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Gender diversity and acquisitions: How female directors add value in acquisition decisions

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Abstract

We investigate board gender diversity and acquisition performance. Greater gender diversity promotes value-enhancing acquisitions. Utilizing an external shock to board composition, we determine whether and why an increase in female directors adds value. Female directors have unique characteristics relative to their male counterparts that contribute to their ability to add value during the merger and acquisition process. The positive market reaction following an acquisition is rationalized by better deal terms, monitoring around the acquisition and post-merger performance. The extensive professional networks and unique backgrounds female directors possess are the underlying mechanisms contributing to acquisition decisions' success.

KEYWORDS
acquisition announcement returns, corporate governance, gender diversity, mergers and acquisitions

JEL CLASSIFICATION
G14, G30, G34, J24

1 | INTRODUCTION

In 2018, Women on Boards (Senate Bill 826) was passed in California, mandating that publicly held companies based in California would have a minimum of one woman on their corporate board by the end of 2019. The bill is building awareness of female underrepresentation on corporate boards. When explaining the rationale behind the bill, the governor of California cited evidence that the presence of female directors creates value for firms. Extensive academic research has examined board gender diversity. Findings suggest that female directors strengthen the firm's

competitive advantages through their experience, skills and the broader perspective they adopt in decision-making. Therefore, increasing board gender diversity improves board effectiveness.[1]

Recent studies have extended to corporate acquisitions and find that companies with gender-diverse boards are less likely to pursue acquisitions. At the same time, those with female executives and directors tend to have better acquisition outcomes (see Dowling & Aribi, 2013; Huang & Kisgen, 2013; Levi et al., 2010, 2014). This research suggests that women have a more realistic outlook on acquisitions than men, which means they are less likely to overestimate a merger's potential gains. The value of gender diversity potentially arises from how women change the dynamics in the boardroom (Adams & Ferreira, 2009; Adams & Funk, 2012). In this paper, we investigate whether (i) gender-diverse firms are less acquisitive because female directors promote value-creating acquisitions but discourage value-destroying acquisitions and (ii) female directors' attributes, roles and unique backgrounds add value to acquisitions. Both these issues are overlooked in the literature. We seek to understand the underlying mechanisms through which female directors add value.

We conduct a battery of tests using a sample of 14,631 acquisitions conducted by 10,374 US firms from 1999 to 2020. First, we use a logit model and find that firms with a higher percentage of women on their boards are more likely to promote acquisitions that create value for shareholders. A one-unit increase in the fraction of female directors increases the probability of a firm making a value-creating acquisition by 18%.

Second, building on the findings of Huang and Kisgen (2013), we establish that the announcement period abnormal return earned by acquirers is positively associated with the fraction of female directors on corporate boards. However, we recognize that there may be biases inherent in gender diversity: Firms that choose to have diverse boards may also have unique acquisition preferences that are unobservable. We address this issue through a quasi-experiment by utilizing a change to listing regulations, requiring public boards to have a majority of independent directors, as a potential exogenous shock to board composition. We find that acquirers that increase female board representation following this regulatory change realize higher acquisition announcement returns. The positive association between the presence of female directors and acquirers' announcement period returns is further confirmed by an additional endogeneity test based on the two-stage least square (2SLS) approach.

Third, to identify the channels through which gender diversity matters, we investigate whether female directors possess unique characteristics that help choose value-creating acquisition targets. We find that, compared with their male counterparts, the female directors in our sample have more robust career networks and Ivy League educations, hold multiple degrees and have prior merger and acquisition (M&A) experience. The announcement period returns are positively related to these characteristics. In contrast, such an association is absent for male directors' attributes, implying that these unique characteristics are one potential mechanism that explains female directors' ability to add value during the M&A process.

Fourth, following the argument that female directors are more diligent monitors (Adams & Ferreira, 2009; Adams & Funk, 2012), we scrutinize the monitoring role of female directors in the acquisition process. When gender-diverse boards meet more often and have better attendance records before making acquisitions, the capital market rewards these monitoring processes. This increased monitoring leads to lower premiums paid, longer due diligence and an increased probability of completing the deal successfully. Finally, to capture the real effect of value-creating acquisitions undertaken by gender-diverse boards, we analyze the post-transaction performance of acquirers. We find that acquirers with a higher percentage of female directors on their boards achieve significant improvements in financial performance, return performance and market valuation in the long run. Our results suggest that female directors' unique attributes and monitoring intensity translate into increased firm value.

There is growing interest among practitioners and academics regarding the role of female directors in firm value and corporate decisions. These studies concur that gender diversity in a corporation adds value to various corporate decisions (Adams & Ferreira, 2009; Atif et al., 2019; Berger et al., 2014; Graham et al., 2013; Huang & Kisgen, 2013; Malmendier & Tate, 2005, 2008; Malmendier et al., 2011). However, the reason why gender-diverse boards add value

[1] See Adams and Ferreira (2009), Bertrand (2011), Coffey and Wang (1998), Huse and Solberg (2006), Nielsen and Huse (2010) and Gyapong et al. (2016).

is still unclear. We enhance the behavioral finance literature on gender and acquisitions by investigating the channels through which female directors add value. Exploring whether female directors' experience, education, finance expertise and networking skills contribute to favorable acquisition outcomes is particularly useful in the context of Ahern and Dittmar's (2012) study. They find that women appointed to a board to meet the requirements of a Norwegian gender quota law are younger and less experienced than their male counterparts, which increases firm acquisitiveness. In contrast to Ahern and Dittmar's (2012) findings, our results, as well as those of other studies conducted in countries without mandatory gender quotas like the United States, challenge their conclusions.

We analyze acquisition efficiency and post-acquisition performance improvements to understand value implications for acquirers with gender-diverse boards. We add insight regarding the monitoring capability of female directors (Adams & Ferreira, 2009; Adams & Funk, 2012) by analyzing board meeting frequency and attendance records and investigating whether the market perceives these aspects as important determinants of the value created in acquisitions. Finally, we provide evidence on the importance of qualitative attributes and the role of female directors, which may be helpful in the investment community and regulatory bodies.

The remainder of the paper is organized as follows. In Section 2, we develop hypotheses to be tested in the study. Section 3 explains the sample selection procedure and presents the data. The empirical findings are discussed in Section 4, and the outcomes of additional tests are presented in Section 5. The last section concludes the paper.

2 | HYPOTHESIS DEVELOPMENT

The empirical literature suggests that acquisitions can be both beneficial and detrimental for the shareholders of acquiring companies.[2] From an agency theory perspective, managerial overconfidence has been identified as one of the causes of value-destroying acquisitions. Managers often fall into the trap of hubris, leading them to make decisions that are not in line with their firm's corporate strategy for the takeover competition, which manifests in these managers overpaying for acquisition targets. In the long run, this overpayment results in the unnecessary dilution of their firms' equity (Boon & Mulherin, 2008; Malmendier & Tate, 2005, 2008; Roll, 1986). There are differing opinions as to why gender diversity helps to curtail empire-building that may result in value-destroying acquisitions. First, some studies suggest that the cautious approach adopted by female directors helps prevent rash decision-making by more overconfident male colleagues (Barber & Odean, 2001; Beyer, 1990; Croson & Gneezy, 2009; D. D. Johnson et al., 2006; Lenney, 1977; Lichtenstein et al., 1982). The argument follows that given the propensity of managerial overconfidence to result in poor financial decisions, the presence of female directors on corporate boards improves the financial decisions taken by firms (Barber & Odean, 2001; Doukas & Petmezas, 2007). Levi et al. (2010, 2014) suggest that female directors are more prudent regarding acquisitions. They predict that female directors' presence correlates with lower motivation for acquisitions and reduced premiums paid in cases where an acquisition does occur.

The diverse views female directors bring to boardroom discussions enhance the ultimate outcomes of board decisions (Carter et al., 2003; Gul et al., 2011; Miller & Triana, 2009). However, another stream of literature suggests that women's unique attributes to the boardroom create value. For instance, Ginglinger and Raskopf (2020) find that female directors may have greater non-conformist beliefs than their male counterparts. Similarly, Chen et al. (2016) suggest that boards with female directors are less likely to suffer from "group think." Additionally, there is mounting evidence that female directors focus more on monitoring than their male counterparts (Adams & Ferreira, 2009). In this paper, we argue that the monitoring and opinions of female directors allow boards to separate value-creating deals that they favor from those that destroy firm value. Therefore, we propose the following hypothesis:

[2] See, for example, Andrade et al. (2001), Antoniou et al. (2008), Bradley et al. (1988), Brown and Horin (1986), Dennis (1986), Diepold et al. (2008), Dodd (1976), Fan and Goyal (2006), and Shekhar and Torbey (2005).

H1: *A greater percentage of women on a board increases the likelihood that a firm will undertake acquisitions that create shareholder value.*

Recent research has explored the effects of gender on decision-making and found that the results vary depending on the context. For example, Guillén et al. (2018) find that females in today's organizations seem to see themselves as equally capable to men of succeeding in their professional roles; one difference is that females are less likely to brag about their achievements. Adams and Funk (2012) claim that female directors tend to have different core values than male directors. As a result, it is important to research which qualities female directors bring to the table when making acquisition decisions. This will help us better understand if women have any advantage due to their individual characteristics and credentials. Fedaseyeu et al. (2018) find that directors with higher educational qualifications and accounting and finance experience are more likely to serve on significant board committees and be appointed as chairs of those committees. Focusing on acquisitions, Bugeja et al. (2017) find that independent directors' prior experience and financial expertise matter during M&As. In this paper, we explore whether a firm's acquisition success is due to the relevant financial knowledge and educational background of female directors.

Neuroscience studies find that girls learn to speak earlier and have more sophisticated communication styles than boys (Horgan, 1975; Lutchmaya et al., 2002; Ozcaliskan & Goldin-Meadow, 2005). At the executive level, female managers are better communicators than their male counterparts. This is partly due to their collaborative management style, which is more effective in solving complex problems (Agarwal et al., 2016; Croson & Gneezy, 2009; Niederle & Vesterlund, 2007). At the board of director level, it has been found that the communication skills of female directors lead to superior decision-making (Adams & Kirchmaier, 2016; Gul et al., 2011). The sociology literature contends that better communication skills allow one to develop more robust networks with others (Bozionelos, 2003). Lutter (2015) finds that gender disadvantages disappear when women build social capital in open networks with higher diversity and information flow. In acquisitions, director networks are shown to be an essential determinant of acquisition success (Cai & Sevilir, 2012; Masulis & Mobbs, 2014). These studies suggest that networks matter for acquisition success. In particular, gender diversity on boards improves the quality of communication channels adopted by the board, together with boards' networking skills, thereby promoting better-informed acquisitions.

The above arguments suggest that the background and experience of female directors add value to acquisitions (Galbreath, 2011; Hillman et al., 2007; Hutchinson et al., 2015). Several studies have examined the effect of board diversity quota rules on firm performance, often concluding that they harm firms, leading to a loss in shareholder value (Ahern & Dittmar, 2012; Matsa & Miller, 2013; Nekhili et al., 2020). One explanation is that when women are placed in board roles as a checkmark to fill a quota, less experienced directors may be appointed. Ahern and Dittmar (2012) suggest that lack of experience is linked to dilutive acquisitions, potentially because of weaker monitoring due to female directors' inexperience, which indicates that the background of female directors matters. Accordingly, we expect female directors' backgrounds, experience and networking skills to be associated with better acquisition outcomes and hypothesize the following:

H2: *The unique backgrounds, experiences and networks of female directors are the underlying mechanisms that create value in acquisitions.*

Researchers have found that female directors may create an environment of greater accountability regarding ethical standards (Bernardi & Arnold, 1997; Cohen et al., 1998; Boulouta, 2013). Lai et al. (2017) argue that female directors are more sensitive to their minority status and, thus, are more likely to demonstrate their value through more intense monitoring responsibilities. They are often more mindful of ethical issues and proactive in mitigating legal and reputational risks than their male counterparts. By increasing female representation on boards, firms can potentially reduce agency conflicts through improved monitoring (Kim & Starks, 2016; Levi et al., 2010, 2014), such as higher attendance at board meetings (Adams & Kirchmaier, 2016). As diligent monitors with strict ethical standards and a unique set of values, female directors' presence on corporate boards can be associated with greater

monitoring intensity as implied by more frequent board meetings and higher director attendance before making acquisition decisions. In addition to financial considerations, acquisition decisions involve considering other critical organizational decisions, such as due diligence and the post-acquisition integration of two corporate cultures. We, therefore, propose the following hypothesis:

H3: *Enhanced monitoring is a significant channel through which female directors create value in acquisitions.*

3 | SAMPLE AND DATA

We use the SDC Platinum M&A database to collect a sample of M&A announcements made by publicly listed US bidders during the 22 years between 1999 and 2020. Following previous studies (Bris, 2005; Cai & Sevilir, 2012; Ishii & Xuan, 2014; King, 2009; Levi et al., 2014; Lin et al., 2018; Shen et al., 2014), we include both completed and incomplete offers for public, private and subsidiary targets across all industries. However, to be included in the final announcement sample, the deal value must be greater than US$1 million, and the bidder must seek to acquire more than 50% of the outstanding equity. We then merge the M&A announcement sample with firm-level accounting variables collected from COMPUSTAT and board gender diversity and other corporate governance variables obtained from the BoardEx database. This matching process across three databases gives us a final sample of 14,631 acquisitions by 10,374 unique bidding firms. We also use Execucomp and Institutional Shareholder Services (ISS) data in subsample analyses.

