

Beyond Gender Diversity: Two Shades of Women Directors and Bank Cash Holdings

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Abstract - Drawing upon the precautionary savings theory and agency theory, the researchers present two competing hypotheses to examine the influence of women directors, critical mass, and the attributes of women directors (specifically, educational expertise in terms of level and type, and financial expertise) on decisions related to bank cash holdings. Utilizing a dataset comprising 1375 observations representing 187 Asian commercial banks spanning from 2011 to 2019, it is discovered that women directors (as well as a critical mass of women directors) exhibit a negative correlation with bank cash holdings, supporting the agency problem-based explanation. These findings remain robust across alternative econometric specifications and varied measures of cash holdings. Concerning the impact of educational expertise, results from the Generalized Method of Moments (GMM) analysis indicate that women directors with a high level of education reduce the level of cash holdings, and those with qualifications in business/accounting/finance also decrease the level of cash holdings when measured by CASH1. Notably, the results reveal that women directors with a financial background increase excess cash holdings, aligning with the precautionary savings-based explanation. The findings contribute valuable insights to the ongoing global discourse on gender diversity and its ramifications for the banking sector.

Keywords: Bank Cash Holdings, Education Level, Financial Expertise and Gender Diversity.

I. INTRODUCTION

“What if Lehman Brothers had been Lehman Sisters?” [Christine Lagarde, President of the ECB] The recent global crisis of 2008 has raised an important question: would things have been different if there were more women running the organizations in the U.S. and around the world (Adams & Funk, 2012). Academic scholars provide empirical results to believe in an affirmative answer. The extant literature shows that women directors have superior monitoring ability, are less tolerant of opportunistic behavior, reduce the internal control weaknesses and the agency cost, thus strengthen the governance mechanisms (Adams & Ferreira, 2009; Ain, Yuan, Javaid, Usman, & Haris, 2020; Cardillo, Onali, & Torluccio, 2021; J. Chen, Leung, & Goergen, 2017; Yu Chen, Eshleman, & Soileau, 2016). Further, women directors are associated with less stock price crash risk and bank specific credit risks (Kinatader et al., 2021; Qayyum et al., 2021). Similarly, literature explores the role of women directors in corporate cash holdings decisions. For instance, Atif, Liu, and Huang (2019) document that women in the boardroom lower the cash holdings. Cambrea, Tenuta, and Vastola (2019) focus on monitoring and executive roles of women and provide empirical evidence revealing that women independent directors and women chair (women CEOs) reduce (increase) cash reserves for Italian firms. However, to the best of our knowledge, the role of women directors in bank cash holdings decisions has not been explored.

As discussed by Xu, Li, Li, and Liu (2019), precautionary motives and agency problem are the important factors in the determination of cash holdings. Precautionary motive argues that holding reserves provide cushion against potential risks and uncertainties. Recently, the studies of Ashraf (2020), Berger et al. (2020), and Dang (2022) have provided empirical results in support of precautionary motives. Further, banks can utilize large cash reserves to undertake profitable opportunities without raising funds from external market sources. Moreover, "excess cash reserves in banking can mitigate financial distress if banks fail in producing enough cash flow to support obligatory debt payments" (Trinh et al., 2021, p. 2). Excess cash reserves are also strategically important as banks can signal the market that they are financially healthy, thus assuring the safety to customers and thus may attract more deposits (Cui et al., 2020; Sasaki & Suzuki, 2019). Contrary to this positive side, cash holdings may have a dark side. According to the agency theory, the opportunistic managers might misuse excess cash reserves e.g., may undertake risky investments, over-investments, may pursue private benefits (Michael & William, 1976). Therefore, bank cash holdings can also be a cause of agency conflict (Trinh et al., 2021). These two sides of bank cash holdings raise an important question: What would women directors in banking industry pursue: precautionary motive or agency motive?

Academic scholars document women as being the more risk-averse, conservative, and less overconfident, relative to men (Faccio, et al., 2016; Palvia et al., 2015; Jianakoplos & Bernasek, 1998; Nadeem, 2020). In line with this view, Huang and Kisgen (2013) and Francis, Hasan, Wu, and Yan (2014) document that, relative to male, women CFOs are less tax aggressive and issue less debt. Women directors may have preference to use internal funds which are less risky over external market sources which are riskier and costly, in accordance with pecking order theory. Therefore, risk-aversion perspective supports that woman directors on banks' board will be precautionary, thus holding excess cash reserves. Another strand of literature shows that women on board are tough monitors, less tolerant of opportunistic behavior, reduce the agency cost (Cardillo et al., 2021; J. Chen et al., 2017; Yu Chen et al., 2016). Contrary to risk-aversion perspective, agency hypothesis predicts that women directors will lower the level of reserves.

To empirically examine these two competing hypotheses, the authors selected a sample of 187 listed commercial banks from Asian region for a period of 2011-2019. Our results show that women directors lower the level of cash holdings, thus supporting the agency motive. In accordance with critical mass theory, results show that critical mass of three or more is negatively associated with cash holdings. Our results are robust to alternative proxy variables and to a variety of estimation procedures including two-step system GMM. Further, we respond to the research call of Atif et al. (2019) and Khatib, Abdullah, Hendrawaty, and Elamer (2021) and analyze the role of women directors with educational expertise and women directors with financial expertise in cash holdings decisions. From resource dependent perspective, these women directors are better able to understand complex and opaque nature of banks' business and thus, can shape a good cash policy. GMM results show that women directors with a high level of education lower the level of cash holdings and women directors with business/accounting/finance qualifications also lower the cash holdings level when measured with CASH1. However, women directors with financial background are found to increase the level of excess cash holdings, supporting the precautionary savings-based explanation.

This study contributes to the literature in several ways. First, to the best of our knowledge, this study is the first attempt to link the women directors with bank cash holdings. On second, we provide empirical results in accordance with critical mass theory that critical mass of three or more play a significant role in cash holdings decisions. Third, we go beyond gender diversity and contribute to the scant literature on women directors' profile by showing that educational expertise and financial expertise play a significant role in shaping good cash policy.

We structure the remainder of the paper as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 discusses sample selection and summary statistics. Research method is elaborated in Section 4. Section 5 presents the results. Finally, we present the conclusion in Section 6.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

A. Women Directorship in Banking Sector

Contrary to the studies on women directors in corporate sector, there is scarcity of studies regarding women directors in the banks' boards. In the banking literature, the association between women directors and bank performance has been discussed. However, results are yet inconclusive. There is evidence of both positive (Adesanmi et al., 2019; García-Meca et al., 2015) and negative (Sajjad & Rashid, 2015) relationship whereas Mohammad, Abdullatif, and Zakzouk (2018); and D. D. Nguyen, Hagedorff, and Eshraghi (2015) fail to find any relation. Further, Arnaboldi, Casu, Gallo, Kalotychou, and Sarkisyan (2021) document that women directors reduce frequency of misconduct fines, equivalent to savings of \$7.48 million per year. Using an international sample from twenty countries, Kinateder et al. (2021) document that gender diversity reduces bank specific credit risks. Similarly, Abou-El-Sood (2021) documented that women on bank boards are associated with less risk-taking. Cardillo, G. et al. (2021) find that women board representation lowers the probability of bailout. Regarding channel through which gender diversity impacts bailout, further analysis reveals that gender diversity enhances the performance and payout ratio which lowers the probability of bailout. Galletta et al. (2022) examine the role of women directors in sustainability performance using a sample from 48 countries for the period of 2011 to 2019 and report that women directors on the bank board increase the environment performance. Tampakoudis et al. (2022) use data of 1130 mergers and acquisitions announced by banks in the US and show that women in bank board decrease the shareholder wealth and thus suggest that representation of women in board has limitations. Garcia-Sanchez et al. (2017) show a positive impact of women board representation on earnings quality in the banking sector while using a sample from nine developed countries.

B. Bank Cash Holdings

Excess reserves in the banking sector have increased after crisis (Fernandes et al., 2021; Keister & McAndrews, 2009; Nana & Samson, 2014), which has gained attention from researchers. For instance, Fernandes et al. (2021) investigate the impact of cash holdings on performance and document a concave relationship; that is, banks have an optimal level of cash holdings that balances costs and benefits and maximizes profitability. Similarly, Dang (2022) uses a sample from Vietnamese and show that, when the uncertainty level is low, profitability is lower for banks that hold more cash. However, the study reveals that holding more cash improves profitability at a high uncertainty point. Trinh et al.

(2021) document the negative value relevance of excess reserves by investors. Further, analysis shows that busy directors mitigate this negative value relevance.

Further, a number of studies decompose excess reserves into precautionary and above precautionary (Boateng et al., 2022; V. et al., 2015). In this research vein, Nguyen and Boateng (2015) show that unwanted liquidity, i.e., excess reserves above the precautionary levels has positive impact on risk-taking. Further, they examine the role of monetary policy and reveal that banks with unwanted liquidity reduce risk-taking when monetary policy is tightened. Boateng, and Nguyen (2018) provide empirical evidence revealing that unwanted excess reserves induce bankers to enhance their remuneration by improving their performance. Most recently, Boateng et al. (2022) support the model of Acharya and Naqvi (2012) and show that surplus reserves lead to risk-taking.

C. Research Gap in the Literature

During the past two decades, academic scholars have paid much attention towards an important topic, i.e., corporate governance and corporate cash holdings. In this research vein, based on precautionary savings and agency hypotheses, a limited literature examines the role of C-level executives and board gender diversity in shaping corporate cash policy. For instance, in accordance with precautionary motive, Xu et al. (2019) document that women CFOs increase the cash holdings. Contrary, Doan and Iskandar-Datta (2020) provide empirical results showing that women CFOs lower cash holdings and pay the excess cash to stockholders and thus reduce the agency cost associated with excess cash reserves. The former study is conducted in China while the latter uses a sample from USA. Regarding CEOs, Zeng and Wang (2015) show that women CEOs are cautious, however, women CEOs lower the over-investment problem. However, the focus of described studies is on gender of executives rather than board gender diversity. Regarding gender diversity, Atif et al. (2019) document that women directors lower the cash levels. Cambrea et al. (2019) focus on monitoring and executive roles of women and provide empirical evidence revealing that women independent directors and women chair (women CEOs) reduce (increase) cash reserves for Italian firms.

