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Women at Multiple Levels of Strategic Leadership: Evidence of Gender Spillovers

Saneesh Edacherian[1] | Amit Karna[2] | Klaus Uhlenbruck[3] | Sunil Sharma[2]

[1]Department of Strategy & International Business, Birmingham Business School, University of Birmingham, Dubai International Academic City, Dubai, UAE | [2]Strategy Area, Indian Institute of Management Ahmedabad, Vastrapur, India | [3]Department of Management and Marketing, College of Business, The University of Montana, Missoula, Montana, USA

Correspondence: Saneesh Edacherian (s.edacherian@bham.ac.uk)

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ABSTRACT

Manuscript Type: Empirical.

Research Question/Issue: We examine how the combined presence of women in multiple levels of strategic leadership, including gender-diverse boards, affects firm accounting performance.

Research Findings/Insights: Our meta-analysis of 273 effect sizes across various hypotheses expands research on women in upper echelons by showing that gender-diverse boards are positively related to gender spillovers, that is, the appointment of female executives. Most importantly, our work demonstrates that gender spillovers mediate the relationship between board gender diversity and firm performance, indicating there are joint effects of women leaders when serving at various levels of the organization simultaneously. We also find that the size of gender-diverse boards negatively affects gender spillovers to the level of executives.

Theoretical/Academic Implications: Our research highlights interdependencies between gender diversity at different organizational levels and the distinct contribution of women directors. We draw attention to the role of gender spillovers as a mechanism that helps explain how the appointment of women directors benefits firm performance. Our findings broadly contribute to upper echelons theory.

Practitioner/Policy Implications: This study emphasizes that increasing the representation of women on boards can advance the cause of women at other levels of strategic leadership. Furthermore, if women are in multiple levels of strategic leadership at the same time, this can lead to improved firm performance.

1 | Introduction

Policymakers and scholars have paid considerable attention to understanding the advantages of appointing women to strategic leadership positions such as the board of directors. Scholarly debates on women in boards are dominated by attempts to test the business case for women leaders, which links women representation in boards to firm performance (Kirsch 2018). Related empirical evidence suggests that firms with women directors tend to enjoy better reputations, invest more in innovation, acquire meaningful resources, and ultimately attain superior firm performance (Hillman 2015; Triana, Miller, and Trzebiatowski 2013). However, there is also evidence suggesting that such firms are prone to higher levels of intragroup conflicts, information overload, and representational gaps, which erode performance (Farrell and Hersch 2005; Iannotta, Gatti, and Huse 2016). Emerging conversations on challenges for women directors highlight that gendered societal beliefs embedded

in organizations might limit the power and influence exerted by women directors in strategic decisions and thereby reduce performance.

Several recent meta-analyses confirmed that the positive effects of women board members marginally outweigh the negative effects on performance (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015). Although multiple meta-analyses highlighting the performance effects of women directors make important and necessary contributions to the field, we find it critical to also understand how women directors overcome existing challenges in making contributions that benefit firm performance. One important reason for this gap in extant research on women directors is that it is largely limited to hypotheses and analyses at the board level (Weck et al. 2022). Missing from the conversation is the relationship that women directors may have with women at other strategic leadership positions, such as with the chief executive officer (CEO) and the top management team (TMT); and, the combined effect women in multiple leadership positions may have on firm performance. This approach is critical because a key assumption in upper echelons research is that women are appointed as directors to improve strategic decision-making by employing their diverse experiences, knowledge, and values and the resultant advantages due to their unique information-seeking and information evaluation processes. However, emerging evidence highlights that board-level challenges, such as intragroup conflicts and social categorization, limit women directors' influence (Sidhu et al. 2021). Investigating the dynamics between women strategic leaders across organizational levels offers an opportunity to understand how women strategic leaders across levels interact to mitigate the drawbacks and enhance the benefits of gender diversity to facilitate successful performance. As we argue in more detail below, better performance can be attributed to an increase in trust across organizational levels and better information exchange, among other reasons, when women leaders interact across levels.

However, despite the quotas in multiple countries for appointing women directors and the increasing number of women executives (in this paper, we use the term executives to indicate all members of the TMT including the CEO) (Chizema, Kamuriwo, and Shinozawa 2015; Sojo et al. 2016; Terjesen, Aguilera, and Lorenz 2015), there is inadequate clarity about the effects that gender-diverse boards have on women at other strategic leadership levels and that the presence of women at multiple levels of strategic leadership has on firm performance. Studies that have tested the relationship between women on the board and women at the executive level have presented equivocal evidence (Dwivedi, Nadkarni, and Paolella 2019; Mah et al. 2023). Whereas some studies generally show that gender-diverse boards are positively related to gender spillovers, that is, the appointment of female executives to the TMT by gender-diverse boards (Cook and Glass 2014; Matsa and Miller 2011), other studies find that this requires a critical mass of female directors (You 2019) or institutional pressure (Gould, Kulik, and Sardeshmukh 2018). This is intriguing because we know that strategic leaders influence firm outcomes through their relationships with other strategic leaders (Samimi et al. 2020). More generally, researchers have not yet sufficiently examined the joint role of the board and the TMT in strategic decision-making and the associated effect on firm performance (Luciano, Nahrgang, and Shropshire 2020; Nielsen 2010).

We approach these issues by building on upper echelons theory (UET), the predominant theoretical lens used to examine strategic leadership. Investigating how gender diversity at one level of strategic leadership affects gender diversity across leadership levels, and the joint effect of having women at multiple leadership levels is fundamental to unpacking the "relational blackbox." The relational blackbox, the critical gap identified within UET, highlights the inadequate exploration of strategic leader interactions within and across levels as key process mediators that facilitate successful firm outcomes (Neely et al. 2020). Therefore, an analysis of the relational dynamics that exist between gender diversity at various levels of strategic leadership adds to recent conversations conceptualizing strategic leadership as a strategy-oriented multiteam system (board, CEO, and TMT) that works both independently and interdependently with the shared goal of superior firm performance (Luciano, Nahrgang, and Shropshire 2020). For example, Richard, Triana, and Li (2020) showed that the congruency of racial diversity—another type of diversity—at multiple levels of management positively impacts firm productivity. Thus, there is value in understanding (a) the relationship between gender diversity at several levels of strategic leadership, (b) the joint effects of women leaders at multiple levels on firm performance, and (c) the factors that may influence the relationship between gender diversity at individual levels of strategic leadership.

