BOARD DIVERSITY AND FIRM'S CASH HOLDINGS: EVIDENCE FROM PAKISTAN

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ABSTRACT

This paper investigates the impact of board diversity, measured in directors' gender and military experience, on corporate cash holdings in Pakistan. Non-financial firms listed on Pakistan Stock Exchange are analyzed from 2009-2017 by employing OLS technique. The results show significant negative relationship between board diversity and corporate cash holdings. Moreover, female as CEO also negatively influence cash holdings. The findings further reveal that the impact on cash holdings is more pronounced in non-state owned enterprises (NSOEs) and state-owned enterprises (SOEs) in case of female on board and as CEO and military director (MD), respectively. The results remain consistent to various econometric tests such as generalized method of moment (GMM) and two-stage least square (2SLS). Overall, the results advocate that female on board and as CEO and MD mitigate agency costs, improve governance mechanism and support the global call for workplace diversity.

Keywords: Gender diversity; female chief executive; cash holdings; military experience directors; Pakistan

INTRODUCTION

The effectiveness of corporate governance (CG, hereafter) mechanisms is vital in achieving the desired goal of shareholders wealth maximization. Extant literature identifies multiple factors which influence CG. Gender diversity of boards is one such significant means that mitigates agency issues, resulting in improved CG (see, e.g., Adams and Ferreira, 2009; Chen et al., 2016; Post and Byron, 2015). Therefore several developed and emerging countries[1] have made it mandatory that a board should have female directors (Abdullah et al., 2016; Gul et al., 2011; Terjesen et al., 2016).

Female leaders, relative to male counterparts, affect corporate decisions differently (Francis et al., 2014). Female directors are believed to have skills and abilities to monitor and provide an advisory role in the board (Adams and Ferreira, 2004; Daily et al., 1999; Johnson et al., 2013), improve board behaviors, creative perspective, quality of monitoring, and firm value (Isidro and Sobral, 2015; Liu et al., 2014; Terjesen et al., 2016). Literature suggests that gender-diverse boards could make efficient decisions (Milliken and Martins, 1996), have effective monitoring and control (Adams and Ferreira, 2009; Benkraiem et al., 2017; Nielsen and Huse, 2010; Ullah, Fang, and Jebran, 2019), improve financial performance (Terjesen et al., 2016; Ullah et al., 2019).

Literature also documents that female CEOs (FCEOs, hereafter) are relatively lesser overconfident, opportunistic, avoid distaste for excessive risk-taking (Adhikari et al., 2019; Bernasek and Shwiff, 2001; La Rocca et al., 2019; Peni, 2014), decrease agency conflict (Jurkus et al., 2011), and reduce information asymmetry (Gul et al., 2011). Females in management enhance the legitimacy of firms' conduct, and due to better monitoring, exceptional qualities, experience and work style improve CG and mitigate agency problems (Gul et al., 2011; Ullah, Majeed, Fang, and Khan 2020). Thus female leadership is associated with relatively superior FRQ (Peni and Vähämaa, 2010), higher investment efficiency (Ullah, Zeb, Khan, and Xiao, 2020), and higher firm performance (Adams & Ferreira, 2009).

Corporate cash holding is a crucial decision among other critical corporate decisions that ensure a firm's liquidity to fulfil its operational needs. In contrast, excessive cash holding is considered damaging to firm value and shareholders' wealth because of inferior return and dual taxation

(Jensen, 1986; Tong, 2010). Excessive cash holding by entrenched managers leads to increased agency problems (Jensen, 1986). As a most liquid asset, maintaining high cash ratio allows managers to spend more on their personal benefits (Harford et al., 2008; Ozkan and Ozkan, 2004). For example, excessive cash enables entrenched managers to protect themselves from capital market monitoring mechanisms by avoiding debt financing (Harford et al., 2008; Jensen, 1986). Corporate board and firm-specific variables have been focused on by the extant literature to deal with agency problems arising due to the entrenchment behavior of managers by exploiting corporate excess cash holding (Harford et al., 2008; Myers and Majluf, 1984; Tong, 2010). However, the role of gender diversity on board and top management as a governance mechanism has not been fully explored, therefore, there is a need to understand that how diverse boards affect excessive cash holding arising from an agency problem. Furthermore, the study tries to investigate the director's ex-military experience impact the firm's cash decisions. The military rules Pakistan for several decades. Well trained, groomed, and experienced military officers are acquiring academic degrees in different areas, including business and commerce and law etc. are emerging as corporate managers. Therefore, military-connected boards' impact on the performance of firms is imperative to be examined. Furthermore, military values such as discipline, law abidance, risk-taking and self-sacrifice are expected to have a favorable influence on governance and agency issues. No single study in Pakistan has investigated this aspect.

To investigate whether a diverse board, in terms of gender and military experience, influences the firm's cash holdings in the Pakistan setting, this study analyses non-financial companies listed on the Pakistan Stock Exchange (PSE) from 2009-2017. Two different but alternative proxies are used to measure corporate cash holding. Firstly, natural log plus one of cash and cash equivalent over net assets (CH_One) (Itzkowitz, 2013), and secondly cash marketable instruments to net assets ratio (CH_Two). We found that gender diversity and female CEOs have negative impact on corporate cash holdings. Likewise, ex-military experience of the board members is significantly negatively associated with the firm's cash holdings. Finally, the results show that the gender diversity and FCEOs impact is pronounced in non-state owned enterprises (NSOEs) while military director (MD) in state-owned enterprises (SOEs) case. This suggests that the effects of Gender_D, FCEOs and MD on corporate cash holdings vary with the nature of the ownership structure.

This study has several contributions to the existing literature. First, this study investigates the female directors' impact on a firm's cash holding in a conservative society, i.e. Pakistan (Khan et

al., 2011). Contrary to the advanced countries which fully integrate women into their economic system, women in Pakistan have limited economic opportunities, and the country is always labelled with men dominated society. Moreover, as an emerging economy, Pakistan has a less-developed capital market and fewer investors' protection rights. Therefore, Pakistan sets peculiar settings for the board gender and cash holdings nexus. The findings reveal that women present at the boardroom discipline the firm's cash holding in Pakistan settings. Furthermore, results show that firms leading by female CEOs have significant smaller cash balances on their balance sheets. Our findings suggest that females on board and top management level intensify the monitoring mechanism, influencing the cash holding decisions. Second, the study investigates the ex-military experience of the board members impact on cash holdings. Despite the fact that military dictators rule Pakistan for decades and many firms have ex-military directors on their board, none of the existing studies has investigated the ex-military director and its cash holding nexus. This study fills this gap by providing empirical evidence on the association. The findings support the diversity hypotheses. Finally, the study provides empirical evidence on the global call for workplace diversity and the country's recent regulatory changes, i.e. appointing directors with different background to the corporate boardroom.

