Does It Pay to Sit on Boards Other Than Your Own?*

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Abstract

More than 40% of the CEOs of the S&P 500 firms sit on outside boards, despite the substantial opportunity cost of CEO time. We examine the potential benefit to home firm of CEOs' outside directorship. External directorships generate economically significant performance improvements for the CEO's primary firm. However, these benefits diminish when CEOs hold an excessive number of outside board positions. Our findings support a learning mechanism where CEOs gain strategic insights through directorships at firms in different industries, non-competitors, and supply chain partners, facilitated by exposure to diverse business environments, unrestricted knowledge sharing, and improved understanding of operational interdependencies. We also show that the strategic importance of supply chain directorships can outweigh logistical barriers such as direct flight availability. Our causal evidence from CEOs' first outside directorships suggests that the positive learning effect is driven more by individual CEO attributes than by the firm's initial experience with having a CEO on an external board.

Keywords: CEO outside directorships; Firm performance; Learning channel

JEL Classification: G32

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1 Introduction

More than 40% of the chief executive officers (CEOs) from S&P 500 firms serve as directors on external corporate boards in 2024, with many holding multiple directorships.[1] The time commitment required for a CEO to serve effectively as an outside board member is substantial, but the benefits this practice brings to the home firm of the executive remain unclear. While previous research indicates that CEOs choose to sit on outside boards for reputation enhancement, future career opportunities, and personal financial gains (Fama and Jensen, 1983; Booth and Deli, 1996; Yermack, 2004; Kim and Oh, 2024), the evidence on incentives for appointee firms, which bear the opportunity cost of the CEO's time, is very limited.

The question of whether a CEO's home firm benefits from their outside board directorships has become increasingly pressing in recent years. Recent regulations, including the Sarbanes-Oxley Act of 2002 (SOX) and rules established by the Securities and Exchange Commission (SEC), the New York Stock Exchange (NYSE), and the National Association of Securities Dealers, now require greater participation of outside directors on boards and key committees (Duchin et al., 2010). As a result, there is a higher demand for CEO outside directors. However, particularly following the global financial crisis, many boards have implemented new restrictions on their CEOs' outside board activities. The average number of outside corporate directorships held by CEOs of S&P 500 firms has declined from one in 2003 to 0.6 in 2013. This trend of limiting CEO outside board service is evident in our sample. As shown in Figure 1, while the proportion of CEOs who hold any outside directorship has remained stable, the proportion of CEOs holding at least three outside directorships has steadily declined since the enactment of SOX in 2002. These restrictions are consistent with the recommendations of corporate governance service firms. For example, the Institutional Shareholder Services group of companies (ISS, formerly Riskmetrics) recommends that CEOs serve on no more than two outside public company boards in addition to their own firm's board.[2] Understanding whether CEOs' outside board service benefits their primary firm is crucial for evaluating such policy recommendations.

Beyond the question of whether outside directorships benefit the firms that appoint CEOs

[1] 2024 U.S. Spencer Stuart Board Index, https://www.spencerstuart.com/research-and-insight/us-board-index

[2] Https://www.issgovernance.com/policy-gateway/2016-policy-information/

as directors, another important question is whether CEO involvement in multiple outside boards—commonly referred to as "busyness" in the board literature—negatively impacts their primary firms. Previous research on director busyness has focused primarily on board of directors in general (Ferris et al., 2003; Fich and Shivdasani, 2006; Field et al., 2013), and these studies have reached varying conclusions.

This study examines whether firms benefit from sending their CEOs to serve on outside boards, using a large and comprehensive dataset. A key challenge in addressing this question is endogeneity. There might exist some unobserved CEO characteristics that lead to both higher firm performance and a greater likelihood of a CEO being selected for outside boards. Additionally, reverse causality could occur, where strong firm performance increases the probability of a CEO being invited to serve on outside boards, rather than the reverse. We employ several approaches to mitigate these concerns.

We begin by explicitly modeling the choice problem of CEOs joining outside boards. Using logit regressions, we find that the industry median Tobin's q is a significant predictor of securing outside directorships. In contrast, a firm's own q, after adjusting for the industry median, does not demonstrate explanatory power. Unsurprisingly, CEOs from larger firms, those with higher intangible assets and research and development (R&D) investments, older CEOs, and those also serving as Chairman are more likely to hold outside directorships. Consistent with the literature on local director markets (Masulis and Mobbs, 2011; Knyazeva et al., 2013), we also find that the number of firms in the local market helps to predict whether a CEO holds an outside directorship, particularly for smaller firms.

Based on these findings, we use industry-adjusted Tobin's q as the primary measure of firm performance in our baseline fixed-effects regressions so that the endogeneity issue is less of a concern. We control for unobservable CEO characteristics, including those associated with personal incentives to accept outside board positions. Our evidence suggests that CEOs' outside board service generally enhances the performance of their primary firms. However, serving on three or more outside boards does not lead to additional performance improvements. Furthermore, the negative impact of CEO busyness outweighs the overall benefits associated with outside directorships.

To further strengthen our results, we re-estimate our baseline regression using an instrumental variable (IV) approach. Ideally, suitable instruments should correlate with a CEO's

likelihood of being invited to and accepting an outside directorship while remaining independent of firm performance. We construct two such IVs: the number of direct flights between the home firm's location and the location of outside boards and the total passenger-volume on relevant routes. These IVs satisfy the relevance condition, as these instruments rely on the assumption that direct flight connections significantly enhance proximity between firms and reduce travel-related hurdles for CEOs serving on external boards (Giroud and Mueller, 2015; Bernile et al., 2018; Bahar et al., 2023). For instance, direct flights streamline travel logistics, making it more feasible for CEOs to attend board meetings, while high passenger-volume reflects robust connectivity, further facilitating board service. Since most corporate location decisions are historically predetermined, these IVs are unlikely to be related to firm performance, thus satisfying the exclusion condition. We then employ endogenous treatment regressions to examine the relationship between CEO external directorships and home firm performance. The results confirm our fixed-effects findings, showing that outside directorships generally enhance the value of firms whose CEOs serve on other boards.

Tobin's q reflects market expectations of future firm performance (Masulis et al., 2012). A common critique, however, is that it may be influenced by short-term fluctuations. For instance, investors might interpret CEOs' outside directorships as a positive signal of their capabilities, leading to increased optimism about the firm's prospects. To strengthen our argument that outside directorships benefit a CEO's primary firm, we examine the relationship between outside directorships and innovation output, using innovation as a more granular measure less prone to endogeneity issues compared to Tobin's q. Innovation outputs, such as patents, are less susceptible to short-term market sentiment and more reflective of tangible firm activities. The skills a CEO develops while serving on an outside board can enhance innovation within their own company. Moreover, it is unlikely that mere recognition from an outside directorship would directly lead to increased innovation at the CEO's home firm. Our results show that outside directorships are associated with significant improvements in innovation performance, including the number of patents granted, patent value, and patent citations, at the CEO's home firm. These findings also suggest that the benefits of outside directorships may persist over time.

We then investigate the mechanisms driving the positive relationship between CEOs' outside directorships and their home firms' performance. Building on the dual board roles of

monitoring and advising identified by Adams and Ferreira (2007), we argue that outside directorships create value by exposing CEOs to diverse strategic practices and business models from multiple companies. The resulting knowledge spillovers and strategic insights enable CEOs to identify novel opportunities and implement innovative practices at their home firms, thereby strengthing their firm's strategic positioning. Our comprehensive analysis provides strong empirical support for this learning mechanism. In particular, the positive impact on firm performance is observed only when outside directorships are held at firms in different industries, non-competitors, or supply chain partners. These settings offer diverse business environments, facilitate unrestricted knowledge sharing, and enhance CEOs' understanding of operational interdependencies, all of which promote effective learning. Furthermore, we find that the strategic value of supply chain relationships attenuates the influence of direct flight availability on the propensity of CEOs to accept outside directorships.

To further strengthen our causal inference, we focus on CEOs who take on their first outside board position during the sample period and examine how firm value changes before and after this event. By selecting CEOs without previous outside board experience and using a difference-in-differences (DID) approach with matched samples, we aim to isolate the effect of the first external appointment. We use a two-step matching method—first by firm size, then by other CEO and firm characteristics—to ensure that the treatment and control groups are comparable. Our results show that when CEOs gain their first outside directorship, their home firms experience a significant increase in firm value. This suggests that the CEOs benefit from learning through their board service. However, when examining firms that, for the first time, have a CEO serving on an outside board, we find a positive but statistically insignificant improvement, indicating that the learning effect is tied more closely to the CEO than to the firm. Further analysis across different groups of firms shows that the positive effects are stronger when CEOs hold ownership, have greater decision-making power, are relatively new in their role, or lead firms with larger boards. These conditions likely facilitate CEOs' ability to apply their acquired knowledge and enable firms to support changes based on that knowledge.

While our study provides novel evidence that CEOs' outside directorships generally improve the performance of their own firms, we note that governance advisory firms have tightened recommended limits on the number of outside directorships in recent years. Our final analysis presents further evidence suggesting that the reduction in board busyness since 2007

has positively impacted firm performance. Although we cannot definitively establish the exogenous nature of these reductions in outside directorships, anecdotal evidence indicates that new limits were implemented in response to heightened post-financial crisis scrutiny of management practices. Our analysis reveals improved firm value among firms whose CEOs reduced their outside directorships from a "busy" level (three or more) to a more manageable number (one to two). We also investigate the determinants of CEO busyness. Our findings demonstrate that both firm-specific and industry-level performance measures negatively correlate with CEO busyness. The consistent negative and statistically significant coefficients for firm-adjusted Tobin's q and industry median q across specifications suggest that CEOs from underperforming firms and industries are more likely to accumulate excessive board appointments.

