Death by Committee? An Analysis of Delegation in Corporate Boards *

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Abstract

Did the corporate governance reforms of the early 2000s have unintended consequences? While readily observable board characteristics have not changed much over time, boards have increasingly delegated responsibilities to sub-committees staffed entirely by independent directors. Consistent with theoretical models on small group decision-making, we find evidence that delegation may have erected barriers to communication between inside and independent directors. Reform-induced delegation does not appear to be value-enhancing; average Tobin's q decreases by 4.1% after the reforms. Sub-committees are relatively understudied, but our results suggest that ignoring them leads to an incomplete picture of corporate boards.

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1. Introduction

Corporate boards are complex entities. An optimally structured board must have the right mix of sub-committees, tailored precisely for the corporation it is overseeing. Tasks, covering a wide variety of issues from monitoring to strategy, need to be allocated properly across the board and sub-committees. The board and its sub-committees should be sized appropriately and contain the correct blend of inside, affiliated, and independent directors. Directors are required to gather costly information, and the board must set operating procedures that promote sharing of information among directors. All these factors need to complement one another so that board members work together and collectively make good decisions.

It is through this subtle machinery that legislators and stock exchanges attempt governance reform whenever boards are blamed for corporate failures, as is often the case. In reaction to a spate of accounting scandals in the early 2000s, a host of changes to the inner workings of corporate boards and sub-committees were mandated by the Sarbanes-Oxley Act and revised stock exchange listing standards (collectively SOX). The Sarbanes-Oxley Act requires firms to have an independent audit committee containing a financial expert. Updated exchanges listing standards require that corporate boards maintain a majority of independent directors. In addition, director nomination and executive compensation tasks are reallocated by these standards from the purview of the Board of Directors to sub-committees comprised entirely of independent directors.

These reforms were supposed to fix corporate governance problems. It is not surprising that corporate boards were blamed for exercising insufficient oversight during the accounting scandal era. Yet, post-SOX reformed boards were once again criticized for not applying enough oversight during the Global Financial Crisis of 2007 and 2008. Clearly, some policymakers and economists did not believe corporate boards had been fixed.[1]

[1] U.S. Senators Cantwell and Schumer proposed a "Shareholder Bill of Rights" in 2009, which stated that "among the central causes of the financial and economic crisis that the United States faces today has been a widespread failure of corporate governance." The Organisation for Economic Co-operation and Development published an article which argued that "the financial crisis can be to an important extent attributed to failures and weaknesses in corporate governance arrangements" (Kirkpatrick (2009)).

Perhaps part of the difficulty in "fixing" corporate boards lies in the approach used to date.[2] Those entrusted with the oversight of the financial system face strong political and societal pressure to react quickly to scandals. Yet, the effect of reforms enacted by different players is an assortment of requirements whose collective impact may be hard to predict. The academic literature, which tends to evaluate specific board characteristics in isolation, provides somewhat inadequate empirical guidance.

Important themes emerge from taking a holistic view of the SOX corporate governance reforms. The reforms codified key responsibilities of boards, requiring the delegation of key tasks to sub-committees composed entirely of independent directors. This codification emphasizes regulatory compliance and performance reporting. The reforms do not consider the board's strategic role to the firm and its shareholders. Whether the cumulative impact of the reforms affects the board's decision-making ability does not appear to have been a consideration.

We believe it is, therefore, important to ask whether the combined effect of SOX-era reforms had unintended consequences. We form two core hypotheses by examining the economic literature on delegation and small-group decision-making. The first hypothesis is that the reforms have decreased the quality of pertinent information known to independent directors. Delegation can result in parties not sharing critical information (Li, Rosen, and Suen (2001)), and boards independence may discourage insiders from providing private information to independent directors (Adams and Ferreira (2007)). Moreover, homogeneous groups of people, who may be predisposed to agree with one another, do not always have strong incentives to gather costly information (Beniers and Swank (2004), Malenko (2014)). Thus, sub-committees of only independent directors, which lack the direct insights from informed corporate insiders, may not have sufficient firm-specific information.

Our second hypothesis is that the reforms have impaired the overall decision-making capacity of the board. Li, Rosen, and Suen (2001) show delegation in small groups is sub-optimal provided the

[2]While we use the phrase "fixing" corporate boards for exposition, it is not clear that boards were broken. Prevention of every possible corporate scandal may not be achievable given the complexity of and agency issues within corporations. An optimally designed board should reduce the probability of corporate scandals. However, the occurrence of a scandal is ultimately a probabilistic event.

group can choose the rule by which a decision is reached.[3] Adams and Ferreira (2007) demonstrate how information from insiders is necessary for boards to correctly fund projects. If, as suggested by the first hypothesis, the reforms restricted information sharing among board members, then independent directors will be relatively under-informed. As these directors must constitute a majority under SOX, the quality of important corporate decisions may suffer.

To test these hypotheses, we assemble the most complete data set on corporate boards of which we are aware. As it is important to develop a full picture of the board, we supplement commonly used board characteristics, such as board size and director independence, with complete structural details on sub-committees and comprehensive information on board and sub-committee activity levels. Our structural data is based on all firm-years found in either the BoardEx or Institutional Shareholder Services RiskMetrics databases. We correct this data, as necessary, with hand collected information on sub-committees and their director memberships.[4]

We use a sophistical natural language processing technique to gather data on the level of activity within corporate boards and sub-committees. Our algorithm searches the text of proxy statements and, by identifying key grammatical relations among words, extracts information on the number of board and sub-committee meetings each fiscal year. This data forms the basis of our activity and delegation measures, following the common practice of using board meetings to serve as a proxy for board activity (Vafeas (1999)). The final sample contains complete data on board structure, directors, sub-committee type and membership, and activity for over 30,000 firm-year observations from 1996 to 2010.

The analysis initially demonstrates that several commonly studied proxies of board quality do not appear to have been materially affected by SOX. While it is true that the exchange listing requirements materially increased the percent of independent directors on boards, other readily

[3] An example will make the intuition behind this result clear. Consider the possibility of delegating a decision to a sub-committee. Instead of delegating, the board may instead set a decision rule where only the votes of the hypothetical sub-committee members are considered. Under this rule, the sub-committee members have access to the full board and may freely dispose of information provided by members that would not be on the sub-committee.

[4] We take the union of the unregulated firms in these two samples as our base sample. This minimizes the time-series limitations of BoardEx, which begins in 2000, and the cross-sectional limitations of Risk-Metrics, which primarily covers S&P 1500 firms. We exclude firms in the financial services and utility industries because their boards have different types of committees and, potentially, slightly different functions.

observable characteristics of boards did not change significantly around SOX. Average board sizes and the average number of sub-committees remain stable.

The detailed activity data, however, tell a different story. Sub-committees became far more active after SOX. Firms often took existing sub-committees and assigned them additional tasks in order to comply with SOX; the official names of committees broadened to encompass more roles. Consistent with this, we observe a dramatic increase in the total number of sub-committee meetings per year, which nearly doubled from approximately 11 to about 20 meetings per year around SOX. Formalization of sub-committee functions appears to have played a key role in these change. Sub-committee activity increased nearly equally for firms that were already structurally compliant with SOX when it passed and for those that were not.[5]

The increased workload of sub-committees disproportionately affected independent directors. Committee-based activity increased materially around SOX for independent directors, who spent approximately 45% of annual meetings on committee before SOX and about 55% afterwards. An opposite result holds for inside directors, whose percent of meetings on sub-committees decreased from around 35% to about 23% over the sample period.

This change in sub-committee activity manifests in increased delegation. Our delegation measure is a board-level characteristic, designed to reflect the amount that independent directors are segregated from inside directors. For each director, we first compute the percent of total annual meetings a director has in sub-committees composed entirely of independent directors. This variable is then averaged over all directors to reflect the board-level separation of inside and independent directors. The measure captures the degree of director separation, while simultaneously accounting for a board's sub-committee structure. Our results show an increase in delegation from 20% for all firms in 1996 to approximately 45% in 2010 for firms that were structurally compliant with SOX and to approximately 40% for firms that were not.[6]

[5] We define a structurally compliant firm as one with a majority of independent directors and fully independent audit, nominating, and compensation committees.

[6] The use of the term "delegation" may seem curious given that we find that board activity is relatively constant over time. Hence, inside and independent directors have equal opportunities for discussions around SOX. J. R. Cohen et al. (2013), however, provide anecdotal evidence supporting

We then investigate whether, as hypothesized, delegation of tasks to sub-committees makes independent directors relatively less informed. If independent directors have less inside information, then their share purchases should be negatively affected by delegation. On the other hand, delegation should not hurt, and may improve, the share purchase performance of inside directors who can more easily keep their firm-specific information private from outside directors. We evaluate these implications by examining both the market reaction to insider trades and buy-and-hold abnormal returns (BHARs) following share purchases. For outside directors, a one standard deviation increase in delegated activity leads to a 0.36% lower CAR over the 2-day window beginning with the net purchase reporting date. Six-month BHARs following net purchases by outside directors are also lower when delegation activity is higher. A marked contrast exists for inside director share purchases, where the market reaction to disclosure and BHARs exhibit a positive relationship with delegation.

The analysis concludes by evaluating whether the cumulative SOX regulations affected board decision-making and firm values. Consistent with increased delegation leading to less effective decision-making, we find that Tobin's q is negatively affected by delegation. Our tests include models with cross-sectional and time-series instruments to address endogeneity problems that arise when firm performance, board activity, and delegation are determined simultaneously.[7] In addition, the market reacts less positively to acquisitions and the likelihood of a positive market reaction is lower when delegated activity is higher.

This paper contributes to the literature in several ways. To our knowledge, this is the first paper with data on firms' complete sub-committee structure in a panel setting. Thus, we believe we are the first to document that the number of sub-committees has not changed much over time, but that the activity of sub-committees has increased significantly. Importantly, this increase in activity

our terminology. They document that a common concern among experienced directors is that SOX greatly increased board discussions on compliance and reporting, reducing the amount and quality of board discussions on firm strategy. In essence, boards delegated decision making to sub-committees. An experienced corporate director is quoted as indicating that, after SOX, "over half the time a board spends is now spent on minutia of reiterative reporting requirements, and this is taking time away from overall strategy. It is taking time away from the big issues to fulfill the small issues."

[7]In the dynamic panel setting, we instrument activity and delegation. The cross-sectional instrument considers each firm's director post-appointment experience on other corporate boards under the belief that a board's activity level should be influenced by individual directors' experiences. Lagged time-series instruments capture each firms' trend in activity over time.

holds for firms that were generally believed to be compliant with SOX before the regulations took place. Thus, the results have relevance for existing empirical studies comparing firms that were structurally compliant with SOX before the reforms with those that were not, suggesting that both types of firms were affected.

More generally, we highlight a topic that has been relatively understudied. While there is a large literature on committees as groups, we are unaware of papers discussing the comprehensive role of sub-committees within boards. This is surprising given the prevalence of sub-committees in corporate and academic decision-making. We hope our novel measures of board activity and delegation, which simultaneously account for multiple dimensions of board structure, prove useful in future corporate governance studies.

Finally, we demonstrate how advanced natural language processing techniques may be used to enable large scale data collection in corporate finance research. Data to answer many interesting corporate finance questions lie not in data sets, but in the statements filed by companies. Existing sentiment and naive word pattern techniques can only extract very limited types of information from these statements. We believe the grammar-based algorithm used in this paper can greatly expand the scope of possible corporate finance research.

2. Hypothesis development

Given the complexity of corporate boards, a unifying theoretical model of board optimality that considers sub-committee structure, task allocation, and director membership does not currently exist. Consequently, we analyze the relevant theoretical literature for boards and sub-committees in stages. We first consider a theoretical economic model of delegation in small group decision-making problems, identifying how task allocation can affect communication among directors and overall decision-making effectiveness. Our discussion then considers models of how each entity (e.g. the board or a sub-committee) is shaped by heterogeneity of group member preferences, aggressiveness of interactions, and other factors. The section concludes by formalizing our hypotheses on how

delegation affects information sharing among directors and board effectiveness.[8]

2.1. Delegation

Li, Rosen, and Suen (2001) model the decision-making problem of a small group consisting of two people with heterogeneous preferences. Each participant has private information and a desired group decision. A truth-telling equilibrium does not exist if the group member preferences are not identical. Instead of disclosing their precise private signal, the participants manipulate and obfuscate their information.

The model shows that delegation of the decision to a single agent is not optimal whenever the group decision rule can be set endogenously. Delegation results in lost information. The delegated decision maker would prefer to know something about the other group member's private signal, however distorted it may be; the person not making the decision would like their information to be used, however marginally, by the decision maker.

Despite its stylized setting, this model provides a reasonable abstraction of delegation in the modern corporate board. While the preferences of insiders and independent directors may differ significantly, the preferences within each group are likely to be similar due to shared legal duties, incentives, and agency issues. Hence, one participant in the model may be viewed as a representative agent for inside directors and the other as the representative agent for independent directors.[9]

The Li, Rosen, and Suen (2001) model requires restricted communication under delegated decision-making. This assumption may not hold in practice as corporate directors are able to communicate with one another in a variety of ways. For example, while a director may not be on a specific committee, she may provide pertinent information when the entire board meets or in private. Anecdotal evidence, however, suggests that the breadth of discussion among director reduced after

[8]The term "committee" has different meanings in the academic literature. Corporate governance research generally follows the terminology used by corporations; a committee is a sub-group of the board of directors tasked with specific responsibilities. Other branches of academic research refer to any small group of people as a committee. To avoid confusion, we will use "group" to refer to studies analyzing decision-making and interactions among a small number of people. The term "sub-committee" will be used to refer to any sub-group of individuals.

[9]Li, Rosen, and Suen do not consider a entity, such as firm shareholders, that would be concerned with moral hazard issues in the group. A moral hazard problem would arise in the model if one participant has preferences to make a sub-optimal decision from the shareholder's perspective. Provided that shareholders can set the decision-making rule, delegation remains sub-optimal even in the presence of moral hazard.

SOX. Cohen et al. (2013) interview a number of experienced directors on changes induced by SOX. A recurrent theme is that SOX changed the nature of discussions among board members resulting in pertinent corporate information not being shared, particularly in the area of corporate strategy. One director is quoted as saying that "good boards used to worry about the future of the company, and now they're spending a lot of time talking about how (they're) reporting what happened."

