Skill Match in the Boardroom

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Keywords: Board of directors, Skill match, Firm value, Committee, Expertise

JEL Classification: D71, G30, G32, G34, J24

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Skill Match in the Boardroom

1. Introduction

In recent years, academicians, regulators, and practitioners have been increasingly focused on the committee structure of boards and the effect of allocating board tasks and responsibilities on corporate decision making. For example, in their seminal paper, Adams, Hermalin, and Weisbach (2010) call for more research on the relation between committees and the full board. In 2009, the Securities and Exchange Commission (SEC) amended Regulation S-K to require public U.S. firms to disclosure detailed information on the background, experiences, attributes, and qualifications of directors for firms and board committees. At a panel hosted by the Ernst & Young Center for Board Matters on May 17, 2022, the former Chief Executive Officer (CEO) and chairman of Vanguard, Bill McNabb, stated that "committees have changed a lot over the years…I think we're in the process…of seeing another major shift in the responsibilities within various committees."[1]

Yet so far, there has been little empirical evidence on how well director skills match the functions of board committees and how the effect of this matching affects the outcomes of firms.[2] In this study, we fill this gap by examining the background, experiences, and qualifications of directors on the committees they serve and addressing the following questions: Do firms put directors with right skills in the right committees? Does skill match on the committees served by directors contribute a positive, negative, or neutral impact to various board decisions and future firm performance? If the impact is positive, how to motivate skill

[1] See Aman Kidwai, "The makeup of board committees are changing, and so are their responsibilities," *Fortune*, May 20, 2022.

[2] Kim and Starks (2016) examine how women directors contribute unique skills to corporate boards and Adams, Akyol, and Verwijmeren (2018) investigate how commonality in directors' skill sets affects firm performance. These studies rely on the data disclosed in a firm's proxy statement following the 2009 amendment to Regulation S-K, and focus on the quantity and the concentration of director skills. They have not examined how individual director characteristics match the functions of board committees they serve over the periods before and after 2009, and whether such skill match affects firm performance.

matched directors?

We provide evidence on these questions by constructing a comprehensive data set of committee structure at publicly traded U.S. firms over 2003−2018, and examine how directors' skill matching affects committee decisions and firm value. Specifically, we determine the skill matching of outside directors and the committees they serve via a linkage from a director's skills obtained from prior experiences (such as board membership, management positions and other positions in organizations, education and qualifications, and purposes of contribution to non-profit organizations) to the function and operation of the specific delegated committee.

We consider three competing hypotheses for the role of skill match in board committees in determining firm value. The *Learning from Experience* hypothesis posits that directors with relevant expertise acquired through prior experiences can share first-hand knowledge of related matters and detect information manipulation to increase the quality of committee decisions. This argument is consistent with the role of director expertise in the effectiveness of advisory and monitoring functions (e.g., Defond, Hann, and Hu (2005), Dass et al. (2014), and Gorshunov et al. (2021)). That is, we expect that directors with expertise relevant to board committees will enhance firm value through the use of their valuable knowledge and skills to perform more effective advisory and monitoring roles.

The *Window Dressing* hypothesis, in contrast, posits that firms recruit diverse directors in gender, ethnicity, personal background, and skills just to reduce the pressures from investors and regulators. In this scenario, these directors may lack firm-specific expertise and impede coordination with committee members or managers (Cai, Nguyen, and Walkling (2022)). This hypothesis predicts that directors with relevant expertise meet the standards of specific delegated committees, but the quality of committee decisions decreases and hence firm value declines.

The third possibility is the *Committee Death* hypothesis, in which the match of

specialization of directors and the function of the committee they serve plays little role in board behavior and firm performance. Firms' committee assignment is not the first priority for hiring expertise in the boardroom. This argument is consistent with prior literature that important factors in the board structure are labor market search frictions, information learning frictions, regulatory requirements, competitive environment, and managerial team (e.g., Boone et al. (2007), Coles, Daniel, and Naveen (2008), and Linck, Netter, and Yang (2009)). Thus, the *Committee Death* hypothesis predicts that skilled matched directors are unlikely to influence firm value.

We first examine whether firms place right directors in the right committees using 38,705 firm-year observations and 130,253 firm-committee-director-year observations covered in BoardEx, Compustat, and CRSP from 2003 through 2018. We find that the mean skill match ratio for a firm's all board committees (*Skill match*) (i.e., outside directors with relevant expertise obtained from prior work experience match the function and operation of delegated committees) is 36.1%. Very few firms have a 100% skill match ratio, which provides an appropriate environment for testing the above three hypotheses.

We next investigate whether skill match on board committees plays a role in determining future firm performance. We show that firms with higher *Skill match* on the board are associated with higher subsequent firm value. Moving from the 25th percentile (0.200) to the 75th percentile (0.500) of the observed distribution of *Skill match* leads to a 5% increase in Tobin's q. Thus, the positive impact of skill match between an outside director and board committees on firm value is economically meaningful. The results are consistent with the *Learning from Experience* hypothesis that firms benefit from directors with relevant expertise acquired through prior work experience and matched with the function or operation of committees they serve. Our findings favor the *Learning from Experience* hypothesis over the *Window Dressing* hypothesis and the *Committee Death* hypothesis.

We conduct several robustness tests to ensure that the positive effect of skill match of board committees on firm value is not spurious. First, we use firm fixed effects in the regression analysis to control for unobservable time-invariant firm heterogeneity that may confound our main conclusion. We find that the coefficient on *Skill match* is still positive and significant. Second, to mitigate the possibility that other time-variant factors are correlated with skill match policy and subsequent firm value, we use difference-in-differences (DiD) analysis surrounding the adoption of the 2009 amendment to Regulation S-K as a source of quasi-exogenous variations in the information set obtained by directors. We find evidence consistent with the *Learning from Experience* hypothesis. Our further test for the pre-treatment effects of the adoption of the 2009 amendment on firm value shows that the results are not significant for the period prior to 2009, indicating that the parallel trend assumption of our DiD test is not violated. Third, we examine whether the departure of skill matched directors affects firm value. If these directors indeed play a critical role in the value-enhancing effects as suggested by the *Learning from Experience* hypothesis, we should observe that firms with skill matched directors exhibit poorer firm performance than other firms subsequent to their departure. To mitigate potential endogeneity concerns, we restrict the reasons of departure events to the sudden death of directors (Nguyen and Nielsen (2010)). Consistent with the prediction, we find that firms losing skill matched directors realize lower three-day cumulative abnormal returns (CARs) around announcements of sudden deaths than other firms.

We further exploit the sources of value creation of skill match between outside directors and board committees through investigating observable corporate outcomes that are highly correlated with the functions of committees. We focus on corporate governance policies and corporate investments in which outside directors are expected to perform important advisory and monitoring duties. We first examine whether firms with higher *Skill match* tend to establish better corporate governance mechanisms captured by various firm-level governance variables

to enhance firm value. We find that a better match between outside directors and committees receives higher governance scores from the third party and plays a more effective role of corporate governance in CEO pay and firing. We then investigate how matching between director expertise and committee function maximizes shareholder wealth via the effectiveness of investment activities. We measure the effectiveness of corporate investment (sum of capital expenditures, acquisitions, and R&D investments) as the sensitivity of firm performance (Tobin's q) to investment and the stock market reaction around the announcement of merger and acquisition (M&A) deals. We find that firms with higher *Skill match* experience a higher sensitivity of firm performance to investment and better three-day CAR (−1, 1) around M&A announcements. The overall evidence indicates that a match between an outside director's expertise and the committee function helps firm establish an effective monitoring and advisory system. Our findings are in stark contrast to Faleye, Hoitash, and Hoitash (2011) and Adams, Ragunathan, and Tumarkin (2021), who show that a high level of director independence in monitoring-based committees runs an active monitoring system but destroys the value of M&As.

While these results show that firms benefit from the matching of director expertise and committee function through the balance of dual functions in monitoring and advising, the potential mechanisms through which directors with matched experience influence committee decisions are not immediately clear. We provide further evidence in two ways. We first address the question of what incentivizes skill matched directors to commit their knowledge, resources, and time to their current directorships. Yermack (2004) and Adams and Ferreira (2008) document that financial rewards play an important role in motivating and disciplining outside directors. Gilson (1990), Kaplan and Reishus (1990), Booth and Deli (1996), Brickley, Linck, and Coles (1999), and Harford and Schonlau (2013) show that director performance and ability are positively related to the number of outside directorships held by a director. We thus expect firms to provide skill matched directors with ex-ante (pay) and ex-post (directorship) interest-

alignment mechanisms. Consistent with this expectation, we show that skill matched outside directors earn higher total compensation and receive more outside board seats than other outside directors.

We next examine whether a board with skilled matched directors is more likely to have effective communication among board members, which in turn improves information flow and thereby enhances the quality of board decisions. Prior studies use the frequency of board meetings to measure the effectiveness of the working of the board (e.g., Vafeas (1999) and Cai, Garner, and Walkling (2009)). Skill matched directors are expected to facilitate the coordination with their valuable information through board meetings and hence improve the quality of corporate decisions. This prediction complements the argument that firms benefit from skill matched directors who can share relevant information and first-hand knowledge under the *Learning from Experience* hypothesis, with a form of physical mechanism. We document that outside directors with experiences matched with the functions of the committees they serve are less likely to have attendance problems at board meetings than other outside directors.

Our study contributes to the literature in several ways. First, our findings clearly indicate that director expertise on the committees they serve produces a positive and significant effect on firm performance. In this regard, we believe that our research makes an important contribution to the growing literature on the role of committee structures in shaping corporate policies (Klein (1998), Brick and Chidambaran (2010), Faleye, Hoitash, and Hoitash (2011), and Kim and Klein (2017)). Most notably, Adams, Ragunathan, and Tumarkin (2021) document that committees fully formed by outsiders may reduce information sharing and impair communication, which in turn leads firms to experience negative market reactions to acquisition announcements and stock purchases of outside directors. Given the importance of a sound and complete assessment of efficacy and real effects of director expertise acquired

through prior experience, it is surprising that little empirical work has been done on how director skill match on board committees affects firm value. Our work fills this gap by presenting the first comprehensive evidence on the interplay between director expertise matched with committee functions and various corporate outcomes.

Second, instead of focusing on one particular aspect of director skills or one specific committee, we rely on a matching system based on a large set of director expertise and committee functions. Prior studies usually focus on one particular skill of directors, such as financial experience (Huang et al. (2014)), industry experience (Dass et al. (2014)), foreign experience (Masulis, Wang, and Xie (2012), Naveen, Daniel, and McConnell (2013), and Giannetti, Liao, and Yu (2015)), and media experience (Giuli and Laux (2022)). They also largely focus on one particular operation and function of a committee, such as the audit committee (e.g., Defond, Hann, and Hu (2005) and Gorshunov et al. (2021)). Thus, prior research normally emphasizes on either the monitoring role or advisory role of board members. However, board and committee decisions do not rely on only one person with one particular skill to fulfill one of the two roles. These decisions should be a collective effort of all directors with various skills. Our research thus provides a more comprehensive view for the evaluation of overall board performance.

Third, our findings provide support for the 2009 SEC requirement on the disclosure of particular experiences, qualifications, attributes, or skills that qualify an individual as a director, especially for a director serving on a certain committee, in an effort to help shareholders make more informed voting and investment decisions. We show that directors with expertise relevant to the operation of committees exert a positive and significant impact on corporate outcomes and firm value. Hence, shareholders that aim at wealth maximization should take into account the match of director skills to the functions of board committees when they vote in the election of the firm's board of directors.

The rest of the paper is organized as follows. Section 2 reviews the literature and develops our hypotheses. Section 3 describes the data and summary statistics. Section 4 presents the main results. Section 5 exploits the potential sources of value creation. Section 6 reports the potential mechanisms through which skill matched directors influence committee decisions. The final section presents concluding remarks.

2. Hypotheses Development

2.1 Skill match on board committees

Boards can either fulfill their duties through the entire board or delegate their authority to standing committees responsible to the board (Klein (1998)). Board committees are composed of subsets of board members. They tend to have specific and narrowly defined functions and can meet separately from the full board (Kesner (1988) and Klein (1998)).

Firms are likely to have three major board committees, auditing, compensation, and nominating. The compensation committee primarily establishes, reviews, and approves compensation policy of corporate officers and directors and employee benefit plans, and evaluates and rewards performance of top managers. The audit committee oversees a firm's financial reporting and internal control systems. The nominating committee primarily recommends to the board qualified candidates for election as directors, assesses the performance of directors, and evaluates corporate governance mechanisms. These three committees constitute the board's principal monitoring duties (see, e.g., Adams and Ferreira (2007) and Faleye, Hoitash, and Hoitash (2011)).