To enhance the understanding of this topic, we ask the following two questions: (a) Is the presence of a gender-diverse board related to the appointment of women executives—what Matsa and Miller (2011) called *gender spillovers*? (b) Does gender spillover act as an intermediate outcome that serves to explain the performance effects of gender-diverse boards? Additionally, because board structural features can influence board effects and because there is evidence that board size is related to board gender diversity, we also examine the contingency effect of a board's size, a key structural attribute (Pfeffer 1972), on the gender spillovers between the board and the executive level.

We test our hypotheses in a meta-analytical setting. Prior meta-analyses have examined the effect of women in strategic leadership positions on firm performance in isolation (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015), disregarding the potential aggregate impact of women strategic leaders in multiple positions. Table 1 compares the findings of previously published meta-analyses on women in individual leadership positions with the insights offered by our study. We employ meta-analysis along with advanced techniques such as meta-analytic structural equation modeling (MASEM) and meta-analytic regression analysis (MARA), which are particularly useful for studying the relationships between multiple constructs and their combined performance effects (Bergh et al. 2016; Grinstein 2008; Schweiger et al. 2019). We meta-analyzed a total of 273 effect sizes (across hypotheses) of primary studies published between 1996 and February 2023.

Our paper makes novel and significant contributions to the literature on women in strategic leadership and UET. First, by demonstrating the effect of board gender diversity on the appointment of women executives, we illustrate the interdependencies

TABLE 1 | Published meta-analyses on women in strategic leadership.

Authors	Post and Byron	Jeong and Harrison	Hoobler et al.	Our study
Journal (year)	*AMJ* (2015)	*AMJ* (2017)	*JOM* (2018)	
Sample studies publication period	1997–May 2014	1983–2014	1997–2015	1996–2023 (February)
Number of effect sizes analyzed (accounting performance)	109	108	75	Board gender diversity–female executives: 66 Mediation analysis: 273
Effect size metric used	Correlations, *t* values, means and standard deviations, or events for different conditions	Any effect size (e.g., r, t, F) or enough data to compute one	Bivariate correlation	Bivariate correlation (only Pearson product moment correlation)
Board diversity–FP	Yes	No	Yes	Yes (in mediation)
Female TMT (CEO/executives)–FP	No	Yes	Yes	Yes (in mediation as combined sample)
Board diversity–female executives	No	No	No	Yes
Examine the relationship between gender diversity at multiple levels	No	No	No	Yes
Examine joint effects of women at multiple levels on performance	No	No	No	Yes
Examine moderators that affect gender diversity at multiple levels	No	No	No	Yes

Abbreviations: *AMJ* = *Academy of Management Journal*, FP = firm accounting performance, *JOM* = *Journal of Management*, K = number of effect sizes, NO = the relationship was not included in the scope of the study, TMT = top management team.

between gender diversity at different organizational levels and a distinct contribution of women directors (Bilimoria 2000). Second, we are first to investigate the mediation effect of gender spillovers from the board to the executive level as a mechanism that helps explain the performance effect of board gender diversity. Our results contribute to unpacking the "relational blackbox" of board–executive dynamics by showcasing how directors' demographic characteristics, such as gender, influence firm performance through the selection of female members for leadership positions below the board.

Third, by examining the moderating effect of board size, we provide insights on boards' structural characteristics that act as a boundary condition for gender spillovers across two levels of strategic leadership. Given the evidence that firms often increase gender diversity by adding additional board seats rather than by strategic substitution of existing male board members (Knippen, Shen, and Zhu 2019), our findings contribute to the understanding of interactions between structural and compositional factors across levels of strategic leadership (Finkelstein, Hambrick, and Cannella 2009).

2 | Theoretical Framework and Hypotheses

2.1 | Women in Strategic Leadership and UET

Given the unique position that strategic leaders occupy at the firm's apex and the significant responsibilities they hold to make strategic decisions that are consequential to a range of firm outcomes, researchers have employed multiple theoretical lenses to investigate strategic leaders. Among these theories, UET, which highlights that strategic leaders influence firm decisions by interpreting strategic situations through the distinct cognitive frames they hold, has been established as one of the most influential lenses for understanding strategic leadership (Neely et al. 2020). In this paper, we theorize our arguments using UET for multiple reasons. First, the assumptions of UET allow researchers to study the effect of strategic leaders across levels, including board, CEO, and TMT (Hambrick 2007). Second, UET research has gained some significance in understanding the relational dynamics between levels of strategic leadership, especially the CEO–TMT relationship. Insights from this scholarship can aid in the wider understanding of the relational dynamics between other levels of strategic leadership (Neely et al. 2020). Notably, recent meta-analyses that synthesize research on the independent impact of board gender diversity (Post and Byron 2015) or women executives (Jeong and Harrison 2017) on firm performance have relied on UET to explain their theoretical predictions.

Our overall discussion in this paper relies on two fundamental assertions of UET regarding women's role in strategic leadership. First, female strategic leaders differ from male leaders in terms of their cognitive frames, guided by differences in their experiences, knowledge, and values from those of male strategic leaders (Finkelstein, Hambrick, and Cannella 2009). Second, female representation in positions of strategic leadership can influence decision-making in organizations, including

the selection of leaders below the board level (Jung, Vissa, and Pich 2017; Richard, Triana, and Li 2020). Our focal construct is women in strategic leadership positions and comprises board gender diversity and the presence of female executives. Our theoretical model is aligned with UET arguments suggesting that the presence of women members in strategic leadership positions as directors and executives can expand the cognitive diversity in strategic leadership and thereby affect firm performance (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015). Figure 1 outlines our framework with the predicted relationships explained below.

2.2 | Board Gender Diversity and Gender Spillovers

Relatively few research studies have investigated the effect of women directors on the appointment of female executives, but the results have been mixed (Mah et al. 2023). Some studies have demonstrated that gender-diverse boards can have a trickle-down effect and lead to the appointment of a female CEO (Cook and Glass 2014, 2015; Matsa and Miller 2011). Other studies highlight that there is a lack of causal evidence to ascertain that the presence of women directors transforms into gender spillovers to levels below the board, such as executives (Bertrand et al. 2019). One recent study illustrated that gender-diverse boards appoint women CEOs only if the number of women directors exceeds a threshold of critical mass (You 2019). Overall, there are mixed results concerning the effect of women leaders on female representation at other levels (Dwivedi, Nadkarni, and Paolella 2019).