We contribute to the literature from three important perspectives. First, using both Tobin's q and innovation output as measures of firm economic performance, we demonstrate that CEO outside directorships generally benefit their home firms. While previous research such as Perry and Peyer (2005) relied on announcement effects from limited samples over brief periods, our analysis encompasses a large, contemporary dataset, achieving more general implications. Second, we identify specific mechanisms—knowledge spillovers and supply chain insights—through which outside directorships enhance CEO performance. These findings contribute valuable insights to ongoing policy discussions regarding potential restrictions on CEOs' external board activities. Third, by showing the negative impact of excessive busyness, we distinguish between optimal and excessive outside directorships.

The remainder of the paper is organised as follows. Section 2 reviews related literature. Section 3 describes the sample construction process and presents the key statistics of the data. Section 4 conducts the empirical analysis of the relationship between outside directorship and firm performance. We conclude in Section 5.

2 Literature Review

CEO outside directorship has often been studied alongside the broader demand and supply of outside directors. For example, Linck et al. (2009) examine the impact of SOX on the supply of outside directors. Knyazeva et al. (2013) study the impact of director supply, including CEO outside directors, on board independence and firm performance. Given the prominent role of

CEOs, recent literature has begun to focus more specifically on CEOs as outside directors. Fahlenbrach et al. (2010) discuss the demand for CEO outside directors, arguing that firms prefer CEOs as outside directors for their certification effect. Chen et al. (2020) demonstrate that following the normalization of U.S.-China trade relations in 2000, firms appointed outside directors with expertise in Chinese business to their boards to strengthen their operational capabilities in China. Baer et al. (2023) examine the pattern of outside board appointments and find that firms with greater advisory needs exhibit a higher likelihood of appointing executives who have been involved in governance failures.

Research on the supply side of CEO outside directors remains more limited. From an agency perspective, CEOs have incentives to provide outside director service not only for renumeration (Yermack, 2004), but also for career opportunities (Yermack, 2004) and post-retirement directorships (Brickley et al., 1999). Network connections appear to benefit CEOs financially. Engelberg et al. (2013) find that CEOs with large networks, partly formed through outside board activities, earn more than those with small networks. Bai and Mkrtchyan (2023) document that firms appointing external CEOs experience superior productivity growth and operating margin improvements compared to those selecting internal successors. While research has examined the impact on receiving firms, the benefits that accrue to sending firms from their CEOs' external board service remain less well understood. Although Larcker et al. (2013) demonstrate that enhanced network centrality through board connections is associated with higher risk-adjusted returns, empirical evidence directly linking CEO outside directorships to value creation for their home firms remains limited.

This study represents one of the first systematic attempts to examine the firm benefits of CEO outside directorship. Booth and Deli (1996) find an inverse relationship between CEOs' outside directorships and their firms' growth opportunities, suggesting this pattern reflects efficient time allocation by CEOs. The study most closely related to our research question is perhaps Perry and Peyer (2005). They investigate the announcement effect of board seat accumulation among firm executives. Using a sample of 349 events from 1994 to 1996, of which 55% involve CEOs, they find that market reaction to the announcement of executive's additional outside directorship is negative only when firms have potential agency problems. Our study advances this research in three important ways. First, we analyze a larger, more recent dataset spanning 2001 to 2023 and focus specifically on CEO outside directors. Second,

we directly measure the impact on firm performance through Tobin's q. Third, we provide new evidence on the mechanisms through which CEO outside directorships can benefit their own firms. Given the renewed importance of this topic, our research addresses a significant gap in board research.

Our research also connects to the literature on the impact of multiple directorships. Research on board busyness generally focuses on directors and provides mixed findings. Ferris et al. (2003) find no evidence that director busyness is detrimental to firm performance. Fich and Shivdasani (2006), on the other hand, find that firms with busy boards are associated with weak corporate governance and lower performance. Focusing on the advisory role, Field et al. (2013) point to the potential information advantages of connected busy directors. Hauser (2018) and Brown et al. (2019) both examine how exogenous M&A-related board terminations affect corporate outcomes. Hauser (2018) show that fewer board appointments improve firm profitability, market-to-book ratios, and directors' committee participation. Similarly, Brown et al. (2019) demonstrate that reduced director commitments enhance operating performance, board monitoring, and strategic advice. These studies provide useful reference points for our study. If multiple directorships prevent directors from effectively monitoring management because they are "too busy to mind the business", then busyness likely affects CEOs as well, whose opportunity cost of time is even much higher. Our findings reveal a more nuanced relationship between CEO external directorships and firm performance. While moderate levels of external board service can benefit firms, excessive board commitments (i.e., CEO busyness) demonstrate no performance benefits and instead negatively impact firm outcomes.

3 Data and Sample

Our analysis uses a merged dataset from BoardEx and Compustat, focusing on U.S. firms. BoardEx Individual Profile data provide detailed employment histories and role durations for executives and board directors, allowing us to track both the CEOs in charge and their outside board positions for each firm-year.[3] Following the previous literature, we exclude

[3]We include a CEO or director in a firm-year only if they served in that role for at least six months of the fiscal year. We exclude observations where firms had multiple CEOs or where a CEO managed multiple firms. Additional exclusions include firm-years with end-of-year stock prices below $2 and observations where fewer than three firms operated in the same two-digit SIC code that year. Since our analysis relies on Compustat data, our sample includes only public company board directorships.

CEOs of financial and regulatory firms (those with Standard Industrial Classification (SIC) codes beginning with 6, 48, 49, or 99) from our analysis. However, we do not exclude outside board positions that CEOs hold in firms within these industries, as CEOs can still learn from and contribute to these outside boards. While we compile complete employment and board activity histories for all CEOs, we restrict our final analysis to fiscal years from 2001 to 2023, when BoardEx data coverage is most reliable. Constructing complete employment histories improves data accuracy when identifying CEOs' first outside directorships for subsequent analysis. Ultimately, we have a sample of 43,243 firm-years and 8,350 unique CEOs. This sample is substantially larger than those derived from the ISS, which covers only the largest 1,500 firms—less than half the size of our sample for the same period.

We focus on an economic measure of firm performance, Tobin's q, to examine the gains from CEO outside directorships. Accounting measures of firm performance are more susceptible to manipulation. For instance, Malmendier and Tate (2009) demonstrate that the practice of earnings management increases significantly after a CEO receives industry awards. In most standard models, Tobin's q is positively correlated with firm growth opportunities. Accordingly, our measure of firm performance is likely to capture increased growth opportunities, which may take years to translate into increased return on assets (ROA), from the learning experiences of CEOs on outside boards. We follow Duchin and Sosyura (2013) in calculating the Tobin's q, then subtract the median q of the industry (defined by two-digit SIC code) in each year to obtain firm-adjusted q. We extend our analysis by examining technological innovation outcomes, complementing our initial focus on Tobin's q. Our measure of innovation is constructed using the patent-level database developed by Kogan et al. (2017), which provides detailed information on patent values and innovation activities. Using Compustat data, we also analyze other company characteristics including firm size, ROA, leverage ratio, proportion of intangible assets, and R&D spending. We obtain CEO-specific information such as tenure and age from BoardEx. For CEO ownership data, we merge our dataset with ISS. Due to limitations in data availability, CEO ownership information is available for only a subset of our sample, with most of the missing data corresponding to CEOs who do not hold directorships in other companies. Details of the variable definition are reported in Appendix A.

To address potential endogeneity concerns, we construct IVs based on information about direct flights from corporate headquarters. Our flight data come from the T-100 Domestic

Segment Database maintained by the Bureau of Transportation Statistics, following Giroud and Mueller (2015). The T-100 Domestic Segment Database contains data on domestic direct flights, categorized by aircraft type and service class. It includes details on passengers, freight, and mail transported, available capacity, scheduled and actual departures, and aircraft hours. We also examine the impact of CEO outside directorships on firm value across different firm types by classifying stocks into categories based on industry, competitive relationships, and supply chain connections. Industries are classified according to the two-digit SIC codes. Competitors are identified using text-based industry classification from the Hoberg-Phillips Data Library, and supply chain relationship data are obtained from the FactSet Revere Supply Chain Relationships database.

Table 1 presents the summary statistics for our sample by the number of CEO outside directorships. The three groups are CEOs with no outside directorships (Outside Directorship=0), CEOs with at least one outside directorship (Outside Directorship>=1), and CEOs with three or more outside directorships (Outside Directorship>=3). For simplicity of exposition, we refer to CEOs with three or more outside directorships as busy CEOs. Our initial analysis reveals that firms whose CEOs hold external directorships exhibit lower average Tobin's q compared to firms without such arrangements, with this effect being more pronounced among busy CEOs. However, this pattern should not be interpreted as evidence that outside directorships are detrimental to the CEO's sending firm performance for at least two reasons. First, Tobin's q exhibits mean-reversion properties.[4] Firms may naturally experience q declines following periods of strong performance, and if superior performance correlates with obtaining external directorships, the observed lower q values may reflect this reversion pattern. Second, as evident from Table 1, these groups exhibit distinct firm characteristics. Compared to firms without external CEO directorships, firms whose CEOs hold external board seats are significantly larger. For instance, firms with at least one external CEO directorship have an average logarithm of assets of 7.546 and a median of 7.602, while firms without external directorships have substantially lower values, with an average logarithm of assets of 6.327 and a median of 6.268. This size differential is particularly significant given the strong negative correlation between firm q and size in our subsequent analysis. Notably, firms with external CEO directorships exhibit stronger operating performance. Those with at least one external

[4]Our unreported analysis indicates that the within-firm autocorrelation coefficient of adjusted Tobin's q across our sample is approximately 0.301.

directorship have an average ROA of 0.017 and a median ROA of 0.062. Companies with busy CEOs have an average ROA of 0.005 and a median ROA of 0.070. Both groups outperform companies without external directorships, which have an average ROA of -0.014 and a median ROA of 0.054. Additionally, firms with CEOs holding external directorships generally exhibit higher leverage ratios, greater levels of intangible assets, and lower R&D intensity. Their CEOs are also more likely to also serve as Chairman and have longer tenures in their roles.