Table 1 reports the year-by-year distribution of the acquisitions from 1999 to 2020, together with the year-by-year distribution of the unique firm sample. The distribution of M&A announcements shows a gradual increase each year from 1999 to 2020. Although there is a substantial increase in announcements before the Global Financial Crisis, the sample appears evenly distributed across the remaining years. A similar pattern of year-by-year distribution is observed for the unique M&A firms (column 3). Although 1999 is an anomaly with the highest representation of firms with gender-diverse boards among acquirers, generally, we find that the participation of gender-diverse firms in acquisitions increases gradually over time. The untabulated industry distribution of our sample, based on Fama and French's (1997) 48 industry classifications, shows that the majority of the acquisitions come from the business service industry (15.30%) followed by financial trading (12.26%) and banking (6.40%). In contrast, the beer and liquor (0.08%), tobacco products (0.08%) and textiles (0.07%) sectors have the smallest number of acquisitions. Given the patterns observed in year-by-year and industry-by-industry distributions, we control for the effects of both year and industry in all our regression models.

4 | ANALYSIS AND RESULTS

4.1 | Female directors and the likelihood of value-creating acquisitions

In this section, we investigate whether female directors encourage value-enhancing acquisitions when confronted with the decision to acquire. Market participants view some acquisitions as value-creating because they award positive abnormal returns, while others are considered value-destroying because they award negative abnormal returns. Concerning the sample analyzed in this study, of the total 14,631 deals, 55.48% generate positive abnormal returns for acquirers during the 3-day announcement period, while 44.52% generate negative abnormal returns. Gender diversity may encourage potentially successful acquisitions that create value while discouraging value-destroying acquisitions. In this section, we test this hypothesis (H1) by estimating a logit model.

Similar to Minnick et al. (2011), we divide acquisitions into two groups: (i) value-creating acquisitions (i.e., those with positive cumulative announcement period abnormal return) and (ii) value-destroying acquisitions (i.e., those with negative cumulative announcement period abnormal return). We then create an indicator variable that is equal to

TABLE 1 Yearly sample distribution

	Merger and acquisition (M&A) announcements		Unique M&A firms	
Year	*N*	%	*N*	% with female directors
1999	82	0.56	32	97%
2000	411	2.81	268	56%
2001	476	3.25	332	62%
2002	503	3.44	349	62%
2003	825	5.64	573	54%
2004	953	6.51	642	53%
2005	1,029	7.03	706	53%
2006	1,017	6.95	710	51%
2007	782	5.34	585	55%
2008	534	3.65	430	56%
2009	706	4.83	505	60%
2010	707	4.83	529	59%
2011	734	5.02	528	59%
2012	685	4.68	484	60%
2013	852	5.82	603	62%
2014	345	2.36	249	65%
2015	632	4.32	456	71%
2016	608	4.16	426	70%
2017	790	5.40	537	78%
2018	656	4.48	482	85%
2019	532	3.64	394	89%
2020	772	5.28	554	92%
N (Average)	14,631	100	10,374	(66%)

Note: This table reports the yearly distribution of sample firms for the total M&A sample and unique M&A firms. The percentage of female directors in unique M&A firms is also reported.

one if a company makes value-creating acquisitions in a given year ($CAR >= 0$) and zero if a company makes value-destroying acquisitions in a given year ($CAR < 0$).[3] Using this indicator variable as the dependent variable, we estimate a logit model that takes the following form:

$$PR(D\_CAR_{i,t}) = \propto_0 + \propto_1 (PFEM/DFEM_{i,t}) + \sum \propto_i Controls_{i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}. \quad (1)$$

The dependent variable, $D\_CAR_{i,t}$, is the indicator variable explained above, and our primary explanatory variable is the fraction of female directors on the board ($PFEM_{i,t}$) or the indicator that captures the presence of female directors on boards ($DFEM_{i,t}$). Following Levi et al. (2014), we use both acquirer governance characteristics (board size, chief executive officer [CEO] duality and the fraction of independent directors) and firm characteristics (firm size,

[3] If a company makes multiple acquisitions in a given year, we calculate the weighted average cumulative abnormal return by using deal values to assign weights to respective deals.

leverage, cash holdings, growth, return on assets, Tobin's Q and firm age) as control variables in the above model.[4] Burns et al. (2021) show that board composition, including size and independence, is related to engaging in value-destroying and value-enhancing acquisitions, so we control for various board characteristics. We control for firm size because Moeller et al. (2004) show that there is an acquirer size effect in acquisitions. Jensen (1986) suggests that leverage has a disciplining effect on firms and may reduce empire-building, whereas larger cash reserves may lead to greater empire-building, resulting in value-destroying acquisitions. Jovanovic and Braguinsky (2002) show a relationship between acquisitions and growth opportunities, and Servaes (1991) indicates that well-run firms with high performance may also be better at acquisitions. Finally, Foster and Kaplan (2011) show that older firms take fewer risks, which may influence their acquisition behavior.

We first show the univariates of the firm characteristics used in equation (1) and test the differences between value-creating and value-destroying acquirers in panel A of Table 2. We find significant differences in mean/median values between these two groups across a number of variables. In particular, compared with their value-destroying counterparts, value-creating acquirers have larger boards and greater gender diversity, as well as more independent directors. These firms are also older, more profitable and hold more liquid assets than value-destroying acquirers but are smaller in size and report lower sales growth.

Panel B of Table 2 reports regression estimates for equation (1). In this table, column 1 (column 2) uses *PFEM* (*DFEM*) as the primary explanatory variable. In column 1 (column 2), the *PFEM* (*DFEM*) variable generates a positive and significant coefficient, suggesting that a higher fraction of female directors (the presence of female directors) leads to a higher probability of making value-creating acquisitions. These results are economically meaningful: The marginal effect analysis indicates that a one-unit increase in the fraction of female directors increases by 18% the probability of a gender-diverse firm making a value-creating acquisition. Several control variables (*BSIZE*, *PINDIR*, *SIZE*, *LEV*, return on assets (*ROA*) and *FIRMAGE*) enter the logit model with significant coefficients, implying the influence of the *PFEM/DFEM* variable holds after accounting for possible effects of governance and firm characteristics on the acquisition decision. Thus, our findings provide strong support for H1.[5]

4.2 | Female directors and acquisition announcement effects

Next, we test our remaining hypotheses related to the source of value creation. First, we examine the relationship between female director presence and the market reaction to acquisition announcements and then explore the influence of the characteristics of female directors on the announcement period abnormal return earned by acquirers. Specifically, we examine whether the market response to acquisition announcements can be explained by various qualities possessed by female directors, such as higher education, financial expertise, networking ability, level of experience and monitoring capability.

Using the 3-day cumulative abnormal return earned by acquirers as the dependent variable, we test if the market rewards the presence of female directors on corporate boards when companies announce their intention to make acquisitions to market participants. The following regression equation is estimated:

$$CAR_{i,t} = \propto_0 + \propto_1 (PFEM/DFEM_{i,t}) + \sum \propto_i Controls_{i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}, \quad (2)$$

where $CAR_{i,t}$ is the cumulative abnormal return earned by acquirers during the 3-day announcement period. *PFEM* and *DFEM* are the main explanatory variables explained in equation (1).

The control variables include the acquirers' firm, board and bid characteristics the year before the acquisition. Gompers et al. (2006) find that acquirers with larger boards, dual CEO–chairs, and fewer independent directors are

[4] The definitions of all variables used in the study are presented in Appendix A.

[5] We exclude utilities and financials from unreported tests and find qualitatively similar results.

TABLE 2 Female directors and the likelihood of value-creating acquisitions

Panel A: Descriptive statistics for logistics models variable						
	Value-creating M&A (*N* = 8117)		Value destroying M&A (*N* = 6514)		Sig. difference	
Main independent variable						
PFEM	0.1431	0.1111	0.1298	0.1111	***	***
DFEM	0.3648	—	0.3482	—	**	***
Board characteristics						
BSIZE	8.8467	9.0000	8.8451	8.0000		***
CEODUAL	0.5066	1.0000	0.5045	1.0000		***
PINDDIR	0.7603	0.7143	0.7289	0.7000	***	***
Firm characteristics						
SIZE	12.2935	14.4352	12.7679	15.3435		***
LEV	0.2498	0.2258	0.2479	0.2214		
CASH	0.1638	0.0869	0.1656	0.0843		
GROWTH	0.2317	0.1123	0.2536	0.1157	**	***
ROA	0.0434	0.0464	0.0373	0.0415	***	***
TOBINQ	2.1087	1.6417	2.1191	1.6244		***
FIRMAGE	18.9698	13.2541	17.9372	12.2521	***	***

Panel B: Logistics Models		
	(1) PFEM	(2) DFEM
	D_CAR = 1 if CAR > = 0 & 0 if CAR < 0	
PFEM/DFEM	0.7286***	0.0783*
	(0.00)	(0.07)
BSIZE	0.0186**	0.0169*
	(0.03)	(0.06)
CEODAUL	0.0121	0.0088
	(0.73)	(0.80)
PINDDIR	0.1448***	0.2214***
	(0.01)	(0.00)
SIZE	−0.0819***	−0.0696***
	(0.00)	(0.00)
LEV	0.2009**	0.2010**
	(0.05)	(0.05)
CASH	0.0115	0.0230
	(0.92)	(0.85)
GROWTH	−0.0348	−0.0358
	(0.25)	(0.23)
ROA	0.5062***	0.4849***
	(0.00)	(0.00)

(Continues)

TABLE 2 (Continued)

Panel B: Logistics Models		
	(1)	(2)
	PFEM	DFEM
	D_CAR = 1 if CAR > = 0 & 0 if CAR < 0	
TOBINQ	0.0086	0.0065
	(0.55)	(0.65)
FIRMAGE	0.0418***	0.0443***
	(0.01)	(0.01)
Constant	−0.1262	−0.1469
	(0.61)	(0.55)
Year and industry FE	Yes	Yes
N	14,631	14,631
Pseudo *R*2	0.0166	0.0154

Note: Panel A of Table 2 compares the means and medians of variables analyzed in the study between value-creating acquirers and value-destroying acquirers. Panel B reports the results for the logit model estimated from equation (1). The dependent variable (*D_CAR*) equals one if the firm conducts at least one acquisition, the announcement period cumulative abnormal return (CAR) is positive, and zero if it is negative. We calculated CAR using a 3-day event window (−1, +1), where day zero is the acquisition announcement date. In model 1, *PFEM* is the primary explanatory variable, while in model 2, *DFEM* is the primary explanatory variable. *PFEM* (*DFEM*) represents the percentage (presence) of female directors on the board. All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

penalized by the capital market with negative abnormal returns. We include board size, a CEO duality indicator, and the percentage of independent directors as control variables to account for these effects. Moeller et al. (2004) show that small acquirers earn significantly larger abnormal returns than their large counterparts. Maloney et al. (1993) argue that levered acquirers with less free cash flows tend to make value-enhancing acquisitions, whereas Harford (1999) finds that cash-rich acquirers destroy value during acquisitions. Capron and Shen (2007) and Lang et al. (1991) find a negative relationship between pre-merger profitability and acquirers' abnormal return. Finally, older firms are considered more viable (Levi et al., 2014). Given the above findings, we control for firm characteristics such as size, leverage, cash holdings, profitability, growth, Tobin's Q and age. Empirical studies also find several bid characteristics influential in market response to acquisition announcements. In this context, (i) the target's organizational form (e.g., Fuller et al., 2002), (ii) method of payment (e.g., Travlos, 1987), (iii) relatedness (e.g., Dutta & Jog, 2009; Haleblian & Finkelstein, 1999; Morck et al., 1990), (iv) relative size of the target (e.g., Asquith et al., 1983), (v) hostility of the bid (e.g., Jarrell & Bradley, 1980), (vi) bidder experience (e.g., Bradley et, al., 1988) and (vii) domestic versus the cross-border status of the target (e.g., Wansley et al., 1983) have been revealed as influential determinants. The theoretical arguments supporting these variables include agency conflict, information asymmetry, entrenchment and market discipline. We, therefore, include an unlisted target indicator, cash-only indicator, stock-only indicator, unrelated indicator, the relative size of the target, high-tech target indicator, foreign acquisition indicator, hostile bid indicator and serial bidder indicator as additional control variables in equation (2).[6]

Splitting the M&A sample into whether the firm has female directors in a given year, we present mean and median values of abnormal return, board characteristics, firm characteristics and deal characteristics in panel A of Table 3

[6] The SDC Platinum database specifically identifies high-tech targets; we assign a value of one to targets identified by SDC Platinum as high-tech firms and zero to others.