In our meta-analysis, we argue that gender-diverse boards will be inclined to appoint more women executives. The appointment of women at higher levels of the organization is challenged by both supply-side and demand-side factors (Gabaldon et al. 2016). Demand-side challenges often arise due to structural barriers such as biased hiring policies and a general bias toward women's capabilities (Fitzsimmons and Callan 2020). The presence of gender-diverse boards addresses demand-side factors by influencing hiring policies and changing preferences for executive teams. Boards play a significant role in determining the policies that affect the hiring of external candidates and the promotion of internal candidates to executive roles (Gupta and Raman 2014; Matsa and Miller 2011). In some countries, such as the United States, effective board monitoring comprises actions that protect shareholder interests by hiring the right executives (Boivie et al. 2016). As women directors generally do not belong to the "old boys' club" of male directors, their professional network includes unique resources such as other women leaders with high potential (Adams and Ferreira 2009; Perrault 2015). As executive selection is highly dependent on peer networks (Carpenter and Westphal 2001; Williamson and Cable 2003), gender-diverse boards are more likely to consider potential women executives from peer networks of women professionals. Additionally, previous researchers have highlighted that teams, to reduce uncertainty with their subordinates, prefer to select or promote individuals with similar demographic characteristics (Kanter 1977). Hence, there is a greater chance that gender-diverse boards will promote women executives than men-only boards.

Similarly, supply-side barriers include differences in values and attitudes toward organizational roles between genders, biased expectations, and challenges due to work–family life balance (Fitzsimmons and Callan 2020). Existing evidence highlights that women have fewer formal and informal opportunities for development within organizations (Lyness and Thompson 2000). The presence of women directors creates opportunities for other women to access adequate mentoring and social exchanges, which are crucial to gaining insights to reach the top management within the organization (Groysberg 2008; Hewlett et al. 2010). Thus, women are more likely to be interested in executive positions at firms with women directors. To conclude, the presence of female directors can result in *gender spillovers* at the executive level. Drawing from these arguments, we hypothesize the following:

Hypothesis 1. *Female representation on boards is positively related to gender spillovers to the level of executives.*

2.3 | The Mediating Role of Gender Spillovers in Strategic Leadership

The rich existing research on women in leadership positions, which includes several meta-analyses, has shown the positive effects of women on boards or the TMT on firm performance (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015). Hence, here, we do not repeat the hypothesis of a direct relationship between women directors and women executives and performance. However, the significance of women

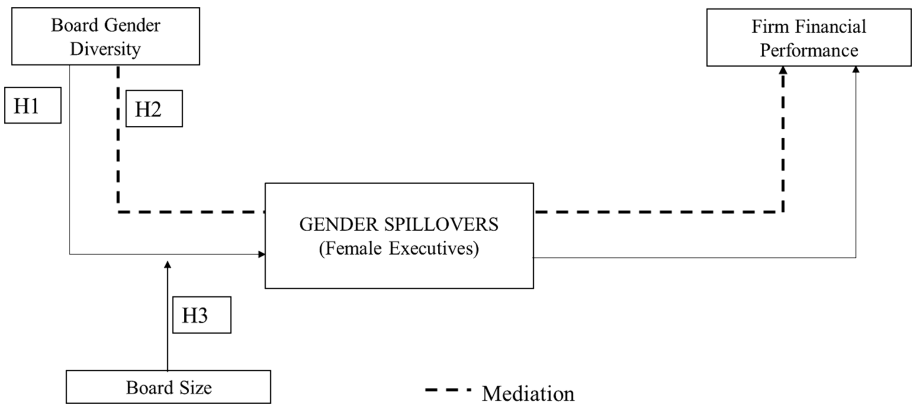

FIGURE 1 | Theoretical framework.

in multiple leadership positions for firm performance has been examined to a lesser extent. To address this shortcoming, from the UET perspective, we advance the line of thought that gender spillovers can act as a critical mechanism that helps to make gender-diverse boards more effective and results in superior firm performance. We argue, first, that the monitoring role of the board reduces the level of trust between the board and executives in each other's actions (Shen 2003). This trust deficit can impact the overall board's cooperation with executives (Adams and Ferreira 2007; Faleye, Hoitash, and Hoitash 2011; Holmlstrom 2004), which is crucial for effective strategy formulation. However, gender-diverse boards, by selecting or promoting female executives, may increase the shared understanding between the board and executives. Socially shared cognition allows effective decision-making and minimizes representational gaps among diverse teams (Martins and Sohn 2022), such as boards and TMTs, thus enhancing performance (Sundaramurthy and Lewis 2003).

Second, we argue that the appointment of female executives enhances the level of information sharing with the board and other levels within the organization. In general, boards are not involved in the day-to-day operations of the firm. They rely on information provided by executives for strategy formulation and evaluation. Congruency in diversity levels across managerial hierarchies is essential for ensuring consistency in absorptive capacities, which is fundamental to knowledge transfers between organizational levels (Richard, Triana, and Li 2020). As gender-diverse boards add value by considering more information and alternatives in the strategic decision-making process (Tasheva and Hillman 2018), these increases in information sharing by boards with female executives will improve the efficiency of gender-diverse boards. Moreover, efficient information sharing at the board–executive interface can limit problems between two groups and enhance their information processing capacity, which is key to effective strategy making (Luciano, Nahrgang, and Shropshire 2020).

Third, we argue that gender-diverse boards, by hiring women executives, create a supportive work climate within the strategic apex to enhance performance. Because executive career outcomes are guided by interactions with other strategic leaders, including directors, gender-diverse boards have proven to provide a supportive work climate for female executives. Evidence shows that firms with gender-diverse boards have a lower likelihood of female executive turnover and a reduced gender pay gap (Carter, Franco, and Gine 2017; Zhang and Qu 2016). Furthermore, gender-diverse boards better handle differing expectations from external stakeholders due to bias and stereotyping of female executives by exhibiting information evaluation processes that include consideration and integration of extensively disparate knowledge, thus enhancing performance.

