

# The impact of an outside board chair on firm value

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## Abstract

Despite inconclusive empirical evidence on the impact on firm performance of having a board chair who is not the CEO, there is a growing incidence of U.S. public companies appointing board chairs who are not current or former executives. Using a large panel dataset from 1996 to 2005, we study the determinants and impact of outside chairs on firm performance. We find that having an outside chair positively and significantly impacts firm performance. This finding is robust to several tests that control for potential endogeneity and reverse causality interpretations. Consistent with recent literature on optimal board structures, we find that the costs and benefits of having an outside chair depend on firm characteristics. Specifically, we find that having an outside chair is more valuable when the CEO has greater bargaining power or when monitoring costs to external investors are high. On the other hand, having an outside chair is less valuable in operationally complex firms. Finally, we document that shareholders react favorably to announcements of outside chair appointments.

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## The impact of an outside board chair on firm value

*“A board with an outside chairman is better equipped to assure appropriate risks are assessed”, says Harry Pearce, outside board chairman of MDU Resources Group, Inc. “Freed of running the board, I have more time to run the complex company. If I were chairman, I might have a bit of bias towards my management during board meetings”, says Terry Hildestad, CEO of MDU.*<sup>1</sup>

### 1. Introduction

The board of directors is an important internal corporate governance mechanism that performs the critical function of monitoring and advising management. An extensive literature has attempted to identify board features that improve board performance. In general, greater board independence has been found to increase monitoring effectiveness (e.g., Weisbach, 1988; Brickley, Coles, and Terry, 1994; Cotter, Shivdasani, and Zenner, 1997; Duchin, Matsusaka and Ozbas, 2010). Larger boards are considered less effective due to co-ordination problems and director free-riding although recent papers find that the optimal board size depends on firm characteristics (e.g., Yermack, 1996; Coles, Naveen, Daniel, 2008; Boone, Field, Karpoff and Raheja, 2007; Linck, Netter, Yang, 2008). Theoretical and empirical research find inside directors are valuable in enhancing a board’s effectiveness by providing necessary firm-specific information (e.g., Raheja, 2005; Adams and Ferreira, 2007; Harris and Raviv, 2008; Coles et al., 2008; Masulis and Mobbs, 2011; Acharya, Myers and Rajan, 2011). Finally, a few studies have delivered inconclusive evidence on the benefits of having a chairman of the board separate from the CEO (e.g., Goyal and Park, 2002; Rechner and Dalton, 1991; Baliga, Moyer and Rao, 1996; Brickley, Coles and Jarrell, 1997).

In this paper, we examine whether having a chairman of the board (board chair, henceforth) who is not a current or former executive improves firm performance through more effective board monitoring and advising. Prior studies examining the impact of separate board

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<sup>1</sup> The quotes are from a Wall Street Journal Article “Chairman-CEO Split Gains Allies”, dated March 30, 2009.

chairs typically assume they are a single homogeneous group.<sup>2</sup> Yet, significant differences can arise if the separate chair is a current or former executive compared to if the chair is an outsider. Inside separate chairs are unlikely to be independent and impartial monitors of the current CEO since they are likely to have had significant overlapping employment at the firm. This is likely to reduce the monitoring benefits of having a separate chair. In addition, the “passing the baton” phenomenon noted by Vancil (1987) makes the distinction between a combined CEO-chair firm and a separate inside chair firm empirically noisy. A potential benefit of having an inside separate chair is that since the chair is familiar with the business, the cost of acquiring firm-specific expertise regarding the current business and future prospects is low (Brickley et al., 1997). In contrast to an inside chair, an outside chair is likely to be more independent of management and consequently a more effective monitor. However, the cost of acquiring firm-specific expertise is higher for an outside chair.

Figure 1 illustrates a significant shift in the board leadership structure of a sample of S&P 1500 firms over the 1996 to 2005 period. The incidence of separate board chairs who are not current or former executives (outside chairs, henceforth) rises from 16.2 percent in 1996 to 25.1 percent in 2005 while the incidence of inside separate chairs increases more modestly from 8.7 percent in 1996 to 12.5 percent in 2005. The occurrence of combined CEO-chair positions decreases from 75.1 percent in 1996 to 62.4 percent in 2005.<sup>3</sup> Hence, there has been a sharp increase in the incidence of outside chairs over time and despite widespread criticism, a large

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<sup>2</sup> Brickley et al. (1997) is an exception but outside chairs occur in only 17 (2.57%) of their sample firms which limits the scope of their analysis.

<sup>3</sup> By comparison, Brickley et al. (1997) find about 80% of large U.S. firms in 1988 have combined CEO-Chair positions with the former CEO or current senior executives occupying the separate chair position in over 80% of separate chair firms.

proportion of U.S. firms continue to have combined CEO-chair positions (e.g., Jensen, 1993; Fama and Jensen, 1983; Lorsch and MacIver, 1989; Lipton and Lorsch, 1992).<sup>4,5</sup>

We extend the literature on corporate leadership structure by examining the determinants of outside chairs and their impact on firm value. By focusing on outside chairs, we provide a potentially more powerful test of the impact of a separate board chair since, as discussed above, both the potential benefits and costs are likely to be accentuated. Recent studies show that the optimal level of board features such as board size and director composition, depend on firm characteristics (e.g., Coles et al., 2008; Boone et al., 2007; Linck et al., 2008; Masulis and Mobbs, 2011). In a similar vein, we test whether the costs and benefits of having an outside board chair depend on firm characteristics. Our tests of these hypotheses using outside chairs are likely to be more powerful given the more pronounced benefits and costs associated with outside chairs, relative to inside chairs. Specifically, we draw on extant theories and empirical findings to characterize firms on three dimensions: operational complexity, CEO bargaining power and external monitoring costs, to determine the kinds of firms where an outside chair may be valuable or costly. We are not aware of any published research that examines the performance impact of outside board chairs. A study of how outside board chairs impact firm performance is particularly timely since recent regulatory requirements may exert implicit pressure on firms to appoint outside chairs irrespective of their firm characteristics and this may be value decreasing for some firms.<sup>6</sup>

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<sup>4</sup>See also recent articles “Chairman-CEO Split Gains Allies” by Joann S. Lublin in Wall Street Journal of March 30, 2009 and “Splitting the CEO and the Chair” by Joseph McCafferty in BusinessWeek of June 12, 2009.

<sup>5</sup> In the U.K., the Cadbury committee recommended that different individuals hold the CEO and board chair positions. In Germany and Holland, this separation is a rule because of their two tier board structure. Most public firms in Australia, Belgium, Canada and Singapore also have a board chair different from the CEO (See a report by Paul Coombes & Simon Chiu-Yin Wong, McKinsey Quarterly n.2, 2004).

<sup>6</sup> Starting February 2010, the SEC requires firms to provide detailed disclosure regarding leadership structure and the rationale for their board leadership structure. Some observers note that by shining a light on this issue, regulators are signaling their preference for more independent board chairs (Bromilow, Atkinson and Olsen, 2010).

A board is supposed to provide monitoring and advising duties such as evaluating the quality of the CEO and determining whether to retain or replace the CEO, designing and approving compensation packages for senior executives like the CEO, evaluating and approving projects, and planning for CEO succession. A board chair plays a critical role in how well a board performs by shaping the agenda and priorities of the board, chairing the board meetings, determining the quality, quantity and timeliness of information from management, facilitating communication among directors and between the board and management, and playing a key role in CEO succession planning, and board and director evaluations. Given the scope of duties, an outside chair can have a potentially far more significant impact on board performance compared to a typical outside director. Consistent with a special role for outside chairs, we find that outside chairs, on average, have been on the board for longer, are older and more experienced, hold more external board seats and have larger stock ownership, than outside directors. In addition, Spencer Stuart, a leading executive search consulting firm, documents that about half of a sample of non-executive board chairs of S&P 500 firms formerly served as the CEO of another company. This suggests that an outside chair has a more senior level of prior experience than the typical outside director. Anecdotal evidence also indicates that the time commitment and compensation of an outside chair is significantly higher than that of an outside director.<sup>7</sup>

Using a sample of S&P 1500 firms over the 1996-2005 period, we find that having an outside chair is positively and significantly associated with firm performance which is consistent with more effective board monitoring. Having an outside chair thus appears to enhance the effectiveness of the board of directors, a critical internal corporate governance mechanism. We also find evidence that the cost-benefit tradeoff of an outside chair depends on firm

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<sup>7</sup> See report by Spencer Stuart on “Cornerstone of the Board: The non-executive chairman” <http://content.spencerstuart.com/sswebsite/pdf/lib/Cornerstone0108.pdf>

characteristics. Specifically, we find that having an outside chair is more valuable when the CEO has greater bargaining power or when monitoring costs to external investors are high. On the other hand, having an outside chair is less valuable in operationally complex firms.

We first examine the determinants of an outside chair. Using firm-level panel regressions, we find evidence that the incidence of outside chairs is higher among smaller and younger firms. The incidence of outside chair is also negatively related to CEO tenure and CEO ownership, suggesting that firms where the CEO is powerful have lower incidence of outside chairs. We detect no significant relationship between the incidence of outside chairs and the proportion of outside directors or prior firm performance.

We conduct several tests to examine whether firm performance is higher with an outside chair potentially due to better board performance arising from a greater independence from the CEO and the reputation and skills of the outside chair. Using an OLS model that controls for industry fixed effects and clustering of standard errors at the firm-level, we find that outside chairs are associated with higher Tobin's Q. To take into account the possibility that unobserved factors associated with firms choosing outside chairs are also associated with differences in firm performance, we employ 2SLS instrument variable and firm fixed effects regressions and find our main result to be robust to these alternative specifications. We conduct robustness tests to control for the possibility that prior firm performance impacts the likelihood of outside chair as well as subsequent firm performance, and find that our main result is unlikely due to this reverse causality. To ensure that outliers are not driving the results, we also conduct a least absolute deviation estimation and continue to find a positive association between outside chair and firm performance. In addition, we obtain similar results when we use an alternate measure of firm performance: return on assets, in place of Tobin's Q. Finally, we examine the stock price

reaction to announcements of appointments of outside chairs from previously combined CEO-chair positions and find a significant positive market reaction to this event. Collectively, our results suggest that outside chairs are value enhancing.

The remainder of this paper is organized as follows. Section 2 draws on related literature to develop the testable hypotheses. In section 3, sample characteristics are described. Section 4 discusses the empirical analysis regarding the determinants of outside chair and its impact on firm performance, as well as the market reaction to announcements of changes in leadership structure. Section 5 provides additional robustness tests while section 6 concludes.

## **2. Literature review and hypothesis development**

According to Monks and Minow (1995), combining the board chair and CEO positions is analogous to asking students to grade their own homework. When important functions of the board chair such as shaping the agenda and priorities of the board and deciding the relevant information to be obtained from management, are undertaken by the CEO, the board may not be able to effectively monitor management (Jensen, 1993). Thus, proponents of outside board chairs argue that appointing one would significantly improve the monitoring effectiveness of boards. In addition, with the cost of complying to regulatory requirements sharply increasing on account of new regulations such as Sarbanes-Oxley Act (2002) and Dodd-Frank Act (2010), a significant diversion of valuable time of a CEO can be reduced by having a separate chair.

However, there are also potential benefits associated with a combined CEO-chair leadership structure. For example, Pfeffer and Salancik (1978) argue that this leadership structure provides more effective leadership since it reduces confusion that may result from divided authority and potential rivalry associated with a split leadership structure. In addition,

since only one person is in control, the CEO is able to respond more quickly to market conditions. Brickley et al. (1997) and Brickley, Coles and Linck (1999) also point out that the CEO has unparalleled firm-specific knowledge regarding the current business, and the strategic challenges and opportunities facing the firm, which is valuable for a board chair to be effective. Brickley et al. (1997) also find evidence indicating that CEOs are awarded board chair titles as part of the promotion and succession process with successful CEOs being awarded the board chair title, supporting Vancil's (1987) "passing the baton" hypothesis. So, requiring an outside or separate chair may remove a potentially important incentive for a CEO.

The relatively few papers that have examined the impact of combined CEO-chair positions have yielded mixed results. Goyal and Park (2002) find that sensitivity of CEO turnover to firm performance is significantly lower when the CEO and chairman duties are vested in the same individual, suggesting weaker board monitoring. Rechner and Dalton (1991) provide some univariate evidence that firms with separate chairs outperform firms with combined CEO-Chair positions. Pi and Timme (1993), in a study of financial firms, also find that firms with separate chairs outperform those with combined CEO-chair positions. On the other hand, Baliga et al. (1996), Brickley et al. (1997), and Linck, Netter and Wintoki (2011), find no evidence of performance differences between firms with combined CEO-chairs and firms with separate board chairs. Finally, Linck et al. (2008) find that combined CEO-chair positions are more likely for firms that are large, have older CEOs, and have CEOs with longer tenures, consistent with incentive as well as CEO bargaining power arguments.

As discussed in the introduction, with the exception of Brickley et al. (1997), prior studies have considered separate chairs as being part of a single homogeneous group and have not differentiated between cases where the separate chair is an outsider and cases where the chair



is a current or former executive.<sup>8</sup> A primary relative benefit of an outside chair over an inside chair is potentially significantly more effective monitoring. On the other hand, a significant relative cost of an outside chair is a higher cost of acquiring the necessary firm-specific knowledge to be effective. In addition, the distinction between firms who plan to maintain a separate inside chair on a long term basis from firms transitioning from an old CEO to a new CEO who will eventually assume the board chair position, is empirically noisy. Due to the above reasons, by focusing on outside chairs, we are able to provide a potentially more powerful test of the impact of a separate board chair and how it may depend on firm characteristics.