TABLE 3 Female directors and abnormal returns to acquirers

Panel A: Descriptive statistics for M&A sample						
	With female directors (*N* = 9319)		Without female directors (*N* = 5312)		Sig. difference	
All variables	Mean	Median	Mean	Median	Mean	Median
Market reactions						
3DCAR	0.0040	0.0001	0.0036	0.0002		
Female directors						
PFEM	0.2154	0.1818			N/A	N/A
PINDFEM	0.1637	0.0000			N/A	N/A
PNONINDFEM	0.0517	0.0000			N/A	N/A
Governance characteristics						
BSIZE	9.6437	9.0000	7.4465	7.0000	***	***
CEODAUL	0.5022	1.0000	0.5117	1.0000		
PINDDIR	0.7712	0.7273	0.7026	0.6667	***	***
Firm characteristics						
SIZE	18.6000	26.4456	18.1150	5.9821	***	***
LEV	0.2507	0.2277	0.2460	0.2123		***
CASH	0.1590	0.0858	0.1745	0.0857	***	
GROWTH	0.1907	0.0927	0.3305	0.1628	***	***
ROA	0.0414	0.0458	0.0395	0.0410		***
TOBINQ	2.1865	1.6745	1.9850	1.5637	***	***
FIRMAGE	22.0541	15.7507	12.2925	8.8384	***	***
Bid characteristics						
PRIVATE	0.4722	0.0000	0.5442	1.0000		***
CASHONLY	0.5572	0.0000	0.4571	0.0000		***
STOCKONLY	0.0566	0.0000	0.0593	0.0000	***	
UNRELATED	0.4679	0.0382	0.4433	0.0000		***
RELSIZE	0.1430	0.0000	0.2223	0.0633	***	***
HIGHTECH	0.3935	0.0000	0.3594	0.0000	***	***
FOREIGNACQ	0.2110	0.0000	0.1602	0.0000	***	***
HOSTILE	0.0054	0.0000	0.0013	0.0000	***	***
SERIAL	0.2836	1.0000	0.2813	0.0000		

Panel B: Regression output						
	OLS		Propensity score matching (PSM)		Two-stage least square (2SLS)	
			First stage	Second stage	First stage	Second stage
	(1)	(2)	(3)	(4)	(5)	(6)
	PFEM	*DFEM*	*DFEM*	*DFEM*	*PFEM*	*PRED/PFEM*
PFEM/DFEM/PRED PFDIR	0.0140***	0.0040***		0.0043***		0.1549***
	(0.00)	(0.00)		(0.00)		(0.00)

(Continues)

TABLE 3 (Continued)

Panel B: Regression output						
	OLS		Propensity score matching (PSM)		Two-stage least square (2SLS)	
			First stage	Second stage	First stage	Second stage
	(1)	(2)	(3)	(4)	(5)	(6)
	PFEM	*DFEM*	*DFEM*	*DFEM*	*PFEM*	*PRED/PFEM*
PFDIR_ERA					0.0050**	
					(0.04)	
PFDIR_Y_S					0.2471***	
					(0.00)	
BSIZE	0.0002	0.0000	0.3107***	0.0005	0.0025***	−0.0002
	(0.30)	(0.81)	(0.00)	(0.18)	(0.00)	(0.38)
CEODUAL	−0.0006	−0.0007	−0.0986**	−0.0003	−0.0064***	0.0002
	(0.42)	(0.39)	(0.03)	(0.83)	(0.00)	(0.81)
PINDDIR	0.0000	0.0010	1.9632***	0.0003	0.1449***	−0.0205***
	(0.99)	(0.38)	(0.00)	(0.89)	(0.00)	(0.00)
SIZE	−0.0017***	−0.0016***	0.3865***	−0.0025***	0.0241***	−0.0051***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LEV	0.0018	0.0019	−0.2288*	0.0017	−0.0007	0.0020
	(0.48)	(0.46)	(0.09)	(0.70)	(0.90)	(0.42)
CASH	−0.0009	−0.0006	−0.1425	0.0059	0.0178**	−0.0030
	(0.78)	(0.85)	(0.39)	(0.27)	(0.01)	(0.35)
GROWTH	−0.0002	−0.0002	−0.2204	−0.0020	−0.0023	0.0002
	(0.76)	(0.77)	(0.00)	(0.15)	(0.23)	(0.83)
ROA	−0.0076	−0.0078	−0.7421***	−0.0111	−0.0357***	−0.0025
	(0.17)	(0.16)	(0.00)	(0.22)	(0.00)	(0.66)
TOBINQ	0.0001	0.0001	0.0124	0.0000	−0.0029***	0.0005
	(0.71)	(0.80)	(0.52)	(0.93)	(0.00)	(0.17)
FIRMAGE	0.0003	0.0003	0.1690***	0.0005	0.0054***	−0.0005
	(0.41)	(0.43)	(0.00)	(0.46)	(0.00)	(0.29)
PRIV	0.0009	0.0009	0.0878*	−0.0011	0.0024	0.0006
	(0.25)	(0.26)	(0.06)	(0.38)	(0.27)	(0.44)
CASHONLY	0.0011	0.0011	0.0672	−0.0015	0.0034	0.0005
	(0.19)	(0.18)	(0.17)	(0.26)	(0.12)	(0.52)
STOCKONLY	−0.0114***	−0.0114***	0.0502	−0.0130***	0.0053	−0.0121***
	(0.00)	(0.00)	(0.63)	(0.00)	(0.39)	(0.00)
UNRELATED	−0.0008	−0.0008	0.1016**	−0.0016	0.0039	−0.0014
	(0.32)	(0.31)	(0.04)	(0.23)	(0.10)	(0.11)
RELSIZE	0.0029***	0.0029***	0.0066	0.0024	−0.0013**	0.0031***
	(0.00)	(0.00)	(0.76)	(0.48)	(0.04)	(0.00)

(Continues)

TABLE 3 (Continued)

Panel B: Regression output						
	OLS		Propensity score matching (PSM)		Two-stage least square (2SLS)	
			First stage	Second stage	First stage	Second stage
	(1)	(2)	(3)	(4)	(5)	(6)
	PFEM	*DFEM*	*DFEM*	*DFEM*	*PFEM*	*PRED/PFEM*
HIGHTECH	−0.0002	−0.0003	−0.0539	0.0018	−0.0060*	0.0007
	(0.84)	(0.79)	(0.43)	(0.29)	(0.07)	(0.57)
FOREIGNACQ	−0.0026***	−0.0026***	−0.0527	−0.0016	−0.0035	−0.0022**
	(0.00)	(0.00)	(0.36)	(0.27)	(0.19)	(0.02)
HOSTILE	−0.0076	−0.0077	−0.0287	−0.0044	−0.0055	−0.0072
	(0.32)	(0.32)	(0.93)	(0.69)	(0.73)	(0.34)
SERIAL	−0.0012	−0.0012	−0.1281**	0.0003	−0.0111***	0.0003
	(0.12)	(0.10)	(0.02)	(0.83)	(0.00)	(0.72)
Constant	0.0176***	0.0179***	−6.4927***	0.0241	−0.1003***	0.0305***
	(0.01)	(0.01)	(0.00)	(0.14)	(0.00)	(0.00)
Year and Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	14,631	14,631	14,612	5756	14,631	14,631
Adjusted ^{R2}/pseudo R^2	0.0301	0.0297	0.3327	0.0382	0.2738	0.0293
Durbin–Wu–Hausman stats (*p*-value)					<0.01	
Overidentification (Sargan test):					0.2538	

Note: Panel A of Table 3 reports the results of univariate analysis for the M&A sample. We test for significant differences in the mean and median values between firms with female directors and those without female directors. We use a *t*-test to compare means and sign rank tests for the medians. Panel B shows the results of the multivariate tests. The dependent variable (*3DCAR*) equals 3-day cumulative abnormal returns earned by an acquirer during the announcement period of an acquisition. Columns 1 and 2 of Panel B report the results for the ordinary least square (OLS) models estimated from equation (2). Column 1 uses *PFEM* (percentage of female directors on the board), and column 2 uses *DFEM* (an indicator variable equal to one if the board is gender diverse and zero otherwise) as our variables of interest. Column 3 reports the first-stage logit model output of the PSM analysis, while column 4 reports regression estimates for equation (2) using the PSM sample. Columns 5–6 show the results of the two-stage least-squared estimations. Column 5 shows the 2SLS first stage estimation with two instrumental variables: (i) the Equal Rights Act (ERA) and (ii) the annual median percentage of female directors in each state. Column 6 shows the second-stage estimations where the variable of interest is the predicted *PFEM*. All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

and test whether there are significant differences between the two groups. The average 3-day announcement period abnormal return earned by all acquirers is 0.39% (untabulated); however, firms with female directors make a significantly higher abnormal return (0.40%) than do firms without female directors 0.36%). Although they cover a different period, these returns are similar in magnitude to Masulis et al. (2009). We convert the abnormal return into a dollar value by multiplying the 3-day cumulative abnormal return by the market value of equity of the acquirer seven

days before the acquisition announcement. We find that gender-diverse acquirers generate higher mean dollar value abnormal returns of million, compared with US$3.882 million reported by their male-only counterparts, which is an economically significant difference.

In untabulated statistics, the mean percentage of female directors in the bidder boards (*PFEM*) is 13.72% across our total sample—or two female directors on average. Even though this is higher than the 9.50% reported by Levi et al. (2014), our sample is representative of the findings of a CS Gender 3000 board diversity survey across the globe, which finds an average female representation of 12.7% at the end of 2013.[7] This percentage increases to 21.54% for gender-diverse acquirers. Of these female directors, 16.37% are independent (*PINDFEM*), while 5.17% are non-independent (*PNONINDFEM*).[8] Gender-diverse boards are larger and have more independent directors than non-gender-diverse boards; CEO duality is similar between the two groups.

Next, we report our study's primary firm and bid characteristics. The acquirers with female directors hold lower cash balances and report lower annual sales growth than those with male-only boards. However, the former group is larger, more levered, older and more profitable while commanding a higher market valuation than the latter group. For bid characteristics, gender-diverse acquirers prefer to buy relatively smaller firms and foreign targets and initiate more hostile bids, whereas firms with no gender diversity favor stock-financed acquisitions and private targets.[9]

We next focus on the multivariate analysis of equation (2) in explaining the acquirers' announcement period abnormal return. In Table 3, panel B, we adopt three approaches to estimating equation (2). Columns 1 and 2 present ordinary least square (OLS) estimates using *PFEM* and *DFEM* as the primary explanatory variable in each model. Columns 3 and 4 present the outcome of propensity score matching (PSM) analysis, and columns 5 and 6 present the estimates generated by the 2SLS analysis. We explain the PSM and 2SLS analysis in detail below. In columns 1 and 2, we find a significant positive coefficient on *PFEM*, suggesting that the presence of female directors on boards improves the announcement period abnormal returns earned by acquirers. Column 1 uses the percentage of females on the board (*PFEM*), and column 2 uses an indicator to capture any gender diversity (*DFEM*). These results imply that the market interprets acquisitions undertaken by companies with female directors on their boards as value-creating, consistent with Huang and Kisgen (2013). As the average board size of 8.8460 for the entire sample, an increase in one female board member is associated with a 0.16% increase in abnormal returns. As the average 3-day abnormal return for the total sample is 0.39%, this is economically significant. This positive association is uncovered after controlling for the influence of firm, board and bid characteristics of acquirers. We find that acquirer size is negatively related to returns. Our results for firm size are consistent with Moeller et al. (2004), who show that smaller acquirers have better announcement returns. None of the board characteristics (board size, CEO duality and percentage of independent directors) is significantly related to announcement effects. The lack of significance for board characteristics is similar to the findings of Levi et al. (2014). Focusing on bid characteristics, stock-financed acquisitions and foreign target acquisitions significantly negatively influence the acquirers' abnormal returns, while relative size has a positive influence. The results are similar to Amihud et al. (1990), who show that stock-financed acquisitions have worse announcement effects.[10]

[7] Source: https://www.forbes.com/sites/karenhigginbottom/2014/10/02/more-women-on-the-board-means-higher-returns-for-firms/#2e1f575b30f3.

[8] Two additional measures are indicator variables that capture whether there are only one or multiple female directors on the board. We find that 56.11% of gender-diverse acquirers have more than one female director on their board.

[9] The untabulated correlation matrix and variance inflation factor (VIF) test for the control variables provides no evidence that the dataset suffers from serious multicollinearity issues. Specifically, the largest VIF score is 2.30 for *HIGHTECH*, far below the threshold of 10, beyond which multicollinearity concerns arise (P. Kennedy, 1992).

[10] We conduct several robustness tests with qualitatively consistent results, including (1) controlling additional governance characteristics (CEO age, CEO tenure, equity ownership of female directors and percentage of institutional ownership) and (2) distinctions between independent and non-independent female directors and between single and multiple female directors. We also control for acquirer-fixed effects instead of industry-fixed effects. Finally, we examine whether bidders with gender-diverse boards buy private cash deals and re-run equation (2) using two-way interactions (*PFEM*PRIV*) and three-way interactions (PFEM*CASHONLY*PRIV). We find that bidders with diverse boards finance private deals primarily with cash which results in higher announcement returns. These findings are available upon request.

