“Board gender diversity and corporate cash hoarding in Europe: The moderating role of investor protection laws”

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ARTICLE INFO	Majd Munir Iskandrani, Mohammed Abusharbeh, Husni Samara and Hadeel Boshmaf (2026). Board gender diversity and corporate cash hoarding in Europe: The moderating role of investor protection laws. *Investment Management and Financial Innovations*, *23*(1), 201-212. doi: 10.21511/imfi.23(1).2026.15
DOI	http://dx.doi.org/10.21511/imfi.23(1).2026.15
RELEASED ON	Friday, 06 February 2026
RECEIVED ON	Wednesday, 03 September 2025
ACCEPTED ON	Thursday, 29 January 2026

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JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
48	0	6

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BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

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BOARD GENDER DIVERSITY AND CORPORATE CASH HOARDING IN EUROPE: THE MODERATING ROLE OF INVESTOR PROTECTION LAWS

Abstract

Board diversity plays a significant role in determining a corporate cash hoarding policy as it influences investment decisions and financial flexibility. This study investigates how investor protection laws moderate the relationship between board diversity and corporate cash hoarding in Europe. Using a sample of 484 listed firms from European capital markets during the period 2015–2023, the analysis captures the influence of board gender diversity on cash reserves and how investor protection levels (high/low) moderate such a relationship. These variables and vital control variables of cash holdings are examined using a panel fixed-effects model and generalized methods of moment (GMM), along with diagnostic tests of model validity. The empirical results reveal that the presence of female directors on the board positively affects corporate cash hoarding, and thus, this effect is more pronounced in countries with high and low investor protection. Additionally, the presence of female executives on the board tends to exhibit more cash reserves and liquidity buffers. The results also provide ample evidence that the high and low levels of investor protection strengthen the positive effect of gender diversity on cash hoarding. This study offers significant theoretical and practical implications for regulators, policymakers, and investors, providing suggestions on the use of investment decisions and contributing to the stability of liquidity management in European capital markets.

Keywords board diversity, cash hoarding, investor protection, European firms

JEL Classification G34, M14, G32

Type of the article: Research Article

Received on: 3rd of September, 2025
Accepted on: 29th of January, 2026
Published on: 6th of February, 2026

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Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Corporate cash hoarding is considered a quick way to fund profitable expansion opportunities without resorting to costly external financing, and ensuring companies have adequate liquidity to navigate uncertainties (Ahmed & Hussain, 2024; Davydov et al., 2024). Thus, cash hoarding is considered an imperative part of company success through resolving corporate liquidity shortage and safeguarding against financial risks in times of ambiguity. On the negative side, deployment of cash is a central point of the agency problem between agents and shareholders. Corporate managers have a strong motive to build large piles of cash reserves to attain their self-interest rather than shareholders' benefits (Harford et al., 2008). This tradeoff between the positive and negative effects of hoarding cash has important implications for the optimal level of liquidity that companies actually achieve.

Along with this debate, the presence of female directors on boards has become more essential in shaping cash hoarding and mitigating liquidity risk (Aladwan et al., 2025). Board diversity can help companies in exhibiting greater risk sensitivity and financial conservatism.

Firms with women directors are likely more risk-averse and increase the need to hold precautionary cash, especially in the case of weak investment protection due to expropriation and regulators' inefficiencies (Seifert & Gonenc, 2018). Otherwise, women on the board can lead to a reduction in excessive cash reserves due to a cautious business strategy. Therefore, companies under high investment protection are critically encouraged to pay more attention to cash management and discourage excessive retention (Tran, 2020). This argument raises the importance of board gender diversity, which is expected to support board oversight and contribute to greater stability in cash hoarding (Chen et al., 2016; Atif et al., 2019).