If firms optimally choose board structures and continuously readjust them, then empirically observing a significant relation between firm performance and the presence of an outside chair is unlikely. However, frictions associated with appointments of outside chairs may affect boards' adjustments to their optimum structure. For example, the influence of CEOs and other insiders may be a barrier to outside chair appointments even if they are optimal for shareholders.<sup>9</sup> On the other hand, well intentioned appointments of outside chairs may be value decreasing for some firms given their characteristics. Thus, we expect to find a cross-sectional association of outside chair with firm performance as well as a potentially differential effect depending on firm characteristics.

Our first hypothesis is:

**H1:** Outside chairs are positively associated with firm performance if the benefits of having outside chairs exceed the costs, relative to inside chairs.

Our next series of hypotheses attempt to relate the benefits and costs of outside chairs to firm characteristics in order to determine the kinds of firms where an outside chair may be

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<sup>8</sup> Brickley et al.'s sample of 17 firms (2.57% of the sample) with an outside separate chair limits their analysis.

<sup>9</sup> Coles et al. (2008) and Masulis and Mobbs (2011) make similar arguments about frictions that slow down adjustments of boards to their optimal composition.

valuable or costly to shareholders. We draw on recent literature indicating that optimal board structures depend on firm characteristics (e.g., Coles et al., 2008; Boone et al., 2007; Linck et al., 2008a; Masulis and Mobbs, 2011; Adams and Ferreira, 2007; Raheja, 2005). This literature generally characterizes firms on three dimensions: (1) Complexity – typically measured by firm size, firm age, leverage and number of business segments, (2) Cost of external monitoring – typically measured by R&D intensity, stock return variance, proportion of intangible assets and insider ownership, and (3) CEO bargaining power – typically measured by CEO tenure, CEO ownership, prior firm performance and proportion of inside directors. The salient empirical findings from these papers are as follows. More complex firms have larger boards, greater proportion of outside directors, and higher likelihood of combined CEO-chair positions. High external monitoring cost firms have smaller boards and lower proportion of outside directors. Interestingly, high monitoring costs does not appear to increase the likelihood of combined CEO-chair positions. Finally, high CEO bargaining power firms have smaller boards, lower proportion of outside directors and higher likelihood of combined CEO-chair positions.

### ***2.1. Operational complexity***

Complex firms are likely to have greater monitoring and advising requirements and could thus benefit from the expertise and oversight of an outside board chair. However, since Coles et al. (2008), Boone et al. (2007) and Linck et al. (2008) document that the board size and proportion of outside directors are larger in complex firms, the incremental monitoring benefit of having an outside chair may be lower in complex firms. On the other hand, similar to arguments put forth by Brickley et al. (1997) and Faleye (2007), an outside chair may constrain the CEO's ability to act quickly in response to market conditions and in formulating and implementing strategy, which is particularly costly in complex firms. Also, the cost to an outside board chair of

acquiring firm-specific expertise regarding the current business and future prospects is higher in complex firms. Unlike in the case of outside directors who provide input based on their area of expertise, outside chairs need firm-specific knowledge to be effective. On a related note, communication between the CEO and outside chair will also be more costly in complex firms. Therefore, we hypothesize that having an outside chair will be less valuable for complex firms since the marginal costs appear to offset the benefits. Following Boone et al. (2007), Coles et al. (2008) and Linck et al. (2008), we use firm size, diversification, leverage and firm age as proxies of operational complexity. We also utilize a factor score from factor analysis using these variables which reduces the attenuation bias associated with using strongly correlated proxies. Similar factor analysis has been used in Coles et al. (2008), Boone et al. (2007) and Linck et al. (2008).

**H2:** Outside chairs are less valuable in firms with high complexity.

## ***2.2. CEO bargaining power***

The potentially more effective board monitoring arising from having an outside chair suggests that firms with more influential or powerful CEOs would benefit more from having an outside chair. Boone et al. (2007) document that high CEO bargaining power firms have smaller boards and lower proportion of outside directors which suggests that the incremental monitoring benefit of having an outside chair is higher in such firms. Raheja (2005) also argues that when CEOs have strong influence, it is more difficult for outsiders to overturn poor decisions and thus the board needs more outsiders to counterbalance CEO influence. Similarly, Armstrong, Guay and Weber (2010) point out that shareholders may decide that more board independence is necessary to monitor a powerful CEO. On the other hand, Hermalin and Weisbach (1998) argue that CEO influence derives from superior ability, which is consistent with the efficiency

argument that good decision makers should have more decision-making powers. In addition, an outside chair could be costly since it may interfere with an incentive system that rewards successful CEOs with the board chair title. We hypothesize that, for high CEO bargaining power firms, the marginal benefits of having an outside chair exceed the costs and that outside chairs will be valuable for such firms.

We use CEO tenure, CEO ownership, proportion of inside directors and prior firm performance to measure CEO influence, consistent with prior literature. We also obtain a factor score from factor analysis using these variables to obtain a single measure of CEO bargaining power.

**H3:** Outside chairs are more valuable in firms with high CEO bargaining power.

### ***2.3. External monitoring costs***

The suitability of an outside chair may depend on the costs of monitoring a firm's business activities. Prior literature finds that the costs of monitoring managers increase with a firm's investment opportunities (Smith and Watt, 1992; Gaver and Gaver, 1993). Coles et al. (2008), Lehn et al. (2009) and Linck et al. (2008) argue that firms with investment opportunities are costly for outside directors to effectively monitor and find that such firms use more inside directors, consistent with the theoretical findings of Raheja (2005) and Harris and Raviv (2008). Extending this argument, it appears that it will be costly for an outside chair to effectively monitor growth firms and thus an inside chair may be optimal for such firms. However, Linck et al. (2008) fail to find their predicted positive association between monitoring costs and the likelihood of combined CEO-chair positions.

On the other hand, Armstrong et al. (2010) point out that shareholders may especially benefit from more board independence necessary to effectively monitor management when high

information asymmetry has the potential to lead to agency conflicts. In addition, the smaller boards and lower levels of outside director representation in growth firms suggest that the incremental monitoring benefit of having an outside chair is potentially higher in such firms. Masulis and Mobbs (2011) find that in high R&D intensity firms, certified inside directors (inside directors with outside directorships) are more frequent and particularly valuable. An outside chair may be especially valuable to growth firms if the costs of monitoring can be reduced as in firms with certified inside directors. The appointment of an outside chair could also be viewed as a signal of a firm's commitment to maintaining good corporate governance which increases the confidence of external investors in a costly monitoring environment. Investor confidence is particularly important for growth firms since they have high information asymmetry and need to access external capital markets frequently.

Based on the above arguments, we hypothesize that an outside chair would be valuable for growth firms. Following prior literature, we use stock return volatility, R&D intensity, insider ownership and ratio of intangible assets to total assets, as proxies of monitoring cost. We include insider ownership since it improves incentives and reduces the need for monitoring (Boone et al., 2007; Faleye, 2007). We also obtain a factor score from factor analysis using these variables to obtain a single measure of external monitoring costs.

**H4:** Outside chairs are more valuable in firms with high external monitoring costs.

### **3. Data**

#### ***3.1. Sample selection and data description***

We obtain director information from the Investor Responsibility Research Center (IRRC) database, financial statement and industrial segment data from Compustat, and stock return

information from CRSP. The sample period is 1996 to 2005. IRRC provides director information for a sample that corresponds to S&P 1500 firms each year. Following studies in this area, we exclude regulated financial services and utility firms since regulation can affect firm performance and governance characteristics. IRRC identifies each director as a firm employee, an affiliated outsider or an independent outsider, and has a flag that indicates if a director is the CEO or board chair. For each director, IRRC also provides information such as age, board tenure, stock ownership and outside directorships held. Using IRRC, we are able to identify firms with combined CEO-chair positions and those with separate chairs. In addition, we are able to distinguish between outside separate chairs and inside separate chairs. For our analysis on outside chairs, we consider the comparison group of inside chairs to include CEOs, current or former executives, and relatives of senior employees.

### ***3.2. Variable description***

Our key dependent variable is firm performance. As is common in the literature (e.g., Yermack, 1996; Coles et al., 2008; Adams and Ferreira, 2009; Masulis and Mobbs, 2011), we primarily use a market-based measure of firm performance, a proxy for Tobin's Q, calculated as the ratio of the firm's market value to its book value. The firm's market value is calculated as the book value of assets minus the book value of equity plus the market value of equity. The natural logarithm of Tobin's Q is the primary dependent variable in our performance regressions.<sup>10</sup> For robustness tests, we also use an alternate measure of firm performance: operating performance measured by return on assets (ROA). To examine the determinants of outside chairs and their association with firm performance, we create a binary variable called outside chair which takes a value of one if a firm has a non-inside board chair, zero otherwise.

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<sup>10</sup> The results are similar in virtually all primary specifications when we use just Tobin's Q.

In the spirit of Brickley et al. (1994), current employees including the CEO, retired employees including a former CEO, or relatives of senior firm employees, are classified as inside chairs.

As control variables in different model specifications and to analyze whether the impact of outside chairs depends on firm characteristics, we employ several firm level variables.

Variables that proxy for operational complexity are firm size, diversification, leverage and firm age. Following Coles et al. (2008), we use the natural log of a firm's assets as the measure of firm size. Diversification is measured by a firm's number of operating segments (Yermack, 1996). We measure leverage as the ratio of book value of debt to total assets, where debt is measured as the sum of both short term and long term debt. Firm age is the time since a firm first appears in CRSP. Our proxies for a CEO's influence or bargaining power are CEO tenure, CEO ownership, proportion of inside directors on the board, and prior firm profitability. CEO tenure is the number of years that a CEO has spent in his/her current position. CEO ownership is the proportion of all outstanding shares owned by the CEO, while insider ratio is the proportion of employee directors on the board. Prior firm profitability is measured by 1-year lagged ROA, which is operating profit scaled by assets. Proxies for external monitoring costs are R&D intensity, stock return volatility, proportion of intangible assets and insider ownership. R&D intensity is R&D expenses scaled by sales while return volatility is the standard deviation of monthly stock returns for the previous 60 months. Insider ownership is the proportion of equity held by directors and officers in the firm, while proportion of intangible assets is measured by one minus the ratio of net Property, Plant and Equipment (PP&E) to book value of assets. We also include board size, measured by the natural log of number of directors on the board following Yermack (1996), and institutional ownership in our specifications. We also use a

dummy variable for the Sarbanes-Oxley time period (2003-2005) to pick up potential effects arising from SOX as well as general time trends.

### ***3.3. Descriptive statistics***

Panel A of Table 1 reports the frequency of different types of board chairs for our sample firms over the sample period. It is clear that there is a trend towards splitting CEO-board chair positions, with the percentage of firms with combined CEO-chair positions declining from 75.1 percent in 1996 to 62.4 percent in 2005. There is a significant increase in the proportion of firms utilizing outside chairs over time, rising from 16.2 percent in 1996 to 25.1 percent in 2005. The proportion of firms using separate inside chairs (e.g., former CEOs) ranges from 8.6 percent to 13.3 percent over the sample period, with a slightly increasing trend over time.

We highlight in Panel B some characteristics of outside chairs which indicate that they are different from outside directors on several dimensions. The average age and tenure on the board for outside chairs (outside directors) are 62.8 (58.7) and 13.2 (9.5) years, respectively, and these differences are significant at the 1 percent level. This suggests that outside chairs, on average, have more experience and greater knowledge about the firm than outside directors. The mean ownership of an outside chair (3.4 percent) is statistically greater than that of outside directors (1.3 percent), suggesting that the incentive to monitor effectively is stronger for outside chairs. In addition, outside chairs, on average, hold 2.6 external board seats, significantly more than that of outside directors (2.1 seats). This indicates that outside chairs have greater reputation typically derived from their past performance and skill sets (e.g., Fich, 2005; Fich and Shivdasani, 2007; Masulis and Mobbs; 2011). We also explore the stability of outside chairs to determine whether they are part of a longer term arrangement. We find that once firms' appoint an outside chair, a significant proportion maintain this arrangement. For example, we observe



that 44.6 percent (87 out of 195 unique firms) of sample firms that changed from an inside chair to an outside chair during 1997-2003 continued with the outside chair arrangement for three consecutive years. Also, 53.6 percent (285 out of 532 unique firms) of sample firms that had an outside chair over the sample period, maintained an outside chair for at least three years over the sample period. This suggests that outside chairs are not transitory arrangements.

In Panel C of Table 1, we report descriptive statistics of firm level variables for the full sample, and for outside chair firms and inside chair firms separately. To reduce the influence of outliers in the data, we winsorize all variables at the 1<sup>st</sup> and 99<sup>th</sup> percentile values. For our discussion, we emphasize variables that are significantly different between outside chair firms and inside chair firms. Mean and median firm performance measured by Tobin's Q is significantly higher for outside chair firms at the 5 percent level. Outside chair firms are smaller, younger, and less diversified than inside chair firms, significant at the 1 percent level. Outside chair firms are also significantly less levered than inside chair firms. These differences indicate that outside chair firms are less complex than inside chair firms. Outside chair firms have shorter CEO tenure and smaller CEO ownership, both significant at the 1 percent level, suggesting that CEO influence is lower among outside chair firms. Mean R&D intensity is significantly higher among outside chair firms but the difference in medians is not significant. Both mean and median intangible assets is significantly higher among outside chair firms at the 5 percent level, while stock return volatility is significantly higher among outside chair firms at the 1 percent level. Insider ownership is also significantly higher among outside chair firms. This indicates that outside chair firms have more growth opportunities and that monitoring costs to outsiders will be higher in such firms. Finally, institutional ownership and board size are significantly lower among outside chair firms.