Firms may additionally set up committees, such as investment and strategy, bank and finance, sustainability and public policy, or other, to facilitate advising and monitoring functions (Adams (2003), Hayes, Mehran, and Schaefer (2004), and Adams, Akyol, and Verwijmeren (2018)). The major functions of the investment and strategy committee are to

review and oversee long-term strategic plans (e.g., science, technology, and R&D), propose acquisitions and divestitures, and make periodic recommendations on major developments or potential business opportunities. The bank and finance committee provides and reviews short- and long-term financing planning and capital structure strategies, such as debt issuance and dividend policy. The sustainability and public policy committee is primarily concerned with community health and safety, employment and equal opportunity matters, diversity and inclusion, sustainability, corporate responsibility, consumer affairs, public image, public policy, government relations, philanthropic activities, and charitable contributions.

Decision making by a small group of directors on a committee may benefit from the possibility of information exchange and discussion before a decision is reached, which implies that specialization by committee members could either lead to greater efficiency and flexibility or delve deeper into board matters (Kesner (1988) and Visser and Swank (2007)). The accuracy and amount of information and the effort that each individual committee member would contribute, however, play an important role in the quality of a committee decision (Li, Rosen, and Suen (2001), Malenko (2014), and Adams, Ragunathan, and Tumarkin (2021)). Intuitively, a key to having high quality of committee decision making is to recruit directors with expertise relevant to the specific delegated committee, which may incur lower costs of communication and information acquisition (Li and Suen (2004)).

2.2 How does skill match on board committees affect firm value?

We propose three competing hypotheses to address the effect of skill match of board committees on firm value. The first view, which we label the *Learning from Experience* hypothesis, posits that directors with relevant expertise acquired through prior work experience can share critical information to increase the quality of committee decisions, which improves firm value. The literature suggests that director expertise acquired through prior work experience have direct knowledge to locate potential problems, improve the flow of

information, and gather relevant information to fulfill their duties. For example, Dass et al. (2014) find that director experience in related industries contributes to better evaluation and monitoring of managerial performance and to more valuable strategic advice through narrowing information gaps and improving information quality. Defond, Hann, and Hu (2005) and Gorshunov et al. (2021) document that firms benefit from the appointment of directors with financial expertise on their audit committees since they would appraise the quality of financial reports and reduce financial corruption to protect shareholder interest.

To the extent that directors with relevant expertise acquired through prior work experience are adept at the functions of committees they serve, we expect these directors to carry out more effectively their advisory and monitoring roles. In particular, directors with prior work experience often have the first-hand knowledge of related matters and can relatively easily detect information manipulation by other committee members or managers. Such knowledge and skills derived from prior experience improve information quality, facilitate information exchange, and narrow the information gap between directors and managers, which increases the likelihood of making value-enhancing committee decisions. Boards thus use the valuable specific knowledge from committees to enhance firm value through the greater effectiveness of monitoring and advising.

An alternative hypothesis, which we label the *Window Dressing* hypothesis, posits that firms recruit diverse directors to meet the high expectations of investors and regulators, thereby destroying firm value. Under the pressure of institutional investors and regulatory rules, firms hire qualified directors and diversify their boardrooms in gender, ethnicity, personal background, and skills. For example, the 2009 amendment to regulation S-K requires firms to disclosure detailed information about the qualification or experience of appointed directors as well as board leadership and diversity.[3] Qualified directors are a scarce human resource,

[3] The Sarbanes-Oxley Act (SOX) in 2002 and the New York Stock Exchange (NYSE) and the National Association

however, and learning directors' skills can be very time consuming (Knyazeva, Knyazeva, and Masulis (2013)). To satisfy those expectations and rules, firms may hire diverse directors who are new and not locally available. These directors may lack firm-specific expertise and impede coordination, which results in costly information exchange and communication among board or committee members (Cai, Nguyen, and Walkling (2022)). In this scenario, we may observe that directors with relevant expertise are appointed to specific delegated committees, but the quality of committee decisions declines, thereby hurting firm value.

A third possibility, which we label the *Committee Death* hypothesis, is that the match of specialization of directors with the functions of the committee they serve plays little role in board behavior and firm value. The functions or responsibilities of board committees could be limited. For example, state law in Delaware reserves some major decisions for the entire board to approve, such as dividend policy, M&As, and stock issuance.[4] Moreover, committee assignment may not be the first priority when firms appoint directors. This argument is consistent with the existing literature that the important factors in the design of optimal board composition and board size are search frictions in the labor market, information frictions, regulatory requirements, industry competition, and managerial team (Boone et al. (2007), Coles, Daniel, and Naveen (2008), and Linck, Netter, and Yang (2009)). Overall, board committees may not exert important functions in board decisions, and hence the matching of director expertise with board committees is unlikely to influence firm value.

of Securities Dealers Automated Quotation System (NASDAQ) in 2003 require firms not only to have a majority of outside directors but also to have on the audit committee at least one member with accounting or financial management expertise (Chhaochharia and Grinstein (2007)). The 2018 Governance Principles Survey conducted by Institutional Shareholder Services (ISS) document that over 80% of institutional investors regard firms as problematic if there are no female directors. For more detailed information, see https://www.issgovernance.com/file/policy/2018-2019-iss-policy-survey-results-report.pdf. In 2018, the passage of Senate Bill 826 mandates each publicly traded company headquartered in California to have between 25% and 50% of female directors on the board by the end of 2021.

[4] See Delaware General Corporate Law at https://delcode.delaware.gov/title8/c001/sc04/index.html for more details.

3. Data and Summary Statistics

3.1 Sample construction

Our initial sample includes outside directors of publicly traded U.S. firms covered in the BoardEx, Compustat, and CRSP databases from 2003 through 2018.[5] We exclude utilities and financial firms (SIC codes 4900–4990 and 6000–6900). The committee data are obtained from BoardEx. This database contains a comprehensive composition of board committees in U.S. firms, including committee names, committee members, and committee roles (such as chairman or member). In the sample, we have 1,243 different committee names as firms vary in how they describe committees. We group committees with similar functions into eight categories: audit, banking and finance, compensation, corporate governance, investment and strategy, nominating, sustainability, and government and public policy.[6] BoardEx also provides detailed information on a director's education, current and historical employments, affiliation to non-profit associations, and club memberships. Our final sample consists of 38,705 firm-year observations and 130,253 firm-committee-director-year observations. We obtain firms' financial information from Compustat, stock return data from CRSP, CEO data from Execucomp, and institutional stock ownership data from Thomson Reuters.

3.2 Measure of skill match

We define an outside director as having matched expertise if the director's historical biographical information in BoardEx includes terms reflecting particular experience that is related to the functions of the committee on which she/he serves. We also require an outside director's matched experience to exist prior to the first year of the directorship in the firm. Panel A of Appendix A provides a detailed description of an outside director's experience

[5] As BoardEx starts to provide company details in 2000 but covers a relatively small number of firms before 2003, our sample period starts in 2003. Our main results remain robust, however, if the sample period starts in 2000.
[6] This classification of committee is similar to that of Adams, Akyol, and Verwijmeren (2018). Skill matching between directors and other committees (e.g., executive, marketing, quality of care, real estates, and risk management) are difficult to identify from the schooling, past positions, employments, and activities of directors.

matched with the function of the board committee served by the director. For example, for skill match on the audit committee, we follow Defond, Hann, and Hu (2005) and consider an independent director as having audit committee-related experience through looking into historical biographical information in BoardEx (i.e., education and employment). We regard the director as having matched experience on the audit committee if she/he (i) has earned an advanced degree in accounting; (ii) has experience as a principal financial officer, principal accounting officer, controller, public accountant, or auditor, or has experience in one or more positions that involve the performance of similar functions; (iii) has experience in actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor, or a person performing similar functions; or (iv) has experience in overseeing or assessing the performance of companies or public accountants with respect to the preparation, auditing, or evaluation of financial statements.[7]

The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. We then calculate *Skill match* for a firm as the average of skill match ratios across all committees in the firm.[8]

3.3 Summary statistics

Panels A and B of Table 1 present summary statistics for firm-level *Skill match* by year and for firm-specific characteristics, respectively. Columns (2) and (3) of Panel A show that the mean (median) value of *Skill match* is 36.1% (33.3%) over the whole sample period from

[7] Prior literature suggests that learning from doing something contributes to a person's knowledge or skill. For example, Arrow (1962) argues that learning is the product of experience. Learning can occur only through an attempt to solve a problem, and hence learning takes place only during activity. That is, previous experience plays an important role in shaping an individual's perception and specialized skills. Garicano (2000) indicates that specialized knowledge can often be acquired through on-the-job learning.

[8] For example, suppose that the total number of board committees for a firm is four in a given year. The total numbers of directors on the four respective committees are 6, 5, 6, and 3, and the numbers of outside directors with matched experience on the four respective committees are 2, 3, 3, and 3. According to our definition, the *Skill match* of the firm in the year is (2/6 + 3/5 + 3/6 + 3/3)/4 = 0.6083 or 60.83%.

2003 through 2018. This number is close to the committee skill match ratio of 32.5% reported by Adams, Akyol, and Verwijmeren (2018), which is calculated based on firms' proxy statements from 2010 through 2013. The mean (median) *Skill match* increases steadily over time from 0.257 (0.233) in 2003 to 0.446 (0.438) in 2018. Notably, we do not find a significant change in *Skill match* in any year, suggesting that director hiring may not strongly respond to any particular macro and regulatory events, such as the 2009 amendment to Regulation S-K. In untabulated results, we find that the ratio of skill match of each committee varies substantially. The investment and strategy committee shows the highest ratio of skill match (0.715), followed by the audit committee (0.577). In contrast, the ratio of skill match is lowest for the sustainability committee (0.182) and the nominating committee (0.266).

Panel B reports summary statistics for main firm-specific attributes. All firm-level continuous variables are winsorized at the 1% level in both tails to mitigate the effects of potential outliers. Panel B of Appendix A provides a detailed description of variable construction. Our main firm performance variable is measured by Tobin's *q*, defined as the ratio of the market value of assets to the book value of total assets, where the market value of assets is the book value of total assets plus the market value of common equity minus the sum of the book value of common equity and balance sheet deferred taxes. The mean (median) value of Tobin's *q* is 2.033 (1.574).

4. Main Results

In this section, we examine whether *Skill match* on board committees collectively produces a positive, negative, or neutral impact on future firm performance. We also tackle potential endogeneity concerns while interpreting the results as causal evidence.

4.1 Impact of skill match on firm value

To examine the effect of *Skill match* on firm value, we estimate the following ordinary

least squares (OLS) model:

$$Tobin's\ q_{i,t+1} = \beta_0 + \beta_1 Skill\ match_{i,t} + \beta_2 \boldsymbol{X}_{i,t} + \delta_t + \theta_j + \varepsilon_{i,t+1}, \quad (1)$$

where firm, industry, and time are denoted by *i*, *j*, and *t*, respectively. $Skill\ match_{i,t}$ is the average skill match ratio for firm *i* in year *t*. $\boldsymbol{X}$ is a vector of control variables, which includes firm characteristics (firm size, stock return volatility, number of segments, leverage, return on assets (ROA), firm age, capital expenditure, and institutional ownership), board characteristics (board size, proportion of outside directors on the board, and average age of outside directors on the board), and CEO characteristics (CEO-chair duality, CEO tenure, and CEO age). The selection of control variables follows previous studies concerning the determinants of firm value and board structure (e.g., Coles, Daniel, Naveen (2008), Linck, Netter, and Yang (2009), Naveen, Daniel, and McConnell (2013), and Knyazeva, Knyazeva, and Masulis (2013)). δ_t and θ_j represent year and two-digit SIC industry fixed effects, respectively.

Table 2 presents the estimates of *Eq*. (1) in which the dependent variable is the natural logarithm of Tobin's *q* and the key independent variable of interest is *Skill match*. Column (1) includes *Skill match*, year fixed effects, and industry fixed effects. The coefficient on *Skill match* is positive and significant at the 1% level, suggesting that firms with a higher average skill match ratio on board committees are subsequently associated with higher firm value. We add the controls for firm, board, and CEO characteristics in column (2), and find that the coefficient on *Skill match* remains positive and significant at the 1% level.[9] The effect of *Skill match* on firm value is also economically meaningful. All else being equal, moving from the 25th percentile (0.200) to the 75th percentile (0.500) of the observed distribution of *Skill match* leads to an additional increase in Tobin's *q* of 4.54% (= (0.500 – 0.200) × ($e^{0.141}$ – 1)).