Despite these studies in the corporate sector, to the best of our knowledge, bank cash holdings (also known as reserves) have been an unexplored area in this regard. Similarly, literature does not examine the role of educational expertise and financial expertise of women directors on cash holdings decisions. From resource dependence perspective, these two shades of women directors may enhance strategic decision making and help to better understand the opaque and complex business nature of banks and thus may help in shaping a good cash policy. Therefore, the present study responds to the research calls of Atif et al. (2019) and Khatib et al. (2021) and analyzes the role of these two shades of women directors in cash holdings decisions.

D. Hypotheses development

1) Women directors and bank cash holdings: Based on precautionary savings hypothesis and agency hypothesis, Bank cash holdings - cushion against risks or ground for opportunism? Along with positive side, bank cash holdings may have a dark side. The reserves serve as a cushion against potential risks and uncertainties while, on the other hand, it may also lead to managerial opportunism.

2) Based on precautionary savings hypothesis: One of the major reasons for banks to hold reserves is precautionary motive. The presence of high cash reserves provides a safety cushion against unexpected events (Dang, 2022). In this regard, Ashraf (2020) and Berger et al. (2020) show that, in periods of economic uncertainty, banks tend to hold excess liquid assets. Similarly, “excess cash reserves in banking can mitigate financial distress if banks’ fail in producing enough cash flow to support obligatory debt payments” (Trinh et al., 2021, p. 2). Fernandes et al. (2021) document two main benefits of cash holdings: (1) lower transaction costs and (2) a valuable buffer to meet unexpected contingencies.

The attitude towards risks triggers the precautionary motive. A large body of literature document women are more risk-averse (Charness & Gneezy, 2012; Croson & Gneezy, 2009). Based on upper echelons theory, academic scholars document that C-suite women are more risk-averse and conservative, take less risky acquisitions, issue less debt, and exhibit lower discretionary accruals (Barua et al., 2010; Faccio et al., 2016; Huang & Kisgen, 2013; Palvia et al., 2015). This risk-aversion of women “can even lead them to leave money on the table by not undertaking all available positive NPV investment opportunities” (Faccio et al., 2016, p. 206). Menicucci and Paolucci (2021) recently show that women-led banks are less risky. Thus, this strand of the literature suggests that women pursue less risky policies.

Learning from gender-based behavioral differences, it can be expected that women directors put more weight on precautionary role of cash holdings due to several reasons. First, if women are more conservative and risk-averse, women directors may hold large reserves because holding reserves serve as a safety cushion against any potential risks and uncertainties. A growing number of studies provide empirical results in support of the precautionary motive. For instance, Chen et al. (2015) and Tran (2020) document the positive relation of uncertainty avoidance with stockpiling of reserves. Lian, Sepehri, and Foley (2011) show Chinese firms are cautious. Recently, Chang and Yang (2022) find that, if a firm has higher level of cash, its operating performance recovers more rapidly after the global crisis. Second, in accordance with pecking order theory, women directors may be likely to use internal funds (less risky) over external market sources (riskier, uncertain, and costly because of asymmetric information) when having profitable investment opportunities and thus can avoid excessive transaction costs related to external funding sources. Third, relative to women (less overconfident), men are more overconfident in financial decisions (Barber & Odean, 2001; Huang & Kisgen, 2013). Therefore, male directors’ overconfidence to cope with uncertainties may lead them to adopt aggressive cash policy by holding low levels of reserves. Thus, precautionary savings hypothesis predicts the positive association between women directors and bank cash holdings.

3) Based on agency hypothesis: On the other hand, cash holdings can exacerbate agency issues. Agency motive argues that self-interested managers may misuse reserves e.g., may undertake risky investments or extract personal benefits (Michael & William, 1976) and thus destroy shareholder value. Prior studies document the phenomenon of stockpiling cash reserves in firms having poor governance and shareholder protection (Dittmar et al., 2003; Nikolov & Whited, 2009). Further, as suggested by Kuan, Li, and Liu (2012), role of governance is to decrease cash holdings level in high cash holdings firms to avoid agency problem. An important governance control mechanism is the efficient monitoring by directors (Fama & Jensen, 1983). Literature document that women directors have

superior monitoring ability, are less tolerant of opportunistic behavior and reduce the internal control weaknesses, thus strengthen the governance mechanisms (Adams & Ferreira, 2009; J. Chen et al., 2017; Yu Chen et al., 2016). Similarly, Srinidhi, Gul, and Tsui (2011) document that women directors improve board oversight. Recently, Cardillo et al. (2021) document women directors reduce agency costs. Atif et al. (2019, p. 1006) argue that “women directors can restrain the opportunistic behavior of managers exercising discretionary power to limit the agency problem related to cash-holding decisions”. Further, women are more ethically sensitive (Ibrahim et al., 2009; Lund, 2008; Simga-Mugan et al., 2005). These studies support the agency hypothesis suggesting that women directors on bank board will lower the levels of cash reserves due to the agency problem. Based on precautionary savings and agency hypotheses, the below non-directional hypothesis is proposed.

H1: Women directors are associated with bank cash holdings.

The critical mass theory argues that women directors need to reach a certain size to influence board decision-making because solo women in the boardroom may imitate the behavior of the majority directors. Kinatader et al. (2021, p. 4) suggest that “a board with higher women representation would be more enabled to easily dictate their opinions, thereby influencing board decision-making, than a board with lower women representation”. Therefore, the number of women is worthy in examining the foregoing relationship. In this research vein, academic scholars have paid attention to critical mass perspective to support a greater women representation connotation. Kinatader et al. (2021) and Qayyum et al. (2021) show the significant role of critical mass of three or more in lowering the credit risk and crash risk, respectively. Y. Liu, Wei, and Xie (2014) highlight that “one is a token, two is a presence, and three is a voice”. Arnaboldi et al. (2021) document that presence of three or more women directors play a crucial role in lowering the frequency of misconduct fines. Following the abovementioned discussion, the following hypothesis is derived.

H2: Women directors’ critical mass is associated with bank cash holdings.

4) Educational expertise (in terms of level and type) of women directors and bank cash holdings: From resource dependence perspective, women directors’ educational expertise (in terms of level and type) is an additional resource on the board which helps them to understand the complex business environment and to make the better decisions. The study of Certo (2003) suggests that women directors with high educational level on the bank board may enhance the prestige and the banks’ legitimacy. Further, educated women directors can experience less cost of external capital and thus can easily access external funding sources (Wang et al., 2017). Educational expert women directors are found to be more ethical (Jones and Gautschi (1988); Lane et al. (1988)). Therefore, women directors with high educational level can be more concerned with agency problem of cash holdings and thus lowering the levels of cash holdings.

Another strand of literature suggests that higher cognitive ability due to higher educational level makes individuals more cautious and risk averse (Andersson et al., 2016; Jianakoplos & Bernasek, 1998). Regarding association of education and risk-aversion, Halek and Eisenhauer (2001) document that an increase of 10 percent in education results in an increase of 2.35 percent in risk aversion. Sun, Kent, Qi, and Wang (2019) document

that high educated executives are more conservative. These studies suggest that women directors with higher education level are more risk-averse than women directors without higher education level. In this vein, Dong, Wu, and Wang (2020) document a strong negative impact of women CFOs' educational expertise (in terms of level) on earning management.

In addition, "the ability to understand the complex business environment is obtained through the type of education, e.g., an MBA degree or other business diploma" (Gull et al., 2021, p. 687). In this research vein, Gull et al. (2018) find that women with formal business education on the board are effective monitors and curb the earning management. Fauzi, Basyith, and Ho (2017) show that CEOs-woman with business major lower the firm risk. Godos-Díez et al. (2015, p. 439) document a positive (negative) relation between business education and instrumental (normative) stakeholder management orientation where "instrumental approach implies an interest in managing the relationship with stakeholders in order to achieve traditional corporate objectives, while the normative approach emphasizes the need of attending the intrinsic value of stakeholders' interests". Wang et al. (2017) find that firms with highly educated board tend to hold more cash, suggesting that education of directors is an additional governance mechanism in determining corporate cash policy. Hence, the above discussion leads to the following hypothesis:

H3: Women directors' educational expertise (in terms of level and type) is associated with bank cash holdings.

5) Financial Expertise of Women Directors and Bank Cash Holdings: "Women directors influence board strategic involvement through their contribution to board decision-making, which in turn depends on women directors' professional experiences and the different values they bring along" (Nielsen and Huse (2010, p. 16). From resource dependence perspective, women director with financial expertise are better able to make decision regarding cash holdings due to financial skills, knowledge and experience accumulated during the career. These directors on the board have skill set to better understand the banking risks. Regarding the role of financial expertise in decision making, prior studies show that women directors with financial background mitigate earning management (Zalata et al., 2022). Similarly, Gull et al. (2021) document that women financial experts are better monitors and thus mitigate risk of material misstatement. Regarding CEOs with financial background, studies show that financial expert CEOs reduce internal control weakness (Oradi et al., 2020) and audit risk (Baatwah et al., 2015; Kalelkar & Khan, 2016).