In Panel D, we report pair-wise correlations between all the variables discussed above. The observed correlations, consistent with prior literature, highlight the benefits of using factor analysis to reduce the attenuation bias discussed by Lubotsky and Wittenberg (2007). For example, firm size is strongly positively correlated to firm age, leverage and diversification. All these variables proxy for operational complexity and including all of them in a regression may likely result in many insignificant individual coefficients. Similarly, proxies for CEO bargaining power such as CEO tenure, CEO ownership, inside director ratio and prior firm profitability, are all positively correlated. In addition, proxies for external monitoring costs such as stock return volatility, R&D intensity, proportion of intangible assets and insider ownership are all positively correlated. To reduce attenuation bias, in subsequent analysis we extensively employ factor scores obtained from factor analysis of variables that proxy for operational complexity, CEO bargaining power and external monitoring costs, respectively. Panel E shows the loadings on the underlying variables using factor analysis. The factor score for each characteristic is calculated using the first principal component since it is the only one with an eigenvalue greater than one. The first principal component, which is a linear combination of the underlying variables, accounts for 44%, 40% and 65% of the variance for the operational complexity, CEO bargaining power and external monitoring cost proxies, respectively.

In analysis not reported for the sake of brevity, we also analyze the industry distribution of outside chair and inside chair firms using 2-digit SIC codes. Industries that account for more than 5 percent of outside chair firms include chemicals and allied products (8.5%), industrial and commercial machinery (7.2%), electronic and other electrical equipment (9.8%), measuring, analyzing and controlling instruments (7.2%), and business services (11.2%). Overall, there does not appear to be significant clustering in any one industry group.

## 4. Empirical tests

### 4.1. Determinants of outside chair

The above univariate analyses indicate that several firm characteristics are significantly different between outside chair and inside chair firms. We use the median of relevant factor scores as a threshold to classify firms as complex and simple firms, high and low CEO bargaining power firms, and high and low external monitoring cost firms. We report in Table 2 Panel A the incidence of outside chairs and inside chairs in these subsamples. We find that outside chairs are appointed in 15.4 percent of complex firms and 25.3 percent of simple firms, while the corresponding figures for inside chairs are 84.6 percent and 74.7 percent, respectively. Similarly, we report that outside chairs are appointed in 16.4 percent of high CEO bargaining firms and 23.4 percent of low CEO bargaining firms. Finally, we observe that outside chairs are appointed in 21.7 percent of high external monitoring cost firms and 19 percent of low external monitoring cost firms. These results indicate that outside chairs are more prevalent among less complex firms and low CEO bargaining power firms.

We next explore the determinants of an outside chair in a multivariate setting. Outside chair is binary variable that takes a value of one if a firm has a non-inside board chair, zero otherwise. As reported in Model 1 of Table 2 Panel B, we include variables discussed above as independent variables in the specification. Consistent with the univariate analysis, smaller and younger firms are more likely to have an outside chair, suggesting that outside chairs are more prevalent among less complex firms. Firms with CEOs who have shorter tenure and smaller ownership are more likely to have an outside chair, indicating that outside chairs are more likely in firms with lower CEO bargaining power. Except for insider ownership, none of the monitoring cost related variables are significant. In addition, we find no evidence that prior firm

profitability is related to the likelihood of an outside chair. We obtain similar results when we use factor scores in place of the underlying variables as reported in Panel C. Consistent with results in Panel A, we find that firms with greater operational complexity and higher CEO bargaining power are less likely to have an outside chair while external monitoring costs does not appear to impact the likelihood of an outside chair. These findings are consistent with Linck et al. (2008) and Faleye (2007) who report that large and diversified firms are more likely to combine their CEO-board chair positions. Linck et al. (2008) also do not find that higher monitoring cost firms are more likely to combine their CEO-board chair positions.

An important issue to address in subsequent outside chair–firm performance analyses is the possibility that unobserved firm characteristics that are associated with firms choosing outside chairs are also associated with differences in firm performance. Since firm performance is serially correlated, one may wrongly attribute the differential firm performance to outside chair instead of the unobserved firm characteristics. We address this issue in multiple ways by employing firm fixed-effects as well as using a 2SLS instrumental variable approach. For the 2SLS estimation, an appropriate instrument needs to be correlated to the likelihood of an outside chair but uncorrelated with the firm performance regression’s error term. Following Glaeser and Scheinkman (2002) and John and Kadyrzhanova (2010) who find some evidence that companies follow their local peers when designing their governance structure, we use the ratio of firms in the county of a given firm that have an outside chair to total firms in that county as an instrumental variable, computed yearly. We expect this variable to have a significantly positive impact on a firm’s choice of an outside chair but is less likely to impact firm performance directly. Results including this instrument are reported in Model 2 of Table 2 Panel B. The instrument is strongly positively related to the likelihood of an outside chair while the remaining

variables, for the most part, retain their prior sign and significance. The pseudo R-squared of the model also increases from 0.12 to 0.19 on inclusion of this instrument, suggesting that it is powerful.

#### ***4.2. Outside chair and firm performance***

We first present an analysis of changes in firm performance around changes in board leadership. Specifically, we compare performance changes when firms change from an inside chair to an outside chair and vice versa. As reported in Table 3 Panel A, the average change in Tobin's Q and ROA over the two-year period following an outside chair appointment is significantly greater than when there is a change from outside chair to inside chair. We also conduct the above analysis in a multivariate setting as reported in Panel B. Controlling for changes in a range of firm characteristics, we find that an appointment of an outside chair has a greater positive impact on subsequent two-year change in firm performance relative to an appointment of an inside chair, significant at the 5 percent level. These results provide clean preliminary evidence that indicates that outside chairs positively impact firm value.

We next investigate the association between outside chair and firm performance over the full panel dataset. The natural log of Tobin's Q is our primary dependent variable. We use different estimation techniques to ensure the robustness of our findings. In all our analyses, we estimate robust standard errors that are also adjusted for clustering within firms.<sup>11</sup> We first use ordinary least squares (OLS) with industry fixed effects and year dummies. Industries are classified using two-digit SIC codes. We control for a number of variables in the model

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<sup>11</sup> Specifically, we use the Huber-White-Sandwich estimator of variance, clustered on firm-level identifiers. In addition, for the OLS regressions, we implement the procedure of Fama-MacBeth (1973) to address the potential bias in standard errors resulting from contemporaneous residuals being correlated across firms and find similar results.

specifications as reported in Table 4. Model 1 indicates that outside chair is positively associated with firm performance, significant at the 5 percent level.

A number of studies empirically (e.g., Boone et al., 2007; Coles et al., 2008; Linck et al., 2008) and theoretically (e.g., Hermalin and Weisbach, 1998; Raheja, 2005; Adams and Ferreira, 2007; Harris and Raviv, 2008) show that board structure and firm performance are endogenously determined. Hence, to the extent that unobservable firm characteristics affect board leadership structure and performance, the observed positive association between outside chair and firm performance may be spurious. We probe the robustness of our main findings to endogeneity concerns using different estimation methods in our analysis. We use a firm fixed effects estimation to address the issue of omitted variables. The drawback of this approach is its greater reliance on within-firm time series variation for its explanatory power. Thus, if key explanatory variables have insufficient time series variability, the power of the tests falls significantly. Using firm fixed effects estimation, we continue to find a positive association between outside chair and Tobin's Q, significant at the 5 percent level, as reported in Model 2.

We also address endogeneity concerns using a 2SLS instrumental variable approach.<sup>12</sup> For the first stage, we utilize the determinants of outside chair specification reported in Table 2 Panel B Model 2. We obtain the predicted value of outside chair from this model and introduce this variable in the performance specification. As reported in Model 3 of Table 4, we find that outside chair continues to have a positive association with Tobin's Q, significant at the 10 percent level.

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<sup>12</sup> Using a Hausman-Wu test, we test for the endogeneity of the relationship between firm performance and outside chair and find evidence that the relationship is endogenous. Therefore, correcting for endogeneity is important and we use 2SLS (IV) estimation. We test for the appropriateness of our instrumental variable and perform a partial F-test to examine the power of this instrument in predicting outside chair in the first-stage regression. The partial F-statistic ( $F > 17.000$ ) indicates that the instrument exhibits sufficient power in explaining outside chair (Stock, Wright and Yogo, 2002).

We address the possibility of outliers influencing our results in multiple ways. First, the above analysis is conducted after all variables are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentile values. In addition, similar to Gompers, Ishii and Metrick (2003) and Coles et al. (2008), we estimate the regression model using the least absolute deviation criterion with respect to deviations from the median. These results are reported in Model 4 and are consistent with earlier results, significant at the 1 percent level. Thus, using OLS, firm fixed effects, 2SLS and median regressions, we find evidence of a strong positive association between outside chair and Tobin's Q. When we use factor scores for operational complexity, CEO bargaining power and external monitoring costs, in place of the underlying variables, we obtain similar results: outside chair is positively and significantly associated with firm performance, as reported in Table 5.<sup>13</sup> The economic effect of an outside chair also appears significant. Using estimates from the firm fixed effects model, having an outside chair is associated with 5.3 percent higher value of Tobin's Q.

Results presented so far suggest having an outside board chair is beneficial to firms. Yet, since performance is measured by Tobin's Q, it may be argued that it is capturing market expectations of growth opportunities. We conduct robustness tests using ROA as an alternative performance measure (e.g., Duchin et al., 2010). In Table 6, we present results using OLS, firm fixed effects, 2SLS and median regressions. The results indicate that an outside chair is positively and significantly associated with ROA. Collectively, our finding of a positive and significant association between outside chair and firm performance is robust to alternative estimation techniques including endogeneity corrections, and to alternate measures of firm performance. These results suggest that the benefits of having an outside chair exceed the costs, relative to inside chairs, supporting hypothesis *H1*.

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<sup>13</sup> The results are similar in virtually all our specifications when year dummies are used in place of the SOX dummy.

### ***4.3. Does the impact of an outside chair depend on firm characteristics?***

We next examine whether the performance impact of outside chair depends on firm characteristics. We characterize firms based on operational complexity, CEO bargaining power and external monitoring costs (e.g., Coles et al., 2008; Boone et al., 2007; Linck et al., 2008). To conduct our tests, we supplement the model used in Table 5 with interaction terms between outside chair and factor scores for operational complexity, CEO bargaining power and external monitoring costs, included one at a time. The coefficients on these interaction terms will indicate whether these characteristics increase or decrease the benefit of having an outside chair.

In Model 1 of Table 7, we test whether the performance impact of an outside chair depends on operational complexity. We find that the coefficient on outside chair is positive and significant at the 1 percent level, while the coefficient on the interaction term between operational complexity and outside chair is negative and significant at the 5 percent level. The coefficient on the operational complexity variable by itself is also negative and significant at the 1 percent level. The economic impact of complexity on the net benefit of an outside chair appears significant. For a firm at the 75<sup>th</sup> percentile of complexity (factor score=1.65), having an outside chair is associated with 0.8 percent higher Tobin's Q, while a firm at the 25<sup>th</sup> percentile (factor score=0.08) is associated with 4.8 percent higher Tobin's Q. Supporting hypothesis **H2**, the cost-benefit tradeoff associated with an outside chair appears to worsen as firm complexity increases, consistent with Brickley et al. (1997) and Faleye (2007).

We next test whether the impact of outside chair varies with CEO bargaining power, as reported in Model 2. The coefficient on the outside chair variable is positive and significant at the 1 percent level. Interestingly, the coefficient on the interaction term of outside chair and CEO bargaining power is also positive and significant at the 1 percent level. The coefficient on



CEO bargaining power variable by itself is also positive and significant at the 1 percent level. These results suggest that, on average, appointing an outside chair is more valuable to investors in firms with a powerful CEO, supporting hypothesis **H3**. The economic impact of CEO bargaining power on the net benefit of an outside chair also appears significant. For a firm at the 75<sup>th</sup> percentile of CEO bargaining power (factor score=0.57), having an outside chair is associated with 8.9 percent higher Tobin's Q, while a firm at the 25<sup>th</sup> percentile (factor score=-0.421) is associated with 4.4 percent higher Tobin's Q. This finding supports Raheja (2005) who argues that investors are benefited by having a countervailing mechanism to powerful CEOs which ensures effective monitoring. These results suggest that, in firms with higher CEO bargaining power, the benefit of more effective monitoring associated with an outside chair outweighs the costs of an outside chair such as removing the incentive of attaining the chair position for well performing CEOs (e.g., Brickley et al.,1997; Faleye, 2007).

In Model 3 of Table 7, we test whether the impact of an outside chair depends on external monitoring costs. We find that the coefficient on outside chair continues to be positive and significant at the 1 percent level, while the coefficient on the interaction term between monitoring costs and outside chair is positive and significant at the 5 percent level. The coefficient on the monitoring costs variable by itself is negative and significant at the 5 percent level. This result suggests that an outside chair is more valuable to external investors when it is costly to monitor management, providing support for hypothesis **H4**. The economic impact of external monitoring costs on the net benefit of an outside chair also appears significant. For a firm at the 75<sup>th</sup> percentile of monitoring costs (factor score=0.598), having an outside chair is associated with 6.9 percent higher Tobin's Q, while a firm at the 25<sup>th</sup> percentile (factor score=-0.463) is associated with 4.0 percent higher Tobin's Q. This finding supports Armstrong et al.