As is common in studies involving corporate boards, endogeneity might be a concern in our investigation. First, our models may suffer from an omitted variable correlated with the presence of female directors on boards of acquirers and their acquisition performance. We address this omitted variable bias by employing the PSM technique, which can alleviate selection biases arising from the non-random assignment of data (Levi et al., 2014; Rosenbaum & Rubin, 1983). It optimally matches gender-diverse boards (the treatment group) to boards without gender diversity (the control group). We first estimate a logistic model using an indicator equal to one if there is board gender diversity (*DFEM*), using the control variables from equation (1). The result of the logistics model is reported in column 3 of panel B (Table 3). Based on the coefficients from this model, we compute a propensity score for each firm-year observation and match each treatment observation to a unique firm-year control observation with the closest propensity score based on a caliper width of 0.01.[11] The results of covariate balance between the treatment and control firms (untabulated) indicate that our matching procedure successfully achieves balance in the covariates, as there is no significant difference in the mean values of the potential determinants. Next, we re-estimate equation (1) using the PSM sample. Column 4 of panel B (Table 3) reports the outcome of this estimation. We observe a positive and significant coefficient on *PFEM*, supporting our previous finding that female directors on the board increase the announcement period's abnormal return of acquirers.

Second, the appointment of female directors and acquisition performance may be endogenously related. Firms that are better at acquisitions may consciously decide to bring female directors onto their boards. We employ a two-stage instrumental variable (IV) approach to mitigate this concern. Our two instruments are (i) an indicator variable assigned the value of one for observations coming from states that have ratified the *Equal Rights Amendment* (ERA) and zero for states that have not ratified ERA (*PFDIR_ERA*) and (ii) the annual median percentage of female directors in each state (*PFDIR_Y_S*).[12] While we believe that changes in female representation after ERA ratification and the state median number of female directors can have significant impacts on individual firms' decisions to appoint female directors (relevance exclusion), there is little, if any, evidence to suggest that they influence acquisition performance of individual firms (exclusion restriction). In the first stage, we regress the *PFEM* variable on the two IVs and all explanatory variables in equation (2). In the second stage, we re-estimate equation (2) using the predicted fraction of female directors based on the first-stage estimation (*PRED_PFDIR*) as our variable of interest. The results of this test are reported in columns 5 and 6 of panel B (Table 3). The results for the first stage (column 5) show that the coefficients on the IVs are positive and significant at the 1% level, suggesting that the ratification of the ERA and annual median percentage of female directors in the states where a firm's headquarters are located are positively associated with the proportion of female directors on the board. The output of the second stage (column 6) shows that the coefficient of *PRED_PFDIR* is positive (0.1549) and statistically significant.

Additionally, the Durbin–Wu–Hausman test of endogeneity leads to the rejection of the null hypothesis that *PFEM* is exogenous ($p < 0.01$). The over-identification test statistic (Sargan test) does not lead to the rejection of the null hypothesis that IVs are uncorrelated with the error term in the second-stage regression ($p = 0.2538$). These outcomes indicate that our main results remain robust to the possibility that the presence of female directors on the board and acquisition performance are endogenously related.

4.3 | Quasi-experiments

Research shows that gender quotas do not necessarily lead to better outcomes. For instance, Ahern and Dittmar (2012) find that gender quotas lead to less experienced boards and increased acquisitive behavior. Bertrand et al.

[11] A 1% caliper distance is consistent with previous studies (e.g., Harp & Barnes, 2018; Hasan et al., 2020).

[12] The objective of the ERA is to guarantee equal legal rights for all US citizens regardless of sex. It seeks to remove legal distinctions between men and women in relation to divorce, property, employment and other matters. Consequently, we expect more female representation on corporate boards domiciled in states that have ratified the ERA than in those domiciled in non-ratified states. The state median number of female directors is an alternative measure that may capture state-specific influences on the appointment of females to corporate boards.

(2019) find that mandating female participation on a board has few spillover effects for other women in the firm or society. However, Hillman et al. (2002) document that female board members tend to be better educated than their male peers. Therefore, the women who reach the upper echelon of executives and are eligible for board seats may possess unique attributes like stronger professional backgrounds or more extensive networks than a traditional pool of candidates.

Conversely, regulatory changes that encourage the appointment of more female directors to corporate boards might result in the selection of less qualified/experienced females to corporate boards, as fewer qualified candidates are in the pool of female directors. This may come at the expense of more qualified/experienced male executives being excluded from the role because of the pressure exerted by regulatory changes. Consequently, any exogenous shock to board membership that may increase board gender diversity may give rise to a weak relationship between the value created in acquisitions and the percentage of female directors on boards.

We use the new listing rules proposed by the New York Stock Exchange (NYSE) and the Nasdaq Stock Market (NASDAQ) in 2002 as a potential exogenous shock to board composition. One of the main provisions proposed by the NYSE and NASDAQ requires the boards of each listed company to have a majority of independent directors. This requirement was approved by the Securities and Exchange Commission in November 2003 and came into effect in 2005. Many firms were compliant with this listing rule before the change was proposed, allowing those companies to be used as control firms for non-compliant (treated) firms in a difference-in-differences analysis. The introduction of the new listing requirement acts as an exogenous shock to board composition in treated firms that were forced to increase board independence and potentially also the percentage of female directors on their boards. Firms that use the opportunity to increase the proportion of independent board directors may also use it to increase gender diversity.[13] Independent board members may closely monitor acquisition processes by asking additional questions in board meetings and voting against potentially value-destroying acquisitions. We create an indicator variable named "*D_TREATED*" that equals one if a firm in 2002 or earlier has less than 50% independent directors and zero otherwise.[14] A second indicator variable called "*D_POST*" equals one for observations 2005 and later and zero otherwise. The following regression is estimated:

$$\begin{aligned} CAR_{i,t} &= \beta_0 + \beta_1 \left(PFEM/DFEM_{i,t}\right) + \beta_2 \left(D\_TREATED_{i,t}\right) + \beta_3 \left(D\_POST_{i,t}\right) + \beta_4 \left(D\_TREATED_{i,t} \times D\_POST_{i,t}\right) \\ &+ \beta_5 \left(D\_TREATED_{i,t} \times D\_POST_{i,t} \times PFEM/DFEM_{i,t}\right) + \sum \beta_i Controls_{i,t} + Year\ FE + \frac{Industry}{Firm} FE + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where $D\_TREATED_{i,t}$ and $D\_POST_{i,t}$ are as defined above, and the other variables are similar to those in equation (2). The three-way interaction means that there is a two-way interaction of treatment firms after the 2005 listing change that differs according to whether the firm added female directors. The change in regulations may act as a shock that forces the treatment firms to increase independent directors, potentially by including women from a less qualified/experienced pool of candidates. Suppose this exogenous shock forces firms to appoint more females as independent directors simply because of the pressure exerted by external groups. In that case, we expect the *D_TREATED*×*D_POST*×*PFEM/DFEM* variable to generate an insignificant coefficient.[15] The findings of this estimation are reported in Table 4. We find that the above three-way interaction term generates positive and significant coefficients in the two models estimated. When complying with the board independence requirement, firms that complied by appointing female directors achieved higher abnormal returns during the announcement of acquisitions. Consequently, this change in corporate boards has improved the quality of acquisitions. More importantly, this exogenous

[13] We conduct a univariate test (untabulated) to determine whether the fraction of female directors on boards increases significantly after this regulatory change. Additionally, we verify that the fractional increase is due to new female directors being appointed and not just a reduction in board size. There is an 8% increase in the fraction of female directors on gender-diverse boards and a 6% increase in non-gender-diverse boards following the NASDAQ listing regulation.

[14] We further refine our definition of *D_TREATED* and code it as one if a firm in 2002 or earlier did not have a female director and had less than 50% board independence and zero otherwise. The results of estimating equation (3) using this revised variable remain qualitatively similar.

[15] We verify that the interaction captures an increase in gender diversity by examining the board's composition change before and after the ruling.

TABLE 4 Female directors and abnormal returns to acquirers—quasi-experiment

Panel A: SEC exchange listing rules				
	(1)	(2)	(3)	(4)
PFEM/DFEM	0.0140***	0.0015	0.0159***	0.0020
	(0.00)	(0.14)	(0.00)	(0.17)
D_TREATED	−0.0014	−0.0017	0.0259	0.0216
	(0.41)	(0.31)	(0.28)	(0.37)
D_POST	0.0026***	0.0028***	0.0034***	0.0037***
	(0.00)	(0.00)	(0.00)	(0.00)
D_TREATED×D_POST	−0.0022	−0.0039	−0.0069*	−0.0083**
	(0.52)	(0.37)	(0.05)	(0.04)
D_TREATED×D_POST×PFEM/DFEM	0.0312**	0.0084**	0.0622***	0.0137***
	(0.03)	(0.04)	(0.00)	(0.00)
Constant	0.0112***	0.0090**	−0.0202	−0.0177
	(0.00)	(0.01)	(0.26)	(0.33)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	No
Firm FE	No	No	Yes	Yes
N	14,631	14,631	14,631	14,631
Adjusted *R2*	0.0330	0.0299	0.4275	0.4267

Note: This table reports the results for the OLS models estimated from equation (3) using the variables capturing the regulatory change as additional explanatory variables. The dependent variable (*3DCAR*) equals 3-day cumulative abnormal returns earned by an acquirer during the announcement period of an acquisition. It uses a difference-in-differences analysis using new exchange listing rules introduced by the SEC in 2002 to improve the governance of listed firms, which came into effect in 2005 as a quasi-natural experiment. We create an indicator variable (*D_TREATED*), which takes the value of one if a firm in 2002 or earlier has less than 50% of independent directors and zero otherwise. We create another indicator variable (*D_POST*) that takes the value of one for post-2005 observations and zero otherwise. Our variable of interest is D_*TREATED×D_POST×PFEM*, which captures the influence of female directors appointed to boards in the post-2005 period, which had less than 50% females in the pre-2002 period. The models control for year and industry fixed effects using Fama–French 49 industry classifications or firm fixed effects. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

shock does not weaken the relationship between female directors' presence and the market response to acquisition announcements.

In Section 5, we address the question of sources of value creation associated with acquisitions conducted by gender-diverse boards. In this respect, we investigate the influence of female director traits (Sections 5.1 and 5.2) and the influence of the monitoring ability of female directors (Section 5.3).

5 | DIRECTOR TRAITS, MONITORING AND MARKET REACTION

5.1 | Director traits and market reaction: Male–female distinction

We find that greater gender diversity is related to better market reactions around acquisitions because female directors encourage the acquisition of value-creating targets. This may indicate that markets believe that acquisitions

undertaken by gender-diverse boards will be successful. However, it is unclear why gender diversity leads to these improvements. Hence, we explore whether female directors possess unique traits that help create value during the M&A process. According to our H2, director traits such as education, financial background, networks and experience are important determinants of value created in acquisitions. Therefore, using only acquirers with gender-diverse boards, we test whether important director traits are the sources of value creation and, in particular, whether the market distinguishes between male and female directors when assigning value to these traits. We consider several important aspects: (i) networking, (ii) the length of time worked on the board, (iii) number of degree qualifications held, (iv) Ivy League education, (v) chartered financial analyst (CFA) certification, (vi) certified public accountant (CPA) certification and (vii) M&A experience.[16] In addition to testing the above traits individually, following Fedaseyeu et al. (2018), we construct a qualification index for directors using the following attributes: (i) legal/consulting experience, (ii) academic experience, (iii) accounting/finance experience, (iv) management experience, (v) political experience, (vi) military experience and (vii) education (undergraduate, graduate and MBA). We use BoardEx to collect information on these traits. The findings of these analyses are reported in Table 5.

Panel A of Table 5 reports the findings of the univariate analysis where we test for differences in average per director of the above traits between female and male directors on gender-diverse boards. This panel reveals that networks are larger for female directors than for their male counterparts: Female directors have, on average, 1963 connections, whereas male directors have only 1516 connections. This result is particularly interesting given that previous research finds a lack of relationships among females to be the main reason for their underrepresentation in corporate boards (García-Izquierdo et al., 2018). More female directors have higher degree qualifications, are more likely to have attended Ivy League schools, hold CPA certification and possess more M&A experience. Their qualification index is also significantly higher than that of male directors, which suggests that these women may have to be better connected or well-qualified to make it to the executive ranks. However, male directors have longer tenure in their positions than female directors.

Panel B of Table 5 (columns 1–7) reports the results from equation (2) modified by adding each trait (while retaining the *PFEM* variable); each attribute is split into two representing both females and males. The number of observations for this test decreases to 9319 because of the merge with the Boardex database. Of the seven traits considered, five aspects of female directors—networks, number of degree qualifications, Ivy League education, CFA membership and M&A experience—are significantly and positively associated with announcement period abnormal returns. In contrast, only one of these aspects possessed by male directors (Ivy League education) is positively valued by the market. In addition, the qualification index generates a positive and significant coefficient for females, while it is negative for males (column 8). As such, these findings support our H2. There are two potential explanations for these results. First, our results suggest that the women in our sample are exceptionally well-qualified candidates. These women were appointed to their boards partly because they possess valuable traits that may improve the quality of corporate decisions. Second, the market potentially believes that female directors make use of their networking, qualifications and experience to improve the quality of acquisitions taken by their companies.