Previous studies have provided substantial evidence regarding the significant role of gender diversity in liquidity and stability of capital markets in general and the European stock market in particular. The presence of female directors encourages corporate cash hoarding and corporate governance, along with low investor protection laws. However, board gender diversity and strong investor laws generally lower corporate cash hoarding. Thus, the strategies for building excessive cash hoarding, particularly in response to uncertainties, like those presented by weak or strong investor protection, are less explored. This study addresses this gap, focusing on the influence of gender diverse boards on improving cash hoarding, along with weak/strong investor laws in Europe. Therefore, European listed firms offer a significant empirical context for investigating such relationship. In particular, these listed firms are in gender quotas on corporate board (France, Spain, Germany, and Norway) and strong investor laws (England, France, and Germany), making it easier to examine their impact on financial decisions like cash holding policies. Therefore, the interaction between board diversity and investor protection in shaping cash hoarding remains an important and unexplored issue. It is worth paying attention to this and conducting further empirical research into such relationships.

1. LITERATURE REVIEW AND HYPOTHESES

Theoretically, cash hoarding is critical in supporting the liquidity and financial stability of a firm, acting as a buffer against financial riskiness, investment constraints, and transaction expenses (La Rocca & Cambrea, 2019; Boubaker et al., 2015). Trade-off theory posits that corporate cash-hoarding decisions depend on balancing between costs and benefits to maintain the optimal level of cash. Thus, excessive cash allows companies to respond quickly to investment opportunities without incurring financial delays. But agency theory provides a framework for understanding the board mechanisms governing corporate cash hoarding (Jensen, 1986). Corporate managers can accumulate cash to benefit their personal interests rather than the stakeholders' interests. Board gender diversity, particularly that of boards with women members, will exert stricter monetary control, limiting the possibility of cash losses deployment (Fama & Jensen, 1983). The pecking order theory claims that companies should use net cash flows as internal financing first (retained earnings and cash reserves), followed by debt or equity financing (Myers, 1977). Therefore, Ali et al. (2024) argue that firms accumulate cash reserves primarily to cover the deficit between retained profits and future capital spending. Essentially, corporate directors can hoard cash to alleviate external monitoring by investors, with adverse impacts on firm decision-making and capital allocation.

Prior literature shows that board gender diversity enhances corporate cash hoarding from an agency theory perspective (Ali et al., 2024; Elamer & Utham, 2024; Jilani et al., 2023). These scholars argue that the inclusion of gender diversity within corporate boards is associated with several benefits for business success, including making investment decisions and maximizing firm value. Akhtar et al. (2018) affirm that well-diversified boards can enhance managerial activities and positively affect cash reserves. Moreover, Chen et al. (2020) mention that strong corporate governance following board reforms leads to higher cash values (Hasan Samara et al., 2025). In the European context, Dimitropoulos and Koronios (2021) examine the influence of women directors on boards on cash reserves policy using 125 listed firms from the sport and leisure sectors. They find

http://dx.doi.org/10.21511/imfi.23(1).2026.15

a positive association between boards with more than three female directors and cash hoarding. In Spain, Fleitas-Castillo et al. (2025) provide new evidence that the presence of a critical mass of non-family women directors is considered a powerful instrument for controlling and legitimating company activities, aligning with stakeholders' interests, which in turn increases cash levels without increasing agency costs. Thus, boards with a substantial presence of female directors enjoy a higher cash reserve.

Otherwise, Wan Ismail et al. (2022) show that female directors are associated with low levels of cash hoarding. From Italy, Cambrea et al. (2020) investigate the impact of Gender Diversity (GD) on Cash Holdings (CH) by testing different locations directed by female directors. They conclude that the association between GD and CH varies according to the position of the female in top management. Pointedly, the study illustrates that there is an inverse association between independent female directors and cash hoarding. In the US context, Atif et al. (2019) gauge the nexus between GD and CH. The scholars reveal an inverse linkage between CH and GD, including the independent directors. In France, Jilani et al. (2023) examine the linkages between women on boards, top management position, and excess CH. The researchers reveal an inverse association between GD and the CH.