Recently, MengYun et al. (2021) found that board financial expertise decreases the level of cash reserves using a sample from Pakistan. In the same research vein, Custódio and Metzger (2014, p. 26) provide empirical results consistent with the idea that "financial experts can follow more aggressive financial policies (holding less cash and more debt) because they can access financial markets more easily". Moreover, the studies of B. Liu, Zhou, Chan, and Chen (2020) and Ren and Zeng (2021) document that women financial experts on board are less likely to avoid risk. Ren and Zeng (2021, p. 77) argue that "high-risk nature of financial industry may increase women directors' tolerance for high-risk decision making and they may even actively pursue risky activities with potentially high returns". Hence, the above discussion leads to the following hypothesis:

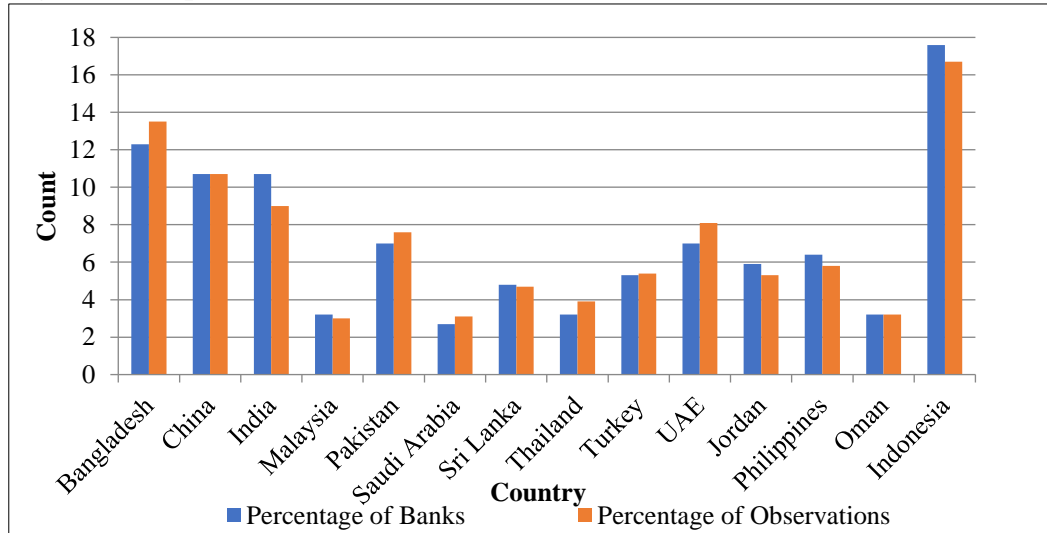
H4: Women directors' financial expertise is associated with bank cash holdings.

III. DATA AND SUMMARY STATISTICS

A. Sample

Since the financial crisis of 2007-08, banks have increased the level of reserve holdings. Therefore, we select a sample period from 2011 to 2019 (nine years).

Figure 1. Sample Distribution



Source: Authors' compilation.

Figure 1 shows the percentages of banks and percentages of observations across the sample of Asian countries.

Table 1. Sample Distribution

Countries	No of Banks	Percentage of Banks	No of Observations	Percentage of Observations
Bangladesh	23	12.3%	186	13.5%
China	20	10.7%	147	10.7%
India	20	10.7%	124	9.0%
Malaysia	6	3.2%	41	3.0%
Pakistan	13	7.0%	105	7.6%
Saudi Arabia	5	2.7%	42	3.1%
Sri Lanka	9	4.8%	65	4.7%
Thailand	6	3.2%	54	3.9%
Turkey	10	5.3%	74	5.4%
UAE	13	7.0%	111	8.1%
Jordan	11	5.9%	73	5.3%
Philippines	12	6.4%	80	5.8%
Oman	6	3.2%	44	3.2%
Indonesia	33	17.6%	229	16.7%
Total	187	100%	1375	100%

Source: Authors' compilation.

The reason to select 2011 instead of the years 2009-10 is that it may have taken time to increase the level of reserve holdings. To form a homogenous sample of banks having common objective of profit maximization, consistent with Abid et al. (2021), we only include listed commercial banks from Bangladesh, China, India, Indonesia, Jordan, Malaysia, Oman, Philippines, Pakistan, Saudi Arabia, Sri Lanka, Thailand, Turkey, UAE and exclude investment, savings, cooperative and mortgage banks from the sample. After applying these filters, our sample consists of 2176 bank-year observations. We manually collect governance data from the annual reports; therefore, due to unavailability of annual reports for some banks and/or years, our sample reduces to 1375 bank-year observations. The financial data are obtained from the Bank Focus database and country-level data are obtained from the World Bank's website. Table 1 represents the sample distribution across the countries.

B. Bank cash holdings

Following prior studies e.g., Dang (2022); Trinh et al. (2021); Xu et al. (2019), we use two proxies to measure bank cash holdings. First, we calculate the level of cash holdings using the ratio of cash and balances with central bank to total assets (CASH1). For robustness, we use the ratio of cash and balances with central bank to net assets (CASH2), where net assets are the subtraction of cash & balances with central bank from the total assets. In our sample, the average values of CASH1 and CASH2 are 0.094 and 0.107, respectively as shown in Table 2.

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
CASH1	1375	.094	.046	.006	.233
CASH2	1375	.107	.058	.006	.304
EXCESS1	1160	.045	.037	.004	.175
EXCESS2	1160	.049	.043	.004	.213
%_Women Dir	1375	.106	.106	0	.667
W_1	1375	.297	.457	0	1
W_2	1375	.193	.395	0	1
W>2	1375	.163	.369	0	1
%_WEDUC	1375	.451	.46	0	1
%_WBUS	1375	.34	.435	0	1
%_WFIN	1375	.075	.215	0	1
Board_Size	1375	11.39	3.252	5	23
Board_Ind	1375	.371	.195	0	1
CEO_Duality	1372	.05	.219	0	1
Bank_Size	1375	17.287	2.741	9.59	25.231
Lev	1375	.882	.079	.025	.978
Bank_Growth	1180	.116	.23	-.785	5.187
ROA	1375	.011	.012	-.117	.091
Ln_Age	1375	3.6	.658	.693	5.124
Country_Gov	1375	-.301	.429	-1.184	.663

Variable	N	Mean	Std. Dev.	Min	Max
GPS	1240	.314	.092	.106	.506
Ln_GDP	1375	27.054	1.448	24.108	30.29

Source: Authors' compilation.

This table shows the descriptive statistics on the sample. N represents the number of bank-year observations. CASH1, CASH2, Excess reserves/TA and Excess reserves/NA are the proxy variables to measure bank cash holdings and are winsorized at 1 and 99 percent level.

The board divided by the total number of directors sitting on the board, as widely applied in gender-related studies e.g., Adams & Ferreira, 2009 and Chen et al., 2019. To investigate the impact of critical mass of women directors on cash holdings, we employ three dummy variables namely W_1, W_2 and W>2. W_1 is equal to '1' in case of 1 women director and '0' otherwise. W_2 equals to '1' in case of 2 women directors and equals to '0' if that is not the case. W>2 is the main proxy which is equal to '1' if there are more than two women directors on the board and is equal to '0' otherwise.

The study uses %_WEDUC and %_WBUS to capture educational experts' women directors (in terms of level and type, respectively). %_WEDUC (%_WBUS) is the number of women directors with a postgraduate degree such as a Master's degree e.g. MBA, MSc or MA or PhD (with business/accounting/finance background) to the total number of women directors, as applied in (Alharbi et al., 2022; Gull et al., 2021). We also include professional qualification e.g. CA/CFA in capturing the educational expertise. To examine the role of women financial experts in cash holdings decisions, we follow Alharbi et al. (2022) and Minton, Taillard, and Williamson (2014), and use variable %_WFIN which is the number of women directors with experience (present or past) in bank or insurance company as a C-suite executive i.e., CEO/CFO/CRO or with experience in academic as a professor in business/finance/accounting to the total number of women directors.

C. Measures of board gender diversity, educational and financial experts' women directors

The main gender diversity variable, %_Women Dir is the ratio of number of women directors on the board divided by the total number of directors sitting on the board, as widely applied in gender related studies e.g., Adams & Ferreira, 2009 and Chen et al., 2019. To investigate the impact of critical mass of women directors on cash holdings, we employ three dummy variables namely W_1, W_2 and W>2. W_1 is equal to '1' in case of 1 women director and '0' otherwise. W_2 equals to '1' in case of 2 women directors and equals to '0' if that is not the case. W>2 is the main proxy which is equal to '1' if there are more than two women directors on the board and is equal to '0' otherwise.

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number of women directors with experience (present or past) in bank or insurance company as a C-suite executive i.e., CEO/CFO/CRO or with experience in academic as a professor in business/finance/accounting to the total number of women directors.

Table 2 presents the summary statistics of gender diversity on the board. We find, on average, 11 percent of directors are women. In the sample of 1375 bank-year observations, on average, 30 percent bank-years have only one women director. Similarly, about 19 percent and 16 percent have two and more than two women directors, respectively. Only male directors sit on the remaining. Women directors with post-graduation are 45 percent. 34 percent of women directors have business/accounting/finance background. 7.5 percent of women directors are financial experts in our sample.

D. Control variables measures

The study follows previous studies Atif et al., (2019) and Xu et al., (2019) and control for several governance variables, bank-specific and country-level variables. Among governance variables, we control for board size (Board_Size), proportion of independent directors (Board-Ind) and CEO duality (CEO_Duality). On average, Table 2 presents board size as 11, board independence as 0.37 and CEO duality as 0.05.

The group of bank-specific variables includes bank size (Bank_Size) measured as the natural log of total assets, leverage (Lev) measured as the ratio of total liabilities to total assets, bank growth (Bank_Growth) that is the annual growth of interest income, return on assets (ROA) measured as the ratio of net income to total assets, bank age (Ln_Age) that is the log of the difference between observation year and year in which bank is established. Table 2 presents that bank size has an average value of 17.28, the mean value of leverage is 0.882, bank growth has mean value of 0.116, and mean values of ROA and Ln_Age are 0.011 and 3.6, respectively.