5.2 | Factor analysis

Our background director characteristic variables may be correlated with each other and an unobserved latent variable. To address these concerns, we conduct a principal component factor analysis with varimax factor rotation and include these factors in the regression models. We run the factor analysis separately for male and female characteristics (identified in Section 5.1), generating three female factors (F1, F2 and F3) and three male factors (M1, M2 and M3).

[16] Our network size is from the BoardEx database. To construct the network size, BoardEx utilizes director curriculum vitae and code information, such as employment history, educational background and affiliation with foundations and charitable organizations, to form a comprehensive database that allows it to generate a network for each individual captured in the database.

TABLE 5 Female directors and abnormal returns to acquirers: Female attributes

Panel A: Univariates						
	Female directors		Male directors		Sig. difference	
	Mean	Median	Mean	Median	Mean	Median
NETWORK	1963.0000	1457.5000	1516.1000	1335.6700	***	***
BOARD TENURE	5.5561	4.2500	7.5990	7.0600	***	***
DEGREES	2.4259	2.0000	2.3193	2.0000	***	***
IVY	0.3797	0.0000	0.3277	0.0000	***	**
CFA	0.0013	0.0000	0.0012	0.0000		
CPA	0.1090	0.0000	0.0835	0.0000	***	
MA_EXP	0.0646	0.0000	0.0524	0.0000	***	***
QUAL_INDEX	2.3523	2.3333	2.3262	2.3333	***	***

Panel B: Multivariate analysis								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PFEM	0.0106**	0.0143***	0.0138***	0.0140***	0.0147***	0.0150***	0.0138***	0.0078
	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.15)
F_NETWORK	0.0011***	–	–	–	–	–	–	–
	(0.00)	–	–	–	–	–	–	–
M_NETWORK	0.0001	–	–	–	–	–	–	–
	(0.91)	–	–	–	–	–	–	–
F_BOARD TENURE		0.0006	–	–	–	–	–	–
		(0.37)	–	–	–	–	–	–
M_BOARD TENURE		−0.0015	–	–	–	–	–	–
		(0.17)						
F_DEGREES			0.0041***					
			(0.00)					
M_DEGREES			0.0001					
			(0.95)					
F_IVY				0.0029**				
				(0.04)				
M_IVY				0.0030***				
				(0.00)				
F_CFA					0.0246***			
					(0.00)			
M_CFA					0.0044			
					(0.41)			
F_CPA						−0.0008		
						(0.65)		

(Continues)

TABLE 5 (Continued)

Panel B: Multivariate analysis								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
M_CPA						−0.0010		
						(0.33)		
F_MA_EXP							0.0040**	
							(0.02)	
M_MA_EXP							−0.0004	
							(0.71)	
F_QUAL_INDEX								0.0005**
								(0.03)
M QUAL_INDEX								−0.0001*
								(0.07)
Constant	0.0144*	0.0223***	0.0199***	0.0234***	0.0201***	0.0197***	0.0209***	0.0191***
	(0.09)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year and Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9319	9319	9319	9319	9319	9319	9319	9319
Adjusted *R2*	0.0389	0.0379	0.0389	0.0397	0.0381	0.0377	0.0381	0.0385

Note: Panel A reports the univariate comparison of director traits between male and female directors by modifying equation (2). We use a *t*-test for the means and sign rank tests for the medians. Panel B (columns 1–7) reports the results for the OLS models estimated from equation (2) of the following characteristics of both female and male directors as main explanatory variables: (i) networking, (ii) time on board, (iii) number of qualifications, (iv) Ivy, (v) chartered financial analyst (CFA) qualifications, (vi) certified public accountant (CPA) qualifications, (vii) prior M&A experience and (viii) qualifications index. The last column reports the regression output when the qualification index (*QUAL INDEX*) is used in place of the *PFEM* variable. The dependent variable (*3DCAR*) equals 3-day cumulative abnormal returns earned by an acquirer during the announcement period of an acquisition. All models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.

The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A of Table 6 shows the loadings on these factors. Focusing on the female characteristics, Factor 1 (F1) loads on IVY and the number of degrees capturing education, Factor 2 (F2) loads primarily on the network and M&A experience, and Factor 3 (F3) loads on the board tenure, CFA certification and CPA certification, which captures entrenchment and expertise. The male factors load on the same variables as the female factors.

Panel B of Table 6 shows the results of multivariate analysis using the same regression model as equation (2). However, we also include our six factors. Model 1 uses only the female loadings, model 2 uses only the male loading and model 3 is a joint estimation. We find that firms with female directors have better announcement returns consistent with earlier results. We find that all three factors matter for returns; F1, F2 and F3 are all positive and significant. Column 2 shows the results for only male directors, and we find a positive and significant coefficient on M2 (network and experience factor) and a negative and significant coefficient on M3 (entrenchment and financial expertise). These results imply that male directors with more robust networks and M&A experience generate better announcement returns, but male directors with longer tenures or specific expertise generate worse announcement returns. When we combine the male and female factors and re-estimate model 2, we find similar results: F1, F2 and F3 enter the regression model with positive and significant coefficients. At the same time, M3 gets negative and significant coefficients. These results support our previous findings in Table 5 that female directors' networks, education and experience bring

TABLE 6 Varimax factor analysis

Panel A: Loadings for the first three factors from a principal components factor analysis						
	Female directors			Male directors		
	F1	F2	F3	M1	M2	M3
DEGREES	0.835	−0.0467	−0.021	0.8013	−0.0074	0.1428
IVY	0.6433	0.3254	0.2407	0.5271	0.3289	−0.144
NETWORK	0.1728	0.7422	−0.0429	0.178	0.7781	−0.1762
MA_EXP	−0.1254	0.7419	−0.0523	−0.2699	0.6838	0.21
BOARD TENURE	0.1394	0.2896	0.5049	0.1657	−0.076	0.8001
CFA	0.1288	−0.2071	0.7268	0.2367	−0.0247	0.5966
CPA	0.3797	−0.1854	0.5365	0.5838	0.0744	0.0826
Panel B: Regression estimates using factors						
	(1)			(2)		(3)
PFEM	0.0094**			0.0149***		0.0098**
	(0.04)			(0.00)		(0.03)
F1	0.0019***					0.0017***
	(0.00)					(0.00)
F2	0.0018***					0.0016***
	(0.00)					(0.00)
F3	0.0009**					0.0009**
	(0.02)					(0.02)
M1				0.0007		0.0006
				(0.30)		(0.40)
M2				0.0012**		0.0007
				(0.05)		(0.22)
M3				−0.0015**		−0.0014*
				(0.04)		(0.06)
Constant	0.0298***			0.0286***		0.0320***
	(0.00)			(0.00)		(0.00)
Controls	Yes			Yes		Yes
Year and Industry FE	Yes			Yes		Yes
N	9,319			9,319		9,319
Adjusted *R2*	0.0403			0.0386		0.0409

Note: Our variables of interest are the three factor loadings. Panel A of this table reports the loadings of the three factors for female and male directors from a principal component factor analysis. Panel B reports the results for the OLS models estimated from equation (2) after controlling for all three factors. All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.

The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

value to the M&A process, whereas more entrenched male directors may encourage empire-building and destroy value.

5.3 | Female directors and the role of monitoring

In this section, we focus on the monitoring displayed by female directors during the acquisition process. The objective is to test H3 and determine whether more diligent monitoring occurs around acquisitions and whether acquisitions are more efficient when gender diversity exists. If gender diversity leads to more diligent monitoring, this may help explain why the literature attributes female behavior to greater risk aversion and conservative acquisition decisions for bidding firms (Boulouta, 2013; Faccio et al., 2016). Additionally, the literature suggests that female directors are concerned with ethical decision-making issues and may provide more intense monitoring to avoid potential risks. The additional scrutiny that arises through increased monitoring may be one channel through which acquirers achieve better acquisition outcomes. If female directors are diligent monitors (Adams & Ferreira, 2009), boards with a higher percentage of female directors should exert a higher level of monitoring during the acquisition process. We use two proxies to capture the extent of the monitoring role deployed by boards with female directors: (i) director attendance from ISS and (ii) number of board meetings from Execucomp.[17] We focus only on the sample of firms that are gender diverse.[18]

We first conduct a univariate analysis focusing on director attendance at board meetings and the number of board meetings held before acquisition decisions. For this purpose, we split the sample using the annual median of the percentage of female directors on boards. Table 7, panel A, reports the findings. In this panel, differences in board attendance and the number of board meetings between companies with a high fraction of female directors and those with a low fraction of female directors are insignificant. It appears that the mere presence of female directors does not significantly influence either director attendance at board meetings or the number of meetings held.

We next estimate the role of monitoring in acquisition outcomes in a multivariate estimation. For this purpose, we split the sample into two groups based on (1) low attendance—that is, attendance less than 75% and (2) high attendance—that is, attendance at least 75%. We also divide board meetings into two groups: (1) low number of meetings—that is, number of meetings less than the median and (2) high number of meetings—that is, number of meetings at least equal to the median. We then estimate equation (2) for each group separately. The results are reported for the two attendance groups in panel B of Table 7. We find that the coefficients of *PFEM* are positive and significant for the high attendance group and the high number of meetings group. The same coefficient has a negative, significant coefficient in the low meeting attendance group but no significance in the low number of meetings group. The results suggest that female directors contribute more to value-creating acquisitions when they regularly attend board meetings and when the board frequently meets before undertaking an acquisition. This finding is hardly surprising because these scenarios allow female directors to contribute by engaging in meaningful discussions and providing valuable inputs, supporting our H3.

The monitoring intensity observed in gender-diverse companies may result from female directors chairing monitoring committees. We conduct an additional test to examine this possibility. We collect data on chair positions held by female directors for committees of sample companies: (i) M&A committee, (ii) audit committee, (iii) corporate governance committee and (iv) nomination committee. We then estimate a variant of equation (1) where the dependent variable is an indicator variable equal to one if a particular committee is headed by a female director and zero otherwise. Four separate logit models are estimated on the sample of gender-diverse acquirers. The findings are reported in panel C of Table 7. The *PFEM* coefficient in all four models is positive and statistically significant, which implies an

[17] The samples used in these tests are significantly smaller than our primary sample because both ISS and Execucomp have less coverage than our original sample.

[18] In unreported tests, we also include firms with no female directors and find qualitatively similar results.

TABLE 7 Female directors and abnormal returns to acquirers: Monitoring intensity

Panel A: Univariate analysis						
Variable	Above median *PFEM*		Below median *PFEM*		Difference	
	Mean	Median	Mean	Median	Mean	Median
NATTEND_LESS75_PCT	0.1136	0	0.1632	0	−0.0118	0
BDMTGS	8.0114	7	7.7586	7	0.2528	0

Panel B: Female directors and abnormal returns: Number of attendees in meeting				
Variable	Meeting attendance		Number of f meetings	
	Less than 75%	More than 75%	Above median	Below median
PFEM	−0.0757***	0.0168***	0.0214**	0.0063
	(0.00)	(0.00)	(0.01)	(0.63)
Constant	−0.0024	0.0442*	0.0207**	0.0450**
	(0.93)	(0.07)	(0.02)	(0.02)
Controls	Yes	Yes	Yes	Yes
Year and Industry FE	Yes	Yes	Yes	Yes
N	449	4206	1411	717
Adjusted *R2*	0.3360	0.0689	0.1223	0.1616

Panel C: Female Directors' Appointment as Chairs of Monitoring Committees				
Variable	M&A committee chair	Audit committee chair	Corporate governance committee chair	Nomination committee chair
PFEM	1.0119**	3.1246***	2.9517***	2.4200***
	(0.02)	(0.00)	(0.00)	(0.00)

(Continues)

TABLE 7 (Continued)

Panel C: Female Directors' Appointment as Chairs of Monitoring Committees				
Variable	**M&A committee chair**	**Audit committee chair**	**Corporate governance committee chair**	**Nomination committee chair**
Constant	−3.1305***	−2.7350***	−0.4880	0.0661
	(0.00)	(0.00)	(0.23)	(0.88)
Controls	Yes	Yes	Yes	Yes
Year and Industry FE	Yes	Yes	Yes	Yes
N	7894	8486	8398	8412
Pseudo *R*2	0.0999	0.0682	0.0711	0.0768

Note: Panel A of this table compares differences in means and medians of board attendance and board meetings before acquisitions between two gender-diverse acquirer groups: (i) those with above annual median percentage of female directors and (ii) those with below annual median percentage of female directors. Panel B reports the results for the OLS models estimated from equation (2) for two meeting attendance groups and two board meeting groups, respectively (identified in panel A). The dependent variable (*3DCAR*) equals 3-day cumulative abnormal returns earned by an acquirer during the announcement period of an acquisition. Panel C reports the results for the logit model estimated from equation (1), where the dependent variable takes the value of one if a particular monitoring committee of a gender-diverse company is headed by a female director and zero otherwise. Our variable of interest is *PFEM*, which represents the percentage of female directors on the board. All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

increased likelihood of firms with gender-diverse boards appointing females to chair monitoring committees. This finding may be the primary explanation for monitoring activities before acquisition decisions, as observed in panels A and B of Table 7.