In prior financial literature, investor protection is an influential instrument to minimize agency problems (Brockman & Unlu, 2009). Previous reports have indicated that when investors are hedged, they can utilize their rights to stimulate managers to use the reserved cash (La Porta et al., 2000). Pointedly, Seifert and Gonenc (2018) argue that companies in countries with low investor protection seem to hold more cash than those in countries with high investor protection. Additionally, ample evidence shows that investor protection positively impacts cash hoarding (Yung & Nafar, 2014). Conversely, Doan and Iskandar Datta (2020) reveal that investor protection positively influences cash reserves. Wan Ismail et al. (2022) provide evidence that investor protection negatively moderates the relationship between board gender diversity and cash hoarding. Moreover, Huang et al. (2013) indicate that low and high investor protection have higher cash reserves. However, Iskandar-Datta and Jia (2014) indicate that low investor protection positively affects cash hoarding. Recently, Chen and Chen (2025) examined the effect of minority investor protection on CH in China. They find that companies with minority investor protection increase cash hoarding. Furthermore, Ilyas et al. (2023) examine whether foreign institutional investors can improve the value of excess cash, using panel data analysis on a sample of 32 countries. The scholars find that the investor protection levels pointedly enhance the value of excessive cash.

Given this theoretical argument and earlier evidence, the present study aims to examine the moderating effect of investor protection on the nexus between gender diversity and cash hoarding to provide new empirical evidence from the European context on how female directors affect corporate liquidity under investor protection laws. This investigation leads to the following hypotheses:

H_1: *Board gender diversity positively affects corporate cash hoarding among EU firms.*

H_2: *Executive gender diversity positively affects cash hoarding among EU firms.*

H_3: *Investor protection laws strengthen the positive effect of gender diversity on cash hoarding.*

Therefore, this study aims to fill the knowledge gap by analyzing how investor protection laws moderate the nexus between board gender diversity and corporate cash hoarding in the European context.

2. METHODS

2.1. Research method

To achieve research objectives and test the aforementioned hypotheses using the most appropriate model, the researchers have run some model specifications with fixed effects model and dummy scores to facilitate the superior model in conducting such a relationship. Also, the Generalized Method of Moments (GMM) was deployed to de-

tect endogeneity bias and any regression defects. Besides, the researchers incorporate a model specification that examines the impact of board gender diversity on cash hoarding, moderated by the investor protection levels. Thus, the basic panel data regression is formulated as follows

$$\begin{aligned} CH_{ii} &= \beta_0 + \beta_1 (FOB_{it}) + \beta_2 (FOE_{it}) \\ &+ \beta_3 (BI_{it}) + \beta_4 (CEO_{it}) + \beta_5 (SIZE_{it}) \\ &+ \beta_6 (ROA_{it}) + \beta_7 (CFO_{it}) + \beta_8 (FI_{it}) \\ &+ \beta_9 (YEAR) + \varepsilon_{it}. \end{aligned} \quad (1)$$

where *CH* refers to corporate cash hoarding, *i* denotes the company, and *t* the time period. *FOB* represents the fraction of female directors on board, *FOE* is the fraction of female executives in top management, *BI* is board independence, *CEO* refers to dual role of *CEO*, *SIZE* stands for firm size, *ROA* represents return on assets, *CFO* denotes for cash flow from operating activities, *FL* implies to company financial leverage, year is a dummy variable, and ε is the error term.

Corporate Cash Hoarding (CH) is captured in this study as the dependent variable. It can be defined as a company's capabilities to meet short-term obligations (Elamer & Utham, 2024). The construction of CH can be calculated by dividing cash and cash equivalents by a company's total assets (Lo et al., 2025). Furthermore, this study also incorporates different independent variables to measure Gender Diversity (GD) including; female directors on boardroom (FOB) that measured by dummy variable 1 if female directors on board and otherwise 0 (Atif et al., 2019), and the presence of female executive on top management (FOE) that coded by 1 and otherwise 0 (Cambrea et al., 2020). Additionally, this study uses significant control variables, including board independence (BI), CEO duality (CEO), firm size (SIZE), Return on Assets (ROA), profitability measures, cash flow from operating activities (CFO), financial leverage (FL), and all these variables are expected to have a strong influence on CH.

As for the moderating effect, this study uses investor protection laws as a moderating variable across 14 listed European countries. Thus, investor protection refers to regulations and laws that are designed to protect investors from fraud, manipulation, and expropriation by corporate insiders, ensuring transparency, accuracy of financial reporting, and investing without undue risk (Silva et al., 2024; La Porta et al., 1997). This variable can be measured by two levels of protection: strong investor protection and weak investor protection (Vo & Thai, 2025). Notably, this study utilizes a subsample investigation to detect the influence of the moderating variable, particularly investor protection laws. In this subsample analysis, the study creates a dummy variable that takes 1 for countries with a high investor protection level and 0 if the countries have a weak level of investor protection (Wan Ismail et al., 2022). Thus, the research model is separately re-estimated for each group of countries.