Finally, gender diversity at the board may activate adverse reactions from male executives and reduce their willingness to provide task-related help to other members of the organization (McDonald, Keeves, and Westphal 2018). By selecting or appointing female executives, gender-diverse boards change the composition of managers at levels below the board. Hence, gender-diverse boards minimize adverse reactions and mitigate the negative effects of board gender diversity through gender spillovers. Combining these arguments, we hypothesize the following:

Hypothesis 2. *The beneficial effect of gender-diverse boards on firm accounting performance is mediated by gender spillovers to the level of executives.*

2.4 | The Size of Gender-Diverse Boards as a Moderator of Gender Spillovers

The extant research on female executives has focused extensively on the factors and barriers that affect women in achieving this position (Glass and Cook 2016). However, we have limited knowledge about the factors that affect the appointment of women executives by gender-diverse boards. Understanding the interactions between the structural characteristics of boards and the demographic characteristics of executives can hold the key to understanding the factors that influence the appointment of women executives (Cook, Ingersoll, and Glass 2019). We extend this line of research by inquiring into how the size of gender-diverse boards affects the appointment of women executives. Given the evidence that firms often increase gender diversity by adding board seats rather than substituting existing male board members (Guldiken et al. 2019; Knippen, Shen, and Zhu 2019), investigating the role of board size in gender-diverse boards becomes paramount.

Research on board size highlights that decision-making on larger boards is slow and less extreme and requires more compromises than that on smaller boards (Cheng 2008). Boards with large numbers of directors are challenged to bring all members to a consensus and introduce decisions that pave the way for change in strategy (Jensen 1993). Recent efforts to understand the effect of board size on the performance effects of women in strategic leadership positions have not yielded any significant results (Hoobler et al. 2018). Against this background, we argue that the board size of gender-diverse boards moderates positive gender spillovers to the level of executives. Specifically, we propose that as the size of a gender-diverse board increases, the gender spillover to the level of executives decreases.

We expect that gender-diverse boards witness higher levels of social categorization that hamper consensual and fast decision-making (Hogg and Terry 2000; Srikanth, Harvey, and Peterson 2016). This can be aggravated for boards with more directors. Large boards are burdened with communication and coordination problems that can be aggravated by board gender diversity. Female directors bring in a variety of perspectives and information to board decision-making and evaluate a multitude of alternatives during the decision-making process on boards (Miller and Del Del Carmen Triana 2009; van Knippenberg and Schippers 2007). However, the role of women directors can decrease with an increase in the number of directors (Torchia, Calabrò, and Huse 2011). On large boards, the perspectives of women leaders who form a minority can be minimal, thus limiting the influence of women directors in appointing women executives.

Additionally, there is evidence that women have a greater chance of being appointed as CEOs or executives in firms in which women directors occupy nomination committees or board chair positions. However, on large boards, the chance of women occupying positions in influential committees or in board chairs

is lower, thus limiting the role of women directors in influencing hiring decisions for top managers. This is likely aggravated if women directors are appointed by adding board seats rather than replacing male directors who continue to occupy committee seats. Hence, we hypothesize that the board size of gender-diverse boards negatively moderates the gender spillovers from the board to the executives.

Hypothesis 3. *The positive gender spillovers from boards to the level of executives is moderated by the size of the gender-diverse board such that gender spillovers to the level of executives decrease with increasing board size.*

3 | Methods

To test our hypotheses and to extend our theoretical understanding, we conducted a meta-analysis that followed the guidelines prescribed in management and economics research (Combs, Crook, and Rauch 2019; Geyskens et al. 2009; Stanley et al. 2013). We employ advanced meta-analytic approaches, such as MASEM and MARA, which are increasingly used to construct new theories and test existing ones (Aguinis et al. 2011; Combs, Crook, and Rauch 2019; Gonzalez-Mulé and Aguinis 2018; Shaw and Ertug 2017). Because the number of firms with women represented across strategic leadership levels is still low (Gould, Kulik, and Sardeshmukh 2018), meta-analysis helps to overcome the constraints due to data availability and the challenges involved in collecting data in a multicountry study.

3.1 | Literature Search

To identify the relevant studies, we followed a systematic three-step process (Karna, Richter, and Riesenkampff 2015). First, we searched the title and abstracts in EBSCO, ProQuest's ABI/INFORM Global (ProQuest), Science Direct, and Web of Science for relevant keywords. The terms for gender diversity used in our search included "female," "women," "gender," "diversity," and "heterogeneity." In the keyword search, we included "boards," "directors," and "governance" to indicate boards and "chief executive," "CEO," "top manager," "top management team," "TMT," "executive," "executive team," and "upper echelons" to find research on executive leaders. The search was first performed to include studies up to 2021 and was later updated to include studies up to February 2023, resulting in a total of 29,013 studies. The search yielded a list of 7604 studies (Proquest), 9673 studies (EBSCO), 5672 (Science Direct), and 6064 studies (Web of Science). Second, we downloaded primary studies used in existing meta-analyses (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015) and literature reviews (Hillman 2015; Roberson and Perry 2017; Zhu and Chen 2015), which resulted in 464 studies. Third, we repeated the keyword search of the websites of leading management journals included in the *Financial Times* 50 list of top journals in management and retained relevant studies. We retained unpublished studies (not published in journals) that included dissertations, working papers, and conference papers that contained our variables of interest to minimize the "file drawer problem" (Pfeffer 2007; Rosenthal 1995), which is considered a major challenge due to the systematic bias in published studies. Despite evidence that this might not be a major threat to the reliability of meta-analytic findings (Dalton et al. 2012), we took efforts to retain as many unpublished studies as possible in our sample. Finally, we combined these lists (generated from steps 1 to 3 and unpublished studies) to eliminate duplicates, which resulted in a total of 16,552 studies.

3.2 | Inclusion Criteria

We first screened the abstracts for search results. To establish our sample, we included only primary studies that used quantitative analysis. We excluded studies that used case studies, interviews, or other qualitative methods for analysis. Furthermore, we included only studies that reported bivariate correlations (i.e., Pearson product moment correlation) between the variables of interest. Researchers have stated that comparing different effect sizes by the use of conversion formulas can have statistical implications (Field and Gillett 2010). Hence, unlike most previous meta-analyses, our study tests these relationships by performing an analysis exclusively on Pearson product moment correlations, the most recommended and commonly used effect size metric in management research (Geyskens et al. 2009). To be included in our sample, we identified studies that reported the effect size between any of the three variables of interest, namely, board gender diversity, female executives, and accounting performance. Previous meta-analyses have highlighted that gender diversity at the strategic leadership level is related both empirically and theoretically differently to various types of firm performance. In our study, we included only studies that reported accounting performance, which is the most direct measure of financial performance.