Institutional background

Women contribution to economic development is not a new phenomenon but lately recognized. Like many other countries, women in Pakistan make up a significant proportion of the country population, i.e. 48.76%, per the 2017 census. However, Pakistan ranks lowest in South Asia and third-to-last (151 out of 153) on global gender gap index[2]. The index highlight that Pakistan has a lot to do to integrate women into the economy. Though, the country made a major step in recent time by making it mandatory for the public listed firms to hire at least one woman director to the corporate boardroom (Listed Companies (Code of Corporate Governance) Regulations , 2017). This regulatory compulsion will reduce the gender gap but might be insufficient to improve its ranking significantly, as the other countries are making similar policies to encourage diversity at the workplace. For instance, France, Iceland and Norway introduced a 40% quota for women directors in the public listed companies, Belgium and Italy 33%, Australia 30%, Finland 40% in state-owned firms, Netherlands 30% in firms having more than 250 employees and India

at least one female director at the upper echelon in public listed firms. Examining the effect of boardroom's diversity will provide empirical evidence on the validity of such legal obligation and workplace equity drive.

LITERATURE REVIEW

Various studies have been conducted on the determinants of corporate cash holdings. For instance, Kim et al., (1998) firstly examined the determinants of cash holdings in U.S firms. They find that firms having higher opportunity cost for investment in liquidity (measured by the difference between returns on assets and the return on Treasury bills) relatively exhibit lower cash holdings. Similarly, Opler et al. (1999) investigated the determinants of corporate cash holdings and documented that firms with higher growth opportunities and riskier cash flows keep higher cash to non-cash assets ratio. They also suggest that firms having easy access to capital markets maintain lower corporate cash reserves. Consistent with this, Pinkowitz and Williamson, (2001) reported similar results for the US, Japan, and Germany.

Some scholars investigated the relationship between corporate governance and corporate cash holdings. Among them, the notable studies are Dittmar et al. (2003), Pinkowitz et al. (2006), and Kalcheva and Lins, (2007). Dittmar et al. (2003) find that in countries where the corporate governance framework is relatively weaker, firms' managers hold more cash and vice versa. Furthermore, their results show that firms that cannot easily access funds in the capital market hold more cash balances. However, extra cash reserve exacerbates the agency problem. For instance, Pinkowtiz et al. (2006) report that entrenched managers and insiders tend to hold excess cash balances, resulting in inefficient utilization of firm's resources and agency conflicts.

On the other hand, holding more cash is important to avail investment opportunities. For instance, empirical research suggest that firms should keep more liquid assets such as cash that allow them to avail profitable opportunities (Hardin et al., 2009). This positive interaction between cash holding and investment opportunity is well supported by precautionary motive theory. Firms with higher investment opportunities hold excess cash to impede financial crises, i.e. adverse shocks and financial distress (Bates et al., 2009). Likewise, Yung and Nafar, (2014) suggest that firms hold more cash to avoid bankruptcy in countries with strong creditor rights. Another study of Chen et al., (2015) show that corporate cash holdings are negatively associated with individualism culture and positively related with uncertainty avoidance.

Beyond the fact that holding cash is important for precautionary motives, holding excess cash reserves has both cost and benefits. Therefore, it is imperative to investigate the factors that

contribute to the appropriate level of cash balance. Extant literature focuses on the role of corporate boards (as a whole) and firm characteristics on mitigating the agency problem and cash-holding decisions (Harford et al., 2008; Myers and Majluf, 1984; Ozkan and Ozkan, 2004; Tong, 2010). However, little is known whether gender and diverse military board influence managerial opportunistic behavior in cash-holding decisions. Nevertheless, a few studies (Adhikari, 2018; Atif et al., 2019; Nasr et al., 2020; Xu et al., 2019) examined the gender diversity and corporate cash holdings nexus. However, these studies are not only carried in advanced economies but also overlook the MD effect in cash holdings decisions. Furthermore, empirical evidence from developing economies are not only limited (only consider gender diversity) but also inconclusive. Keeping in view the low participation of women in economic activities and huge number MD in Pakistani boardrooms makes Pakistan a peculiar setting to investigate the gender and military diverse board impact on firm's cash holdings.

Hypotheses development

Gender diversity on board and top management and corporate cash holdings

There are ample benefits attached to board gender diversity, like intensive monitoring strengthens the governance mechanism, unique capabilities of females improve decision quality, and varied and innovative opinion helps in containing dynamic complications (Atif et al., 2019; Cox and Blake, 2011). Extant literature documents advantages of gender-diverse boards in the light of agency, upper echelon, and resource dependency theories proposed by prior studies (Jensen and Meckling, 1976; Kanter, 1977; Pfeffer and Salancik, 1978).

Board gender diversity, FCEO and corporate cash holding

The two primary motives behind cash holdings are business and entrenchment (related to agency theory). The business motive claims that firms hold cash to meet the business' operational and investment needs when no other financial source is available. Consequently, risk of underinvestment is mitigated (Bates et al., 2009). While on the other hand, with entrenchment motive, managers keep excess cash for their engrained purposes because extra cash gives them unnecessary control over the firm's resources. As a result, excessive cash holding exacerbates the agency problem. Therefore, excessive cash holding encourages manager's opportunistic behavior to spend maliciously on personal perquisite or waste in unprofitable investments (Jensen, 1986; Masulis et al., 2009). Hence, holding funds for ingrained purposes is harmful to the firm (La Porta et al., 2000).

An efficient and effective corporate board can control agency problems (related to cash holding) through intensive monitoring mechanisms (Fama and Jensen, 1983). An effective board is considered an internal governance tool to protect stakeholders' wealth from inefficient use by entrenched managers (Fama, 1980). Good corporate governance would influence cash holding decisions through good monitoring mechanism, exceptional abilities of board members, and impartial advice(Dittmar and Mahrt-Smith, 2007; Harford et al., 2008). Therefore, as documented in the literature, the effectiveness of the corporate board and quality of internal governance mechanism is crucial to mitigate the agency problem that arises due to excessive cash holding (Atif et al., 2019; Boubaker et al., 2015; Harford et al., 2008).

Extant literature document that board gender diversity significantly contributes to the corporate governance role. Female member's(s) presence at the firm's top cadre increases board collective wisdom and quality decision making. For instance, Huang and Kisgen, (2013) suggest that female directors hold diverse viewpoints, opinions, and pre-requisite experiences to deal with complex situations and quality decision-making. Furthermore, females are more outspoken and less conservative than their male counterparts (Carter et al., 2003; Chen et al., 2016). Thus, female presence on board curtails likelihood that decisions are affected by group-think. Moreover, female board members enhance the legitimacy of the firm's conduct, improve its effectiveness and efficiency, and serve as an alternative to good governance mechanism as they are more efficient monitors than their male counterparts (Gul et al., 2011). Extant literature also show that female CEO has significant impact on firm's outcomes. For instance, female CEOs engage less in earning management (Belot and Serve, 2018), have high moral standards (Abad et al., 2017; Ain et al., 2020) and significantly influences the firm's capital allocation process (Faccio et al., 2016). Likewise, female-lead firms are less vulnerable to risk (Li and Zeng, 2019; Martín-Ugedo et al., 2018). Thus, keeping the critical role of gender and CEO in mind, we assume that female presence at the board and corporate's CEO ladder would significantly impact the firm's disposable funds, i.e. cash balances. This leads to first hypotheses, which is as follow:

Hypothesis 1a. *Firms with female directors on board have relatively less cash holdings than firms with only male directors.*

Hypothesis 1b. *Firms with female CEO on board have relatively less cash holdings than firms with male CEO*