2.2. Data and sample selection

The panel dataset includes historical financial transactions and data extracted from audited financial reports of 484 listed firms on London Stock Exchange Group (LSEG) during the period 2015 to 2023, covering a total of 4,356 observations selected from 14 European countries (Germany, Italy, Spain, Denmark, Netherlands, Ireland, France, Belgium, Sweden, Austria, Luxembourg, Finland, Portugal, and Greece). The data were gathered from official websites of securities companies and the EIKON Refinitiv database. Therefore, the selected firms and the period of study are chosen based on the following criteria:

(i) Non-financial listed companies are included in the analysis. However, financial companies are excluded due to different financial transactions and governance regulations. Besides that, some listed companies for which there is insufficient data are excluded.

(ii) The period of the study is from 2015 to 2023 due to limited data availability to obtain a strong, balanced panel dataset.

Table 1 provides a brief description of the distribution of countries covered in the study. The results include the sample firms from Germany, Italy, Spain, Denmark, the Netherlands, Ireland, France, Belgium, Sweden, Austria, Luxembourg, Finland, Portugal, and Greece. It is, however,

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Table 1. Country distribution

Country	Legal tradition	Number of firms	Percent (%)	Acumulative percentage
Austria	German Civil Law	17	3.51	3.51
Belgium	French Civil Law	20	4.13	7.64
Denmark	Scandinavian Civil Law	24	4.96	12.60
Finland	Scandinavian Civil Law	21	4.34	16.94
France	French Civil Law	86	17.77	34.71
Germany	German Civil Law	91	18.80	53.51
Greece	French Civil Law	8	1.65	55.17
Republic of Ireland	Common Law	28	5.79	60.95
Italy	French Civil Law	39	8.06	69.01
Luxembourg	French Civil Law	15	3.10	72.11
Netherlands	French Civil Law	35	7.23	79.34
Portugal	French Civil Law	9	1.86	81.20
Spain	French Civil Law	32	6.61	87.81
Sweden	Scandinavian Civil Law	59	12.19	100
Total		484	100%	

evident that Germany and France account for more than 18.8% and 17.8%, respectively, followed by Sweden, Italy, the Netherlands, Spain, and Ireland, which account for 12%, 8%, 7%, 6%, and 5%, respectively. However, the rest of the countries represent less than 5% of the sample.

3. RESULTS AND DISCUSSION

Table 2 presents the basic summary of research variables in terms of mean, standard deviations, minimum, and maximum, using STATA 19. The results show that cash hoarding has a mean value of 12% and deviates by 12%, revealing that European firms have a modest level of variation in CH. While board gender diversity, on average, accounts for 31.3%, executive GD appears at a lower frequency, on average, 15.9%. It is also noted that some firms have no female directors, although others report up to 75% and 66% representation at board and top-management levels, respectively. Additionally, the result indicates that 58.4% of boards have independent directors, and only 19.1% of firms studied have a CEO who holds a dual role. The mean value of firm size is 10, net cash flow (CFO) is 8.34%, and financial leverage is 61% of assets. Meanwhile, profitability provides a considerable level of variation among European firms, with the average ROA being 4.9% and the deviation being 6.85%.

Table 2. Description of variables

Variable	N*T	Mean	Std. Dev.	Min	Max
CH	4356	0.120	0.120	–0.258	0.561
FOB%	4356	0.313	0.127	0	0.750
D_FOB	4356	0.696	0.460	0	1
FOE%	4356	0.159	0.127	0	0.664
D_FOE	4356	0.703	0.457	0	1
BI	4356	0.584	0.248	0	1
CEO	4356	0.191	0.393	0	1
Size	4356	10.06	0.690	7.79	12.43
ROA	4356	0.049	0.069	–0.235	35.722
CFO	4356	0.0834	.0711	–0.612	.5312
FL	4356	0.610	0.192	0.10	0.810

Table 3 depicts the results of the correlation coefficients among research variables. It shows that female directors on the board and women at executive levels are positively associated with CH. Similarly, independent members (BI) and ROA are positively correlated with CH. However, CEO duality is negatively correlated with CH. Additionally, the control variables, firm size, CFO, and financial leverage, exhibit significant negative correlation with CH. As a result, we conclude the correlation between research variables is relatively low, with the absence of a co-linearity problem.