4 Empirical Results

4.1 Determination of outside board seats

In the previous section, we described the summary statistics and initial observations regarding the characteristics of firms with CEOs holding external directorships. Before examining the impact of CEO external directorships on firm performance in greater detail, we first address the question of what determines whether a CEO holds outside directorships.

To address this question, we conduct logit regressions using the binary variable Outside-Board as our dependent variable. We hypothesize that CEOs have a higher probability of securing outside directorships when either their firm or industry demonstrates stronger performance. We therefore include both economic and accounting measures of firm performance in the regressions. Furthermore, we decompose Tobin's q into an individual firm component of adjusted q and an industry median q to examine the relative importance of the two components. We also hypothesize that firm size positively influences outside directorship opportunities, as larger firms typically have greater visibility in the corporate governance market.

Prior literature suggests that CEOs of R&D-intensive firms develop specialized expertise in managing innovation and technological development (e.g., Islam and Zein, 2020). This expertise is particularly valuable for corporate boards seeking strategic guidance on R&D investment decisions and innovation initiatives. Building on this theoretical framework, we hypothesize that higher firm R&D intensity enhances a CEO's prospects for securing outside directorships. To test this relationship empirically, we include R&D expenditure as an explanatory variable in our logit regression specifications.

We also hypothesize that CEOs who serve as Chairman are more likely to secure outside

directorships. This relationship may operate through two mechanisms. First, CEOs with dual roles typically have higher reputation and greater visibility. Second, dual-role CEOs demonstrate greater organizational power (Adams et al., 2005; Lisic et al., 2016), which may facilitate board approval of their external directorship pursuits. We include a Chairman indicator variable to test these mechanisms. To account for geographic factors in the director labor market, we construct LogNfirms as the natural logarithm of the number of firms within a 100-kilometer radius of each focal company. Our model also controls for CEO characteristics through the inclusion of tenure and age variables.

Our empirical results, presented in Table 2, reveal that while the coefficients on adjusted firm-specific Tobin's q demonstrate no statistical significance, the industry median q is positively and statistically significantly associated with the probability of a CEO holding an outside directorship. This finding suggests that industry performance, rather than firm-specific performance, plays a more decisive role in determining CEO outside directorship opportunities. The estimates also confirm our hypothesis that both R&D expenditure and CEO-Chairman duality exhibit positive and statistically significant associations with the probability of a CEO holding an outside directorship.

In Column (2), we also investigate how local firm density moderates the relationship between firm size and CEO outside directorships. We introduce an interaction term between firm size and LogNfirms. The negative and statistically significant coefficient on this interaction term reveals an important nuance in how geographic proximity influences directorship opportunities. While the main effect of LogNfirms shows no significant direct impact on outside directorships, its interaction with firm size suggests that the density of local firms plays a more crucial role for CEOs of smaller firms in securing board appointments. This finding implies that the geographic constraints in the director labor market are not uniform across firm size, with CEOs of smaller firms being more dependent on local opportunities for outside directorships. Column (3) extends our baseline specification by incorporating CEO ownership as an additional explanatory variable. The coefficient on CEO ownership is negative and statistically significant at the 1% level, supporting the hypothesis that CEOs with stronger alignment to firm performance through equity ownership are less inclined to pursue outside directorships.

4.2 Firm performance and CEO outside directorship

Our investigation then examines the impact of CEOs' external board memberships on firm performance, employing fixed-effects regressions across the entire sample. However, measuring this relationship presents methodological challenges. The primary concern is that the number of outside directorships a CEO holds may correlate with their inherent capabilities, which themselves influence firm performance.[5] In other words, unobserved CEO characteristics may simultaneously influence both the likelihood of holding outside board positions and the performance of their primary firm. To mitigate potential endogeneity concerns, our empirical model includes fixed effects at the CEO level. This methodology offers advantages over firm-level fixed effects since it accounts for scenarios where CEOs move between different companies during our study period. Nevertheless, we also include firm fixed effects in our analysis.

Table 3 presents the results of our fixed effects analysis. We use the firm's industry-adjusted Tobin's q as the dependent variable, calculated by subtracting the industry median q from the firm's q for each year. This adjustment inherently controls for aggregate temporal variations in q.[6] We construct a dummy variable, OutsideBoard, that is equal to one if a CEO holds one or more outside directorships in the fiscal year, and zero otherwise. This serves as our key independent variable of interest. In addition, we include a dummy variable BusyCEO, which takes a value of one if a CEO sits on three or more outside boards and zero otherwise, to capture the additional effects of multiple outside directorship. Following previous literature (e.g., Coles et al., 2008), we include firm size, ROA, leverage, percentage of intangible asset, and R&D expenditure as control variables.

Column (1) presents our baseline estimates, and the coefficients on control variables generally align with existing literature. Larger firm size and higher leverage are associated with lower industry-adjusted Tobin's q, as indicated by their negative and statistically significant coefficients. In contrast, ROA and R&D spending are positively related to firm performance, with statistically significant coefficients. The coefficient for intangible assets is not statistically significant in this specification, suggesting no clear relationship with Tobin's q under fixed effects. Our primary variable of interest, OutsideBoard, maintains a positive and statis-

[5] We note here that Fahlenbrach et al. (2010) find little evidence that firms that hire CEO outside directors improves their performance. They conclude that firms hire CEO outside director for certification effect.

[6] We alternatively estimate a model with unadjusted Tobin's q as dependent variable and include industry, year and CEO fixed effects in regressions. We obtain similar results.

tically significant coefficient of 0.024 at the 5% level, even after controlling for both CEO and firm fixed effects. This finding suggests that CEOs who serve on outside boards contribute to improved performance in their primary firms. The positive and significant coefficient on OutsideBoard remains robust to the inclusion of the Chairman variable in Column (2). However, the effect of holding multiple outside directorships is less favorable. In line with Hauser (2018), serving on three or more outside boards may detract from a CEO's ability to focus on their primary firm, potentially leading to reduced firm performance, as indicated by the negative and statistically significant coefficient on BusyCEO.

4.3 Endogenous treatment regression

One approach to address the endogeneity in CEOs holding outside directorships is to use an endogenous treatment-regression model. This approach treats our dataset as a large cross-sectional sample, after controlling for lagged variables, and models firm performance as follows:

$$Firm\ Adj\ q_j = \mathbf{x}_j\beta + \delta OutsideBoard_j + \epsilon_j,$$

$$OutsideBoard_j = \begin{cases} 1, & \text{if } \mathbf{w}_j\gamma + u_j > 0, \\ 0, & \text{otherwise.} \end{cases}$$

The first equation models firm performance as a function of a vector of control variables $\mathbf{x_j}$, the binary treatment variable $OutsideBoard_j$, and an errort term ϵ_j. The second equation represents a first-stage latent choice function that can be estimated with probit regression, which is well-suited for binary choice models.[7] To mitigate concerns about endogeneity, we employ two distinct instruments that are expected to influence the likelihood of CEOs serving on outside directorships while remaining exogenous to firm performance. These instruments focus on the ease of travel between corporate headquarters, a factor that plausibly affects the feasibility of holding outside directorships without directly impacting the focal firm's financial outcomes. The first instrument, LogNlines, is defined as the natural logarithm of one plus the number of direct flight connections between the cities of the CEO's primary firm and the outside board firm. The second instrument, LogNpassengers, is the natural logarithm of one plus the total passenger volume on these routes. Both instruments leverage airline connectivity

[7]See Wooldridge (2010) for a detailed discussion of this methodology.

as a proxy for geographic accessibility, which is a critical determinant of a CEO's ability to serve on distant boards.[8] By focusing on travel logistics, these two instruments satisfy the relevance condition by influencing the decision to hold outside directorships, and the exclusion restriction by having no direct effect on firm performance. We also include the lagged variable of adjusted Tobin's q in the second stage to account for the fact that our data are not purely cross-sectional. Meanwhile, the inclusion of lagged adjusted q ensures that our model not only accounts for persistence in financial outcomes but also mitigates potential biases arising from time-series effects.

We report the results in Table 4. In the first stage of the analysis, a probit regression is employed where the OutsideBoard serves as the dependent variable, using LogNlines and LogNpassengers as IVs alongside other control variables. The second stage of the analysis consists of a probit regression where firm-adjusted Tobin's q is utilized as the dependent variable, incorporating the predicted values from the first stage to correct for endogeneity. In the first stage results, both instruments exhibit statistically significantly positive effects, indicating that a greater number of direct flight connections or higher passenger volumes on these routes significantly increase the likelihood of a CEO holding an outside directorship. In the second stage, the coefficient for OutsideBoard remains consistently positive and significant at least at the 1% level across both IV specifications, with values of 0.336 and 0.334 respectively. These estimates suggest that our results are robust to different IV specifications. The narrow range of the OutsideBoard coefficients across specifications strengthens the stability of our results, thereby enhancing confidence in the our identification strategy and supporting a causal interpretation.