2.2. Board and committee composition

The SOX-era reforms necessitated that boards (i) have a majority of independent directors and (ii) establish specific committees staffed entirely by independent directors. The theoretical economic literature suggests that the independent director majority, while potentially limiting corporate scandals, may not have improved the overall functioning and communication of the board. Adams and Ferreira (2007) consider a moral hazard problem in which a CEO prefers to pursue a sub-optimal project and needs approval from a board. If the board is too independent, the CEO chooses not to reveal private information. A friendly board can learn about the CEO's private information and may actually implement better policies than one that monitors too aggressively. Gillette, Noe, and Rebello (2003) show that a board with a watchdog (independent director) majority is only guaranteed to implement shareholder preferred policies when insiders can not coordinate their actions through a coalition.

If, as predicted by Adams and Ferreira, an independent director majority discourages insiders from disclosing private information, then SOX shifted the burden of information gathering to sub-committees composed entirely of independent directors. Yet, theoretical models suggest that homogeneous groups do not always have incentives to gather information. Beniers and Swank (2004) and Malenko (2014) show that heterogeneous preferences encourages group members to gather costly information so they may convince others of their point of view. As a consequence of not gathering sufficient information, the models show that homogeneous sub-groups need not make optimal decisions.

2.3. Hypotheses

Two common themes emerge from analyzing this theoretical literature. First, delegation of tasks from the board of directors to sub-committees of independent directors is not expected to improve the sharing of information among directors. Second, delegation does not always improve the overall quality of the board's decisions. We form hypotheses on each of these themes below.

Information Hypothesis

Delegation is expected to result in less shared information among directors (Li, Rosen, and Suen (2001)). Adams and Ferreira (2007) show how insiders will be reluctant to reveal private information to a board that monitors too aggressively. In equilibrium, as communication from inside to independent directors worsens, independent directors should exert more effort gathering information from other corporate sources. It is unlikely, however, this effort will completely offset the information loss because of mandatory, homogeneous committees of independent directors under SOX (Beniers and Swank (2004), Malenko (2014)). As such, reform-induced delegation should, in essence, move boards from a first-best to a second-best informational equilibrium.

We expect that inside directors due to their employment with the firm will have access to private information about the firm regardless of the level of delegation. This private information, however, is less likely to reach independent directors with delegation:

Hypothesis 1 *Delegation of task from the board of directors to sub-committees comprised entirely of independent directors hinders the flow of firm-specific information from inside directors to independent directors.*

We explore the implications of the above hypothesis through director activity levels and the performance of director stock transactions. We expect independent directors to be more active as they work to gather information and compensate for lost information from insiders. Additionally, if independent directors have less access to information, then their share purchases should be

negatively affected by delegation. On the other hand, delegation may allow inside directors to conceal information from independent directors. This should not hurt, and may help, their share purchase performance. Efficient markets should recognize these effects. The market reaction to disclosed share purchases by independent directors should be negatively related to delegation, while a null, or positive relation, should exist for share purchases by inside directors.[10]

The alternative hypothesis is that delegation will not impact, or may increase, the amount of information known to independent directors. While Cohen et al. (2013) document a decrease in strategic discussions post-SOX, Cohen, Krishnamoorthy, and Wright (2010) find that the big four accounting firms believe audit committees and independent directors increased their level of scrutiny after SOX. This increased knowledge of firm fundamentals may provide sub-committee members with greater insight into corporate performance. Hence, this alternative hypothesis implies that delegation will be positively associated with both independent director activity and the market reaction to disclosed purchases by independent directors.

Decision-Making Hypothesis

The second theme from the theoretical literature suggests that the quality of key corporate decisions will deteriorate as boards delegate to sub-committees. Delegation is not necessary when the board decision rule is set optimally (Li, Rosen, and Suen (2001)). Moreover, sub-committees composed of homogeneous independent directors may not gather sufficient information to make good decisions (Beniers and Swank (2004), Malenko (2014)).

Hypothesis 2 *Delegation of task from the board of directors to sub-committees comprised entirely of independent directors impairs the overall decision-making quality of the board of directors.*

If delegation hurts board and sub-committee decision making in general, firm value should decrease as delegation increases. Moreover, anecdotal evidence (Cohen et al. (2013)) indicates that

[10]We follow much of the existing literature and only examine share purchases. The decision to sell stock is often driven by liquidity needs of the insider and not private information (Lakonishok and Lee (2001)).

directors spend less time discussing strategic issues after SOX. Hence, key corporate decisions made under boards with high degrees of delegation should be viewed skeptically by markets. We assess these implications by examining Tobin's q and the market reaction to acquisition announcements.

The natural alternative hypothesis is that delegation improves board and sub-committee decision-making. Aghion and Tirole (1997) provide a delegation model in which a principal may choose to cede decision making authority to incentivize a better-informed agent. Delegation is optimal provided the combined effect of the agent's informational advantage and improved incentives exceed a private benefit. While independent directors may not be better informed about company-specific information than inside directors, delegation to sub-committees of independent directors may provide sufficient incentives to improve overall decision making.[11]

The finance literature on firm values and board size also provide mixed support for this alternative hypothesis. Yermack (1996) and Eisenberg, Sundgren, and Wells (1998) find that board size is inversely related to firm value. If smaller groups are more effective, then delegation, which naturally results in smaller groups making decisions, may improve decision-making quality. However, Adams, Hermalin, and Weisbach (2010) provide a critique that board size is endogenously determined by the firm. Coles, Daniel, and Naveen (2008) find that board size increases firm value after empirically controlling for heterogeneity in the underlying business environments.

3. Data

We test our hypotheses by examining how delegation affects (i) the activity of boards of directors and their sub-committees, (ii) the market reaction to and performance of director stock purchases, (iii) the market reaction to important corporate decisions, such as acquisitions, and (iv) firm values. The core of our data consists of unique information on the composition and activity of boards

[11] The model Li, Rosen, and Suen (2001) may also provide support for the alternative when considered in a multi-project setting. The model suggests that an optimal decision rule can compensate for the tendency of group members to distort information in an attempt to achieve a preferred outcome. In a multi-project setting, the model implies that a unique group decision rule may be needed for each project. Hence, if the board uses a single decision rule regardless of project type, then the decision rule may not be optimal for all projects and, as a consequence, delegation may be optimal for certain projects.

of directors and sub-committees. For each firm-year in the sample, we collect (i) the names and classification (e.g. inside or independent) of all directors, (ii) the names of all sub-committees of the board and their membership, and (iii) board and sub-committee activity, as measured by the number of meetings held by each entity over a fiscal year. We supplement this board- and committee-level data with information on firm financial performance (Compustat), stock prices (CRSP), insider trading (Thomson Reuters), and acquisition activity (SDC Platinum). The sample begins in fiscal year 1996, the earliest year for which we have data on corporate directors for a large number of firms, and ends in 2010. Details about the sample construction and data collection methods follow.

3.1. Sample Construction

Our sample consists of unregulated firms found in either the BoardEx or the Institutional Shareholder Services RiskMetrics (RiskMetrics) board of directors databases. The firms and years covered by the two databases differ significantly. RiskMetrics begins with proxy statements filed in calendar year 1996; BoardEx provides data for a large number of firms beginning with proxy statements filed in calendar year 2000 (a small number of firms are included for 1999). While the RiskMetrics data covers a longer time period than BoardEx, it contains a smaller cross-section of firms. The RiskMetrics universe primarily emphasizes firms found in the S&P 1500.[12] BoardEx, on the other hand, contains information on a wide cross-section of firms for much of the sample. From its inception in 2000 through 2002, BoardEx contains data on between 1,500 and 2,000 firms. Coverage increases over the next two years so that the data set contains between 5,000 and 6,000 firms annually beginning in 2005.[13]

We take the union of firm-years found in the two databases to minimize the time-series limitations of BoardEx and the cross-sectional limitations of RiskMetrics. See Appendix B.1 for details on

[12] RiskMetrics includes 400 to 500 widely held companies not included in the S&P 1500 for some fiscal years.

[13] We exclude firms in the financial services and utilities sectors. The structure of boards and committees in financial services firms differs greatly from those in other industries. Financial services conglomerates have separate boards of directors for each subsidiary bank. Directors of the parent company may sit on subsidiary boards, but their activity may not be disclosed. As it is unclear how to aggregate director activity for these firms to create comparable activity measures to those for industrial firms, we do not include these firms in the sample. Utility firms, due to strict regulations, have unique board and committee activity characteristics and are also not part of the sample.

the process by which we ensure a firm appears only once in the combined data set. As detailed in the following sections, the BoardEx data is more detailed and accurate at the sub-committee-level. Hence, we use the BoardEx observation whenever a firm is in both databases in a single year. When a firm only appears in RiskMetrics for a given year, we use the database's information on the directors, but correct the sub-committee data as described later.

3.2. Directors

Our analysis requires a comprehensive history of each director's experience both cross-sectionally across firms and over time. As a director may appear in both BoardEx and RiskMetrics firm-year observations, we match each director across the two databases to ensure we have a complete understanding of their work history on corporate boards. BoardEx identifiers are unique per director. RiskMetrics reuses director identifiers and, therefore, its director identifiers are unsuitable for our analysis.[14] Consequently, we build our own director data set by combining BoardEx and RiskMetrics using a variety of manually-assisted name-matching algorithms. See Appendix B.2 for details.

We classify these directors as either (i) inside directors, (ii) affiliated directors, or (iii) independent directors. Directors in RiskMetrics are already grouped into these three categories. An inside director in RiskMetrics is marked as "E" (executive director). Affiliated director are identified with "L" (linked director) and independent directors are tagged with "I". BoardEx data does not include such clean classifications. Instead, it splits directors into executive and non-executive directors and provides a description of each director's role. We consider an executive director to be an insider director. Non-executive directors whose board role includes the word "independent" are categorized as independent director. All remaining non-executive directors are considered affiliated.

[14] One director identifier in RiskMetrics is particularly problematic as it associated with nearly 800 unique director names.

3.3. Sub-committees and their Composition

We require detailed information on all the sub-committees supporting the board of directors of each firm in order to build an accurate picture of board structure. Sub-committee data is used as-is for sample firm-years with source data from BoardEx. As detailed in Appendix B.3, RiskMetrics sub-committee data is both incomplete and misleading. The database only provides information on audit, compensation, governance, and nominating sub-committees. Sub-committees not fitting within one of these functional categories are ignored. A sub-committee fitting into multiple categories may be repeated, and it is not clear how RiskMetrics chooses which sub-committee to report when multiple overlap functionally. Given these limitations of RiskMetrics, we ignore all sub-committee information in the data set. Instead, we collect sub-committee names and memberships by manually reviewing proxy statements.

3.4. Board and Sub-committee Activity

Comprehensive data on the meetings of a firm's Board of Directors and all of its sub-committees is not compiled by available data sets used in finance research. This information can be found in the definitive proxy statements (form DEF 14A) that each firm is required to file annually with the SEC under Section 14(a) of the Securities Exchange Act of 1934. The SEC's instructions under paragraph (b)(13)(i) require that firms disclose the name, a statement of function, membership, and number of meetings held during the preceding fiscal year for every sub-committee of the board.[15]

We use advances in computational linguistics to overcome the difficulty in collecting data for our full panel of firm-year observations. Our technique analyzes the underlying grammatical structure of proxy statements. This approach differs significantly from natural language processing techniques commonly used in finance, such as keyword searches or tonal analysis, that analyze words out of context. Given the innumerable ways firms can articulate information, these techniques are

[15] One might be concerned that corporations inflate their activity levels to appear diligent to shareholders. Rule 14a-9 of the Securities Exchange Act of 1934 prohibits companies from soliciting shareholder votes with misleading or false information.

generally unable to extract precise numerical data in a robust manner. By grammatically analyzing sentences, we are able to consider words in context, identifying their usage and interrelationships for communicating information.

The Stanford CoreNLP enables our analysis.[16] This software embeds a computer learning algorithm that has been trained to parse and grammatically analyze sentences. For each pair of words forming a grammatical relationship in a sentence, the "dependencies" output of the CoreNLP yields (i) the governing word, (ii) the dependent word, and (iii) the type of grammatical relationship between the governing and dependent words.

— *Insert Figure 1 about here.* —

An example will make the power of using grammatical dependencies clear. Consider a simple sentence: "The audit committee met 4 times over the last fiscal year." The dependency output from the CoreNLP can be visually represented by the grammatical tree shown in panel A of Figure 1.[17] The verb "met" is the root of the sentence. There is a relationship through this verb between the "committee" nominal subject (*nsubj*) and the direct object (*dobj*) "times". A noun compound modifier (*nn*) relationship links the subject with its "audit" committee type. The numeric modifier (*num*) provides the actual number of meetings.

Similar relationships between words hold even if the sentence structure changes. For example, panel B of Figure 1 shows the grammatical structure underlying the passive voice sentence "Five meetings were held by the compensation committee last year." Despite differences between this sentence and the active voice example, the two share a remarkably similar grammatical structure. In the passive voice, a committee, marked as the agent of the root verb, held meetings, marked as the passive nominal subject (*nsubjpass*). As with the active voice case, committee type appears as a noun compound modifier and the number of meetings is a numeric modifier.

[16]This software is freely available from its developer, the Stanford Natural Language Process Group (Manning et al. (2014)). An technical review of the part-of-speech tagging algorithms are provided in Toutanova and Manning (2000), and Toutanova et al. (2003). Chen and Manning (2014) describe the neural network technology behind the dependency parser, which we use to understand grammatical relationship among words.

[17]The grammatical tree is a convenient simplification that illustrates the general structure of the data. As discussed later, the grammatical dependency data structure is more accurately modeled as a labelled directed graph.

Our data extraction procedure is implemented as follows. We first prepare all proxy statements by eliminating HTML codes, page breaks, and other items not related to content. The cleaned text is then segmented into sentences. Sentences are filtered and those that mention either a committee or a board are passed to the Stanford Core NLP for grammatical dependency and part of speech analysis. The resulting grammatical representation is translated into a labelled directed graph data structure. Finally, an exhaustive sub-graph search algorithm is performed based on a set of grammatical dependency structures similar to the active-voice and passive-voice examples described above. A matching sub-graph yields the number of meetings for each board and committee.

The grammatical approach offers many benefits. The approach is logically parsimonious; only four grammatical relationships are needed to find board and sub-committee meeting data in a proxy statement. These include the active voice and passive-voice grammatical patterns described previously. Two other grammar patterns, one active voice and one passive voice, process cases when a committee did not meet during a fiscal year. The approach is also very resilient, handling word pattern structures that would be impossible to analyze with naive NLP techniques. This ensures it intrinsically ignores unnecessary clauses that can confuse other algorithms.[18] A more detailed discussion of the grammatical analysis technique and its benefits is found in Appendix A.