To proceed with the model selection process, we use the Hausman test (1978) to select the best model from all panel data estimates. The result in Table 4 indicates that the fixed effects model (FEM) is more suitable than the random effects

Table 3. Correlation coefficient matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CH	1.000							
(2) FOB%	0.009	1.000						
(3) FOE%	0.037**	0.228***	1.000					
(4) BI	0.030**	0.103***	−0.013	1.000				
(5) CEO	−0.128***	0.095***	0.050***	−0.103***	1.000			
(6) SIZE	−0.365***	0.169***	0.149***	0.108***	−0.007	1.000		
(7) ROA	0.047***	0.018	0.049***	0.021	−0.033**	−0.128***	1.000	
(8) CFO	−0.101***	0.082***	0.106***	0.033**	−0.004	0.516***	0.082***	1.000
(9) FL	−0.087***	0.049***	−0.045***	−0.033**	0.077***	0.332***	−0.345***	0.122***

Note: *** p < 0.01, ** p < 0.05, * p < 0.1.

model (Prob < Chi2 = 0.000). The researchers further use additional tests for potential autocorrelation and endogeneity issues using Two-stage Least Squares (2SLS) and Generalized Method of Moments (GMM) estimator, as shown in Table 6.

Table 4 shows the impact of GD and executive female directors on CH. Therefore, the females on board are quantified by two metrics: the percentage of women directors, reported in model 1, and a binary score (equal to 1 if there are at least three females in the boardroom and 0 otherwise) as reported in model 2. The result of the fixed effects model shows that female directors have a direct positive effect on CH ($\beta = 0.034$, $p < 0.05$). This implies that a 1% increase in female representation on the board leads to an increase in CH by 3.4 %, with a significant level of 0.05. This result, however, supports the risk-aversion hypothesis, which suggests that female directors tend to favor conservative financial policies for long-term investments or illiquid assets (Sah et al., 2022). The findings also have the potential to provide support for stakeholder theory, as gender diversity may be more inclined to consider broader stakeholder concerns, leading to more cautious financial strategies.

To further validate our findings, a binary score is used to empirically test the validity of mass critical theory and its effect on the nexus between female directors and CH. This hypothesis articulates that having only one-woman director serves as a symbolic gesture, two women on board reveal a more substantial existence, and three or more can significantly influence decision-making (Bhardwaj et al., 2024). Relevant literature on gender diversity substantially supports this argument (Lefley & Janeček, 2024; Kramer, 2006). As reported in model 2, the coefficient of female directors is positive and has a significant effect on CH ($\beta = 0.019$, $p < 0.01$). Thus, this result supports hypothesis 1. These results support the core of critical mass theory and are consistent with the findings of Atif et al. (2019) and Sarang et al. (2021), who validate its applicability and underscore the substantial role of female directors in shaping firms' corporate cash hoarding. The result also affirms that more than three female directors on the boardroom tend to influence corporate board decisions, which in turn holds more excessive cash.

Table 4 also displays that those female executives (FOE%) have a positive and significant effect on CH ($\beta = 0.03$, $p < 0.05$). An increase in the fraction of female leaders by 1% leads to an increase in CH by 3%, as reported in model 3. Moreover, this study reveals that firms with female executives have a positive and significant effect on CH ($\beta = 0.015$, $p < 0.10$), as shown in model 4. Thus, these findings support hypothesis 2 (H_2), suggesting that the presence of women executives on the board leads to an increase in company cash buffers. This argument is consistent with the findings of Asadi et al. (2021), Booth and Nolen (2012), and Borghans et al. (2009), who argue that female leaders are obsessed with precautionary motives, are less disposed to risk than their male counterparts, and tend to hoard more cash as a safeguard of financial flexibility. Additionally, our results are strongly supported by La Rocca et al. (2019), who suggest that firms with female executives tend to adopt more conservative financial strategies, including more cash hoarding.