4.4 Evidence from corporate innovation

Our analysis thus far demonstrates that CEOs serving on outside boards enhance their primary firms' performance, as measured by Tobin's q. In this section, we examine their impact on corporate innovation, an important drive of long-term firm competitiveness and value creation. While Tobin's q captures the market's overall assessment of firm value, innovation metrics provide specific insights into firms' technological capabilities and long-term competitive

[8]Similar usage of airline connectivity as an instrumental variable can be found in Bernile et al. (2018) and Bahar et al. (2023).

advantages. Using the patent-level database developed by Kogan et al. (2017), we construct three measures of innovation outcomes: (1) the number of patents granted (Patent), (2) the real value of patents (PatentValue), and (3) the patent citations (PatentCitation). We analyze these innovation outcomes over a three-year forward-looking window from year t+1 to year t+3 as dependent variables. This forward-looking approach captures the lagged effects of CEOs' external board engagements on innovation outcomes, accounting for the time required for innovative activities to materialize into measurable outputs.[9]

Table 5 presents our findings on how CEOs' outside board service influences these innovation metrics. By analyzing innovation outcomes alongside Tobin's q, we can better understand the channels through which CEO external directorships affect firm performance. We find that CEOs' outside board service is positively associated with all measures of innovation, with coefficients on OutsideBoard being statistically significant at the 1% level across all specifications. These findings align with our earlier results from Table 3 and suggest that CEOs who serve on other boards enhance their primary firms' innovation output. The alignment between these sets of results suggests that the increase in firm value may be partly attributable to improved innovation outcomes (Hall et al., 2005). For instance, the higher number of patents reflects greater inventive activity, while the increased real value indicates that these patents are perceived as economically significant. Similarly, the rise in patent citations suggests that the firm's innovations are influential within the technological community, contributing to its reputation and competitive positioning. Collectively, these innovation metrics may explain the positive relationship between outside board service and firm value, as the market likely incorporates expectations of future cash flows from innovative activities into its valuation of Tobin's q.

4.5 Mechanism analysis

Having established that CEOs' external board service enhances their primary firm's performance, we now investigate the underlying economic mechanisms driving this relationship. We conduct our analysis at both the industry and firm levels to provide comprehensive evidence of the channels through which outside directorships create value.

[9]In an unreported analysis, we also consider a one-year forward-looking window for year t+1 as a robustness check, and find the results are qualitatively similar.

4.5.1 Evidence from the industry level

We begin by examining how industry characteristics influence the value-enhancing effects of CEOs' external board service. Our primary hypothesis relates to the learning channel, which posits that value creation should be most pronounced when CEOs are exposed to the greatest diversity of strategic practices and business models. This suggests that outside directorships in different industries should generate higher returns than same-industry positions, as cross-industry exposure provides access to novel approaches that may not be available within the CEO's home industry. To test this hypothesis, we first classify outside directorships based on whether the CEO's primary firm and the firms where they hold board positions operate in the same industry. Specifically, we define industry affiliation using two-digit SIC codes, which provide a standardized framework for distinguishing between same-industry and different-industry directorships. We then examine how this industry classification moderates the relationship between external board service and firm value by creating two dummy variables in a regression of firm adjusted q on them and control variables: OutsideBoard-DifferentIndustry, which equals one if the CEO's outside directorship is in a different industry, and OutsideBoard-SameIndustry, which equals one if the outside directorship is in the same industry.

The results in Column (1) of Table 6 provide strong support for the learning channel hypothesis. We find that the coefficient for OutsideBoard-DifferentIndustry is statistically significant at the 1% level, with a value of 0.029, indicating substantial value creation when CEOs serve on boards in different industries. In contrast, the coefficient for OutsideBoard-SameIndustry is not significantly different from zero. This pattern is consistent with CEOs acquiring valuable strategic insights from exposure to diverse business environments that differ from their home industry context. The lack of benefits from same-industry directorships suggests that similar business models and practices provide limited incremental learning opportunities.

In Column (2), we extend this analysis by classifying outside directorships based on whether the CEO's home firm and the firms where they serve as outside directors are competitors. Specifically, we follow Hoberg and Phillips (2010, 2016) to define the competitive relationship between firms using the Text-based Network Industry Classification (TNIC) score. TNIC scores capture the similarity of firms' business operations through textual analysis of product descriptions, where positive scores indicate competitive overlap, and higher scores reflect

greater similarity. We classify external board directorships into two categories: competitors, defined as firms with a positive TNIC score (denoted OutsideBoard–Competitor), and non-competitors, defined as firms with no TNIC relationship (denoted OutsideBoard–NonCompetitor). The results mirror our industry-level findings in Column (1): the coefficient for OutsideBoard-NonCompetitor is significantly positive at the 1% level, whereas the coefficient for OutsideBoard-Competitor is 0.002, statistically insignificant. This reinforces the learning channel mechanism—when firms are not direct competitors, there is greater opportunity for open knowledge sharing and strategic learning, allowing CEOs to transfer valuable practices to their home firms without competitive concerns.

4.5.2 Evidence from the supply chain

We next examine whether the learning channel is particularly strong when CEOs serve on the boards of firms within their primary firm's supply chain. Under the learning channel, we hypothesize that such directorships are uniquely valuable because they expose CEOs to rich, operationally relevant insights—such as market conditions, customer demand patterns, and supply chain dynamics—that can be directly incorporated into their own firm's strategic decision-making. Supply chain relationships offer particularly fertile ground for learning because operational interdependencies generate both privileged access to strategically important information and strong incentives for reciprocal knowledge sharing between partner firms (e.g., Afrin et al., 2025).

Guided by this reasoning, we investigate whether the benefits of outside directorships are amplified when CEOs serve on the boards of suppliers or customers of their primary firms. This setting enables us to test whether supply chain-related board memberships enhance CEOs' access to timely and granular information and thus strengthen the value-creation potential of external board service. We classify outside directorships based on whether the outside firm is a supply chain partner of the CEO's primary firm, defined as a firm that serves as either a supplier or a customer. Using this definition, we create four dummy variables. OutsideBoard–SupplyChain equals one if the CEO holds an outside directorship at a supply chain partner (whether a supplier or customer), and zero otherwise. OutsideBoard–SupplierorCustomer equals one if the outside firm is either a supplier or a customer, but not both. OutsideBoard–Both equals one if the outside firm is both a supplier and a

customer. Finally, OutsideBoard–NonSupplyChain refers to cases where the outside firm has no supply chain relationship with the focal firm.

Column (1) of Table 7 analyzes the impact of outside directorships at supply chain partners versus non-supply chain firms. We observe that the coefficient for OutsideBoard–SupplyChain is significantly positive at the 5% level, while that for OutsideBoard–NonSupplyChain is statistically insignificant. This contrast indicates that the value-enhancing effects of external board service are concentrated in directorships at supply chain partners, consistent with the learning channel. In Column (2), we disaggregate the supply chain relationships by including OutsideBoard–SupplierorCustomer, OutsideBoard–Both, and OutsideBoard–NonSupplyChain in the regression to provide a more detailed analysis. The result shows that the coefficient for OutsideBoard–Both is 0.052, which is significantly positive at the 1% level, indicating a highly significant and substantial positive effect on firm value. The economic intuition behind these results is compelling. When CEOs hold board positions at companies within their supply chain, they gain access to important information that is often not publicly available. This helps reduce information asymmetry and develop better mutual understanding between the top management teams of the two firms (Barker et al., 2024). This, in turn, supports joint decision-making, strengthens operational and strategic alignment, and helps identify resource complementarities that can generate economic value (Ireland and Webb, 2007). The particularly strong impact of OutsideBoard–Both suggests that two-way relationships—where a firm is both a supplier and a customer—create particularly strong opportunities for organizational learning. Such positions allow CEOs to observe and engage with both upstream and downstream processes, fostering a comprehensive understanding of the supply chain's strategic and operational interdependencies. Through this experience, CEOs can synthesize information across functions, identify patterns in demand–supply coordination, and anticipate potential frictions or opportunities. The knowledge gained through this process supports the formulation of integrated supply agreements, the pursuit of joint product development initiatives, and the streamlining of logistics, ultimately converting accumulated learning into measurable performance gains. Supporting this interpretation, data show that among CEOs who sit on the board of a supply chain partner, approximately 55% hold positions on both sides—supplier and customer—rather than only one. In contrast, the lack of significant effects for OutsideBoard–SupplierorCustomer suggests that one-way relationships offer more limited learning

opportunities and therefore exert less strategic benefits.

4.5.3 Impact of direct flight availability and supply chain relationship on CEO outside directorships

Our analysis demonstrates that CEOs serving on outside boards generate performance benefits for their primary firms through knowledge and experience spillovers, consistent with the learning channel. Prior research also show that logistical conveniences significantly increase the likelihood of CEOs accepting outside directorships. For instance, Fahlenbrach et al. (2010) find that CEOs are more likely to join boards of firms located geographically closer to their own firm. This finding may extend to the availability of direct flights, as such connections could further facilitate CEOs' willingness to serve on external boards. Given the strategic value of supply chain directorships for facilitating organizational learning, this section examines whether the strategic importance of supply chain directorships can outweigh the logistical barriers posed by the absence of direct flights.

To explore this, we pair each sample firm one-by-one with all listed companies to obtain location information for both firms. We then construct two dummy variables: DirectFlight, which equals one if a direct flight exists between the cities of the two firms and zero otherwise; and SC, which equals one if the two firms have a supply chain relationship (e.g., supplier or customer) and zero otherwise. We interact these variables and regress a dummy variable indicating whether the CEO holds an outside directorship (OutsideBoard) on them, along with control variables. This specification allows us to assess whether the learning potential from supply chain relationships offsets the travel cost disadvantages of no direct flight.

We report the empirical results in Table 8. We find a significant positive coefficient on DirectFlight, indicating that the absence of direct flights reduces the likelihood of outside directorships, highlighting a logistical barrier. This is consistent with our expectation that the availability of direct flights could facilitate CEOs' willingness to serve on outside boards. The significant negative coefficient on the interaction term DirectFlight $\times$ SC suggests that the incremental effect of supply chain relationships mitigates the presence of a direct flight on the likelihood of outside directorships, implying that when a supply chain relationship exists, the importance of direct flights diminishes, as CEOs are more willing to accept these strategically valuable roles despite logistical inconveniences. This finding further highlights the

role of knowledge and experience gained from supply chain directorships, as CEOs prioritize the opportunity to acquire firm-specific insights from their suppliers and customers over the convenience of travel.