Military experience directors and firm's cash holdings

Military experience directors have more incentives to enhance corporate governance mechanism. There are several arguments for this. First, military training emphasizes on discipline, risk-taking and sacrifice for others (Griffith, 2002). Extant literature shows that training affects one's behavior. Therefore, a board member's military training and subsequent military service experience would influence his behavior and lead to high moral values such as dedication and fairness. Consequently, ex-military director presence at the board level will strengthen the board governance function and alleviate agency costs (Benmelech and Frydman, 2015; Franke, 2001; Koch-Bayram and Wernicke, 2018). Second, military training has a large portion of environment assessment for opportunities and threats. This inspires the military director(s), in corporate settings, to hold sufficient funds for investment and precautionary motives. As a result, the stakeholders' interests secure due to the easy access of funds for taking an opportunity and as shield in a financial distress situation. Third, in line with the resource dependency theory, military in Pakistan has a significant influence on the country's politics, therefore, the board with the military director can get easy access at favorable terms (Harymawan, 2018). Finally, military-connected boards have less incentive to engage in fraudulent behavior (Benmelech and Frydman, 2015), strengthening the board's supervisory role. Taking together the above discussion, we assume that in a male-dominant board, presence of military director(s) would emphasis on the appropriate level of cash holding. Thus a military-connected board would have relatively governance and supervisory advantage over the non-military connected boards. Hence, the agency problem that arises due to the excess cash holdings will be mitigated in the presence of ex-military directors. So, our second hypothesis is as follow.

Hypothesis 2: Military experience directors have a negative relationship with corporate cash holdings.

METHODOLOGY

Sample selection

The sample initially consisted of all non-financial firms listed on the PSX from 2009-2017. All the financial and accounting data are collected from the Wharton Research Data Services (Compustat). At the same time, the data for gender diversity (on board and top management) and corporate governance are collected manually from the financial reports published by the State Bank of Pakistan (SBP). Our sample starting from 2009 has three reasons. Firstly, the availability of data, from 2009, the selected sample firms have complete financial reports

available on the SBP website. Secondly, the data to compute gender diversity (on board and top management) are available since 2009 through annual reports of selected companies. Finally, the Wharton Research Data Services provides complete financial data only since 2009. Following previous studies (Atif et al., 2019; Q. Liu et al., 2015; Nikolov and Whited, 2014), the financial firms are excluded due to their unique regulatory mechanism, accounting roles, and disclosure requirements. Initially, our sample composed of 337 firms with 3,033 firm-year observations for the defined sample periods. We drop the missing value as well as the firms that defaulted during the sample period. We also drop missing data on control variables. Thus, our final sample consists of 1,857 observations[3]. To exclude the unwarranted influence of extreme values of certain variables in our sample, we winsorize all continuous variables at 99th percentiles.

Variables Measurement

Corporate cash holdings

Cash holding indicates the fraction of assets in a firm at the disposal of a manager. Two separate measures are used for this purpose. One, natural log of 1 plus cash and cash equivalent over net assets (CH_One) (Itzkowitz, 2013), and second cash plus marketable instruments to net assets ratio (CH_Two), where net assets mean total assets at book value less cash and marketable securities.

Gender diversity on board and top management

From the gender diversity on board and top management, we mean female members on the corporate board and CEO ladder. The key independent variables used in this study are the percentage of female directors (Gender_D) and female Chief Executive Officers (FCEOs), whereas FCEOs is a dummy variable that takes the value of one if the firm has a female CEO and zero otherwise.

Military experience directors

Many firms listed on PSX have military experience directors at their boardroom. Directors with a military background have distinctive training and work experience than other directors. Well trained, groomed, and experienced military officers are acquiring academic degrees in different areas, including business and commerce and law etc. are emerging as corporate managers. Further, the military has several firms listed on PSX, which play an essential role in the

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[3] Please see appendix A for further detail.

development of the country. Thus, we add new variable military experience directors (MD) in this study, measured as the percentage of military directors on the board.

Control variables

We include a set of control variables that may affect cash holdings such as tangibility, leverage, ROA, Tobin Q, capital expenditure, selling, general, and administrative expenses, board independence, board size, and CEOs duality (Bates et al., 2009; Doan and Iskandar-Datta, 2020; Jensen et al., 2010; Opler et al., 1999; Alipour et al., 2019).

Table 1 Variables Definition

Variable	Name	Definition	Source
Panel: A Dependent variables			
Cash holdings	CH_One	Ln(1 + cash and cash equivalent divided by total assets)	Wharton Database (Compustat)
Cash holdings	CH_Two	Ratio of cash and marketable securities to net assets	Wharton Database (Compustat)
Panel B: Independent Variables			
Gender Diversity	Gender_D	Percentage of female directors on the board	Annual reports (SBP)
Female Chief Executive	FCEOs	Indicator variable equals 1 if the firm has Female chief executive, and 0 otherwise	Annual reports (SBP)
Military directors	MD	Percentage of military directors on the board	Annual reports (SBP)
Panel C: Firm's Specific Variables			
Tangibility	TANG	Property, plant and equipment scaled by total assets	Wharton Database (Compustat)
Leverage	LEV	Total debt divided by total assets	Wharton Database (Compustat)
ROA	ROA	Net income divided by total assets	Wharton Database (Compustat)
Tobin's Q	Q	Market value divided by book value of equity	Wharton Database (Compustat)
Capital expenditure	CAPEX	Total capital expenditure scaled by total assets	Wharton Database (Compustat)
Operating cash flow	CFO	Total operating cash flow scaled by total assets	Wharton Database (Compustat)
Sales Growth	SG	Percentage change in sales scald by total assets	Wharton Database (Compustat)
Panel D: Governance Variables			
Board Independence	BIND	Number of independent directors on the board	Annual reports (SBP)
Board size	BSize	Number of directors on the board	Annual reports (SBP)
CEO Duality	DUAL	Indicator variable: equals one if CEO is also the chairman of the board and zero otherwise	Annual reports (SBP)

Econometric models

To test hypotheses 1a, 1b and 2, this study assumes that corporate cash holding is a function of Gender_D, FCEO, MD, and other control variables. Following prior studies (Atif et al., 2019; Liu et al., 2015; Nikolov and Whited, 2014; Ozkan and Ozkan, 2004), this study applies ordinary least squared (OLS) estimation analysis. However, in the additional analysis, we used Generalized Method of Moment (GMM) and Two-Stage Least squared measure (2SLS) for a robust check to confirm the validity of results. The regression equations are as followed:

$$
\begin{aligned}
(CH_{One}, CH_{Two})_{i,t} \\
= \delta_0 + \delta_1(Gender\_D)_{i,t} + \delta_2(FirmsCharacteristics)_{i,t} \\
+ \delta_3(BoardCharacteristics)_{i,t} + \delta_4 \sum(Industry\ Effect)_i \\
+ \delta_5 \sum(Year\ Effect)_i + \gamma_{i,t} \qquad (1)
\end{aligned}
$$

$$
\begin{aligned}
(CH_{One}, CH_{Two})_{i,t} \\
= \delta_0 + \delta_1 FCEOs_{i,t} + \delta_2(FirmsCharacteristics)_{i,t} \\
+ \delta_3(BoardCharacteristics)_{i,t} + \delta_4 \sum(Industry\ Effect)_i \\
+ \delta_5 \sum(Year\ Effect)_i + \gamma_{i,t} \qquad (2)
\end{aligned}
$$

$$
\begin{aligned}
(CH_{One}, CH_{Two})_{i,t} \\
= \delta_0 + \delta_1 MD_{i,t} + \delta_2(FirmsCharacteristics)_{i,t} \\
+ \delta_3(BoardCharacteristics)_{i,t} + \delta_4 \sum(Industry\ Effect)_i \\
+ \delta_5 \sum(Year\ Effect)_i + \gamma_{i,t} \qquad (3)
\end{aligned}
$$

From the Gender_D, we mean the female members' percentage on the corporation's board. We used the percentage (%) of female members on the board (Gender_D). $FCEOs_{i,t}$ illustrates female chief executives. MD is the percentage of military directors on the boardroom. Firm-specific characteristics are TANG, LEV, ROA, Q, CAPEX and SG, while board related variables are BIND, BSIZE and DUAL.