Regarding control variables, the findings imply that board independence positively affects CH (β

http://dx.doi.org/10.21511/imfi.23(1).2026.15

= 0.018, p < 0.05), supported by the study by Chen et al. (2020), which suggests that independent directors may favor conservative financial policies to safeguard shareholders' interests and liquidity management. Conversely, CEO duality adversely affects CH (β = –0.007, p < 0.1), suggesting that firms with combined CEO-chair positions may have weaker governance mechanisms, leading to lower precautionary cash reserves. Therefore, a double position of CEO is likely to keep out their excessive cash. This result is in line with findings by Cambrea et al. (2022), who affirm that the presence of CEO duality increases cash reserves. However, firm size (Log of TA) exhibits a strong negative effect on CH (β = –0.102, p < 0.01), which is consistent with the trade-off theory of CH, as large firm size induces firms to have better access to capital markets and require less precautionary liquidity. This implies that large firms' size in European countries requires fewer liquidity buffers. This argument is consistent with prior studies, such as Magerakis et al. (2020), who argue that small-sized firms require more cash reserves for operational activities. Finally, financial leverage (FL) does not show a significant effect on CH.

Table 5 presents the results of the interactive effect between board diversity attributes (FOB%, D_FOB, FOE%, D_FOE) and investor protection levels (IP) on CH. Thus, we categorized panel data into two groups according to investor protection (High IP and Low IP). After that, the model was separately re-estimated for each group. As a result, the countries with strong or high investor protection are displayed in columns (1), (3), (5), and (7), while countries with low investor protection are presented in columns (2), (4), (6), and (8). As a result, Table 5 shows the moderating effect of investor protection law on the nexus between board gender diversity and CH. The results provide evidence that boards with higher female directors in low investor protection countries are more likely

Table 4. Results of fixed-effect models

Variables	Board Gender Diversity (BGD)		Executive Gender Diversity (EGD)	
	Model 1	Model 2	Model 3	Model 4
FOB%	0.034**			
	(0.011)			
D_FOB		0.019***		
		(0.000)		
FOE%			0.030**	
			(0.019)	
D_FOE				0.015*
				(0.061)
BI	0.018**	0.028***	0.033***	0.032***
	(0.033)	(0.001)	(0.000)	(0.000)
CEO	–0.007*	–0.011**	–0.009**	–0.009**
	(0.088)	(0.012)	(0.044)	(0.046)
Size	–0.102***	–0.091***	–0.087***	–0.087***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
CFO	–0.000*	–0.000***	–0.000**	–0.000***
	(0.092)	(0.009)	(0.011)	(0.01)
FL	–0.004	–0.003	–0.006	–0.005
	(0.772)	(0.799)	(0.646)	(0.711)
Constant	1.109***	1.002***	0.969***	0.964***
	(0.000)	(0.000)	(0.000)	(0.000)
N*T	4356	4356	4356	4356
Adj R2	0.16	0.109	0.102	0.102
Year Dummy	Yes	Yes	Yes	Yes
Hausman	Chi (9) = 95.54, Prob< Chi2 = 0.000	Chi (9) = 92.34, Prob< Chi2 = 0.000	Chi (9) = 91.45, Prob< Chi2 = 0.000	Chi (9) = 91,.45 Prob< Chi2 = 0.000

Note: p-values are in parentheses; *** p < .01, ** p < .05, * p < .1.