3.5. Descriptive statistics

— *Insert Table 1 about here.* —

Table 1 reports the number of firms in the sample on an annual basis and in aggregate. Annual counts are based on the year in which a firm's fiscal year ends. The sample begins in 1996 and ends in 2010. For the period from 1996 through 1999, the sample is almost entirely composed of observations from RiskMetrics. The sample transitions to BoardEx data beginning in 2000, the

[18]For example, Bruker Corporation's proxy statement for the 2008 fiscal year included the following statement: "The Audit Committee of the board of directors, which is currently comprised of Brenda J. Furlong, Collin J. D'Silva and Richard A. Packer, each of whom satisfy the applicable independence requirements of the SEC rules and regulations and NASDAQ Marketplace Rules, met six times during the 2008 fiscal year." Naive word pattern rules will have trouble with this sentence as there are 38 words between the subject "committee" and the root verb "met". The grammatical parsing technique, on the other hand, identifies the relationship between the subject and the verb. In essence, a grammatical rule allows for implementation of algorithms that intelligently eliminate clauses that are not of interest. This grammatical approach extracts the meeting-related content in this complex sentence to "The Audit Committee met six times."

first year for which BoardEx data is available for a large number of firms, when it consists of 65% firm-year observations from BoardEx and 35% from RiskMetrics. The BoardEx share grows from approximately 81% in 2001 to approximately 95% in 2003. Starting in 2004, BoardEx is responsible for the majority of the firm-year observations with 98% of the observations in the combined sample. RiskMetrics provides less than 20 unique annual observations not covered by BoardEx beginning with fiscal year ends in 2006.

— *Insert Table 2 about here.* —

Table 2 reports summary statistics on board activity and firm financial performance. In Panel A of Table 2, we define activity as the total number of director-meetings that occur in a fiscal year. It is the product of the size of the entity (board or committee) multiplied by the number of members.[19] So, a board with seven directors that met five times over a fiscal year would have an activity measure of 35 director-meetings. On average, board activity was 60.5 director-meetings for the full sample. The average firm's total committee activity was 49.9 director-meetings, representing approximately 45% of total director-meetings. Panel B indicates how active directors are on average. Directors have, on average, 7.3 board meetings and 6.0 committee meetings each fiscal year. There is substantial variation in activity; median activity levels are generally twice those found at the (least active) 5^{th} percentile and half those at the (most active) 95^{th} percentile.

3.6. Delegation

Along with details about general board characteristics and structure, panel C of table 2 provides information about delegation to independent directors. Economic theory predicts information sharing issues when sub-committees are homogeneous and do not contain inside directors, who have private information critical to informed decision making. Consistent with this prediction, we

[19] We consider all meetings to have equal weight regardless of whether they take place in the board or sub-committees of different types. Since we cannot measure the length of the meetings, it is natural to weight meetings equally. Some evidence that this assumption is reasonable comes from Machold and Farquhar (2013), who document that the average board meeting length in a sample of six UK firms is between 101 and 189 minutes. It seems unlikely that sub-committee meetings would be much shorter.

define delegation as a board-level characteristic that reflects the amount that independent directors are segregated from inside directors. It is computed as the average percent of total annual meetings a director has in sub-committees composed entirely of independent directors. We first calculate this percentage for each director on a board and then average it over all directors to compute the board-level delegation. The average director on the average firm in the sample spent approximately 30% of annual meetings in sub-committees composed entirely of independent directors.

The term "delegation" may seem inappropriate given that we find that board activity is relatively constant over time. However, our results in the next sections suggests that SOX reforms affected firms that had been structurally compliant with the regulations. This suggests that qualitative aspects of SOX, such as formalization of tasks and responsibilities, reshaped corporate governance and the content of conversations between inside and independent directors. J. R. Cohen et al. (2013) provide anecdotal evidence suggesting that boards did, in fact, delegate responsibilities as board meetings were occupied with reporting requirements and compliance after SOX (see section 2 and footnote 6).

4. A Visual History of Corporate Boards

Our data give us an exceptional perspective on the evolution of corporate board structure and activity over a 15-year period that contained corporate scandals and a global financial crisis. In Figures 2 through 4, we present a visual history of this period that illustrates major trends in the data. We require that any firm included in this univariate analysis be in the sample for at least of 10 years. This requirement is intended to minimize issues that could arise as the cross-section expands from the large-cap firms of RiskMetrics to the broad universe of BoardEx. As a result, the sample for this visual history primarily consists of S&P 1500 firms. Later analysis examines boards in multivariate regression settings.[20]

— *Insert Figure 2 about here.* —

[20] Plots using the full sample are very similar.

In figure 2, we document the time-series of board and sub-committees structure. Panel A shows that average board size is very stable over time. As is well-documented in the existing literature, the percent of independent directors increases around the passage of Sarbanes-Oxley and the changes in the NYSE and NASDAQ listing standards. Hence, firms did not, on average, comply with the requirement to have an independent director majority by simply adding new directors. Instead, inside directors were replaced by independent directors. Panel B shows that the sub-committee characteristics parallel those found in boards. The average sub-committee size does not change materially over the sample period, but the percent of independent sub-committee members increases from 78% to 96%.

Panel C suggests an interesting, and perhaps unexpected, change in corporate boards due to SOX. Firms do not appear to have created new sub-committees to comply with SOX listing standards. The average number of sub-committees changes little over time. One may have expected boards to add new sub-committees given SOX's emphasis on maintaining standing audit, nominating/governance, and compensation sub-committees. Rather than do so, firms appear to have expanded sub-committee duties to comply with listing requirements. This is seen in the significant increase in multi-function sub-committees, defined as a sub-committee whose name includes multiple formal roles (e.g. a Compensation and Nominating Committee). Multi-function sub-committees increased to 28% of all sub-committees in 2010 from 12% of sub-committees in 1996.

— *Insert Figure 3 about here.* —

The 2002 governance reforms emphasized structural elements of boards and sub-committees and board responsibility. They did not mandate that boards and sub-committees meet more frequently. Figure 3 provides evidence that the reforms precipitated a major change in board activity. Panel A displays the total number of board and sub-committee meetings. There was no significant change in board meetings over time. However, the number of sub-committee meetings nearly doubled post-reform from around 11 sub-committee meetings annually before SOX to approximately 20

afterwards.

The next two panels investigate which types of directors experienced an increase in meeting responsibilities. Panels B and C show the average number of board and sub-committee meetings per inside and independent director, respectively.[21] Insiders participated in fewer sub-committee meetings after the SOX reforms. On the other hand, independent directors held far more sub-committee meetings. Independent directors had about 6 committee meetings annually on average from 1996 through 2001. From 2004 through 2010, the average independent director was responsible for around 10 committee meetings annually.

— *Insert Figure 4 about here.* —

Figure 4 displays trends in delegation to independent directors. For this panel, we split the sample into two groups representing firms that were structurally compliant with SOX and those that were not. Structurally compliant firms are those that had a majority of independent directors on their boards and fully independent committees responsible for audit, governance/nominating, and executive compensation in fiscal year 2002. This is a time-constant indicator variable specific for each firm.

The figure shows a marked increase in delegation to independent directors from the pre- to the post-SOX period. By accounting for sub-committee structure, the delegation measure captures the combined effects of the multiple reforms instituted through the Sarbanes-Oxley Act and the revised exchange listing standards. Pre-reform and post-reform, delegated activity is nearly constant. However, delegation to independent directors increased significantly as the reforms took hold. Interestingly, both structurally SOX compliant and non-structurally SOX compliant firms increased delegation. Delegation increased from 20% in 1996 to approximately 45% in 2010 for firms that were structurally compliant with SOX and to approximately 40% for firms that were not. Thus, structurally SOX-compliant firms appear to be treated by the reforms, even though this "treatment"

[21] We do not plot affiliated directors as they represent a small percent of the sample. Affiliated directors activity curtailed post-SOX, though this reduction was less severe than that for inside directors.

is not specifically spelled out in the regulations.[22]

5. Board and Sub-Committee Activity, Delegation, and SOX

The broad patterns illustrated in the previous section do not consider cross-sectional heterogeneity. In this section, we examine activity and delegation in a regression framework. The results suggest that the reforms had a significant impact on both activity and delegation, even after controlling for firm characteristics. Confirming the trends documented in the visual history, all firms were affected by the reforms regardless of whether they had already been compliant with SOX's structural conditions before the reforms were put forward. Therefore, these result suggests that the effects of SOX were not restricted to structural changes to boards and sub-committees; formalization of task allocation, responsibilities, and reporting requirements across the board and its sub-committees affected all firms.

All regressions control for board characteristics, such as the number of directors and the percent of independent directors, that a large body of research suggests are associated with board effectiveness and firm performance (e.g. Adams and Ferreira (2007), Beniers and Swank (2004), Coles, Daniel, and Naveen (2008), Malenko (2014), and Yermack (1996)). We also control for firm characteristics that should be related to the composition and size of the board of director, board and sub-committee activity, and firm performance. Levered firms, which need external financing, may need the advise of board members with financial experience (Booth and Deli (1996), Güner, Malmendier, and Tate (2008), and A. Klein (1998)). Vafeas (1999) shows that larger firms size and older firms have more active boards. Firms with significant growth opportunities should seek the insights of insiders (Coles, Daniel, and Naveen (2008)), and CEOs of diversified firms benefit from advice provided by large boards with outside directors (Hermalin and Weisbach (1988)). Finally, boards need to address business uncertainty (Demsetz and Lehn (1985)). Hence, our specifications control for book leverage, firm size (measured by assets and number of employees), firm age, growth opportunities

[22] We do not split figure 2 and figure 3 by SOX structural compliance in order to keep the plots easy to analyze visually. The trends in these figures are virtually identical for firms (and their directors) that were structurally compliant with SOX and for those that were not.

(measured by R&D expenditures), diversification (measured by the number of business segments), and business uncertainty (measured by stock return volatility).

5.1. Board Meetings

— *Insert Table 3 about here.* —

Table 3 presents results of OLS regressions examining board meetings. Columns (1) through (3) suggest that boards of directors respond to negative firm performance by holding more meetings. Columns (2) and (3) provide evidence that boards held slightly more meetings (about 0.3 per year) after SOX. The coefficient reflects a 4% increase in total board meetings after SOX and is significant at the 1% level. There is no statistically significant difference in the increased board meetings between firms that were structurally compliant with SOX as of fiscal year 2002 and those that were not.

The revised exchange listing requirements necessitated independent directors majorities on corporate boards. Thus, the results in columns (1) through (3) may simply arise due to reform mandated changes in board composition if, for example, independent directors like to hold more board meetings than inside directors. In columns (4) through (8), we analyze board meetings by director-firm-year observation. A director that sits on multiple boards in a sample year will appear as separate director-firm-year observations. We add director fixed effects in the regressions and, thereby, control for each director's preferred number of annual board meetings. Standard errors are double clustered by firm and by director.

The results in columns (4) through (6) mirror those in columns (1) through (3). Boards hold more meetings when firms perform poorly. Board meeting frequency increased slightly after SOX even after controlling for director fixed effects, and this affected all directors regardless of whether the firm was structurally compliant with SOX as of fiscal year 2002. The subsets of inside and independent directors are analyzed in columns (7) and (8), respectively. Each set of individual director-type results is similar to those in the full sample of directors.

The table reveals little relation between board characteristics and the annual number of meetings. Board size is not statistically related to the number of meetings. Boards with more independent directors appear to hold more meetings annually in specifications without year fixed effects (e.g. columns (2) and (3)). However, the effect is negative and not statistically significant once year fixed effects are included.

By contrast, many firm-level control variables are related to the number of board meetings annually. Consistent with Vafeas (1999), we find that larger firms, as measured by assets, hold more board meetings. Leveraged and older firms are also more active in general. Boards of firms with greater growth opportunities (higher R&D expenses) and more uncertainty (stock volatility) meet more often. No statistically significant relation exists between board meetings and the number of employees or the number of business segments.

5.2. Committee Meetings

Table 4 presents results of regressions examining sub-committee meetings. The dependent variable in columns (1) through (3) is the average number of director sub-committee meetings annually.[23] Columns (4) through (6) of the table show results from regressions analyzing a panel of director-firm-year observations. Columns (7) and (8) look at results for the sub-samples of inside and independent directors, respectively. The dependent variable in the director-firm-year specifications is the total number of annual meetings held by sub-committees on which each director was a member.

The results show that sub-committees meet more often when firms perform poorly; columns (7) and (8) suggest that this response is from independent directors. The economic effect is quite small, however; a one standard deviation in annual stock returns results in approximately 0.06 more annual committee meetings for the average director.

[23] We compute the number of committee meetings for each director and then average over all the directors of the board. An alternate measure computed as the total number of committee-director meetings for all board members divided by the number of directors yields similar results. of whether the director was a member of a sub-committee

SOX, however, had a material effect on sub-committee meetings. Columns (2) shows that the average director had 1.7 more sub-committee meetings annually after SOX, which is significant at the 1% level. The independent director majority in the exchange listing requirements do not appear to be responsible for the increase in sub-committee activity. After controlling for director fixed effects, the average director has slightly more than 2 more sub-committee meetings annually after SOX (columns (5) and (6)). Regulations forbidding inside directors from serving on a variety of sub-committees appear to have resulted in these directors having 0.7 fewer annual sub-committee meetings (column (7)). Instead, independent directors, who have approximately 2.5 more annual sub-committee meetings (column (8)), are responsible for the board-level increase in average director sub-committee activity.

The results indicate that SOX affected the sub-committee activity of firms equally, whether a firm was structurally compliant with SOX or not. While the firm-level result in column (3) shows a statistically significant relation where a director in structurally compliant firms had more meetings after SOX than a peer in a non-structurally compliant firm, this difference is not significant once director fixed effects are included in column (6).

In contrast to the results analyzing the number of board meetings, committee meetings are related to characteristics of the board of directors. Larger boards hold fewer sub-committee meetings. Boards with a greater percentage of independent directors hold more sub-committee meetings. Firm-level characteristics also play a role in sub-committee activity. Firms with more assets and older firms hold more sub-committee meetings. These results are, in general, significant at the 1% level across a variety of specifications.