Regression models are also controlled for several country-level variables: country governance index (Country_Gov, average score of six country governance indicators including corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability), the ratio of gross savings to gross domestic product (GPS), log of GDP (Ln-GDP). The mean values for Country_Gov, GPS, and Ln_GDP are -0.301, 0.314 and 27.05, respectively, as shown in table 2.

E. Correlations among variables

Table 3 reports correlation matrix to check the multicollinearity problem. As a general principle, the value higher than 0.70 may depict multicollinearity problem (Y. Liu et al., 2014). As shown in table 3, highest correlation exists (highlighted in bold) among proxy variables for bank cash holdings (i.e., CASH1, CASH2, EXCESS1 and EXCESS2). Each of four proxy variables is used in separate regression; therefore, multicollinearity is not the concern. All the remaining coefficients do not report multicollinearity issue.

IV. EMPIRICAL METHODOLOGY

A. Estimation models

We test our hypotheses H1 and H2 using the following equation:

$$\text{Cash_holdings}_{i,j,t} = \beta_0 + \beta_1 \text{BGD}_{i,j,t} + \beta_2 \text{COR}_{GOV_{i,j,t}} + \beta_3 \text{Bank_Characteristics}_{i,j,t} + \beta_4 \text{COUNTRY}_{i,j,t} + \quad (1)$$

The impact of educational experts (H3) and financial experts (H4) women directors on bank cash holdings is examined via equations (2) and (3), respectively:

$$\text{Cash_holdings}_{i,j,t} = \beta_0 + \beta_1 \text{WEDUC}_{i,j,t} + \beta_2 \text{WBUS}_{i,j,t} + \beta_3 \text{COR_GOV}_{i,j,t} + \beta_4 \text{Bank_Characteristics}_{i,j,t} + \beta_5 \text{COUNTRY}_{i,j,t} + \varepsilon_{i,j,t} \quad (2)$$

$$\text{Cash_holdings}_{i,j,t} = \beta_0 + \beta_1 \text{WFIN}_{i,j,t} + \beta_2 \text{COR_GOV}_{i,j,t} + \beta_3 \text{Bank_Characteristics}_{i,j,t} + \beta_4 \text{COUNTRY}_{i,j,t} + \varepsilon_{i,j,t} \quad (3)$$

We measure board gender diversity as the proportion of women directors. To examine the impact of critical mass of women directors on cash holdings, we employ a set of three dummy variables (W_1, W_2 and W>2). WEDUC_{i,j,t}, WBUS_{i,j,t} and WFIN_{i,j,t} are the proportion of educational experts and financial experts women directors. COR_GOV_{i,j,t} are governance control variables and include board size (Board_Size), board independence (Board-Ind) and CEO duality (CEO_Duality).

Bank_Characteristics are bank-specific control variable including bank size (Bank_Size), leverage (Lev), bank growth (Bank_Growth), return on assets (ROA), bank age (Ln_Age). Country_{i,j,t} denotes country-level variables including country governance index (Country_Gov), gross savings to GDP (GPS), log of GDP (Ln_GDP). $\varepsilon_{i,j,t}$ is the error term.

B. Robustness tests

Our independent variable may suffer from a self-selection bias and may not be systematically associated with our dependent variable. Therefore, to address endogeneity problem, we employ two-step system generalized method of moments (GMM) approach and reports the results in section 5.5.

V. RESULTS

A. Women directors and bank cash holdings

Table 4 reports the regression results about how women directors affect bank cash holdings. We run two forms of regressions including panel regression with fixed effects (FE) and panel regression with random effects (RE). We report the regression results based on fixed effect (FE) method in column (1) and (2) and random effect regression results in column (3) and (4) of table 4. In column (1) when we use the ratio of cash and balances with central bank to total assets (CASH1) as the dependent variable, the coefficient on %_Women Dir is -0.027 and it is statistically significant at the 5% level which indicates that women directors decrease the level of cash holdings.

When authors re-estimate our model using the ratio of cash and balances with central bank to net assets (CASH2) as the alternative dependent variable as shown in column (2), results remain unchanged. Similar to fixed effect model, random effect regression results point out the negative association between women directors and cash holdings. These results support the agency hypothesis that women directors lower the cash holdings due to agency problem. Our findings are similar to prior studies, which found that women directors are less tolerant of opportunistic behavior and reduce the internal control weaknesses thus strengthen the governance mechanisms (Adams & Ferreira, 2009; J. Chen et al., 2017; Yu Chen et al., 2016). Further, the findings are in line

with Atif et al. (2019) and Cambrea et al. (2019) who show a negative association between women independent directors and cash holdings in non-financial firms.

B. Critical mass and bank cash holdings

To examine the impact of critical mass of women directors on bank cash holdings, the study employed a set of three dummy variables representing one woman in the board, two women in the board and three or more women directors in the boardroom (W_1, W_2 and W>2). We report the results in table 5. As shown in column (1) and (2), one woman in the boardroom does not significantly impact level of cash holdings. These findings are in accordance with Yarram et al. (2021), who suggest that "token representation may cause the woman director to imitate the behavior of the male directors, leading to the continuance of 'agentic' behavior rather than 'communal' behavior". Thus, token representation may result in the lone woman having no impact of the cash holdings decisions. However, when boards of directors are constituted with two women directors, banks experience a decrease in level of cash holdings. Similarly, critical mass of three or more is significantly and negatively associated the cash holdings. Our findings are consistent with Y. Liu et al. (2014) and Atif et al. (2019) reflecting the summary statement of critical mass theory: "one is token, two is presence, and three is a voice".

C. Two shades of women directors: educational expertise and financial expertise

This study goes beyond gender diversity and examines the role of educational expertise (in terms of level and type) and financial expertise of women directors in cash holdings decisions. Regarding educational expertise, we separately analyze the role of women directors with postgraduate degree (level of education) and women directors with business education (type of education) in cash holdings decisions and report the results in Table 6 and 7, respectively.

Results in Table 6 reveal that postgraduate degree of women directors (%_WEDUC) is insignificant in relation to cash holdings. These results contradict Wang et al. (2017), who find that, without distinguishing the gender of directors, directors with postgraduate degree increase the level of cash holdings using a sample from Taiwan.

However, the results for the business education attribute are quite unique and report a significant. Also, recently, studies show that firms tend to hoard cash when they sense that banks are unhealthy, instead of depositing the cash in banks (Cui et al., 2020; Sasaki & Suzuki, 2019). With a high level of cash, business women in the boardroom may want to attract more deposits, thus increasing the capability to offer loans which in turn may increase banks' profits (Fernandes et al., 2021). About financial expertise of women directors, regression results are reported in Table 8. Our study does not find any significant association between women directors' financial expertise and cash holdings. Prior studies e.g., MengYun, Husnain, Sarwar, and Ali (2021), find that board financial expertise decrease the level of cash reserves using a sample from Pakistan and Custódio and Metzger (2014) document that firms tend to hold less cash when a newly appointed CEO is a financial expert.

D. Additional analysis: excess reserves holdings

Authors acknowledge that level of cash holdings may be due to the mandatory requirement of reserves imposed by central banks called as statutory/mandatory/required deposits. Therefore, we subtract the mandatory deposits from the cash and balances with central bank to obtain the excess reserves. We, then, re-estimate our models using the

ratio of excess reserves to total assets (EXCESS1) and excess reserves to net assets (EXCESS2) as the dependent variables, where net assets are the subtraction of excess reserves from the total assets. Similar to the results reported in Table 4, we find that coefficient of %_Women Dir is negative and statistically significant with excess reserves holdings as reported in Table 9. It appears that women directors reduce the level of excess reserves holdings which may be a source of agency conflict between opportunistic managers and shareholders. In accordance with critical mass theory, presence of three or more women directors is found to be significantly and negatively associated with the level of excess reserves as shown in Table 10. Similar to previously reported results, we do not find any significant impact of women directors with postgraduate degree and financial expertise on cash holdings; however, women directors with business background are found to be positively related to excess reserve holdings under fixed effect regression model. The results regarding educational experts (in terms of level and type) and financial experts women directors in relation to excess reserves holdings are reported in Table 11, 12 and 13, respectively.

E. Robustness check for endogeneity

Endogeneity is a common issue with studies on board diversity. Board gender diversity is a potential endogenous variable; therefore, we acknowledge that our estimated coefficients for the relationship between women directors, two shades of women directors and bank cash holdings might be subject to endogeneity problem. To address this issue, we employ two-step system generalized method of moments (GMM)(Blundell & Bond, 1998).

The validity tests confirm that our GMM estimators are valid. Across all the models, the first-order serial correlation AR (1) shows a significant result indicating that null hypothesis of no first order autocorrelation can be rejected. On the other hand, AR (2) tests are insignificant indicating that null hypothesis of no serial correlation of second differences cannot be rejected. We also present Sargan test for over-identification and Hansen test of exogeneity of the instruments. The Sargan results indicate that null hypothesis of over-identified model is always rejected while the Hansen results show that it is not possible to reject the hypothesis that our instruments are valid.

In Tables 14, column (1) and (2) show the GMM results for the association between women directors and bank cash holdings when we use the proxy variables CASH1 and CASH 2, while column (3) and (4) reports the results when proxy variables EXCESS1 and EXCESS 2 are used. The results are qualitatively similar to previously reported results and show evidence that women directors lower the level of cash holdings. Regarding critical mass, findings reported in Table 15 reveal that critical mass of three or more is negatively associated with CASH1 and CASH2.

Table 3 captures the role of postgraduate degree of women directors and cash holdings decisions and shows a negative and significant association between highly educated women directors and CASH1, CASH2, EXCESS1 indicating that such women directors also lower the level of cash holdings. GMM estimates regarding businesswomen directors are reported in Table 17 and show a negative association between businesswomen directors and the CASH1. In the GMM specifications, women financial experts have a significant and positive association with proxy variables EXCESS1 and EXCESS2 suggesting that such women increase the level of excess reserves, thus putting more weight on precautionary role of reserves.

