax credit, while using the same denominator of total book assets. Qualitatively similar results ensue.

governance variables shown elsewhere to affect Q ratios. These include *CEO age* (Morck et al. (1988)) and *board size* (Yermack (1996)), in logarithm form, and the *e-index* of Bebchuk, Cohen and Farrell (2009) – a composite index reflecting the absence or presence of economically important management entrenchment devices: supermajority requirements on amending corporate charters, similar requirements for mergers, limits on amending bylaws, staggered boards, poison pills, and golden parachutes.

Table 5 Panel A presents summary statistics. In our sample, the average Tobin's Q is 1.58, with a standard deviation of 1.55. The average board has nine members. Over the entire sample period, independent directors constitute 80% of the typical board, and 57% are PIDs. The mean independent director centrality is at the 81th percentile. The summary statistics of the other variables accord with those in other studies using these data.

[Tables 5 about here]

4. Empirical Results and Discussion

We hypothesize that the presence of powerful CEOs, powerful non-CEO chairs, and a predominance of powerfully independent directors might affect shareholder value. In particular, we posit that powerful non-CEO chairs and powerfully independent directors do so more reliably than generic non-CEO chairs and independent directors.

4.1 Power Structure of the Board and Shareholder Value

As a first pass test of this, firm valuation is measured by *Tobin's Q*, the market value of a firm over the replacement costs of its assets, or empirically defined using Compustat data as the book value of total assets minus the book value of equity plus the market value of equity minus deferred tax obligations, divided by total book assets. Average Q is known to be affected by other factors. Table 6 therefore re-considers these comparisons using regressions of Q ratios with industry and year fixed-effects and a standard set of control variables, allowing for firm-level clustering. The control variables attract typical coefficients and significance levels. Larger firms, larger boards, more levered firms, and firms with more entrenched managers (indicated by a higher *e-index*) all have significantly lower shareholder valuations. Firms with more capital investment, higher R&D spending, and higher profitability are tend to have higher Tobin's Q ratios.

[Table 6 about here]

Regressions 6.1 through 6.3 shows that shareholders attach a statistically significant valuation premium to firms with powerfully independent boards (PIB), but not to firms with powerful CEOs (PCEO) or powerful directors other than the CEO chairing the board (PNCC). Regressions 6.4 through 6.6 repeat these comparisons, but use continuous measures: the power centrality of the CEO (CEOC), the mean power centrality of independent directors (IDC), and the power centrality of the chair if the chair is not the CEO (NCCC). These regressions show that more powerfully independent directors correlate with higher valuations, but that more powerful CEOs and non-CEO chairs do not. Regressions 6.5 and 6.6 include each set of three power centrality measures, and show that only the power centrality of the independent directors correlates with higher shareholder valuations.

The coefficients associated with independent director power in Table 6 are highly

economically significant. For example, regression 6.2 implies that shareholders attach a premium of 5.7% (0.09 over the mean Q ratio of 1.58) to the market value of a firm with a powerfully independent board.

[Table 7 about here]

Table 6 contrasts starkly with the uniformly statistical insignificance of standard measures of board independence and the separation of the roles of CEO and chair. Panel A of Table 7 reproduces typical regressions of this genre. The fraction of directors designated independent in the firm's financial statements, a dummy for a majority of directors so designated, and a dummy for a two-thirds majority of independent directors all attract either negative or insignificant coefficients. A dummy for the CEO not chairing the board is likewise insignificant. At face value, these regressions suggest that powerfully independent directors and powerful directors other than the CEO chairing the board correlate with elevated valuations, nominally independent directors and simply separating the roles of CEO and chair do not.

Panel B of Table 7 lets us compare powerfully independent directors to powerful insider directors. Regressions 7B.1 and 7B.2 show that a majority of insider directors being powerful, like the PIB dummy for a majority of independent directors being powerful, correlates with elevated shareholder valuations. Regressions 7.3 through 7.5 show that a powerful insider other than the CEO chairing the board correlates with higher value, but a powerfully independent director doing so does not. Regressions 7.6 and 7.8 run a horserace between all these indicators, and find that a powerfully independent board attracts a nearly 50% larger point estimate than does a powerfully non-independent board, but that both indicators remain highly significant. At face value, these results point to power mattering more than independence for directors, and power mattering for a non-CEO chairing the board only if the chair is an insider.

The results in Tables 6 and 7 are very robust. For example, we cluster the standard errors by firm to control for persistence at the firm level and include industry fixed effects to control for unobserved time invariant latent industry factors. Clustering by industry, which also allows for cross-correlations between firms within each industry, generates *qualitatively similar* results to those in the table, by which we mean identical patterns of signs and significance as well as comparable point estimates. Regressions including all possible combinations and permutations of the variables in the table yield qualitatively similar results to those in the tables in every case. Dropping the control variables, but retaining year and firm fixed effects, also generates qualitatively similar results, except that a powerful CEO becomes significantly associated with higher Q ratios. Restoring the controls one-by-one reveals R&D spending critical in rendering PCEO insignificant: R&D intensive firms tend to have powerful CEOs, but both are included, the R&D variable retains significance while PCEO does not. Powerful CEOs have a higher median age, but dropping the CEO age variable does not qualitatively change the results.

4.2 The Direction of Causality

The panel regressions in Table 6 and 7 are consistent with powerfully independent directors, powerfully non-independent directors, and powerfully non-independent non-CEO chairs elevating shareholder valuations (direct causality). However, high shareholder valuations might also help firms attract and retain powerful directors (reverse causality); or some other factor might both elevate shareholder valuations and draw powerful directors (latent factor causality). Latent factor problems are mitigated in Tables 6 and 7 by including control variables designed to

proxy for plausible latent factors. This section undertakes a series of tests to distinguish direct from reverse causality.

Our first approach is an event study of stock market reactions to the sudden deaths of corporate directors. LexisNexis and Google searches, we construct a list of directors in our sample who die while serving on their boards and ascertain the date and the cause of death in each case. We exclude death events coincident with confounding events, such as earnings or M&A announcements, the 9-11 attacks, etc.; as well as death events following a long–term illness. Each decedent director is classified as independent or not and as powerful or not. These events provide defensibly exogenous changes to the power of independent directors in the affected firms' boards, and their associated stock price reactions measure their impacts on shareholder valuation.

[Figure 1 about here]

Figure 1 summarizes the results graphically. Firms' stock prices drop substantially on news of a powerfully independent director's sudden death. In contrast, news of the sudden deaths of other directors causes either little change or, in the case of insider directors – powerful or not – a stock price increase.

[Table 8 about here]

Panel A of Table 8 begins by reproducing the findings of Nguyen and Nielsen (2010) that, on average, stock prices fall on news of independent directors sudden deaths. However, regardless of the window, and regardless of how the CARs are weighted, stock prices drop substantially only on news of the sudden death of a powerfully independent director, and actually rise on news of the sudden death of a non-powerfully independent director. Panel A suggests that the finding that stock prices drop on news of independent director deaths is driven by the deaths of powerfully independent directors only.

Panel B tests the statistical significance of the patterns presented in Figure 1 and Panel A. Each column summarizes a regression of CAR on main effects for directors being powerful (PD) and independent (ID) as well as their cross produce, which is equal to our powerfully independent director dummy (PID). The main effect of the independent director dummy is uniformly insignificant, indicating that independent director sudden deaths do not move the stock price if the decedent is not powerful.

The main effect of the powerful director dummy is positive across the board and significant in three of the eight regressions. Because the regressions all include the PID cross-product as well, these positive and intermittently significant main effect coefficients indicate that stocks do not fall, and may well rise, on news of the sudden death of a powerful insider director. The interaction, the PID dummy, attracts a significantly negative coefficient in every case, except for the value-weighted analysis using the seven day window [-3, +3], which attracts a similar point estimate but a p-level of only 14%. The negative coefficients on PID are uniformly larger than the positive coefficients on PD, so the net reaction to powerfully independent director deaths is negative. In the three regressions where PD attracts a positive significant coefficient, the net effect upon news of the death of a powerfully independent director is negative, but insignificant. Thus, five of the eight regressions in Panel B suggest a negligible stock price reaction to the sudden death of a powerful insider director and a significantly negative stock

price reaction to the sudden death of a powerfully independent director. The other three regressions point to a significantly positive reaction to the sudden death of a powerful insider director and negligible reaction to the sudden death of a powerfully independent director.

These findings are consistent with the results in Tables 6 and 7 reflecting causality flowing from the presence of a powerfully independent director on the board to elevated shareholder value, but from elevated shareholder value to more powerful insiders being on the board. The effects in Panels A and B are economically significant. For example, the sudden death of a powerfully independent director triggering a 2% drop share price drop causes a decline in shareholder value of over $200 million, given the average market capitalization of $11.64 billion in the relevant sample of firms.

Panel B of Table 7 highlights a statistically significant relationship between a powerful insider other than the CEO chairing the board and elevated shareholder valuations. We find only eight sudden deaths of powerful insider chairs, so the event study methodology for assessing the direction of causation is not statistically viable here. We therefore resort to an alternative method of causal inference, Granger causality tests, to explore this issue and to assess the robustness of the causality results from the event study tests above.

In such tests, a variable *X* is said to *Granger-cause* another variable *Y* if lagged values of *X* significantly explain *Y* after controlling for lagged values of *Y*. Here, *X* is an indicator variable for powerful non-CEO chairs (or another director power measure) and *Y* is the firm's Q ratio. The exercise thus runs firm-year panel regressions of Q ratios on its own lags and on lagged values of the board power indicators, adjusted for firm-level clustering and including industry and year dummies.

[Table 9 about here]

Consistent with powerfully independent directors elevating shareholder valuations, the left panel of Table 9 shows all combinations of lags of the two independent director power measures, PIB and IDC, to Granger cause shareholder valuations. The right panel finds no evidence of the continuous measure of independent director power, IDC, Granger causing shareholder valuations, but suggests reverse causality at a one year lag only if independent director power if gauged by the PIB dummy variable. Table 9 thus supports causation flowing from director power to shareholder valuations, but does not entirely rule out reverse causality as well.

Table 9 reveals reverse causality underlying the correlation between Q and non-independent director power. The left panel finds no evidence of either the continuous measure, NIDC, or the dummy, PNIB, Granger causing shareholder valuations. In contrast, the right panel reveals statistically significant evidence that shareholder valuations Granger cause powerfully non-independent directors. Table 9 thus reinforces the evidence above that powerful people tend to become directors of already highly valued firms.