(2010) who point out that it is important for external investors that managers are properly monitored even in costly to monitor firms. We obtain similar results when use underlying variables, in place of factor scores, in the performance specifications as reported in Table 8.<sup>14</sup>

One mechanism through which outside chairs can obtain firm-specific knowledge and credible information at lower cost in high monitoring cost firms is if reputed inside directors are on the board. Masulis and Mobbs (2011) find evidence that inside directors with outside directorships (called certified inside directors) add value in firms that are difficult to monitor for outsiders. Interestingly, when we include a certified inside director (CID) dummy variable in the determinants of outside chair specification of Table 2 Model 2, the coefficient on the CID dummy is positive and significant at the 1 percent level, as reported in Appendix Table A1. Hence, having at least one certified inside director on the board is associated with a higher likelihood of an outside chair. By lowering the costs of monitoring, certified inside directors appear to make outside chairs a more viable option.

#### ***4.4. Does the impact of an outside chair depend on the board chair's affiliation?***

So far in our analysis, we treat board chairs who are non-insiders as outside chairs. However, outside chairs may be completely independent or affiliated, i.e., they may have some non-employment relationships with the firm (e.g., business relationships).<sup>15</sup> In Table 9 Panel A, we provide the time distribution of the breakdown of outside chairs between independent and affiliated chairs in our sample. Examining how the impact of independent and affiliated chairs varies with firm characteristics may provide additional insight on the costs and benefits of having an outside chair. For example, if investors benefit from an outside chair because of more

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<sup>14</sup> When we include the factor score for a particular characteristic in a specification, we drop the corresponding underlying variables to avoid multicollinearity.

<sup>15</sup> For the 2000-2005 period, we investigate the types of affiliated outside chairs and find that the major categories are consultants (32.6%), large shareholders (29.6%), founders and founding family members (21.2%), and executives in related companies (16.5%).

effective board monitoring, the benefit should be greater when the outside chair is independent and less when affiliated. On the other hand, the costs of acquiring the necessary firm-specific expertise and to coordinate effectively with the CEO would be greater with an independent chair than with an affiliated chair.

We present results from performance regressions for different types of outside chair in Panel B of Table 9. Similar to our primary analysis, we use natural log of Tobin's Q and ROA as dependent variable. We use OLS and firm fixed effect regressions to estimate the relationship between these two types of outside chair and firm performance. We find positive and significant coefficient estimates for *Affiliated Outside Chair* across all the specifications. The coefficient on *Independent Outside Chair* is also positive and significant in all but the OLS specification with Tobin's Q.<sup>16</sup> These results indicate that non-inside chairs whether they are independent or affiliated are valued by investors.

To see if the impact of different types of outside chair varies with specific firm characteristics, in Panel C of Table 9 we introduce interaction terms of *Affiliated Outside Chair* and *Independent Outside Chair* with operational complexity, CEO bargaining and monitoring cost factors. The first three models of Table 9 Panel C present results from firm fixed effects regressions for independent chairs and the last three models are for affiliated chairs. We find that the penalty for outside chairs in operationally complex firms exists only for independent chairs and not for affiliated chairs, consistent with our above discussion. On the other hand, the benefit of outside chairs in high monitoring cost firms occurs only for independent chairs and not for affiliated chairs, as we hypothesize. Finally, the benefit of outside chairs in high CEO bargaining power firms derives only for affiliated chairs and not for independent chairs. This result may be explained by the fact that CEOs obtain bargaining power typically through good

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<sup>16</sup> We find similar results when we use median and 2SLS estimations.

performance. Hence, in such firms, the monitoring benefits from having an independent chair may be offset by the costs of acquiring firm-specific knowledge and communicating effectively with the CEO. Overall, the above findings highlight the costs and benefits of different types of outside chairs and how they vary depending on firm characteristics.

#### ***4.5. Effect of Sarbanes-Oxley Act on the impact of an outside chair***

We next study whether the impact of an outside chair is different before and after the Sarbanes-Oxley Act of 2002. Although there are no explicit regulations requiring appointments of outside chairs, stock exchange and Sarbanes-Oxley requirements have required more outside directors on boards since 2002. This is likely to result in generally more effective monitoring and potentially reduces the incremental monitoring benefits of having an outside chair.

We examine whether the net benefit of having an outside chair occurs in both the pre-SOX (1996-2002) and post-SOX (2003-2005) periods. In unreported results, we find that outside chair has a significant and positive association with firm performance in both periods. We next examine the relationship between the performance impact of outside chair and firm characteristics in both periods, using interaction terms similar to that used in Table 7. As reported in Table 10 Models 1 and 4, we find that outside chairs are less valuable for complex firms only in the post-SOX period. This may indicate that the incremental monitoring benefits of an outside chair is lower in the post-SOX period due to more outside directors, and this may worsen the cost-benefit tradeoff of an outside chair for complex firms in the post-SOX period.<sup>17</sup>

We find that an outside chair has an incremental positive and significant impact on the performance of high CEO bargaining power firms in the pre-SOX period but not in the post-SOX period, as reported in Models 2 and 5. This again can be explained by the fact that more

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<sup>17</sup> In univariate analysis, we do not see any significant increase in the proportion of complex firms appointing outside chairs in the post-SOX period.

outside directors in the post-SOX period has imposed generally higher monitoring in firms. Thus, the incremental monitoring benefit of an outside chair would be more pronounced in the pre-SOX period for high CEO bargaining power firms.

For firms with high monitoring costs, the performance impact of an outside chair is positive and significant in both time periods, as reported in Models 3 and 6. Given the limited monitoring effectiveness of outside directors in such firms, SOX mandated additional outside directors may not provide significant incremental monitoring benefits (e.g., Duchin et al., 2010). Thus, an outside chair appears to continue to be valuable for such firms in the post-SOX period.

#### ***4.6. Announcement reaction to changes in board leadership involving outside chairs***

We provide an alternate test of the value impact of outside board chairs by examining the stock market reaction to the announcement of a change in board leadership. Although we control for endogeneity using different estimation methods, examining the market reaction will add to the robustness of our findings. A few papers have examined the market reaction to changes in board leadership, focusing on the effect of combining CEO and chair positions, with mixed results. Brickley et al. (1997) generally find no evidence against combining the CEO and chair positions while Worrell et al. (1997) find some evidence indicating adverse effects associated with combining CEO and chair positions.

We begin by identifying changes in board chairs of sample firms. We then identify exact dates when the changes were announced using Lexis-Nexis and Mergent online.<sup>18</sup> Initially, we obtain 408 announcements of which 236 are of separation of previously combined CEO-board chair positions and 172 are of the combination of two previously separated CEO and chair positions. We then exclude announcements that were accompanied by potentially confounding

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<sup>18</sup> These databases include the Wall Street Journal, Financial Times and New York Times, as well as other business news sources.

events such as mergers, dividend declaration, splits, tender offers, new product announcements, charter amendments, large order announcements or substantial changes in capital structure. We also exclude announcements associated with seemingly transitory situations. For example, when soon after separation the CEO reassumes the board chair position due to the sudden departure of the board chair. The above filtering rules result in a total of 152 announcements of which 82 pertain to the appointment of an outside chair from previously combined CEO-chair positions while 70 pertain to the combination of previously separate CEO and outside chair positions. We also determine whether the outside chair is independent or affiliated.

We present cumulative abnormal returns around these announcements in Table 11. Abnormal return is computed by subtracting predicted return from realized stock return. Predicted returns are computed using a market model with a value-weighted market index which is estimated using one year of daily trading data ending 30 days prior to the announcement. Abnormal returns are then cumulated from 1 day prior to the announcement to 1 day after the announcement to obtain 3-day cumulative abnormal returns (CAR -1, +1).<sup>19</sup>

These results show that, on average, investors positively react to appointments of an independent outside chair from previously combined CEO-chair positions. The average 3-day cumulative abnormal return is 1.63 percent, significant at the 5 percent level. On the other hand, the market reaction to announcements of the decision to combine the positions of CEO and independent chair is -1.31 percent but not significant. The difference between the abnormal returns around these two types of announcements is significant at the 10 percent level.<sup>20</sup> The market reactions to changes involving affiliated outside chairs are insignificant although the

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<sup>19</sup> In untabulated results, we find similar results using (-5,+5), (-5,+10) and (-10, +10) day windows.

<sup>20</sup> We also study whether the stock price reaction depends on operational complexity, CEO bargaining power and external monitoring costs, using medians of the respective factor scores as thresholds. We find no significant differences in stock price reactions based on these firm characteristics, which may be due to the low power of the tests arising from small sample sizes.

difference is significant. This provides weak evidence that investors react more favorably to appointments of affiliated chairs than to their removal. Overall, our results indicate that shareholders react favorably to appointments of outside chairs and react negatively to their removal. This provides further support to our earlier findings that outside chairs are value enhancing on average.

## **5. Additional robustness tests**

### ***5.1. Non-transitional outside chairs***

We conduct a number of additional tests to further probe the robustness of our main findings and to provide additional insights into the costs and benefits associated with outside chairs. First, we rerun our main performance regressions after dropping observations of firms which had only one year with an outside chair. Our objective is to ensure that our documented impact of outside chairs is driven by firms who have outside chairs as part of a longer term arrangement. We find that outside chair continues to be positively and significantly associated with firm performance for the modified sample, as reported in Appendix Table A2.

### ***5.2. Alternative governance mechanisms***

We also rerun performance regressions after including variables to control for other governance mechanisms (e.g., Adams and Ferreira, 2009). We use the Gompers et al. (2003) GIM index as well as the E-index of Bebchuk, Cohen and Ferrell (2009) to measure the quality of other governance mechanisms. A higher value of these indices indicates that a firm is more insulated from takeovers and one in which, all else constant, agency problems may be expected to be higher. We also control for performance-based incentive compensation since they align incentives and reduce agency problems. In addition, we control for the level of product market

competition measured using the Herfindahl index of industry sales at a 2-digit SIC code level (e.g., Masulis and Mobbs, 2011). Product market competition serves as a mechanism that limits agency problems since it forces managers and directors to work harder and more efficiently to survive. Controlling for these other governance mechanisms, we find that the coefficient of outside chair continues to be positive and significant while the sign and significance of these additional controls are generally as predicted, reported in Appendix Table A3.

### ***5.3. Outside chair and firm performance: Controlling for prior performance***

We further address potential endogeneity problems that may arise because past performance could influence the likelihood of outside chair. As additional tests to control for the impact of prior performance, we pursue two approaches. First, we include prior year's Tobin's Q as an independent variable and re-run the firm fixed effects models similar to the performance specifications used in Table 5. Second, using firm fixed effects regressions, we employ a dynamic panel GMM estimator, developed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991). To the extent that prior firm performance affects board structure endogenously, dynamic panel data estimation techniques provide consistent estimates even when firm fixed effects are included. The Arellano-Bond technique uses first differencing and lags of exogenous variables as instruments to produce consistent estimates. Results from this analysis are presented in Appendix Table A4. The first model of Table A4 reports results from a firm fixed effects regression with one-year lag prior performance as an additional control variable while the second model presents results using Arellano-Bond estimations. The coefficient of outside chair continues to be positive and significant in both regressions indicating that our main finding is not driven by reverse causality.



#### ***5.4. Outside chair and firm performance: Additional endogeneity controls***

We conduct additional tests to address the possibility that board size, board composition (proportion of outside directors) and outside chair are endogenously determined. Recall that we include industry fixed effects in earlier OLS regressions to control for the underlying economic environment that may jointly determine board size, board composition and outside chair. Similar to Boone et al. (2007), we also control for endogeneity by introducing lagged board size and lagged proportion of outside directors as instrumental variables for board size and proportion of outside directors, respectively, in the performance specifications. As reported in Appendix Table A5, the coefficient of outside chair continues to have a positive and significant association with Tobin's Q. We also estimate a system of simultaneous equations that explicitly endogenizes Tobin's Q, outside chair, fraction of outside directors and board size, using three-stage least squares (3SLS) regressions. Appendix Table A6 reports the parameter estimates of the system of equations with the coefficient of outside chair continuing to be positively and significantly associated with Tobin's Q. We also do not find performance impacting the likelihood of outside chair. Note also that with 1-year lagged values of dependent variables on the right hand side, we are able to explain a very large proportion of variability in Tobin's Q (71.7%), outside chair (49%), board size (80.3%) and board independence (72.6%).

#### ***5.5 Inside chair and firm performance: Difference between employee chair and CEO-chair***

Our inside chair classification consists of both combined CEO-chairs as well as separate inside chairs who are former employees (like the former CEO). In Appendix Table A7, we attempt to identify any differential performance impact of these two categories of inside chairs, as well as how they vary with firm characteristics. We find that both CEO-chair as well as separate inside chair are negatively associated with Tobin'Q. This indicates that grouping both

categories as inside chair is appropriate. We find that CEO-chairs are less costly as operational complexity increases. This is consistent with Brickley et al. (1997) and Brickley et al. (1999) who point out that the CEO has unparalleled firm-specific knowledge which is particularly valuable for a board chair in complex firms. We also find that CEO-chairs are more costly in firms with high CEO bargaining power while separate inside chairs are more costly in firms with high CEO monitoring costs. To clarify, when we say more costly, we mean that the cost-benefit tradeoff of these chairs worsens in firms with these characteristics.