[9] The results remain unchanged if we use Tobin's *q* without logarithm transformation as the dependent variable.

In column (3), we replace industry fixed effects with firm fixed effects to account for time-invariant firm heterogeneity. Although the parameter estimate of our variable of interest *Skill match* becomes smaller, we still find that a firm's proportion of directors with relevant experience on board committees is positively and significantly associated with firm value. In an untabulated test, we also control for lagged firm value to tackle the possibility that the appointment of directors with relevant experience may depend on the firm's past performance. We continue to find a positive and significant effect of *Skill match*.

Overall, the results in Table 2 support the prediction of the *Learning from Experience Hypothesis*. Firms benefit from directors with relevant expertise acquired through prior work experience that is associated with the functions of committees they serve.

4.2 Difference-in-differences tests

It is well known that board composition is endogenously determined (e.g., Hermalin and Weisbach (1998, 2003), Adams, Hermalin, and Weisbach (2010), and Adams, Akyol, and Verwijmeren (2018)), which may bias our results. For example, outperforming firms may be able to operate their committees effectively through recruiting directors with relevant expertise that is associated with the functions of committees. Directors with relevant experience may be more talented than other directors, which contributes to higher firm value. More experienced directors may select into firms with better quality management that tend to make better decisions and thereby enjoy higher firm value. To mitigate potential biases stemming from omitted variables or reverse causality, we perform difference-in-differences (DiD) regression based on the amendment to Regulation S-K in 2009, and examine whether skill match between director expertise and committee functions has a significant impact on firm value. The 2009 amendment requires companies to disclose for each director and any nominee for director the particular experience, qualifications, attributes, or skills that led the board to conclude that the person should serve as a director on a specific committee for the company.

Before the 2009 amendment, corporate outsiders might rely on commercial databases or hand collect personal information to analyze directors' background and historical employment, which required high costs of information collection. The new requirements under this amendment can reduce the costs of accessing corporate disclosures and extracting value-relevant information, which leads to a persistent reassessment by investors of the implications of director skill sets for firm valuations. Directors with matched skills may hence earn greater support from shareholders. This argument is consistent with the purpose of adopting this policy by the SEC: The requirements on the disclosure of particular experience, qualifications, attributes, or skills that qualify an individual to serve as a director help shareholders make more informed voting and investment decisions. The 2009 newly mandated disclosure can also help directors learn more relevant and valuable information and incorporate it in corporate decision making, or reduce their cost of information acquisition from shareholders and stakeholders (Duchin, Matsusaka, and Ozbas (2010), Cai and Sevilir (2012), and Dass et al. (2014)). Such information could include the demand for a firm's products, supply of key materials, technology usage, or strategic issues. The adoption of a new rule for Regulation S-K disclosure enhancements in 2009 hence disproportionately affected the effect of *Skill match* through the amount of information set obtained by directors.

We conduct a DiD test by exploiting the 2009 amendment, and examine how cross-sectional differences in *Skill match* influence firm value. The treatment group consists of firms with an average skill match ratio over the three years prior to 2009 above the sample median.[10] It is important to note that we define the treatment variable based solely on *Skill match* prior to the 2009 amendment, as opposed to actual *Skill match* across time after the amendment, the latter of which likely reflects how firms are able to deal with labor market frictions to reduce

[10] Our main conclusion remains unchanged if the treatment group is defined as firms with a *Skill match* ratio in 2009 above the sample median.

the switch costs of appointing new directors induced by the amendment. Specifically, we perform the following DiD regression:

$$Tobin's\ q_{i,t+1} = \beta_0 + \beta_1 Treat_i \times Post_t + \beta_2 Treat_i + \beta_3 Post_t + \beta_2 \boldsymbol{X}_{i,t} + \delta_t + \theta_i + \varepsilon_{i,t+1}, \quad (2)$$

where firm and time are denoted by *i* and *t*, respectively. *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over the three years prior to 2009 is above the sample median, and zero otherwise. *Post* is an indicator that takes the value of one for the post-amendment period from 2010 through 2018, and zero for the pre-amendment period from 2003 through 2008. ***X*** is a vector of control variables as defined in *Eq*. (1). Our key independent variable of interest is the DiD term, *Treat* × *Post.* The marginal effects of *Treat* and *Post* are absorbed by firm and year fixed effects, respectively.

Column (1) of Table 3 presents estimates of *Eq*. (2) in which the dependent variable is the natural logarithm of Tobin's *q*.[11] The coefficient on the interaction term is positive and significant at the 5% level. The evidence suggests that firms with more skill matched directors experience a significantly greater increase in firm valuation relative to firms with fewer skill matched directors after the 2009 amendment to Regulation S-K.

To mitigate the concern that our DiD results are confounded by other events and to take into account that firms in the control group may improve their skill matching over time,[12] in column (2) we repeat the analysis in column (1) by focusing on the five years before (2004 through 2008) and five years after (2010 through 2014) the 2009 amendment. We find that the coefficient on the interaction between *Treat* and *Post* remains positive and significant at the 10% level.

[11] We lose some observations in Table 3 because of data unavailability for computing the average *Skill match* over the three years before 2009.

[12] *Skill match* tends to be sticky at the firm level over time. We examine whether firms in the bottom *Skill match* portfolio in 2009 move to the high *Skill match* portfolio in the subsequent five years. There are less than 5% of firms in the bottom 30% portfolio moving to the top 30% portfolio. This is consistent with a common argument that labor market frictions contribute to the persistence of skill match as they make reallocation costly.

To validate the parallel trend assumption of a DiD test, we re-estimate the analysis in column (2) by replacing the interaction between *Treat* and *Post* with interactions between *Treat* and separate year indicators. *Year –t* (*Year t*) is an indicator that takes the value of one for *t* years before (after) 2009, and zero otherwise. We treat *Year –5* as the baseline year. The coefficients on *Treat* × *Year –t* indicate whether there are any differences in firm value between the treatment group and the control group prior to the 2009 amendment. Column (3) shows that all the four coefficients on *Treat* × *Year –t* (where *t* = 1, 2, 3, and 4) are not statistically significant. The evidence indicates that the parallel trend assumption of our DiD test is not violated. In contrast, most of the interaction terms involving indicators for the years after 2009 are positive and significant.[13]

Overall, the results in Table 3 are consistent with those in Table 2 and again support the *Learning from Experience Hypothesis*. Firms benefit from skill match between directors with relevant expertise acquired through prior work experience and the functions of committees on which they serve.

4.3 Sudden deaths of skill-matched outside directors

As an additional test for the effect of skill-matched outside directors on firm value, we investigate the stock market reaction to outside director departures due to sudden deaths. Our *Learning from Experience* hypothesis suggests that the departures of outside directors with matched experience reduce subsequent firm value because they perform a value-enhancing role in monitoring and advising. To test this prediction, we collect director change events from the Audit Analytics Director and Officer Changes database and the RavenPack News Analytics

[13] We notice that the impact of the 2009 amendment starts to appear two years after the amendment: The coefficient on *Treat* × *Year 1* is positive but insignificant, while the coefficients on *Treat* × *Year 2*, *Treat* × *Year 3*, *Treat* × *Year 4*, and *Treat* × *Year 5* are positive and significant. The results suggest that it takes a few years to reveal the full impact of the 2009 amendment on firm value through director skill match. This evidence is reasonable given that it is usually a long-term process for board committee decisions to influence firm value.

database. We manually identify the cause of death for each deceased outside director by reading newspaper articles. To ensure that deaths are sudden and unexpected by the stock market, we follow Nguyen and Nielsen (2010) and consider director deaths as sudden deaths if their deaths are caused by heart attack, murder, stroke, airplane crash, automobile crash, helicopter crash, fall incident, shooting incident, or leisure activities, or are described as unexpected without specification of cause of death.[14] We use the earliest news dates or 8-K filing dates as the event dates of sudden deaths. We are able to identify 71 outside directors with 120 firm-director-year observations (directorships) due to the reason of sudden death.

Table 4 presents estimates of OLS regressions in which the dependent variable is the cumulative abnormal return from one day before to one day after the announcement date of the outside director's sudden death (*CAR* (*–1*, *1*)). We compute abnormal return using Carhart's (1997) four-factor model with parameters estimated using 210 trading days of return data ending 11 days before the death announcement. The key independent variable of interest is *Skill matched director*, an indicator that takes the value of one if the deceased outside director had prior experience matched with the function of the committee on which she/he served, and zero otherwise. The regressions control for firm characteristics, Fama-French 48 industry fixed effects, and year fixed effects. We find in column (1) that the coefficient on *Skill matched director* is negative and significant at the 5% level. The evidence suggests that firms experiencing a sudden death of skill matched directors exhibit a larger loss in value than firms experiencing a sudden death of skill non-matched directors. In column (2), we add the controls for board and director characteristics. The coefficient on *Skill matched director* remains negative and significant at the 1% level. In columns (3) and (4), we repeat the analysis in columns (1) and (2) using the market model for estimating abnormal returns. The results remain

[14] We find no news indicating that the deceased outside director has prolonged illness, suffers from long-term health concerns, or experiences complicated medical surgery. We exclude suicides as they may be related to the current situation surrounding the firm (Nguyen and Nielsen (2010)).

unchanged.

Overall, the evidence of changes in firm value subsequent to the sudden deaths of skill matched outside directors provides further support for the *Learning from Experience* hypothesis.

5. Sources of Value Creation

Our results thus far indicate that directors with expertise relevant to the functions of board committees they serve can improve subsequent firm value, supporting the *Learning from Experience* hypothesis. This evidence then prompts the question of the sources of value created by placing skill matched directors on board committees. We focus on several observable corporate outcomes: corporate governance policies, executive compensation, CEO turnover, and investment activities. These outcomes are related to committee decision-makings and capture how the quality of committee task allocation (sub-group) generates the overall board's performance (group).

5.1 Corporate governance quality

Prior literature suggests that the board of directors plays an important role in shaping a firm's corporate governance policy, which is an important mechanism to both mitigate agency problems and ensure managerial incentives to undertake value-enhancing actions (e.g., Shleifer and Vishny (1997), Acharya, Myers, and Rajan (2011), and Fracassi and Tate (2012)). For example, directors have prior experiences matched with the functions of committees on which they serve may have stronger incentives and more know-how to conduct governance reform, which helps their firms engage in value-increasing decisions. In this case, we should observe that firms with a stronger matching between director expertise and the operations of committees are associated with better corporate governance performance (i.e., less conflicts of interest between managers and shareholders).

To examine whether firms with a higher ratio of skill matched directors establish a better corporate governance mechanism, we use a broad rating based on various governance policies to capture a complete picture of corporate governance quality (e.g., Lins, Servaes, and Tamayo (2017)). Specifically, we obtain firm-level governance performance data from the MSCI ESG KLD STATS database (hereafter ESG Stats), which tracks governance ratings of large publicly traded companies on both strengths (positive indicators) and concerns (negative indicators) based on various sources including company filings, government databases, 1600+ media, non-governmental organizations (NGOs), and other stakeholder sources. ESG Stats evaluates governance performance in compensation to top managers and board members, anti-bribery policies, a history of involvement in corruption scandals, tax evasion, insider trading, accounting irregularities, opposition to shareholder resolutions seeking change to governance practices, criticism by NGOs or other third-party observers, and other unethical behavior and other severity of controversies related to a firm's governance.

We compute the corporate governance score (*Governance index*) as the difference between the relative governance score of strengths and the relative governance score of concerns. The relative governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in ESG Stats in the year scaled by the maximum number of strengths (concerns) for all firms in the same year. To accommodate the changing numbers of strengths and concerns over time in the database, we follow Deng, Kang, and Low (2013) to form the standardized corporate governance score (*Standardized governance index*), which is computed as the difference between the standardized governance score of strengths and the standardized governance score of concerns. The standardized governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in ESG Stats in the year scaled by the total number of corporate governance strength (concern) indicators used by

ESG Stats to assess governance performance in the same year.

We regress the measure of corporate governance quality on *Skill match*, the control variables used in Table 2, and year and firm fixed effects.[15] The results are reported in Table 5. In column (1), we report results from OLS regressions in which the dependent variable is *Governance index*. We find that the coefficient on *Skill match* is positive and significant at the 1% level. The evidence indicates that firms with a higher *Skill match* ratio are associated with a better corporate governance score. The results remain unchanged if we replace *Governance index* with *Standardized governance index* in column (2).