Table 3. Correlation Matrix

Variables	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
(1) CASH1	1									
(2) CASH2	0.998***	1								
(3) EXCESS1	0.709***	0.715***	1							
(4) EXCESS2	0.710***	0.718***	0.999***	1						
(5) %_Women Dir	0.038	0.038	-	-	1					
			0.127***	0.128***						
(6) W_1	-0.011	-0.011	0.027	0.027	-	1				
					0.089***					
(7) W_2	-0.032	-0.029	-	-	0.364***	-	1			
			0.099***	0.098***		0.317***				
(8) W>2	0.075***	0.071***	-	-	0.661***	-	-	1		
			0.109***	0.110***		0.287***	0.216***			
(9) %_WEDUC	-	-	-	-	0.449***	0.408***	0.246***	0.154***	1	
	0.080***	0.077***	0.154***	0.150***						
(10) %_WBUS	0.050*	0.049*	-	-	0.385***	0.249***	0.224***	0.190***	0.619**	1
			0.097***	0.094***					*	
(11) %_WFIN	0.019	0.021	-0.006	-0.008	0.202***	0.084***	0.091***	0.129***	0.217**	0.240***
									*	
(12) Board_Size	0.073***	0.064**	-	-	0.129***	0.071***	0.058**	0.327***	0.267**	0.269***
			0.205***	0.201***					*	
(13) Board_Ind	-	-	0.128***	0.125***	0	0.022	-0.036	-0.065**	0.045*	0.066**
	0.096***	0.092***								
(14) CEO_Duality	-	-	-	-	-	0.091***	-0.062**	-	0.033	-
	0.152***	0.145***	0.118***	0.112***	0.079***			0.092***		0.059**
(15) Bank_Size	0.384***	0.378***	0.190***	0.186***	0.192***	0.01	0.057**	0.192***	0.048*	0.150**
										*

(16) Lev	0.04	0.028	-	-	0.028	0.071***	-0.003	0.051*	0.106***	0.056**
(17) Bank_Growth	0.004	0.005	-0.03	-0.029	-0.018	0.001	-0.007	-0.007	-0.012	-0.003
(18) ROA	0.094***	0.096***	0.051*	0.050*	-0.055**	-	0.078***	-0.038	0.041	-0.047*
(19) Ln_Age	0.105***	0.104***	0.097***	0.099***	0.078***	0.021	0.02	0.097***	0.095***	0.180** *
(20) Country_Gov	0.188***	0.194***	0.434***	0.430***	-0.004	0.013	-0.006	-0.049*	-0.009	0.079** *
(21) GPS	0.097***	0.099***	-	-	0.152***	0.043	0.087***	0.159***	0.206***	0.192** *
(22) Ln_GDP	0.129***	0.128***	-	-	0.106***	0.080***	0.050*	0.096***	0.177***	0.177** *
	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20
(11) %_WFIN	1									
(12) Board_Size	0.118***	1								
(13) Board_Ind	0.077***	-	1							
(14) CEO_Duality	-0.011	-	0.012	1						
(15) Bank_Size	0.108***	0.257***	-0.060**	-0.022	1					
(16) Lev	0.014	0.220***	-	0.093***	-0.01	1				
(17) Bank_Growth	-0.006	-0.009	-0.003	-0.02	-0.031	0.019	1			
(18) ROA	0.014	0.046*	0.091***	-	0.053**	-	0.112***	1		
				0.085***		0.224***				

(19) Ln_Age	0.057**	0.104***	0.001	0.250***	0.317***	0.034	0.091***	0.052*	1	
(20) Country_Gov	0.046*	0.218***	0.428***	0.003	0.171***	0.390***	-0.03	0.077***	0.131***	1
(21) GPS	0.02	0.385***	0.104***	-0.052*	0.199***	0.223***	0.054*	-0.021	-0.188***	0.011
(22) Ln_GDP	0.144***	0.238***	-0.023	0.110***	0.607***	0.142***	-0.008	0.087***	0.056**	-0.022
	-21	-22								
(21) GPS	1									
(22) Ln_GDP	0.563***	1								

Source: Authors' compilation.

*p<0.10; **p<0.05; ***p<0.01.

Table 4. Women Directors and Bank Cash Holdings

	Independent Variable			
	FE		RE	
	CASH1	CASH2	CASH1	CASH2
%_Women Dir	-.027** (-2.12)	-.035** (-2.12)	-.027** (-2.24)	-.033** (-2.16)
Board_Size	.001* -1.82	.001* -1.69	0 (-0.01)	0 (-0.31)
Board_Ind	-.027*** (-2.80)	-.035*** (-2.73)	-.022** (-2.52)	-.028** (-2.42)
CEO_Duality	-.009* (-1.74)	-.012* (-1.71)	-.012** (-2.37)	-.015** (-2.27)
Bank_Size	-.009* (-1.77)	-.012* (-1.85)	.01*** -7.52	.012*** -7.4
Lev	.257*** -6.95	.325*** -6.62	.171*** -5.07	.205*** -4.66
Bank_Growth	-0.003 (-0.87)	-0.003 (-0.77)	-0.003 (-1.14)	-0.004 (-1.04)
ROA	-0.17 (-1.59)	-0.224 (-1.58)	0.1 -0.99	0.145 -1.09
Ln_Age	-.032** (-2.44)	-.04** (-2.29)	-.01** (-2.44)	-.012** (-2.18)
Country_Gov	0.011 -1.02	0.011 -0.81	-0.001 (-0.08)	-0.001 (-0.06)
GPS	.075** -2.46	.097** -2.41	.126*** -5.4	.162*** -5.34
Ln_GDP	-0.008 (-1.61)	-0.008 (-1.25)	-.016*** (-7.31)	-.02*** (-6.95)
Constant	.327*** -3.75	.368*** -3.19	.216*** -4.15	.247*** -3.72
Number of obs.	1070	1070	1070	1070
R ²	0.177	0.165	0.125	0.125
Chi ²	-	-	138.405***	126.158***

Source: Authors' compilation.

Table 4 reports the results of model (1):

$$Cash_holdings_{i,j,t} = \beta_0 + \beta_1 BGD_{i,j,t} + \beta_2 COR_GOV_{i,j,t} + \beta_3 Bank_Characteristics_{i,j,t} + \beta_4 COUNTRY_{i,j,t} + \varepsilon_{i,j,t} \quad (4)$$

In above equation, board gender diversity is the proportion of women directors. Column (1) and (2) presents the results when cash holdings are measured by cash and balances with central bank to total assets (CASH1) and cash and balances with central bank to net

assets (CASH2) using fixed effect (FE) regression model. Column (3) and (4) reports the results for random effect (RE) regression model. CASH1 and CASH2 are winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 5. Critical Mass of Women Directors and Bank Cash Holdings

	Dependent Variable			
	FE		RE	
	CASH1	CASH2	CASH1	CASH2
W_1	0.002	0.002	0.003	0.003
	-0.86	-0.73	-1.06	-1.02
W_2	-.006*	-.009**	-.008**	-.01**
	(-1.96)	(-2.02)	(-2.42)	(-2.39)
W>2	-.01***	-.014***	-.009**	-.012**
	(-2.63)	(-2.71)	(-2.43)	(-2.40)
Board_Size	.001**	.002*	0	0
	-2.06	-1.95	-0.34	-0.05
Board_Ind	-.027***	-.034***	-.023***	-.029**
	(-2.80)	(-2.73)	(-2.58)	(-2.48)
CEO_Duality	-.01*	-.013*	-.013***	-.016**
	(-1.85)	(-1.82)	(-2.58)	(-2.48)
Bank_Size	-.009*	-.012*	.01***	.012***
	(-1.77)	(-1.86)	-7.48	-7.35
Lev	.243***	.307***	.159***	.191***
	-6.56	-6.25	-4.72	-4.33
Bank_Growth	-0.002	-0.003	-0.003	-0.004
	(-0.82)	(-0.72)	(-1.11)	(-1.02)
ROA	-0.165	-0.217	0.104	0.148
	(-1.55)	(-1.54)	-1.03	-1.13
Ln_Age	-.032**	-.04**	-.01**	-.011**
	(-2.46)	(-2.32)	(-2.41)	(-2.14)
Country_Gov	0.011	0.012	0	0
	-1.09	-0.89	(-0.04)	(-0.01)
GPS	.071**	.092**	.126***	.161***
	-2.35	-2.3	-5.4	-5.35
Ln_GDP	-0.008	-0.008	-.016***	-.019***
	(-1.59)	(-1.23)	(-7.24)	(-6.88)
Constant	.336***	.378***	.221***	.253***
	-3.82	-3.24	-4.24	-3.79
Number of obs.	1070	1070	1070	1070
R ²	0.189	0.177	0.129	0.129
Chi ²	-	-	155.394***	142.426***

Source: Authors' compilation.