Empirical results

Descriptive statistics

Table 2 shows the data description used in this study. It is clear from the table that the mean value of FCEOs, Gender_D and MD is 0.036, 0.101 and 0.184, respectively. These values suggest that the proportion of female executives in Pakistani firms is still low, but the ratio of female directors (Gender_D) is relatively higher than FCEOs. The summary statistics also show that in Pakistani firms, 18.4% of the board members have military experience. The table also indicates that the mean value of CH_One and CH_Two is 0.047 and 0.043, respectively, which means that the sample listed companies generally hold a lower proportion of cash and cash equivalent. Further, the average value of firm's specific variables such as TANG, LEV, ROA, Q, CAPEX, CFO and SG is 0.993, 0.608, 0.046, 0.131, 0.054, 0.089 and 0.147, respectively, which means that the Pakistani listed firms hold a higher proportion of tangible assets (fixed assets to total assets) and the higher leverage ratio indicates that Pakistani firms hold a large portion of assets as liabilities. The table also illustrates the governance variables of listed firms: BIND, BSIZE and DUAL, respectively, and their average values are 0.558, 0.015 and 0.259, respectively

Table 2 Descriptive Statistics

	N	Mean	SD	Min	Max
CH_One	1857	0.047	0.08	0	0.581
CH_Two	1857	0.043	0.069	0	0.458
Gender_D	1857	0.101	0.143	0	0.714
FCEOs	1857	0.036	0.187	0	1
MD	1857	0.184	0.064	0	1
TANG	1857	0.993	0.032	0.559	1
LEV	1857	0.608	0.357	0.004	4.414
ROA	1857	0.046	0.113	-1.961	0.592
Q	1857	0.131	0.164	0	1.658
CAPEX	1857	0.054	0.07	0	0.95
CFO	1857	0.089	0.118	-0.497	0.886
SG	1857	0.147	1.353	-2.552	49.194
BIND	1857	0.558	0.196	0	1.125

BSIZE	1857	8.015	1.567	0	16
DUAL	1857	0.259	0.618	0	1

Note: *This table reports the descriptive statistics. Please refers to Table 1 for variables definitions*

Correlation analysis

Table 3 displays the Pearson matrix of correlation among variables. Results show a high correlation among cash holding measures, i.e., CH-One and CH-Two. To avoid the issue of multicollinearity, these variables were tested in separate regression models. Furthermore, as expected, the coefficient among cash holding measures (i.e., CH-One and CH-Two) with FCEOs and Gender_D and MD is negative. These results offer preliminary support to our argument that FCEOs and firms having female directors (Gender_D) are negatively related to cash holding measures.

Table 3 Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) CH_One	1														
(2) CH_Two	0.999	1													
(3) Gender_D	-0.089	-0.093	1												
(4) FCEOs	-0.011	-0.008	0.203	1											
(5) MD	-0.006	-0.005	0.002	-0.018	1										
(6) TANG	-0.016	-0.02	0.058	-0.009	0.027	1									
(7) LEV	-0.211	-0.215	0.113	0.123	-0.054	0.023	1								
(8) ROA	0.333	0.339	-0.099	0.142	0.072	-0.047	-0.396	1							
(9) Q	-0.23	-0.235	0.007	-0.087	0.04	0.047	0.522	-0.266	1						
(10) CAPEX	-0.001	0.004	-0.037	0.017	-0.073	0.032	-0.103	0.156	0.049	1					
(11) CFO	0.307	0.314	-0.1	0.093	0.088	-0.011	-0.335	0.88	-0.201	0.128	1				
(12) SG	0.001	0	0.005	-0.005	0.064	-0.005	-0.01	0.049	0.047	-0.003	0.078	1			
(13) BIND	-0.012	-0.012	-0.015	-0.015	0.111	0.02	-0.035	0.042	-0.092	-0.039	0.016	-0.018	1		
(14) BSIZE	0.021	0.021	-0.118	0.009	0.06	-0.114	-0.052	0.097	-0.086	0.018	0.063	0.024	0.042	1	
(15) DUAL	-0.04	-0.039	0.133	0.094	-0.015	0.06	0.098	-0.07	0.067	-0.053	-0.079	0.014	-0.131	-0.152	1

Note: this table reports Pearson correlation results.

Gender diversity, FCEOs, MD and corporate cash holdings (Regression analysis)

Table 4 reports the results of regression analysis by using two different measures of corporate cash holdings (i.e. CH_One and CH_Two). The empirical results show that corporate cash holdings, measured by either CH_One or CH_Two, are negatively related to Gender_D FCEOs and MD.

When we used CH_One as the cash holding proxy, the coefficients on Gender_D is -0.0340 (Columns 1), with a t-statistics of -2.20, and it is statistically significant at the 5% level, which indicates that the level of cash holdings for firms with female directors on board is 3.4% lower than that of firms with male directors on board. As shown in Columns (2), when we used CH_Two as the alternative cash holding proxy, the empirical results remain unchanged and thus support our Hypothesis 1, suggesting that firms with female directors on board have relatively less cash holdings than firms with male directors.

Similarly, when we used CH_One, the coefficients on FCEOs is -0.0261 (Columns 3), with a t-statistics of -2.79, and it is statistically significant at the 1% level, which indicates that the level of cash holdings for firms with female CEOs is 2.61% lower than that of firms with male CEOs. As shown in Columns (4), when we used CH_Two as the alternative cash holding proxy, the empirical results remain unchanged and thus support our Hypothesis 1b, suggesting that firms with female CEOs on board have relatively less cash holdings than firms with male CEOs. These results indicate that females on board and FCEOs may put more weights on the agency motive in shaping corporate cash policy than the precautionary motive, resulting in a lower level of cash holdings. Likewise, column (5) and (6) of table 4 reveal the significant negative impact of MD on CH_One and CH_Two, respectively. This supports our hypothesis 2 that firms hold fewer cash balances in the presence of Ex-military director(s). Overall, the findings support all our hypotheses.