### ***5.6. Outside chair and board activity level***

Finally, we provide a direct test of the hypothesis that outside chairs enhance the monitoring effectiveness of boards by examining the number of board meetings in a year, as a measure of board input. We obtain data on number of board meetings for sample firms each year over the sample period from IRRC. We run both OLS and firm fixed effects regressions with number of board meetings and natural logarithm of number of board meetings as the dependent variables. We control for a range of firm characteristics in these regressions. As reported in Appendix Table A8, we find that boards with outside chairs meet more frequently suggesting that boards perform their tasks more diligently when there is an outside chair, consistent with more effective monitoring.

## **6. Conclusion**

Despite substantial research on the role of board of directors in internal corporate governance, our knowledge of what makes boards effective is still limited. In this paper, we examine the impact of outside board chairs in the functioning of boards. We find strong evidence that indicates that outside chairs are positively associated with Tobin's Q. This result is

robust to alternative estimation techniques including endogeneity corrections, and to an alternate measure of firm performance, suggesting that on average, the benefits of having an outside chair exceed the costs, relative to inside chairs.

Consistent with our hypotheses, we also find evidence that the cost-benefit tradeoff of an outside chair depends on firm characteristics. Specifically, we find that having an outside chair is more valuable when the CEO has greater bargaining power or when monitoring costs to external investors are high. On the other hand, having an outside chair is less valuable in operationally complex firms. This suggests that firms should take into account their characteristics when considering the suitability of outside chairs. In addition, we find that the cost-benefit tradeoff of an outside chair is impacted by whether the outside chair is independent or affiliated, and by regulations such as the Sarbanes-Oxley Act which have increased the proportion of outside directors since 2002. We also document that shareholders appear to react favorably to appointments of outside chairs and react negatively to their removal, further indicating that outside chairs are value enhancing on average.

Our results suggest that outside chairs, on average, have higher ownership and more experience and knowledge about the firm than outside directors. Outside chairs also hold more external board seats, indicating greater reputation. Our findings also indicate that the incremental monitoring benefit of an outside chair relative to outside directors depends on firm characteristics. For example, outside chairs appear to be more valuable in firms that are costly to monitor by outside directors and less valuable in firms that are easier to monitor by outsiders. Collectively, our findings indicate that the feature of board chair, which has so far received relatively less attention in the literature, should be considered along with director composition and board size while determining optimal board structures.

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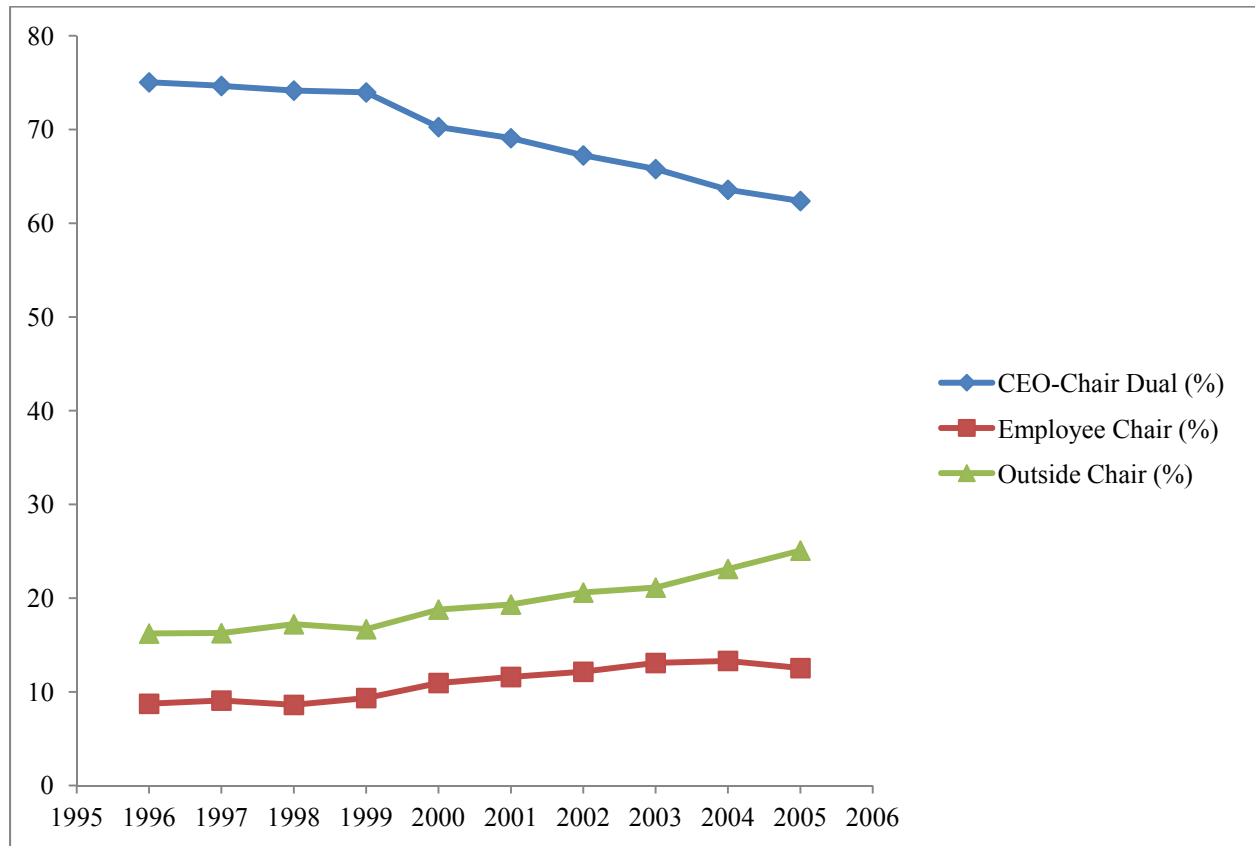
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**Figure 1: Time distribution of different types of board chairs**

This figure provides the time distribution of the proportion of CEO-Chairs, Outside chairs and Employee chairs for a sample of S&P 1500 firms over the 1996-2005 period.





### Appendix: Variable Definitions

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
Affiliated Outside Chair	Indicator variable: equals 1 if board chair is an affiliated director, 0 otherwise.	IRRC, Proxy reports
Board Meeting Frequency	# of times the full board met in a given year.	ExecuComp
Board Independence	Ratio of independent outside directors to board size.	IRRC
Board Size	# of directors on board.	IRRC
CEO Bargaining	Factor score from CEO tenure, CEO ownership, prior year ROA, and Insider ratio	IRRC, ExecuComp & COMPUSTAT
CEO-Chair	Indicator variable: equals 1 if firm's CEO is also board chair, 0 otherwise.	IRRC, Proxy reports
CEO incentive compensation	One minus the ratio of CEO salary to total compensation	ExecuComp
CEO tenure	# of years served by a CEO in current position.	ExecuComp
CEO ownership	Ratio of shares outstanding held by CEO.	ExecuComp
Certified Inside Director (CID)	Indicator variable: equals 1 if there is at least one inside director with at least one external board seat, 0 otherwise (Masulis and Mobbs, 2011).	IRRC
Country Ratio of Firms with Outside Chair	Ratio of firms in the county of a given firm that have outside chair to total firms in that county in a given year.	IRRC, Compustat, Proxy reports.
Diversification	Number of operating segments.	COMPUSTAT
DSOX	Indicator variable: equals 1 if sample year is 2003-2005; 0 otherwise.	
E-index	Index used by Bebchuk et al. (2009).	From the website of Prof. Bebchuk
Employee chair	Indicator variable: equals 1 if board chair is an ex-employee, 0 otherwise.	IRRC, Proxy reports
Firm size	Natural log of total assets (Data 6)	COMPUSTAT
Firm age	Natural log of number of years that a firm has been in CRSP	CRSP

G-index	Index as used by Gompers et al. (2003)	IRRC
Independent Outside Chair	Indicator variable: equals 1 if board chair is an independent director, zero otherwise	IRRC, Proxy reports
Insider holding	Ratio of outstanding shares held by the directors and officers, excluding the CEO.	IRRC
Insider ratio	Ratio of number of employee directors to board size.	IRRC
Institutional holding	Ratio of outstanding shares held by institutional investors.	Thomson Financial
Intangible Assets	$1 - (\text{Net PPE} / \text{Assets})$ $(1 - (\text{Data8} / \text{Data6}))$ .	COMPUSTAT
Leverage	Total debt by total assets $((\text{Data9} + \text{Data34}) / \text{Data6})$ .	COMPUSTAT
Monitoring costs	Factor score from stock return volatility, R&D intensity, intangible assets and insider ownership.	CRSP, COMPUSTAT and IRRC
Operational complexity	Factor score from firm size, firm age, diversification and leverage.	CRSP & COMPUSTAT
Outside chair	Indicator variable: equals 1 if board chair is an outside director, 0 otherwise.	IRRC
Outside Chair Change Dummy	Indicator variable: equals 1 if a firm replaced an inside chair with an outside chair, and zero if a firm changed from an outside chair to an inside chair.	IRRC
Product market competition	Herfindahl index of industry sales at the 2-digit SIC level.	COMPUSTAT
Volatility	Standard deviation of monthly stock return for prior sixty months.	CRSP
R&D intensity	R&D expenses divided by total assets $(\text{Data46} / \text{Data6})$ .	COMPUSTAT
ROA	Operating income divided by total assets $(\text{Data13} / \text{Data6})$ .	COMPUSTAT
Tobin's Q	Ratio of (market value of equity + book value of debt) to book value of assets $((\text{Data6} - \text{Data60} + \text{Data25} * \text{Data199}) / \text{Data6})$ .	COMPUSTAT

**Table 1****Panel A: Time distribution of board leadership structure**

This table presents the time distribution of different board chairs. Inside chair takes a value of one if a firm reports an ex-employee or a current employee holding the board chair position, zero otherwise. CEO-Chair is an indicator variable which takes a value of one if a firm has same individual holding both board chair and CEO positions, zero otherwise. Employee chair is an indicator variable which takes a value of one if the board chair was an employee of the firm in past, zero otherwise. Outside chair is an indicator variable which takes a value of one if a firm has a board chair separate from the CEO and who did not have an employment with the firm, zero otherwise. The percentages are calculated on the basis of the sample size in a given year.

Year	Inside Chair		Outside Chair (%)
	CEO-Chair (%)	Employee Chair (%)	
1996	421 (75.045)	49 (8.734)	91 (16.221)
1997	436(74.658)	53(9.075)	95(16.267)
1998	465(74.163)	54(8.612)	108 (17.225)
1999	483(73.966)	61 (9.342)	109(16.692)
2000	520(70.270)	81(10.946)	139 (18.784)
2001	572(69.082)	96(11.594)	160(19.324)
2002	581(67.245)	105(12.153)	178(20.602)
2003	573(65.786)	114(13.088)	184(21.125)
2004	583(63.577)	122(13.304)	214(23.119)
2005	587(62.380)	118(12.540)	238(25.080)
Total	5255 (69.272)	819(10.796)	1512(19.931)

**Panel B: Characteristics of outside chairs**

Characteristics	Outside Chair	Outside Directors	t-stats
Age	62.78	58.706	18.001
Tenure	13.182	9.533	19.384
No. of external board seats	2.585	2.11	13.352
Ownership (%)	3.420	1.248	10.797

### Panel C: Descriptive statistics of firm level variables

This table presents our sample firm characteristics. The data is on S&P 1500 firms covered by IRRG from 1996 to 2005 and all variables are winsorized at the 1% and 99% percentile values. Tobin's Q is the ratio of (market value of equity + book value of debt) to book value of assets. Operational complexity, CEO bargaining and Monitoring cost variables are the factor scores obtained from Table 1 Panel E. Firm size is the natural log of book value of assets. Firm age is the natural log of number of years that a firm has been in CRSP. Diversification is the number of operating segments of a firm. Leverage is the ratio of book value of long term and short term debt to book value of assets. CEO tenure is number of years spent by a CEO in the current position. ROA is operating income (EBITDA) scaled by book value of assets. CEO ownership is ratio of outstanding stocks held by CEO. Insider Ratio is the ratio of employee directors to board size. R&D intensity is the ratio of R&D expenses to assets. Intangible Assets is one minus the ratio of net PPE to book value of assets. Insider holding is the ratio of outstanding stocks held by the directors and officers, excluding the CEO, of a firm. Volatility is standard deviation of monthly stock returns of prior sixty months. Institutional holding is the proportion of outstanding stocks held by institutional investors. Board size is number of board directors. Board meeting frequency is the number of times the full board met in a given year.