To mitigate the potential endogeneity of *Skill match*, we perform DiD regression in which we use the adoption of a new rule for Regulation S-K disclosure enhancements in 2009 as a source of quasi-exogenous variations in the information set obtained by directors. Columns (3) and (4) present estimates of *Eq*. (2) using *Governance index* and *Standardized governance index* as the dependent variables are, respectively. The key independent variable of interest is the interaction between *Treat* and *Post*. The coefficients on the interaction term are positive and significant at the 1% level in both columns, suggesting that firms placing more skill matched directors on board committees exhibit significantly better corporate governance performance after the 2009 amendment to Regulation S-K. Columns (5) and (6) show that the results do not change when we focus on the five years before and after the 2009 amendment. We also examine whether there is a pre-treatment effect on corporate governance policies prior to 2009, and report the results in columns (1) and (2) of Appendix B. All the coefficients on *Treat* × *Year* $-t$ (where t = 1, 2, 3, and 4) are not significant.

Overall, the results suggest that firms with a higher ratio of skill matched directors tend to experience better quality of corporate governance.

[15] The results still hold if we replace firm fixed effects with industry fixed effects.

5.2 Monitoring quality in CEO pay

In addition to a reduction in the conflict of interests through improvement in the overall corporate governance reform, we know less about the interest alignment between managers and shareholders through well-designed compensation contracts and termination decisions. To better capture the monitoring function by firms with a stronger matching between outside directors and board committees, we examine whether *Skill match* is related to CEO pay-performance sensitivity (e.g., Murphy (1985), Aggarwal and Samwick (1999), and Core and Guay (2002)) and forced CEO turnover-performance sensitivity (e.g., Denis and Denis (1995), Denis, Denis, and Sarin (1997), and Peters and Wagner (2014)), the two most common measures used in the literature to assess the effectiveness of corporate governance based on executive compensation and CEO forced turnover. In these tests, the sample consists of 11,717 S&P 1500 firms covered in BoardEx, Compustat, CRSP, and Execucomp for the full sample period.

The results for CEO pay-performance sensitivity are reported in Table 6. In column (1), we regress the natural logarithm of one plus CEO total compensation on *Skill match*, a firm's *Portfolio-adjusted stock return* in the previous year, their interaction, a set of control variables, and year and firm fixed effects, where *Portfolio-adjusted stock return* is a firm's annual stock return subtracted by the value-weighted return on a portfolio constructed based on size and book/market deciles. The coefficient on the interaction term captures the incremental effect of *Skill match* on CEO pay-performance sensitivity. We find that the coefficient on the interaction term is positive and significant at the 1% level. In column (2), we replace *Portfolio-adjusted stock return* with *Market-adjusted stock return*, defined as the difference between the annual stock return and the CRSP value-weighted return. The coefficient on the interaction between *Skill match* and *Market-adjusted stock return* is again positive and significant at the 5% level.

To address the potential endogeneity of *Skill match*, we perform DiD regression using the

2009 amendment to Regulation S-K. Columns (3) and (4) present estimates of *Eq*. (2) using the natural logarithm of one plus CEO total compensation as the dependent variable. The key independent variable of interest is the triple interaction between *Treat*, *Post*, and *Performance*, where *Performance* is measured as *Portfolio-adjusted stock return* and *Market-adjusted stock return*, respectively. The coefficients on the two triple interaction terms are both positive and significant at the 1% level, suggesting that firms with a higher ratio of skill matched directors have a significantly better design of compensation contracts to align managerial inventive with shareholders wealth after the 2009 amendment. Columns (5) and (6) present the results when we focus on the five years before and after the 2009 amendment. The coefficients on the two triple interaction terms remain positive, and it is significant when *Performance* is measured by *Market-adjusted stock return*. We also examine whether there is a pre-treatment effect on CEO pay-performance sensitivity prior to 2009, and report the results in columns (3) and (4) of Appendix B. We find that all the coefficients on *Treat* × *Year* $-t$ × *Performance* (where t = 1, 2, 3, and 4) are not significant. Overall, these results suggest that directors with prior experience matched with the committees they serve perform an active governance role in CEO compensation design.

As a test for the effectiveness of corporate governance based on CEO turnover, we examine forced CEO turnover-performance sensitivity in Table 7. In column (1), we perform a logistic regression in which the dependent variable, *Forced CEO turnover*, is an indicator that takes the value of one if a firm experiences a forced CEO turnover in a given year, and zero otherwise.[16] The key independent variable of interest is the interaction between *Skill match* and *Portfolio-adjusted stock return* in the previous year. We find that the coefficient on

[16] Following Peters and Wagner (2014), we classify a turnover event as a forced turnover if: (1) news articles on Factiva report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; (2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or (3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure.

the interaction term is negative and significant at the 5% level. In column (2), we replace *Portfolio-adjusted stock return* with *Market-adjusted stock return*, and continue to find a negative and significant coefficient on the interaction term. The results confirm that directors with expertise matched with the committees they serve perform an active governance role in CEO evaluation.

5.3 Investment activities

While our results thus far mainly support the argument that skill matched directors help to enhance firm value through their effectiveness of monitoring according to the *Learning from Experience* hypothesis, we still lack evidence of their advisory function, for example, in firm investment policy.[17] In this subsection, we examine whether directors with higher *Skill match* are more likely to efficiently fulfill their duties and help firms conduct value increasing investment decisions. Specifically, we proxy the profitability of corporate investment using sensitivity of firm performance to investment and the announcement returns of M&A deals.

Table 8 reports the results for sensitivity of firm performance to investment in which the dependent variable is the natural logarithm of Tobin's *q*. We first compute the ratio of the sum of research and development (R&D) expenses, capital expenditures, and acquisition expenditures to lagged total assets (*Total investment*) to capture corporate investment. In column (1), we regress firm performance on *Skill match*, *Total investment* in the previous year, their interaction, a set of firm, board, and CEO characteristics, and year and firm fixed effects. The coefficient on the interaction term captures the incremental effect of *Skill match* on sensitivity of firm performance to investment. We find that the coefficient on the interaction term is positive and significant at the 1% level. The evidence suggests that firms with a better matching between director expertise and committee functions tend to enhance the value of

[17] While we have shown that skill match in the boardroom leads to better corporate governance quality and monitoring quality, we cannot completely rule out the possibility that well-established monitoring functions help firms avoid wasteful (i.e., negative-NPV) investment projects and thus improve investment efficiency.

corporate investment, again supporting the *Learning from Experience* hypothesis. In column (2), we replace *Total investment* with *Net investment*, defined as the ratio of the sum of R&D expenses, capital expenditures, and acquisition expenditures minus sales of property, plant, and equipment, sales of investments, change in short-term investments, and other investing activities to lagged total assets, which is similar to that defined by Malmendier, Tate, and Yan (2011). The results remain robust after taking into account the sales of assets in defining corporate investment.

To mitigate potential endogeneity of *Skill match*, we also perform DiD regression based on the adoption of the 2009 amendment to Regulation S-K. Columns (3) and (4) present estimates of *Eq*. (2) in which the dependent variable is the natural logarithm of Tobin's *q*, and the key independent variable of interest is the triple interaction between *Treat*, *Post* and *Investment*. The coefficient on the triple interaction term is positive and significant at the 1% level when *Investment* is measured as *Total investment* or *Net investment*. The results suggest that firms with a higher ratio of skill matched directors tend to have higher sensitivity of firm performance to investment after the 2009 amendment. The results do not change when we focus on the five years before and after the 2009 amendment (columns (5) and (6)). We also examine whether there is a pre-treatment effect on sensitivity of firm performance to investment prior to 2009, and report the results in columns (5) and (6) of Appendix B. We find that all the coefficients on $Treat \times Year_{-t} \times Investment$ (where t = 1, 2, 3, and 4) are not significant. Overall, the findings in Table 8 suggest that directors with prior experience matched with the committees they serve perform a value-enhancing role in corporate investment decision.

We further examine stock price responses to M&A announcements based on standard event-study methods in Table 9. We collect the sample of M&As conducted by U.S. firms over 2003–2018 from the SDC Platinum Mergers & Acquisitions database. To be included in the

final sample, the following requirements must be satisfied: (i) the target is a U.S. firm; (ii) the deal is completed; (iii) the transaction value is greater than $1 million; (iv) the acquirer needs to obtain at least 51% of the target's shares and holds less than 50% of the target's shares before the announcement; (v) stock returns, accounting data, board, CEO, and deal information for acquirers are available; and (vi) the acquirer should not be utilities and financial firms. We exclude M&As with other major confounding corporate events (e.g., announcements of quarterly earnings, dividend payments, management guidance, and manager changes) within three trading days before and after the M&A announcement date.

Table 9 presents estimates of OLS regressions in which the dependent variable is the cumulative abnormal return for acquirers from one day before to one day after the M&A announcement date (CAR (−1, 1)). We compute abnormal return using Carhart's (1997) four-factor model with parameters estimated using 210 trading days of return data ending 11 days before the M&A announcement. The key independent variable of interest is *Skill match*. The choice of control variables follows Lang, Stulz, and Walkling (1989) and Masulis, Wang, and Xie (2007). We find that the coefficient on *Skill match* is positive and significant at the 10% level in column (1). The evidence suggests that firms with a higher ratio of skill matched directors realize higher M&A announcement returns. In column (2) we repeat the analysis in column (1) using the market model when estimating abnormal returns. We find that the coefficient on *Skill match* remains positive and significant at the 5% level.

Overall, the evidence suggests that committees formed by directors with matched skills make value-enhancing decisions to achieve better corporate investment performance and thereby improve subsequent firm value, further supporting the *Learning from Experience* hypothesis.

6. Potential Mechanisms for Skill Matched Directors to Influence Committee Decisions

In this section, we exploit what incentivizes skill matched directors to fulfill their commitments. We also examine whether a board with skilled matched directors tends to have effective communication among board members. To answer these questions, we examine directorial pay, outside directorships, and board meeting attendance.

6.1 Directorial incentive: *Director compensation*

Individuals make decisions based on both their knowledge and incentives (Brickley and Zimmerman (2010)). If firms benefit from skill matched directors, then what motivates them to spend limited time and resources on fulfilling their duties in monitoring and advising? The literature suggests that monetary rewards have an incremental incentive effect for outside directors to shape their contribution to the firm. For example, Yermack (2004) find that director compensation is one of the most important incentives for firms to motivate and discipline outside directors to perform their skills. Adams and Ferreira (2008) show that directors perform for even very small financial rewards, such as board meeting fees. Linck, Netter, and Yang (2009) document that firms need to pay more to lure more qualified directors for a position. We thus expect that outside directors with prior experiences matched with the functions and operations of the committees they serve are more likely to earn higher total director pay than other outside directors.

To test this prediction, we first obtain a director's total pay, which is the sum of all fees earned or paid in cash, stock awards, and all other compensation, from the MSCI GMI Ratings database (GMI Ratings).[18] We then regress the natural logarithm of a director's total pay (*Log* (*director compensation*)) on *Skill matched director*, firm-, board-, and director-level characteristics, and year and firm fixed effects. The choice of control variables follows Linck,

[18] GMI Ratings offers annual historical data on the executives and directors of U.S. companies. GMI Ratings began collecting information on U.S. companies in 2001, starting with the largest S&P 1500 firms. In 2003, GMI Ratings covered Russell 3000 firms. The database contains detailed information on CEO compensation, compensation for each director, and other board- and director-level characteristics.

Netter, and Yang (2009) and Field, Souther, and Yore (2020). Column (1) of Table 10 reports the results. We find that the coefficient on *Skill matched director* is positive and significant at the 1% level. The evidence suggests that outside directors can receive a higher total compensation when their specialized knowledge and skills match the functions and responsibilities of the board committees on which they serve. In column (2), we additionally include director fixed effects to account for time-invariant directorial heterogeneity. We continue to find that compensation is significantly higher for skill matched directors.

6.2 Directorial incentive: *Outside directorships*

We examine whether the opportunity to obtain other directorships is another incentive for skill matched directors to perform their value-enhanced functions. Prior literature shows that director performance and prior experience are positively related to the number of outside directorships held by a director. For example, several studies show that directors are more likely to receive additional directorships when they have served for bankrupt firms (Gilson (1990)), when they have had acquisition experience (Harford and Schonlau (2013)), and when they have had oversea experience (Chen et al. (2020)). If outside directors with skills relevant to the functions of committees they serve can share critical information, the cost of information acquisition will be reduced and the quality of decision making will be improved. We thus expect such directors to receive more outside board seats as the labor market would value their skills and performance and compensate them subsequent directorships.[19] To test this prediction, we regress the natural logarithm of a director's outside board seats (*Log* (*outside board seats*)), which is the sum of all outside board seats held in other publicly traded U.S. firms, on *Skill matched director*, firm-, board-, and director-level characteristics, and year and firm fixed

[19] We use data on voting outcomes in director elections from the Institutional Shareholder Services (ISS) Voting Analytics database to capture shareholder satisfaction with director performance. We find that skill matched directors receive a smaller percentage of against votes from shareholders. The evidence suggests that shareholders tend to be satisfied with the expertise and performance of skilled matched directors.

effects. Column (3) of Table 10 reports the results. We find that the coefficient on *Skill matched director* is positive and significant at the 1% level, suggesting that directors with matched skills on board committees earn rewards in terms of more board seats from the directorial labor market. In column (4), we additionally include director fixed effects and continue to find that the coefficient on *Skill matched director* is positive and significant at the 1% level.