As far as control variables are concerned, corporate cash holdings are positively related to ROA, showing that firms with high profitability ratios maintain a large reserve of cash holdings. In contrast, Q, CAPEX and BIND are negatively associated with cash holdings. Inverse nexus between the firm's growth opportunities with cash holdings is consistent with the pecking order theory. This means that corporations primarily finance their investment projects with their own generated resources (Myers and Majluf, 1984). Consequently, firms having relatively better

expansion prospects on hand have small cash balances on their statement of financial position. Similarly, BIND negatively affects cash holdings. However, CAPEX and Cash holding negative relationships contradict the trade-off theory and the findings of many researchers (Opler et al., 1999; Rehman, 2015; Siddiqua et al., 2019; Wang and Kabiraj, 2016). However, our results are in line with Bates et al. (2009), who also documented that cash holdings surge when capital expenditures (CAPEX) are reduced. The authors state that CAPEX is another good proxy for financial distress cost or investment opportunities, and an increase in CAPEX means more assets in the firm, and more assets mean firms have more collateral to pay off debt when required. Therefore, firms increase their debt capacity and decrease the need to hold onto high levels of cash (Doidge et al., 2007). Finally, TANG, LEV, CFO, SG, BSIZE, and DUAL do not significantly relate to corporate cash holdings.

Table 4 Gender_D, FCEOs, MD and corporate cash holdings

	(1)	(2)	(3)	(4)	(5)	(6)
	H1a		H1b		H2	
VARIABLES	CH_One	CH_Two	CH_One	CH_Two	CH_One	CH_Two
Gender_D	-0.0340	-0.0315				
	(-2.20)**	(-2.34)**				
FCEOs			-0.0261	-0.0222		
			(-2.79)***	(-2.69)***		
MD					-0.0159	-0.0145
					(-4.30) ***	(-4.34) ***
TANG	0.0095	0.0009	0.0036	-0.0045	0.0239	0.0186
	(0.22)	(0.02)	(0.08)	(-0.12)	(0.46)	(0.39)
LEV	-0.0032	-0.0028	-0.0002	-0.0003	0.0001	0.0001
	(-0.40)	(-0.39)	(-0.02)	(-0.05)	(0.02)	(0.02)
ROA	0.1760	0.1540	0.1919	0.1676	0.1371	0.1240
	(3.82)***	(3.84)***	(3.91)***	(3.92)***	(5.90) ***	(5.89) ***
Q	-0.0765	-0.0690	-0.0803	-0.0720	-0.0706	-0.0645
	(-4.31)***	(-4.32)***	(-4.34)***	(-4.33)***	(-4.98) ***	(-4.95) ***
CAPEX	-0.0550	-0.0435	-0.0521	-0.0410	-0.0396	-0.0336
	(-1.88)*	(-1.67)*	(-1.80)*	(-1.58)	(-1.58)	(-1.47)
CFO	0.0476	0.0448	0.0444	0.0422	0.0814	0.0763
	(1.31)	(1.41)	(1.21)	(1.31)	(3.81) ***	(3.87) ***
SG	-0.0004	-0.0004	-0.0005	-0.0004	-0.0005	-0.0004
	(-0.94)	(-1.04)	(-1.11)	(-1.21)	(-1.20)	(-1.20)
BIND	-0.0180	-0.0155	-0.0185	-0.0159	-0.0106	-0.0094
	(-2.28)**	(-2.24)**	(-2.34)**	(-2.29)**	(-1.25)	(-1.23)
BSIZE	-0.0011	-0.0011	-0.0009	-0.0008	-0.0020	-0.0019
	(-0.93)	(-0.96)	(-0.70)	(-0.37)	(-1.93) *	(-2.03) *
DUAL	-0.0009	-0.0005	-0.0009	-0.0006	0.0022	0.0020
	(-0.52)	(-0.33)	(-0.56)	(-0.41)	(1.19)	(1.23)
Ind. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0634	0.0649	0.0634	0.0650	0.0743	0.0726
	(1.48)	(1.66)	(1.50)	(1.68)*	(1.46)	(1.56)
N	1,471	1,471	1,471	1,471	1,471	1,471
R^2	0.149	0.154	0.149	0.154	0.2092	0.2136

Note: This table reports OLS results of the impact of gender diversity on board and top management on cash holdings. The dependent variable is cash holding measures (i.e. CH_One and CH_Two). The independent variables are Gender_D and FCEOs. Gender_D is the percentage of female directors on the board. FCEOs is the indicator variable takes value of one for female chief executive and zero otherwise. MD represents military directors on the board, measured as the percentage of military directors on the board. TANG illustrates tangibility. LEV illustrates leverage. ROA illustrates return on assets. Q is the Tobin's Q. CAPEX reports capital expenditure. CFO reports operating cash flow. SG illustrates sales growth. BIND illustrate board independence. BSIZE illustrate number of directors on the board. DUAL illustrate CEOs duality. Refer to Table 1 for detailed definitions of variables. Figures in parentheses are t-statistics. *, **, ***, Significant at 1, 5, and 10 percent levels, respectively.

Robustness tests

This study conducts a battery of tests, including alternative proxy and different economic techniques, such as GMM and lag of test variables, to ensure that model specifications do not bias the results.

Alternative proxies

For robustness check, this study used another measure of cash holding: cash and cash equivalent over total assets (CH_Three). Control variables in the regression are the same as used in Table 4. The results are reported in Table 5. Our main results remains consistent when we use additional measure of corporate cash holdings. As expected, the coefficients on Gender_D (β = -0.0404, p < 0.05, Column 1), FCEOs (β = -0.0255, p < 0.05, Column 2) and MD (β = -0.0221 p < 0.05) are negative and statistically significant. Our earlier findings suggest that gender diversity at the board level (Gender_D), firm's managed by FCEOs and military connected boards have lower cash holdings, is robust to an alternative measure of cash holdings. These findings are consistent to the prior studies (Atif et al., 2019; Chen et al., 2015; Tong, 2010).

Table 5 Gender_D, FCEOs, MD and corporate cash holdings: using alternative proxy

	(1)	(2)	(3)
	H1a	H1b	H2
VARIABLES	CH_Three	CH_Three	CH_Three
Gender_D	-0.0404 (-2.47)**		
FCEOs		-0.0255 (-2.66)***	
MD			-0.0221 (-4.17)***
TANG	-0.354 (-2.15)**	-0.3614 (-2.20)**	0.0574 (0.87)
LEV	-0.0422 (-3.57)***	-0.0396 (-3.27)***	0.0008 (0.10)
ROA	0.463 (2.09)**	0.4796 (2.13)**	0.1832 (5.52)***
Q	0.0425 (1.34)	0.0395 (1.26)	-0.0944 (-5.08)***
CAPEX	0.1387 (1.26)	0.1416 (1.28)	-0.0781 (-2.31)**
CFO	-0.3344 (-1.85)*	-0.3370 (-1.86)*	0.1191 (3.81)***
SG	0.0003 (0.24)	0.0002 (0.19)	-0.0005 (-0.89)
BIND	0.0261 (2.29)**	0.0258 (2.25)**	-0.0168 (-1.41)
BSIZE	0.0023 (1.51)	0.0026 (1.72)*	-0.0028 (-1.94)*
DUAL	0.0054 (1.80)*	0.0052 (1.70)*	0.0025 (1.01)
Ind. Effect	Yes	Yes	Yes
Year. Effect	Yes	Yes	Yes
Constant	0.3882 (2.39)**	0.3884 (2.39)**	0.0720 (1.10)
N	1,465	1,465	1,471
R^2	0.085	0.084	0.1924

Note: This table reports the impact of gender diversity and FCEOs on cash holdings. CH_Three illustrates cash holdings. Refer to Table 1 for detailed definitions of variables. Figures in parentheses are t-statistics. *, **, ***, Significant at 1, 5, and 10 percent levels, respectively.