The Granger causality tests also favor high valuations attracting powerful people to chair their boards. Shareholder valuation is Granger caused by neither a powerfully independent chair, as reflected by PINC or INCC, nor a powerfully non-independent chair, as reflected by PNINC or NINCC. In contrast, none of these chair power measures Granger causes shareholder valuation. The picture is muddied somewhat if powerfully independent and non-independent non-CEO chairs are pooled to make one set of power centrality measures – a dummy PNC for a powerful director as the non-CEO as chair and the mean power centrality of the non-CEO chair,

NCC. This exercise suggests causality flowing in both directions.

Overall, Table 9 is consistent with the event studies above in favoring direct causality: powerfully independent directors Granger cause Tobin's Q. Reverse causality, Tobin's Q also Granger causing powerfully non-independent directors, is not utterly precluded, but finds far less robust support in the data. In contrast, the data favor reverse causality, a high Tobin's Q Granger causing a firm to have a powerfully non-independent non-CEO as chair and do not support direct causality, a powerfully non-independent non-CEO as chair Granger causing the firm's Q ratio. This exercise thus isolates powerfully independent directors causing high Q ratios as the only result from Tables 6 and 7 that survives the Granger causality tests.

[Table 10 about here]

Lastly, Table 10 shows changes in Tobin's Q corresponding to changes in the power structure of the board. The table shows an additional PIDs correlates with a significant increase in shareholder valuation of five to six percent. In contrast, a net increase in powerfully non-independent directors (PNIDs) is uncorrelated with shareholder valuation, as is the entry or exit of a powerfully non-independent chair other than the CEO (PNIC). A powerfully independent director assuming the chair actually correlates with a 2.5% drop in shareholder valuation.

While this exercise is conceptually an event study, the annual frequency of observations of Q makes causal inference noisy. Given this caveat, the timing of changes in the numbers of powerfully independent directors is consistent with more such directors causing investors to value a firm's shares more highly. In contrast, the timing of powerfully non-independent directors' and powerful non-CEO chairs' entries and exits does not correspond with changes in shareholder valuations consistent with these directors and chairs causing the correlations with elevated shareholder valuations evident in Tables 6 and 7.

Given the results in Tables 8, 9 and 10, we conclude that the weight of empirical evidence favors more powerfully independent directors elevating shareholder valuations, but that other powerful people on the board – more powerfully non-independent directors, powerfully independent directors chairing the board, and powerfully non-independent directors other than the CEO chairing the board – do not appear to cause higher shareholder valuations. We recognize that these conclusions are tentative, and welcome further research into these issues.

4.3 How Powerfully Independent Directors Matter

Taking the thesis that powerfully independent directors elevate shareholder value as an operating hypothesis, this section explores channels through which this effect might operate. We therefore consider situations in which the potential for corporate governance problems is plausibly especially large, and explore the importance of powerfully independent boards in these situations.

M&A

Mergers and acquisitions often rank among the most economically important decisions CEOs make. Many acquisitions result in substantial bidder shareholder value losses, and boards' failure to provide sound advice or to rein in CEOs who ignore it are often blamed (Morck et al. (1990b), Moeller et al (2004, 2005)). If powerful non-CEO chairs and powerfully independent directors render boards more effective, their presence ought to decrease the incidence of

shareholder value-destroying M&A.

A sample of acquisitions by S&P 1500 firms from 2000 to 2009 for which Securities Data Company (SDC) data are available let us identify takeovers of listed firms by listed firms and estimate their value to the acquiring firm (the bidder's CAR) and to shareholders (the size-weighted average of the two firms' announcement CARs). This exercise excludes acquirers with pre-acquisition majority ownership and a post-acquisition ownership below 100% to eliminate effects associated with stalled takeovers. This leaves 632 takeovers by 379 distinct acquirers.

[Table 11 about here]

Table 11 presents OLS regressions of the cumulative abnormal returns of either the bidder or the bidder and target around the merger announcement on either the powerfully independent board dummy variable, PIB, or the mean independent director centrality measure, IDC. Cumulative abnormal returns are measured from three days prior to the announcement date until three days after it, and denoted CAR[-3, 3].

Controls include the log of CEO age (Jenter and Lewellen, 2011), log bidder size (Moeller, et al. 2004, 2005), the E-index entrenchment measure of Bebchuk, et al., 2009), dummies for the target and bidder being in the same industry (Morck, Shleifer, and Vishny, 1990) and for the payment being primarily in the bidder's stock (Myers and Majluf, 1984), and year and bidder industry fixed effects. In addition, the size of the deal is measured as deal value over bidder size in regressions explaining the bidder CAR or deal value over combined size in regressions explaining the combined CAR. Finally, because El-Khatib, Fogel, and Jandik (2013) find firms with better connected CEOs more prone to undertake value destroying M&A, we also control for the dummy indicating a powerful CEO, PCEO, in regressions where the dummy PIB measures independent director power, and for the continuous CEO power centrality measure CEOC in regressions where the continuous variable IDC measures independent director power. In general, the controls attract coefficients consistent with prior studies. In particular, our CEO power measures enter significant and negative, with coefficients consistent with the results of El-Khatib et al. (2013).

Acquirers with powerfully independent boards make significantly better M&A decisions, countering about one third of the negative effect of a powerful CEO. A powerfully independent board correlates with a bidder CAR higher by 2.0% and a combined CAR higher by 1.7%. Given number and sizes of the deals in our sample, this constitutes an economically significant addition of $623 million to acquirer shareholder wealth and of $561 million to overall shareholder wealth.

These results are robust to alternative lists of controls. For example, including all the controls used in Table 6 yields qualitatively similar results – and the additional control variables are uniformly insignificant. Including the powerful dummy variables or continuous power centrality measures for powerfully non-independent directors and/or independent and/or non-independent non-CEO chairs likewise yields qualitatively similar results, and the added power measures are likewise uniformly insignificant. The sole exception is that the powerfully non-independent board dummy, *PNIB*, attracts a negative and significant signs if PCEO is dropped. Including the PCEO dummy renders the coefficient of PNIB insignificant.

Free Cash Flow

Jensen (1986) argues that self-interested managers are apt to retain earnings and invest excessively from shareholders perspective, and thus to pay lower dividends than shareholders

would prefer. This free cash flow agency problem is known to be more commonplace in firms with lower shareholder valuations, higher cash flows, and lower dividend payouts (Lang and Litzenberger 1989; Lang, Stulz and Walkling 1991; La Porta et al. 2000). Our proxy for the likelihood of free cash flow problems is therefore an indicator variable set to one if the firm has all of the following: a below median Tobin's Q, an above median cash flow to property, plant and equipment ratio, and a below median dividend payout ratio; and to zero otherwise.

[Table 12 about here]

Jensen (1986) argues that free cash flow agency problems are apt to be worse in firms where boards are less effective in advising and monitoring the CEO. To explore this, Table 12 presents probit regressions of the likely free cash flow problem dummy on either the powerfully independent board dummy, *PIB*, or the continuous independent director power centrality variable, *IDC*. Consistent previous studies, lower leverage and greater managerial entrenchment also correlate significantly with the likely free cash flow problems indicator.

Consistent with Jensen's prediction, a both independent director power measures attract negative significant coefficients. The effects are also economically significant. For example, PIB corresponds to a 25.2% lower likelihood of a firm being designated as likely to suffer from free cash flow problems.

Abnormal CEO successions

Boards fulfill their monitoring duties by, among other things, firing CEOs who oversee persistently poor firm performance. Weisbach (1988) reports weak past financial performance increasing the odds of a forced CEO exit in firms with more independent boards. To investigate this issue, we follow Vancil (198x), who argues that a board satisfied with the departing CEO generally selects a senior officer – one of the old CEO's team - as the successor so as to disturb existing policies as little as possible; and that a new CEO from outside reliably indicates dissatisfaction the status quo. We therefore flag as *abnormal successions* firm-year observations during which a CEO steps aside for a successor drawn from outside the firm.

[Table 13 about here]

Table 13 presents probit regressions of a dummy variable set to one for abnormal successions and zero otherwise on the firm's total stock return the prior year, *RET*, various independent director power measures and, following Weisbach (1988), their interactions. The power measures are: the powerfully independent board dummy, *PIB*, a powerfully independent nominating committee dummy variable, *PIBN*, set to one if a majority of the independent directors on the nominating committee are powerfully independent directors (PIDs), the continuous mean independent director centrality measure, IDC, and an analogously defined mean of the power measures of independent directors on the nominating committee, *IDCN*.

Weisbach argues that the coefficients of the interaction terms in such regressions reflect the board's propensity to fire an underperforming manager. In Table 13, these coefficients are uniformly negative and two of the four, those of the interactions of lagged stock returns with *PIBC* and IDC are statistically significant. Including additional controls for CEO power and non-CEO chair power and independence leaves the coefficients of the independent director power measures virtually unchanged, and the added controls are uniformly insignificant. These findings

are consistent with more powerfully independent directors on the full board and the nominating committee being more prone to replace underperforming CEOs with outsiders.

CEO Compensation

We collect data from ExecuComp on the cash, equity, and total compensation of CEOs, and take log transformations of these as dependent variables. The key variable of interest on the right hand side of our regressions is the sensitivity of the CEO's compensation components to past stock return performance in PIB boards versus other boards. The control variables include past shareholder returns (Murphy, 1985), CEO age (McKnight, 2000), CEO entrenchment index (Bebchuk, et al., 2009), firm size (Murphy, 1985), board size (Hermalin and Weisbach, 2001), leverage (Ortiz-Molina, 2007), Profitability (Deckop, 1988), capital investments and R&D investments (Cheng, 2004). Table 14 presents the regression coefficients and significance levels.

[Table 14 about here]

Table 14 examines the link between independent director power and CEO pay defined as total compensation in Panel A, equity-linked compensation in Panel B, and cash compensation in Panel C. Paralleling Table 13, we set a *Powerfully Independent Board Compensation Committee* (*PIBC*) dummy variable to one if a majority of PIDs on its compensation committee and the mean power centrality of the independent directors on that committee, *IDCC*. More powerful CEOs receive higher compensation across the board; as do CEOs running larger firms and CEOs serving in the wake of higher past returns. Older CEOs receive more cash and less equity-based compensation.

Panel A shows powerfully independent boards and compensation committees generally award CEOs higher total compensation package. Regressions 14A.5 to 14A.8 show that this effect persists after controlling for powerful CEOs – who appear to command higher pay in general. Total CEO pay is positively related to the prior year's stock return, but no more or less in firms with powerfully independent full boards or compensation committees. Consistent with prior findings, the CEOs of larger or more profitable firms also command higher pay, as do CEOs whose entrenchment renders them less accountable to shareholders. More R&D intensive firms also pay their CEOs better.