4.6 First outside directorship

4.6.1 DID with matched sample at the CEO-level

Having investigated the full sample, in this section we will narrow down and focus on CEOs gain their first outside board seat to establish a causal relationship. In particular, we select CEOs with no prior outside directorships who receive their first external board appointment and have at least two years of information available before and after the event. This sample allows us to isolate the effect of the initial outside directorship, select comparable control CEOs, and obtain precise estimates of performance changes. It also enables us to examine how the characteristics of the outside board influence firm outcomes. If CEO first outside directorship is beneficial to their own firm, we expect this effect to be evident in this carefully defined sample.

We employ a DID framework with a matching methodology to ensure causal inference. Specifically, we require firms to have at least two years of information prior to and after the CEO's first outside directorship be included in the sample. This requirement may lead to conservative estimates of the benefits of outside directorships, particularly since newly appointed CEOs, who might benefit most from outside board experience, are potentially excluded from our analysis due to insufficient pre-appointment data. Our treatment sample comprises CEOs receiving their first outside directorship. We identify 2,501 potential treatment firms in our sample. Our control sample is drawn from the pool of CEOs holds no outside directorship during the whole sample period. From this pool, we match each treatment CEO with a control CEO from the same year of the outside directorship appointment.

A crucial factor in the matching strategy is the balance of covariates between treatment and control CEOs. To achieve this, we combine a Coarsened Exact Matching (CEM, Iacus et al., 2012) method with Propensity Score Matching (PSM). The summary statistics presented in Table 1 reveal that firm size represents one of the most substantial differences between companies whose CEOs hold outside directorships and those whose CEOs do not. To address

this disparity, we employ a two-stage matching approach. First, we select firms whose CEOs have no prior outside directorships and receive their first external board appointment as the treatment group. We then use CEM to ensure that treatment and control firms fall within the same size strata. Following this initial matching, we apply PSM to the pre-processed data, incorporating both firm and CEO characteristics as covariates. We replace the q measures with the average Tobin's q in the previous two years since we focus on before-and-after treatment comparison. This procedure generates fewer matched pairs (531), but covariates between treatment and control firms are well balanced, as shown in Panel B of Table 9. The mean values of most variables are very similar between the treatment and control samples, and their variance ratios are close to one. Panel A of Appendix Table A outlines the sample selection process in detail.

We estimate the DID for the matched sample using two years before and two years after the CEO obtains their first outside directorship. We exclude the appointment year from our analysis, though including it would strengthen our results. By focusing on a relatively brief time period around the appointment, we enhance the reliability of our DIDs estimation, consistent with Bertrand et al. (2004). This sample selection approach, combined with the exclusion of the appointment year, likely produces conservative estimates of performance improvements. The benefits that CEOs derive from their first outside board experience may require multiple years to be reflected in the performance of their primary firms. Since the treatment and control firms are already matched by year and industry, we use Tobin's q as our main outcome variable.

Following Baker et al. (2022), we perform a Cohort DID regression to mitigate potential bias from concurrent trends that could confound our treatment effect estimation. Panel A of Table 9 shows that the interaction term Treat $\times$ Post produces a statistically significant positive coefficient. This finding demonstrates that firms experience meaningful performance improvements, as measured by Tobin's q, following their CEOs' initial appointments to external boards. These results provide causal evidence supporting our full sample analysis in Table 3.

4.6.2 DID with matched sample at the firm-level

In this section, we shift our analysis from the CEO-level to a firm-level analysis, examining firms that, for the first time, have a CEO who serves on an external board. This firm-level analysis provides an important complement to our CEO-level results by addressing a different research question: does the first instance of having any CEO serve on an external board create value for a firm? This distinction is crucial because it separates the learning effects specific to individual CEOs from potential firm-level benefits that might accrue regardless of which particular CEO serves on the external board. The theoretical motivation for this firm-level analysis stems from the possibility that external board connections create value through channels beyond individual CEO learning. For instance, the firm might benefit from reputational effects, enhanced visibility in the corporate governance market, or access to business networks that persist beyond any particular CEO's tenure. Alternatively, firms that have never had a CEO serve on an external board might systematically differ from those that have, and these differences could drive performance variations independent of the specific learning benefits we identify at the CEO level.

Our empirical design requires firms to have at least two years of information before and after the CEO's outside directorship be included in the sample. We identify 1,771 potential treatment firms, defined as firms whose CEOs serve on an outside board for the first time in the firm's history during the sample period. This definition ensures we capture the firm's initial exposure to external board networks rather than simply a change in CEO. The control group consists of firms whose CEOs hold no outside directorships during our entire sample period, providing a clean comparison group of firms that never experience this type of external board exposure. We also match each treatment firm with a control firm by the year of the external board appointment to account for time-specific effects.

Using the same matching methodology as the CEO-level analysis—detailed in Panel B of Appendix Table A—we achieve covariate balance, as shown in Panel B of Table 10. We find that the treatment and control groups have similar characteristics, indicating effective matching. Panel A reports Cohort DID estimates for the firm-level analysis. We find that the coefficient for the interaction term Treat $\times$ Post is positive but insignificant, suggesting no measurable improvement in firm value when a firm first has a CEO serve on an external board. Unlike the CEO-level analysis in Section 4.6.1, where CEOs' learning from their first

outside directorship drives firm value increases, the firm-level results suggest that when a firm first has a CEO on an external board, the CEO learns little, leading to no significant performance gains. The difference between our CEO-level and firm-level results indicates that the value creation documented in our main analysis arises from the development of individual CEOs' human capital, rather than from firm-wide network effects. This pattern is consistent with the learning channel, as it shows that the benefits accrue to CEOs who personally gain external board experience, rather than to firms solely because their CEO holds an external directorship.

4.6.3 Cross section of the matched sample and possible channels

After establishing the causal link between external board memberships and company performance, as well as the underlying mechanisms, we further verify this relationship through analyses across different subgroups of firms. We divide our sample of firms whose CEOs receive first-time outside board appointments based on four characteristics measured at the time of appointment: CEO ownership, CEO power, CEO tenure, and board size of receiving firms. These characteristics may influence how much CEOs learn from their external board roles and apply insights to enhance firm performance. For each characteristic, we divide the sample into two groups based on whether the value is above or below the sample median at the year of gaining directorships. We then apply the DID framework at the CEO-level with observations two years before and two years after gaining the first directorship, excluding the event year.[10] We report the results in Table 11.

The analysis reveals distinct patterns across these characteristics. In CEO ownership subsamples, firms with CEOs holding ownership stakes show a large and statistically significant positive effect at the 1% level, while those with CEOs lacking ownership exhibit a negiligible effect. In the CEO power subsamples, while firms with high power CEOs show a positive and significant effect at the 5% level, those with low power CEOs demonstrate a smaller and insignificant positive effect. The tenure analysis also achieves particularly informative results. CEOs with shorter tenure at the time of their first outside directorship exhibit a large and significant effect at the 5% level, whereas those with longer tenure show no significant effect. This

[10]Since we only have four years per event in the fixed effect regression, inclusion of variables such as CEO tenure which correlates with years, will take most of the regression power away.

pattern suggests that external directorships are most beneficial for CEOs with ownership, high power or short tenure, as these executives may be more receptive to adopting new practices and implementing organizational changes based on their board service experiences. Board size analysis shows that the positive effects are concentrated in firms with large boards, where the coefficient is significant at the 1% level. Firms with smaller boards display only a marginally significant effect. These results indicate that larger boards facilitate better implementation of knowledge gained through external directorships, likely due to their broader range of expertise and professional networks. The enhanced advisory capacity of larger boards appears to help CEOs more effectively adapt and apply insights from their outside board service to improve their firms' operations.

4.7 The role of busy CEO

Chen and Guay (2020) show that busy directors serving on multiple boards receive lower shareholder satisfaction compared to those who do not, indicating that the costs of busy directors outweigh their benefits. In Table 3, we find consistent evidence that serving on three or more external boards negatively affects the performance of the CEO's primary firm. Following the global financial crisis, companies increasingly began restricting their CEOs' external board commitments. Spencer Stuart reports that by 2014, 75% of S&P 500 boards had implemented restrictions on additional corporate directorships for board members, up from 55% in 2006. The proportion of CEOs serving on two or three outside boards decreased from 16% in 2009 to 9% in 2014.

In Table 12, we formally examine the effectiveness of these outside board seat limitations on firm performance. We identify instances where CEO outside directorship reduces from busy status (directorship>=3) to normal status (directorship<3) during the period between financial year 2003 and 2021 (since we require two-year post-event observations). We identify 23 such cases. We then run the fixed effect model with two pre-event and two post-event years of data. Although many in the industry argue that board seat limitation is a response to the financial crisis and increased management scrutiny, the exact exogeneity of the seat reduction is difficult to establish. Our result should be interpreted with this caveat in mind. The result in Table 12 is consistent with Chen and Guay (2020) that the recent efforts to limit CEO outside board seats have been value enhancing. OutsideBoardReduction, which takes a value

of one post-event and zero pre-event, has a coefficient of 0.297 and is highly significant at the 1% level.

These findings highlight the potential risks of overextension among corporate leaders. To investigate this issue more thoroughly, this section examines the specific impact of busy CEOs on firm performance, aiming to analyze the underlying mechanisms driving this relationship. In Table 13, we identify the determinants of CEO busyness, defined as serving on three or more external corporate boards. The results reveal that both firm-specific and industry-level performance measures are negatively associated with CEO busyness. The coefficients for firm-adjusted q and industry median q remain negative and statistically significant across most specifications, suggesting that CEOs from underperforming companies and industries have a higher tendency to take on an excessive number of board appointments.