6 | ADDITIONAL AND ROBUSTNESS TESTS

6.1 | Female directors and acquisition efficiency

This section addresses the issue of whether gender diversity is related to improved efficiency in acquisitions. We focus on three efficiency measures: (i) the premium paid to targets, (ii) the time taken to complete the deal and (iii) the likelihood of completing the acquisition. Firms that pay a lower premium for acquisitions can capture more synergies and potential value for their shareholders. An acquirer who rushes to close a deal may forgo important due diligence exercises, making it prone to bad acquisitions. Therefore, spending more time on due diligence, which extends the time to close the deal, may be more value-enhancing. An alternative explanation may be that a shorter negotiation period means that the acquisition is a good deal for both the acquirer and the target and, thus, is completed earlier. Finally, the expected synergies can only be realized if the bid is completed successfully.

For public targets, we take the difference between the deal value and the market capitalization 1 month before the deal announcement as the bid premium. For private targets, we take the average bid premium paid to public targets in a given industry in a given year as the proxy bid premium (Humphery-Jenner & Powell, 2011; Officer, 2007).[19] Following Faleye et al. (2011), we use the days to complete the bid as the time to complete the deal. The following model is estimated:

$$\gamma_{i,t} = \propto_0 + \beta_1 \left(PFEM_{i,t}\right) + \sum \beta_i Controls_{i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}, \quad (4)$$

where in separate regressions, $\gamma_{i,t}$, represents (i) the natural logarithm of the bid premium paid in an acquisition (*BIDPREM*), (ii) the natural logarithm of the number of days taken to complete the deal *(LOGDAYS)* and (iii) an indicator variable that equals one when a bid is completed and zero if the bid is unsuccessful (*SUCCESS*). We use an OLS estimate for the first two models and a logit estimation for the third model. The control variables included in equation (4) are the same as those in equation (2).

The findings are reported in Table 8, panel A. We show only the variables of interest for brevity, although all controls show signs consistent with the literature. In agreement with previous studies (Levi et al., 2014), we find that the presence of female directors has a significant negative influence on the bid premium paid in acquisitions; the *PFEM* variable generates a negative and significant coefficient when the dependent variable is the bid premium paid. The same variable generates a positive and significant coefficient when the time taken to complete the deal is the dependent variable. The literature shows that the time to complete the deal is equated to longer due diligence (Wangerin, 2019). Therefore, our results imply that gender-diverse boards may engage in lengthier due diligence to ensure that these decisions add value to their firms. The presence of female directors is also associated with the successful completion of deals initiated by their firms as implied by the positive and significant coefficient generated for the *PFEM* variable when the dependent variable is the likelihood of completing the deal.

[19] We estimate equation (4) by excluding private targets, and the results remain similar to those reported in Table 8, panel A. Additionally, we use two-way interactions (*PFEM*PRIV)* and three-way interactions (*PFEM*CASHONLY*PRIV*) and find that premiums are smaller for firms with gender-diverse boards that acquire private firms with cash.

TABLE 8 Female directors, acquisition efficiency and post-acquisition performance

Panel A: Acquisition efficiency			
	BIDPREM	**LOGDAYS**	**SUCCESS**
PFEM	−0.4847***	0.5268***	0.2998**
	(0.01)	(0.00)	(0.02)
Constant	0.4834	1.2410**	−0.5081
	(0.28)	(0.02)	(0.22)
Controls	Yes	Yes	Yes
Year and Industry FE	Yes	Yes	Yes
N	9492	13,204	13,133
Adjusted *R*2/pseudo R^2	0.1191	0.2805	0.1196

Panel B: Post-acquisition performance				
	Post-operating and market based performance		**Long run stock market performance**	
	***AVGCHROA* t0 to *t* + 3**	***AVGCHTOBINQ* t0 to *t* + 3**	***AVGRET (EW)* t0 to *t* + 3**	***AVGRET (VW)* t0 to *t* + 3**
PFEM	0.0197***	0.1843*	0.1967***	0.1004*
	(0.00)	(0.05)	(0.01)	(0.07)
Constant	−0.0667**	−0.8196	0.1004	0.0835
	(0.01)	(0.22)	(0.50)	(0.49)
Controls	Yes	Yes	Yes	Yes
Year and Industry FE	Yes	Yes	Yes	Yes
N	13,318	13,318	8399	8399
Adjusted *R*2	0.0724	0.2807	0.1243	0.1867

Note: Panel A reports the results generated by estimating equation (4). The dependent variables are represented by three acquisition proxies: (i) bid premium (*BIDPREM*)—the ratio of the final offer price to the target stock price four weeks before the original announcement date minus one; (ii) number of days taken to complete the deal (*LOGDAYS*)—the natural logarithm of one plus the number of days from the deal announcement date to deal effective date as reported in SDC database and (iii) partial acquisition (*SUCCESS*)—an indicator variable that takes the value of one if the bid is completed and zero if the bid is unsuccessful. Panel B reports the results for the OLS models estimated from equation (5). The dependent variable in each model represents post-acquisition operating, market-based and stock market performance: (i) the average change in ROA in the post-acquisition 3-year period, (ii) the average change in Tobin's Q in the post-acquisition 3–year period and (ii) either equally weighted or value-weighted monthly stock return in the post-acquisition 36-month period. Our variable of interest is *PFEM*, which represents the percentage of female directors on the board. All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

6.2 | Female directors and post-acquisition performance

In this section, we test whether the improved efficiency associated with the presence of female directors on acquirers' boards translates into performance improvement in the long run. The following model is estimated:

$$PAPER_{i,year0\ to\ year+3} = \propto_0 + \beta_1 \left(PFEM_{i,t}\right) + \sum \beta_i Controls_{i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}, \quad (5)$$

where $PAPER_{i,year0\ to\ year\ t+3}$ is the post-acquisition performance represented by four measures: (i) average change in return on assets in the 3-year post-acquisition period (*AVGCHROA*); (ii) average change in Tobin's Q in the 3-year post-acquisition period (*AVGCHTOBINQ*); (iii) equally weighted monthly buy-and-hold return for the 36-month period following the acquisition month (*AVGRET(EW)*) and (iv) value-weighted monthly buy-and-hold return for the 36-month period (*AVGRET(VW)*) following the acquisition month. The control variables include only the board and firm characteristics referred to in equation (2). We also have lagged *ROA* and Tobin's Q in respective models to account for any persistence or mean reversion in firm performance; the standard deviation of stock returns is also included to account for the influence of firm risk on performance. Finally, we include an indicator to capture whether the acquirer has more than one acquisition in a given year.

Table 8, panel B, reports the results. These results are based on a smaller sample because companies that make multiple acquisitions in a given year appear only once in the regression models. Our performance measures include both accounting-based and market-based metrics. *ROA* captures the operating performance, Tobin's Q captures the market valuation of a firm's assets base and the buy-and-hold return reflects a firm's market performance. We find that the coefficient on the *PFEM* variable is consistently positive and significant across all four performance measures, implying that acquirers with a higher fraction of female directors on their boards report a significant improvement in operating and return performances during the post-acquisition period. The standard deviation of female directors on boards is 0.1525 (untabulated). Accordingly, a one standard deviation increase in female directors ensures a rise of 0.30% in return on assets, suggesting improved asset utilization efficiency by acquirers.

Similarly, Tobin's Q increases by 2.81% with an increase in female directors of similar magnitude. Equity investors accumulate similar gains from such action; a one standard deviation increase in female directors is associated with a 1.53%—2.99% increase in their monthly buy-and-hold return during the 36 months following the acquisition. Our findings are interesting in the context of conflicting evidence in the literature about the long-run performance of acquirers. Some studies report significant improvements in acquirers' post-acquisition performance (e.g., Healy et al., 1992; Powell & Stark, 2005), while others find a significant deterioration (e.g., André et al., 2004; Clark & Ofek, 1994; Sharma & Ho, 2002) or no improvement (e.g., Chatterjee, 2000; Dutta & Jog, 2009; Ghosh, 2001). In contrast, our results imply that firms with gender-diverse boards show more robust performance improvements in the long run.

6.3 | Robustness

In this section, we examine the role of managerial entrenchment. We report these results in a separate section because we use smaller samples for almost all these tests than the primary sample used in the study.

In Table 9, we re-estimate equations (1) and (2) but substitute Bebchuk et al.'s (2009) entrenchment index (*EINDEX*) with the three governance characteristics (board size, CEO duality and the fraction of independent directors). Again, we find the *PFEM* coefficient is positive and significant in the two models (0.7983 for equation 1 and 0.0088 for equation 2), implying that the use of the entrenchment index does not alter our main findings.[20]

[20] Evidence suggests that toehold acquisitions facilitate value-enhancing control transfers (Choi, 1991), allow potential acquirers to obtain vital information about possible synergies associated with the acquisition of that target (Povel & Sertsios, 2014) enabling the minority shareholder to purchase the target at a lower price (Bulow et al., 1999). Therefore, companies with gender-diverse boards may prefer to acquire a minority stake in targets to reap the benefits of having a toehold. To test this, we expand our sample by bringing in acquisitions of less than 50% and estimate equation (1). Our dependent variable is an indicator variable that takes the value of one if an acquirer acquires less than 50% of the target and zero otherwise. The *PFEM* variable generates a positive coefficient (0.6769) that is significant at the 1% level. This finding implies that boards with female directors are more likely to acquire a toehold in prospective targets rather than acquiring a majority stake. We do not report this test as it is not the main focus of our study.

TABLE 9 Estimating equations (1) and (2) after adding *EINDEX* as an additional control variable

	(1)	(2)
PFEM	0.7983***	0.0088**
	(0.00)	(0.03)
Constant	−0.4552	0.0090
	(0.36)	(0.33)
Controls	Yes	Yes
Year and Industry FE	Yes	Yes
N	6821	6829
Pseudo R^2/ Adjusted R^2	0.0218	0.0291

Note: This table reports the results of additional robustness tests estimating equations (1) and (2) in columns 1 and 2, respectively. The table shows the results when the three measures of board governance (*BSIZE*, *CEODUAL*, *PINDDIR*) are replaced by an entrenchment index (*EINDEX*). All the models control for year and industry fixed effects using Fama–French 49 industry classifications. The *p*-values are reported in parentheses, and robust standard errors are clustered by firm. All variables are defined in Appendix A.
The *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

7 | CONCLUSION

In this study, we conduct a comprehensive investigation into how female directors contribute to the success of acquisitions. We not only look at whether gender diversity exists but also examine the quality of the diversity by investigating the backgrounds of female and male directors, which allows us to understand the channels through which diversity adds value. Specifically, we show how gender diversity is related to the probability of making value-creating acquisitions, acquirers' stock returns around the acquisition announcement, acquisition negotiations and long-term performance changes after acquisitions.

First, we show that the presence of female directors is positively related to undertaking value-enhancing acquisitions, implying that a higher fraction of female directors leads to a higher probability of making value-creating acquisitions. Further results show that firms with greater gender diversity have significantly higher stock returns around the acquisition announcements. Acquirers with female directors outperform their counterparts without female directors over a 3-day announcement period. Gender diversity helps reduce agency issues associated with acquisitions by helping to align the interests of management with the interests of shareholders. Gender-diverse boards focus on acquisitions that have the potential to maximize shareholder value. We also find that the female directors in our sample have unique attributes like strong networks and backgrounds in M&A and finance, which may enable them to identify potential targets that are synergistic for the acquirer.

Gender-diverse boards provide more diligent monitoring around the acquisition through more meetings that female directors will attend. The multifaceted contributions made by female directors translate into efficiency improvements in acquisitions as reflected by lower premiums offered, better due diligence undertaken before closing the deal and greater success in completing bids. Consequently, gender-diverse acquirers accumulate long-run performance improvements at the operational and market levels.

As politicians' and regulators' focus on gender diversity grows, our results can add insight into the debate as to how and why firms should add additional female directors. We hope our results will promote public policy, encouraging firms to add females with specific backgrounds and not just add females to the diversity box.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from BoardEx. Restrictions apply to the availability of these data, which were used under license for this study.

REFERENCES

Abernethy, M. A., Bouwens, J., & van Lent, L. (2004). Determinants of control system design in divisionalized firms. *Accounting Review*, *79*(3), 545–570.

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, *94*(2), 291–309.

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science*, *58*(2), 219–235.

Adams, R. B., & Kirchmaier, T. (2016). Women on boards in finance and STEM industries. *American Economic Review*, *106*, 277–281.

Ahern, K. R., & Dittmar, A. K. (2012). The changing of the boards: The impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics*, *127*(1), 137–197.

Agarwal, S., Qian, W., Reeb, D. M., & Sing, T. F. (2016). Playing the boys game: Golf buddies and board diversity. *American Economic Review*, *106*(5), 272–276.