Panel B, explaining CEO equity-linked compensation, presents a generally similar picture. Older CEOs' pay is less linked to equity values, as is the pay of CEOs running firms with large advertising budgets. The most important difference is that firms with more powerfully independent full boards and compensation committees tie CEO equity-linked pay significantly more tightly to lagged stock returns in three of the eight specifications. Remarkably, CEO equity-linked compensation is not significantly related to lagged stock returns in firms whose boards or compensation committees lack a substantial presence of powerfully independent directors. Panel C resolves this puzzle by revealing the positive correlation between CEO pay and the lagged stock return evident in Panel A to be due to higher cash compensation.

Earnings Management

A large body of empirical work links more extensive earnings management to less effective internal control procedures (Doyle et al. (2007)), less disciplinary executive turnover (DeAngelo (1988), Dechow and Sloan (1991), and less independent boards and audit committees (Klein

(2002).

This section examines whether or not more powerfully independent directors on the board or audit committee limit earnings management. Abnormal earnings accruals are estimated as in Jones (1991), but adjusting for growth in credit sales (Dechow et al. (1995)), and benchmarking against a control firm – that with the closest ROA in the same industry that year (Kothari et al. (2005)).

[Table 15 about here]

Each regression in Table 15 explains abnormal earnings accruals with one our independent director power measures for the full board, the dummy *PIB* or the continuous measure IDC or with their analogs reflecting the power of independent directors on the audit committee, the dummy variable *PIBA* and the continuous measure *IDCA*. The table reveals abnormal accruals to be significantly lower in firms with powerfully independent boards or audit committees in five of the eight specifications, and bordering on being significantly lower (p = 0.11) in two more. The point estimate in 15.1 amounts to roughly half of the overall mean value of abnormal accruals, and so the effect is highly economically significant. The coefficients on the controls show earnings management to be greater if the CEO is older or less powerful or if the firm engages in less capital investment. Reported earnings are also higher in firms that manage earnings more aggressively. These findings are consistent with powerful independent directors elevating shareholder valuations by limiting earnings management.[16]

4.4 Robustness Checks

The results presented above survive a battery of robustness checks. Throughout the analysis, we test for outliers and windsorize the continuous variables to mitigate outlier influence in the results.

The precise way the PIB dummy is constructed does not drive these results. First, the exact fraction of independent directors we require to be PIDs in order for PIB to be set to one does not greatly affect our results: other reasonable values, such as 3/5, 2/3, 3/4, or 4/5, yields qualitatively similar results, by which we mean identical patterns of signs and significance to those in the tables, along with plausible coefficient point estimates given the specific robustness exercise.

Reasonable alternative measures of the power centrality of independent directors tell much the same story as the variables din the table. For example, a *PID ratio*, the number of PIDs divided by the number of independent directors, a continuous variable ranging from 0 to 1, yields results qualitatively similar to those in the tables.

The measures of the presence, independence or non-independence of a powerful director other than the CEO chairing the board – the dummies PNC, PINC or PNINC, respectively and their continuous analogs PNCC, INCC or PINCC, respectively – are not shown in table 11 through 15 except in cases where one is significant. Including these variables as additional controls in these tables generates qualitatively similar results and the added variables are uniformly insignificant.

[16] As a robustness check, abnormal accruals are also estimated using an alternative variant of the method in Jones (1991) that benchmarks accruals against a control firm – that with the closest ROA in the same industry that year (Kothari et al. (2005)). Qualitatively similar results ensue.

Further robustness checks utilize alternative continuous power measures: the arithmetic mean of the individual's three highest centrality measures, expressed in percentiles, rather than of all four. For example, for individual *i*, this alternative continuous centrality measure is $C_i = \frac{1}{3}(d_i + b_i + c_i + e_i - \min[d_i, b_i, c_i, e_i])$. Constructing analogs of our various dummies and based on this procedure again generates qualitatively similar results to those shown in the tables.

5. Conclusions

Boards dominated by powerful independent directors increase shareholder's valuations of those companies. Sudden director death event study regressions show causation to flow from powerful independent directors to shareholder valuations. These results validate measuring not just directors' status as independent, but also their power – their ability to access information, draw on external resources, and mobilize support to question and, if necessary, defy CEOs bent on strategies that risk destroying shareholder wealth and exposing directors to lawsuits.

These findings may explain why a robust link between independent directors on boards and firm value has proved so elusive. Nominally independent directors who lack a power-base with which to exercise their independence might as well be officers of the company as far as shareholder wealth effects are concerned. That a few very recent studies find some evidence of independent directors mattering may reflect the fact that more independent directors have such power bases in more recent years. Nonetheless, such findings may well be due to variables based on nominally independent directors becoming noisy proxies for measures reflecting effectively independent directors in recent years, not to legal director independence mattering per se..

These findings also suggest a range of public policy and corporate governance strategy considerations. First, public policy should recognize two sorts of agency issues in corporate governance: compromised director loyalty to shareholders and uncompromised director loyalty to powerful CEOs. Directors' loyalty to shareholders may well be adequately ensured by a fiduciary duty to shareholders limited by a business judgment rule. However, additional measures designed to disrupt directors' loyalty to a powerful CEO might be considered if the goal of corporate governance reform is greater value creation by corporations. Specifically, attention might be given to recruiting independent directors with independent power bases that let them challenge a CEO if necessary.

CEOs who lead their firms into corporate governance disasters also destroy their own wealth and careers, and so might welcome powerful dissenting voices that protect them from mistakes. Bernardo, Antonio and Welch (2001), Adams, Almeida, and Ferreira (2005) and others identify overconfident and powerful CEOs who turn out to be right as valuable trailblazers; and boards that become debating societies could plausibly be as problematic as a board of loyal "yes men". Nonetheless, the tables above suggest that, at present in the United States, more capacity for debate in boards elevates shareholder valuations and limits strategic mistakes such as value destroying takeover bids, cash flow retention in excess of liquidity and capital spending needs, or a failure to keep up with technological change.

This may not be true in every circumstance. Different issues may matter more in different firms, industries, time periods, or countries. For example, where controlling shareholders – tycoons or business families, rather than professional hired CEOs – dominate corporate governance, large-shareholder entrenchment (Stulz (1988)) and self-dealing (Johnson et al. (1999)) may attain greater economic importance and directors with power bases independent of the controlling shareholder might merit attention. Where state-owned enterprises or listed firms

controlled by sovereign investment funds attain more importance than they have in the United States, attention might be given to mechanisms that allow powerful independent voices within those entities – perhaps to remind political appointees of a duty to taxpayers. We welcome additional research into these and other related questions.

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Figure 1

Cumulative abnormal returns surrounding the sudden deaths of directors, by status of decedent as independent or insider, and either powerful or not powerful if independent.

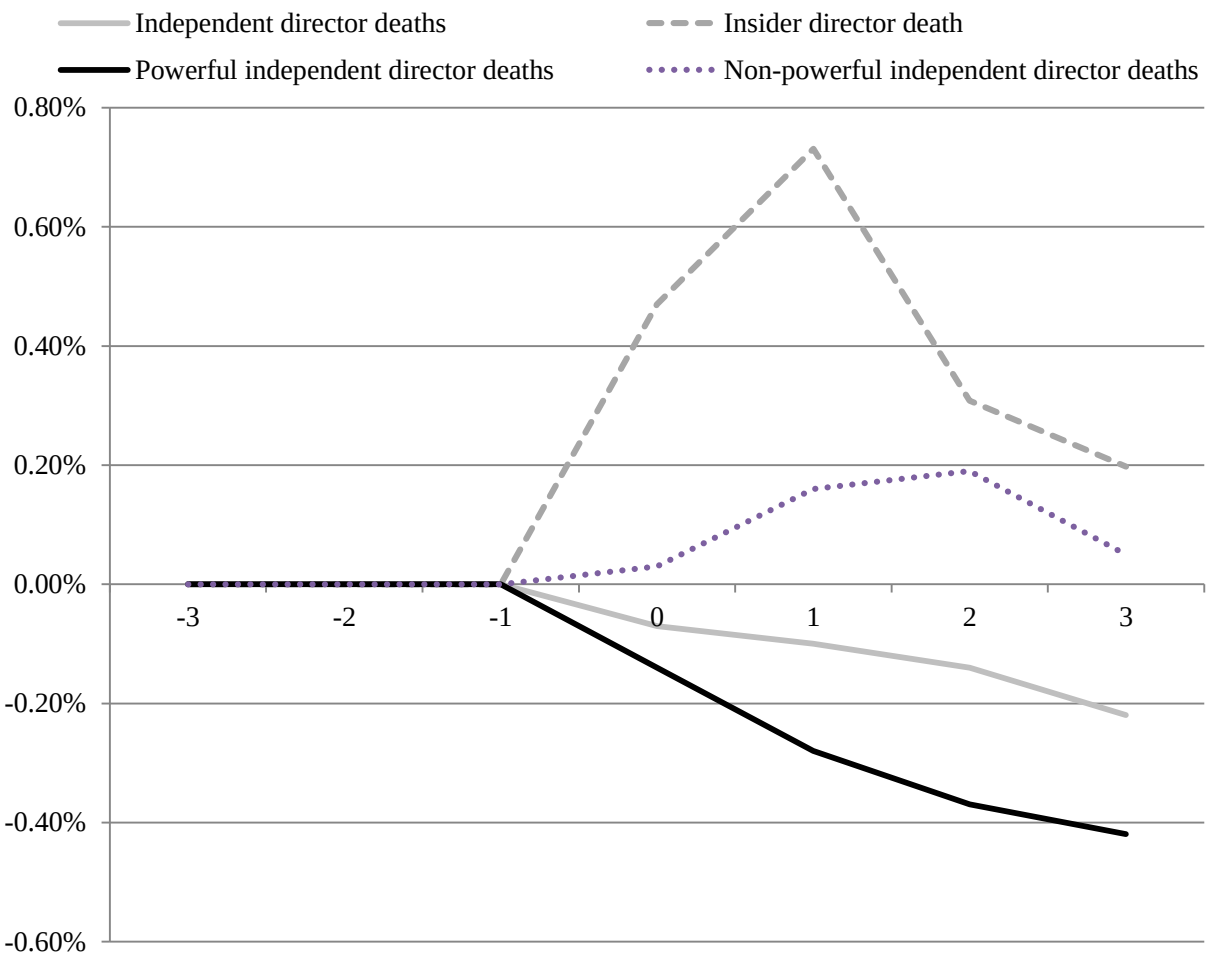
Independent director deaths
Insider director death
Powerful independent director deaths
Non-powerful independent director deaths
0.80%
0.60%
0.40%
0.20%
0.00%
-0.20%
-0.40%
-0.60%
-3
-2
-1
0
1
2
3

Table 1: Corporate Executives and Directors Social Network Characteristics

Each Node is a director or business executive with at least one connection to other directors or executives. The Listed Network includes all business professionals who ever worked at or served on the board of a listed firm. The Largest Component of the Listed Network includes those connected to the largest sub-network based on ties established in listed firms. The Full Network includes all directors or executives with at least one connection to another business professional who ever worked at any firm, public or private, covered by BoardEx from 1998 through 2010.