Endogeneity issues

To address the endogeneity issue, we use GMM results, lag of test variables, and 2SLS. The results of each method are discussed below in the relevant sections.

Lagged of independent variables

We used lagged independent variables (Gender_D, FCEOs and MD) to validate that our results are not subject to endogeneity issue. Using lagged independent variables is a significant technique to cater endogeneity issues in corporate governance studies (Bennouri et al., 2018). Control variables in the regression are the same as the control variables in Table 4. We used one-year lagged gender diversity measures in the estimation model to substitute the contemporary ones since female directors to influence cash holdings. The results reported in Table 6 provide consistent results and support that female directors, i.e., lag of Gender_D, lag of FCEOs, and lag of MD, have a significant negative impact on the firm's cash holdings, thus supporting Hypothesis 1a, 1b and 2.

Table 6 Gender_D, FCEOs, MD and cash holdings: Using lag of variables

	(1)	(2)	(3)	(4)	(5)	(6)
	H1a		H1b		H2	
VARIABLES	CH_One	CH_Two	CH_One	CH_Two	CH_One	CH_Two
L.Gender_D	-0.0296	-0.0275				
	(-2.11)**	(-2.23)**				
L.FCEOs			-0.0259	-0.0220		
			(-2.78)***	(-2.67)***		
L.MD					-0.0154	-0.0141
					(-4.25)***	(-4.36)***
TANG	0.0065	-0.0019	-0.0000	-0.0080	0.0194	0.0144
	(0.15)	(-0.05)	(-0.01)	(-0.20)	(0.37)	(0.30)
LEV	-0.0035	-0.0030	-0.0001	-0.0003	-0.0002	-0.0001
	(-0.43)	(-0.42)	(-0.01)	(-0.03)	(-0.02)	(-0.01)
ROA	0.1734	0.1515	0.1901	0.1658	0.1366	0.1234
	(3.74)***	(3.75)***	(3.84)***	(3.85)***	(5.89)***	(5.88)***
Q	-0.0760	-0.0685	-0.0797	-0.0715	-0.0696	-0.0637
	(-4.33)***	(-4.34)***	(-4.32)***	(-4.31)***	(-4.94)***	(-4.92)***
CAPEX	-0.0564	-0.0447	-0.0540	-0.0426	-0.0417	-0.0355
	(-1.94)*	(-1.72)*	(-1.87)*	(-1.65)	(-1.66)*	(-1.54)
CFO	0.0486	0.0458	0.0458	0.0435	0.0807	0.0756
	(1.34)	(1.42)	(1.25)	(1.35)	(3.78)***	(3.84)***
SG	-0.0004	-0.0004	-0.0005	-0.0004	-0.0004	-0.0004
	(-1.04)	(-1.14)	(-1.12)	(-1.22)	(-1.17)	(-1.16)
BIND	-0.0182	-0.0157	-0.0192	-0.0165	-0.0102	-0.0090
	(-2.34)**	(-2.24)**	(-2.47)**	(-2.43)**	(-1.20)	(-1.18)
BSIZE	-0.0011	-0.0011	-0.0009	-0.0008	-0.0021	-0.0020
	(-0.95)	(-0.97)	(-0.75)	(-0.77)	(-2.01)**	(-2.11)**
DUAL	-0.0009	-0.0005	-0.0010	-0.0006	0.0021	0.0020
	(-0.56)	(-0.37)	(-0.56)	(-0.42)	(1.16)	(1.21)
Ind.Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes

Constant	0.0657	0.0672	0.0672	0.0687	0.0790	0.0771
	(1.49)	(1.67)*	(1.56)	(1.75)*	(1.51)	(1.61)
N	1,468	1,468	1,467	1,467	1,468	1,468
R^2	0.1470	0.1526	0.1480	0.1531	0.2074	0.2119

Note: This table reports the results the impact of gender diversity on board and top management on cash holding using lag of independent variable. Refer to Table 1 for detailed definitions of variables. Figures in parentheses are t-statistics. *, **, ***, Significant at 1, 5, and 10 percent levels, respectively

The estimated coefficients on the lag of Gender_D, lag of FCEOs and lag of MD are negative and statistically significant at 5% by using both measures of cash holdings, i.e., CH_One and CH_Two (see columns 1 and 2). Thus, these results support our all hypotheses, i.e. H1a, H1b and H2.

GMM model

To address the endogeneity issue, we further used a System Generalized Method of Moment (GMM) technique (Blundell and Bond, 1998). The GMM approach is a unique tool that provides potential instruments to handle unobserved heterogeneity and solve endogeneity issues (Wintoki et al., 2012). Furthermore, this technique overcomes the endogeneity bias that can occur when the explanatory and explained variables are combined in reciprocal explanations. This methodology estimates a system of two simultaneous equations to remove any possible bias arising from simultaneous estimation. The first equation uses variables in levels (first difference instruments), and the other uses variables in the first difference (lag with respect to instruments). This methodology has important advantages in comparison to others. For example, the OLS methodology does not solve the problem of heterogeneity bias. Similarly, better than fixed effect estimation because it does not solve the problem of endogeneity. In addition, this method has preference over 2SLS because 2SLS solve the problem of endogeneity bias but is not appropriate for use in samples where there is a low value of T (number of years).

According to this approach, lagged values of cash holdings are taken and estimated in advanced regression via Arellano-Bond. This method circumvents the endogeneity problem arising from unobserved, simultaneity and vibrant relationship of board composition and the firm's past performance (Wintoki et al., 2012). Explanatory variables are concocted to be endogenous. The first lags of the explained variables, together with the lags of the exogenous variables, are used as instrumental variables (IVs).

The results of the GMM are reported in Table 7. In all the models, the AR (2) is insignificant, which shows that the model is not misrepresented. The results of the two-step GMM reported in Table 7 provide consistent evidence to the earlier reported, table 4, by showing a negative

relation between gender diversity (columns 1 and 2) and corporate cash holdings (H1a), FCEOs (columns 3 and 4) and corporate cash holdings (H1b) and military experience director (column 5 and 6) and firm's cash holding (H2).