5.3. Delegation

— *Insert Table 5 about here.* —

Delegation from the board of directors to sub-committees of independent directors is analyzed in Table 5. Columns (1) through (3) are results from models in which the dependent variable

is the board-level delegation averaged over all members of the board. Columns (4) through (6) use director-level data to look at each independent director's particular level of delegation per firm-year.[24]

Unlike board and sub-committee meetings activity, delegation does not appear to respond to stock returns. Specifications with year fixed effects in columns (1) and (4) do not reveal a statistically meaningful relation between delegation and stock returns. Thus, when firms perform poorly, board and committee meetings increase pro rata such that the proportion of director activity on independent sub-committees remains relatively constant.

SOX increased delegation (columns (2) and (3)), and this increase is not due to the preferences of independent directors who constitute a majority after SOX (columns (5) and (6)). The average independent director spends about 10% more of their total annual meetings in groups without an inside director after SOX. This result is highly statistically significant, even after including director, firm, and year fixed effects and double clustering standard errors by director and firm. As with board and sub-committee meetings, SOX and the revised exchange listing standards affected firms that were both structurally compliant with the reforms and those that were not. The difference in the post-SOX increase in delegation based on structural compliance is statistically insignificant in the director-level panel.

6. Delegation and the Flow of Information

We hypothesize that delegation of tasks from the Board of Directors to sub-committees comprised entirely of independent directors will reduce the flow of information from inside to independent directors. An extensive literature measures how much information corporate insiders have by examining the market reaction to and performance of their stock transactions (e.g. Aboody and Lev (2000), Fidrmuc, Goergen, and Renneboog (2006), Lakonishok and Lee (2001), and Ravina and

[24] While delegation is designed as a board-level measure of separation of independent and inside directors, we perform these tests with each director's individual level of delegation so that director fixed effects may fully control for each director's preferred delegation level. Inside directors are not included in these tests as delegation to inside directors is 0 by definition.

Sapienza (2010)). Consistent with this literature, we test Hypothesis 1 by examining director trades in the presence of delegated activity. We follow the majority of the literature by analyzing share purchases and excluding sales, for which liquidity motives may obscure information content.[25]

We construct an individual-level trading data set so we may compare the trades of different types of directors. Transaction and filing data for directors of our sample firms are obtained from Thomson covering the period from January 1996 through December 2010. Our sample considers open market purchases and sales. As detailed in Appendix B.4, we exclude flawed transactions, option related sales, and pre-planned sales thought to be made pursuant to Rule 10b5-1 of the Securities Exchange Act (Brochet 2010; Jagolinzer 2009).

Thomson data allow us to classify directors as either inside or outside directors. Directors identified by Thomson as the chairperson of the board, the vice chairperson of the board, an officer, or a beneficial owner (role codes *CB*, *H*, *OD*, and *VC*) are classified as insider directors. All other directors are considered outside directors. Thus, outside directors include affiliated and independent directors. As affiliated directors should have better information that independent directors, grouping the two types of directors together should bias the tests against supporting our hypothesis that delegation impairs the flow of information within the board.[26]

6.1. Market reaction to reported director purchases

We begin testing Hypothesis 1 by examining the market reaction to reported director share purchases. The hypothesis implies that delegation will be associated with decreased market reactions for announced purchases from outside directors. As delegation may allow inside directors to conceal information from independent directors, the market reaction to insider purchases should exhibit a null, or positive, relation with delegation.

Prior to August 2002, corporate insiders needed to report SEC Form 4 relevant transactions

[25] Lakonishok and Lee (2001) argue that "insiders have many reasons to sell shares but the main reason to buy shares is to make money." Our evidence for sales is consistent with this idea that they are less informative than share purchases; we do not report them for the sake of brevity.

[26] Delegation is a firm-level measure of separation between inside and independent directors. Hence, it is not necessary to link the nearly 50,000 distinct directors in our database to individual trades in Thomson.

within ten days after the end of the calendar month in which a transaction had occurred. Thus, a corporate insider trading on March 1 could wait until April 10 to report the trade. Given this, reported transaction dates are likely to be non-informative in the early part of the sample.[27] Electronic filing became mandatory June 30, 2003; prior to that, insiders could choose, but were not required, to file electronically. Given these limitations, we analyze the market reaction to director trades for the period from July 2003 through December 2010.

We classify a reporting date for an director as a "net purchase" if the director's net number of company shares purchased on that date is positive. A single day may have one director executing a net purchase and another director executing a net sale. Therefore, our unit of observation is director-firm-transaction day. The market reaction is defined as the cumulative abnormal return (CAR) over the 2-trading day window beginning on the day the trade is reported to the SEC. For both days in this trading window, we compute the daily abnormal return as the return of the stock less that of a size and book-to-market matched Fama-French (1993) 2 x 3 benchmark portfolio.[28] CAR is the total of the daily abnormal returns over the 2-day event window.

The regressions include the firm-level control variables used in the previous section and trade-level control variables. The trade-level control include two factors, book-to-market ratio and stock market capitalization, known to influence returns (Fama and French (1993)). As delegation may affect information known to directors and, consequently, optimal trading strategies, we add controls to measure the strength of the purchase signal. These include the dollar value of shares purchased (*trade size*), the number of directors purchasing shares (*strong buy*), and the number of purchases executed over the past year by the director (*filing frequency*). Control variables are measured as of the fiscal year end preceding the trade to reflect information known to market participants on the reported trade date. All regressions include year and Fama-French 48 industry fixed effects, and

[27] Brochet (2010) and Wu and Zhu (2011b) find that trades of corporate insiders are more informative under the timely reporting regime implemented post-SOX than pre-SOX. Thus, given the potential lag between trade dates and reporting dates, it is likely that reported date for insider trades before 2003 are not informative.

[28] Each stock from July of year *t* through June of year *t+1* is matched to the corresponding portfolios based on the cutoffs reported by Fama-French as of the end of June in year *t*. Size is the market value of equity as of June in year *t*. Book-to-Market is the ratio of the book-value of equity in fiscal year *t-1* to the market value of equity as of year-end *t-1*.

standard errors are clustered at the firm-month level.

— *Insert Table 6 about here.* —

The results presented in Columns (1) of Table 6 support Hypothesis 1 and provide evidence against the alternative. Delegation is associated with an increase in the market response to reported trades of inside directors (as reflected in the non-interacted coefficient on delegation). A one standard deviation increase in delegation corresponds to a 0.57% increase in the CAR for inside director purchases. Critically, delegation is associated with a decrease in CAR for outside directors. The coefficient on the interaction of delegation and the outside director indicator is negative and statistically significant. It suggests that a one standard deviation increase in delegated activity leads to a 0.36% decrease in the market reaction to outside director purchases. These results are consistent with the idea that there is less information-sharing when independent directors spend a greater percent of board and sub-committee meetings separated from inside directors. The increased scrutiny of firms by independent directors documented by J. Cohen, Krishnamoorthy, and Wright (2010) does not appear to translate into actionable information for directors.

Directors may copy the activity of other members of the board. Such trades may obscure the effect of information if, for example, outside directors simply copy the transactions of insider directors. We, therefore, eliminate trades that appear to mimic trades of other directors in column (2). Mimicking trades are considered trades that occur within two days of a director's transaction report date. The results supporting Hypothesis 1 remain economically and statistically significant when mimicking trades are excluded.[29]

The coefficients on several other control variables suggest that market participants consider board activity and trading strategy to reflect information known to directors. Board meetings exhibits a positive relationship with CAR, suggesting that information is transferred among directors at board meetings. The three variables that serve as proxies for the strength of the director purchase signal

[29]The *strong buy* variable is still defined when mimicking trades are excluded as multiple directors of a single type can trade on a single day.

are positive and statistically significant.

6.2. Performance of director purchases

Insider trade reporting requirements in place during the early part of the sample do not permit the CAR tests. In order to examine the full sample, we test Buy and Hold Abnormal Returns (BHARs). Section 16(b) corporate insiders are subject to short swing profit rules that prevent them from trading in opposite directions within a six-month period and making a net profit. Hence, we compute BHARs over this minimum holding period. These are calculated in excess of the return of the size and book-to-market matched Fama and French (1993) 2 x 3 benchmark portfolio.

The analysis uses firm-director type-month observations. Months are classified as either purchase or sale months based on the net shares transacted by all directors within a common classification group (e.g. insider or outsider). Thus, for example, an inside director purchase month would be one in which the net shares traded by all inside directors was positive. BHARs are computed starting with the last trade date of each aggregated month.

The results are presented in columns (3) and (4) of Table 6. All trade months are tested in column (3) while, as with the CAR results, we eliminate mimicking trades in column (4).[30] The buy and hold performance of stock purchases of outside directors decreases as delegation increases in both columns. Economically, a one standard deviation in delegation lowers outside director BHAR by 1.38% in the specification without mimicking trades. Once mimicking trades are eliminated, delegation is positively related to BHAR performance for inside directors, mirroring the CAR results.

7. Delegation, Decision-Making, and Firm Value

We hypothesize that delegation of tasks from the Board of Directors to sub-committees of independent directors can affect the decision-making capacity of the board and, as a result, firm

[30]Due to the timing limitation in place during much of the BHAR sample period, we simply eliminate transaction months in which inside and outside directors trade in the same direction.

values. To test Hypothesis 2, we analyze the market reaction to acquisition announcements. Acquisitions represent key corporate decisions that generally fall under the purview of the board of directors, and board approval is required for material acquisitions. While acquisition represent a very visible corporate decision with relatively clear timing, other, less-visible decisions by the board should also impaired leading to a cumulative effect on firm value. We, therefore, examine Tobin's q in a panel setting.

7.1. Delegation and Acquisitions

We obtain data on mergers and acquisitions from SDC. To ensure we examine deals of economic consequence, we use the filters proposed by Masulis, Wang, and Xie (2007).[31] Matching transactions to our sample of firms yields a sample of 2,146 deals completed by 1,131 unique firms.

Following Masulis, Wang, and Xie, we consider the market reaction to an acquisition announcement as the cumulative abnormal returns over the 5-day window beginning 2 days prior to and ending 2 days following the announcement. The daily abnormal returns is defined as the difference between the acquiring firm's return and the return on the CRSP U.S. Value-Weighted Index. The 5-day CAR is the sum of the individual daily abnormal returns. Acquirer control variables include the board- and firm-level characteristics used earlier, measured as of the fiscal year-end preceding the deal announcement. As per the existing literature, we add the bidder's Tobin's q, cash flow, and the cumulative stock return from 210 days prior through 11 days prior to the event. We also include a number of deal-level control variables used in the literature.[32]

— *Insert Table 7 about here.* —

Table 7 presents the results of regressions analyzing the market reaction to the acquisition announcements for sample firms. Columns (1) and (2) shows a statistically strong negative relationship

[31]The deal value must be greater than greater than $1 million and comprise more than 1% of acquirer market capitalization on the announcement date. Prior to the deal announcement, the acquirer must control less than 50% of the target company's shares, and the acquirer must control 100% of the target's shares after the transaction is completed.

[32]The deal-level controls include indicator variables for public and private targets, all cash deals, whether the deal included stock, high tech deals, hostile offers, tender offers, and diversifying deals. Continuous deal-level control variables are the relative deal size and the transaction value. As with the existing literature, we also include relevant interactions of these deal-level control variables.

between delegation and acquisition CARs.[33] The coefficient in the specification with industry fixed effects (column (2)) implies that the average increase in delegated activity due to SOX decreased the value of acquisition returns to acquirers by approximately 30 basis points.

Columns (3) and (4) present further evidence that the market discounts the acquisition decisions of firms that have boards with high degrees of delegated activity. The dependent variable in these columns is an indicator variable that takes the value of 1 if the 5-day acquisition CAR is positive and 0 otherwise. These linear probability models illustrate a strong statistical relationship between delegated activity and the likelihood that the market views an acquisition announcement skeptically. The increase in delegated activity due to SOX decreases the probability that the acquisition CAR is positive by approximately 2.2%. Results using probit and logit models are economically and statistically similar to the linear probability results.

7.2. Delegation and Firm Value

The results in Section 5 suggest that boards and sub-committees respond to negative firm performance through additional meetings. This endogeneity makes it difficult to empirically test the firm value implications of Hypothesis 2. To address endogeneity between value and board activity, we implement an instrumentation technique that leverages the cross-sectional and time-series information in our panel.

The cross-sectional instruments rely on the assumption that a director's past experience outside the firm influences their beliefs regarding optimal levels of activity and delegation, but is unrelated to firm performance shocks. Alternatively stated, this assumption requires that a firm's current value shock is unrelated to the past value shocks of other firms where directors are also board members. Historical value shocks to other companies are publicly known and, therefore, should not impact a firm's current value. Similarly, past activity and delegation of boards is publicly disclosed in end-of-year proxy statements and, consequently, should be incorporated into current market prices.

[33] As each firm only undertook a small number of acquisitions, we are unable to include firm fixed effects in these specification.

The cross-sectional instruments, therefore, require a semi-strong market efficiency assumption by which all information known to market participants is priced.

We calculate the cross-sectional instruments as follows. For each director of a firm, we find all past activity (or delegation) of the director while serving as a director of another firm. We exclude all experience earned before the director's current board appointment as firms may recruit directors based on their experience. Each director's past activity (or delegation) is averaged to yield a measure of the director's history. This approach will yield a unique historical average for each firm with which the director is associated. Hence, the historical average is a director-firm-year measure. The instrument is the average across the board members of the individual director-firm-year historical activity measures.[34]

The instruments are only available when a firm's board includes at least one director's that has served on the board of another firm in our sample. Due to our use of a large cross-section and long time-series, the majority of boards in our sample meet this requirement. The number of firm-year observations for which the cross-sectional instruments exist is approximately 87% of the total. Moreover the effectiveness of the instruments rely critically on the identification of directors across BoardEx and RiskMetrics. The high observability of the instruments suggest our director matching procedure (described earlier) was effective.

— *Insert Table 8 about here.* —

Table 8 presents the results testing the hypothesis that delegated board activity reduce firm value. The dependent variable is the natural log of Tobin's q. We define Tobin's q as the market value-to-book value ratio of assets, where the market value of assets is the book value of assets, net of the book value of common/ordinary equity, plus the market value of equity. Columns (1) and (2) show results for estimating standard fixed effects panel regressions. Columns (3) and (4)

[34] An example will illustrate this instrumentation approach. Consider a director for firm A in 2008, who was initially appointed in 2004. The director has experience on the board of firm B from 2003 through 2006 and for firm C from 2005 through 2008. The cross-sectional instrument excludes the experience on the board of firm B as it was earned before the director was appointed to firm A. It also excludes the concurrent experience on firm C in 2008, which may affect the director's effort on firm A. Hence, the experience used in the instrument is years 2005 and 2006 from firm B and years 2005 through 2007 from firm C.

present results from estimating dynamic panel models (Arellano and Bond (1991)). All variables are measured contemporaneously with Tobin's q . Dynamic panel models include cross-sectional instruments for board meetings, delegations, and the interaction of those variables. All right-hand side variables are instrumented with lagged value time-series instruments. Both fixed effects and dynamical panel specifications control for firm and year fixed effects. All standard errors are clustered by firm.