Year	Nodes in Listed Firm Network	Nodes in Largest Component of Listed Firm Network	Nodes in Full Network (Listed & Unlisted Firms)
1998	191,049	167,211	267,979
1999	200,156	178,209	275,377
2000	210,220	190,310	283,643
2001	219,321	201,059	291,002
2002	228,375	211,299	298,138
2003	237,980	222,129	305,074
2004	249,126	234,714	313,040
2005	261,823	249,123	322,010
2006	276,237	264,915	332,341
2007	292,131	281,985	343,779
2008	305,399	295,763	336,175
2009	313,958	304,460	384,489
Mean	248,815	233,431	312,754

Table 2: Officer and Director Power Centrality Measure Characteristics

The social networks described in Table 1 contain nodes representing 15,889 CEO-years with 3,302 unique CEOs, 5,983 non-CEO chairs-year, and 132,000 Director-years with 19,223 unique directors. Other nodes represent corporate executives, bankers, and other business executives included in Boardex, but not serving as a CEO, chair or director of the S&P 1500 sample from 1999 to 2010.

Panel A: Characteristics of Raw Power Centrality Measures

			Mean	Std. Dev.	Min	25th	Median	75th	Max
CEOs	**Betweenness**	B_i	0.00450%	0.0111%	0.00%	0.0000425%	0.000795%	0.00396%	0.362%
	Closeness	C_i	24.8%	3.03%	0.00619%	22.8%	24.9%	26.9%	33.6%
	Degree	D_i	192	261	3	45	94	218	3,006
	Eigenvector	E_i	0.0563%	0.375%	0.00%	0.0000921%	0.000730%	0.00824%	4.10%
Non-CEO Chairs	**Betweenness**	B_i	0.00685%	0.0158%	0.00%	0.000113%	0.00129%	0.00630%	0.336%
	Closeness	C_i	25.2%	3.08%	0.00856%	23.2%	25.3%	27.2%	33.7%
	Degree	D_i	170	220	5	40	81	203	2,064
	Eigenvector	E_i	0.0649%	0.404%	0.00%	0.000114%	0.000850%	0.00921%	4.11%
Directors	**Betweenness**	B_i	0.00975%	0.0229%	0.00%	0.000147%	0.00216%	0.00905%	0.675%
	Closeness	C_i	25.3%	3.20%	0.000688%	23.2%	25.4%	27.6%	34.4%
	Degree	D_i	249	313	1	55	130	305	3,221
	Eigenvector	E_i	0.0581%	0.371%	0.00%	0.000129%	0.00213%	0.0117%	4.15%

Panel B: Characteristics of Power Centrality Measure Percentage Ranks

CEOs	**Betweenness**	b_i	76.2	24.0	1	66	84	94	100
	Closeness	c_i	74.7	21.4	2	61	80	92	100
	Degree	d_i	72.1	23.5	2	56	78	92	100
	Eigenvector	e_i	73.7	21.2	1	61	78	92	100
Non-CEO Chairs	**Betweenness**	b_i	79.7	22.5	1	72	87	96	100
	Closeness	c_i	75.8	21.0	2	64	81	93	100
	Degree	d_i	74.3	22.7	3	59	80	94	100
	Eigenvector	e_i	74.8	20.8	1	63	78	92	100
Directors	**Betweenness**	b_i	79.8	25.7	1	73	90	98	100
	Closeness	c_i	78.2	21.3	1	66	85	95	100
	Degree	d_i	77.0	22.4	1	63	86	95	100
	Eigenvector	e_i	76.5	20.9	1	65	81	94	100

Table 3: Variables and Definitions

Variable	Definition
Measures of Independent Directors' Power	
Independent Board (IB)	Dummy set to 1 if more than 50% of directors are independent (as defined in financial statements) and 0 otherwise
Powerful Independent Director (PID)	A director-level dummy, used to construct firm-level variables, and defined as follows: An independent director is a *powerful independent director (*PID) if at least three of his four centrality measures are in their distributions' top quintiles)
Powerful Independent Board (PIB)	Dummy set to 1 if more than 50% of directors are both independent and powerful, and 0 otherwise
Independent Director Centrality (IDC)	Mean of the top 3 centrality measures for all independent directors on board
PID Ratio on Board (PIDR)	Fraction of powerful independent directors on board
Measures of Chair's Power	
Non-CEO Chair (NC)	Dummy set to 1 if the CEO does not chair the board and 0 otherwise
Non-CEO Chair Centrality (NCC)	Mean of chair's top 3 centrality measures if CEO is not chair, 0 otherwise
Powerful Non-CEO Chair (PNC)	Dummy set to 1 for a non-CEO chair whose top three centrality measures average falls above the 80th percentile of all business professionals and 0 otherwise
Independent Non-CEO Chair Centrality (INCC)	Mean of chair's top 3 centrality measures if an independent director is the chair, 0 otherwise
Powerful Independent Non-CEO Chair (PINC)	Dummy set to 1 for an independent non-CEO chair whose top three centrality measures average falls above the 80th percentile of all business professionals and 0 otherwise
Non-independent Non-CEO Chair Centrality (NCCC)	Mean of chair's top 3 centrality measures if an insider director, not the CEO, is chair, 0 otherwise
Powerful Non-independent Non-CEO Chair (PNC)	Dummy set to 1 for a non-independent non-CEO chair whose top three centrality measures average falls above the 80th percentile of all business professionals and 0 otherwise
Measures of CEO Power	
Powerful CEO (PCEO)	Dummy set to one if CEO is *powerful* – defined as at least three of CEO's four centrality measures (degree, closeness, betweenness and eigenvector) in their distributions' top quintiles
CEO Centrality (CEOC)	Mean of the top 3 centrality measures for the CEO
Regression Variables	
Tobin's Q (Q)	The book value of total assets minus the book value of equity plus the market value of equity minus deferred tax obligations, divided by total book assets
CEO Age (CEOA)	CEO age

Board Size (BSIZE)	Total number of directors on board
E-Index (ENDX)	Entrenchment Index (Bebchuk, Cohen, and Ferrell, 2009)
Assets (ASSETS)	Log total assets, in billions of dollars
Leverage (LEV)	Total debt over total assets
Probability (PROF)	Net income over total assets
Tangibility(TANG)	Property, Plant, and Equipment over total assets
Capital Investment(CAPEX)	Net Capital expenditure over last year's property, plant and equipment
Cash Flows(CF)	The sum of net income, depreciation, and amortization over last year's property, plant and equipment
Research &Development (R&D)	Research & Development expense over total assets
Advertising (ADV)	Advertising expense over total assets
Event Study Variables	
Stock Return(RET)	Annual stock return minus the NYSE/AMSE/NASDAQ market index value weighted return
Sudden Death (DEATH)	An indicator variable set to one on the date of a powerful independent director's sudden death and zero otherwise
Measures of Changing Independent Director Power	
PID Addition (PIDA)	Dummy set to 1 if at least one new PID joins the board and 0 otherwise
PID Deletion (PIDD)	Dummy set to 1 if at least one new PID leaves the board and 0 otherwise.
Measures of Independent Directors' Power in Specific Decisions	
PID Ratio on Nominating Committee (PIDN)	Ratio of PIDs over total number of directors on nominating committee
PID Ratio on Auditing Committee (PIDA)	Ratio of PIDs over total number of directors on auditing committee
PID Ratio on Compensation Committee (PIDC)	Ratio of PIDs over total number of directors on compensation committee
Centrality of Nominating Comm. Members (IDCN)	Mean of the top 3 centrality measures for independent directors who serve on nominating committee
Centrality of Auditing Comm. Members (IDCA)	Mean of the top 3 centrality measures for independent directors who serve on auditing committee
Centrality of Compensation Comm. Members (IDCC)	Mean of the top 3 centrality measures for independent directors who serve on compensation committee
Other variables	
Bidder Return (BRET)	Cumulative Abnormal Return between [-3, +3] to a bidder upon merger announcement
Combined Return (CRET)	Cumulative Abnormal Return between [-3, +3] to the combined entity, calculated as the asset weighted CARs of the bidder and the target, upon merger announcement

Free Cash Flow	Dummy set to 1 if a firm's cash flow is higher than two digit SIC industry median, dividend payout is lower than two digit SIC industry median, and Tobin's Q is lower than two digit SIC industry median.
CEO Pay - Total	Log of total compensation (tdc1), defined as the sum of salary, bonus, stock grants, and option grants.
CEO Pay - Base	Log of cash compensation
CEO Pay – Performance-based	Log of stock and option compensation
Earnings Manipulation	The absolute value of discretionary accruals generated from the modified Jones model

Table 4: Characteristics of CEOs, Independent Directors, Chairs, and Committees

No. firms is number of S&P 1500 firms in sample each year. Board characteristics include: PCEO is set to one if the CEO is designated as powerful, that is having at least three of her four power centrality measures lying in the top quintiles of their overall distributions. PCEO is one if the CEO is designates as powerful. **BSIZE**, mean directors per board; **NID is the number of a firm's** directors designated independent in SEC filings and **IB** is one for firms with a majority of independent directors so defined and zero otherwise. N**PID/ID** is the fraction of independent directors designated as powerful and **PIB** is one for firms for whom a majority of independent directors are powerful Board chair characteristics are : **NCC,**set to one if the CEO is not the chair and to zero otherwise and **PNC** set to one if NCC is one and if the chair is designated as powerful, and **PNCs**, the fraction both not serving as CEO and also designated powerful Board committee characteristics are the means of dummies set to one if majorities of the Audit, Compensation and Nominating **committee members** are powerful..