6.3 Information exchange in the boardroom

Under the *Learning from Experience* hypothesis, firms benefit from skill matched directors who can improve information flow and enhance the quality of board decisions by sharing relevant information and first-hand knowledge. Despite a lack of detailed data on information generated by board members and the content of committee and board meetings, we argue that skill matched directors facilitate the coordination with their valuable information and improve the quality of corporate decisions through the attendance of board meetings. This argument is consistent with prior literature documenting that board meeting is an important mechanism to improve information flow, the quality of board decisions, and firm value (e.g., Vafeas (1999), Masulis, Wang, and Xie (2012), and Chen et al. (2020)). Cai, Garner, and Walkling (2009) further point out that institutional investors usually use director meeting attendance as their criteria for evaluating directors' performance and efficiency of monitoring. Adams, Ragunathan, and Tumarkin (2021) also use meeting frequency to measure the amount of time directors spend on communication. Thus, we expect that outside directors with experience matched with the functions of committees are less likely to have attendance problems at board meetings than other outside directors.

To test this prediction, we obtain data from GMI Ratings to determine whether a director has a problem of board meeting frequency. We then estimate linear probability model (LPM) regressions in which the dependent variable, *Attendance problem,* is an indicator that takes the value of one if an outside director attends fewer than 75% of annual board meetings, and zero

otherwise.[20] The key of interest variable is *Skill matched director*. The results are presented in column (5) of Table 10. We find that the coefficient on *Skill matched director* is negative and significant at the 5% level. The evidence suggests that outside directors with skills matched with board committees are less likely to miss board meetings. We re-estimate the analysis in column (5) using conditional logit regressions. The results remain unchanged as shown in column (6). In column (7), we additionally include director fixed effects, and find that skill matched directors are still less likely to miss board meetings.

Overall, skill matched directors earn higher compensation, receive more outside board seats, and are less likely to miss board meetings than other directors. The results suggest that firms provide ex-ante (pay) and ex-post (directorship) interest-alignment mechanisms for skill matched directors to fulfill their commitments and that skill matched directors facilitate information flow and improve the quality of board decisions through the attendance of board meetings.

7. Summary and Conclusion

In this research, we examine how outside directors with prior experiences matched with the functions of board committees on which they serve influence firm value. The *Learning from Experience hypothesis* predicts that skill matched directors can improve firm value by sharing critical information and increasing the quality of committee decisions. The *Window Dressing hypothesis* predicts that these directors destroy firm value as they are appointed by firms to meet the high expectations of investors and regulators, but they may lack firm-specific expertise and impede coordination, which leads to costly information exchange and communication among board or committee members. The *Committee Death* hypothesis

[20] GMI Ratings report the frequency of attendance for the aggregate of all meetings of the full board and the committees on which each director serves.

predicts that skill matched directors play little role in determining firm value because the functions or responsibilities of board committees could be limited and committee assignment may not be the first priority when firms appoint directors.

Examination of 38,705 firm-year observations between 2003 and 2018 indicates that firms with a higher ratio of skill matched directors on the board experience higher subsequent firm value. The positive impact of skill matched directors on firm value is economically meaningful. Our findings are robust to the inclusion of firm fixed effects and to the use of difference-in-differences tests around the adoption of the 2009 amendment to Regulation S-K. We also find that firms experiencing a loss of skill matched directors due to sudden deaths exhibit poorer announcement returns. The overall evidence favors the *Learning from Experience* hypothesis over the *Window Dressing* hypothesis and the *Committee Death* hypothesis.

We next exploit the various sources of value created by skill matched directors through investigating corporate outcomes that are highly correlated with the functions of committees. We show that firms with more skill matched directors establish better corporate governance mechanisms, play a more effective role in CEO pay and firing, and are more likely to conduct value-enhancing investment decisions. These results suggest that directors with prior experiences relevant to committee functions improve firm value through their more effective monitoring and advisory functions.

We further investigate what incentivizes skill matched directors to fulfill their commitments and whether boards with more skilled matched directors are likely to have more effective communication among board members. We find that skill matched directors earn higher compensation, receive more outside board seats, and are less likely to miss board meetings. The evidence suggests that firms offer interest-alignment mechanisms to motivate skill matched directors, who facilitate information flow and improve the quality of board decisions through the attendance of board meetings.

Overall, this research documents that individual director experiences matched with the functions of the committee she/he serve contribute a positive impact to firm value. Our research highlights the importance of skill match in the allocation of directors across board committees for their monitoring and advisory functions to perform well. Our evidence also suggests that shareholders aiming at wealth maximization should take into account the skill match of directors in their voting and investment decisions.

Appendix A
Variable Definitions

Panel A presents a description of matched experience of an outside director to the function of the board committee on which she/he serves. Panel B provides a detailed description of other variables used in this study.

Panel A: Skill Match

Variable	Description
Skill match: Audit committee	An outside director has matched experience on the audit committee if she/he (i) has earned an advanced degree in accounting; (ii) has experience as a principal financial officer, principal accounting officer, controller, public accountant, or auditor, or has experience in one or more positions that involve the performance of similar functions; (iii) has experience in actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor, or a person performing similar functions; or (iv) has experience in overseeing or assessing the performance of companies or public accountants with respect to the preparation, auditing, or evaluation of financial statements (Defond, Hann, and Hu (2005)).
Skill match: Bank & finance committee	An outside director has matched experience on the bank and finance committee if she/he has worked in a commercial bank or an investment bank (Güner, Malmendier, and Tate (2008)).
Skill match: Compensation committee	An outside director has matched experience on the compensation committee if she/he (i) has served on a compensation committee or human resource department of a firm or (ii) has worked in one of the 266 current and historical compensation consultant firms listed in the Institutional Shareholder Services (ISS) database.
Skill match: Corporate governance committee	An outside director has matched experience on the corporate governance committee if she/he has served on a governance committee of a firm.
Skill match: Investment & strategy committee	An outside director has matched experience on the investment and strategic committee if she/he (i) has participated in M&A deals as either a manager or a director at firms during the past ten years or (ii) has served as a Chief Science & Technology (Scientific) officer of a firm (Field and Mkrtchyan (2017)).
Skill match: Nominating committee	An outside director has matched experience on the nominating committee if she/he (i) has served on a nominating committee or human resource department of a firm or (ii) has worked in a human capital consulting firm (Standard Industry Classification (SIC) code 8742 or Global Industry Classification Standard (GICS) code 20202010).
Skill match: Sustainability committee	An outside director has matched experience on the sustainability committee if she/he (i) has served on a sustainability committee of a firm or (ii) has worked/participated in a charitable, community, employment relations, environment, human rights, or philanthropic foundation.
Skill match: Government & public policy committee	An outside director has matched experience on the government and public policy committee if she/he (i) has worked in the government institutions with any of the following positions: president, vice president, presidential (vice presidential) candidate, senator, member of the House of Representatives, governor, mayor, (assistant) secretary, deputy secretary, deputy assistant secretary, undersecretary, director of Central Intelligence Agency (CIA) and Federal Emergency Management Agency, deputy director (CIA and Office of Management and Budget), commissioner (Internal Revenue Service, Nuclear Regulatory Commission, Social Security Administration, Civil Rights Commission, Food and Drug Administration, and Securities and Exchange Commission), representative to the United Nations, ambassador, staff (White House, president, and presidential campaign), chairman of the party caucus, chairman or staff of the presidential election campaign, and chairman or member of the president's committee (or council) or (ii) has served on a government and regulation policy committee of a firm (Goldman, Rocholl, and So (2009)).

Panel B: Other Variables

Variable	Definition	Source
Attendance problem (indicator)	Indicator that equals one if an outside director attends fewer than 75% of annual board meetings, and zero otherwise	MSCI GMI Ratings
Board independence	Ratio of the number of outside directors to the total number of directors on the board	BoardEx

Busy director (indicator)	Indicator that equals one if an outside director serves on three or more boards in other firms, and zero otherwise	BoardEx
Capex	Ratio of capital expenditures to the book value of total assets	Compustat
Cash deal (indicator)	Indicator that equals one if an M&A deal is purely cash-financed, and zero otherwise	SDC
CEO from Ivy League university (indicator)	Indicator that equals one if the CEO graduated from an Ivy League university (Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, Princeton University, University of Pennsylvania, and Yale University), and zero otherwise	BoardEx
CEO ownership	Ratio of the sum of number of shares held by the CEO to the total number of common shares outstanding	Execucomp, MSCI GMI Ratings
CEO with Ph.D. degree (indicator)	Indicator that equals one if the CEO has a Ph.D. degree, and zero otherwise	BoardEx
CEO-chair duality (indicator)	Indicator that equals one if the CEO is also the chairman of the board, and zero otherwise	BoardEx, Execucomp
Chair of committee (indicator)	Indicator that equals one if an outside director is a chair of a committee, and zero otherwise	BoardEx
Chairperson (indicator)	Indicator that equals one if an outside director is a chair of a firm's board, and zero otherwise	BoardEx
Director from Ivy League university (indicator)	Indicator that equals one if an outside director graduated from an Ivy League university, and zero otherwise	BoardEx
Director ownership	Ratio of the sum of number of shares held by an outside director to the total number of common shares outstanding	BoardEx, MSCI GMI Ratings
Director with oversea working experience (indicator)	Indicator that equals one if an outside director had foreign experience (studied abroad or worked in non-U.S. firms) prior to the appointment year, and zero otherwise	BoardEx
Director with senior manager experience (indicator)	Indicator that equals one if an outside director has served as a senior manager (CEO, CFO, CIO, COO, president, VP, executive VP, senior VP, partner, managing director, and treasurer) prior to the appointment year, and zero otherwise	BoardEx
Diversifying M&A (indicator)	Indicator that equals one if the acquirer and the target have different first two-digit SIC codes, and zero otherwise	SDC
E-index	Entrenchment index, measured by summing the indicators for staggered board, limitation on amending bylaws, limitation on amending the charter, supermajority to approve a merger, golden parachute, and poison pill	ISS Governance
Female director (indicator)	Indicator that equals one if an outside director is female, and zero otherwise	BoardEx
Free cash flow	Ratio of operating net cash flow minus common and preferred dividends to the book value of total assets	Compustat
Herfindahl index	Sum of the squared market shares of all Compustat firms in the same two-digit SIC industry. The market share is computed as the ratio of total sales to the total industry sales.	Compustat
High tech (indicator)	Indicator that equals one if the acquirer and the target are both in high-tech industries defined by Loughran and Ritter (2004), and zero otherwise	Compustat, SDC
Hostile deal (indicator)	Indicator that equals one if the M&A deal is reported as hostile in SDC, and zero otherwise	SDC
Industry M&A	Ratio of the value of all M&A transactions reported in SDC for each two-digit SIC industry to the total book value of assets of all Compustat firms in the same two-digit SIC industry	Compustat, SDC
Institutional ownership	Ratio of the number of shares held by all institutional investors to the total number of common shares outstanding	Thomson/ Refinitiv 13F
Lead independent director (indicator)	Indicator that equals one if an outside director is a board's lead director, and zero otherwise	BoardEx, MSCI GMI Ratings
Leverage	Ratio of the book value of debt to total assets, where the book value of debt is the sum of long-term debt and debt in current liabilities	Compustat
Log (board age)	Natural logarithm of the average age of outside directors on the board	BoardEx