Furthermore, we took several steps to meet the assumption of independence of the effect sizes used in our analysis. First, we examined for any duplicates that could have appeared due to the presence of unpublished and published versions of the same study in our sample. Next, we followed Wood (2008) to examine our sample to remove any studies that overlapped with reference to sample, year, and measures. Next, in studies that included multiple measures of the same variable, we computed the average value of the measure. Our final sample consisted of 273 effect sizes (used across hypotheses) from 270 studies published between 1996 and 2023 (February). The 270 studies included 248 journal articles and 22 unpublished articles covering theses or dissertations (doctoral, master's, or bachelor's), conference or working papers. We prepared the PRISMA chart to document the search strategy and included it as supporting information in the appendix (Figure S8). The detailed list of studies included in the sample is provided in the supporting information as appendix (details of coded effect sizes can be provided upon request) (Table S1).

3.3 | Coding Procedure

From the sampled primary studies, we extracted bivariate correlations (r) (i.e., Pearson product moment correlation between any three variables, namely, board gender diversity, female executives, and firm accounting performance). Two authors coded the individual variables independently according to the coding criteria developed from the literature. The index of reliability between the coders based on Perreault and Leigh (1989) was 93%, which is considered adequately high (LeBreton and Senter 2008;

Nunnally and Bernstein 1978). Disagreements between the coders were resolved through discussions. In cases where multiple correlations are reported for a relationship in the same sample, to maintain the independence of effect sizes, we computed the average of the correlations to obtain a single effect size for that study (Hunter and Schmidt 1990).

3.4 | Primary Study Variables

3.4.1 | Board Gender Diversity

Research on female representation on boards has measured gender diversity in several ways. We followed previous meta-analyses (Post and Byron 2015) and coded board gender diversity using a variety of measures, such as the percentage of women, the ratio of women, and diversity indices, such as Blau's index (Blau 1977); additionally, we coded board gender diversity as a binary variable indicating the presence or absence of women. If the variable for board gender diversity indicates the presence of male directors, then we reverse the sign of the extracted effect size.

3.4.2 | Gender Spillovers

We measure gender spillovers as the appointment of female executives. Female executives are indicated by the presence of either a female CEO or female members on the TMT. In primary studies, the gender of the CEO is coded as a dichotomous variable. Most studies use 1 to denote a female CEO and 0 to denote a male CEO. In studies that included male CEOs as 1, we reversed the sign to accommodate the measure for female CEOs.

The empirical operation of the TMT varies across primary studies. For our meta-analysis, we included all types of TMT definitions used in the primary studies. The most common operationalization of the TMT consists of the five highest paid executives and those with the title of senior vice president or higher. Like in previous meta-analyses (Jeong and Harrison 2017), our samples also include primary studies that have measured female representation in the TMT as the percentage of women executives, the presence of at least one woman, and diversity indices such as Blau's index. If the study indicates the presence of male executives, then we reverse the sign of the extracted effect size. A recent meta-analysis highlighted that the variance due to the type of measure of TMT diversity does not have a significant effect on the tests (Jeong and Harrison 2017).

3.4.3 | Firm Financial Performance

The literature and recent meta-analyses (Jeong and Harrison 2017; Post and Byron 2015) have treated firm performance as a multidimensional construct. In this study, we coded financial performance as accounting-based performance, such as return on assets (ROA), return on equity (ROE), return on sales (ROS), or return on invested capital (ROIC).

3.4.4 | Moderator Coding

Board size is measured as the total number of directors (Dalton et al. 2012).

3.5 | Control Variables

To perform MARA, we included a range of primary study characteristics as control variables to minimize the influence of the variance across study characteristics on our estimated effect size. We controlled for variation in the quality of the results reported in primary studies by controlling for the journal impact factor, defined as the Social Sciences Citation Index (SSCI) impact factor score for the year 2020. To control for the temporal characteristics of the sample (cross-sectional vs. panel) used in the primary study, we used the median year of the sample and a dichotomous variable for panel datasets as controls. Furthermore, we controlled for sample country bias by coding a dichotomous variable that denotes the US sample. Finally, because board independence is another key attribute of board structure, we controlled for board independence in our analysis.

3.6 | Meta-Analytic Procedures

3.6.1 | HOMA Analysis

We used Hedges–Olkin-type meta-analysis (HOMA) to test Hypothesis 1. HOMA facilitates the calculation of the mean effect sizes of various relationships that we test in our hypotheses (Hedges and Olkin 1985; Lipsey and Wilson 2001). For statistical interpretation of the results, meta-analysis requires an assumption that effect sizes are normally distributed (Rosenthal 1995). Therefore, we converted the effect sizes, in our case correlations, by using Fisher's z coefficients (Hedges and Olkin 1985). Because our analysis involved multiple subgroups in terms of different countries and industries, we chose a random effects model rather than a fixed effects model. Random effects models, unlike fixed effects models, attribute variability in effect sizes not only to sampling error but also to effect size population, making it a more conservative choice (Lipsey and Wilson 2001).

The meta-analysis technique mandates that the mean effect size accounts for the variability across samples. Hence, to calculate the mean effect size ($\bar{r}$), a meta-analytic technique such as HOMA uses inverse variances (w_i^*), which are the inverse of its squared standard error and the random effects variance component (the inverse variance of an effect size is $w_i^* = \frac{1}{SE\left(Z_{r_i}\right)^2 + v}$. The squared standard error of each effect size is $SE\left(Z_{r_i}\right)^2 = \frac{1}{n_i - 3}$, where n_i is the sample size of a study. If a study used panel data, then we used the number of firms in that study as n_i. The random effects variance component is $v = \frac{Q-(K-1)}{C}$, where K is the number of effect sizes. Q is Cochran's homogeneity test and is calculated as $Q = \sum_{i=1}^{K}\left(n_i - 3\right)\left(Z_{r_i} - \overline{Z_r}\right)^2$. C is a constant and calculated as $C = \sum_{i=1}^{K}\left(n_i - 3\right) - \frac{\sum_{i=1}^{K}(n_i-3)^2}{\sum_{i=1}^{K}(n_i-3)}$). Furthermore, we employed these weights to compute the inverse variance weighted z coefficient and reconverted it. Additionally, we used (w_i^*) to compute the standard error of the mean effect size and its confidence interval (Hedges and Olkin 1985). The results are shown in Table 2.