		CEOs		**Full boards**				**Board chairs**		**Board committees**		
				Independent Directors		**Powerful Independent Directors (PIDs)**				**Audit**	**Compensation**	**Nominating**
Year	***No. of Firms***	***PCEO***	***BSIZE***	***NID BSIZE***	***IB***	***NPID ID***	***PIB***	***NCC***	***PNC***	***PIDA***	***PIDC***	***PIDN***
1999	1,110	44.7	9.74	58.7	76.9	34.5	49.4	30.5	17.7	43.6	49.1	31.4
2000	1,233	46.4	9.58	61.8	80.2	36.2	49.9	29.9	17.2	46	50.4	31.8
2001	1,343	46.4	9.44	63.3	81.9	37.8	51.8	30.8	18.0	48.9	51.6	33.8
2002	1,327	46.9	9.42	65.5	86.1	39.8	53.7	30.7	17.2	50.5	52.8	38.7
2003	1,372	47.1	9.38	67.6	89.5	41.3	54.1	31.9	18.1	52.5	54	47.8
2004	1,384	47.3	9.36	69.7	93.1	42	54.6	34.5	19.8	52.9	54.6	52.2
2005	1,354	46.5	9.36	71.2	93.9	43.4	54.9	36.6	22.0	54.5	55.8	53.1
2006	1,341	47.7	9.48	71.6	94.9	44.6	58.1	38.3	22.5	55.2	57.3	52.8
2007	1,367	46.2	9.32	76.3	99.1	46.9	56.8	40.5	24.7	56.9	59.5	56.7
2008	1,417	44.8	9.43	77.2	99.1	48	58.1	40.9	25.8	56.8	59.6	56.8
2009	1,376	46.2	9.43	77.2	98.8	49.2	58.9	43.0	27.5	59	60.8	58.1
2010	1,265	46.1	9.44	78.3	99.3	49.9	59.8	39.8	25.7	59.8	61.7	59
All	15,889	46.4	9.44	70.1	91.4	43	55.1	35.8	21.4	53.2	55.7	48.1

Table 5: Firm-level Summary Statistics

Tobin's Q is the book value of total assets minus the book value of equity plus the market value of equity minus deferred tax obligations, divided by total book assets. **Independent director centrality** is the average centrality of all independent directors satisfying SEC definitions. **CEO Centrality** is the average value of the highest three centrality measures for CEOs. **CEO age** is measured in years. **PID age** is the average age of all PIDs on board. **Board size** is the total number of directors for each board. **E-Index** is Bebchuk, et al. (2009) Entrenchment Index that adds 1 for each of the six index components of poison pills, staggered board, golden parachute, supermajority vote in charter and bylaw amendments and calling special meetings. **Total Assets** is firm's asset. **Leverage** is Total Debt/Total Assets. **Capital Expenditure** is net capital investments over last year's net PPE. **Cash Flow** is the sum of net income and depreciation and amortization divided by last year's net PPE. **R&D** is R&D expenses over total assets **Advertising** is Advertising expenses over total assets.

		Mean	Standard deviation	Q1	Median	Q3
Independent Board	*IB*	0.906	0.292	1	1	1
Independent Director Centrality	*IDC*	81.1	14.9	74.3	84.9	92.1
Powerfully Independent Board	*PIB*	0.551	0.497	0	1	1
Powerful Non-Independent Director Centrality	*NIDC*	0.313	0.464	0	0	1
Powerfully Non-independent Board	*PNIB*	56.5	35.2	30	68	85.7
Non-CEO Chair	*NC*	0.358	0.479	0	0	1
Powerful Non-CEO Chair	*PNC*	0.214	0.41	0	0	1
Non-CEO Chair Centrality	*NCC*	28.5	39.7	0	0	74
Powerful Independent Non-CEO Chair	*PINC*	0.111	0.314	0	0	0
Powerful Indep. Non-CEO Chair Centrality	*INCC*	10.31	29.23	0	0	0
Powerful Non-independent Non-CEO Chair	*PNINC*	0.103	0.304	0	0	0
Powerful Non-indep. Non-CEO Chair Centrality	*NINCC*	9.41	27.81	0	0	0
Powerful CEO	*PCEO*	0.464	0.499	0	0	1
CEO Centrality	*CEOC*	77.3	19.2	65.3	82.3	93
Auditing Committee Members Centrality	*IDCA*	80.7	16.3	73.3	85.0	92.8
Powerful independent Auditing Committee	*PIBA*	0.490	0.500	0	0	1
Compensation Committee Members Centrality	*IDCC*	80.9	18.1	74.0	86.2	93.6
Powerful independent Compensation Committee	*PIBC*	0.520	0.500	0	1	1
Nominating Committee Members Centrality	*IDCN*	70.7	32.0	64.0	83.8	92.8
Powerful independent Nominating Committee	*PIBN*	0.442	0.497	0	0	1
Tobin's Q	*Q*	1.58	1.55	0.848	1.19	1.83
CEO Age	*CEOA*	55.7	7.33	51	56	60
Board Size	*BSIZE*	9.44	2.62	8	9	11
E-Index	*ENDX*	2.72	1.4	2	3	4
Total Assets	*ASSETS*	16.8	89.2	0.755	2.12	7.37
Leverage	*LEV*	0.225	0.181	0.066	0.212	0.339
Profitability	*PROFIT*	0.126	0.101	0.07	0.121	0.176
Capital Expenditure	*CAPEX*	0.049	0.062	0.013	0.0324	0.0638
Cash Flow	*CF*	0.0908	0.125	0.0407	0.0878	0.142
R&D	*R&D*	0.024	0.0444	0	0	0.0279
Advertising	*ADV*	0.0102	0.0245	0	0	0.00584
CEO Pay – Total		5.65	10.3	1.50	3.15	6.44
CEO Pay – Base		1.39	1.94	0.630	0.950	1.50
CEO Pay – Performance-based		3.59	11.3	0.250	1.23	3.50
Earnings Manipulation		0.00819	0.0870	-0.0228	0.0113	0.0464

Table 6: Firm Value, Powerful Independent Directors, and a Powerful Non-CEO as Chair

Shareholder valuation, measured by Tobin's average Q ratio (Q), explained by OLS regressions on measures of CEO, chair, and independent director presence and power as well control variables including industry and year fixed effects. Variables are as described in Table 3. Sample is 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels with clustering by firm. Boldface denotes significance at 10% or better.

	6.1	**6.2**	**6.3**	**6.4**	**6.5**	**6.6**	**6.7**	**6.8**
Powerful CEO dummy (PCEO)	0.0364 (0.26)						0.0166 (0.62)	
Powerful independent board dummy (PIB)		**0.0890** **(0.01)**					**0.0804** **(0.02)**	
Powerful non-CEO chair (PNC)			0.0499 (0.16)				0.0397 (0.26)	
CEO power centrality (CEOC)				0.000189 (0.84)				-0.00105 (0.35)
Independent director power centrality (IDC)					**0.00254** **(0.04)**			**0.00322** **(0.04)**
Non-CEO chair power centrality (NCCC)						0.000179 (0.63)		0.000106 (0.78)
log (ceo age)	**-0.183** **(0.09)**	-0.151 (0.16)	-0.156 (0.14)	**-0.180** **(0.09)**	-0.148 (0.17)	-0.169 (0.12)	-0.135 (0.21)	-0.138 (0.21)
log(board size)	**-0.303** **(0.00)**	**-0.318** **(0.00)**	**-0.309** **(0.00)**	**-0.302** **(0.00)**	**-0.311** **(0.00)**	**-0.305** **(0.00)**	**-0.323** **(0.00)**	**-0.310** **(0.00)**
e-index	**-0.0597** **(0.00)**	**-0.0602** **(0.00)**	**-0.0589** **(0.00)**	**-0.0593** **(0.00)**	**-0.0601** **(0.00)**	**-0.0588** **(0.00)**	**-0.0603** **(0.00)**	**-0.0592** **(0.00)**
log (total assets)	**-0.0433** **(0.00)**	**-0.0505** **(0.00)**	**-0.0382** **(0.01)**	**-0.0393** **(0.01)**	**-0.0502** **(0.00)**	**-0.0377** **(0.01)**	**-0.0516** **(0.00)**	**-0.0469** **(0.00)**
book leverage	-0.137 (0.26)	-0.136 (0.27)	-0.138 (0.26)	-0.137 (0.26)	-0.140 (0.25)	-0.137 (0.26)	-0.138 (0.26)	-0.140 (0.25)
profitability	**5.384** **(0.00)**	**5.373** **(0.00)**	**5.393** **(0.00)**	**5.391** **(0.00)**	**5.377** **(0.00)**	**5.393** **(0.00)**	**5.371** **(0.00)**	**5.378** **(0.00)**
investment	**0.796** **(0.01)**	**0.813** **(0.01)**	**0.782** **(0.01)**	**0.784** **(0.01)**	**0.821** **(0.01)**	**0.782** **(0.01)**	**0.818** **(0.01)**	**0.813** **(0.01)**
R&D/total assets	**8.674** **(0.00)**	**8.548** **(0.00)**	**8.694** **(0.00)**	**8.733** **(0.00)**	**8.569** **(0.00)**	**8.738** **(0.00)**	**8.488** **(0.00)**	**8.609** **(0.00)**
advertising / total assets	**1.767** **(0.05)**	**1.704** **(0.06)**	**1.821** **(0.04)**	**1.798** **(0.04)**	**1.723** **(0.05)**	**1.820** **(0.04)**	**1.712** **(0.06)**	**1.740** **(0.05)**
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.388	0.389	0.388	0.388	0.388	0.388	0.389	0.388

Table 7: Firm Value and Board Characteristics

Tobin's Q (Q) explained by extent of board's legal independence and independent director power, as well as all control variables from Table 6 and industry and year fixed effects (not shown). Variables are as described in Table 3. Sample is a 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels clustering by firm. Boldface denotes significance at 10% or better.