Log (board meeting)	Natural logarithm of the number of full board meetings held as reported in the proxy filing	MSCI GMI Ratings
Log (board size)	Natural logarithm of the number of directors	BoardEx
Log (CEO age)	Natural logarithm of the age of the CEO	Execucomp, MSCI GMI Ratings
Log (CEO tenure)	Natural logarithm of the number of years served as CEO	Execucomp, MSCI GMI Ratings
Log (director age)	Natural logarithm of the age of the outside director	BoardEx
Log (director tenure)	Natural logarithm of the number of years served as an outside director	BoardEx
Log (firm age)	Natural logarithm of a firm's age, defined as the current year minus the first year the firm appears in Compustat	Compustat
Log (firm size)	Natural logarithm of the book value of total assets	Compustat
Log (segment)	Natural logarithm of a firm's business segments	Compustat
Market-adjusted stock return	Difference between the annual stock return and the CRSP value-weighted return	CRSP, Compustat
Merge deal (indicator)	Indicator that equals one if the deal is a merger, and zero otherwise	SDC
Multi acquirer (indicator)	Indicator that equals one if there is more than one acquirer in the M&A, and zero otherwise	SDC
Net investment	Ratio of the sum of R&D expenses, capital expenditures, and acquisition expenditures minus sales of property, plant, and equipment, sales of investments, change in short-term investments, and other investing activities to lagged total assets	Compustat
Non-US director (indicator)	Indicator that equals one if the nationality of an outside director is not the U.S., and zero otherwise	BoardEx
Number of committees	Number of board committees that an outside director serves	BoardEx
Portfolio-adjusted stock return	Difference in the annual stock return and the value-weighted return on a portfolio constructed based on size and book/market deciles	CRSP, Compustat
Post (indicator)	Indicator that equals one for the years after the 2009 amendment to Regulation S-K, and zero for the years before the 2009 amendment	
Public target (indicator)	Indicator that equals one if the target is a publicly traded firm, and zero otherwise	SDC
Relative deal size	Ratio of M&A deal value to an acquirer's market capitalization, measured at the fiscal year end before the announcement	CRSP, SDC
Return volatility	Standard deviation of daily excess stock returns over the fiscal year	CRSP, Compustat
ROA	Ratio of operating income after depreciation to the book value of total assets	Compustat
Sales growth	Ratio of total sales in year $t + 1$ to total sales in year t	Compustat
Skill match	Average skill match ratio for a firm, calculated as the average of skill match ratios across all committees in the firm. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee.	BoardEx, ISS, Compustat Global, SDC
Skill matched director (indicator)	Indicator that equals one if an outside director has prior experiences matched with the functions of the committee on which she/he serves, and zero otherwise	BoardEx
Stock price run-up	Acquirer's buy-and-hold abnormal stock return from day –210 to day –11 before the M&A announcement, where day 0 is the announcement date. The CRSP value-weighted return is subtracted to compute the abnormal return.	CRSP
Tender offer (indicator)	Indicator that equals one if the M&A deal is a tender offer, and zero otherwise	SDC
Tobin's q	Ratio of the market value of assets to the book value of total assets. The market value of assets is computed as the book value of total assets plus the market value of common equity less the sum of the book value of common equity and balance sheet deferred taxes.	Compustat
Total investment	Ratio of the sum of R&D expenses, capital expenditures, and acquisition expenditures to lagged total assets	Compustat

Treat (indicator)	Indicator that equals one if a firm's average skill match ratio over the three years prior to 2009 is above the sample median, and zero otherwise	BoardEx
Years of industry experience	Number of years that an outside director works for firms in the same industry	BoardEx
Year$_{-t}$ (Year t) (indicator)	Indicator that takes the value of one for t years before (after) 2009, and zero otherwise	

Appendix B
Pre-treatment Test

This table presents estimates of OLS difference-in-differences regressions in which the dependent variables are *Governance index* (column (1)), *Standardized governance index* (column (2)), the natural logarithm of one plus CEO total compensation (columns (3) and (4)), and the natural logarithm of Tobin's *q* (columns (5) and (6)). The sample consists of S&P 1500 firms covered in BoardEx, Compustat, and CRSP from 2004 through 2014 excluding 2009 (i.e., five years before and after the 2009 amendment to Regulation S-K). *Governance index* is a corporate governance score, computed as the difference between the relative governance score of strengths and the relative governance score of concerns. The relative governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in MSCI ESG KLD STATS in the year scaled by the maximum number of strengths (concerns) for all firms in the same year. *Standardized governance index* is the standardized corporate governance score, computed as the difference between the standardized governance score of strengths and the standardized governance score of concerns. The standardized governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in MSCI ESG KLD STATS in the year scaled by the total number of corporate governance strength (concern) indicators used by MSCI ESG KLD STATS to assess governance performance in the same year. *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over three years prior to 2009 is above the sample median, and zero otherwise. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. *Year –t* (*Year t*) is an indicator that takes the value of one for *t* years before (after) 2009, and zero otherwise. We omit *Year –5* from the regressions. *Portfolio-adjusted stock return* is a firm's annual stock return subtracted by the value-weighted return on a portfolio constructed based on size and book/market deciles. *Market-adjusted stock return* is the difference between the annual stock return and the CRSP value-weighted return. *Total investment* is the ratio of the sum of research and development (R&D) expenses, capital expenditures, and acquisition expenditures to lagged total assets. *Net investment* is the ratio of the sum of R&D expenses, capital expenditures, and acquisition expenditures minus sales of property, plant, and equipment, sales of investments, change in short-term investments, and other investing activities to lagged total assets. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Governance index	Standardized governance index	Log (one + CEO total compensation)		Log (Tobin's *q*)	
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Treat (indicator) × Year –4 (indicator)	-0.023	-0.012				
	(-1.639)	(-1.568)				
Treat (indicator) × Year –3 (indicator)	-0.006	-0.001				
	(-0.440)	(-0.112)				
Treat (indicator) × Year –2 (indicator)	-0.006	-0.006				
	(-0.449)	(-0.792)				
Treat (indicator) × Year –1 (indicator)	-0.004	-0.005				
	(-0.287)	(-0.579)				
Treat (indicator) × Year 1 (indicator)	0.115***	0.103***				
	(6.784)	(7.354)				
Treat (indicator) × Year 2 (indicator)	0.072***	0.056***				
	(3.898)	(2.880)				
Treat (indicator) × Year 3 (indicator)	0.067***	0.064***				
	(4.148)	(5.215)				
Treat (indicator) × Year 4 (indicator)	0.065***	0.066***				
	(3.871)	(4.304)				
Treat (indicator) × Year 5 (indicator)	0.092***	0.078***				
	(3.991)	(4.213)				
Portfolio adjusted stock return: a			0.292***			
			(3.103)			
Market adjusted stock return: b				0.381***		
				(5.181)		
Total investment: c					0.162***	
					(4.227)	
Net investment: d						0.094***
						(2.711)

Treat (indicator) × a	-0.076			
	(-0.998)			
Treat (indicator) × b		-0.185**		
		(-2.254)		
Treat (indicator) × c			-0.018	
			(-0.377)	
Treat (indicator) × d				-0.019
				(-0.546)
Treat (indicator) ×	0.044			
Year –4 (indicator) × a	(0.320)			
Treat (indicator) ×	0.121			
Year –3 (indicator) × a	(1.091)			
Treat (indicator) ×	-0.103			
Year –2 (indicator) × a	(-0.788)			
Treat (indicator) ×	0.055			
Year –1 (indicator) × a	(0.374)			
Treat (indicator) ×	0.175			
Year 1 (indicator) × a	(1.533)			
Treat (indicator) ×	0.265**			
Year 2 (indicator) × a	(2.100)			
Treat (indicator) ×	0.066			
Year 3 (indicator) × a	(0.326)			
Treat (indicator) ×	0.066			
Year 4 (indicator) × a	(0.488)			
Treat (indicator) ×	0.069			
Year 5 (indicator) × a	(0.401)			
Treat (indicator) ×		0.095		
Year –4 (indicator) × b		(0.690)		
Treat (indicator) ×		0.157		
Year –3 (indicator) × b		(1.311)		
Treat (indicator) ×		0.084		
Year –2 (indicator) × b		(0.609)		
Treat (indicator) ×		0.221		
Year –1 (indicator) × b		(1.468)		
Treat (indicator) ×		0.313**		
Year 1 (indicator) × b		(2.429)		
Treat (indicator) ×		0.337**		
Year 2 (indicator) × b		(2.253)		
Treat (indicator) ×		0.113		
Year 3 (indicator) × b		(0.574)		
Treat (indicator) ×		0.204		
Year 4 (indicator) × b		(1.394)		
Treat (indicator) ×		0.125		
Year 5 (indicator) × b		(0.652)		
Treat (indicator) ×			-0.020	
Year –4 (indicator) × c			(-0.269)	
Treat (indicator) ×			0.008	
Year –3 (indicator) × c			(0.100)	
Treat (indicator) ×			-0.002	
Year –2 (indicator) × c			(-0.026)	
Treat (indicator) ×			0.133	
Year –1 (indicator) × c			(1.133)	
Treat (indicator) ×			0.127	
Year 1 (indicator) × c			(0.552)	
Treat (indicator) ×			0.120	
Year 2 (indicator) × c			(0.531)	
Treat (indicator) ×			0.608**	
Year 3 (indicator) × c			(2.324)	
Treat (indicator) ×			0.388	
Year 4 (indicator) × c			(1.289)	
Treat (indicator) ×			0.975***	
Year 5 (indicator) × c			(2.703)	
Treat (indicator) ×				0.010
Year –4 (indicator) × d				(0.171)
Treat (indicator) ×				-0.011

Year –3 (indicator) × d						(-0.193)
Treat (indicator) ×						0.037
Year –2 (indicator) × d						(0.573)
Treat (indicator) ×						0.125
Year –1 (indicator) × d						(1.479)
Treat (indicator) ×						0.163
Year 1 (indicator) × d						(0.810)
Treat (indicator) ×						0.244
Year 2 (indicator) × d						(1.257)
Treat (indicator) ×						0.384*
Year 3 (indicator) × d						(1.653)
Treat (indicator) ×						0.222
Year 4 (indicator) × d						(0.805)
Treat (indicator) ×						0.796***
Year 5 (indicator) × d						(2.602)
Control variables	Column (2) of Table 2	Column (2) of Table 2	Treat (indicator) × Year (indicator), Performance × Year (indicator), Column (5) of Table 6	Treat (indicator) × Year (indicator), Performance × Year (indicator), Column (6) of Table 6	Treat (indicator) × Year (indicator), Investment × Year (indicator), Column (5) of Table 8	Treat (indicator) × Year (indicator), Investment × Year (indicator), Column (6) of Table 8
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	13,555	13,555	7,663	7,663	21,021	21,021
Adj. R^2	0.384	0.357	0.699	0.699	0.708	0.708

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Table 1
Summary Statistics

This table presents summary statistics for skill match between an outside director and a board committee at the firm-level by year (Panel A) and for firm-specific characteristics (Panel B). The sample consists of 38,705 firm-year observations covered in BoardEx, Compustat, and CRSP from 2003 through 2018. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction.

Panel A: Skill Match at the Firm Level by Year

	No. of observations	Mean skill match	Median skill match
Year	(1)	(2)	(3)
2003	2,520	0.257	0.233
2004	2,782	0.271	0.250
2005	2,806	0.289	0.250
2006	2,743	0.309	0.292
2007	2,686	0.325	0.313
2008	2,561	0.340	0.333
2009	2,393	0.352	0.333
2010	2,337	0.367	0.333
2011	2,305	0.378	0.360
2012	2,287	0.394	0.375
2013	2,273	0.406	0.396
2014	2,271	0.417	0.412
2015	2,231	0.429	0.417
2016	2,151	0.435	0.417
2017	2,136	0.441	0.425
2018	2,133	0.446	0.438
Total	38,705	0.361	0.333

Panel B: Firm Characteristics

Variable	No. of observations	Mean	Median
Tobin's *q*	38,705	2.033	1.574
Governance index	22,059	-0.016	0.000
Standardized governance index	22,059	-0.014	0.000
CEO pay ($thousands)	17,434	5,402	3,705
Forced CEO turnover (indicator)	32,581	0.017	0.000
Total investment	37,464	0.210	0.101
Net investment	37,464	0.530	0.097
Firm size (book assets, $millions)	38,705	4,167	488
Return volatility	38,705	0.131	0.111
Number of segments	38,705	2.242	1.000
Leverage	38,705	0.207	0.158
ROA	38,705	-0.003	0.062
Capex	38,705	0.048	0.028
Sales growth	37,536	0.168	0.077
Firm age	38,705	20	16
Portfolio-adjusted stock return	13,147	0.127	-0.013
Market-adjusted stock return	13,147	0.254	0.111
Board size	38,705	8.055	8.000
Board independence	38,705	0.747	0.778
Board age	38,705	61	62
CEO-chair duality (indicator)	38,705	0.450	0.000
CEO tenure	38,705	5.524	3.500
CEO age	38,705	56	55
CEO ownership	23,448	0.028	0.004
CEO with Ph.D. degree (indicator)	38,705	0.137	0.000
CEO from Ivy League university (indicator)	38,705	0.125	0.000
Institutional ownership	38,705	0.513	0.571