Table 6 reports the results of model (1) where gender diversity is replaced by dummy variables: W_1, W_2 and W>2. CASH1 and CASH2 are winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 6. Women Directors with Postgraduate Degree and Bank Cash Holdings

	Dependent Variable			
	FE		RE	
	CASH1	CASH2	CASH1	CASH2
%_WEDUC	0.004 -1.41	0.004 -1.33	0.002 -0.75	0.002 -0.71
Board_Size	.001* -1.84	.001* -1.72	0 -0.05	0 (-0.26)
Board_Ind	-.027*** (-2.85)	-.035*** (-2.78)	-.023*** (-2.61)	-.029** (-2.51)
CEO_Duality	-0.008 (-1.55)	-0.011 (-1.53)	-.011** (-2.20)	-.014** (-2.10)
Bank_Size	-.009* (-1.90)	-.013** (-1.99)	.01*** -7.45	.012*** -7.32
Lev	.257*** -6.91	.324*** -6.6	.173*** -5.12	.208*** -4.72
Bank_Growth	-0.002 (-0.82)	-0.003 (-0.73)	-0.003 (-1.12)	-0.004 (-1.03)
ROA	-0.161 (-1.49)	-0.212 (-1.49)	0.109 -1.07	0.155 -1.17
Ln_Age	-.032** (-2.43)	-.04** (-2.28)	-.011** (-2.56)	-.012** (-2.30)
Country_Gov	0.009 -0.91	0.01 -0.71	-0.002 (-0.26)	-0.002 (-0.23)
GPS	.076** -2.47	.098** -2.42	.125*** -5.35	.16*** -5.28
Ln_GDP	-.009* (-1.87)	-0.01 (-1.51)	-.017*** (-7.49)	-.02*** (-7.11)
Constant	.369*** -4.19	.423*** -3.62	.229*** -4.33	.261*** -3.87
Number of obs.	1070	1070	1070	1070
R ²	0.174	0.162	0.121	0.122
Chi ²	-	-	133.436***	121.562***

Source: Authors' compilation.

Table 7 presents the results for the role of women directors with postgraduate degree in cash holdings decisions. CASH1 and CASH2 are winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 7. Women Directors with Business Education and Bank Cash Holdings

	Dependent Variable			
	FE		RE	
	CASH1	CASH2	CASH1	CASH2
%_WBUS	.006** (-2.1)	.008** (-2.06)	.005* (-1.9)	.007* (-1.9)
Board_Size	.001* (-1.89)	.002* (-1.76)	0 (-0.03)	0 (-0.35)
Board_Ind	-.027*** (-2.83)	-.035*** (-2.76)	-.023*** (-2.64)	-.03** (-2.55)
CEO_Duality	-0.008 (-1.53)	-0.01 (-1.50)	-.011** (-2.15)	-.014** (-2.05)
Bank_Size	-.01** (-1.97)	-.014** (-2.06)	.01*** (-7.44)	.012*** (-7.32)
Lev	.259*** (-7)	.328*** (-6.68)	.173*** (-5.13)	.208*** (-4.72)
Bank_Growth	-0.003 (-0.84)	-0.003 (-0.75)	-0.003 (-1.14)	-0.004 (-1.05)
ROA	-0.163 (-1.53)	-0.215 (-1.51)	0.111 (-1.1)	0.159 (-1.2)
Ln_Age	-.033** (-2.46)	-.041** (-2.31)	-.011*** (-2.69)	-.013** (-2.43)
Country_Gov	0.011 (-1.03)	0.011 (-0.83)	-0.002 (-0.26)	-0.002 (-0.24)
GPS	.072** (-2.35)	.093** (-2.3)	.122*** (-5.21)	.156*** (-5.13)
Ln_GDP	-.009* (-1.77)	-0.009 (-1.42)	-.017*** (-7.53)	-.02*** (-7.15)
Constant	.361*** (-4.15)	.413*** (-3.59)	.229*** (-4.4)	.262*** (-3.94)
Number of obs.	1070	1070	1070	1070
R2	0.177	0.165	0.125	0.126
Chi2	-	-	136.811***	124.983***

Source: Authors' compilation.

Table 8 presents the results for the role of businesswomen directors in cash holdings decisions. CASH1 and CASH2 are winsorized at 1 percent and 99 percent. T-statistics

and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 8. Women with Financial Experience and Bank Cash Holdings

	Dependent Variable			
	FE		RE	
	CASH1	CASH2	CASH1	CASH2
%_WFIN	0.003 -0.6	0.003 -0.43	0.003 -0.54	0.003 -0.42
Board_Size	.001** -1.98	.002* -1.86	0 -0.12	0 (-0.20)
Board_Ind	-.027*** (-2.80)	-.035*** (-2.74)	-.023*** (-2.59)	-.029** (-2.49)
CEO_Duality	-0.008 (-1.58)	-0.011 (-1.55)	-.011** (-2.21)	-.014** (-2.12)
Bank_Size	-.009* (-1.88)	-.013** (-1.97)	.01*** -7.43	.012*** -7.3
Lev	.261*** -7.03	.33*** -6.7	.175*** -5.18	.211*** -4.77
Bank_Growth	-0.003 (-0.87)	-0.003 (-0.78)	-0.004 (-1.15)	-0.004 (-1.05)
ROA	-0.171 (-1.59)	-0.224 (-1.58)	0.104 -1.02	0.149 -1.12
Ln_Age	-.032** (-2.39)	-.039** (-2.24)	-.011** (-2.53)	-.012** (-2.26)
Country_Gov	0.01 -0.99	0.011 -0.79	-0.002 (-0.23)	-0.002 (-0.20)
GPS	.077** -2.5	.099** -2.43	.126*** -5.36	.161*** -5.28
Ln_GDP	-.009* (-1.80)	-0.009 (-1.43)	-.017*** (-7.47)	-.02*** (-7.09)
Constant	.352*** -4.04	.4*** -3.47	.224*** -4.29	.255*** -3.83
Number of obs.	1070	1070	1070	1070
R ²	0.173	0.161	0.123	0.124
Chi ²	-	-	133.123***	121.191***

Source: Authors' compilation.

Table 9 presents the results for the role of women financial experts in cash holdings decisions. CASH1 and CASH2 are winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 9. Women Directors and Excess Reserves Holdings

	Dependent Variable			
	FE		RE	
	EXCESS1	EXCESS2	EXCESS1	EXCESS2
%_Women Directors	-.029** (-2.47)	-.034** (-2.47)	-.034*** (-3.39)	-.04*** (-3.38)
Board_Size	0 -0.75	0.001 -0.71	-.001*** (-2.65)	-.001*** (-2.68)
Board_Ind	-0.01 (-1.13)	-0.011 (-1.05)	-0.003 (-0.36)	-0.003 (-0.34)
CEO_Duality	-.016** (-2.17)	-.018** (-2.07)	-.017*** (-2.74)	-.019*** (-2.61)
Bank_Size	0.003 -0.64	0.004 -0.67	.007*** -7.41	.008*** -7.33
Lev	.144*** -4.37	.171*** -4.36	.112*** -4	.131*** -3.99
Bank_Growth	-0.003 (-1.03)	-0.003 (-1.07)	-0.003 (-1.08)	-0.003 (-1.10)
ROA	-.163* (-1.68)	-0.186 (-1.61)	-0.06 (-0.66)	-0.065 (-0.61)
Ln_Age	-0.02 (-1.50)	-0.023 (-1.49)	-.006** (-2.04)	-.007** (-1.97)
Country_Gov	-0.003 (-0.24)	-0.002 (-0.13)	.012** -2.25	.015** -2.41
GPS	.122*** -4.32	.141*** -4.18	.05*** -2.71	.055** -2.55
Ln_GDP	-0.001 (-0.13)	-0.001 (-0.07)	-.014*** (-8.02)	-.015*** (-7.85)
Constant	-0.084 (-0.67)	-0.117 (-0.78)	.217*** -5.34	.239*** -5.11
Number of obs.	894	894	894	894
R ²	0.104	0.098	0.262	0.263
Chi ²	-	-	119.982***	118.383***

Source: Authors' compilation.

Table 10 presents the results of model (1) when dependent variable is replaced by EXCESS1 and EXCESS 2. EXCESS 1 and EXCESS 2 are the ratio of excess reserves to total assets and excess reserves to net assets, respectively. Both proxy variables are

winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 10. Critical Mass and Excess Reserves Holdings

	Dependent Variable			
	FE		RE	
	EXCESS1	EXCESS2	EXCESS1	EXCESS2
W_1	0.003	0.003	0.003	0.003
	-1.17	-1.13	-1.2	-1.19
W_2	-0.004	-0.005	-.006**	-.008**
	(-1.23)	(-1.28)	(-2.27)	(-2.30)
W>2	-.007*	-.008*	-.008**	-.01***
	(-1.80)	(-1.85)	(-2.54)	(-2.58)
Board_Size	0.001	0.001	-.001**	-.001**
	-1.03	-0.99	(-2.07)	(-2.08)
Board_Ind	-0.01	-0.011	-0.003	-0.003
	(-1.10)	(-1.02)	(-0.33)	(-0.31)
CEO_Duality	-.017**	-.019**	-.018***	-.021***
	(-2.31)	(-2.22)	(-2.99)	(-2.87)
Bank_Size	0.003	0.004	.007***	.008***
	-0.65	-0.68	-7.38	-7.29
Lev	.133***	.157***	.102***	.119***
	-3.99	-3.98	-3.63	-3.63
Bank_Growth	-0.003	-0.003	-0.003	-0.004
	(-1.03)	(-1.07)	(-1.11)	(-1.14)
ROA	-0.156	-0.177	-0.048	-0.052
	(-1.61)	(-1.54)	(-0.54)	(-0.49)
Ln_Age	-0.021	-0.025	-.006**	-.007*
	(-1.60)	(-1.59)	(-1.97)	(-1.90)
Country_Gov	-0.003	-0.002	.011**	.014**
	(-0.31)	(-0.19)	-2.14	-2.31
GPS	.121***	.14***	.049***	.053**
	-4.29	-4.15	-2.65	-2.49
Ln_GDP	0	0	-.013***	-.015***
	(-0.03)	-0.03	(-7.98)	(-7.81)
Constant	-0.091	-0.125	.217***	.24***
	(-0.72)	(-0.83)	-5.38	-5.14
Number of obs.	894	894	894	894
R ²	0.111	0.105	0.274	0.274
Chi ²	-	-	130.922***	129.573***

Source: Authors' compilation.

Table 11 presents the results for the impact of critical mass on excess reserves holdings. EXCESS 1 and EXCESS 2 are the ratio of excess reserves to total assets and excess reserves to net assets, respectively. Both proxy variables are winsorized at 1 percent and 99 percent. T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively.