	Full Sample			Outside Chair			Inside Chair			p-Value	
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median
Ln(Tobin's Q)	0.606	0.487	7586	0.637	0.524	1512	0.598	0.479	6074	0.011	0.014
Operational Complexity	0.138	0.129	7535	0.016	0.021	1503	0.168	0.161	6032	0.000	0.000
CEO Bargaining	0.013	0.005	7554	0.002	0.01	1508	0.016	0.012	6046	0.000	0.000
Monitoring Cost	-0.015	0.009	7543	0.015	0.008	1507	-0.023	-0.019	6036	0.000	0.002
Firm Size	7.459	7.309	7586	7.018	6.782	1512	7.569	7.449	6074	0.000	0.000
Firm Age	2.906	2.996	7535	2.755	2.773	1503	2.944	3.045	6032	0.000	0.000
Diversification	2.614	2.000	7586	2.398	2.000	1512	2.668	2.000	6074	0.000	0.000
Leverage	0.230	0.231	7586	0.221	0.214	1512	0.232	0.235	6074	0.024	0.005
CEO Tenure	7.596	5.000	7586	4.698	3.000	1512	8.318	6.000	6074	0.000	0.000
ROA	0.110	0.095	7586	0.116	0.11	1512	0.109	0.108	6074	0.066	0.000
CEO Ownership	0.025	0.002	7586	0.014	0.000	1512	0.028	0.003	6074	0.000	0.000
Insider Ratio	0.206	0.167	7586	0.21	0.167	1512	0.205	0.167	6074	0.103	0.091
R&D Intensity	0.045	0.002	7586	0.051	0.000	1512	0.043	0.003	6074	0.018	0.615
Intangible Assets	0.683	0.744	7586	0.694	0.746	1512	0.68	0.742	6074	0.035	0.048
Insider Holding	0.086	0.036	7586	0.103	0.042	1512	0.082	0.003	6074	0.000	0.000
Volatility	0.426	0.375	7543	0.446	0.398	1507	0.421	0.369	6036	0.000	0.000
Institutional Holding	0.683	0.700	7586	0.66	0.673	1512	0.689	0.704	6074	0.000	0.000
Lnboard	2.195	2.197	7586	2.174	2.197	1512	2.200	2.197	6074	0.000	0.000
Board Meeting Frequency	7.108	6.000	7586	7.255	7.000	1512	7.071	6.000	6074	0.011	0.163

**Panel D: Correlations of firm level variables**

	Tobin's Q	Outside Chair	Firm Size	Div. Div.	Lev. Lev.	Firm Age	CEO Tenure	CEO Own.	Insider Ratio	Prior Profit.	Ret. Vol.	R&D	Int. Asset s	Insider Own.	DSO X	Inst. Own .	Lnboard
Ln (Tobin's Q)	1.000																
Outside Chair	0.016	1.000															
Firm Size	-0.078	-0.133	1.000														
Diversification	-0.157	-0.057	0.282	1.000													
Leverage	-0.316	-0.008	0.289	0.113	1.000												
Firm age	-0.153	-0.097	0.374	0.253	0.124	1.000											
CEO Tenure	0.060	-0.202	-0.100	-0.030	-0.088	-0.050	1.000										
CEO Ownership	0.025	-0.110	-0.187	-0.073	-0.079	-0.131	0.348	1.000									
Insider Ratio	0.080	0.010	-0.248	-0.141	-0.122	-0.182	0.255	0.285	1.000								
Prior Profitability	0.217	0.005	0.094	0.003	-0.176	0.074	0.049	0.019	0.019	1.000							
Volatility	0.068	0.054	-0.360	-0.154	-0.195	-0.415	0.044	0.074	0.099	-0.306	1.000						
R&D Intensity	0.345	0.034	-0.220	-0.093	-0.271	-0.159	-0.026	-0.052	-0.003	-0.233	0.423	1.000					
Intangible assets	0.232	0.018	-0.206	-0.003	-0.311	-0.158	0.028	0.064	0.078	-0.016	0.319	0.344	1.000				
Insider holding	0.036	0.040	-0.188	-0.069	-0.033	-0.167	0.217	0.628	0.287	0.008	0.091	-0.081	0.087	1.000			
DSOX	0.038	-0.012	0.065	0.012	-0.094	-0.038	-0.016	-0.029	-0.166	0.020	0.143	0.002	0.120	-0.028	1.000		
Institutional Own.	0.118	-0.063	0.092	-0.022	-0.078	-0.129	-0.018	-0.159	-0.127	0.152	0.093	-0.005	0.146	-0.146	0.297	1.000	
Lnboard	-0.127	-0.028	0.544	0.208	0.224	0.386	-0.104	-0.172	-0.252	0.088	-0.431	-0.248	-0.206	-0.097	-0.068	-0.072	1.000

### Panel E: Principal components analysis – loading on underlying variables

This table presents the loadings of the first principal component on underlying variables and the proportion of variability explained. All the variables are defined in Appendix.

Variable	Operational Complexity	CEO Bargaining	Monitoring Cost
Firm Size	0.781		
Diversification	0.678		
Leverage	0.485		
Firm Age	0.681		
CEO Tenure		0.727	
Prior Profitability		0.178	
CEO Ownership		0.742	
Insider Ratio		0.685	
Volatility			0.700
R&D Intensity			0.824
Intangible Assets			0.641
Insider Ownership			-0.124
Variability Explained	0.4417	0.3948	0.6491

**Table 2: Incidence and determinants of outside chairs based on firm characteristics**

**Panel A: Incidence of outside chairs based on firm characteristics**

Complex Firms have greater than the median Operational Complexity score while Simple Firms have median or lower Complexity score. High Monitoring Cost Firms have greater than the median monitoring cost score while Low Monitoring Cost Firms have median or lower monitoring cost score. High CEO Bargaining Firms have above median value of CEO Influence Factor Score while Low CEO Influence Firms have median or lower score. All the variables are reported in Appendix.

<b>Operational Complexity and Outside Chair</b>		
	Outside Chair	Inside Chair
Complex Firms	0.154	0.846
Simple Firms	0.253	0.747
t-Stats	9.980	

<b>CEO Bargaining and Outside Chair</b>		
	Outside Chair	Inside Chair
High CEO Bargaining Firms	0.164	0.836
Low CEO Bargaining Firms	0.234	0.766
t-Stats	2.447	

<b>Monitoring Costs and Outside Chair</b>		
	Outside Chair	Inside Chair
High Monitoring Cost Firms	0.217	0.783
Low Monitoring Costs Firms	0.190	0.810
t-Stats	7.566	

**Table 2 Panel B: Determinants of outside chair**

This table presents results from a Logit regression where the dependent variable is Outside Chair binary variable. County Ratio of Firms with Outside Chair is the ratio of firms in the county of a given firm that have outside chair to total firms in that county in a given year. All the variables are defined in Appendix. All the regressions include an intercept. Robust z-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Outside Chair	
	1	2
County Ratio of Firms with Outside Chair		5.764*** (20.352)
Firm Size	-0.345*** (-11.169)	-0.384*** (-11.838)
Diversification	-0.025 (-1.147)	-0.026 (-1.143)
Leverage	0.037 (0.161)	0.149 (0.618)
Firm Age	-0.221*** (-4.681)	-0.235*** (-4.678)
CEO Tenure	-0.102*** (-14.255)	-0.099*** (-13.550)
CEO Ownership	-0.098*** (-8.679)	-0.102*** (-8.847)
Insider Ratio	0.250 (0.741)	0.032 (0.088)
ROA <sub>t-1</sub>	0.342 (0.848)	0.401 (0.957)
Volatility	-0.110 (-0.472)	0.088 (0.361)
R&D Intensity	0.682 (0.897)	-0.847 (-1.065)
Intangible Assets	-0.211 (-1.163)	-0.085 (-0.446)
Insider Ownership	0.022*** (8.213)	0.023*** (8.184)
DSOX	0.104 (1.383)	0.013 (0.161)
Institutional Ownership	-1.465*** (-7.379)	-1.415*** (-6.771)
Lnboard	0.113 (0.662)	0.296* (1.672)
Intercept	Yes	Yes
Fixed effects	Industry	Industry
NOBS	7535	7535
Pseudo R-Sqd.	0.1223	0.1929



**Table 2 Panel C: Determinants of outside chair using factor score variables**

Factor scores for different characteristics are obtained using the factor analysis reported in Table 1 Panel E. All variables are reported in Appendix.

	Outside Chair	Outside Chair
County Ratio of Firms with Outside Chair		5.444*** (13.294)
Operational Complexity	-0.562*** (-7.498)	-0.594*** (-7.951)
CEO Bargaining	-0.486*** (-8.995)	-0.680*** (-8.068)
Monitoring Cost	-0.882 (-1.449)	-0.123* (-1.879)
DSOX	-0.859 (-1.591)	-0.216** (-2.558)
Institutional Ownership	-0.196*** (-5.650)	-1.557*** (-5.287)
Lnboard	1.196 (0.662)	0.175 (0.640)
Intercept	Yes	Yes
Fixed Effects	Industry	Industry
NOBS	7535	7535
Pseudo R-Sqd.	0.0879	0.1296

**Table 3: Change in board leadership structure and change in firm performance**

This table presents results from OLS regressions with 2-year change in natural log of Tobin's Q and ROA as dependent variables. Outside Chair Change Dummy take a value of one if a firm replaced an inside chair with an outside chair, and zero if a firm changed from an outside chair to an inside chair. All the other variables are defined in Appendix. All the regressions include an intercept. Robust t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

**Panel A: Univariate analysis**

	$\ln(Q)_t$	$\ln(Q)_{t+1}$	$\ln(Q)_{t+2}$	$\ln(Q)_{t+2}-\ln(Q)_t$	$ROA_t$	$(ROA)_{t+1}$	$(ROA)_{t+2}$	$\frac{(ROA)_{t+2}-}{(ROA)_t}$
Inside-Outside Chair	0.612	0.596	0.596	-0.016	0.109	0.103	0.105	-0.004
Outside-Inside Chair	0.635	0.602	0.533	-0.102	0.102	0.091	0.081	-0.021
t-Stats	0.571	0.153	1.556	3.107	0.556	1.256	1.762	1.728

**Panel B: Multivariate analysis using difference-on-difference regressions**

	Dependent Variable	
	$\ln(\text{Tobin's } Q)_{t+2}-\ln(\text{Tobin's } Q)_t$	$(ROA)_{t+2}-(ROA)_t$
Outside Chair Change Dummy	0.077** (2.561)	0.044** (2.009)
$\Delta(\text{Operational Complexity})_{t-(t-1)}$	-0.010 (-0.250)	-0.078 (-1.059)
$\Delta(\text{CEO Bargaining})_{t-(t-1)}$	-0.009 (-0.398)	0.018* (1.653)
$\Delta(\text{Monitoring Cost})_{t-(t-1)}$	-0.045 (-0.931)	0.075** (2.038)
DSOX	-0.044 (-1.497)	0.002 (0.061)
$\Delta(\text{Institutional Ownership})_{t-(t-1)}$	-0.218 (-1.382)	-0.139 (-1.009)
$\Delta(\text{Inboard})_{t-(t-1)}$	0.143* (1.656)	0.098 (1.188)
Intercept and Industry Fixed Effects	Yes	Yes
nobs	469	469
adj-r-sqd	0.0648	0.1063

**Table 4: Outside chair and Tobin's Q**

This table presents results from OLS, Firm Fixed Effects, 2SLS and Median regressions with natural log of Tobin's Q as dependent variable. 1<sup>st</sup> Stage of 2SLS is estimated using Model 2 of Table 2, Panel B. All the variables are defined in Appendix. All the regressions include intercept. Robust t-statistics in parentheses are reported below each coefficient estimate. The OLS specification uses standard errors clustered on firm level identifiers. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects	2SLS	Median
Outside Chair/Predicted Outside Chair	0.046** (2.458)	0.024** (2.060)	0.147* (1.857)	0.041*** (2.803)
Firm Size	0.044*** (4.550)	-0.215*** (-16.776)	0.049*** (4.920)	0.048*** (9.456)
Diversification	-0.032*** (-6.288)	-0.001 (-0.261)	-0.026*** (-5.269)	-0.022*** (-6.118)
Leverage	-0.435*** (-4.453)	-0.503*** (-11.930)	-0.519*** (-5.855)	-0.613*** (-16.385)
Firm Age	-0.034** (-2.494)	-0.052*** (-2.937)	-0.026** (-2.130)	-0.045*** (-5.945)
CEO Tenure	0.002 (1.335)	0.002*** (3.063)	0.003* (1.819)	0.001 (1.499)
CEO Ownership	-0.001 (-0.914)	-0.000 (-0.433)	0.001 (0.328)	-0.002* (-1.860)
Insider Ratio	0.243*** (2.678)	0.103* (1.907)	0.165* (1.913)	0.223*** (4.011)
ROA <sub>t-1</sub>	1.835*** (12.212)	0.740*** (13.478)	2.298*** (15.931)	2.674*** (39.128)
Volatility	-0.264*** (-4.490)	-0.603*** (-11.805)	-0.189*** (-2.831)	-0.189*** (-4.724)
R&D Intensity	3.368*** (10.931)	-0.230 (-1.062)	1.617*** (8.357)	3.336*** (26.040)
Intangible Assets	0.226*** (3.068)	0.330*** (4.405)	0.293*** (4.217)	0.170*** (5.825)
Insider Ownership	0.002*** (2.827)	0.001*** (2.883)	0.001 (1.628)	0.002*** (4.094)
Institutional Ownership	0.088 (1.557)	0.478*** (13.568)	0.093 (1.432)	0.097*** (2.850)
Lnboard	-0.060 (-1.309)	-0.067** (-2.364)	-0.094** (-2.139)	-0.031 (-1.143)
Intercept and Time Dummies	Yes	Yes	Yes	Yes
Fixed Effects	Industry	Firm	Industry	Industry
nobs	7535	7535	7535	7535
Adj. R-sqd	0.3933	0.0636	0.4094	0.2423