Panel A. Legally Independent directors versus powerful independent directors

	7A.1	7A.2	7A.3	7A.4	7A.5	7A.6	7A.7
Powerful independent board dummy (PIB)						**0.110**	**0.110**
						(0.00)	**(0.00)**
Fraction of directors independent	**-0.211**				**-0.335**	**-0.268**	**-0.390**
	(0.02)				**(0.02)**	**(0.01)**	**(0.01)**
Majority of directors independent dummy (IB)		-0.0521			0.0461		0.0494
		(0.30)			(0.42)		(0.38)
Two-thirds of directors independent dummy			-0.0517		0.0346		0.0316
			(0.12)		(0.42)		(0.46)
CEO does not chair the board dummy				-0.0101	-0.0187		-0.0188
				(0.74)	(0.54)		(0.54)
Control variables	yes	yes	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
Adjusted R-squared	0.389	0.388	0.388	0.388	0.389	0.390	0.390

Panel B. Powerful Independent Directors versus Powerful Insider Directors

	7B.1	7B.2	7B.3	7B.4	7B.5	7B.6	7BV.7
Powerful CEO dummy (PCEO)							0.0112
							(0.74)
Powerful independent board dummy (PIB)	**0.0761**					**0.0814**	**0.0787**
	(0.02)					**(0.01)**	**(0.02)**
Powerful non-independent board dummy (PNIB)	**0.0835**	**0.0951**				**0.0553**	**0.0538**
	(0.00)	**(0.00)**				**(0.08)**	**(0.09)**
Powerful independent non-CEO chair (PINC)			-0.0551	-0.0751		-0.0669	-0.0669
			(0.28)	(0.13)		(0.18)	(0.18)
Powerful non-independent non-CEO chair (PNINC)			**0.153**		**0.160**	**0.123**	**0.124**
			(0.00)		**(0.00)**	**(0.01)**	**(0.01)**
Control variables	yes	yes	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
R^2	0.390	0.389	0.389	0.388	0.389	0.391	0.391

Table 8: Cumulative Abnormal Returns on Powerful Independent Director Sudden Deaths

This table reports t-test statistics and OLS regressions of Cumulative Abnormal Returns when a director suddenly died. The abnormal returns are calculated after the director death over four event windows including [-3, 3], [-1, 1], [-1, 2], and [-1, 3], respectively. Numbers in Panel A are percentages of CARs over these windows. Boldface indicates t-test statistics with p-values rejecting equal means at 10% significance or less. Panel B are regressions of CARs on dummies of IB and PIB and controls. Controls include director age at death plus firm characteristics as in Table 6. Numbers in parentheses are probability levels rejecting the null hypothesis of zero coefficients. Boldface indicates significance at 10% or better.

Panel A: Mean CAR comparisons surrounding the sudden deaths of independent directors (*IB=1*) versus other directors (IB = 0) and of powerful independent directors (*PID=1*) versus other independent directors (PID = 0)

	Weights	**Equal**				**Value**			
	Events	**Director sudden deaths**		**Independent director sudden deaths**		**Director sudden deaths**		**Independent director sudden deaths**	
	Dichotomy	**Independent**		**Powerful**		**Independent**		**Powerful**	
		Y	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**
Event Window	**[-1, +1]**	-0.0285	0.572	-0.320	0.387	-0.0197	0.618	-0.311	0.394
	[-1, +2]	-0.0275	0.142	-0.308	0.372	0.0602	0.219	-0.251	0.503
	[-1, +3]	-0.0265	0.0665	-0.250	0.291	0.0247	0.158	-0.252	0.419
	[-3, +3]	-0.247	0.154	-0.383	-0.0532	0.0267	-0.0385	-0.121	0.237
	Events	172	54	101	71	172	54	101	71

Panel B: Regressions of CARs on dummies for sudden death of an independent director (*IB*), a powerful director (PD), and a powerful independent director (*PID*). Sample is 226 sudden director deaths.

	8B.1	**8B.2**	**8B.3**	**8B.4**	**8B.5**	**8B.6**	**8B.7**	**8B.8**
weights	**equal**	**equal**	**equal**	**equal**	**value**	**value**	**value**	**value**
window	**[-1, +1]**	**[-1, +2]**	**[-1, +3]**	**[-3, +3]**	**[-3, +3]**	**[-3, +3]**	**[-3, +3]**	**[-3, +3]**
Powerful director (PD)	0.0168 (0.14)	**0.0231 (0.06)**	**0.0288 (0.05)**	**0.0289 (0.10)**	0.0133 (0.23)	0.0178 (0.16)	0.0219 (0.14)	0.0197 (0.17)
Independent director (ID)	0.00187 (0.78)	0.00743 (0.31)	0.00866 (0.32)	0.00435 (0.68)	0.000720 (0.91)	0.00680 (0.36)	0.00748 (0.39)	0.00714 (0.40)
Powerful Independent director (PID)	**-0.0239 (0.06)**	**-0.0299 (0.03)**	**-0.0342 (0.03)**	**-0.0322 (0.10)**	**-0.0204 (0.10)**	**-0.0254 (0.07)**	**-0.0286 (0.08)**	-0.0233 (0.14)
Intercept	0.00199 (0.71)	-0.00372 (0.52)	-0.00574 (0.40)	-0.00488 (0.55)	0.00322 (0.54)	-0.00177 (0.76)	-0.00329 (0.64)	-0.00477 (0.48)
R^2	0.023	0.022	0.020	0.014	0.021	0.016	0.014	0.010

Panel C: Regressions of CAR on power centrality. Sample is 172 sudden deaths of independent directors.

		8C.1		8C.2		8C.3		8C.4	
	Weights	**equal**		**equal**		**value**		**value**	
	Events	**Director sudden deaths**		**Independent director sudden deaths**		**Director sudden deaths**		**Independent director sudden deaths**	
		coefficient	*p-value*	*coefficient*	*p-value*	*coefficient*	*p-value*	*coefficient*	*p-value*
Event Window	**[-1, +1]**	-0.000198	(0.11)	**-0.000287**	**(0.04)**	**-0.000236**	**(0.06)**	**-0.000299**	**(0.05)**
	[-1, +2]	-0.000146	(0.26)	**-0.000242**	**(0.10)**	-0.000209	(0.12)	**-0.000291**	**(0.08)**
	[-1, +3]	-0.000190	(0.25)	**-0.000375**	**(0.07)**	-0.000255	(0.13)	**-0.000423**	**(0.05)**
	[-3, +3]	-0.000153	(0.38)	**-0.000350**	**(0.09)**	-0.000220	(0.15)	**-0.000343**	**(0.07)**
Observations		226		172		226		172	

Table 9: Granger Causality Tests

The left panel provides joint F statistics and p-levels for lags of X, a power centrality measure equal to one of . In regressions explaining Q and also including lags of Q. and the right panel runs x's on lags of y's and lags of x's. In both panels, y is Tobin's Q and x's are one of the indicator variables PIB (one if a majority of independent directors are powerful), PPNIB (one if a majority of non-independent director are powerful), PINC (one if the chair is a powerful independent director), or PNINC (one if the chair is a powerful non-independent director) or one of the continuous variables IDC (mean independent director power centrality), NIDC (mean non-independent director centrality), INCC (chair's power centrality if an independent director is chair), or NINCC (chair's power centrality if a non-independent director other than th CEO is chair). F-statistics report the joint significance of lagged values of X in the left panel, and the joint significance of lagged values of Y in the right panel. Numbers in the parentheses are probability levels for rejecting the null hypothesis that the lags are jointly statistically insignificant.

	Board power Granger causes shareholder value			**Shareholder value Granger causes board power**		
Power measure ($X_{i,t}$) is:	$Q_{i,t} = \sum_{s=1}^{5} a_s Q_{i,t-s} + \sum_{s=1}^{5} b_s X_{i,t-s} + u_{i,t}$			$X_{i,t} = \sum_{s=1}^{5} a_s X_{i,t-s} + \sum_{s=1}^{5} b_s Q_{i,t-s} + u_{i,t}$		
	1 lag	***2 lags***	***3 lags***	***1 lag***	***2 lags***	***3 lags***
PIB	**6.79** **(0.01)**	**3.33** **(0.04)**	**3.28** **(0.02)**	**4.35** **(0.04)**	1.45 (0.23)	2.05 (0.11)
PNIB	0.38 (0.54)	0.91 (0.40)	1.00 (0.39)	**8.77** **(0.00)**	1.70 (0.18)	**2.91** **(0.03)**
PINC	2.08 (0.15)	2.00 (0.14)	0.23 (0.88)	2.32 (0.13)	**4.21** **(0.02)**	1.41 (0.24)
PNINC	1.87 (0.17)	1.13 (0.32)	0.37 (0.78)	**13.45** **(0.00)**	**6.89** **(0.00)**	**2.15** **(0.09)**
IDC	**4.33** **(0.04)**	**3.97** **(0.02)**	**4.99** **(0.00)**	2.05 (0.15)	1.36 (0.26)	1.16 (0.32)
NIDC	0.07 (0.79)	0.62 (0.54)	2.1 (0.10)	**15.49** **(0.00)**	**3.81** **(0.02)**	**6.60** **(0.00)**
INCC	0.17 (0.68)	1.90 (0.15)	1.26 (0.29)	**9.77** **(0.00)**	**7.81** **(0.00)**	**3.69** **(0.01)**
NINCC	3.76 (0.05)	0.96 (0.38)	0.69 (0.56)	**10.81** **(0.00)**	**10.43** **(0.00)**	**3.91** **(0.01)**

Table 10: First Differences in Tobin's Q and Changes in Board Power Structure

Regressions explaining year-on-year change in Tobin's average Q with *ΔPIDs* and *ΔPNIDs*, respectively defined as net increases in the number of powerful independent directors (PIDs) and powerful non-independent directors (PNIDs), both scaled by the total number of directors, as well as by indictor variables reflecting changes in the chair of the board. The indicator variable *ΔPINC* takes the value +1 if the chair this period is a powerful independent director and the chair the previous chair was not, -1 if the chair this period is not a powerful independent director and the chair the previous period was, and 0 in all other cases. The indicator variable change in ΔPNINCis +1 if the chair this period is a powerful non-independent director other than the CEO and the chair the previous chair was not, -1 if the chair this period is not a powerful non-independent director other than the CEO and the chair the previous period was, and 0 otherwise. Control variables are first differences of variables defined in Table 3. The sample is a 13,933 panel of firm-annual difference observations. Numbers in the parentheses are probability levels adjusted for clustering by firm.