Both company and CEO characteristics influence excessive multiple board service. Larger companies, as well as those with more intangible assets and higher R&D spending are more likely to have CEOs serving on an excessive number of boards, while higher company debt levels show the opposite relationship, although this relationship is not statistically significant. Among CEO characteristics, older CEOs and those serving as board chairman tend to hold more outside directorships that lead to excessive board commitments, while longer-tenured CEOs serve on fewer boards. However, the tenure effects become insignificant when accounting for CEO ownership.

5 Conclusion

The demand for CEO outside directorships has increased in the post-SOX era, while firms increasingly restrict such activities. Our evidence suggests that CEO outside directorships generally create value for their home firms, subject to important governance conditions. The value gains are concentrated among CEOs who hold a moderate number of external seats—typically one or two—while heavier outside board commitments appear to reduce these benefits, suggesting the potential costs of CEO overextension.

Our findings are consistent with a learning mechanism whereby CEOs gain valuable strategic insights through directorships at firms in different industries, non-competitors, and supply chain partners. Firms in different industries offer exposure to varied business contexts, while

non-competing firms facilitate knowledge sharing without competitive constraints. Board roles in supply chain firms enable CEOs to observe upstream and downstream operations, enhancing their understanding of strategic and operational interconnections. We further demonstrate that CEOs prioritize opportunities to obtain firm-specific insights over travel convenience considerations. Finally, we demonstrate that the benefits primarily arise from CEOs' personal learning through outside board experience, rather than from firm-wide network effects.

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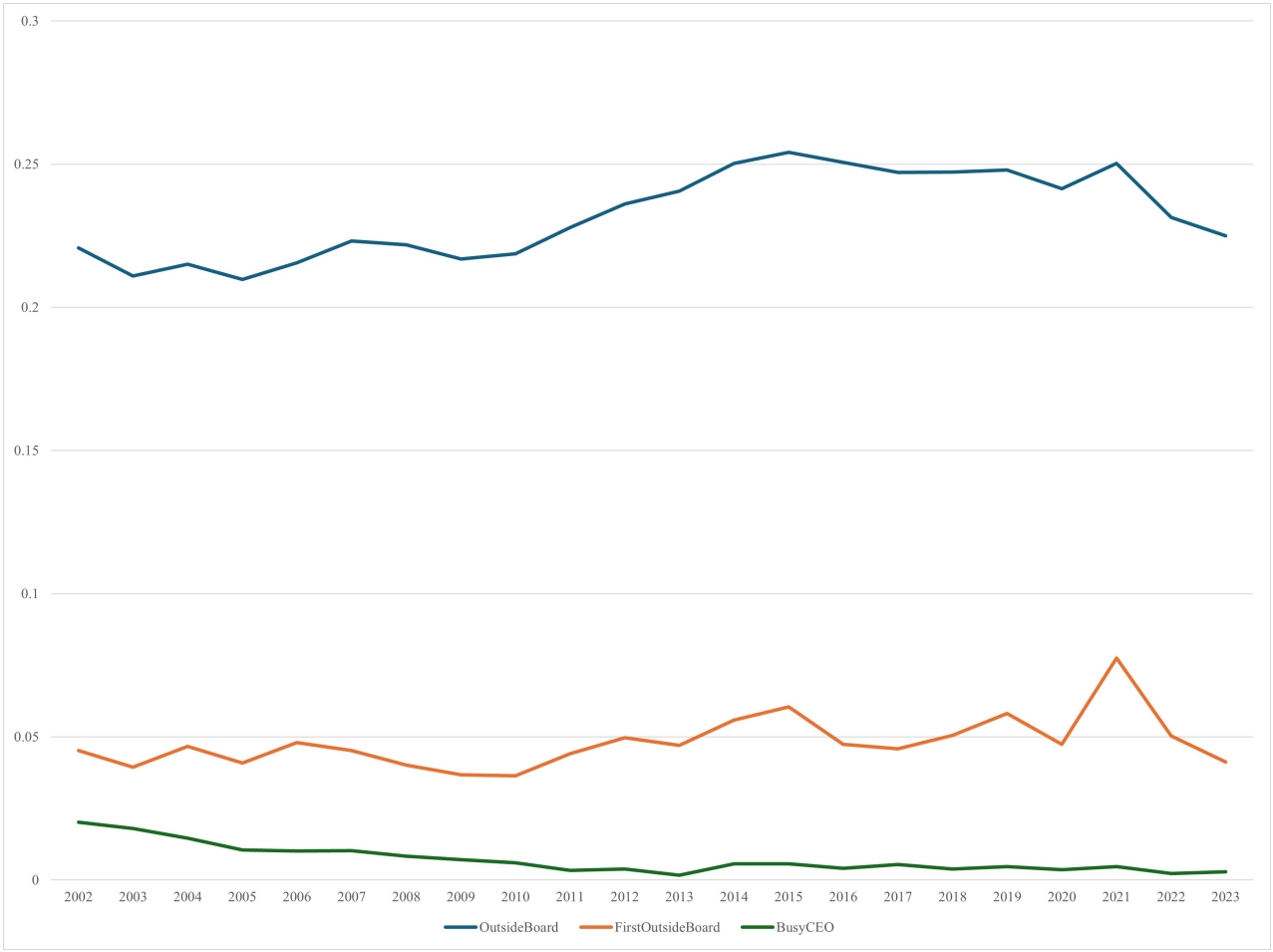

Figure 1: **Proportion of CEOs Holding Outside Directorships, First-Time Outside Directorships, and Busy CEOs**
This figure shows the average values of OutsideBoard, FirstOutsideBoard, and BusyCEO by fiscal year from 2002 to 2023. OutsideBoard is a dummy variable that equals to one if a CEO holds an outside directorship and zero otherwise. FirstOutsideBoard is a dummy variable that equals to one if a CEO holds their first outside directorship and zero otherwise. BusyCEO is a dummy variable that equals to one if a CEO holds three or more directorships and zero otherwise.

Table 1: **Summary Statistics**
This table reports the summary statistics for key CEO and firm characteristics, grouped by the number of CEO outside directorships. The left panel shows results for firms whose CEOs hold no outside directorships, the middle panel for firms whose CEOs hold at least one outside directorship, and the right panel for firms whose CEOs hold three or more outside directorships. Firm Adj. q is Tobin's q minus the industry median Tobin's q for the year. Firm Size is logarithm of total assets. ROA is return on assets. Leverage is the firm leverage ratio. Intangible Asset is the proportion of intangible assets to total assets. R&D is research and development expense normalized by total assets. Chairman is a dummy variable equals to one if a CEO also holds the title of "Chairman", and zero otherwise. CEO Tenure is the number of years as CEO. For detailed variable definitions, see Appendix A.

Outside Directorship	0				>=1				>=3			
	N	Mean	Std	Median	N	Mean	Std	Median	N	Mean	Std	Median
Tobin's q	32,257	1.862	0.989	1.561	10,986	1.828	0.897	1.563	310	1.716	0.790	1.454
Firm Adj. q	32,257	0.255	0.879	0.028	10,986	0.225	0.796	0.041	310	0.177	0.696	0.027
Firm Size	32,257	6.327	1.881	6.268	10,986	7.546	1.758	7.602	310	7.409	1.767	7.553
ROA	32,257	-0.014	0.294	0.054	10,986	0.017	0.228	0.062	310	0.005	0.318	0.070
Leverage	32,257	0.237	0.235	0.192	10,986	0.269	0.217	0.244	310	0.247	0.187	0.226
Intangible Asset	32,257	0.753	0.240	0.841	10,986	0.760	0.217	0.830	310	0.777	0.205	0.846
R & D	32,257	0.073	0.144	0.006	10,986	0.062	0.127	0.012	310	0.070	0.161	0.006
Chairman	32,257	0.420	0.494	0.000	10,986	0.526	0.499	1.000	310	0.735	0.442	1.000
CEO Tenure	32,257	4.905	4.362	3.586	10,986	5.314	3.821	4.553	310	4.138	3.073	3.003

Table 2: **Determination of Outside Board Seats**
This table reports the results of logistic regressions examining CEO outside directorships. The dependent variable is OutsideBoard, which is a dummy variable that equals to one if a CEO holds outside directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

OutsideBoard	(1)	(2)	(3)
Firm Adj. q	-0.007	-0.007	-0.011
	(0.009)	(0.009)	(0.010)
Industry Median q	0.044**	0.046**	0.068***
	(0.021)	(0.021)	(0.024)
Firm Size	0.233***	0.232***	0.231***
	(0.004)	(0.004)	(0.005)
ROA	-0.036	-0.033	-0.026
	(0.037)	(0.037)	(0.042)
Leverage	-0.057*	-0.061*	-0.050
	(0.032)	(0.032)	(0.037)
Intangible Asset	0.367***	0.365***	0.379***
	(0.033)	(0.033)	(0.038)
R & D	0.614***	0.598***	0.633***
	(0.080)	(0.080)	(0.091)
LogNfirms	-0.001	0.005	-0.001
	(0.005)	(0.005)	(0.006)
CEO Tenure	-0.004**	-0.004**	0.007***
	(0.002)	(0.002)	(0.002)
CEOage	0.009***	0.009***	0.007***
	(0.001)	(0.001)	(0.001)
Chairman	0.228***	0.227***	0.139***
	(0.014)	(0.014)	(0.018)
Firm Size × LogNfirms		-0.007***	
		(0.002)	
CEO Ownership			-8.047***
			(1.428)
Constant	-3.246***	-3.259***	-3.221***
	(0.070)	(0.070)	(0.083)
Observations	43,203	43,203	31,549
Pseudo R-squared	0.085	0.085	0.079

Table 3: **Firm Performance and CEO Outside Directorship: Fixed Effects Regressions**