3.6.2 | MASEM Procedure

To test the mediation effect discussed in Hypothesis 3, we used random effects MASEM (Bergh et al. 2016; Cheung and

Chan 2005; Viswesvaran and Ones 1995). The MASEM is a two-step procedure. In the first step, we computed the mean correlations of the various relationships of interest. Second, we created a matrix of these mean correlations and applied structural equation modeling (SEM) using maximum likelihood modeling routines (Cheung and Chan 2005). The MASEM is the method of choice for testing intermediate mechanisms in a relationship with competing evidence shown by previous primary studies. The MASEM does not require correlations between individual relationships for all the studies, helping the researcher overcome the challenge posed by the small sample of primary studies (Karna, Richter, and Riesenkampff 2015). The MASEM allows testing and comparing competing frameworks (Earnest, Allen, and Landis 2011). Comparing models is essential in areas such as strategic leadership, where different theoretical frameworks are used to understand the relationship between strategic leadership characteristics and firm outcomes (Bergh et al. 2016). To conduct our MASEM analysis, we used metaSEM (Version 0.9), an R package (Cheung 2015). We also controlled for firm size (total assets, sales, or employees) by considering the correlations between the firm size and the hypothesized variables.

3.6.3 | MARA Procedure

We used the MARA procedure to test the moderation effect proposed in Hypothesis 3. MARA (Lipsey and Wilson 2001), a specific type of weighted least squares (WLS) regression analysis, uses effect sizes weighted by w_i^* as the dependent variable. In line with recent studies, we chose mixed effect models for our estimation (Drees and Heugens 2013; van Essen, Van Oosterhout, and Heugens 2013). We used the "metafor" package (Version 2.0-0) in R software to conduct MARA (Viechtbauer 2010).

4 | Results

4.1 | Gender Spillovers

According to Hypothesis 1, we predicted that gender diversity on boards is related to gender spillovers, that is, the appointment of female executives. Our HOMA results in Table 2 show that board gender diversity is positively related to the presence of female executives ($\bar{r} = 0.183, p = 0.000$). Hence, Hypothesis 1 is supported.

4.2 | Results of Mediation Effect

Although we do not hypothesize, we reexamine the effect of women in strategic leadership positions on accounting-based performance for an extended sampling period (5+years) compared to previous meta-analysis (Hoobler et al. 2018; Jeong and Harrison 2017; Post and Byron 2015). As preliminary information, we report (Table 2) that the presence of women in strategic leadership positions, such as boards of directors ($\bar{r} = 0.035, p = 0.000$) and executives ($\bar{r} = 0.029, p = 0.000$), is positively related to firm accounting performance. Our findings concur with previous meta-analyses, as expected.

According to Hypothesis 2, we predicted that gender spillovers mediate the relationship between board gender diversity and firm performance. We tested this mediation effect by conducting MASEM. We tested three models, namely, Model A (with only direct effects between board diversity and performance), Model B (partial mediation with both direct effects of board diversity on performance and indirect effects of board diversity on performance through female executives), and Model C (indirect effects only). To account for the variation in sample size across primary studies, we used the harmonic mean of the sample size as the overall sample size for the path analysis (Viswesvaran and Ones 1995). The harmonic mean provides a more conservative parameter estimate than the arithmetic mean (Samba, Van Knippenberg, and Miller 2018).

Our MASEM results are presented in Table 3. The results show that the direct effect between board gender diversity and firm performance is marginally reduced when we include the indirect effect through female executives in Model B (Model A = 0.035, Model B = 0.031). This difference is small; however, given that relatively small effect sizes are common in meta-analyses in strategic management, especially for gender diversity in strategic leadership (Jeong and Harrison 2017; Post and Byron 2015), this change should be considered important and significant for consideration as a mediation effect. The Sobel test (Sobel 1982) for mediation indicates support for Hypothesis 2; that is, the indirect effect of board gender diversity on firm performance through gender spillovers to female executives is significant ($z = 2.945,\ p = 0.003$). The correlation matrix for all constructs in MASEM analysis is presented in Table 4.

Furthermore, we used multiple indices to assess model fit. It is advisable to use a range of fit indices belonging to different classes because each index represents only a particular feature of the fit (Kline 2015). Hence, we used multiple fit indices (Bergh et al. 2016; Geyskens, Steenkamp, and Kumar 2006; Kirca et al. 2011; Kline 2015; Nye and Drasgow 2011; Shook et al. 2004), such as chi-square ($\chi 2$), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI), Akaike information criterion (AIC), and Bayesian information criterion (BIC), to determine the relative fit of Model A and Model B—with and without indirect effects through female executives. A strong model fit is indicated by chi-square values of $P > 0.05$, but the

TABLE 2 | Results of Hedges and Olkin meta-analysis (HOMA).

Relationship tested	K	*N*	$\bar{r}$	SE	95% CI		Model Q	pQ
Board gender diversity–female executives	66	62,244	0.183***	0.020	0.144	0.223	1190.337	<0.001
Board gender diversity–FP[a]	214	243,711	0.035***	0.007	0.020	0.050	1034.35	<0.001
Female executives–FP[a]	119	126,711	0.029***	0.007	0.014	0.044	471.484	<0.001

Abbreviations: CI = confidence interval, FP = firm accounting performance, K = number of effect sizes, *N* = total sample size, pQ = probability of Q, Q = Cochran's homogeneity test, $\bar{r}$ = mean effect size, SE = standard error of $\bar{r}$.
[a]Used in mediation hypothesis (Hypothesis 2).
***Statistically significant at the 1% level.

TABLE 3 | Results of meta-analytic structural equation modeling (MASEM) (harmonic means).