Table 11. Highly Educated Women Directors and Excess Reserves Holdings

	Dependent Variable			
	FE		RE	
	EXCESS1	EXCESS2	EXCESS1	EXCESS2
%_WEDUC	0.002 -0.87	0.002 -0.85	0.001 -0.31	0.001 -0.31
Board_Size	0.001 -1.01	0.001 -0.97	-0.001** (-2.48)	-0.001** (-2.52)
Board_Ind	-0.011 (-1.19)	-0.012 (-1.10)	-0.004 (-0.46)	-0.004 (-0.45)
CEO_Duality	-0.014** (-1.97)	-0.016* (-1.87)	-0.015** (-2.39)	-0.016** (-2.26)
Bank_Size	0.002 -0.48	0.003 -0.51	.007*** -7.36	.008*** -7.27
Lev	.145*** -4.38	.172*** -4.37	.114*** -4.04	.133*** -4.04
Bank_Growth	-0.003 (-1.01)	-0.003 (-1.05)	-0.003 (-1.05)	-0.003 (-1.08)
ROA	-0.154 (-1.58)	-0.175 (-1.51)	-0.041 (-0.45)	-0.042 (-0.39)
Ln_Age	-0.02 (-1.53)	-0.024 (-1.52)	-0.007** (-2.26)	-0.008** (-2.20)
Country_Gov	-0.004 (-0.38)	-0.003 (-0.26)	.011* -1.95	.013** -2.11
GPS	.123*** -4.34	.142*** -4.21	.046** -2.47	.05** -2.29
Ln_GDP	-0.001 (-0.19)	-0.001 (-0.14)	-.014*** (-8.10)	-.016*** (-7.93)
Constant	-0.067 (-0.53)	-0.096 (-0.64)	.22*** -5.36	.242*** -5.12
Number of obs.	894	894	894	894
R ²	0.097	0.091	0.246	0.247
Chi ²	-	-	107.970***	106.462***

Source: Authors' compilation.

T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively (Table 12).

Table 12. Businesswomen Directors and Excess Reserves Holdings

	Dependent Variable			
	FE		RE	
	EXCESS1	EXCESS2	EXCESS1	EXCESS2
%_WBUS	.005* -1.7	.006* -1.75	0.003 -1.22	0.004 -1.24
Board_Size	0.001 -1	0.001 -0.96	-0.001** (-2.54)	-0.001*** (-2.58)
Board_Ind	-0.011 (-1.20)	-0.012 (-1.11)	-0.004 (-0.49)	-0.004 (-0.47)
CEO_Duality	-.014* (-1.95)	-.016* (-1.85)	-.015** (-2.35)	-.016** (-2.22)
Bank_Size	0.002 -0.46	0.003 -0.49	.007*** -7.37	.008*** -7.28
Lev	.147*** -4.45	.175*** -4.44	.113*** -4.03	.133*** -4.02
Bank_Growth	-0.003 (-1.03)	-0.003 (-1.07)	-0.003 (-1.07)	-0.003 (-1.10)
ROA	-0.151 (-1.55)	-0.171 (-1.48)	-0.037 (-0.40)	-0.038 (-0.35)
Ln_Age	-0.02 (-1.56)	-0.024 (-1.56)	-0.008** (-2.38)	-0.008** (-2.33)
Country_Gov	-0.002 (-0.22)	-0.001 (-0.10)	.01* -1.9	.013** -2.06
GPS	.12*** -4.22	.138*** -4.08	.044** -2.36	.047** -2.18
Ln_GDP	-0.001 (-0.18)	-0.001 (-0.13)	-.014*** (-8.14)	-.016*** (-7.96)
Constant	-0.066 (-0.52)	-0.095 (-0.63)	.222*** -5.43	.246*** -5.2
Num. of obs.	894	894	894	894
R ²	0.1	0.094	0.245	0.245
Chi ²	-	-	108.871***	107.354***

Source: Authors' compilation.

T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively (Table 12).

Table 13. Women Financial Experts and Excess Reserves Holdings

	Dependent Variable			
	FE		RE	
	EXCESS1	EXCESS2	EXCESS1	EXCESS2
%_WFIN	0.007 -1.35	0.007 -1.27	0.005 -1.22	0.006 -1.11
Board_Size	0.001 -1.03	0.001 -0.99	-0.001** (-2.52)	-0.001** (-2.56)
Board_Ind	-0.011 (-1.25)	-0.012 (-1.16)	-0.004 (-0.53)	-0.005 (-0.50)
CEO_Duality	-.014** (-1.97)	-.016* (-1.88)	-.015** (-2.40)	-.016** (-2.27)
Bank_Size	0.002 -0.51	0.003 -0.54	.007*** -7.39	.008*** -7.3
Lev	.151*** -4.54	.178*** -4.52	.117*** -4.15	.137*** -4.13
Bank_Growth	-0.003 (-1.06)	-0.004 (-1.10)	-0.003 (-1.08)	-0.003 (-1.10)
ROA	-0.159 (-1.63)	-0.18 (-1.56)	-0.044 (-0.48)	-0.046 (-0.43)
Ln_Age	-0.019 (-1.44)	-0.022 (-1.43)	-0.007** (-2.23)	-0.008** (-2.18)
Country_Gov	-0.004 (-0.35)	-0.003 (-0.23)	.01* -1.88	.013** -2.05
GPS	.125*** -4.4	.144*** -4.26	.048*** -2.59	.052** -2.4
Ln_GDP	-0.002 (-0.28)	-0.002 (-0.22)	-.014*** (-8.19)	-.016*** (-8.00)
Constant	-0.064 (-0.50)	-0.093 (-0.62)	.221*** -5.4	.243*** -5.16
Number of obs.	894	894	894	894
R ²	0.098	0.092	0.246	0.247
Chi ²	-	-	108.932***	107.159***

Source: Authors' compilation.

T-statistics and z-statistics are shown in parentheses. ***, ** and * indicate the significance levels of 1%, 5% and 10%, respectively (Table 13).

Table 14. GMM Estimations for the Association Between Women Directors and Bank Cash Holdings

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Lag dependent variable	.586*** -15.04	.576*** -15.22	.482*** -18.01	.46*** -18.86
%_Women Dir	-.091*** (-3.82)	-.104*** (-3.41)	-.027* (-1.77)	-.033* (-1.98)
Board_Size	0 -0.67	0 -0.72	0 (-0.35)	0 (-0.39)
Board_Ind	-0.002 (-0.25)	-0.002 (-0.20)	0.004 -0.87	0.005 -0.91
CEO_Duality	-.007* (-1.67)	-0.007 (-1.39)	-.009*** (-3.10)	-.01*** (-3.21)
Bank_Size	.003*** -4.46	.004*** -4.34	.002*** -3.8	.002*** -3.88
Lev	0.022 -0.73	0.029 -0.76	0.008 -0.36	0.009 -0.36
Bank_Growth	-.005*** (-3.03)	-.006*** (-3.03)	-.004*** (-4.96)	-.004*** (-4.94)
ROA	0.081 -1.21	0.096 -1.15	-0.018 (-0.42)	-0.027 (-0.56)
Ln_Age	0 (-0.09)	0 (-0.02)	-.003** (-2.44)	-.003** (-2.54)
Country_Gov	0.004 -1.2	0.005 -1.09	.006** -2.13	.008** -2.35
GPS	.032** -2.09	.037* -1.94	-0.013 (-1.30)	-0.014 (-1.21)
Ln_GDP	-.004*** (-3.56)	-.005*** (-3.45)	-.003*** (-3.34)	-.004*** (-3.48)
Constant	.064** -2.34	.07** -2.1	.076*** -4.17	.09*** -4.35
Number of obs.	1070	1070	891	891
F (Prob > F)	921.04***	749.96***	274.13***	246.75***
Arellano-Bond test AR (1)	-5.95***	-5.73***	-4.74***	-4.53***

Arellano-Bond test	-2.56	-2.59	-1.75	-1.81
AR (2)				
Sargan test	132.23***	146.61***	140.37***	149.00***
Hansen test	47.87	46.22	46.48	44.6

Source: Authors' compilation.

Table 14 presents regression results for the impact of women directors on cash holdings when each of four proxy variables (CASH1, CASH2, EXCESS1 and EXCESS2) are used as dependent variable using GMM estimations to control for endogeneity. T-statistics are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table 15. GMM Estimations for the Association Between Critical Mass and Bank Cash Holdings

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Lag dependent variable	.567*** -11.76	.547*** -10.81	.43*** -12.46	.41*** -12.65
W_1	-.02** (-2.16)	-0.02 (-1.57)	.022** -2.5	.027*** -2.8
W_2	-.033*** (-3.50)	-.041*** (-3.05)	-0.006 (-0.77)	-0.008 (-0.97)
W>2	-.027** (-2.38)	-.029* (-1.84)	-0.011 (-1.63)	-0.011 (-1.54)
Board_Size	.001** -2.56	.002** -2.21	0 -0.45	0 -0.29
Board_Ind	-0.001 (-0.13)	-0.001 (-0.15)	0.007 -1.32	0.009 -1.37
CEO_Duality	-.01** (-2.04)	-.012* (-1.89)	-.019*** (-3.45)	-.022*** (-3.50)
Bank_Size	.003*** -3.96	.004*** -3.88	.003*** -4.56	.003*** -4.59
Lev	0.029 -0.81	0.035 -0.73	0.01 -0.42	0.006 -0.24
Bank_Growth	-.006*** (-3.32)	-.007*** (-3.07)	-.004*** (-3.88)	-.004*** (-3.76)
ROA	0.076 -1.22	0.11 -1.46	-0.005 (-0.09)	0 (-0.01)
Ln_Age	0 -0.08	0 -0.09	-0.002 (-1.35)	-0.002 (-1.21)
Country_Gov	.007* -1.75	0.008 -1.5	0.004 -1.06	0.005 -1.22
GPS	0.027 -1.51	0.032 -1.3	-0.013 (-1.05)	-0.014 (-0.91)

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Ln_GDP	-.003*** (-2.81)	-.004** (-2.56)	-.004*** (-3.73)	-.005*** (-3.74)
Constant	0.046 -1.36	0.052 -1.17	.078*** -3.21	.095*** -3.36
Number of obs.	1070	1070	891	891
F (Prob > F)	684.01***	496.93***	175.46***	167.24***
Arellano-Bond test AR (1)	-5.77***	-5.48***	-4.82***	-4.63***
Arellano-Bond test AR (2)	-2.69	-2.74	-2.03	-2.11
Sargan test	122.75***	126.59***	119.57***	125.06***
Hansen test	43.3	40.4	44.75	42.36

Source: Authors' compilation.