	10.1	10.2	10.3	10.4	10.5
Δ PIDs	**0.0592**				**0.0612**
	(0.08)				**(0.07)**
Δ PNID		0.0472			0.0448
		(0.56)			(0.58)
Δ PINC			**-0.0240**		**-0.0253**
			(0.05)		**(0.04)**
Δ PNINC				0.0310	0.0339
				(0.27)	(0.24)
Δ CEO age	0.108	0.111	0.108	0.111	0.110
	(0.19)	(0.18)	(0.19)	(0.18)	(0.18)
Δ log(board size)	**-0.119**	**-0.113**	**-0.107**	**-0.108**	**-0.126**
	(0.01)	**(0.02)**	**(0.02)**	**(0.02)**	**(0.01)**
Δ E-Index	0.00756	0.00735	0.00737	0.00723	0.00805
	(0.20)	(0.21)	(0.21)	(0.22)	(0.17)
Δ log(assets)	**-0.380**	**-0.376**	**-0.375**	**-0.376**	**-0.379**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
Δ book leverage	**-0.536**	**-0.541**	**-0.542**	**-0.541**	**-0.539**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
Δ profitability	**1.924**	**1.929**	**1.927**	**1.930**	**1.924**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
Δ investment rate	0.218	0.217	0.213	0.217	0.217
	(0.19)	(0.19)	(0.20)	(0.19)	(0.20)
Δ R&D /assets	-0.602	-0.597	-0.597	-0.595	-0.607
	(0.43)	(0.43)	(0.43)	(0.43)	(0.43)
Δ Advertising /assets	-1.475	-1.480	-1.478	-1.474	-1.461
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
Intercept	-0.0408	-0.0413	-0.0420	-0.0415	-0.0406
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.063	0.063	0.063	0.063	0.063

Table 11: Value Destroying M&A Activity

Cumulative abnormal returns from day -3 to day +3 around dates of M&A announcement by S&P 1500 firms between 1999 and 2009, explained by OLS regressions on measures of CEO and independent director power as well as control variables, including industry and year fixed effects. Variables are as described in Table 3. Numbers in parentheses are robust probability levels with clustering by bidder. Boldface denotes significance at 10% or better

	11.1	11.2	11.3	11.4
CAR [-3, +3] of	***Bidder***	***Bidder***	***Combined***	***Combined***
PIB	**0.0199** **(0.01)**		**0.0173** **(0.03)**	
IDC		**0.000777** **(0.03)**		**0.000396** **(0.26)**
PCEO	**-0.0366** **(0.00)**		**-0.0316** **(0.00)**	
CEOC		**-0.00127** **(0.00)**		**-0.000871** **(0.00)**
Log of CEO age	0.0736 (0.01)	0.0656 (0.02)	0.0392 (0.14)	0.0290 (0.27)
Log board size	-0.00295 (0.78)	-0.000736 (0.94)	-0.0163 (0.12)	-0.0143 (0.17)
Entrenchment index	0.00256 (0.25)	0.00223 (0.33)	0.00334 (0.13)	0.00276 (0.21)
Same industry dummy	-0.00438 (0.50)	-0.00359 (0.58)	-0.00274 (0.67)	-0.00233 (0.71)
Stock payment dummy	**-0.0170** **(0.02)**	**-0.0164** **(0.02)**	**-0.0167** **(0.02)**	**-0.0166** **(0.02)**
Deal value over bidder size	**-0.0324** **(0.00)**	**-0.0333** **(0.00)**		
Deal value over combined size			**0.0292** **(0.04)**	**0.0281** **(0.05)**
Observations	632	632	632	632
R^2	0.0619	0.0568	0.0416	0.0313

Table 12 Powerful Independent Directors and Free Cash Flow Agency Problems

Probit regression of free cash flow problem on measures of CEO, chair, and independent director presence and power as well control variables including industry and year fixed effects. Variables are as described in Table 3. The free cash flow measure is a dummy which takes the value of one if a firm's cash flow is higher than the Fama-French 17-industry (FF-17) median, dividend payout is lower than FF-17 median, and Tobin's Q is lower than FF-17 median, and zero otherwise. Sample is 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels with clustering by firm. Boldface denotes significance at 10% or better.

	(1)	(2)	(3)	(4)	(5)	(6)
Power	**-0.252**	**-0.251**	**-0.261**			
	(0.00)	**(0.00)**	**(0.00)**			
PCEO		-0.00192	-0.000175			
		(0.98)	(1.00)			
PNCC			0.0754			
			(0.35)			
PIBC				**-0.00700**	**-0.00797**	**-0.00817**
				(0.00)	**(0.00)**	**(0.00)**
CEOC					0.00134	0.00140
					(0.54)	(0.53)
NCCC						0.000568
						(0.50)
log (ceo age)	0.0916	0.0919	0.126	0.0768	0.0708	0.107
	(0.70)	(0.70)	(0.60)	(0.74)	(0.76)	(0.65)
log (board size)	0.105	0.105	0.0980	0.0890	0.0847	0.0749
	(0.48)	(0.48)	(0.51)	(0.54)	(0.56)	(0.61)
e-index	-0.0177	-0.0177	-0.0180	-0.0171	-0.0174	-0.0168
	(0.52)	(0.52)	(0.51)	(0.53)	(0.53)	(0.54)
log (total assets)	0.0207	0.0209	0.0223	0.0189	0.0164	0.0188
	(0.46)	(0.46)	(0.42)	(0.48)	(0.54)	(0.48)
book leverage	-0.424	-0.423	-0.428	-0.393	-0.399	-0.400
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
profitability	-0.557	-0.556	-0.551	-0.541	-0.553	-0.543
	(0.11)	(0.11)	(0.11)	(0.12)	(0.12)	(0.12)
investment	0.989	0.988	0.992	1.006	1.015	1.017
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
R&D / total assets	-7.937	-7.932	-8.004	-7.950	-8.061	-8.081
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
advertising / total assets	-4.091	-4.090	-4.070	-4.177	-4.147	-4.102
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$\mathbf{R^2}$	0.0507	0.0507	0.0512	0.0494	0.0497	0.0499

Table 13. Powerful Independent Directors and Forced CEO Turnover

Binomial probit regressions explaining the odds of a forced CEO turnover occurring on independent director power measures –the powerfully independent board dummy *PIB* or the continuous independent director power measure *IDC* for the full board or their analogs for the nominating committee, *PIBN* or *IDCN* – and their interactions with the prior year's total stock return, *RET*, as well control variables including industry and year fixed effects. The forced CEO turnover dummy variable is set to one if a new CEO is brought in from outside the firm during the year and to zero otherwise. Variables are described in Table 3. Sample is a 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels with clustering by firm. Boldface denotes significance at 10% or better.

	13.1	**13.2**	**13.3**	**13.4**
***power* measure**	***PIB***	***PIBC***	***IDC***	***IDCC***
power	0.136	-0.411	0.0167	0.000425
	(0.66)	(0.20)	(0.18)	(0.92)
power* × *RET	-0.943	**-1.747**	**-0.0434**	-0.00272
	(0.22)	**(0.03)**	**(0.00)**	(0.79)
RET	-0.666	**-0.713**	**2.283**	-1.017
	(0.21)	**(0.05)**	**(0.02)**	(0.19)
log (*ceo age*)	1.324	0.973	1.457	1.192
	(0.21)	(0.35)	(0.18)	(0.25)
log (*board size*)	**-0.767**	-0.583	**-1.010**	-0.617
	(0.10)	(0.20)	**(0.06)**	(0.22)
e-index	0.127	0.0941	**0.166**	0.115
	(0.14)	(0.26)	**(0.08)**	(0.18)
$\mathbf{R^2}$	0.130	0.133	0.150	0.114

Table 14. Powerful Independent Directors and CEO Compensation

Regressions of the logarithm of CEO pay – total, equity and cash, compensation in Panels A, B and C, respectively – on various independent director power measures – the powerfully independent board dummy *PIB* or the continuous independent director power measure *IDC* for the full board or their analogs for the compensation committee, *PIBC* or *IDCC* – and their interactions with the prior year's total stock return, *RET*, as well as controls including year and industry fixed effects. Regressions 14.4 through 14.8 also control for the corresponding CEO power measure, either the powerful CEO dummy *PCEO* or the continuous CEO power measure *CEOC*. Variables are described in Table 3. Sample is a 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels with clustering by firm. Boldface denotes significance at 10% or better.

Panel A. CEO Total Compensation

	14A.1	**14A.2**	**14A.3**	**14A.4**	**14A.5**	**14A.6**	**14A.7**	**14A.8**
Independent director *power* measure	***PIB***	***PIBC***	***IDC***	***IDCC***	***PIB***	***PIBC***	***IDC***	***IDCC***
power	**0.271**	**0.258**	**0.0145**	**0.0104**	**0.223**	**0.215**	**0.0103**	**0.00731**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
power* × *RET	0.0497	0.0398	-0.000167	-0.00204	0.0668	0.0501	0.000812	-0.00191
	(0.40)	(0.53)	(0.95)	(0.26)	(0.22)	(0.35)	(0.76)	(0.31)
PCEO					**0.186**	**0.191**		
					(0.00)	**(0.00)**		
PCEO* × *RET					-0.0324	-0.0232		
					(0.61)	(0.70)		
CEOC							**0.00595**	**0.00690**
							(0.00)	**(0.00)**
CEOC* × *RET							-0.00132	0.000138
							(0.45)	(0.95)
RET	**0.0981**	**0.103**	**0.126**	**0.275**	**0.102**	**0.107**	**0.150**	**0.254**
	(0.01)	**(0.01)**	**(0.54)**	**(0.08)**	**(0.01)**	**(0.01)**	**(0.47)**	**(0.15)**
log (*ceo age*)	-0.0222	-0.0431	0.0701	0.0386	-0.0495	-0.0662	0.0516	0.0315
	(0.87)	(0.75)	(0.60)	(0.77)	(0.72)	(0.63)	(0.70)	(0.81)
log (*board size*)	-0.0825	-0.0744	-0.0934	-0.103	-0.0837	-0.0773	-0.109	-0.120
	(0.44)	(0.48)	(0.37)	(0.33)	(0.43)	(0.46)	(0.30)	(0.25)
e-index	**0.0715**	**0.0697**	**0.0697**	**0.0680**	**0.0690**	**0.0673**	**0.0660**	**0.0640**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
log (*total assets*)	**0.411**	**0.414**	**0.381**	**0.400**	**0.392**	**0.393**	**0.367**	**0.375**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
book leverage	0.0705	0.0754	0.0461	0.0409	0.0658	0.0694	0.0428	0.0374
	(0.56)	(0.54)	(0.70)	(0.74)	(0.59)	(0.57)	(0.72)	(0.76)
profitability	**1.556**	**1.558**	**1.522**	**1.562**	**1.522**	**1.522**	**1.514**	**1.539**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
investment	0.155	0.159	0.316	0.225	0.211	0.218	0.366	0.318
	(0.63)	(0.63)	(0.35)	(0.50)	(0.52)	(0.50)	(0.27)	(0.34)
R&D / total assets	**2.540**	**2.583**	**2.120**	**2.295**	**2.273**	**2.295**	**1.878**	**1.929**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
advertising / total assets	-0.610	-0.488	-0.730	-0.592	-0.742	-0.644	-0.760	-0.676
	(0.52)	(0.61)	(0.45)	(0.54)	(0.43)	(0.50)	(0.42)	(0.47)
R^2	0.278	0.277	0.286	0.284	0.281	0.281	0.290	0.289