Table 2
Tobin's *q* and Skill Match

This table presents estimates of ordinary least squares (OLS) regressions in which the dependent variable is the natural logarithm of Tobin's *q*, defined as the ratio of the market value of assets to the book value of total assets. The market value of assets is computed as the book value of total assets plus the market value of common equity minus the sum of the book value of common equity and balance sheet deferred taxes. The sample consists of 38,705 firm-year observations covered in BoardEx, Compustat, and CRSP from 2003 through 2018. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log (Tobin's *q*)		
Independent variable	(1)	(2)	(3)
Skill match	0.138***	0.141***	0.057*
	(4.335)	(4.453)	(1.880)
Log (firm size)		-0.033***	-0.194***
		(-6.312)	(-21.735)
Return volatility		-0.269***	0.044
		(-4.681)	(1.069)
Log (segment)		-0.118***	-0.036**
		(-7.543)	(-2.372)
Leverage		-0.088***	0.158***
		(-2.851)	(5.960)
ROA		-0.106***	0.203***
		(-3.679)	(7.928)
Log (firm age)		-0.032***	-0.119***
		(-4.080)	(-6.676)
Capex		0.382***	0.367***
		(3.293)	(4.878)
Log (board size)		0.198***	0.048**
		(7.277)	(2.226)
Board independence		0.157***	0.006
		(3.481)	(0.169)
Log (board age)		-0.161**	0.008
		(-2.158)	(0.127)
CEO-chair duality (indicator)		0.033***	0.015
		(2.781)	(1.569)
Log (CEO tenure)		0.026***	0.020***
		(3.979)	(4.282)
Log (CEO age)		-0.235***	-0.016
		(-5.357)	(-0.417)
Institutional ownership		0.168***	0.134***
		(9.146)	(7.253)
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No
Firm fixed effects	No	No	Yes
No. of observations	38,705	38,705	38,163
Adj. R^2	0.165	0.209	0.687

Table 3
Tobin's *q* and Skill Match: Difference-in-Differences Test

This table presents estimates of OLS difference-in-differences regressions in which the dependent variable is the natural logarithm of Tobin's *q*, defined as the ratio of the market value of assets to the book value of total assets. The market value of assets is computed as the book value of total assets plus the market value of common equity less the sum of the book value of common equity and balance sheet deferred taxes. The sample in column (1) consists of 32,005 firm-year observations covered in BoardEx, Compustat, and CRSP for the full sample period. The sample in columns (2) and (3) consists of 21,692 firm-year observations covered in BoardEx, Compustat, and CRSP for the subsample period from 2004 through 2014 excluding 2009 (i.e., five years before and after the 2009 amendment to Regulation S-K). *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over three years prior to 2009 is above the sample median, and zero otherwise. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. In column (1), *Post* is an indicator that takes the value of one for the post-amendment period from 2010 through 2018, and zero for the pre-amendment period from 2003 through 2008. In column (2), *Post* is an indicator that takes the value of one for the post-amendment period from 2010 through 2014, and zero for the pre-amendment period from 2004 through 2008. *Year–t* (*Year t*) is an indicator that takes the value of one for *t* years before (after) 2009, and zero otherwise. We omit *Year–5* from the regression in column (3). All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log (Tobin's *q*)		
		Subsample period:	
	Full sample period	year –5 to year +5	
Independent variable	(1)	(2)	(3)
Treat (indicator) × Post (indicator)	0.032**	0.029*	
	(2.196)	(1.941)	
Treat (indicator) × Year–4 (indicator)			-0.000
			(-0.008)
Treat (indicator) × Year–3 (indicator)			0.022
			(1.287)
Treat (indicator) × Year–2 (indicator)			0.025
			(1.223)
Treat (indicator) × Year–1 (indicator)			0.030
			(1.597)
Treat (indicator) × Year 1 (indicator)			0.013
			(0.610)
Treat (indicator) × Year 2 (indicator)			0.040*
			(1.848)
Treat (indicator) × Year 3 (indicator)			0.056**
			(2.485)
Treat (indicator) × Year 4 (indicator)			0.067***
			(2.820)
Treat (indicator) × Year 5 (indicator)			0.065**
			(2.557)
Control variables	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
No. of observations	32,005	21,692	21,692
Adj. R^2	0.674	0.707	0.707

Table 4
Effects of Sudden Deaths of Skill-Matched Outside Directors on Firm Value

This table presents estimates of ordinary least squares (OLS) regressions in which the dependent variable is the cumulative abnormal return from one day before to one day after announcement date of an outside director's sudden death (*CAR* (*–1, 1*)). Columns (1) and (2) compute abnormal return using Carhart's (1997) four-factor model with parameters estimated using 210 trading days of return data ending 11 days before the death announcement. Columns (3) and (4) use the market model for estimating abnormal returns. The sample consists of 120 firm-director-year observations covered in BoardEx, Compustat, and CRSP for the announcements of sudden deaths of outside directors from 2003 through 2018. Following Nguyen and Nielsen (2010), we consider director deaths as sudden deaths if their deaths are caused by heart attack, murder, stroke, airplane crash, automobile crash, helicopter crash, fall incident, shooting incident, or leisure activities, or are described as unexpected without specification of cause of death. *Skill matched director* is an indicator that takes the value of one if the deceased outside director had prior experience matched with the function of the committee on which she/he served, and zero otherwise. All firm-level continuous variables are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the director level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	CAR (–1, 1) estimated using Carhart's four-factor model		CAR (–1, 1) estimated using the market model	
Independent variable	(1)	(2)	(3)	(4)
Skill matched director	-0.046**	-0.044***	-0.034*	-0.033**
(indicator)	(-2.477)	(-2.935)	(-1.940)	(-2.298)
Log (firm size)	0.000	0.002	0.003	0.003
	(0.094)	(0.518)	(0.633)	(1.006)
Market-adjusted stock return	0.003	-0.018	0.001	-0.021
	(0.096)	(-1.043)	(0.025)	(-1.169)
Return volatility	-0.390	-0.355*	-0.288	-0.210
	(-1.601)	(-1.918)	(-1.250)	(-1.283)
Leverage	-0.002	0.024	0.017	0.035
	(-0.045)	(0.785)	(0.473)	(1.293)
Log (segment)	-0.032**	-0.013	-0.035***	-0.022*
	(-2.245)	(-0.962)	(-2.783)	(-1.865)
Log (firm age)	-0.050***	-0.006	-0.049***	-0.008
	(-3.659)	(-0.617)	(-4.000)	(-0.772)
Log (board size)		-0.031		-0.012
		(-0.802)		(-0.312)
Board independence		-0.001		0.012
		(-0.012)		(0.173)
Director with oversea		0.210***		0.180***
working experience (indicator)		(6.776)		(5.458)
Director from Ivy League		-0.020		-0.033
university (indicator)		(-0.445)		(-0.759)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
No. of observations	120	120	120	120
Adj. R^2	0.714	0.852	0.723	0.837

Table 5
Corporate Governance and Skill Match

This table presents estimates of ordinary least squares (OLS) regressions (columns (1) and (2)) and OLS difference-in-differences regressions (columns (3)–(6)) in which the dependent variables are *Governance index* and *Standardized governance index*, respectively. Columns (1)–(4) cover the full sample period and columns (5) and (6) cover the subsample period from 2004 through 2014 excluding 2009 (i.e., five years before and after the 2009 amendment to Regulation S-K). *Governance index* is a corporate governance score, computed as the difference between the relative governance score of strengths and the relative governance score of concerns. The relative governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in MSCI ESG KLD STATS in the year scaled by the maximum number of strengths (concerns) for all firms in the same year. *Standardized governance index* is the standardized corporate governance score, computed as the difference between the standardized governance score of strengths and the standardized governance score of concerns. The standardized governance score of strengths (concerns) for a firm in a given year is the number of the firm's corporate governance strengths (concerns) reported in MSCI ESG KLD STATS in the year scaled by the total number of corporate governance strength (concern) indicators used by MSCI ESG KLD STATS to assess governance performance in the same year. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over three years prior to 2009 is above the sample median, and zero otherwise. In columns (3) and (4), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2018, and zero for the pre-amendment period 2003–2008. In columns (5) and (6), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2014, and zero for the pre-amendment period 2004–2008. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Governance index	Standardized governance index	Governance index	Standardized governance index	Governance index	Standardized governance index
	OLS regression		Difference-in-differences regression			
	Full sample period		Full sample period		Subsample period: year –5 to year +5	
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Skill match	0.092***	0.037*				
	(3.861)	(1.861)				
Treat (indicator) × Post (indicator)			0.099***	0.089***	0.091***	0.079***
			(7.432)	(8.031)	(7.074)	(7.355)
Control variables	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	20,215	20,215	17,717	17,717	13,687	13,687
Adj. R^2	0.313	0.328	0.313	0.328	0.384	0.358

Table 6
Pay-Performance Sensitivity and Skill Match

This table presents estimates of ordinary least squares (OLS) regressions (columns (1) and (2)) and OLS difference-in-differences regressions (columns (3)–(6)) in which the dependent variable is the natural logarithm of one plus CEO total compensation. Columns (1)–(4) cover the full sample period and columns (5) and (6) cover the subsample period from 2004 through 2014 excluding 2009 (i.e., five years before and after the 2009 amendment to Regulation S-K). The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. *Portfolio-adjusted stock return* is a firm's annual stock return subtracted by the value-weighted return on a portfolio constructed based on size and book/market deciles. *Market-adjusted stock return* is the difference between the annual stock return and the CRSP value-weighted return. *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over three years prior to 2009 is above the sample median, and zero otherwise. In columns (3) and (4), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2018, and zero for the pre-amendment period 2003–2008. In columns (5) and (6), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2014, and zero for the pre-amendment period 2004–2008. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log (one + CEO total compensation)					
	OLS regression		Difference-in-differences regression			
	Full sample period		Full sample period		Subsample period: year –5 to year +5	
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Skill match: a	-0.045	-0.051				
	(-0.458)	(-0.519)				
Portfolio-adjusted stock return: b	0.041		0.132***		0.146***	
	(1.440)		(5.684)		(4.369)	
Market-adjusted stock return: c		0.047		0.139***		0.176***
		(1.554)		(5.751)		(4.966)
a × b	0.224***					
	(2.654)					
a × c		0.217**				
		(2.540)				
Treat (indicator) × Post (indicator)			-0.045	-0.049	-0.034	-0.037
			(-1.176)	(-1.277)	(-0.816)	(-0.884)
Treat (indicator) × b			-0.040		-0.039	
			(-1.445)		(-0.996)	
Treat (indicator) × c				-0.052*		-0.065
				(-1.747)		(-1.583)
Post (indicator) × b			-0.044		-0.038	
			(-1.494)		(-0.939)	
Post (indicator) × c				-0.039		-0.053
				(-1.222)		(-1.234)
Treat (indicator) × Post (indicator) × b			0.168***		0.106	
			(2.978)		(1.595)	
Treat (indicator) × Post (indicator) × c				0.167***		0.128*
				(2.773)		(1.760)
Control variables	Sales growth, CEO with Ph.D. degree (indicator), CEO from Ivy League university (indicator), CEO ownership, Column (2) of Table 2					
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	11,717	11,717	10,906	10,906	7,663	7,663
Adj. R^2	0.687	0.687	0.691	0.691	0.709	0.709

Table 7
Forced Turnover-Performance Sensitivity and Skill Match

This table presents estimates of logit regressions in which the dependent variable, *Forced CEO turnover*, is an indicator that takes the value of one if a firm experiences a forced CEO turnover in a given year, and zero otherwise. Following Peters and Wagner (2014), we classify a turnover event as a forced turnover if: (1) news articles on Factiva report that the CEO has been fired, has been forced to depart from the position, or has departed due to unspecified policy differences; (2) the departing CEO is under the age of 60 and the stated reason for the departure is not death, poor health, or the acceptance of another position (elsewhere or within the firm); or (3) the departing CEO is under the age of 60 and the stated reason for the departure is retirement but the firm does not announce it at least six months before the departure. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. *Portfolio-adjusted stock return* is a firm's annual stock return subtracted by the value-weighted return on a portfolio constructed based on size and book/market deciles. *Market-adjusted stock return* is the difference between the annual stock return and the CRSP value-weighted return. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Forced CEO turnover (indicator)	
Independent variable	(1)	(2)
Skill match: a	0.005	0.005
	(0.027)	(0.027)
Portfolio-adjusted stock return: b	0.027	
	(0.147)	
Market-adjusted stock return: c		-0.016
		(-0.080)
a × b	-0.922**	
	(-2.014)	
a × c		-1.010**
		(-2.009)
Log (firm size)	0.042	0.041
	(1.314)	(1.295)
Return volatility	0.699	0.746
	(1.227)	(1.255)
Log (segment)	-0.075	-0.072
	(-1.000)	(-0.956)
Leverage	0.236	0.227
	(1.070)	(1.028)
Log (firm age)	0.044	0.046
	(0.904)	(0.942)
Capex	-0.993	-1.051
	(-1.117)	(-1.184)
Sales growth	-0.457***	-0.448***
	(-3.317)	(-3.242)
ROA	-0.562	-0.491
	(-1.559)	(-1.354)
Log (board size)	0.317*	0.324**
	(1.960)	(2.012)
Board independence	0.469*	0.475*
	(1.806)	(1.824)
Log (board age)	-0.525	-0.527
	(-1.236)	(-1.237)
CEO ownership	-1.846**	-1.860**
	(-2.189)	(-2.194)