**Table 5: Outside chair and Tobin's Q using factor scores**

This table presents results from OLS, firm fixed effects, 2SLS and median regressions in which the dependent variable is natural log of Tobin's Q. First stage of 2SLS is estimated using Model 2 of Table 2, Panel C. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. In OLS regressions, t-statistics is computed using Huber-White-Sandwich estimator of variance by clustering on firm level indicators. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects	2SLS	Median
Outside Chair/ Predicted Outside Chair	0.047** (1.987)	0.052*** (4.400)	0.178** (2.364)	0.047*** (3.499)
Operational Complexity	-0.055*** (-3.482)	-0.217*** (-20.255)	-0.042** (-2.358)	-0.061*** (-8.563)
CEO Bargaining	0.074*** (5.183)	0.069*** (9.346)	0.087*** (5.390)	0.074*** (11.866)
Monitoring Cost	0.098*** (5.490)	-0.019* (-1.654)	0.103*** (5.433)	0.070*** (8.923)
DSOX	0.003 (0.230)	0.013 (1.373)	0.004 (0.262)	0.034*** (2.927)
Institutional Ownership	0.206*** (3.085)	0.451*** (12.875)	0.229*** (3.117)	0.160*** (5.069)
Lnboard	0.072 (1.266)	-0.091*** (-3.121)	0.052 (0.869)	0.068*** (2.678)
Intercept	Yes	Yes	Yes	Yes
Fixed Effects	Industry	Firm	Industry	Industry
NOBS	7535	7535	7535	7535
Adj. R. Sqd.	0.2014	0.0501	0.1948	0.1151

**Table 6: Outside chair and ROA**

This table presents results from OLS, fixed effects, 2SLS and median regressions with ROA as dependent variable. All the variables are defined in Appendix. First stage of 2SLS is estimated using Model 2 of Table 2, Panel C. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. In OLS regressions, t-statistics is computed using Huber-White-Sandwich estimator of variance by clustering on firm level indicators. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects	2SLS	Median
Outside Chair/ Predicted Outside Chair	0.027*** (5.633)	0.035*** (10.194)	0.178*** (9.255)	0.029*** (8.724)
Operational Complexity	-0.016*** (-5.761)	-0.065*** (-20.692)	-0.007 (-1.389)	-0.017*** (-9.629)
CEO Bargaining	0.017*** (7.168)	0.032*** (14.613)	0.034*** (8.946)	0.014*** (8.840)
Monitoring Cost	-0.051*** (-12.675)	-0.073*** (-21.302)	-0.065*** (-9.973)	-0.047*** (-24.306)
DSOX	-0.003 (-1.045)	0.012*** (4.343)	-0.003 (-0.673)	0.001 (0.237)
Institutional Ownership	0.046*** (3.914)	0.066*** (6.439)	0.121*** (4.475)	0.032*** (4.150)
Lnboard	0.029*** (2.920)	0.019** (2.243)	0.037* (1.842)	0.027*** (4.294)
Intercept	Yes	Yes	Yes	Yes
Fixed Effects	Industry	Firm	Industry	Industry
NOBS	7535	7535	7535	7535
Adj. R. Sqd.	0.1936	0.1247	0.1707	0.0905

**Table 7: Outside chair and Tobin's Q by firm characteristics (factor scores)**

This table presents results from firm fixed effects regressions in which the dependent variable is the natural log of Tobin's Q. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Ln(Tobin's Q)		
Outside Chair	0.049*** (4.145)	0.061*** (5.003)	0.051*** (4.302)
Outside Chair* Op. Complexity	-0.025** (-2.048)		
Outside Chair * CEO Bargaining		0.042*** (2.803)	
Outside Chair * Monitoring Cost			0.026** (2.278)
Operational Complexity	-0.212*** (-19.240)	-0.216*** (-20.133)	-0.217*** (-20.300)
CEO Bargaining	0.069*** (9.393)	0.064*** (8.393)	0.069*** (9.363)
Monitoring Cost	-0.020* (-1.666)	-0.019 (-1.596)	-0.025** (-2.100)
DSOX	0.013 (1.325)	0.015 (1.528)	0.012 (1.243)
Institutional Ownership	0.453*** (12.937)	0.455*** (12.992)	0.452*** (12.923)
Lnboard	-0.090*** (-3.076)	-0.089*** (-3.051)	-0.090*** (-3.072)
Intercept	Yes	Yes	Yes
Fixed Effects	Firm	Firm	Firm
NOBS	7535	7535	7535
Adj. R. Sqd.	0.0504	0.0502	0.0502

**Table 8: Outside chair and Tobin's Q by firm characteristics (individual firm characteristics controls)**

This table presents results from Firm Fixed Effects regressions with natural log of Tobin's Q as dependent variable. All the variables are defined in Appendix. All the regressions include an intercept. Robust t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Ln(Tobin's Q)		
Outside Chair	0.035*** (2.890)	0.033*** (2.825)	0.007 (0.654)
Outside Chair*Operational Complexity	-0.028** (-2.238)		
Operational Complexity	-0.181*** (-13.915)		
Outside Chair* CEO Bargaining		0.037*** (2.640)	
CEO Bargaining		0.035*** (4.668)	
Outside Chair* Monitoring Cost			0.021* (1.947)
Monitoring Cost			-0.016 (-1.298)
Firm Size		-0.204*** (-16.692)	-0.185*** (-15.212)
Diversification		-0.004 (-1.063)	-0.005 (-1.460)
Leverage		-0.564*** (-14.370)	-0.513*** (-12.791)
Firm Age		-0.063*** (-3.822)	-0.033* (-1.798)
CEO Tenure	0.001* (1.753)		0.001 (1.127)
CEO Ownership	-0.000 (-0.291)		0.000 (0.125)
Insider Ratio	0.112* (1.950)		0.104** (2.023)
ROA <sub>t-1</sub>	0.520*** (9.289)		0.657*** (12.850)
Volatility	-0.624*** (-11.280)	-0.730*** (-15.069)	
R&D Intensity	0.468** (2.030)	-0.353* (-1.683)	
Intangible Assets	0.256*** (3.260)	0.239*** (3.425)	
Insider Ownership	0.001*** (2.921)	0.001** (2.000)	
DSOX	0.016* (1.694)	0.036*** (4.022)	0.067*** (6.692)
Institutional Ownership	0.481*** (12.350)	0.495*** (14.552)	0.477*** (13.775)
Lnboard	-0.105*** (-3.590)	-0.063** (-2.339)	-0.026 (-0.965)
Intercept	Yes	Yes	Yes
nobs	7535	7535	7535
adj-r-sqd	0.1300	0.0348	0.0361

**Table 9: Analysis of separation of outside chair into independent and linked chair**

**Panel A: Time distribution of Independent and Affiliated Outside chair**

This panel provides the breakdown of Outside chair into Independent Outside chair and Affiliated Outside Chair each year over the 1996-2005 period. The variables are defined in Appendix.

Year	Independent Outside Chair (%)	Affiliated Outside Chair (%)
1996	34(37.363)	57(62.637)
1997	35(36.842)	60(63.158)
1998	37(34.259)	71(65.741)
1999	36(33.028)	73(66.972)
2000	51(36.691)	88(63.309)
2001	68(42.500)	92(57.500)
2002	79(44.382)	99(55.618)
2003	88(47.826)	96(52.174)
2004	101(47.196)	113(52.804)
2005	124(52.101)	114(47.899)
Total	653(43.074)	863(56.926)



**Table 9 Panel B: Different types of outside chair and firm performance**

This table presents results from OLS and fixed effects regressions in which the dependent variables are natural log of Tobin's Q and ROA. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. In OLS regressions, t-statistics is computed using Huber-White-Sandwich estimator of variance by clustering on firm level indicators. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable			
	Ln(Tobin's Q)		ROA	
	OLS	Fixed Effects	OLS	Fixed Effects
Independent Outside Chair	-0.003 (-0.098)	0.035** (2.020)	0.016** (2.440)	0.027*** (5.268)
Affiliated Outside Chair	0.084*** (3.071)	0.062*** (4.532)	0.035*** (6.145)	0.040*** (9.979)
Operational Complexity	-0.054*** (-3.440)	-0.216*** (-20.163)	-0.016*** (-5.698)	-0.065*** (-20.563)
CEO Bargaining	0.073*** (5.119)	0.069*** (9.297)	0.016*** (7.106)	0.031*** (14.530)
Monitoring Cost	0.101*** (5.640)	-0.018 (-1.536)	-0.050*** (-12.351)	-0.072*** (-21.059)
DSOX	0.006 (0.391)	0.014 (1.468)	-0.002 (-0.870)	0.013*** (4.499)
Institutional Ownership	0.215*** (3.209)	0.452*** (12.916)	0.048*** (4.043)	0.067*** (6.516)
Lnboard	0.065 (1.142)	-0.094*** (-3.188)	0.027*** (2.754)	0.018** (2.127)
Intercept	Yes	Yes	Yes	Yes
Fixed Effects	Industry	Firm	Industry	Firm
NOBS	7535	7535	7535	7535
Adj. R. Sqd.	0.2027	0.0507	0.1949	0.1257

**Table 9 Panel C: Different types of outside chair and Tobin's Q based upon firm characteristics**

This table presents results from fixed effects regressions in which the dependent variable is natural log of Tobin's Q. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Ln(Tobin's Q)					
Independent Outside Chair	0.029*	0.039*	0.022	0.036**	0.032*	0.035**
	(1.650)	(1.727)	(1.210)	(2.067)	(1.852)	(2.030)
Ind. Outside Chair* Op. Complexity	-0.035*					
	(-1.912)					
Ind. Outside Chair * CEO Bargaining		0.008				
		(0.274)				
Ind. Outside Chair * Monitoring Cost			0.045***			
			(2.980)			
Affiliated Outside Chair	0.063***	0.062***	0.061***	0.061***	0.067***	0.063***
	(4.605)	(4.538)	(4.452)	(4.363)	(4.827)	(4.540)
Affiliated Outside Chair * Op. Complexity				-0.012		
				(-0.858)		
Affiliated Outside Chair * CEO Bargaining					0.047***	
					(2.683)	
Affiliated Outside Chair * Monitoring Cost						0.004
						(0.309)
Operational Complexity	-0.213***	-0.216***	-0.216***	-0.215***	-0.215***	-0.216***
	(-19.663)	(-20.160)	(-20.207)	(-19.762)	(-20.081)	(-20.162)
CEO Bargaining	0.069***	0.068***	0.069***	0.069***	0.065***	0.069***
	(9.337)	(9.150)	(9.286)	(9.307)	(8.647)	(9.298)
Monitoring Cost	-0.018	-0.018	-0.023*	-0.018	-0.018	-0.019
	(-1.522)	(-1.539)	(-1.911)	(-1.548)	(-1.512)	(-1.563)
DSOX	0.014	0.014	0.013	0.014	0.015	0.014
	(1.461)	(1.472)	(1.403)	(1.446)	(1.568)	(1.457)
Institutional Ownership	0.453***	0.452***	0.457***	0.453***	0.457***	0.452***
	(12.952)	(12.912)	(13.056)	(12.932)	(13.038)	(12.910)
Lnboard	-0.094***	-0.093***	-0.092***	-0.093***	-0.091***	-0.094***
	(-3.194)	(-3.185)	(-3.127)	(-3.163)	(-3.087)	(-3.190)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Firm	Firm	Firm	Firm	Firm	Firm
NOBS	7535	7535	7535	7535	7535	7535
Adj. R. Sqd.	0.0511	0.0507	0.0513	0.0507	0.0507	0.0507

**Table 10: Outside chair, firm characteristics and firm performance: Impact of SOX**

This table presents results from Firm Fixed Effects regressions with natural log of Tobin's Q as dependent variable. Pre-SOX is the sample period before 2003 and Post-SOX is 2003-2005. All the variables are defined in Appendix. All the regressions include an intercept. Robust t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Ln(Tobin's Q)					
	Pre-SOX			Post-SOX		
Outside Chair	0.050*** (3.167)	0.057*** (3.588)	0.049*** (3.117)	0.023 (1.511)	0.042* (1.743)	0.038** (2.006)
Outside Chair*Complexity	-0.014 (-0.840)			-0.056** (-2.172)		
Outside Chair*CEO Bargaining		0.046** (2.419)			0.013 (0.441)	
Outside Chair* Monitoring Cost			0.026* (1.802)			0.038** (2.035)
Operational Complexity	-0.206*** (-14.459)	-0.208*** (-15.041)	-0.210*** (-15.179)	-0.112*** (-5.132)	-0.117*** (-5.392)	-0.120*** (-5.521)
CEO Bargaining	0.072*** (7.206)	0.067*** (6.608)	0.072*** (7.225)	0.005 (0.327)	0.003 (0.167)	0.006 (0.404)
Monitoring Cost	-0.091*** (-5.541)	-0.090*** (-5.454)	-0.097*** (-5.776)	0.037* (1.870)	0.034* (1.748)	0.029 (1.467)
Institutional Ownership	0.552*** (10.407)	0.555*** (10.473)	0.550*** (10.388)	0.196*** (3.701)	0.193*** (3.648)	0.200*** (3.769)
Lnboard	-0.128*** (-3.027)	-0.123*** (-2.917)	-0.127*** (-3.024)	-0.038 (-0.855)	-0.035 (-0.785)	-0.035 (-0.793)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
nobs	4759	4759	4759	2776	2776	2776
adj-r-sqd	0.0283	0.0264	0.0272	0.0868	0.0845	0.0859

**Table 11: Market reaction to announcements of change in board chair**

This table presents results from an event study of changes in board chair position. Combined-to-Independent Outside Chair is the event when a firm changes from combined CEO-Chair to Independent Outside Chair. Combined-to-Affiliated Chair is the event when a firm changes from combined CEO-Chair to Affiliated Outside Chair. Independent Chair-to-Combined CEO-Chair and Affiliated Outside Chair to Combined CEO-Chair are the events when a firm combines separate CEO and Outside chair positions. Abnormal Return is computed after subtracting predicted returns from realized returns. Predicted returns are computed using market model with value-weighted market index. Cumulative returns are computed from 1-day before the announcement to 1-day after announcement. Two tail t-stats are reported. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

<b>Event- Study Returns</b>			
<b>3-Day Cumulative Abnormal Return</b>			
	Sample Size	Mean	p-value
(a) Combined To Independent Chair	38	1.625**	0.033
(b) Independent Chair to Combined CEO-Chair	13	-1.313	0.136
Difference between (a) and (b)		2.938*	0.045
(c) Combined To Affiliated Chair	44	0.861	0.102
(d) Affiliated Chair to Combined CEO-Chair	57	-0.903	0.118
Difference between (c) and (d)		1.764**	0.048

### Appendix Table A1: Outside chair and certified inside director

This table presents the determinants of outside chair specification of model 2 of Table 2, Panel B, after including a certified inside director dummy variable. This dummy variable takes a value of one where there is at least one such director on the board, zero otherwise. An inside director is considered certified if he/she has outside directorships. All the variables are defined in Appendix.