Table 5. Results of the moderating effect of investor protection laws between board diversity and cash hoarding

Variables	(1) High IP	(2) Low IP	(3) High IP	(4) Low IP	(5) High IP	(6) Low IP	(7) High IP	(8) Low IP
FOB%	0.034* (0.011)	0.045** (0.008)						
D_FOB			0.019** (0.000)	0.030** (0.000)				
FOE%					0.030* (0.019)	0.038* (0.012)		
D_FOE							0.010* (0.041)	0.025** (0.042)
BI	0.018** (0.033)	0.032*** (0.000)	0.017** (0.040)	0.030*** (0.000)	0.020** (0.028)	0.035*** (0.000)	0.015** (0.045)	0.029*** (0.002)
CEO	−0.007 (0.088)	−0.011* (0.012)	−0.009 (0.070)	−0.012** (0.010)	−0.006 (0.091)	−0.010* (0.015)	−0.008 (0.078)	−0.011* (0.013)
Size	−0.102** (0.000)	−0.091** (0.000)	−0.10** (0.000)	−0.092** (0.000)	−0.100** (0.000)	−0.093** (0.000)	−0.099** (0.000)	−0.094** (0.000)
ROA	0.001** (0.000)	0.0015** (0.000)	0.001** (0.000)	0.0014** (0.000)	0.001** (0.000)	0.0016** (0.000)	0.001** (0.000)	0.0017** (0.000)
CFO	−0.000 (0.092)	−0.003** (0.009)	0.0001 (0.087)	−0.0028* (0.011)	−0.0002 (0.089)	−0.0032** (0.008)	−0.0003 (0.085)	−0.0029** (0.010)
FL	−0.004 (0.772)	−0.006 (0.646)	−0.003 (0.785)	−0.005 (0.660)	−0.005 (0.769)	−0.007 (0.632)	−0.002 (0.790)	−0.004 (0.670)
Constant	1.109** (0.000)	1.250** (0.000)	1.105** (0.000)	1.255** (0.000)	1.103** (0.000)	1.260** (0.000)	1.100** (0.000)	1.265** (0.000)
N*T	2904	1452	2904	1452	2904	1452	2904	1452
Adj R^2	0.16	0.18	0.15	0.17	0.16	0.19	0.15	0.18
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: p-values are in parentheses; ** p < .01, * p < .05.

to hold cash than those in higher investor protection countries. These findings support hypothesis 3, suggesting that higher gender diversity positively affects CH under low investor protection laws and positively impacts CH with strong investor protection. This proposition is consistent with the prior study by Chen et al. (2020), who argue that higher GD positively affects cash management when the level of investor protection is relatively weak. In contrast, Huang et al. (2013) argue that higher CH respond positively to the stronger investor protection. Indeed, this result conflicts with the core of agency theory that states strong investor protection makes it costly for corporate directors to pursue their conflicting interest over stockholders' benefits, which is relatively lower than their cash reserves (Drobetz et al., 2010).

In our main analysis, the primary findings suffer from endogeneity bias. For instance, firms that tend to prioritize shareholders' interests by holding more cash may also be inclined to increase GD representation at the board and executive levels, either in response to growing demands for gender diversity or to comply with corporate governance oversight. As such, GD is considered an endogenous variable. To control the endogeneity issue, we employed two additional analytical approaches. First, this study uses two-stage least squares (2SLS), which effectively isolates the exogenous components of GD, allowing for a more precise analysis of its impact on cash hoarding. Second, the dynamic panel model (GMM) is used to mitigate potential biases related to "undetected heterogeneity, causality, and dynamic endogeneity".

Table 6 shows the results of 2SLS, as reported in models (1), (2), (3), and (4), which reveal that the presence of female directors and women executives positively affects cash reserves in the European context. In addition, the second estimation of GMM, as reported in models (5), (6), (7), and (8), provides ample evidence that FOB% and FOE% have a positive effect on cash hoarding. These results are consistent with the initial results of the fixed effect model, with small deviations in coefficients and p-values. As a result, the research findings remain consistent and significant with earlier results of the study.

http://dx.doi.org/10.21511/imfi.23(1).2026.15

Table 6. The effect of gender diversity on cash hoarding while accounting for endogeneity

Variables	Second Stage of Least Square (2SLS)				Dynamic Panel Model (GMM)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
FOB%	0.05** (0.049)				0.10* (0.09)			
D_FOB		0.050** (0.049)				0.01* (0.10)		
FOE%			0.034** (0.011)				0.054* (0.046)	
D_FOE				0.010*** (0.000)				0.02* (0.09)
R–squared	0.1648	0.1677	0.0484	0.1694				
F–stat	106.17	108.53	93.71	107.95				
Prob.	(0.000)	(0.000)	(0.000)	(0.000)				
AR (1)					–4.34 **	–11.23**	–11.29**	
AR (2)					0.16	1.06	1.00	
Hansen					55.88	34.43	40.10	
Wald chi2					1585.26	4633.07	4503.49	
N*T	4356	4356	4356	4356	4356	4356	4356	4356
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: p-values are in parentheses; *** p<.01, ** p<.05, * p<.1.