Effects tested	Model A Only direct Estimate	Model B Both direct and indirect Estimate (partial mediation)	Model C Only indirect Estimate
Board diversity–FP	0.035***	0.031***	
Female executives–FP		0.022***	0.033***
Board diversity–female executives		0.176***	0.182***
Model parameters			
Sample size	427,805	427,805	427,805
Chi-square of target model	120.745	11.726	3.005
DF of target model	3	1	2
P value of target model	0.000	0.001	0.000
RMSEA	0.009	0.005	0.005
SRMR	0.075	0.017	0.001
TLI	−0.284	0.901	0.540
CFI	0.357	0.941	0.847
AIC	114.745	9.726	26.056
BIC	81.845	−1.240	4.123
N	273	273	273
Monte Carlo CI LL		0.001	
Monte Carlo CI UL		0.006	

Abbreviations: AIC = Akaike information criterion, BIC=Bayesian information criterion, CFI = comparative fit index, CI = confidence interval at 95%, DF = degrees of freedom, FP = firm performance, RMSEA = root mean square error of approximation, SRMR = standardized root mean square residual, $\chi 2$ = chi-square.
***Statistically significant at the 1% level.

TABLE 4 | Meta-analytically derived correlation matrix for input in meta-analytic structural equation model.

	Board diversity	Executive diversity	Firm accounting performance
Board diversity	1		
Executive diversity	0.177 K = 67 [0.141; 0.212]	1	
Firm accounting performance	0.034 K = 215 [0.020; 0.048]	0.029 K = 120 [0.015; 0.043]	1

Note: Below the diagonal, we report correlations and 95% confidence intervals in brackets.
Abbreviation: K = number of independent effect sizes.

chi-squared value is highly sensitive to sample size; thus, researchers view this measure with caution when evaluating model fit (Aguinis and Harden 2009; Bollen 1989; Kline 2015). The reference values for the other indices included RMSEA and SMR < 0.08 and CFI > 0.90. Furthermore, the AIC and BIC were used to compare models, and the model with the smallest value for these indices was better.

The various model fit indices (Table 3) for Model B ($\chi 2 = 11.726$, *P* value of the target model = 0.001; RMSEA = 0.005; SRMR = 0.017; CFI = 0.941; AIC = 9.726; BIC = −1.240) were computed. Our results in Table 3 show that Model B, which has a partial mediation effect, has a better fit than Model A, which has only a direct effect ($\chi 2 = 120.745$, *P* value of the target model = 0.000; RMSEA = 0.009; SRMR = 0.075; CFI = 0.357; AIC = 114.745; and BIC = 81.845). Finally, to test the significance of the proposed mediating mechanism, we followed previous meta-analyses (Jeong and Harrison 2017) to estimate confidence intervals using Monte Carlo simulations with 50,000 repetitions (Selig and Preacher 2008), the preferred method for assessing mediation in cases such as meta-analyses where raw data are unavailable (Hayes 2009). The indirect effect of board gender diversity on performance through female executives (95% CI = 0.001–0.006) is significant. These findings indicate that gender spillovers mediate the relationship between board gender diversity and firm performance. Thus, Hypothesis 2 is supported. We present our results in Figure 2.

4.3 | Moderation Effect of Board Size

In Hypothesis 3, we predicted that the size of a gender-diverse board moderates the gender spillovers from gender-diverse boards

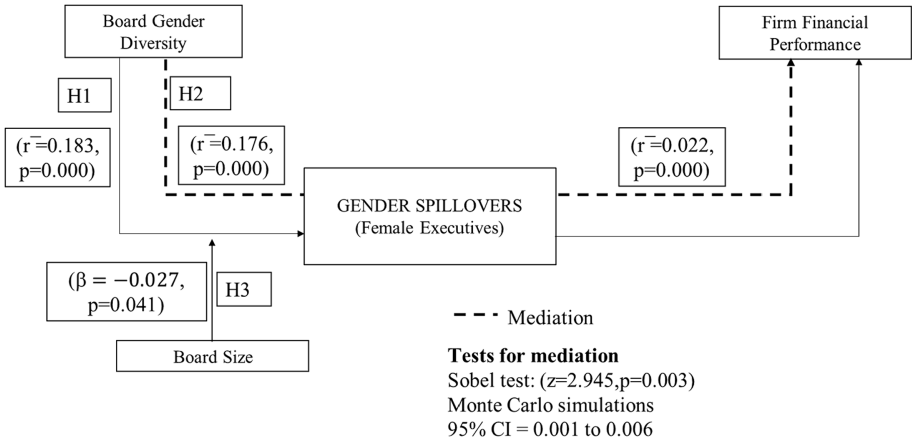

FIGURE 2 | Theoretical framework with results.

to the level of executives. Our MARA results in Table 5 reveal that board size negatively moderates ($\beta = -0.027, p = 0.041$) the relationship between female executives and firm performance. Hence, Hypothesis 3 is also supported. We note that the moderation effect was not significant in models without the control variables.

4.4 | Robustness Tests

We performed a battery of tests to ensure the robustness of our estimates (the results are provided in the appendix). First, tests to check the influence of publication bias and outliers on our estimates showed that our results do not suffer from publication bias and outliers (Table S2 in the appendix). Next, we tested our hypotheses using alternative meta-analytical approaches suggested by Hunter and Schmidt (1990) and also tested the fixed effects model using the HOMA approach (Table S3 in the appendix). The results from these tests did not vary from our original results. Finally, we also tested our hypotheses with market-based measures of performance (Tables S5 and S6 in the appendix). Our results for Hypotheses 1 and 2 were robust even with the use of a market-based measure of performance. We have provided a detailed description of these tests and their results in the appendix. We also tested the moderation effect of contextual moderators such as country-level board gender quotas, the Sarbanes–Oxley Act, and TMT size on the direct hypothesis predicting gender spillovers to the level of executives (Hypothesis 1). As expected, none of these variables had any significant moderating effect on our main hypothesis on gender spillovers (Hypothesis 1). Our findings from subsample of studies ranked ABS 2 or higher reaffirm the robustness of our hypotheses. Detailed results from these supplementary analyses are provided in the supporting information document accompanying this draft (Tables S9–S11). This additional validation step adds strength to our conclusions and underscores the credibility of our meta-analytic findings.

4.5 | Summary and Theoretical Implications

In practice, there are firms with women represented at multiple levels of strategic leadership. This reality and consequent theoretical implications, however, have not been adequately captured by extant research because the effect of women leaders on firm performance has been studied at the individual level of leadership only. In our work, we build on the rich existing research on the performance effects of women in leadership positions, which includes several meta-analyses, to understand the relational dynamics between gender diversity at the board and executive levels, their joint effects on performance, and board structure as a potential moderator.