Amihud, Y., Lev, B., & Travlos, N. G. (1990). Corporate control and the choice of investment financing: The case of corporate acquisitions. *The Journal of Finance*, *45*(2), 603–616.

Antoniou, A., Arbour, P., & Zhao, H. (2008). How much is too much: Are merger premiums too high? *European Financial Management*, *14*(2), 268–287.

André, P., Kooli, M., & L'her, J. F. (2004). The long-run performance of mergers and acquisitions: Evidence from the Canadian stock market. *Financial Management*, *33*(4), 27–43.

Andrade, G., Mitchell, M., & Stafford, E. (2001). New evidence and perspectives on mergers. *Journal of Economic Perspectives*, *15*(2), 103–120.

Asquith, P., Bruner, R. F., & Mullins, D. W. (1983). The gains to bidding firms from merger. *Journal of Financial Economics*, *11*(1-4), 121–139.

Atif, M., Liu, B., & Huang, A. (2019). Does board gender diversity affect corporate cash holdings? *Journal of Business Finance & Accounting*, *46*(7-8), 1003–1029.

Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, *116*(1), 261–292.

Bebchuk, L., Cohen, A., & Ferrell, A. (2009). What matters in corporate governance? *Review of Financial Studies*, *22*(2), 783–827.

Berger, A. N., Kick, T., & Schaeck, K. (2014). Executive board composition and bank risk taking. *Journal of Corporate Finance*, *28*, 48–65.

Bernardi, R. A., & Arnold, D. F. (1997). An examination of moral development within public accounting by gender, staff level, and firm. *Contemporary Accounting Research*, *14*(4), 653–668.

Bertrand, M. (2011). *New perspectives on gender. Handbook of labor economics* (Vol. 4. pp. 1543–1590). Elsevier.

Bertrand, M., Black, S. E., Jensen, S., & Lleras-Muney, A. (2019). Breaking the glass ceiling? The effect of board quotas on female labor market outcomes in Norway. *The Review of Economic Studies*, *86*(1), 191–239.

Beyer, S. (1990). Gender differences in the accuracy of self-evaluations of performance. *Journal of Personality and Social Psychology*, *59*(5), 960.

Boone, A. L., & Mulherin, J. H. (2008). Do auctions induce a winner's curse? New evidence from the corporate takeover market. *Journal of Financial Economics*, *89*(1), 1–19.

Boulouta, I. (2013). Hidden connections: The link between board gender diversity and corporate social performance. *Journal of Business Ethics*, *113*(2), 185–197.

Bozionelos, N. (2003). Intra-organizational network resources: Relation to career success and personality. *The International Journal of Organizational Analysis*, *11*(1), 41–66.

Bradley, M., Desai, A., & Kim, E. H. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *Journal of Financial Economics*, *21*(1), 3–40.

Bris, A. (2005). Do insider trading laws work? *European Financial Management*, *11*(3), 267–312.

Brown, P., & Horin, A. (1986). Assessing competition in the market for corporate control: Australian evidence. *Australian Journal of Management*, *11*(1), 23–50.

Burns, N., Minnick, K., & Smith, A. H. (2021). The role of directors with related supply chain industry experience in corporate acquisition decisions. *Journal of Corporate Finance*, *67*(2), 101911.

Bugeja, M., Matolcsy, Z., & Spiropoulos, H. (2017). The CEO pay slice: Managerial power or efficient contracting? Some indirect evidence. *Journal of Contemporary Accounting & Economics*, *13*(1), 69–87.

Bulow, J., Huang, M., & Klemperer, P. (1999). Toeholds and takeovers. *Journal of Political Economy*, *107*(3), 427–454.

Cai, Y., & Sevilir, M. (2012). Board connections and M&A transactions. *Journal of Financial Economics*, *103*(2), 327–349.

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *Financial Review*, *38*(1), 33–53.

Capron, L., & Shen, J. -C. (2007). Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal*, *28*(9), 891–911.

Chatterjee, R. A. (2000). The financial performance of companies acquiring very large takeover targets. *Applied Financial Economics*, *10*(2), 185–191.

Chen, J., Leung, W. S., Song, W., & Goergen, M. (2016). *Why board gender diversity matters: The role of female directors in reining in male CEO overconfidence.* (Working Paper), Cardiff University.

Choi, C. (1991). Toehold acquisitions, shareholder wealth, and the market for corporate control. *The Journal of Financial and Quantitative Analysis*, *26*(3), 391–407.

Clark, K., & Ofek, E. (1994). Mergers as a means of restructuring distressed firms: An empirical investigation. *Journal of Financial and Quantitative Analysis*, *29*(4), 541–565.

Coffey, B. S., & Wang, J. (1998). Board diversity and managerial control as predictors of corporate social performance. *Journal of Business Ethics*, *17*(14), 1595–1603.

Cohen, L. E., Broschak, J. P., & Haveman, H. A. (1998). And then there were more? The effect of organizational sex composition on the hiring and promotion of managers. *American Sociological Review*, *63*(5), 711–727.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 448–474.

Dennis, D. K., & McConnell, J. J. (1986). Corporate mergers and security returns. *Journal of Financial Economics*, *16*(2), 143–187.

Diepold, B., Feinberg, R. M., Round, D. K., & Tustin, J. (2008). Merger impacts on investor expectations: An event study for Australia. *International Journal of the Economics of Business*, *15*(1), 45–62.

Dodd, P. (1976). Company takeovers and the Australian equity market. *Australian Journal of Management*, *1*(2), 15–21.

Doukas, J. A., & Petmezas, D. (2007). Acquisitions, overconfident managers and self-attribution bias. *European Financial Management*, *13*(3), 531–577.

Dowling, M., & Aribi, Z. A. (2013). Female directors and UK company acquisitiveness. *International Review of Financial Analysis*, *29*, 79–86.

Dutta, S., & Jog, V. (2009). The long-term performance of acquiring firms: A re-examination of an anomaly. *Journal of Banking & Finance*, *33*(8), 1400–1412.

Fan, J. P. H., & Goyal, V. K. (2006). On the patterns and wealth effects of vertical mergers. *The Journal of Business*, *79*(2), 877–902.

Faccio, M., Marchica, M. T., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance*, *39*, 193–209.

Faleye, O., Hoitash, R., & Hoitash, U. (2011). The costs of intense board monitoring. *Journal of Financial Economics*, *101*(1), 160–181.

Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics*, *43*(2), 153–193.

Fedaseyeu, V., Linck, J. S., & Wagner, H. F. (2018). Do qualifications matter? New evidence on board functions and director compensation. *Journal of Corporate Finance*, *48*, 816–839.

Foster, R., & Kaplan, S., 2011. *Creative Destruction: Why companies that are built to last underperform the market--And how to success fully transform them*. Currency.

Fuller, K., Netter, J., & Stegemoller, M. (2002). What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. *The Journal of Finance*, *57*(4), 1763–1793.

Galbreath, J. (2011). Are there gender-related influences on corporate sustainability? A study of women on boards of directors. *Journal of Management & Organization*, *17*(1), 17–38.

García-Izquierdo, A. L., Fernández-Méndez, C., & Arrondo-García, R. (2018). Gender diversity on boards of directors and remuneration committees, The influence on listed companies in Spain. *Frontiers in Psychology*, *9*, 1351.

Ghosh, A. (2001). Does operating performance really improve following corporate acquisitions? *Journal of Corporate Finance*, *7*(2), 151–178.

Ginglinger, E., & Raskopf, C. (2020). *Women directors and E&S performance: Evidence from board gender quotas.* (Working Paper No. 761/2021), EGCI.

Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. S. (2006). *Skill vs. luck in entrepreneurship and venture capital: Evidence from serial entrepreneurs*. (Working Paper Series No. w12592) NBER.

Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics*, *109*(1), 103–121.

Guillén, L., Mayo, M., & Karelaia, N. (2018). Appearing self-confident and getting credit for it: Why it may be easier for men than women to gain influence at work. *Human Resource Management*, *57*(4), 839–854.

Gul, F. A., Srinidhi, B., & Ng, A. C. (2011). Does board gender diversity improve the informativeness of stock prices? *Journal of Accounting and Economics*, *51*(3), 314–338.

Gyapong, E., Monem, R. M., & Hu, F. (2016). Do women and ethnic minority directors influence firm value? Evidence from post-apartheid South Africa. *Journal of Business Finance & Accounting*, *43*(3-4), 370–413.

Haleblian, J., & Finkelestein, S. (1999). The influence of organizational acquisition experience on acquisition performance: A behavioral learning perspective. *Administrative Science Quarterly*, *44*(1), 29–56.

Harford, J. (1999). Corporate cash reserves and acquisitions. *The Journal of Finance*, *54*(6), 1969–1997.

Harp, N. L., & Barnes, B. G (2018). Internal control weaknesses and acquisition performance. *Accounting Review*, *93*(1), 235–258.
Hasan, I., Navone, M., To, T. Y., & Wu, E. (2020). Tournament incentives and acquisition performance. *Review of Corporate Finance Studies*, *9*(2), 384–419.
Healy, P. M., Palepu, K. G., & Ruback, R. S. (1992). Does corporate performance improve after mergers? *Journal of Financial Economics*, *31*(2), 135–175.
Hillman, A. J., Shropshire, C., & Cannella, A. A. Jr. (2007). Organizational predictors of women on corporate boards. *Academy of Management Journal*, *50*(4), 941–952.
Hillman, A. J., Cannella, A. A. Jr., & Harris, I. C. (2002). Women and racial minorities in the boardroom: How do directors differ? *Journal of Management*, *28*(6), 747–763.
Horgan, D. M. (1975). *Language development*. University of Michigan.
Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, *108*(3), 822–839.
Hutchinson, M., Mack, J., & Plastow, K. (2015). Who selects the 'right' directors? An examination of the association between board selection, gender diversity and outcomes. *Accounting & Finance*, *55*(4), 1071–1103.
Humphery-Jenner, M. L., & Powell, R. G. (2011). Firm size, takeover profitability, and the effectiveness of the market for corporate control: Does the absence of anti-takeover provisions make a difference? *Journal of Corporate Finance*, *17*(3), 418–437.
Huse, M., & Solberg, G. A. (2006). Gender-related boardroom dynamics: How Scandinavian women make and can make contributions on corporate boards. *Women in Management Review*, *21*(2), 113–130.
Ishii, J., & Xuan, Y. (2014). Acquirer-target social ties and merger outcomes. *Journal of Financial Economics*, *112*(3), 344–363.
Jarrell, G. A., & Bradley, M. (1980). The economic effects of federal and state regulations of cash tender offers. *Journal of Law and Economics*, *23*(2), 371–407.
Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, *76*(2), 323–329.
Johnson, D. D., McDermott, R., Barrett, E. S., Cowden, J., Wrangham, R., McIntyre, M. H., & Peter Rosen, S. (2006). Overconfidence in wargames: Experimental evidence on expectations, aggression, gender and testosterone. *Proceedings of the Royal Society B: Biological Sciences*, *273*(1600), 2513–2520.
Jovanovich, R., & Braguinsky, S. (2002). *Acquisitions: Strategy, Structure and Valuation*. New York: Wiley.
Kennedy, P. (1992). *A guide to econometrics*. MIT Press.
Kim, D., & Starks, L. T. (2016). Gender diversity on corporate boards: Do women contribute unique skills? *American Economic Review*, *106*(5), 267–71.
King, M. R. (2009). Prebid run-ups ahead of Canadian takeovers: How big is the problem? *Financial Management*, *38*(4), 699–726.
Lang, L. H. P., Stulz, R., & Walkling, R. (1991). A test of the free cash flow hypothesis: The case of bidder returns. *Journal of Financial Economics*, *29*(2), 315–335.
Lai, K. M. Y., Srinidhi, B., Gul, F. A., & Tsui, J. S. L. (2017). Board gender diversity, audit fees, and auditor choice. *Contemporary Accounting Research*, *34*(3), 1681–1714.
Lenney, E. (1977). Women's self-confidence in achievement settings. *Psychological Bulletin*, *84*(1), 1–13.
Levi, M. D., Li, K., & Zhang, F. (2010). Deal or no deal: Hormones and the mergers and acquisitions game. *Management Science*, *56*, 1462–1483.
Levi, M., Li, K., & Zhang, F. (2014). Director gender and mergers and acquisitions. *Journal of Corporate Finance*, *28*(C), 185–200.
Lichtenstein, S., Fischhoff, B., Phillips, L. (1982). Calibration of probabilities: The state of the art to 1980. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 306–344). Cambridge University Press.
Lin, Y. Q., Liu, M. T., & Jiang, X. G. (2018). Acquisitions and firm performance: The moderating effect of pre-acquisition innovation capability. *Journal of Business Research*, *89*, 76–88. https://doi.org/10.1016/j.jbusres.2018.04.002
Lutchmaya, S., Baron-Cohen, S., & Raggatt, P. (2002). Foetal testosterone and eye contact in 12-month- old human infants. *Infant Behavior and Development*, *25*(3), 327–335.
Lutter, M. (2015). Do women suffer from network closure? The moderating effects of social capital on gender inequality in a project based labor market, 1929 to 2010. *American Sociological Review*, *80*(2), 329–358.
Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment, *The Journal of Finance*, *60*(6), 2661–2700.
Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, *89*(1), 20–43.
Malmendier, U., Tate, G., & Yan, J. (2011). Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies. *The Journal of Finance*, *66*(5), 1687–1733.
Maloney, M. T., McCormick, R. E., & Mitchel, M. L. (1993). Managerial decision making and capital structure. *Journal of Business*, *66*(2), 189–218.