Table 15 presents regression results for the impact of critical mass on cash holdings when each of four proxy variables (CASH1, CASH2, EXCESS1 and EXCESS2) are used as dependent variable using GMM estimations to control endogeneity. T-statistics are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table 16. GMM Estimations for the Impact of Women Directors with Postgraduate Degree on Bank Cash Holdings

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Lag dependent variable	.6*** -16.87	.586*** -17.41	.483*** -24.52	.463*** -26.18
%_WEDUC	-.028*** (-3.93)	-.034*** (-3.69)	-.008* (-1.76)	-0.007 (-1.47)
Board_Size	.001*** -3.31	.002*** -3.31	0 -0.68	0 -0.47
Board_Ind	0.008 -1.13	0.011 -1.23	0.003 -0.71	0.004 -0.73
CEO_Duality	-0.004 (-0.79)	-0.003 (-0.59)	-.008*** (-3.72)	-.008*** (-3.69)
Bank_Size	.002** -2.27	.002** -2.37	.002*** -3.55	.002*** -3.63
Lev	0.03 -0.86	0.038 -0.83	0.016 -0.86	0.017 -0.79
Bank_Growth	-.006*** (-3.15)	-.007*** (-3.28)	-.003*** (-4.25)	-.004*** (-4.27)
ROA	0.064 -0.89	0.07 -0.79	-0.027 (-0.57)	-0.023 (-0.43)
Ln_Age	0.001 -0.52	0.001 -0.46	-.002* (-1.67)	-.003* (-1.93)

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Country_Gov	0.005 -1.21	0.006 -1.16	.007** -2.41	.008** -2.47
GPS	0.021 -1.5	0.026 -1.45	-.015* (-1.67)	-.019* (-1.80)
Ln_GDP	-.002* (-1.69)	-.002* (-1.72)	-.003*** (-3.45)	-.003*** (-3.54)
Constant	0.013 -0.37	0.013 -0.31	.061*** -3.55	.073*** -3.72
Number of obs.	1070	1070	891	891
F (Prob > F)	842.52***	676.99***	319.99***	295.77***
Arellano-Bond test AR (1)	-5.92***	-5.69***	-4.72***	-4.52***
Arellano-Bond test AR (2)	-2.88	-2.88	-1.89	-1.92
Sargan test	119.66***	133.10 ***	138.98***	147.33***
Hansen test	44.38	42.77	45.15	44.4

Source: Authors' compilation.

Table 16 presents regression results for the impact of highly educated women directors on cash holdings when each of four proxy variables (CASH1, CASH2, EXCESS1 and EXCESS2) are used as dependent variable using GMM estimations to control for endogeneity. T-statistics are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table 17. GMM Estimations for the Association Between Women Directors with Business Education and Bank Cash Holdings

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Lag dependent variable	.635*** -18.76	.621*** -19.34	.482*** -23.2	.463*** -24.32
%_WBUS	-.014* (-1.85)	-0.012 (-1.29)	0.005 -0.8	0.006 -0.94
Board_Size	0.001 -1.59	0.001 -1.35	0 (-0.89)	0 (-0.96)
Board_Ind	-0.001 (-0.19)	-0.002 (-0.25)	0.001 -0.3	0.002 -0.34
CEO_Duality	-0.005 (-1.16)	-0.004 (-0.83)	-.007*** (-3.25)	-.008*** (-3.16)
Bank_Size	.002*** -2.93	.002*** -2.98	.002*** -4.45	.002*** -4.54
Lev	0.024 -0.77	0.027 -0.68	0.006 -0.32	0.005 -0.25
Bank_Growth	-.005*** (-2.79)	-.006*** (-2.92)	-.004*** (-4.94)	-.004*** (-5.10)

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
ROA	.128* -1.73	0.146 -1.56	0.012 -0.27	0.015 -0.3
Ln_Age	0.001 -0.64	0.001 -0.49	-.004** (-2.48)	-.004*** (-2.71)
Country_Gov	0.004 -1.07	0.004 -0.81	0.004 -1.35	0.005 -1.48
GPS	0.011 -0.85	0.012 -0.72	-.025*** (-2.69)	-.029*** (-2.72)
Ln_GDP	-.002** (-2.30)	-.003** (-2.32)	-.003*** (-3.78)	-.003*** (-3.92)
Constant	0.029 -0.98	0.038 -1.04	.077*** -4.24	.092*** -4.5
Number of obs.	1070	1070	891	891
F (Prob > F)	1093.02***	874.20***	311.02***	282.33***
Arellano-Bond test AR (1)	-6.03***	-5.84***	-4.70***	-4.53***
Arellano-Bond test AR (2)	-2.85	-2.8	-1.81	-1.87
Sargan test	132.75***	146.89***	139.22***	147.63***
Hansen test	53.24	51.52	48.02	46.51

Source: Authors' compilation.

Table 17 presents regression results for the impact of businesswomen directors on cash holdings when each of four proxy variables (CASH1, CASH2, EXCESS1 and EXCESS2) are used as dependent variable using GMM estimations to control for endogeneity. T-statistics are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

Table 18. GMM Estimations for the Impact of Women Directors with Financial Expertise and Bank Cash Holdings

Dependent variable	CASH1	CASH2	EXCESS1	EXCESS2
Lag dependent variable	.626*** -18.22	.617*** -19.06	.476*** -22.08	.457*** -23.93
%_WFIN	-0.014 (-0.99)	-0.016 (-0.86)	.035*** -4.09	.038*** -4.08
Board_Size	0 -1.13	0.001 -1.25	0 (-1.43)	0 (-1.45)
Board_Ind	-0.002 (-0.33)	-0.001 (-0.15)	0.002 -0.35	0.002 -0.42
CEO_Duality	-0.003 (-0.72)	-0.002 (-0.50)	-.009*** (-3.26)	-.009*** (-3.26)

Bank_Size	.002*** -3.2	.003*** -3.16	.002*** -4.86	.003*** -4.82
Lev	0.015 -0.47	0.017 -0.43	0.022 -1.2	0.023 -1.11
Bank_Growth	-.005*** (-3.16)	-.007*** (-3.34)	-.003*** (-4.10)	-.004*** (-4.42)
ROA	.131* -1.67	0.141 -1.42	0.001 -0.03	0 -0.01
Ln_Age	-0.001 (-0.52)	-0.001 (-0.39)	-0.003** (-2.26)	-0.003** (-2.40)
Country_Gov	0.002 -0.49	0.002 -0.39	0.003 -0.96	0.004 -1.18
GPS	-0.001 (-0.06)	-0.001 (-0.06)	-0.012 (-1.22)	-0.013 (-1.24)
Ln_GDP	-.002* (-1.94)	-.003* (-1.95)	-.004*** (-4.67)	-.005*** (-4.69)
Constant	0.042 -1.44	0.049 -1.36	.088*** -4.59	.101*** -4.75
Number of obs.	1070	1070	891	891
F (Prob > F)	1102.37***	880.80***	303.65***	292.04***
Arellano-Bond test AR (1)	-6.33***	-6.10***	-4.66***	-4.46***
Arellano-Bond test AR (2)	-2.72	-2.71	-2.02	-2.03
Sargan test	131.67***	145.54***	135.06***	144.17***
Hansen test	55.17	52.34	48.93	46.99

Source: Authors' compilation.

Table 18 presents regression results for the impact of women financial experts on cash holdings when each of four proxy variables (CASH1, CASH2, EXCESS1 and EXCESS2) are used as dependent variable using GMM estimations to control for endogeneity. T-statistics are shown in parentheses. *p<0.10; **p<0.05; ***p<0.01.

VI. CONCLUSION

Based on the two competing hypotheses, namely precautionary savings hypothesis, and agency hypothesis, the study empirically examined the role of women directors, critical mass, and educational and financial experts' women directors in bank cash holdings decisions. On the one hand, precautionary savings hypothesis predicts that women directors who are more risk-averse, more conservative, less confident will increase the level of cash holdings. On the other hand, agency hypothesis suggests that women directors lower the level of cash holdings due to the agency problem. Using a sample of 1375 observations representing 187 Asian commercial banks from year 2011 to 2019, we find that women directors and critical mass of women directors are negatively associated

with bank cash holdings which is in accordance with agency hypothesis. These findings are robust to alternative econometric specifications and proxy variables.

Regarding the role of educational expertise of women directors, GMM estimations show that women directors with high education (education level) and accounting and finance qualifications (education type) are negatively associated with cash holdings. Interestingly, women financial experts are found to increase the level of excess cash holdings which favors the precautionary savings-based explanation.

It would be worth noting that, due to data unavailability, our study was only able to examine the relation between women directors and bank cash holdings in the post-crisis period. The findings of our study cannot be generalized due to several factors e.g. differences in culture, institutional settings and social backgrounds. Future research may consider these factors. Similarly, future research may examine the role of risk governance mechanisms in cash holdings decisions.

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