This table reports the results of fixed effects regressions of firm performance. The dependent variable is firm adjusted q. OutsideBoard is a dummy variable that equals to one if a CEO holds outside directorship, and zero otherwise. BusyCEO is a dummy variable that equals to one if a CEO holds three or more directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: Firm Adj. q	(1)	(2)
OutsideBoard	0.024**	0.022**
	(0.011)	(0.011)
BusyCEO	-0.085**	-0.083**
	(0.041)	(0.041)
Firm Size	-0.193***	-0.196***
	(0.009)	(0.010)
ROA	0.461***	0.460***
	(0.042)	(0.042)
Leverage	-0.160***	-0.159***
	(0.032)	(0.032)
Intangible Asset	-0.037	-0.037
	(0.057)	(0.057)
R & D	1.559***	1.555***
	(0.110)	(0.110)
Chairman		0.039***
		(0.013)
Constant	1.484***	1.488***
	(0.076)	(0.076)
CEO FE	Yes	Yes
Firm FE	Yes	Yes
F statistics	137.700	120.472
Observations	43,243	43,243
Adjusted R-squared	0.704	0.704

Table 4: **Firm Performance and Outside Directorship: Endogenous Treatment Regression**

This table reports the results of endogenous treatment regressions on firm performance. The dependent variable in the first stage regression is OutsideBoard, which is a dummy variable that equals to one if a CEO holds outside directorship, and zero otherwise. The dependent variable in the second stage regression is firm adjusted q. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

	IV: LogNlines		IV: LogNpassengers	
Dependent variable	OutsideBoard	Firm Adj. q	OutsideBoard	Firm Adj. q
LogNlines	0.004**			
	(0.002)			
LogNpassengers			0.002**	
			(0.001)	
OutsideBoard		0.336***		0.334***
		(0.074)		(0.074)
Lag Adj. q		0.788***		0.788***
		(0.003)		(0.003)
Firm Size	0.230***	-0.025***	0.230***	-0.025***
	(0.004)	(0.005)	(0.004)	(0.005)
ROA	-0.085*	0.208***	-0.085*	0.208***
	(0.049)	(0.017)	(0.049)	(0.017)
Leverage	-0.039	-0.031***	-0.039	-0.031***
	(0.034)	(0.012)	(0.034)	(0.012)
Intangible Asset	0.373***	-0.023	0.372***	-0.023
	(0.034)	(0.014)	(0.034)	(0.014)
R & D	0.666***	0.478***	0.665***	0.479***
	(0.085)	(0.034)	(0.085)	(0.034)
Chairman	0.237***	-0.033***	0.237***	-0.033***
	(0.015)	(0.008)	(0.015)	(0.008)
Constant	-2.677***	0.116***	-2.677***	0.115***
	(0.045)	(0.029)	(0.045)	(0.029)
hazard lambda		-0.193***		-0.192***
		(0.043)		(0.044)
Observations		37,403		37,403
Wald chi2		83444.875		83467.164

Table 5: **Firm Innovation and CEO Outside Directorship**
This table reports the regression results analyzing firm innovation. The dependent variables comprise various measures of innovative activity at the firm level, assessed over a three-year forward window (t+1 to t+3): patent quantity (Patent), patent value (PatentValue), and patent citation counts (PatentCitation). OutsideBoard is a dummy variable that equals to one if a CEO holds outside directorship, and zero otherwise. BusyCEO is a dummy variable that equals to one if a CEO holds three or more directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

	(1)	(2)	(3)
Dependent variables	Patent	PatentValue	PatentCitation
OutsideBoard	0.336***	0.458***	0.556***
	(0.039)	(0.055)	(0.065)
BusyCEO	-0.396**	-0.420	-0.142
	(0.185)	(0.265)	(0.322)
Firm Size	0.760***	1.323***	0.989***
	(0.011)	(0.015)	(0.017)
ROA	2.141***	3.159***	3.708***
	(0.106)	(0.152)	(0.184)
Leverage	-1.881***	-2.584***	-3.445***
	(0.085)	(0.123)	(0.146)
Intangible Asset	3.654***	5.019***	5.674***
	(0.081)	(0.119)	(0.137)
R & D	10.103***	15.127***	15.731***
	(0.206)	(0.292)	(0.342)
Chairman	0.188***	0.281***	0.519***
	(0.033)	(0.047)	(0.056)
Constant	-8.220***	-13.120***	-11.890***
	(0.104)	(0.144)	(0.170)
F statistics	1279.922	1702.088	1101.168
Observations	37,051	37,051	37,051
Pseudo R-squared	0.091	0.096	0.068

Table 6: **Firm Performance and Industry Characteristics of CEO Outside Directorships**

This table reports fixed effects regression results examining the association between firm performance and the industry affiliation of CEOs' outside directorships. The dependent variable is firm adjusted q. In Column (1), OutsideBoard-DifferentIndustry and OutsideBoard-SameIndustry are dummy variables indicating whether the CEO's outside directorship is in a different or the same industry, respectively. In Column (2), OutsideBoard-NonCompetitor and OutsideBoard-Competitor classify the CEO's outside directorships based on whether the outside firm is a product market competitor. BusyCEO is a dummy variable that equals to one if a CEO holds three or more directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: Firm Adj. q	(1)	(2)
OutsideBoard-DifferentIndustry	0.029***	
	(0.010)	
OutsideBoard-SameIndustry	-0.001	
	(0.022)	
OutsideBoard-NonCompetitor		0.030***
		(0.010)
OutsideBoard-Competitor		0.002
		(0.019)
BusyCEO	-0.082**	-0.081*
	(0.041)	(0.041)
Firm Size	-0.196***	-0.196***
	(0.010)	(0.010)
ROA	0.461***	0.460***
	(0.042)	(0.042)
Leverage	-0.159***	-0.159***
	(0.032)	(0.032)
Intangible Asset	-0.037	-0.037
	(0.057)	(0.057)
R & D	1.554***	1.554***
	(0.110)	(0.110)
Chairman	0.038***	0.038***
	(0.013)	(0.013)
Constant	1.489***	1.489***
	(0.076)	(0.076)
CEO FE	Yes	Yes
Firm FE	Yes	Yes
F statistics	107.259	107.382
Observations	43,243	43,243
Adjusted R-squared	0.704	0.704

Table 7: **Firm Performance and Supply Chain Relationships of CEO Outside Directorships**

This table reports fixed effects regression results examining the association between firm performance and the supply chain relationships of CEOs' outside directorships. The dependent variable is firm-adjusted q. In Column (1), OutsideBoard–SupplyChain is a dummy variable that equals to one if a CEO holds an outside directorship at any supply chain partner, and zero otherwise. Column (2) distinguishes among OutsideBoard–SupplierorCustomer, OutsideBoard–Both (i.e., the outside firm is both a supplier and a customer), and OutsideBoard–NonSupplyChain. BusyCEO is a dummy variable that equals to one if a CEO holds three or more directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: Firm Adj. q	(1)	(2)
OutsideBoard-SupplyChain	0.028**	
	(0.012)	
OutsideBoard-SupplierorCustomer		0.005
		(0.014)
OutsideBoard-Both		0.052***
		(0.014)
OutsideBoard-NonSupplyChain	0.012	0.009
	(0.014)	(0.015)
BusyCEO	-0.083**	-0.084**
	(0.041)	(0.041)
Firm Size	-0.197***	-0.197***
	(0.010)	(0.010)
ROA	0.460***	0.460***
	(0.042)	(0.042)
Leverage	-0.160***	-0.160***
	(0.032)	(0.032)
Intangible Asset	-0.037	-0.037
	(0.057)	(0.057)
R & D	1.555***	1.554***
	(0.110)	(0.110)
Chairman	0.038***	0.038***
	(0.013)	(0.013)
Constant	1.493***	1.496***
	(0.076)	(0.076)
CEO FE	Yes	Yes
Firm FE	Yes	Yes
F statistics	107.176	97.845
Observations	43,243	43,243
Adjusted R-squared	0.704	0.704

Table 8: **Effect of Direct Flight Availability and Supply Chain Relationship on CEO Outside Directorships**

This table presents regression results examining how supply chain relationships and direct flight availability affect the likelihood of a CEO holding an outside directorship. The dependent variable is a dummy variable indicating whether the CEO holds an outside directorship. DirectFlight is a dummy variable that equals to one if a direct flight exists between cities of the firm and the firm of the potential outside directorship, and zero otherwise. SC is a dummy variable equals to one if the CEO sits on the board of a supply chain company, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: OutsideBoard	(1)
DirectFlight × SC	-0.086***
	(0.011)
DirectFlight	0.019***
	(0.000)
SC	0.194***
	(0.005)
Firm Size	0.231***
	(0.000)
ROA	-0.039***
	(0.001)
Leverage	-0.056***
	(0.001)
Intangible Asset	0.383***
	(0.001)
R & D	0.650***
	(0.002)
CEO Tenure	-0.005***
	(0.000)
CEOage	0.009***
	(0.000)
Chairman	0.226***
	(0.000)
Constant	-3.192***
	(0.001)
Observations	99,367,060
Pseudo R-squared	0.085

Table 9: **Firm Performance and CEO Outside Directorship: Difference-in-Differences Analysis**

Panel A reports the results of a difference-in-differences (DID) analysis assessing the impact of CEO outside directorships on firm performance, measured by firm-adjusted q. The interaction Treat × Post indicates treated firms after CEOs obtain outside board seats. Panel B reports sample balance between the treatment and control groups based on pre-treatment firm characteristics. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Panel A: DID	
Dep: Firm Adj. q	(1)
Treat × Post	0.036**
	(0.017)
Firm Size	-0.171***
	(0.033)
ROA	0.558***
	(0.172)
Leverage	-0.342***
	(0.102)
Intangible Asset	-0.351*
	(0.187)
R & D	2.026***
	(0.324)
Chairman	-0.029
	(0.034)
Constant	1.793***
	(0.267)
Firm FE	Yes
CEO FE	Yes
F statistics	19.156
Observations	4,248
Adjusted R-squared	0.791