Table 7 Gender_D, FCEOs, MD, and cash holdings: Using GMM

	(1)	(2)	(3)	(4)	(5)	(6)
	H1a		H1b		H2	
VARIABLES	CH_One	CH_Two	CH_One	CH_Two	CH_One	CH_Two
L.CH_One	0.3183		0.3196		0.5368	
	(12.24)***		(9.04)***		(12.98)***	
L.CH_Two		0.3531		0.3334		0.4705
		(13.21)***		(8.86)***		(12.49)***
Gender_D	-0.1630	-0.1400				
	(-2.60)***	(-2.52)**				
FCEOs			-0.5974	-0.4621		
			(-6.24)***	(-5.62)***		
MD					-0.0522	-0.0420
					(-2.55)**	(-2.31)**
TANG	0.0033	-0.0104	0.0290	0.0095	0.0842	0.0697
	(0.05)	(-0.16)	(0.37)	(0.14)	(1.43)	(1.27)
LEV	-0.0035	-0.0035	0.0398	0.0309	-0.0033	-0.0042
	(-0.33)	(-0.38)	(2.24)**	(1.99)**	(-0.34)	(-0.50)
ROA	0.0357	0.0289	0.2234	0.1827	-0.0187	-0.0150
	(1.49)	(1.40)	(4.60)***	(4.29)***	(-0.50)	(-0.46)
Q	-0.0324	-0.0271	-0.0983	-0.0790	0.0018	0.0013
	(-1.97)**	(-1.87)*	(-4.02)***	(-3.63)***	(0.09)	(0.08)
CAPEX	-0.0122	-0.0139	0.0008	0.0000	-0.4161	-0.3406
	(-0.57)	(-0.72)	(0.03)	(0.00)	(-2.99)***	(-2.78)***
CFO	0.0365	0.0335	-0.0190	-0.0091	0.2207	0.1946
	(1.811)*	(1.93)*	(-0.59)	(-0.33)	(4.65)***	(4.52)***
SG	0.0003	0.0003	0.0002	0.0001	0.0002	0.0002
	(1.01)	(1.30)	(0.66)	(0.64)	(0.62)	(0.77)
BIND	-0.0017	-0.0016	-0.0152	-0.0105	0.0779	0.0711
	(-0.18)	(-0.20)	(-1.44)	(-1.16)	(1.49)	(1.58)
BSIZE	-0.0017	-0.0015	-0.0006	-0.0007	0.0000	-0.0001
	(-1.13)	(-1.17)	(-0.32)	(-0.49)	(0.00)	(-0.12)
DUAL	0.0026	0.0024	0.0063	0.0051	0.0021	0.0022
	(0.62)	(0.65)	(0.95)	(0.95)	(0.60)	(0.67)
Ind. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0522 (0.74)	0.0598	0.0022	0.0189	-0.0909	-0.0752
		(0.97)	(0.02)	(0.29)	(-1.38)	(-1.25)
Diagnostic tests						
Ar(1)	-4.47***	-5.20***	-4.35***	-4.90***	-5.73***	-5.94 ***
Ar(2)	0.58	0.7	0.32	0.35	0.83	0.92
J-stat	27.17	27.09	30.91	29.67	35.73	36.08
N	1,411	1,411	1,411	1,411	1,412	1,412
Firms	214	214	214	214	214	214

Note: This table reports GMM results of gender diversity on board and top management and cash holdings. The dependent variables are CH_One and CH_Two.

Two-stage least square (2SLS)

We employ the 2SLS technique to carter the endogeneity of female's representation on the board. The problem of using this approach is the construction of an instrumental variable (IV) that should not have a direct (or indirect) relationship with the exogenous variable (dependent variable). Using the approach by (Liu et al., 2014) and (Atif et al., 2019), we construct W_Ratio

as the IV (as the number of female directors on the board minus the total number of female directors on the board of its industry and divided by the number of the board members minus the total number of board members in its industry). The idea of using W_Ratio as the IV is based on the assumption that board gender diversity in a firm's industry may affect the firm's board gender diversity but does not have a direct nexus with the cash holdings of the firms. In the first-stage regressions, where Gender_D is the dependent variable, W_Ratio produces significant at the 10% level and negative at explaining the presence of female directors on the board, reported in Column 1, establishing W_Ratio as a valid instrument. This result suggests that if W_Ratio is high, firms are less likely to have female directors on the board. In the second stage, we use the predicted gender diversity on the CH_One and CH_Two. Similarly, we use the earliest values of FCEOs variable as an instrument. We identify the earliest year when each firm appears in our sample. Then, we replace the value of FCEOs dummy in each given year with the value in the earliest year. The results for stage 1 and stage 2 are reported in Table 8, similar to our main model's findings. Thus, after minimizing the endogeneity concerns, we can safely infer that females on the boards on top management decrease cash holdings.

Table 8 Gender_D, FCEOs, MD and cash holding: using 2SLS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Stage One		Stage Two					
	Gender_D	FCEOs	MD	CH_One	CH_Two	CH_One	CH_Two	CH_One	CH_Two
Women%_IV	-0.0172 (-1.85)*								
Earlier_CEOs		-0.0234 (-2.45)**							
Ind_meanMD			1.1722 (4.81)***						
Pred_Gender_D				-0.0430 (-1.96)*	-0.0364 (-1.82)*				
FCEOs_IV						-0.4597 (-5.42)***	-0.4645 (-4.72)***		
MD								-0.5666 (-3.16)***	-0.5654 (-2.92)***
TANG	1.6347 (1.82)*	0.3437 (1.72)*	0.0511 (0.23)	-0.0675 (-1.19)	-0.0647 (-1.24)	0.0198 (0.47)	0.0195 (0.48)	0.1345 (2.35)**	0.1232 (2.35)**
LEV	0.3305 (2.92)***	0.3015 (3.12)***	0.1040 (2.24)**	-0.0203 (-1.82)*	-0.0174 (-1.74)*	0.0389 (2.44)**	0.0309 (1.99)**	0.0417 (2.15)**	0.0433 (2.08)**
ROA	-0.0925 (-0.15)	-0.0725 (-0.54)	-0.1634 (-1.05)	0.1769 (3.84)***	0.1548 (3.86)***	0.2324 (3.60)***	0.2827 (4.89)***	0.0247 (0.69)	0.0138 (0.37)
Q	-0.5724 (-2.59)***	-0.0724 (-2.97)***	-0.3798 (-4.84)***	-0.0476 (-2.39)**	-0.0442 (-2.45)**	-0.1893 (-4.42)***	-0.1790 (-3.33)***	-0.2309 (-3.38)***	-0.2296 (-3.11)***
CAPEX	-0.1112 (-0.23)	-0.1002 (-0.64)	-0.4335 (-2.68)***	-0.0490 (-1.63)	-0.0382 (-1.42)	0.0005 (0.08)	0.0004 (0.09)	-0.2680 (-3.27)***	-0.2630 (-3.00)***
CFO	-0.4592 (-0.92)	-0.0582 (-0.82)	0.2174 (1.93)*	0.0730 (2.02)**	0.0666 (2.09)**	-0.0400 (-0.67)	-0.0501 (-0.44)	0.1801 (4.23)***	0.1770 (3.86)***
SG	0.0113 (0.57)	0.0013 (0.67)	-0.0027 (-0.52)	-0.0010 (-2.19)**	-0.0009 (-2.21)**	0.0002 (2.56)***	0.0001 (2.76)***	-0.0021 (-2.25)**	-0.0021 (-2.30)**
BIND	-0.1071 (-0.71)	-0.0171 (-0.81)	-0.0091 (-0.16)	-0.0125 (-1.51)	-0.0107 (-1.47)	-0.0152 (-1.44)	-0.0105 (-1.26)	-0.0172 (-2.04)**	-0.0160 (-2.10)**
BSIZE	0.0014 (0.08)	0.0043 (0.09)	0.0298 (4.02)***	-0.0010 (-0.76)	-0.0009 (-0.78)	-0.0006 (-0.32)	-0.0009 (-0.89)	0.0111 (2.04)**	0.0117 (1.98)**
DUAL	0.1839 (4.09)***	0.0039 (3.19)***	0.0425 (2.00)**	-0.0097 (-2.07)**	-0.0080 (-1.89)*	0.0163 (0.85)	0.0151 (0.85)	0.0249 (3.20)***	0.0248 (2.98)***
Ind. Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year. Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.9094 (-0.99)	-0.1064 (-0.89)	-0.3403 (-1.48)	0.1056 (2.17)**	0.1007 (2.25)**	0.0022 (0.02)	0.0189 (0.29)	-0.0851 (-1.48)	-0.0793 (-1.49)
N	1,498	1,411	1,525	1,446	1,446	1,411	1,411	1,472	1,472
R^2	0.0319	0.0289	0.1301	0.1471	0.1525	0.0489	0.0519	0.3974	0.4004

Note: This table reports the results of gender diversity on corporate cash holdings. Refer to Table 1 for detailed definitions of variables. Figures in parentheses are t-statistics. *, **, ***, Significant at 1, 5, and 10 percent levels, respectively.