The results support Hypothesis 2. The coefficient on delegation is negative and statistically significant in specifications in columns (1) and (3). The interaction between delegation and board meetings is included as an regressor in columns (2) and (4). The coefficient on this term is negative and statistically significant. This suggests that delegation makes each board meeting less productive. That is, separation of inside directors from independent directors affects decision making at board meetings. The economic significance of an increase delegated activity is material. The increase in delegation after SOX lowers Tobin's q by approximately 4.1%.[35]

8. Conclusion

Corporate boards of directors are often blamed for corporate failures. Whether it is the accounting scandals of the early 2000s or the Global Financial Crisis of 2007 and 2008, boards of directors are targeted by regulators and stock exchanges for reform. However, proposals are often made by multiple bodies in isolation without necessarily considering the collective effects. The resulting cornucopia of governance mandates may have unexpected results.

This paper provides an in-depth analysis of corporate boards using complete data on board and sub-committee structure, activity, and delegation from 1996 to 2010. We use the literature on small-group decision-making and delegation to derive two key hypotheses. First, delegation of tasks from the board of directors to sub-committees of independent directors is expected to impair the

[35] After SOX, delegation increased by approximately 0.072 for the average firm in the sample (column (2) of Table 5. The average board met 7.3 times per year as seen in the summary statistics. Therefore, the impact of the change in delegated activity, as implied by the coefficient on the interaction of board meetings and delegation in column (4) of Table 8, is to decrease log Tobin's q by -0.041.

flow of information from inside directors to independent directors. Second, delegation can hurt the ability of the board to make crucial decisions for shareholders, decreasing firm value. Our results support these hypotheses.

While boards and directors are meeting more often over time, they may not be creating value. We argue one reason for this is precisely that much of the increase in activity takes place in a delegated environment. If reforms forced firms to move from a first-best to a second-best informational equilibrium, then board activity does not necessarily translate into value. Instead, directors may meet more to comply with reform-mandated formalization of tasks and enhanced shareholder reporting requirements.

The results have clear policy implications. First, SOX appears to have affected all firms. Firms that were compliant with SOX increased committee activity and delegation in nearly perfect alignment with those firms that were not compliant. Hence, SOX had the perhaps unintended consequence of affecting firms that were already believed to have good governance practices.

Second, perhaps part of the difficulty in fixing corporate boards lies in an approach where general mandates are applied to a complicated entity that economic theory suggests should be crafted uniquely to meet each firm's needs. Reforms were enacted in response to accounting scandals. By focusing on sub-committee structure, director independence, task formalization, and reporting, the strategic responsibility of the board appears to have been lost in SOX. By ignoring this important role, reforms may have destroyed value.

Our results suggest that board sub-committees are important for board functioning and should be examined in greater detail by both theoretical and empirical researchers. As boards become more complex due to heterogeneity in sub-committee structure and director preferences, information aggregation problems become more acute. Determining who should sit on sub-committees and how committees should report back to the group are interesting topics for theoretical analyses.

While collecting data on sub-committee structure and constructing our proxies for board behavior

involves a substantial amount of work, the increasing use of natural language data extraction methods, such as the ones we use in this paper, should reduce the costs of constructing these proxies in the future. We believe the effort is worth it as the measures we introduce are able to provide new insights on boards of directors. We hope our novel measures of board activity and delegation, which simultaneously account for multiple dimensions of board structure, prove useful in future corporate governance studies.

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A. Grammatical Analysis

A.1. Data Collection

Mathematically, the grammatical structure of a sentence is most easily represented by a labelled directed graph, which consists of nodes connected by edges that indicate direction and type. For a given sentence grammar, the nodes of the graph are the words of the sentence. The edges of the graph link the words from governing word to dependent word and are labelled by the type of grammatical relationship. The tree structure presented in the main text, which presents a direct hierarchy from governing word to dependent word, is a useful tool for exposition. However, it does not permit all possible sentence grammars. Two words may share both a governing-dependent and a dependent-governing relationship, either directly or indirectly through other words. Such cyclical relationships break the tree structure, but are allowed in directed graphs.

After representing sentences as a directed graph, we identify key grammatical relationships between words in sentences describing either board or committee activity. The words and relationships mirror those described in the main text's examples. We allow for several other words to comprise the information about board or committee meetings. But, we always keep the number of words modest to ensure we do not generate false data, never allowing for more than a few alternatives for a word. Similarly, as the Stanford CoreNLP contains a descriptively rich set of grammatical relationships, we modestly expand on the types of permitted grammatical relationships beyond those in the examples.

For example, in the active voice grammatical pattern, we look for a nominative subject of either a board or committee. The root verb may be met, held, or conducted. And the object is meeting, time, or occasion, or their pluralized forms. The object may appear as either a direct object, a clausal complement (*ccomp*), temporal modifier (*tmod*), or a preposition of the word "on" (*prep on*).

Once a pertinent grammatical sub-graph has been identified, we extract the number of committee meetings. These generally show up as a numeric modifier of the object. However, when a committee meets infrequently (e.g., "the committee met once"), an object will not be present. Instead the number of meetings is found in the word "once" or "twice," which appear as adverbial modifiers (*amod*) or indirect objects (*iobj*) of the verb. Additionally, a committee that matches one of the sub-graph patterns for a non-meeting committee is assigned zero meetings for the fiscal year.

The type of committee is found by looking at words that are dependent noun compound modifiers or adjectival modifier (*amod*) of the governing word "committee." In the case of a committee with multiple roles, all descriptive words link directly to the governing "committee." So, for a Nominating and Governance Committee, "nominating" and "governance" will both be direct dependents of "committee." Companies often name committees using the preposition "on", as in a Committee on Governance. In these cases, the type of committee is marked with the prepositional-on relationship (*prep on*) by CoreNLP. Finally, in some cases, a firm may spend a paragraph discussing the composition, charter, and activity of a committee. As such, the sentence discussing activity may referred to the entity generically as "the committee." In such cases, the algorithm scans the paragraph to find the most recently mentioned committee type.

In order to extract data on the number of meetings for both the board of directors and committees from a proxy statement, we first split each filing into its constituent sentences. As grammatical parsing of a sentence is the most computationally intensive part of our approach, we screen the sentences to ensure they have words comprising one of the candidate grammatical patterns described above. Sentences passing the filter are grammatically parsed. Our grammatical patterns are matched to the parsed sentence data using an exhaustive sub-graph search and the information from any matching labelled directed sub-graph is recorded.

A.2. Methodological Benefits

There are three key benefits of this approach. First, grammatical analysis reduces the number of ways of conveying information. While there are a myriad of ways of verbalizing information about the activity of boards and committees, there is, in effect, only one underlying grammatical structure linking an entity with the number of meetings it holds. Whereas naive NLP techniques may need to adapt to a multitude of possible formulation of word orders in key sentences, grammatical techniques need only focus on a few key structures. This focus makes grammar-based parsing robust and accurate.

Second, this approach does not suffer from issues that plague naive NLP techniques. Grammatical analysis considers words and the context in which they are used. Naive NLP techniques, on the other hand, generally look at words without context. Naive techniques often incorporate ad hoc rules designed to patch this intrinsic shortcoming. For example, keyword searches are frequently used to find information in documents. However, these searches necessitate that researchers place an upper bound on the number of words between keywords. Such bounds are designed to allow for flexibility in the way sentences are structured, but can create false positives. Grammatical techniques, on the other hand, are able to identify clauses that intervene between the governing words and its dependent. Great distances between words due to intervening clauses make keyword searches not viable, as they may lead to an algorithm that picks up a large amount of non-relevant information. However, the grammatical parsing technique still identifies the simple grammatical relationship regardless of intervening clauses.

Third, grammatical analysis easily allows for sentences that contain multiple pieces of information. Firms often disclose all the meetings of its committees in a single sentence. One such example is "During the last fiscal year, the Audit Committee met five times, the Compensation Committee met three times, and the Nominating and Governance committee met once." Grammatical parsing of this sentence creates a nested structure. Each clause discussing a committee and its meetings is recognized individually and, therefore, can be easily identified as containing relevant information for our study.

B. Data set construction details

B.1. Firm-year observations

The data consists of unique firm-year observations from the union of the BoardEx and RiskMetrics data sets. To ensure we only have one observation per firm-year, we track observations by Compustat firm identifier (*gvkey*) and fiscal year. This requires merging both BoardEx and RiskMetrics with Compustat. Our merging procedure follows. We are able to match all RiskMetrics firm-year source observations with Compustat by CUSIP codes. While we can match most BoardEx firms to Compustat using CUSIPs, there are many cases for which BoardEx firm CUSIPs do not have a match in Compustat. For such firms, we attempt to match across the databases using firm names. Fortunately, BoardEx provides a full history of the firm's name. We use all these historical names to identify potential matches in Compustat. Whenever a match on name is unsuccessful, we use Internet searches to identify the Compustat observation that corresponds to the BoardEx firm. Compustat matches are not available for slightly more than one hundred firms in BoardEx, all of which are either private or headquartered outside the United States.

B.2. Director data set construction

The analysis requires that we are able to track each director's experience over time on all the sample boards they have served. This requires that we have unique identifiers for each director whether the director appears in a BoardEx or in a RiskMetrics firm-year observation. The BoardEx director data is of high quality, with each person having a identifier that is common across all the corporate boards on which he or she serves. RiskMetrics director data, on the other hand, is less reliable. A director with multiple appointments may have different identifiers depending on the firm. Director identifiers are also shared across people with different names. Our approach is to use BoardEx as a base data set. We then match directors to BoardEx observations by firm-director name. Any unmatched directors appearing only in RiskMetrics is matched across RiskMetrics firms (to ensure we capture the director's experience) before being added to the sample. Details on the process follow.

We begin by taking the unique director name from BoardEx. Then, we match RiskMetrics directors to BoardEx directors. For each director-observation in both databases, we build a list of companies with which the director was associated. Initially, we define a match between BoardEx and RiskMetrics to occur when director names exactly match and the directors share a company association. The company association need not occur in the same year, which allows us to bridge the time between the start of RiskMetrics data and that of BoardEx. If a director match is not found using this approach, we perform a fuzzy match on the director's name using both edit distance (Damerau-Levenshtein) and sound-based (Metaphone) algorithms, while maintaining the requirement that the director share a firm history. The remaining unmatched directors in RiskMetrics are then matched to BoardEx by name only, with all matches validated by reviewing the affiliated companies' proxy statements to ensure the potential match refers to the same person. Finally, any remaining directors in RiskMetrics are assumed to be unique to the database and are added to our sample without a matching director in BoardEx.

B.3. Issues with RiskMetrics committee data

RiskMetrics committee data is both restrictive and misleading. RiskMetrics provides committee memberships for four types of committee functions: Audit, Compensation, Governance, and Nominating. Committees that fall outside of these designated functions are not recorded in the data. United Airlines maintained 10 sub-committees during the 1998 fiscal year.[36] Most of these committees are not recorded in RiskMetrics. In addition, when multiple committees have similar functions, RiskMetrics selects one as a representative committee. For example, United Airlines had an Independent Director Nomination Committee and an Outside Public Director Nomination Committee. The committee membership presented in BoardEx is for the Outside Public Director Nomination Committee, committee members unique to the Independent Director Nomination Committee do not have a nomination role in the database. Moreover, RiskMetrics disaggregates committees with multiple functions into multiple observations. For example, the proxy statement filed by Briggs and Stratton for the 1998 fiscal year indicates that the firm had two committees, an Audit Committee and a Nominating, Compensation and Governance Committee.[37] Members of the single Nominating, Compensation and Governance Committee are recorded as having these three distinct committee functions in RiskMetrics. Therefore, naive use of RiskMetrics data can result in an overstatement of the number of committees of a firm in some cases and an understatement in others.

[36] These were the Executive, Audit, Compensation, Compensation Administration, Competitive Action Plan, Labor, Independent Director Nomination, Outside Public Director Nomination, Pension and Welfare Plans Oversight, and Transaction Committees. United's proxy statement may be accessed at http://edgar.sec.gov/Archives/edgar/data/100517/0000950137-99-000464.txt.

[37] This proxy statement may be accessed at http://www.sec.gov/Archives/edgar/data/14195/0000950124-98- 004843.txt.

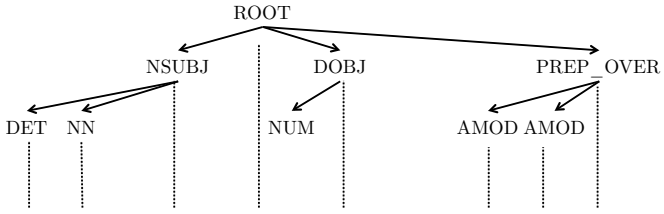
B.4. Thomson insider trade sample selection

When examining insider trades, we exclude those trades that Thomson Reuters believes are either flawed or non-informative. Thomson evaluates the data reported to the SEC by referencing external sources, assigning "cleanse indicators," which rate the reported data's accuracy and reasonableness. We eliminate flawed transactions (marked with cleanse code "A" or "S") for which numerous data fields were missing or invalid or the transacted security did not meet Thomson's data collection requirements. We also exclude option related sales (option sell indicator "A" or "P") as they are more likely to be motivated by diversification needs and less likely to be informative. Corporate insiders may trade securities to escape rules restricting transactions based on non-public information. Such transactions must be scheduled in advance pursuant to Rule 10b5-1 of the Securities Exchange Act. Any calendar month during which a director makes trades in the same net direction for three consecutive years is considered a non-informative, pre-planned trade and removed from the sample.