Panel B. CEO Equity Compensation

	14B.1	**14B.2**	**14B.3**	**14B.4**	**14B.5**	**14B.6**	**14B.7**	**14B.8**
Independent director *power* measure	***PIB***	***PIBC***	***IDC***	***IDCC***	***PIB***	***PIBC***	***IDC***	***IDCC***
power	**0.934** **(0.00)**	**1.079** **(0.00)**	**0.0475** **(0.00)**	**0.0411** **(0.00)**	**0.751** **(0.00)**	**0.922** **(0.00)**	**0.0361** **(0.00)**	**0.0335** **(0.00)**
power* × *RET	0.102 (0.61)	0.295 (0.14)	0.00761 (0.36)	**0.0156** **(0.09)**	0.110 (0.66)	**0.401** **(0.05)**	0.00876 (0.35)	**0.0200** **(0.06)**
PCEO					**0.708** **(0.00)**	**0.685** **(0.00)**		
PCEO* × *RET					-0.0152 (0.96)	-0.205 (0.38)		
CEOC							**0.0164** **(0.00)**	**0.0166** **(0.00)**
CEOC* × *RET							-0.00153 (0.85)	-0.00609 (0.43)
RET	0.0820 (0.27)	0.0380 (0.71)	-0.460 (0.45)	-1.141 (0.12)	0.0893 (0.24)	0.0624 (0.51)	-0.434 (0.50)	-1.034 (0.16)
log (*ceo age*)	**-2.301** **(0.00)**	**-2.313** **(0.00)**	**-2.013** **(0.00)**	**-1.991** **(0.00)**	**-2.406** **(0.00)**	**-2.395** **(0.00)**	**-2.065** **(0.00)**	**-2.003** **(0.00)**
log (*board size*)	0.215 (0.57)	0.211 (0.57)	0.186 (0.61)	0.0922 (0.80)	0.213 (0.57)	0.198 (0.59)	0.143 (0.70)	0.0485 (0.89)
e-index	**0.290** **(0.00)**	**0.278** **(0.00)**	**0.283** **(0.00)**	**0.271** **(0.00)**	**0.280** **(0.00)**	**0.270** **(0.00)**	**0.273** **(0.00)**	**0.262** **(0.00)**
log (*total assets*)	**0.367** **(0.00)**	**0.353** **(0.00)**	**0.277** **(0.00)**	**0.306** **(0.00)**	**0.295** **(0.00)**	**0.280** **(0.00)**	**0.236** **(0.00)**	**0.247** **(0.00)**
book leverage	-0.160 (0.71)	-0.145 (0.74)	-0.247 (0.56)	-0.307 (0.47)	-0.180 (0.67)	-0.165 (0.70)	-0.257 (0.55)	-0.313 (0.46)
profitability	**1.349** **(0.10)**	1.309 (0.11)	1.240 (0.13)	**1.345** **(0.10)**	1.214 (0.14)	1.186 (0.14)	1.218 (0.13)	1.289 (0.11)
investment	**4.201** **(0.00)**	**4.332** **(0.00)**	**4.754** **(0.00)**	**4.603** **(0.00)**	**4.424** **(0.00)**	**4.533** **(0.00)**	**4.892** **(0.00)**	**4.817** **(0.00)**
R&D / total assets	**6.015** **(0.00)**	**5.720** **(0.00)**	**4.678** **(0.01)**	**4.648** **(0.01)**	**4.995** **(0.01)**	**4.695** **(0.01)**	**4.009** **(0.03)**	**3.788** **(0.04)**
advertising / total assets	**-6.249** **(0.08)**	**-6.002** **(0.09)**	**-6.616** **(0.06)**	**-6.358** **(0.07)**	**-6.740** **(0.05)**	**-6.563** **(0.06)**	**-6.689** **(0.05)**	**-6.576** **(0.06)**
R^2	0.659	0.660	0.661	0.662	0.660	0.661	0.662	0.663

Panel C. CEO Cash Compensation

	14C.1	14C.2	14C.3	14C.4	14C.5	14C.6	14C.7	14C.8
Independent director *power* measure	*PIB*	*PIBC*	*IDC*	*IDCC*	*PIB*	*PIBC*	*IDC*	*IDCC*
power	**0.0715**	**0.0920**	**0.00431**	**0.00391**	**0.0519**	**0.0757**	0.00274	**0.00299**
	(0.02)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.07)**	**(0.00)**	(0.11)	**(0.01)**
power* × *RET	0.00793	0.0106	7.02e-05	-0.00129	-0.00296	-0.000836	7.36e-05	-0.00182
	(0.87)	(0.84)	(0.97)	(0.38)	(0.93)	(0.98)	(0.97)	(0.11)
PCEO					**0.0768**	**0.0724**		
					(0.01)	**(0.02)**		
PCEO* × *RET					0.0205	0.0183		
					(0.67)	(0.69)		
CEOC							**0.00226**	**0.00208**
							(0.07)	**(0.06)**
CEOC* × *RET							-3.42e-07	0.000970
							(1.00)	(0.52)
RET	**0.0647**	**0.0645**	0.0618	0.169	**0.0638**	**0.0639**	0.0614	0.140
	(0.03)	**(0.02)**	(0.70)	(0.15)	**(0.03)**	**(0.03)**	(0.71)	(0.32)
log (*ceo age*)	**0.323**	**0.325**	0.354	**0.356**	**0.311**	**0.316**	**0.346**	**0.353**
	(0.01)	**(0.01)**	(0.00)	**(0.00)**	**(0.01)**	**(0.01)**	**(0.00)**	**(0.00)**
log (*board size*)	0.0839	0.0820	0.0789	0.0707	0.0841	0.0813	0.0730	0.0663
	(0.39)	(0.41)	(0.42)	(0.48)	(0.39)	(0.41)	(0.46)	(0.50)
e-index	**0.0391**	**0.0380**	**0.0384**	**0.0373**	**0.0379**	**0.0371**	**0.0369**	**0.0360**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
log (*total assets*)	**0.207**	**0.204**	**0.197**	**0.198**	**0.199**	**0.196**	**0.191**	**0.191**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
book leverage	**0.334**	**0.336**	**0.327**	**0.324**	**0.332**	**0.333**	**0.325**	**0.322**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
profitability	**0.963**	**0.958**	**0.951**	**0.959**	**0.948**	**0.943**	**0.948**	**0.951**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
investment	**-0.755**	**-0.743**	**-0.702**	**-0.717**	**-0.729**	**-0.718**	**-0.683**	**-0.687**
	(0.02)	**(0.02)**	**(0.03)**	**(0.03)**	**(0.02)**	**(0.02)**	**(0.03)**	**(0.03)**
R&D / total assets	-0.316	-0.357	-0.463	-0.474	-0.427	-0.468	-0.555	-0.587
	(0.44)	(0.38)	(0.25)	(0.24)	(0.30)	(0.25)	(0.17)	(0.15)
advertising / total assets	-0.395	-0.383	-0.443	-0.426	-0.446	-0.441	-0.453	-0.449
	(0.69)	(0.70)	(0.66)	(0.67)	(0.65)	(0.66)	(0.65)	(0.65)
R^2	0.188	0.189	0.190	0.191	0.189	0.190	0.190	0.191

Table 15. Powerful Independent Directors and Earnings Manipulation

OLS regressions of the absolute value of modified Jones model discretionary accruals on measures of independent director power measures –the powerfully independent board dummy *PIB* or the continuous independent director power measure *IDC* for the full board or their analogs for the audit committee, *PIBA* or *IDCA* – as well control variables including industry and year fixed effects. Regressions 15.4 through 15.8 also control for the corresponding CEO power measures, either the powerful CEO dummy PCEO or the continuous CEO power measure CEOC. Variables are as described in Table 3. Sample is 13,933 firm-year panel of S&P 1500 firms from 1999 to 2010. Numbers in parentheses are robust probability levels with clustering by firm. Boldface denotes significance at 10% or better.

	15.1	**15.2**	**15.3**	**15.4**	**15.5**	**15.6**	**15.7**	**15.8**
Independent director *power* measure	***PIB***	***PIBA***	***IDC***	***IDCA***	***PIB***	***PIBA***	***IDC***	***IDCA***
power	**-0.00430** **(0.04)**	-0.00326 (0.11)	**-0.000263** **(0.00)**	**-0.000210** **(0.00)**	-0.00363 (0.11)	-0.00259 (0.22)	**-0.000168** **(0.05)**	**-0.000137** **(0.06)**
PCEO					-0.00240 (0.29)	-0.00272 (0.22)		
CEOC							**-0.000138** **(0.04)**	**-0.000152** **(0.02)**
log *(ceo age*)	**0.0271** **(0.00)**	**0.0277** **(0.00)**	**0.0251** **(0.00)**	**0.0259** **(0.00)**	**0.0274** **(0.00)**	**0.0280** **(0.00)**	**0.0255** **(0.00)**	**0.0259** **(0.00)**
log (*board size*)	0.00391 (0.39)	0.00345 (0.45)	0.00402 (0.38)	0.00393 (0.39)	0.00389 (0.40)	0.00349 (0.45)	0.00424 (0.36)	0.00425 (0.35)
e-index	-0.000224 (0.75)	-0.000246 (0.73)	-0.000144 (0.84)	-0.000169 (0.81)	-0.000192 (0.79)	-0.000208 (0.77)	-4.79e-05 (0.95)	-4.80e-05 (0.95)
log (*total assets*)	0.000794 (0.44)	0.000638 (0.53)	0.00139 (0.19)	0.00117 (0.25)	0.00104 (0.32)	0.000934 (0.38)	0.00176 (0.10)	0.00170 (0.11)
book leverage	0.00389 (0.62)	0.00408 (0.61)	0.00370 (0.64)	0.00357 (0.65)	0.00380 (0.63)	0.00395 (0.62)	0.00377 (0.63)	0.00364 (0.65)
profitability	**0.0668** **(0.00)**	**0.0671** **(0.00)**	**0.0658** **(0.00)**	**0.0658** **(0.00)**	**0.0668** **(0.00)**	**0.0670** **(0.00)**	**0.0651** **(0.00)**	**0.0650** **(0.00)**
investment	**-0.114** **(0.00)**	**-0.114** **(0.00)**	**-0.117** **(0.00)**	**-0.116** **(0.00)**	**-0.115** **(0.00)**	**-0.115** **(0.00)**	**-0.119** **(0.00)**	**-0.118** **(0.00)**
R^2	0.0374	0.0372	0.0383	0.0381	0.0375	0.0373	0.0388	0.0388