	Dependent Variable: Outside Chair
Certified Inside Director Dummy	0.498*** (5.064)
County Ratio of Firms with Outside Chair	5.516*** (14.901)
Firm Size	-0.423*** (-7.078)
Diversification	-0.006 (-0.156)
Leverage	0.446 (1.076)
Firm Age	-0.194*** (-2.737)
CEO Tenure	-0.100*** (-5.893)
CEO Ownership	-0.118*** (-5.806)
Insider Ratio	0.199 (0.347)
ROA <sub>t-1</sub>	0.006 (1.108)
Volatility	0.155 (0.442)
R&D Intensity	0.198 (0.129)
Intangible Assets	0.066 (0.197)
Insider Ownership	0.024*** (6.202)
DSOX	-0.077 (-0.823)
Institutional Ownership	-1.542*** (-4.951)
Lnboard	0.421 (1.348)
Intercept	Yes
nobs	7535
Pseudo adj. R-sqd	0.2233

**Appendix Table A2: Exclusion of transitional outside chairs**

This table presents results from OLS and fixed effects regression in which the dependent variable is natural log of Tobin's Q. The sample excludes firms that report having an outside chair for only one year. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects
Outside Chair	0.050*** (3.061)	0.052*** (3.900)
Operational Complexity	-0.056*** (-6.043)	-0.220*** (-18.286)
CEO Bargaining	0.074*** (9.554)	0.074*** (8.940)
Monitoring Cost	0.116*** (10.366)	-0.009 (-0.670)
DSOX	0.012 (0.941)	0.013 (1.184)
Institutional Ownership	0.152*** (3.527)	0.465*** (11.556)
Lnboard	0.073** (2.152)	-0.093*** (-2.842)
Intercept	Yes	Yes
Fixed Effects	Industry	Firm
nobs	6480	6480
adj-r-sqd	0.2062	0.0584

### Appendix Table A3: Outside chair, and firm performance: governance quality and product market competition

This table presents results from OLS and fixed effects regression in which the dependent variable is natural log of Tobin's Q. GIM Index is calculated following Gompers, Ishii and Metrick (2003). E-Index is the index used by Bebchuk, Cohen and Ferrell (RFS, 2009). CEO Incentive Compensation is  $\{1-(\text{Salary}/\text{Total CEO Compensation})\}$ . Product Market Competition is Herfindahl Index of industry sales at the 2-digit SIC level. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects
Outside Chair	0.054** (2.259)	0.039*** (3.007)
Operational Complexity	-0.085*** (-7.409)	-0.120*** (-13.974)
CEO Bargaining	0.028*** (2.668)	0.033*** (5.164)
Monitoring Cost	-0.053*** (-3.322)	-0.189*** (-14.477)
DSOX	0.011 (0.741)	0.011 (1.267)
Institutional Ownership	0.090 (1.392)	0.450*** (11.296)
Lnboard	0.046 (0.875)	-0.098*** (-3.076)
GIM-Index	-0.011 (-1.525)	-0.021*** (-2.597)
E-Index	-0.072*** (-5.248)	-0.027** (-2.052)
CEO Incentive Compensation	0.301*** (10.046)	0.062*** (4.073)
Product Market Competition	-0.312** (-2.080)	-0.050 (-0.624)
Intercept	Yes	Yes
Fixed Effects	Industry	Firm
NOBS	7535	7535
Adj. R-Sqd.	0.2210	0.0746

### Appendix Table A4: Endogeneity control for prior firm performance

This table presents results from firm fixed effects and Arellano-Bond dynamic regressions in which the dependent variable is the natural log of Tobin's Q. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. Robust t-statistics are used. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable:Ln(Tobin's Q)	
Outside Chair	0.046*** (3.932)	0.071** (2.302)
Operational Complexity	-0.193*** (-17.104)	-0.214*** (-13.355)
CEO Bargaining	0.049*** (6.604)	0.038*** (3.279)
Monitoring Cost	-0.034*** (-2.887)	-0.068*** (-4.104)
DSOX	0.061*** (6.691)	0.070*** (6.240)
Institutional Ownership	0.290*** (8.197)	0.328*** (6.478)
Lnboard	-0.042 (-1.452)	-0.265** (-2.224)
Ln(Tobin's Q) <sub>t-1</sub>	0.346*** (27.715)	0.501*** (20.216)
Intercept	Yes	Yes
Fixed Effects	Firm	Firm
NOBS	6506	5471
Adj. R-Sqd.	.3909	
Wald- Chi Sqd.		1009.80
p> Chi Sqd.		0.000
Arellano-Bond		Yes



### Appendix Table A5: Endogeneity control for prior board structures

This table presents results from OLS and fixed effects regressions in which the dependent variable is natural log of Tobin's Q. Board Independence is the ratio of independent outside directors to board size. All the variables are defined in Appendix. All the regressions include an intercept. t-statistics in parentheses are reported below each coefficient estimate. Robust t-statistics are used. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	OLS	Fixed Effects
Outside Chair	0.044*** (2.578)	0.054*** (4.044)
Operational Complexity	-0.045*** (-5.035)	-0.239*** (-18.439)
CEO Bargaining	0.071*** (8.418)	0.066*** (7.951)
Monitoring Cost	0.108*** (9.890)	-0.001 (-0.080)
DSOX	0.013 (0.992)	0.028*** (2.729)
Institutional Ownership	0.203*** (4.902)	0.477*** (11.835)
Lnboard	0.165*** (3.046)	-0.024 (-0.663)
(Board Independence) <sub>t-1</sub>	-0.028 (-0.659)	-0.126*** (-3.068)
(Lnboard) <sub>t-1</sub>	-0.086* (-1.674)	-0.102*** (-2.904)
Intercept	Yes	Yes
Fixed Effects	Industry	Firm
nobs	6506	6506
adj-r-sqd	0.1970	0.0646

### Appendix Table A6: 3SLS estimation of firm performance, outside chair, board size and board independence

This table presents results from 3SLS estimation in which dependent variables are natural log of Tobin's Q, Outside Chair, Board Size and Board Independence. Board Independence is the ratio of independent outside directors to board size. All the variables are defined in Appendix. All the regressions include intercept. z-statistics in parentheses are reported below each coefficient estimate. z-statistics are used. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Independent Variable			
	Ln(Tobin's Q)	Outside Chair	Lnboard	Board Independence
Outside Chair	0.025* (1.754)		-0.005 (-0.830)	-0.011** (-2.399)
Ln(Tobin's Q)		0.002 (0.171)	0.016*** (4.207)	-0.003 (-1.147)
Lnboard	0.053** (2.533)	-0.041* (-1.896)		-0.022*** (-3.159)
Board Independence	-0.006 (-0.190)	-0.157*** (-4.878)	-0.022 (-1.597)	
Operational Complexity	-0.019*** (-3.700)	-0.025*** (-4.879)	0.019*** (9.144)	0.005*** (2.900)
CEO Bargaining	0.012** (2.313)	-0.051*** (-10.111)	-0.007*** (-3.335)	-0.023*** (-14.667)
Monitoring Cost	0.000 (0.090)	-0.002 (-0.373)	-0.010*** (-5.252)	-0.001 (-0.451)
DSOX	0.084*** (10.605)	0.021*** (2.609)	0.000 (0.116)	0.008*** (3.036)
Institutional Ownership	0.043* (1.933)	-0.085*** (-3.745)	-0.020** (-2.124)	0.013* (1.727)
Ln(Tobin's Q) <sub>t-1</sub>	0.840*** (111.747)			
(Outside Chair) <sub>t-1</sub>		0.657*** (67.132)		
(Lnboard) <sub>t-1</sub>			0.804*** (112.311)	
(Board Independence) <sub>t-1</sub>				0.751*** (95.870)
Intercept	Yes	Yes	Yes	Yes
Fixed Effects	Industry	Industry	Industry	Industry
Nobs	6506	6506	6506	6506
Chi-Sqd.	14538.31	5500.70	23423.40	15178.40
p>Chi-Sqd.	0.000	0.000	0.000	0.000
R-Sqd.	0.7171	0.4902	0.8032	0.7258

### Appendix Table A7: Inside chair and firm performance: CEO-chair vs. separate inside chair

This table presents results from firm fixed effects regressions in which the dependent variable is natural log of Tobin's Q. CEO-Chair takes a value of one if a firm reports its current CEO holding the board chair position as well, zero otherwise. Employee Chair takes a value of one if a firm reports an ex-employee (including a retired CEO) holding board chair position, zero otherwise. All the variables are defined in Appendix. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable: Ln(Tobin's Q)					
Employee Chair	-0.076*** (-4.233)	-0.075*** (-4.001)	-0.073*** (-4.075)	-0.072*** (-3.979)	-0.076*** (-4.251)	-0.076*** (-4.218)
Emp. Chair*Op. Complex.	-0.011 (-0.677)					
Emp. Chair *CEO Bargaining		0.006 (0.294)				
Emp. Chair *Mon. Cost			-0.037** (-2.431)			
CEO-Chair	-0.073*** (-4.816)	-0.073*** (-4.791)	-0.072*** (-4.712)	-0.071*** (-4.661)	-0.081*** (-5.183)	-0.072*** (-4.716)
CEO-Chair*Op. Complex.				0.029** (2.306)		
CEO-Chair*CEO Bargaining					-0.034** (-2.296)	
CEO-Chair*Mon. Cost						-0.007 (-0.623)
Operational Complexity	-0.235*** (-16.135)	-0.236*** (-16.237)	-0.236*** (-16.228)	-0.257*** (-15.029)	-0.236*** (-16.243)	-0.236*** (-16.232)
CEO Bargaining	0.075*** (8.009)	0.074*** (7.869)	0.075*** (8.083)	0.075*** (8.067)	0.101*** (6.806)	0.074*** (7.980)
Monitoring Cost	0.013 (0.930)	0.013 (0.907)	0.018 (1.264)	0.014 (0.943)	0.012 (0.856)	0.018 (1.097)
DSOX	0.032*** (2.949)	0.032*** (2.936)	0.032*** (2.939)	0.031*** (2.926)	0.032*** (2.989)	0.031*** (2.908)
Institutional Ownership	0.477*** (11.559)	0.477*** (11.546)	0.476*** (11.538)	0.480*** (11.624)	0.479*** (11.605)	0.478*** (11.563)
Lnboard	-0.108*** (-3.094)	-0.108*** (-3.079)	-0.106*** (-3.024)	-0.108*** (-3.072)	-0.105*** (-2.988)	-0.108*** (-3.084)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Firm	Firm	Firm	Firm	Firm	Firm
nobs	7535	7535	7535	7535	7535	7535
adj-r-sqd	0.0624	0.0624	0.0629	0.0630	0.0625	0.0624

### Appendix Table A8: Outside chair and number of board meetings

This table presents results from fixed effects regressions in which the dependent variable is Board Meeting Frequency (the number of board meetings in a given year) in Model 1 and the natural logarithm of Board Meeting Frequency in Model 2. Model 2 includes firm fixed effects. All the variables are defined in Appendix. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent Variable	
	Board Meeting Frequency (1)	Ln(Board Meeting Frequency) (2)
Outside Chair	0.023** (2.054)	0.021* (1.825)
Operational Complexity	0.066*** (15.413)	0.040*** (5.517)
CEO Bargaining	-0.060*** (-12.657)	-0.019*** (-3.189)
Monitoring Cost	0.051*** (10.842)	0.008 (0.699)
DSOX	0.051*** (5.149)	0.066*** (8.077)
Institutional Ownership	-0.089*** (-3.547)	-0.091*** (-2.794)
Lnboard	0.015 (0.770)	-0.008 (-0.298)
Intercept	Yes	Yes
Fixed Effects	Industry	Firm
nobs	7535	7535
adj-r-sqd.	0.0191	0.0762