Figure 1: Grammatical Structures

The plots show a grammatical dependency tree for simple sentences describing the activity of the committees of the board of directors. Panel A displays a tree for an active voice sentence; panel B shows a tree for a passive voice sentence. Grammatical structures are generated using the Stanford CoreNLP software created by the Stanford Natural Language Processing Group. CoreNLP software embeds a computer learning algorithm that has been trained to parse sentences, providing the grammatical interrelationships between words. For each pair of words forming a grammatical relationship in a sentence, the "dependencies" output of the CoreNLP yields the (i) governing word, (ii) the dependent word, and (iii) the type of grammatical relationship between the governing and dependent words. The core sentence is displayed at the bottom of each panel. The grammatical structure is represented by the tree above the sentence. The relationships between words are displayed using arrows from the governing word to the dependent word. The type of grammatical relationship between the governing and dependent word is displayed at the end of the arrow. Dash vertical lines link these grammatical dependencies to the words in the sentence. *ROOT* is the root word of the sentence, which is the base word from which all grammatical dependencies relate. The other grammatical grammatical relationships appearing in these sentences include an agent (*AGENT*), an adjectival modifier (*AMOD*), a passive auxiliary (*AUXPASS*), a determiner (*DET*), a direct object (*DOBJ*), a noun compound modifier (*NN*), a nominal subject (*NSUBJ*), a passive nominal subject (*NSUBJPASS*), a numeric modifier (*NUM*), the preposition "over" (*PREP_OVER*), and a temporal modifier (*TMOD*).

Panel A: Active Voice



Panel B: Passive Voice

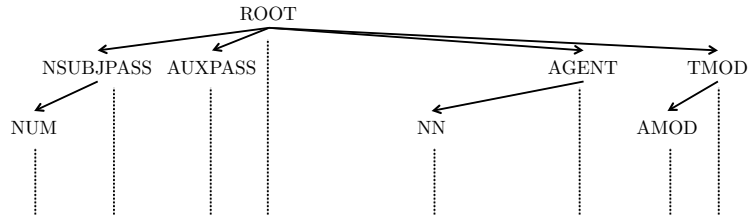
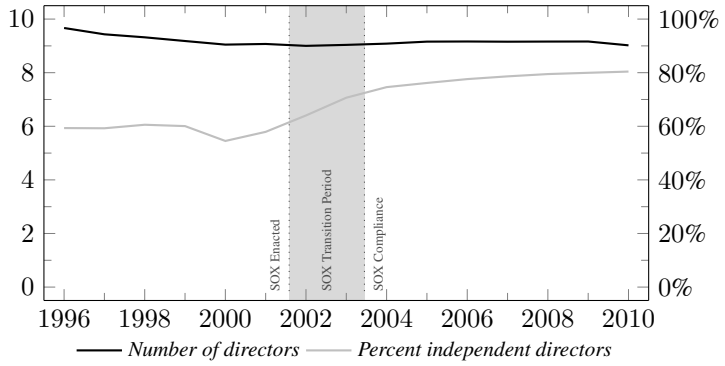


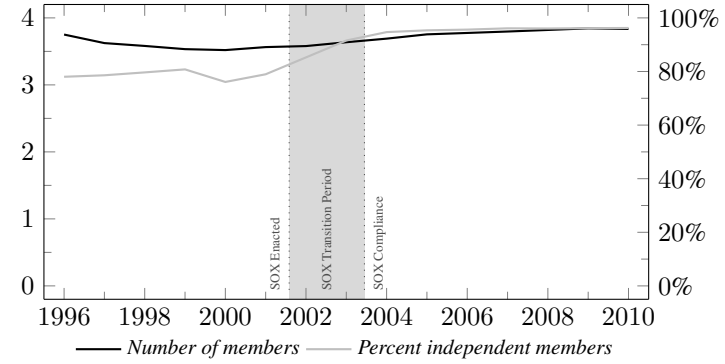
Figure 2: Board Structure

The plots show averages board characteristics for sample firms that were in the sample for at least 10 years. These are primariy firms in the S&P 1500, excluding those in the financial services and utilities sectors. Observations are averaged based on the calendar year in which a firm's fiscal year ends. Panel A displays information about the directors of the board. The black line, *Number of Directors*, is the average number of members of the Board of Directors with values displayed on the left axis. The gray line, *Percent independent directors*, is the percent of those directors classified as independent with values on the right axis. See Section 3 for details on the classification process. Panel B displays information about committee members. The black line, *Number of members*, is the average number of committee members with values displayed on the left axis.The gray line, *Percent independent directors*, is the percent of those classified as independent with values on the right axis. Panel C displays information about the committees of the board. The black line, *Number of Committees*, is the average number of standing committees of the Board of Directors with values on the left axis. The gray line, *Percent multi-function committees*, presents the percent of committees with multiple functions with values on the right axis. Tick marks on the horizontal axis indicate December 31 of each year. Vertical lines mark two key dates related to the Sarbanes-Oxley Act (SOX): July 30, 2002, the day the bill was signed into law, and June 15, 2004, the fiscal year end date after which public companies with a market capitalization greater than $75 million were required to be compliant with the legislation.

Panel A: Board Characteristics



Panel B: Committee Member Characteristics



Panel C: Committee Characteristics

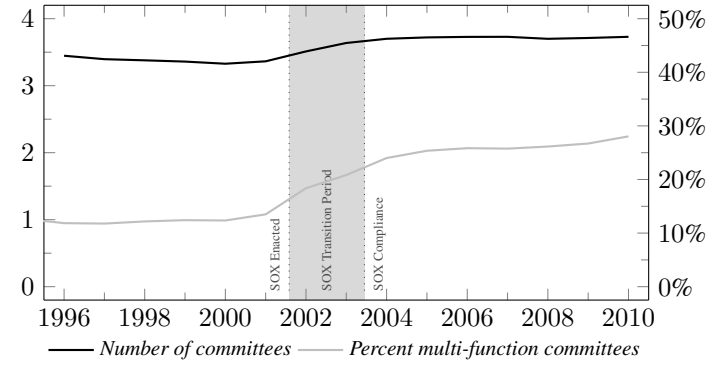
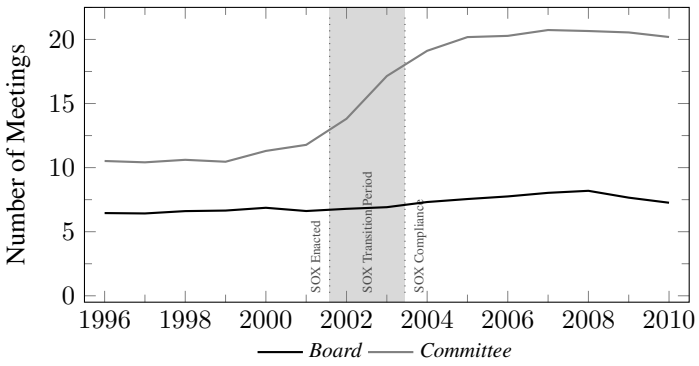


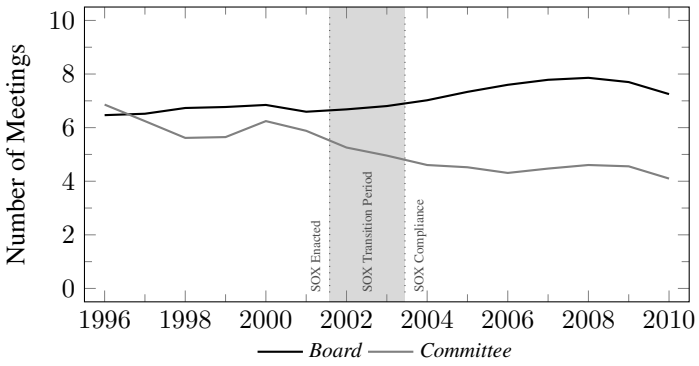
Figure 3: Board and Director Activity

The plots show averages board characteristics for sample firms that were in the sample for at least 10 years. These are primariy firms in the S&P 1500, excluding those in the financial services and utilities sectors. Observations are averaged based on the calendar year in which a firm's fiscal year ends. In each panel, the black line display is for *Board* meetings and the gray line is for *Committee* meetings. Panel A displays the average number of annual meetings for directors of the board. Panels B and C show the average number of annual meetings for inside directors and independent directors, respectively. Tick marks on the horizontal axis indicate December 31 of each year. Vertical lines mark two key dates related to the Sarbanes-Oxley Act (SOX): July 30, 2002, the day the bill was signed into law, and June 15, 2004, the fiscal year end date after which public companies with a market capitalization greater than $75 million were required to be compliant with the legislation.

Panel A: Total Annual Meetings



Panel B: Inside Director Activity



Panel C: Independent Director Activity

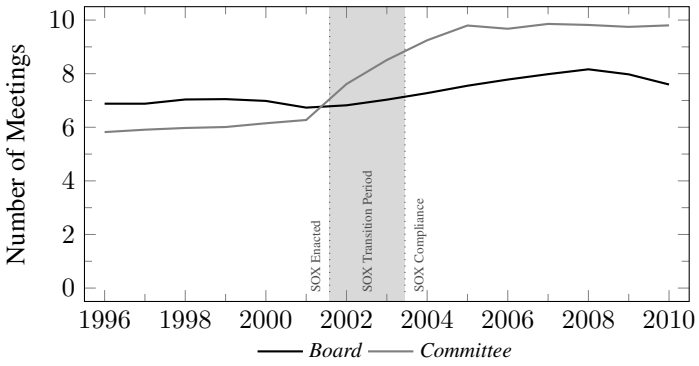


Figure 4: Delegation to Independent Directors

The plots show annual averages of independent director delegation for sample firms in the S&P 1500, excluding those in the financial services and utilities sectors, and their directors. Observations are averaged based on the calendar year in which a firm's fiscal year ends. Deleagation is initially computed for each independent director-firm-year observation as the number of meetings with committees composed entirely of independent directors divided by the total number of meetings (board and committees). The average director-level values for independent directors are plotted below. Tick marks on the horizontal axis indicate December 31 of each year. Vertical lines mark two key dates related to the Sarbanes-Oxley Act (SOX): July 30, 2002, the day the bill was signed into law, and June 15, 2004, the fiscal year end date after which public companies with a market capitalization greater than $75 million were required to be compliant with the legislation. SOX Structurally Compliant firms are those with a majority of independent directors on their boards and fully independent committees responsible for audit, governance/nominating, and executive compensation of fiscal year 2002.

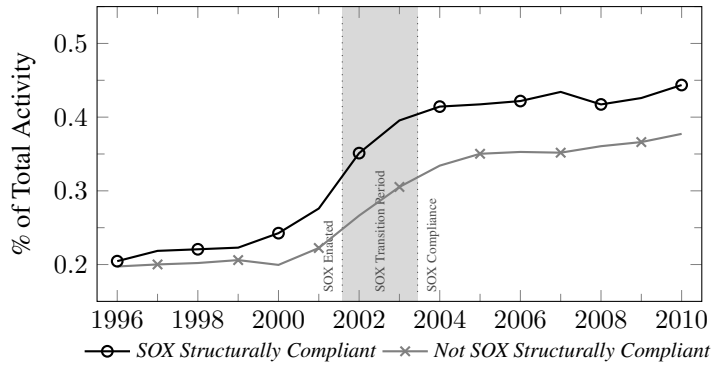


Table 1: Source Observations by Database

The table reports the number of firms sample observations on an annual basis and in aggregate. Annual counts are based on the year in which a firm's fiscal year ends. BoardEx data is used in preference to RiskMetrics. BoardEx provides accurate information on director names and classifications, committees of the board, and committee memberships. When BoardEx data is not available, RiskMetrics is used for the names and classifications of directors only; committee names and committee composition are collected manually. The BoardEx and RiskMetrics column indicates the number of firms observations that were sourced from each databases. The parenthesized numbers in the RiskMetrics column indicate the total number of firm-year observations covered by BoardEx. Any differences between the non-parenthesized and parenthesized RiskMetrics observation counts indicate firm-year observations that were covered by both BoardEx and RiskMetrics and, consequently, were sourced from BoardEx.

	Number of Observations			
Year	Total	BoardEx	RiskMetrics	
1996	1,080	0	1,080	(1,080)
1997	1,276	0	1,276	(1,276)
1998	1,299	0	1,299	(1,299)
1999	1,293	51	1,242	(1,292)
2000	1,628	1,063	565	(1,359)
2001	1,647	1,334	313	(1,159)
2002	1,645	1,390	255	(1,120)
2003	2,642	2,508	134	(1,112)
2004	3,118	3,058	60	(1,115)
2005	3,201	3,170	31	(1,092)
2006	3,132	3,124	8	(1,039)
2007	3,114	3,106	8	(1,053)
2008	2,858	2,841	17	(1,047)
2009	2,743	2,726	17	(1,104)
2010	2,230	2,229	1	(954)
Total	32,906	26,600	6,306	(17,101)

Table 2: Summary Statistics

The table presents summary statistics on 33,049 firm-year observations. *Mean*,*SD*, and Median reports the means, standard deviations, and medians. *p1*, *p25*, *p75*, and *p99* show the 1st, 25th, 75th, and 99th percentile values, respectively. In Panel A, *Board Activity*, *Committee Activity*, and *Total Activity* report the total number of director-entity meetings (calculated as the total over all relevent entities of the product of the number of meetings and the number of members) for board, committees, and combined entities, respectively. In Panel B, these values are averaged over the number of directors in the firm. In Panel C, *Log Board Size* is the natural log of one plus the number of directors on the firm's board; and *Percent Independent Directors* is the number of independent directors on the board over the total number of directors; *Delegation* is average director's percent of total annual meetings spent with committees composed entirely of independent directors. In Panel D, *Book Leverage* is the total book value of debt over the book value of total assets; *Log Assets* is the natural log of the book value of total assets; *Log Firm Age* is the natural log of the firm's age; *Log Number of Employees* is the natural log of one plus the number of employees (in thousands) of the firm; *Log Number of Segments* is the natural log of one plus the number of operating business segments; *R&D* is total annual R&D expenditures normalized by the start-of-year book value of total assets; *Log Tobin's q* is the log market value-to-book value ratio of assets; *Stock Return* is the cumulative annual stock return including dividends; and *Stock Volatiliy* is the annualized standard deviation of daily stock returns.