TABLE 5 | Results of meta-analytic regression analysis (MARA).

	B	SE
Intercept	23.831	21.078
Controls		
Impact factor	0.015	0.015
Panel dummy	0.018	0.032
US sample dummy	0.061	0.096
Median year sample	−0.011	0.010
Board independence	0.175	0.228
Moderator variables		
Board size	−0.027**	0.013
Adj. R^2	60.66%	
K	28	
$Q_{\text{-Residual}}$	275.429***	

Abbreviations: K = number of effect sizes, Q = Cochran's homogeneity test statistic.
***Statistically significant at the 1% level. **Statistically significant at the 5% level.

Overall, our findings attest to the importance of women's presence at multiple levels of strategic leadership for firm performance. However, they also caution about board-level factors that may impede the appointment of women executives to gender-diverse boards. Although not hypothesized, our analysis, based on a larger sample of studies, as performed previously, confirms the findings from previous meta-analyses. These authors found positive correlations between the presence of women on boards and in executive positions and firm performance. First, however, our work showcased how gender spillovers—the appointment of female executives by gender-diverse boards—act as a mechanism through which board diversity enhances financial performance. At the same time, despite the positive effect

of board gender diversity, our findings caution that the size of gender-diverse boards reduces gender spillovers to the level of executives. As we mentioned, the moderation effect of size was not significant in our models without controls, implying that the effect of board size on gender spillovers is strongly influenced by multiple other factors, including geographic location, study characteristics, and board characteristics. Furthermore, the effect of board size on gender spillovers could also vary across samples, as our moderator analysis of the sample with market-based performance as a robustness test did not yield statistical significance.

Our research interest is not just exploratory but has significant theoretical implications for the UET literature in general and for scholarship on women strategic leaders in particular. First, by studying gender spillovers as an intermediate outcome of decisions made by gender-diverse boards, we contribute to the research on the distinct contributions of women directors (Bilimoria 2000). We corroborate the scholarship that has identified the impact of women directors on gender diversity (Bilimoria 2006; Cook and Glass 2015) at different levels of the organization below the board and offer clarity to the inconsistent results in this area. Our insights contribute to emerging interest in UET research to understand relational dynamics at the board level (Quigley and Hambrick 2012) and show that the gender composition of boards determines the gender of executives (Nielsen 2010; Nielsen and Nielsen 2013).

Second, our study both supports and extends UET by suggesting that through gender spillovers from the board to the executive level, women directors enable superior performance. This finding directly responds to repeated calls for research to identify mechanisms that explain how firms can overcome the costs of board gender diversity and reap its benefits (Hillman 2015; Johnson, Schnatterly, and Hill 2013; Kirsch 2018). Furthermore, our findings unpack the "relational blackbox" of the dynamics between board and executive levels and support the recent conversation to expand UET to study strategic leadership as a system that works efficiently when intergroup dynamics are characterized by coordination (Luciano, Nahrgang, and Shropshire 2020) and when intergroup characteristics are configured with congruence (Richard, Triana, and Li 2020). The joint effects of women working at different organizational levels help explain the positive relationship between leadership and firm performance identified by extant studies such as Hoobler et al. (2018), Jeong and Harrison (2017), and Post and Byron (2015).

Third, because the connection between board-level diversity and the appointment of female executives is an important route for gender-diverse boards to realize their potential, it is vital to establish conditions that impact the appointment of female executives in the presence of gender-diverse boards. Although the literature on managerial performance and gender acknowledges that female executives are treated differently from their male counterparts (Dezsö and Ross 2012; Oakley 2000), it is not clear how this varies in the presence of women directors on boards. Our analysis extends the discussion on the interdependencies between board structure and the appointment of female executives. Our results show that the size of gender-diverse boards negatively influences gender spillovers to the level of executives.

4.6 | Practical Implications

For policymakers, shareholders, and company owners, our results show that increasing the gender representation of women on boards can advance the cause of women at other senior levels of strategic leadership, with positive implications for firm performance. Increasing the representation of women on boards addresses several structural barriers that firms face to attract more women to executive levels of the organization. Furthermore, existing policies that guarantee women's access to boards are useful because of the positive financial outcomes if women are joined with a holistic approach that enables women's overall access to various levels of the organization. As we show, firms with increased matching of demographic characteristics such as gender among various levels of leadership can lead to superior performance. Firms can enhance the positive effects of diversity, such as communication, knowledge transfer, and joint decision-making, and minimize negative effects due to conflicts and complacency by minimizing the gender mismatch between various levels of strategic leadership.

4.7 | Study Limitations and Future Research Directions

Although we found significant support for all our hypotheses, our study is not without limitations. First, previous studies have identified different types of diversity, namely, separation, variety, and disparity (Harrison and Klein 2007). Our study focused on the "variety" aspect of diversity due to a lack of adequate samples to test all three types of diversity. Future research could test how the various conceptualizations of diversity impact the relationship between board gender diversity and TMT diversity. Second, meta-analytic methods have certain limitations in establishing causality (Combs, Crook, and Rauch 2019). Primary studies allow researchers to address issues of endogeneity and causality through methodological choices. Hence, we encourage future researchers to conduct additional primary studies to understand the causal role of the gender-diverse board in determining executive characteristics in general and executive diversity and the associated factors that influence this relationship. Furthermore, due to limitations in sample size, we do not hypothesize about the effect of key regulatory events such as Sarbanes–Oxley, the establishment of lead independent directors, board gender quotas, and structural elements such as the size of executive teams. Although we expect that our time controls and robustness tests limit these concerns, they provide an opportunity for future research to understand the effect of regulatory events and executive team structure as boundary conditions that influence gender spillovers.

In addition to the future research that emerges from our study limitations, we identified other potential research directions from our findings. Since the number of women executives is expected to increase in the future, future research could investigate specific characteristics of women executives appointed by gender-diverse boards. For example, the power dynamics between women and male directors influence board decisions to select internal or external candidates. Hence, it is vital to examine whether women directors prefer to appoint women executives through their social networks or internal selection. Emerging evidence in this area suggests that gender-diverse

boards are associated with the appointment of female CEOs only if the CEO aspirant occupies a position on the board or is influenced by the friendliness of other female board members (You 2019). Our study shows that many important and fruitful research avenues continue to exist on the topic of diversity and female leadership in business.

Conflicts of Interest

The authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.