Additional analysis: SOEs and NSOEs

Moreover, we split our sample into two unique types of ownership structure, i.e., state-owned enterprises (SOEs) and non-state-owned enterprises (Non-SOEs), to investigate whether the effects of Gender_D, FCEOs and MD on corporate cash holdings vary between SOEs and Non-SOEs and the findings are reported in Table 9. In columns 1 and 2, the dependent variable is CH_One. We find that the coefficient of Gender_D is -0.0689 and statistically significant at the 1% level (column 1) in Non_SOEs, whereas insignificant in case of SOEs (column 2). In columns 3 and 4, we use CH_One as the dependent variable, and we obtain similar results for FCEOs, i.e., we find that the coefficient of FCEOs is -0.0314 and statistically significant at the 10% level (column 3) in Non_SOEs, whereas insignificant in case of SOEs (column 4). However, contrary results are reported in case of military experience director, the relationship is significant in SOEs and insignificant in Non-SOEs. The findings illustrate that the effects of Gender_D, FCEOs and MD on corporate cash holdings vary with the nature of the ownership structure.

Table 9 Gender_D, FCEOs, MD and cash holdings: SOEs Vs NSOEs

	(1)	(2)	(3)	(4)	(3)	(4)
	NSOEs	SOEs	NSOEs	SOEs	NSOEs	SOEs
	H1a		H1b		H2	
VARIABLES	CH_One	CH_One	CH_One	CH_One	CH_One	CH_One
Gender_D	-0.0689	-0.0192				
	(-3.14)***	(-1.00)				
FCEOs			-0.0314	-0.0207		
			(-1.85)*	(-1.59)		
MD					-0.0000	-0.0163
					(-0.00)	(-2.12)**
TANG	0.3381	-0.0928	0.3687	-0.1008	-0.0816	0.5529
	(4.27)***	(-1.59)	(4.51)***	(-1.77)*	(-1.60)	(4.36)***
LEV	0.0108	-0.0090	0.0089	-0.0045	-0.0146	-0.0101
	(0.60)	(-1.02)	(0.47)	(-0.48)	(-2.18)**	(-0.55)
ROA	0.2560	0.1508	0.2830	0.1601	0.1306	0.1233
	(1.76)*	(3.15)***	(1.93)*	(3.14)***	(4.92)***	(2.06)**
Q	-0.0567	-0.1045	-0.0535	-0.1095	-0.0441	-0.0013
	(-2.12)**	(-5.36)***	(-2.02)**	(-5.15)***	(-3.20)***	(-0.05)
CAPEX	0.0186	-0.0685	0.0111	-0.0635	0.0025	-0.0655
	(0.34)	(-2.08)**	(0.19)	(-2.03)**	(0.08)	(-1.14)
CFO	0.0110	0.0661 (1.87)*	0.0012	0.0673 (1.89)*	0.0429	0.0972
	(0.11)		(0.01)		(1.84)*	(2.83)***
SG	-0.0015	-0.0004	-0.0019	-0.0004	-0.0004	-0.0020

	(-0.86)	(-0.84)	(-1.06)	(-0.93)	(-0.35)	(-1.13)
BIND	-0.0413	-0.0077	-0.0409	-0.0087	-0.0068	-0.0400
	(-2.96)***	(-0.75)	(-2.87)***	(-0.83)	(-0.69)	(-1.98)**
BSIZE	-0.0054	0.0018	-0.0039	0.0017	-0.0037	-0.0086
	(-3.65)***	(1.18)	(-2.58)**	(1.12)	(-2.47)**	(-4.24)***
DUAL	-0.0063	0.0069	-0.0065	0.0067	0.0074	-0.0037
	(-3.39)***	(1.20)	(-3.53)***	(1.07)	(1.38)	(-2.06)**
Ind. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year. Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.2228	0.1388	-0.2670	0.1435	0.2748	-0.4285
	(-2.79)***	(2.40)**	(-3.22)***	(2.53)**	(4.03)***	(-3.34)***
Observations	1,042	429	1,042	429	1,043	429
R^2	0.1917	0.1646	0.1846	0.1653	0.4499	0.5084

Note: *This table reports OLS results of the impact of gender diversity on board and top management on cash holdings in State and non-state owned enterprises. Refer to Table 1 for detailed definitions of variables. Figures in parentheses are t-statistics.* *, **, ***, *Significant at 1, 5, and 10 percent levels, respectively.*

CONCLUSION

Diversity at the firm's upper echelon attracted scholars' attention in the last decade or so, however, there is little empirical consensus on whether board diversity mitigates the agency costs. This study provides empirical evidence on females director and as CEO and military director impact on agency cost (arises from excess cash holdings) mitigation. We carried our study in an emerging South-Asian economy, i.e. Pakistan. Using a sample of non-financial firms listed on PSX for the years 2009-2017, we found a significant negative impact of female, as a director and CEO, and military director on firm's cash holdings. This supports the notion that diversity, measured in gender and MD, mitigate the agency problems at cash holdings level. These findings are robust under different estimation models, i.e. GMM, Lag of test variables and 2SLS. In the additional analysis, we further confirmed that the female director and as CEOs and MD have a significantly negative effect on firms' cash holdings. Finally, the results show that the gender diversity and FCEOs impact is pronounced in NSOEs while MD in SOEs case. This suggests that the effects of Gender_D, FCEOs and MD on corporate cash holdings vary with the nature of the ownership structure. Overall, our findings advocate that diversity alleviate agency cost and improve board monitoring function.

The study has important implications for both policymakers and shareholders. The policymakers can promote good corporate governance practices and achieve workplace equity by encouraging members from diverse backgrounds to the corporate boardroom. Similarly, the investors can

safeguard their interests by appointing directors from diverse background to the firm's upper echelon. However, due to the shortage of a sufficient number of qualified female directors and conservative nature-society, it is challenging for Pakistani policymakers to formulate policies for gender-diverse board structures. We also acknowledge the limitation and generalization of these results to a broader perspective due to various elements such as culture, social backgrounds, institutional settings, and religious perspectives. Furthermore, this study does not take into consideration the specific attributes of directors, such as qualification, age, expertise and ethnicity.

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Appendix A. Sector-wise firm-years observations

Industry	Observations (firm-year)	age
Auto Car	81	4.36%
Auto-Part & Accessories	53	2.85%
Cement	140	7.54%
Chemical	130	7.0%
Engineering	90	4.85%
Fertilizers	44	2.37%
Food & Health	100	5.39%
Glass	81	4.36%
Oil Refinery and Marketing	81	4.36%
Paper & Board	54	2.91%
Pharmaceutical	72	3.88%
Power	72	3.88%
Sugar	110	5.92%
Textile	601	32.36%
Other	148	7.97%
Total	1857	100