			Distribution				
	Mean	SD	p5	p25	Median	p75	p95
Panel A: Activity (Total Director-Meetings)							
Board Activity	60.521	32.872	21.000	36.000	54.000	77.000	121.000
Sub-committee Activity	49.894	33.660	11.000	25.000	42.000	67.000	115.000
Total Activity	110.415	57.073	40.000	69.000	99.000	141.000	219.000
Panel B: Activity (Average Meetings per Director)							
Board Activity	7.293	3.354	4.000	5.000	7.000	9.000	14.000
Sub-committee Activity	5.956	3.424	1.500	3.429	5.400	7.900	12.429
Total Activity	13.249	5.438	6.000	9.286	12.429	16.333	23.556
Panel C: Board Characteristics							
Log Board Size	2.074	0.282	1.609	1.946	2.079	2.303	2.565
Percent Independent Directors	0.685	0.166	0.375	0.571	0.714	0.833	0.889
Delegation	0.288	0.157	0.000	0.181	0.302	0.403	0.528
Panel D: Firm Financials and Performance							
Book Leverage	0.214	0.250	0.000	0.012	0.170	0.327	0.609
Log Assets	2.691	0.838	1.293	2.134	2.699	3.239	4.121
Log Firm Age	2.716	0.770	1.609	2.197	2.639	3.367	3.930
Log # of Employees	0.267	0.904	−1.252	−0.395	0.313	0.903	1.717
Log # of Segments	1.400	0.831	0.000	1.099	1.099	2.197	2.708
Log Tobin's q	0.598	0.583	−0.135	0.186	0.487	0.906	1.717
R&D	0.087	2.207	0.000	0.000	0.005	0.075	0.315
Stock Return	0.041	0.276	−0.363	−0.105	0.028	0.158	0.473
Stock Volatility	0.549	0.331	0.221	0.345	0.476	0.671	1.104

Table 3: Board Meetings, SOX, and Firm Performance

The table reports estimation results for fixed effects models examining the relations among meetings of the board of directors, firm performance, the pre- and post-SOX periods, and firms that were structurally compliant with SOX reforms. The dependent variable in all columns is the number of board meetings. Columns (1) through (3) report estimation results from board-level regressions in which each firm-year is an individual observation. Columns (4) through (8) show results from director-level regressions where each observation is a unique director-firm-year. *Post-SOX* is an indicator variable equal to 1 for observations with fiscal year ends in 2002, and 0 otherwise. *SOX Struct. Comp.* is an indicator equal to 1 for firms that were structurally compliant with SOX as of the fiscal year ending in 2002, and 0 otherwise. A structurally complianct firm is one with a majority of independent directors on its board and fully independent committees responsible for audit, governance/nominating, and executive compensation. *Stock Return* is the cumulative annual stock return including dividends over the fiscal year. All other controls are as defined in Table 2 and are measured contemporaneously with board meetings and the stock return variables. Specifications in columns (1) through (3) include firm and year fixed effects with standard errors clustered by firm. Specifications in columns (4) through (8) include director, firm, and year effects with standard errors double clustered by director and firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

				Director-level				
	Board-level			All directors			Insiders	Independent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-SOX		0.280***	0.313***		0.236***	0.258***	0.237***	0.260***
		(4.261)	(4.494)		(3.548)	(3.740)	(3.066)	(3.477)
Post-SOX ×			−0.186			−0.128	−0.197	−0.129
SOX Struct. Comp.			(−1.220)			(−0.840)	(−1.107)	(−0.810)
Stock Return	−0.462***	−0.521***	−0.520***	−0.415***	−0.475***	−0.475***	−0.472***	−0.496***
	(−7.128)	(−8.698)	(−8.691)	(−6.018)	(−7.427)	(−7.418)	(−6.736)	(−7.269)
Board-level controls:								
Log Board Size	−0.083	−0.092	−0.086	−0.149	−0.141	−0.136	−0.105	−0.126
	(−0.491)	(−0.540)	(−0.506)	(−0.878)	(−0.824)	(−0.800)	(−0.534)	(−0.699)
Independent Director %	−0.048	0.496**	0.494**	−0.175	0.356*	0.355*	0.237	0.395*
	(−0.217)	(2.312)	(2.305)	(−0.811)	(1.709)	(1.709)	(0.913)	(1.719)
Firm-level controls:								
Book Leverage	0.560**	0.585***	0.580***	0.751***	0.764***	0.760***	0.664***	0.743***
	(2.484)	(2.629)	(2.604)	(3.560)	(3.682)	(3.663)	(2.748)	(3.249)
Log Assets	0.429**	0.642***	0.649***	0.554***	0.751***	0.755***	0.682***	0.800***
	(2.325)	(3.698)	(3.746)	(2.939)	(4.233)	(4.263)	(3.178)	(4.300)
Log Firm Age	0.796***	1.102***	1.099***	0.750***	0.948***	0.946***	0.705***	0.958***
	(5.137)	(9.242)	(9.232)	(4.873)	(7.884)	(7.878)	(4.982)	(7.303)

(*Continued*)

Table 3: Continued

	Board-level			Director-level				
				All directors			Insiders	Independent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log # of Employees	−0.276	−0.369*	−0.367*	−0.321	−0.387**	−0.386**	−0.088	−0.421**
	(−1.440)	(−1.942)	(−1.929)	(−1.641)	(−1.987)	(−1.977)	(−0.382)	(−1.995)
Log # of Segments	−0.015	−0.068*	−0.067*	−0.012	−0.062*	−0.062*	−0.059	−0.062
	(−0.335)	(−1.875)	(−1.847)	(−0.273)	(−1.767)	(−1.744)	(−1.281)	(−1.641)
R&D	0.185*	0.212*	0.212*	0.139*	0.159*	0.159*	0.178***	0.135
	(1.778)	(1.937)	(1.939)	(1.658)	(1.818)	(1.819)	(2.752)	(1.241)
Stock Volatility	1.143***	0.882***	0.883***	1.158***	0.846***	0.847***	0.766***	0.860***
	(5.385)	(6.262)	(6.264)	(5.100)	(5.919)	(5.921)	(6.125)	(5.540)
Year FE	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Director FE	No	No	No	Yes	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm/ Director	Firm/ Director	Firm/ Director	Firm/ Director	Firm/ Director
N	31,985	31,985	31,985	265,632	265,632	265,632	52,807	182,609
R^2	0.052	0.043	0.043	0.583	0.579	0.579	0.636	0.577

Table 4: Committee Meetings, SOX, and Firm Performance

The table reports estimation results for fixed effects models examining the relations among the number of sub-committee meetings of the board of directors, firm performance, the pre- and post-SOX periods, and firms that were structurally compliant with SOX reforms. Columns (1) through (3) report estimation results from board-level regressions in which each firm-year is an individual observation. The dependent variable in these columns is the average number of director sub-committee meetings, where the average is taken over all directors of a board regardless of whether the director was a member of a sub-committee. Columns (4) through (8) show results from director-level regressions where each observation is a unique director-firm-year. The dependent variable in these columns is each director's total number of meetings for sub-committee on which they were a member over a firm's fiscal year. *Post-SOX* is an indicator variable equal to 1 for observations with fiscal year ends in 2002, and 0 otherwise. *SOX Struct. Comp.* is an indicator equal to 1 for firms that were structurally compliant with SOX as of the fiscal year ending in 2002, and 0 otherwise. A structurally complianct firm is one with a majority of independent directors on its board and fully independent committees responsible for audit, governance/nominating, and executive compensation. *Stock Return* is the cumulative annual stock return including dividends over the fiscal year. All other controls are as defined in Table 2 and are measured contemporaneously with sub-committee meetings and the stock return variables. Specifications in columns (1) through (3) include firm and year fixed effects with standard errors clustered by firm. Specifications in columns (4) through (8) include director, firm, and year effects with standard errors double clustered by director and firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

				Director-level				
	Board-level			All directors			Insiders	Independent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-SOX		1.726***	1.630***		2.152***	2.090***	−0.713***	2.537***
		(25.387)	(22.700)		(24.639)	(22.508)	(−4.356)	(25.097)
Post-SOX ×			0.556***			0.346	−0.073	0.183
SOX Struct. Comp.			(3.282)			(1.614)	(−0.153)	(0.823)
Stock Return	−0.217***	−0.234***	−0.236***	−0.278***	−0.242***	−0.244***	0.052	−0.284***
	(−4.522)	(−5.018)	(−5.055)	(−4.087)	(−3.703)	(−3.736)	(0.410)	(−4.011)
Board-level controls:								
Log Board Size	−1.884***	−1.858***	−1.876***	−0.911***	−0.864***	−0.876***	1.104**	−1.076***
	(−12.168)	(−11.845)	(−11.953)	(−4.459)	(−4.205)	(−4.267)	(2.418)	(−4.922)
Independent Director %	2.766***	3.838***	3.844***	−0.207	1.175***	1.176***	−0.522	1.125***
	(12.813)	(17.660)	(17.671)	(−0.754)	(4.254)	(4.255)	(−0.977)	(3.915)
Firm-level controls:								
Book Leverage	−0.026	−0.071	−0.055	0.146	0.035	0.046	−0.496	0.089
	(−0.168)	(−0.461)	(−0.356)	(0.626)	(0.148)	(0.197)	(−1.237)	(0.365)
Log Assets	0.466***	0.991***	0.970***	0.778***	1.551***	1.541***	0.129	1.455***
	(3.051)	(6.782)	(6.661)	(3.772)	(7.875)	(7.830)	(0.275)	(7.101)
Log Firm Age	1.608***	2.408***	2.415***	1.674***	2.652***	2.656***	−0.368	2.878***
	(10.864)	(22.116)	(22.177)	(8.404)	(17.727)	(17.772)	(−1.153)	(18.012)

(*Continued*)

Table 4: Continued

	Board-level			Director-level				
				All directors			Insiders	Independent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log # of Employees	0.511***	0.192	0.186	0.499**	0.076	0.071	0.342	0.318
	(3.087)	(1.188)	(1.152)	(2.406)	(0.363)	(0.337)	(0.873)	(1.419)
Log # of Segments	−0.047	−0.073**	−0.076**	−0.029	−0.063	−0.065	0.026	−0.061
	(−1.004)	(−1.967)	(−2.048)	(−0.520)	(−1.361)	(−1.403)	(0.256)	(−1.241)
R&D	−0.089	−0.051	−0.053	−0.170	−0.142	−0.143	−0.067	−0.119
	(−1.489)	(−1.014)	(−1.033)	(−1.579)	(−1.476)	(−1.476)	(−0.174)	(−1.281)
Stock Volatility	0.232***	−0.073	−0.077	0.301***	−0.143*	−0.145*	−0.345*	−0.138*
	(3.085)	(−1.238)	(−1.303)	(3.032)	(−1.820)	(−1.842)	(−1.852)	(−1.729)
Year FE	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Director FE	No	No	No	Yes	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm/ Director	Firm/ Director	Firm/ Director	Firm/ Director	Firm/ Director
N	31,985	31,985	31,985	203,914	203,914	203,914	15,699	171,496
R^2	0.379	0.353	0.354	0.637	0.630	0.630	0.742	0.624

Table 5: Delegation, SOX, and Firm Performance

The table reports estimation results for fixed effects models examining the relations among delegation, firm performance, the pre- and post-SOX periods, and firms that were structurally compliant with SOX reforms. Columns (1) through (3) report estimation results from board-level regressions in which each firm-year is an individual observation. The dependent variable in these columns is *Delegation*, defined as the average percent of total annual meetings a director has in sub-committees composed entirely of independent directors. Columns (4) through (6) show results from director-level regressions where each observation is a unique director-firm-year. The dependent variable in these columns is each director's individual percent of total annual meetings with sub-committees composed entirely of independent directors. As this variable is 0 by definition for inside directors, these columns only include independent directors. *Post-SOX* is an indicator variable equal to 1 for observations with fiscal year ends in 2002, and 0 otherwise. *SOX Struct. Comp.* is an indicator equal to 1 for firms that were structurally compliant with SOX as of the fiscal year ending in 2002, and 0 otherwise. A structurally complianct firm is one with a majority of independent directors on its board and fully independent committees responsible for audit, governance/nominating, and executive compensation. *Stock Return* is the cumulative annual stock return including dividends over the fiscal year. All other controls are as defined in Table 2 and are measured contemporaneously with sub-committee meetings and the stock return variables. Specifications in columns (1) through (3) include firm and year fixed effects with standard errors clustered by firm. Specifications in columns (4) through (6) include director, firm, and year effects with standard errors double clustered by director and firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

	Board-level			Director-level		
				Independent directors		
	(1)	(2)	(3)	(4)	(5)	(6)
Post-SOX		0.072***	0.070***		0.100***	0.100***
		(31.728)	(28.853)		(27.618)	(25.872)
Post-SOX ×			0.012**			0.001
SOX Struct. Comp.			(2.398)			(0.075)
Stock Return	0.002	0.003*	0.003*	0.003	0.006**	0.006**
	(1.135)	(1.672)	(1.653)	(0.961)	(2.498)	(2.497)
Board-level controls:						
Log Board Size	−0.077***	−0.077***	−0.077***	−0.069***	−0.070***	−0.070***
	(−15.617)	(−15.419)	(−15.504)	(−8.858)	(−8.839)	(−8.836)
Independent Director %	0.357***	0.387***	0.387***	−0.025**	0.004	0.004
	(51.183)	(57.210)	(57.354)	(−2.175)	(0.323)	(0.324)
Firm-level controls:						
Book Leverage	−0.023***	−0.025***	−0.025***	−0.025***	−0.028***	−0.028***
	(−4.547)	(−4.809)	(−4.729)	(−3.341)	(−3.635)	(−3.634)
Log Assets	<0.001	0.021***	0.021***	−0.001	0.030***	0.030***
	(−0.049)	(4.509)	(4.399)	(−0.193)	(4.196)	(4.187)
Log Firm Age	0.030***	0.062***	0.063***	0.050***	0.092***	0.092***
	(6.300)	(17.675)	(17.725)	(5.921)	(14.622)	(14.627)

(*Continued*)

Table 5: Continued

	Board-level			Director-level		
				Independent directors		
	(1)	(2)	(3)	(4)	(5)	(6)
Log # of Employees	0.029***	0.014***	0.014***	0.041***	0.021**	0.021**
	(5.473)	(2.806)	(2.768)	(4.876)	(2.574)	(2.573)
Log # of Segments	−0.001	0.002*	0.002*	−0.001	0.006***	0.006***
	(−0.846)	(1.761)	(1.703)	(−0.691)	(3.614)	(3.614)
R&D	−0.004	−0.003	−0.003	−0.007	−0.006	−0.006
	(−1.447)	(−1.193)	(−1.201)	(−1.324)	(−1.231)	(−1.231)
Stock Volatility	−0.007***	−0.010***	−0.010***	−0.013***	−0.015***	−0.015***
	(−3.023)	(−4.290)	(−4.319)	(−3.146)	(−3.962)	(−3.961)
Year FE	No	Yes	Yes	No	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Director FE	No	No	No	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm/ Director	Firm/ Director	Firm/ Director
N	31,985	31,985	31,985	182,609	182,609	182,609
R^2	0.541	0.527	0.527	0.592	0.587	0.587