Matsa, D. A., & Miller, A. R. (2013). A female style in corporate leadership? Evidence from quotas. *American Economic Journal: Applied Economics*, *5*(3), 136–69.
Masulis, R. W., & Mobbs, S. (2014). Independent director incentives: Where do talented directors spend their limited time and energy? *Journal of Financial Economics*, *111*(2), 406–429.
Masulis, R. W., Wang, C., & Xie, F. (2009). Agency problems at dual-class companies. *The Journal of Finance*, *64*(4), 1697–1727.
Miller, T., & del Carmen Triana, M. (2009). Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management Studies*, *46*(5), 755–786.
Minnick, K., Unal, H., & Yang, L. (2011). Pay for performance? CEO compensation and acquirer returns in BHCs. *The Review of Financial Studies*, *24*(2), 439–472.
Moeller, S. B., Schlingemann, F. P., & Stulz, R. M. (2004). Firm size and the gains from acquisitions. *Journal of Financial Economics*, *73*(2), 201–228.
Morck, R., Shleifer, A., & Vishny, R. W. (1990). Do managerial objectives drive bad acquisitions? *The Journal of Finance*, *45*(1), 31–48.
Nekhili, M., Gull, A. A., Chtioui, T., & Radhouane, I. (2020). Gender-diverse boards and audit fees: What difference does gender quota legislation make? *Journal of Business Finance & Accounting*, *47*(1-2), 52–99.
Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *The Quarterly Journal of Economics*, *122*(3), 1067–1101.
Nielsen, S., & Huse, M. (2010). Women directors' contribution to board decision-making and strategic involvement: The role of equality perception, *European Management Review*, *7*(1), 16–29.
Officer, M. S. (2007). The price of corporate liquidity: Acquisition discounts for unlisted targets. *Journal of Financial Economics*, *83*(3), 571–598.
Ozcaliskan, S., & Goldin-Meadow, S. (2005). Gesture is at the cutting edge of early language development. *Cognition*, *96*, 101–113.
Powell, R. G., & Stark, A. W. (2005). Does operating performance increase post-takeover for UK takeovers? A comparison of performance measures and benchmarks. *Journal of Corporate Finance*, *11*(1-2), 293–317.
Povel, P., & Sertsios, G. (2014). Getting to know each other: The role of toeholds in acquisitions. *Journal of Corporate Finance*, *26*, 201–224.
Roll, R. (1986). The hubris hypothesis of corporate takeovers. *Journal of Business*, *59*(2), 197–216.
Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1), 41–55.
Servaes, H. (1991). Tobin's Q and the gains from takeovers. *The Journal of Finance*, *46*(1), 409–419.
Sharma, D. S., & Ho, J. (2002). The impact of acquisitions on operating performance: Some Australian evidence. *Journal of Business Finance & Accounting*, *29*(1-2), 155–200.
Shen, R., Tang, Y., & Chen, G. (2014). When the role fits: How firm status differentials affect corporate takeovers? *Strategic Management Journal*, *35*(3), 2012–2030.
Shekhar, C., & Torbey, V. (2005). Takeovers, ownership, and shareholder wealth—The Australian evidence. *Review of Accounting & Finance*, *4*(3), 101–120.
Travlos, N. G. (1987). Corporate takeover bids, methods of payment, and bidding firms' stock returns. *The Journal of Finance*, *42*(4), 943–963.
Wangerin, D. (2019). M&A due diligence, post-acquisition performance, and financial reporting for business combinations. *Contemporary Accounting Research*, *36*(4), 2344–2378.
Wansley, J. W., Lane, W. R., & Yang, H. C. (1983). Shareholder returns to USA acquired firms in foreign and domestic acquisitions. *Journal of Business Finance & Accounting*, *10*(4), 647–656.
Weisbach, M. S. (1988). Outside directors and CEO turnover. *Journal of Financial Economics*, *20*(1-2), 431–460.
Worrell, D. L., Davidson, W. N. III, Chandy, P. R., & Garrison, S. L. (1986). Management turnover through deaths of key executives: Effects on investor wealth. *Academy of Management Journal*, *29*(4), 674–694.

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APPENDIX A
DEFINITIONS OF VARIABLES

Variable	Code	Definition
Announcement period abnormal return:		
Announcement period cumulative abnormal return	*3DCAR*	The cumulative abnormal return earned by the acquirer during the 3-day announcement period
Indicator variable for value-destroying/creating acquisitions	*D_CAR*	Indicator variable that takes the value of one if a company makes value-creating acquisitions in a given year reflected by the positive cumulative abnormal return earned during the announcement period ($CAR >= 0$) and zero if a company makes value-destroying acquisitions in a given year ($CAR < 0$)
Female director variables:		
Percentage of female directors on the board	*PFEM*	The number of female directors on the board divided by the board's size
Indicator variable for female directors on the board	*DFEM*	Indicator variable that takes the value of one if there is at least one female director on the board and zero otherwise
Percentage of independent female directors on the board	*PINDFEM*	The number of independent female directors on the board divided by the size of the board
Percentage of non-independent female directors on the board	*PNONINDFEM*	The number of non-independent female directors on the board divided by the size of the board
Female/male director attributes:		
Network size	*F_NETWORK (M_NETWORK)*	Total network size of female (male) directors on the board
Board tenure	*F_BOARD TENURE (M_BOARD TENURE)*	The median time of presence of female (male) directors on the board
Number of degree qualifications	*F_DEGREES (M_DEGREES)*	The median number of degree qualifications of female (male) directors on the board
IVY education	*F_IVY (M_IVY)*	The maximum number of female (male) directors on the board with Ivy league education
CPA qualification	*F_CFA (M_CFA)*	The maximum number of female (male) directors on the board with CFA qualifications
CPA qualification	*F_CPA (M_CPA)*	The maximum number of female (male) directors on the board with CPA qualifications
M&A experience	*F_MA_EXP (M_MA_EXP)*	The number of female (male) directors with M&A experience. A director is considered to have M&A experience if she(he) is currently on a board or has been on a board of a firm that engaged in acquisition activity.

(Continues)

Variable	Code	Definition
Qualification index	*F_QUAL_INDEX (M_QUAL_INDEX)*	The sum of the following indicator variables: (i) legal/consulting experience, (ii) academic experience, (iii) accounting/finance experience, (iv) management experience, (v) political experience, (vi) military experience, (vii) education—undergraduate, (viii) education—graduate and (ix) education—MBA. Each variable is assigned a value of one if a female (male) director possesses that particular skill/experience and zero otherwise
Acquirers' firm characteristics:		
Firm size	*SIZE*	The natural logarithm of the bidder's market capitalization
Leverage	*LEV*	The debt in current liabilities plus long-term debt divided by total assets
Cash holdings	*CASH*	Total cash holdings divided by total assets
Growth	*GROWTH*	The current fiscal year's sales ratio to sales in the last year minus one
Return on assets	*ROA*	Income before extraordinary items divided by opening year book value of total assets
Tobin's Q	*TOBINSQ*	The market value of total assets divided by the book value of total assets. The market value of assets is calculated as the book value of total assets minus the book value of common equity plus the number of common shares outstanding times the stock price
Firm age	*FIRMAGE*	The number of years since a firm first appears in the CRSP database
Acquirers' post-acquisition performance:		
Post-acquisition change in return on asset	*AVGCHROA*	The average change in ROA reported by the acquirer during the three years following the acquisition *Note*: For this purpose, we first calculate an acquirer's ROA change in years $t + 1$, $t + 2$ and $t + 3$, where year $t0$ is the financial year in which the acquisition occurred. We then calculate the change in ROA across three post-acquisition years.
Post-acquisition change in Tobin's C	*AVGCHTOBINQ*	The acquirer reported the average change in Tobin's Q during the 3 years following the acquisition *Note*: For this purpose, we first calculate the change in Tobin's Q of an acquirer in years $t + 1$, $t + 2$ and $t + 3$, where year $t0$ is the financial year in which the acquisition occurred. We then calculate the change in Tobin's Q across three post-acquisition years
Post-acquisition equally weighted long-run return	*AVGRET (EW)*	Equally weighted monthly buy and hold return earned by the acquirer for the 36-month period following the acquisition month
Post-acquisition value-weighted long-run return	*AVGRET (VW)*	Value-weighted monthly buy and hold return earned by the acquirer for the 36-month period following the acquisition month
Acquirers' governance characteristics:		
Board size	*BSIZE*	The number of directors on the board
Percentage of independent directors on the board	*PINDDIR*	The proportion of independent directors on the board

(Continues)

Variable	Code	Definition
CEO duality	*CEODUAL*	Indicator variable that takes the value of one if the same person holds both CEO and chair positions,and zero otherwise
CEO tenure	*CEOTENURE*	The number of years the CEO has been with the firm
CEO age	*CEOAGE*	The natural logarithm of the age of the CEO
The number of directors who attended less than 75% of meetings	*NATTEND_LESS75_PCT*	The indicator variable coded one if a director attends less than 75% of board meetings in a fiscal year and zero otherwise (*Source*: ISS)
Number of board meetings	*BDMTGS*	Number of a firm's board meetings in a fiscal year (*Source*: Execucomp)
Entrenchment Index	*EINDEX*	Bebchuk et al.'s (2009) entrenchment index based on six takeover defenses reported by the ISS: (1) staggered boards, (2) limits to shareholder bylaw amendments, (3) poison pills, (4) golden parachutes, (5) supermajority requirements for mergers and (6) supermajority requirements for charter amendments. *EINDEX* ranges between 0 and 6
M&A Committee Chair	*M&ACOMCHAIR*	The indicator variable takes the value of one if the chair of the M&A committee is a female director and zero otherwise
Audit Committee Chair	*AUDITCOMCHAIR*	Indicator variable that takes the value of one if the audit committee chair is a female director and zero otherwise
Corporate Governance Committee Chair	*CGCOMCHAIR*	Indicator variable that takes the value of one if the corporate governance committee chair is a female director and zero otherwise
Nomination Committee Chair	*NOMCOMCHAIR*	Indicator variable that takes the value of one if the chair of the nomination committee is a female director and zero otherwise
Bid characteristics:		
Private target acquisitions	*PRIV*	Indicator variable that takes the value of one if the target is a private firm and zero otherwise
Cash financed acquisitions	*CASHONLY*	Indicator variable that takes the value of one if the acquisition is 100% financed with cash and zero otherwise
Stock financed acquisitions	*STOCKONLY*	Indicator variable that takes the value of one if the acquisition is 100% financed with stock and zero otherwise
Unrelated acquisitions	*UNRELATED*	Indicator variable that takes the value of one if the bidder and the target belong to different four-digit primary standard industrial code (SIC) codes reported by SDC and zero if they belong to the same SIC codes *Note*: We use a four-digit classification following prior studies (e.g., Dutta & Jog, 2009; Haleblian & Finkelstein, 1999; Morck et al., 1990), which use the same classification
The relative size of the acquisition	*RELSIZE*	Transaction value reported by SDC Platinum divided by the market value of the acquirer 1 month before the acquisition announcement

(Continues)

Variable	Code	Definition
High-tech target acquisitions	*HIGHTECH*	Indicator variable that takes the value of one if the target is a high-tech firm and zero otherwise *Note*: The SDC Platinum database specifically identifies high-tech targets, and following that, we assign a value of one to targets identified by SDC Platinum as high-tech firms and zero to others
Foreign acquisitions	*FOREIGNACQ*	Indicator variable that takes the value of one if the target is a foreign firm and zero otherwise
Hostile acquisitions	*HOSTILE*	Indicator variable that takes the value of one if the SDC classifies the bid as a hostile takeover and zero otherwise
Serial bidders	*SERIAL*	Indicator variable that takes the value of one if the bidder acquires three or more targets in a given year and zero otherwise
Multiple bidders	*MULTIPLE*	Indicator variable that takes the value of one if a bidder announces more than one acquisition in a given year and zero if a bidder makes only one acquisition announcement
Acquisition efficiency measures:		
Bid premium	*BIDPREMIUM*	For public targets—The difference between the deal value and the market capitalization of the target 1 month before the deal announcement divided by the market capitalization For private targets—Average industry bid premium paid to public targets in a given year *Note*: The target's deal value and market capitalization target's deal value and market capitalization were obtained from the SDC Platinum database for domestic and foreign targets
Days to complete the deal	*LOGDAYS*	Natural logarithm of the number of days taken to complete the deal
Successful acquisitions	*SUCCESS*	Indicator variable that takes the value of one if the bid is completed and zero if the bid is unsuccessful