CEO-chair duality (indicator)	-0.073	-0.074
	(-1.067)	(-1.077)
Log (CEO tenure)	-0.041	-0.040
	(-0.988)	(-0.968)
Log (CEO age)	-0.663***	-0.663***
	(-2.667)	(-2.668)
Institutional ownership	0.117	0.126
	(0.970)	(1.039)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
No. of observations	8,786	8,786
Pseudo R^2	0.088	0.091
Log-likelihood	-928.076	-925.177

Table 8
Investment-Performance Sensitivity and Skill Match

This table presents estimates of ordinary least squares (OLS) regressions (columns (1) and (2)) and OLS difference-in-differences regressions (columns (3)–(6)) in which the dependent variable is the natural logarithm of Tobin's *q*. Columns (1)–(4) covers the full sample period and columns (5) and (6) covers the subsample period from 2004 through 2014 excluding 2009 (i.e., five years before and after the 2009 amendment to Regulation S-K). The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. *Total investment* is the ratio of the sum of research and development (R&D) expenses, capital expenditures, and acquisition expenditures to lagged total assets. *Net investment* is the ratio of the sum of R&D expenses, capital expenditures, and acquisition expenditures minus sales of property, plant, and equipment, sales of investments, change in short-term investments, and other investing activities to lagged total assets. *Treat* is an indicator that takes the value of one if a firm's average *Skill match* over three years prior to 2009 is above the sample median, and zero otherwise. In columns (3) and (4), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2018, and zero for the pre-amendment period 2003–2008. In columns (5) and (6), *Post* is an indicator that takes the value of one for the post-amendment period 2010–2014, and zero for the pre-amendment period 2004–2008. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log (Tobin's *q*)					
	OLS regression		Difference-in-differences regression			
	Full sample period		Full sample period		Subsample period: year –5 to year +5	
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Skill match: a	0.028	0.039				
	(0.913)	(1.267)				
Total investment: b	-0.007		0.067***		0.057**	
	(-1.616)		(2.668)		(2.275)	
Net investment: c		-0.003		0.057***		0.050***
		(-1.166)		(3.368)		(2.789)
a × b	0.190***					
	(5.013)					
a × c		0.123***				
		(4.582)				
Treat (indicator) ×			0.002	0.005	0.004	0.008
Post (indicator)			(0.117)	(0.316)	(0.238)	(0.496)
Treat (indicator) × b			-0.038		-0.026	
			(-1.129)		(-0.794)	
Treat (indicator) × c				-0.042*		-0.034
				(-1.913)		(-1.489)
Post (indicator) × b			-0.027		0.010	
			(-0.833)		(0.264)	
Post (indicator) × c				-0.015		0.011
				(-0.613)		(0.369)
Treat (indicator) ×			0.204***		0.155**	
Post (indicator) × b			(2.998)		(1.992)	
Treat (indicator) ×				0.180***		0.124**
Post (indicator) × c				(3.471)		(2.115)
Control variables	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2	Column (2) of Table 2
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	36,915	36,915	30,974	30,974	21,021	21,021
Adj. R^2	0.687	0.686	0.673	0.674	0.707	0.707

Table 9
M&A Announcement Returns for Acquirers and Skill Match

This table presents estimates of ordinary least squares (OLS) regressions in which the dependent variable is the cumulative abnormal return for acquirers from one day before to one day after the M&A announcement date (*CAR (–1, 1)*). Column (1) computes abnormal return using Carhart's (1997) four-factor model with parameters estimated using 210 trading days of return data ending 11 days before the M&A announcement. Column (2) uses the market model when estimating abnormal returns. The sample consists of 2,477 completed M&As obtained from the SDC Platinum M&A database from 2003 through 2018. The skill match ratio for a board committee is defined as the ratio of the number of outside directors with matched experience to the total number of directors on the committee. *Skill match* for a firm is calculated as the average of skill match ratios across all committees in the firm. All firm-level continuous variables except *Skill match* are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the acquirer firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	CAR (–1, 1) estimated using Carhart's four-factor model	CAR (–1, 1) estimated using the market model
Independent variable	(1)	(2)
Skill match	0.019*	0.020**
	(1.919)	(2.038)
Log (firm size)	-0.004**	-0.004**
	(-2.535)	(-2.492)
Return volatility	0.052	0.048
	(0.981)	(0.825)
Tobin's *q*	0.001	0.001
	(0.699)	(0.583)
Market-adjusted stock return	-0.000**	-0.000**
	(-2.490)	(-2.379)
Log (segment)	-0.003	-0.003
	(-0.839)	(-0.832)
Leverage	0.007	0.007
	(0.710)	(0.665)
Free cash flow	-0.001	0.002
	(-0.020)	(0.048)
Log (firm age)	0.004*	0.003
	(1.846)	(1.254)
Capex	-0.076*	-0.072
	(-1.780)	(-1.576)
Log (board size)	-0.005	-0.005
	(-0.407)	(-0.447)
Board independence	-0.020*	-0.021*
	(-1.691)	(-1.767)
CEO-chair duality (indicator)	0.008***	0.008**
	(2.596)	(2.522)
Log (CEO tenure)	0.001	-0.000
	(0.372)	(-0.051)
Log (CEO age)	0.006	0.009
	(0.366)	(0.530)
Institutional ownership	-0.003	-0.003
	(-0.380)	(-0.455)
Cash deal (indicator)	0.005*	0.004*
	(1.759)	(1.711)
Public target (indicator)	-0.018***	-0.018***
	(-3.203)	(-3.107)
Tender offer (indicator)	0.010	0.012

	(1.233)	(1.506)
Relative deal size	0.021***	0.020***
	(2.758)	(2.754)
High tech (indicator)	-0.003	-0.003
	(-0.955)	(-0.812)
Multi acquirer (indicator)	-0.005	-0.007
	(-0.863)	(-1.102)
Merge deal (indicator)	0.002	0.001
	(0.597)	(0.158)
Diversifying M&A (indicator)	-0.004	-0.003
	(-1.237)	(-1.134)
Industry M&A	0.001***	0.001***
	(21.247)	(21.377)
Stock price run-up	-0.003	-0.002
	(-1.047)	(-0.647)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
No. of observations	2,477	2,477
Adj. R^2	0.073	0.070

Table 10
Directorial Compensation, Outside Directorships, Board Meeting Attendance, and Skill Match

This table presents estimates of ordinary least squares (OLS) (columns (1)–(4)), linear probability model (LPM) (columns (5) and (7)), and conditional logit (column (9)) regressions in which the dependent variables are the natural logarithm of a director's total pay (*Log* (*director compensation*)) in columns (1) and (2), the natural logarithm of the number of outside board seats in other publicly traded U.S. firms held by a director (*Log* (*outside board seats*)) in columns (3) and (4), and an indicator (*Attendance problem*) that takes the value of one if an outside director attends fewer than 75% of annual board meetings, and zero otherwise in columns (5)–(7). A director's total pay is the sum of all fees earned or paid in cash, stock awards, and all other compensation. *Skill matched director* is an indicator that takes the value of one if the outside director has past experience matched with the function of the committee on which she/he serves, and zero otherwise. All firm-level continuous variables are winsorized at the 1% level in both tails. Appendix A provides a detailed description of variable construction. *T*-statistics based on robust standard errors clustered at the director level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Log (director compensation)		Log (outside board seats)		Attendance problem (indicator)		
	OLS regression		OLS regression		LPM	Conditional logit	LPM
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Skill matched director	0.122***	0.009**	0.062***	0.004***	-0.002**	-0.222**	-0.001*
(indicator)	(15.066)	(2.149)	(19.421)	(3.859)	(-2.263)	(-2.180)	(-1.864)
Log (firm size)	0.158***	0.130***	0.003	-0.009*	-0.002	-0.195	-0.005***
	(6.677)	(5.051)	(0.535)	(-1.747)	(-0.975)	(-0.906)	(-2.987)
ROA	0.376***	0.285***	-0.015	-0.027*	0.000	0.010	-0.001
	(3.672)	(2.884)	(-0.906)	(-1.946)	(0.037)	(0.014)	(-0.074)
Tobin's *q*	0.007	-0.001	0.002	0.003**	-0.001**	-0.195*	-0.001*
	(0.692)	(-0.110)	(0.882)	(1.989)	(-2.039)	(-1.850)	(-1.737)
Log (board size)	-0.068	-0.014	-0.001	0.003	0.008*	1.282*	0.004
	(-1.152)	(-0.227)	(-0.082)	(0.221)	(1.849)	(1.954)	(0.775)
Board independence	0.355**	0.306**	-0.006	-0.026	0.000	-0.202	-0.005
	(2.434)	(2.148)	(-0.249)	(-1.192)	(0.019)	(-0.167)	(-0.569)
Log (director age)	0.263***	3.898***	0.073***	5.581***	0.003	0.250	-0.302***
	(3.327)	(2.797)	(2.638)	(13.118)	(0.708)	(0.425)	(-2.893)
Institutional ownership	0.161***	0.095			-0.002	0.305	0.001
	(2.623)	(1.487)			(-0.537)	(0.527)	(0.305)
Log (board meeting)	-0.055**	-0.071***			0.002	0.284	0.002
	(-2.183)	(-2.961)			(1.244)	(1.192)	(1.124)
Log (director tenure)	0.100***	0.240***			-0.001	-0.131	0.004**
	(8.512)	(9.652)			(-1.136)	(-1.213)	(2.557)
Busy director (indicator)	0.552***	0.206***			0.003***	0.410***	0.003
	(36.572)	(10.699)			(2.710)	(2.736)	(1.388)
Chairperson (indicator)	0.328***	0.239***			-0.010***	-2.393**	-0.004
	(9.411)	(4.300)			(-3.797)	(-2.171)	(-1.054)
Lead independent director	0.097***	0.052			-0.003	-0.406	-0.003
(indicator)	(3.174)	(1.277)			(-1.135)	(-0.988)	(-1.161)

Director ownership	-0.006***	-0.014***					
	(-7.702)	(-4.100)					
Number of committees	0.044***	0.009					
	(5.309)	(0.830)					
Years of industry experience	0.014***	-0.011***	0.002***	-0.009***			
	(10.118)	(-3.071)	(3.281)	(-9.302)			
Director with senior manager	0.014	-0.036	-0.001	0.013			
experience (indicator)	(0.818)	(-0.793)	(-0.146)	(0.568)			
Director with oversea working	-0.005	0.007	0.044***	0.047***			
experience (indicator)	(-0.350)	(0.166)	(5.726)	(3.699)			
Chair of committee	0.043***	0.000					
(indicator)	(6.077)	(0.022)					
Attendance problem	-0.147	-0.095					
(indicator)	(-1.607)	(-0.830)					
Female director (indicator)	0.075***				-0.002	-0.217	
	(4.188)				(-1.254)	(-1.173)	
Non-US director (indicator)	-0.224***				0.005*	0.540*	
	(-4.936)				(1.942)	(1.826)	
Director from Ivy League	-0.017		-0.009				
university (indicator)	(-0.993)		(-0.902)				
Stock return			0.000	0.000			
			(1.513)	(1.373)			
Return volatility			0.032	0.056**			
			(1.123)	(2.514)			
Leverage			0.002	0.002**			
			(1.150)	(2.412)			
Log (segment)			0.000	-0.005			
			(0.020)	(-0.581)			
Herfindahl index					0.006	2.045	0.010
					(0.231)	(0.614)	(0.324)
E-index					0.001	0.094	0.001
					(0.882)	(0.934)	(0.809)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Director fixed effects	No	Yes	No	Yes	No	No	Yes
No. of observations	86,081	85,650	130,253	129,808	112,352	25,263	111,657
Adj. R^2 (Pseudo R^2)	0.813	0.869	0.206	0.704	0.050	0.052	0.288