Table 6: Director Stock Purchase Abnormal Returns and Delegation

The table reports results from estimating OLS models examining how abnormal returns associated with director share purchase disclosures vary with delegation. The dependent variable in columns (1) through (4) is *Cumlative Abnormal Return (CAR)*, defined as the sum over the two-day window of daily abnormal returns for company stock over a size and book-to-market matching benchmark portfolio. The CAR window begins on the day the insider filing was received by the SEC. Observations are based on director-firm-disclosure day, where a disclosure day is categorized as a purchase if the net transactions executed by the insider was positive. The CAR sample period runs begins on January 1, 2003, when the Sarbanes-Oxley regulation requiring corporate insiders to electronically report trades to the SEC within two days of executation came into effect, and runs through the end of 2010. The dependent variable in column (5) *Buy and Hold Abnormal Return (BHAR)*, defined as the six-month return of a stock in excess of the benchmark portfolio. Observations are based on director type-firm-month, where a month is categorized as a purchase if the net transactions executed by all director of a given type was positive. The BHAR sample period is from 1996 through 2010. Benchmark portfolios for both dependent variables are six Fama-French (1993) 2×3 portfolios. We match each stock from July of year t through June of year $t+1$ to the corresponding portfolios based on the cutoffs reported by Fama-French as of the end of June in year t. Size is the market value of equity as of June in year t. Book-to-Market is the ratio of the book-value of equity in fiscal year $t-1$ to the market value of equity as of year-end $t-1$. Director types are either either *Outsider* or *Insider* based on classifications reported to the SEC and recorded by Thomson. Columns (1) and (2) reports CAR results for inside and outside directors, respectively. Specifications in columns (3) through (5) use both types of directors. Columns (4) and (5) exclude mimicking strategies in which outside directors follow the trades of insiders. To do so, trade days (column (4)) or trade months (column (5)) in which both types of directors purchased shares are dropped from the sample. *Delegation* is the average director's percent of total annual meetings spent with committees over the fiscal year. *Strong buy* equals the number of unique directors in a firm who reported trades on the filing date. All other control variables are as defined in Table 2 All specifications include year and industry fixed effects (defined using Fama-French 48 industry classifications). Standard errors in CAR specifications are clustered by firm-month; BHAR standard errors are clustered by firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

	CAR		BHAR	
	(1)	(2)	(3)	(4)
Outside Director ×	−0.023***	−0.020**	−0.055*	−0.088**
Delegation	(−2.711)	(−2.323)	(−1.849)	(−2.372)
Delegation	0.036***	0.036***	0.038	0.079**
	(4.562)	(4.564)	(1.024)	(1.992)
Outside Director	0.001	0.001	0.005	0.013
	(0.399)	(0.267)	(0.499)	(1.065)
Board-level controls:				
Board Meetings	0.001***	0.001***	0.002***	0.002**
	(4.476)	(3.464)	(2.893)	(2.132)
Log Board Size	0.001	0.001	−0.022*	−0.016
	(0.616)	(0.390)	(−1.861)	(−1.381)
Independent Director %	−0.001	−0.005	−0.042**	−0.038**
	(−0.292)	(−1.083)	(−2.072)	(−1.961)
Trade-level controls:				
Log Book to Market	−0.003***	−0.002***	−0.003	−0.003
	(−4.065)	(−2.847)	(−0.582)	(−0.615)
Log Market Cap	−0.001	<0.001	0.051***	0.052***
	(−1.531)	(−0.387)	(9.641)	(9.465)
Strong Buy	0.002***	0.002***	0.007**	0.006*
	(6.875)	(5.825)	(2.544)	(1.678)
Trade Size	<0.001***	<0.001***	<0.001	<0.001
	(7.286)	(7.840)	(−1.247)	(−0.482)
Filing Frequency	<0.001***	<0.001***	<0.001	<0.001
	(−9.898)	(−9.769)	(0.119)	(−0.822)

(*Continued*)

Table 6: Continued

	CAR		BHAR	
	(1)	(2)	(3)	(4)
Firm-level controls:				
Book Leverage	0.004	0.004	0.078***	0.090***
	(1.304)	(1.205)	(4.379)	(4.998)
Log Assets	0.002	<0.001	−0.109***	−0.113***
	(1.109)	(0.135)	(−7.889)	(−7.937)
Log Firm Age	−0.003***	−0.003***	0.008**	0.006*
	(−3.592)	(−3.579)	(2.391)	(1.671)
Log # of Employees	−0.003**	−0.003**	0.012**	0.011**
	(−2.474)	(−2.094)	(2.383)	(2.320)
Log # of Segments	<0.001	<0.001	0.006*	0.005
	(0.107)	(0.066)	(1.917)	(1.617)
R&D	−0.001	−0.001	−0.008***	−0.010***
	(−1.482)	(−1.279)	(−3.488)	(−3.798)
Stock Volatility	0.020***	0.017***	−0.011	−0.005
	(11.019)	(9.169)	(−0.861)	(−0.372)
Constant	−0.005	−0.007	0.008	−0.010
	(−0.553)	(−0.704)	(0.268)	(−0.304)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Mimicking Trades	Included	Excluded	Included	Excluded
N	25,583	22,398	18,549	15,283
R^2	0.030	0.029	0.048	0.050

Table 7: Acquisition Cumulative Abnormal Returns and Delegation

The table reports estimation results for ordinary least squares models examining the relationship between acquiring firm merger announcement cumulative abnormal returns (CAR) and delegation. Acquisitions must have a value greater than $1 million and comprise more than 1% of acquirer market capitalization on the announcement date. The dependent variable in columns (1) and (2) is the announcement cumulative abnormal return for engaging in an acquisition. Cumulative abnormal return is defined as the difference between the acquiring firm's daily return and the Standard and Poor's 500 market daily return, aggregated over the 5-day window beginning 2 days prior to and ending 2 days following the merger announcement. The dependent variable in columns (3) and (4) is an indicator variable that takes the value of 1 if the cumulative 5-day CAR for the acquisition is positive and 0 otherwise. *Delegated Activity* is the percent of total annual meetings spent with committees averaged over each member of a firm's board of directors. All controls variables are as defined in Table 2 and are measured as of the fiscal year during which the merger announcement occured. All specifications include year fixed effects. Specifications in columns (2) and (4) include industry fixed effects, defined using Fama-French 48 industry classifications. Standard errors are clustered by firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

	Acquisition CAR		Positive Acquisition CAR	
	(1)	(2)	(3)	(4)
Delegation	−0.039*	−0.042**	−0.261**	−0.299**
	(−1.867)	(−2.003)	(−2.187)	(−2.484)
Board Meetings	<0.001	<0.001	<0.001	0.002
	(−0.613)	(−0.180)	(0.095)	(0.398)
Board-level controls:				
Log Board Size	−0.007	−0.012	−0.039	−0.052
	(−0.726)	(−1.140)	(−0.767)	(−1.005)
Independent Director %	−0.013	−0.011	−0.044	−0.020
	(−0.886)	(−0.718)	(−0.519)	(−0.230)
Bidder controls:				
Book Leverage	0.019	0.021	0.094	0.103
	(1.564)	(1.525)	(1.630)	(1.624)
Cash flow	0.002	0.002	0.006	0.005
	(0.348)	(0.311)	(0.290)	(0.241)
Log Assets	−0.008*	−0.010*	−0.050*	−0.046
	(−1.689)	(−1.773)	(−1.866)	(−1.528)
Log Firm Age	0.002	−0.001	0.027*	0.015
	(0.676)	(−0.228)	(1.676)	(0.870)
Log # of Employees	0.006	0.009	0.046*	0.043
	(1.147)	(1.623)	(1.689)	(1.345)
Log # of Segments	0.001	0.001	−0.005	−0.006
	(0.475)	(0.553)	(−0.365)	(−0.384)
R&D	−0.003	0.001	−0.076	−0.075
	(−0.177)	(0.051)	(−1.216)	(−1.208)
Tobin's *q*	−0.001	−0.001	0.001	<0.001
	(−1.291)	(−1.307)	(0.303)	(0.148)
Stock Runup	0.005	0.005	0.013	0.014
	(0.921)	(0.909)	(0.858)	(0.899)
Stock Volatility	−0.008	−0.009	0.032	0.026
	(−0.747)	(−0.806)	(0.665)	(0.529)

(*Continued*)

Table 7: Continued

	Acquisition CAR		Positive Acquisition CAR	
	(1)	(2)	(3)	(4)
Deal-level controls:				
Public target	−0.036*	−0.033*	−0.193*	−0.174
	(−1.939)	(−1.712)	(−1.744)	(−1.544)
Private target	−0.053**	−0.052**	−0.186	−0.171
	(−2.329)	(−2.271)	(−1.398)	(−1.292)
All cash deal	−0.017	−0.014	−0.083	−0.077
	(−1.136)	(−0.925)	(−1.021)	(−0.926)
Stock deal	0.007	0.009	−0.012	−0.006
	(0.604)	(0.743)	(−0.153)	(−0.067)
Public target × All cash deal	0.020	0.016	0.109	0.094
	(1.175)	(0.930)	(1.163)	(0.988)
Public target × Stock deal	0.011	0.008	0.060	0.045
	(0.794)	(0.552)	(0.629)	(0.457)
Private target × All cash deal	0.046**	0.046**	0.098	0.097
	(2.101)	(2.085)	(0.813)	(0.813)
Private target × Stock deal	−0.009	−0.010	−0.145	−0.160
	(−0.474)	(−0.532)	(−1.183)	(−1.302)
High Tech Deal	0.002	0.009	−0.004	0.044
	(0.467)	(1.495)	(−0.165)	(1.353)
Relative Deal Size	0.004	0.003	0.038	0.026
	(0.561)	(0.418)	(1.242)	(0.939)
High Tech Deal ×	−0.011	−0.009	−0.058	−0.043
Relative Deal Size	(−1.019)	(−0.846)	(−1.081)	(−0.782)
Hostile	0.004	0.006	−0.090	−0.114
	(0.188)	(0.257)	(−0.478)	(−0.562)
Tender Offer	0.010*	0.009	0.086**	0.082**
	(1.855)	(1.561)	(2.183)	(2.090)
Diversifying Acquisition	−0.005	−0.007	−0.040*	−0.049**
	(−1.407)	(−1.573)	(−1.802)	(−2.067)
Transaction Value	<0.001**	<0.001**	<0.001***	<0.001***
	(−2.508)	(−2.563)	(−3.555)	(−3.619)
Constant	0.079***	0.086***	0.690***	0.764***
	(2.587)	(2.842)	(3.879)	(3.625)
Year FE	Yes	Yes	Yes	Yes
Industry Fixed Effects	No	Yes	No	Yes
N	2,146	2,146	2,146	2,146
R^2	0.074	0.091	0.070	0.091

Table 8: Firm Value and Delegation

The table reports estimation results for models examining the relationship between firm value, board of director activity, and delegation. The dependent variable in all specification is *Tobin's q*, defined as the market value of assets divided by the book value of assets. The market value of assets is the market value of equity, defined as closing share price at the end of the fiscal year multiplied by the number of common shares outstanding, plus the book value of assets, net of the book value of common/ordinary equity. *Board meetings* is the number of board meetings held in a fiscal year. *Delegation* is the average director's percent of total annual meetings spent with committees composed entirely of independent directors. Controls are as defined in Table 2 and are measured contemporaneously with the firm value, board meetings, and delegation variables. Columns (1) and (2) present the results using a fixed effects panel data model. Columns (3) and (4) use the dynamical panel data model of Arellano and Bond (1991). *Board meetings* is instrumented because board activity is associated with changes in firm value. Cross-sectional (CS) instruments in columns (3) and (4) are based on director experience with other corporate boards. As directorial appointments may be based on experience, we only consider experience earned after a director was appointed to a firm's board. For each director with directorships outside the firm, we compute both the average number of board meetings and delegation variables. These instruments are averaged over the directors. All variables are instrumented with lagged values as time-series (TS) instruments in columns (3) and (4). As proxy statements are filed after a fiscal year ends, the lagged values may not be known to investors for the entirety of a fiscal year. Hence, two- and three-year lagged variables are used as instruments. *Lagged Tobin's q* is included as control variable to ensure that the economic effect of information in the activity, delegation, and control variables is reflected in the model. Specifications in columns (1) and (2) include firm fixed effects; Arellano-Bond models in columns (3) and (4) first-difference the data to remove the unobserved firm-specific effect. All standard errors are clustered by firm. *t*-statistics are reported in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5% and 10% level, respectively.

	Fixed Effect Panel		Dynamic Panel	
	(1)	(2)	(3)	(4)
Board Meetings		−0.036***		−0.078**
× Delegation		(−4.701)		(−2.118)
Board Meetings	−0.011***	−0.002	−0.004	0.015
	(−8.945)	(−0.742)	(−0.637)	(1.258)
Delegation	−0.106**	0.107*	−0.685***	−0.185
	(−2.535)	(1.796)	(−4.248)	(−0.676)
Lagged Tobin's q			0.352***	0.348***
			(18.583)	(18.448)
Board-level controls:				
Log Board Size	−0.034	−0.037	−0.118*	−0.106
	(−1.413)	(−1.545)	(−1.754)	(−1.575)
Independent Director %	0.109***	0.124***	0.239***	0.245***
	(3.020)	(3.412)	(2.698)	(2.778)
Firm-level controls:				
Book Leverage	−0.112***	−0.110***	−0.119	−0.103
	(−2.636)	(−2.603)	(−1.313)	(−1.134)
Log Assets	−0.426***	−0.426***	−0.816***	−0.835***
	(−14.215)	(−14.244)	(−7.474)	(−7.699)
Log Firm Age	−0.256***	−0.254***	−0.016	−0.012
	(−9.313)	(−9.264)	(−0.467)	(−0.351)
Log # of Employees	0.098***	0.098***	0.001	−0.005
	(3.254)	(3.249)	(0.009)	(−0.038)
Log # of Segments	−0.005	−0.005	−0.007	−0.009
	(−0.728)	(−0.795)	(−0.397)	(−0.485)
R&D	0.064	0.063	0.254	0.253
	(1.476)	(1.482)	(1.079)	(1.108)
Stock Volatility	−0.067***	−0.070***	0.056	0.043
	(−4.173)	(−4.282)	(1.482)	(1.160)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	FD	FD
Clustering	Firm	Firm	Firm	Firm
Instruments	-	-	CS/TS	CS/TS
N	31,985	31,985	21,333	21,333
R^2	0.197	0.198	-	-