Panel B: Sample Balance			
	Treat	Control	MeanDiff
PastAverageQ	1.845	1.860	-0.015
Firm Size	7.544	7.602	-0.058
ROA	0.048	0.055	-0.007
Leverage	0.267	0.264	0.003
Intangible Asset	0.764	0.763	0.001
R & D	0.050	0.048	0.002
Chairman	0.460	0.460	0.000

Table 10: **Firm Performance and CEO's First Outside Directorship: Firm-Level Difference-in-Differences Analysis**
Panel A reports the results of a difference-in-differences (DID) analysis assessing the impact of a CEO's first outside directorship at the firm-level on firm performance, measured by firm-adjusted q. The interaction Treat × Post is an interaction term that equals to one for firm-year observations after the CEO receives their first outside board appointment (treatment group) and zero otherwise (control group). Panel B reports sample balance between the treatment and control groups based on pre-treatment firm characteristics. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Panel A: DID	
Dep: Firm Adj. q	(1)
Treat × Post	0.013
	(0.019)
Firm Size	-0.168***
	(0.040)
ROA	0.605**
	(0.255)
Leverage	-0.436***
	(0.140)
Intangible Asset	-0.402*
	(0.223)
R & D	2.289***
	(0.452)
Chairman	-0.028
	(0.039)
Constant	1.717***
	(0.313)
CEO FE	Yes
Firm FE	Yes
F statistics	13.218
Observations	2,560
Adjusted R-squared	0.795

Panel B: Sample Balance			
	Treat	Control	MeanDiff
PastAverageQ	1.763	1.730	0.033
Firm Size	7.358	7.363	-0.005
ROA	0.059	0.071	-0.012
Leverage	0.232	0.236	-0.004
Intangible Asset	0.751	0.761	-0.010
R & D	0.046	0.041	0.005
Chairman	0.556	0.544	0.012

Table 11: **Heterogeneous Effects of CEO's First Outside Directorship on Firm Performance: Difference-in-Differences Analysis**

This table reports the results of a difference-in-differences (DID) analysis assessing the impact of CEO outside directorships on firm performance varies across different CEO and board characteristics. Columns (1)–(2) split the sample by CEO ownership, (3)–(4) by CEO power, (5)–(6) by CEO tenure, and (7)–(8) by board size. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: Firm Adj. q	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CEO ownership		CEO power		CEO tenure		Board size	
	With	Without	Not Chairman	Chairman	High	Low	Large	Small
Treat × Post	0.079***	0.021	0.032	0.048**	0.029	0.061**	0.053***	0.048*
	(0.026)	(0.022)	(0.025)	(0.022)	(0.024)	(0.024)	(0.020)	(0.028)
Firm Size	-0.217***	-0.219***	-0.186***	-0.218***	-0.177***	-0.276***	-0.178***	-0.313***
	(0.056)	(0.049)	(0.048)	(0.055)	(0.046)	(0.054)	(0.042)	(0.058)
ROA	0.795***	0.483**	0.512**	0.569**	0.824***	0.451*	0.503**	0.582**
	(0.249)	(0.204)	(0.232)	(0.250)	(0.201)	(0.239)	(0.241)	(0.244)
Leverage	-0.501**	-0.198	-0.415***	-0.235	-0.452***	-0.209	-0.251*	-0.348**
	(0.195)	(0.127)	(0.137)	(0.161)	(0.136)	(0.147)	(0.148)	(0.148)
Intangible Asset	-0.572*	-0.082	-0.823***	0.191	-0.336	-0.171	0.018	-0.568**
	(0.306)	(0.250)	(0.231)	(0.280)	(0.278)	(0.271)	(0.294)	(0.254)
R & D	2.556***	1.734***	2.019***	2.071***	1.859***	2.122***	1.923***	2.035***
	(0.541)	(0.408)	(0.436)	(0.473)	(0.414)	(0.503)	(0.358)	(0.546)
Chairman	0.083	-0.128***			-0.155**	-0.099	-0.077*	-0.128**
	(0.090)	(0.044)			(0.063)	(0.067)	(0.042)	(0.062)
Constant	2.223***	1.985***	2.262***	1.723***	1.909***	2.455***	1.714***	2.841***
	(0.434)	(0.384)	(0.374)	(0.444)	(0.386)	(0.412)	(0.399)	(0.372)
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F statistics	9.975	13.149	14.612	11.597	13.327	12.857	13.305	15.554
Observations	1,416	2,832	2,296	1,952	2,144	2,104	2,128	2,120
Adjusted R-squared	0.796	0.794	0.773	0.817	0.800	0.797	0.836	0.762

Table 12: **Firm Performance and Reduction in CEO Outside Busyness**
This table reports the results of fixed-effect regressions analyzing firm performance for firms whose CEOs reduce the number of outside directorships, transitioning from busy to non-busy status. We include data from two years before and two years after the reduction, excluding the event year. The dependent variable is firm adjusted q. OutsideBoardReduction is a dummy variable that equals to one in the years following the reduction in directorships and zero in the years before. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

Dep: Firm Adj. q	(1)
OutsideBoardReduction	0.297***
	(0.074)
Firm Size	-0.893***
	(0.213)
ROA	0.698
	(0.665)
Leverage	0.035
	(0.439)
Intangible Asset	0.645
	(0.902)
R & D	-0.594
	(2.572)
Chairman	-0.317**
	(0.147)
Constant	6.571***
	(1.694)
CEO FE	Yes
Firm FE	Yes
F statistics	5.814
Observations	107
Adjusted R-squared	0.836

Table 13: **Determination of CEO Busyness**
This table reports the results of logistic regressions examining CEO busyness. The dependent variable is BusyCEO, which is a dummy variable that equals one if a CEO holds three or more directorship, and zero otherwise. For detailed definitions of all remaining variables, please refer to Appendix A. *, **, *** denotes 10%, 5%, and 1% statistical significance, respectively.

BusyCEO	(1)	(2)	(3)
Firm Adj. q	-0.062**	-0.062**	-0.055
	(0.030)	(0.030)	(0.045)
Industry Median q	-0.223***	-0.222***	-0.101
	(0.066)	(0.066)	(0.095)
Firm Size	0.100***	0.100***	0.078***
	(0.011)	(0.011)	(0.018)
ROA	0.174	0.177	-0.025
	(0.124)	(0.123)	(0.130)
Leverage	-0.135	-0.137	-0.026
	(0.104)	(0.105)	(0.144)
Intangible Asset	0.418***	0.418***	0.516**
	(0.113)	(0.113)	(0.216)
R & D	1.028***	1.021***	0.918***
	(0.236)	(0.237)	(0.304)
LogNfirms	-0.009	-0.005	0.000
	(0.013)	(0.014)	(0.019)
CEO Tenure	-0.053***	-0.053***	-0.002
	(0.006)	(0.006)	(0.007)
CEOage	0.023***	0.023***	0.015***
	(0.003)	(0.003)	(0.005)
Chairman	0.437***	0.437***	0.221***
	(0.048)	(0.048)	(0.071)
Firm Size × LogNfirms		-0.003	
		(0.006)	
CEO Ownership			-36.852
			(22.918)
Constant	-4.463***	-4.469***	-4.502***
	(0.215)	(0.217)	(0.395)
Observations	43,203	43,203	31,549
Pseudo R-squared	0.080	0.080	0.048

A Variable definitions

The definitions of the key variables are as follows:

Tobin's q: Market value of assets (book assets (AT) + market value of common equity (CSHO $\times$ PRCC_F) − common equity (CEQ) − deferred taxes (TXDB)) / (0.9 $\times$ book value of assets (AT) + 0.1 $\times$ market value of assets), where common equity and deferred taxes are assumed to be zero if missing.

Firm Adj. q: Firm Tobin's q − Industry (2 digit SIC) median Tobin's q of the year.

Firm Size: Log of MidAT, where MidAT is the average of current and lag book assets (AT).

ROA: return on assets, (Income before Extraordinary Items (IB) + Interest and Related Expense (XINT)) / MidAT.

Leverage: (Debt in Current Liabilities (DLC) + Long-Term Debt (DLTT)) / MidAT.

Intangible Asset: 1 − (Property, Plant and Equipment (PPENT) / MidAT).

R&D: Research and Development Expense (XRD) / MidAT.

CEO Ownership: CEO total shares owned / Shares Outstanding (CSHO).

CEO Tenure: Years being CEO.

CEO Age: Age of CEO.

Firm Age: Current year − year the firm first appear in COMPUSTAT.

Chairman: A dummy variable. It equals one if a CEO also holds the title "Chairman", and zero otherwise.

OutsideBoard: A dummy variable that equals one if a CEO holds outside directorship, and zero otherwise.

BusyCEO: A dummy variable that equals one if a CEO holds three or more directorship, and zero otherwise.

LogNfirms: Log of number of other firms within 100km of a firms headquarter.

Table A: **Sample selection process for first outside directorship**
This table outlines the step-by-step sample selection process for two event types: (1) the CEO's first time to hold outside directorship and (2) the company's first time to have a CEO hold outside directorship.

Selection process	Number of firms
Panel A: CEO first outside directorship	
Initial sample	2,501
Minus: No continuous data for 5 years (2 years before and 2 years after the event)	-1,397
Minus: CEO changed within 5 years or not consistently outside for 3 years	-568
Minus: Does not satisfy the joint support assumption for the PSM	-3
Final sample	531
Panel B: Firm first outside directorship	
Initial sample	1,771
Minus: No continuous data for 5 years (2 years before and 2 years after the event)	-1,186
Minus: CEO changed within 5 years or not consistently outside for 3 years	-259
Minus: Does not satisfy the joint support assumption for the PSM	-6
Final sample	320