CONCLUSION

This study analyzes how investor protection laws in European countries shape the relationship between board gender diversity and cash hoarding during the period 2015–2023, using data for 484 listed firms on the London Stock Exchange Group (LSEG). Through analysis and synthesis of previous studies and data regression analysis, this study has successfully developed a research model to assess the direct effect of board diversity on cash hoarding and to examine the moderating effect of investor protection levels between board gender diversity and cash hoarding.

The empirical results support the conclusion that the presence of female directors on the board positively influences corporate cash hoarding. Additionally, higher gender representation and women executives on the board tend to exhibit more cash and liquidity buffers, which supports the critical mass theory. This study also concludes that lower investor protection positively moderates the association between board gender diversity and cash hoarding. Similarly, strong investor protection strengthens the positive effect of board gender diversity on cash hoarding. These findings support the precautionary cash holdings theory. Regarding control variables, this study finds that independent directors positively affect cash reserves. In contrast, CEO duality and firm size adversely affect cash hoarding. But financial leverage did not significantly impact corporate cash hoarding.

Those findings lay out the listed firms through the following implications aimed at enhancing investment decisions in constructing well-diverse portfolio investment and helping top management in formulating their policies toward board oversight and liquidity management. These findings help regulators in promoting good governance practices, which in turn lead to better liquidity buffers and cash use discipline.

This study also comes with a few limitations for future research. First, it is important to emphasize that explanatory variables are limited. Therefore, other board attributes are neglected in the estimated model. Thus, future research should consider the impact of board qualities on cash hoarding along with investor protection law. Second, our findings contend that women on the board have a similar effect across

all industries. Thus, different sectors, such as the banking sector, face distinct liquidity requirements and different risk levels; incorporating industry-specific sector effects would provide deeper insights into the nexus between board diversity and cash hoarding.

AUTHOR CONTRIBUTIONS

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REFERENCES

1. Ahmed, A., & Hussain, A. (2024). Board gender diversity and corporate cash holdings: Evidence from Australia. *International Journal of Accounting & Information Management, 32*(4), 622-650. https://doi.org/10.1108/IJAIM-10-2023-0256
2. Akhtar, T., Tareq, M. A., Sakti, M. R. P., & Khan, A. A. (2018). Corporate governance and cash holdings: the way forward. *Qualitative Research in Financial Markets, 10*(2), 152-170. https://doi.org/10.1108/QRFM-04-2017-0034
3. Aladwan, M., Samara, H., Alsinglawi, O., Elamer, A. A., & Moustafa, M. W. (2025). Do women on boards drive corporate sustainability? Evidence from the European Union. *Corporate Social Responsibility and Environmental Management, 32*(6), 8144-8160. Retrieved from https://ideas.repec.org/a/wly/corsem/v32y2025i6p8144-8160.html
4. Ali, M. A. S., Aly, S. A. S., Abdelazim, S. I., & Metwally, A. B. M. (2024). Cash holdings, board governance characteristics, and Egyptian firms' performance. *Cogent Business & Management, 11*(1), 2302205. https://doi.org/10.1080/23311975.2024.2302205
5. Asadi, A., Oladi, M., & Aghel, M. G. (2021). Evaluation of managerial overconfidence, cash holding, and investment efficiency in companies. *Journal of Mathematics, 2021*(1), 1954526. https://doi.org/10.1155/2021/1954526
6. Atif, M., Liu, B., & Huang, A. (2019). Does board gender diversity affect corporate cash holdings? *Journal of Business Finance & Accounting, 46*(7-8), 1003-1029. https://doi.org/10.1111/jbfa.12397
7. Bhardwaj S., Morgan, D., & Elms, N. (2024). Why women on corporate boards are more than just tokens: an Indian perspective? *Gender in Management: An international Journal, 39*(6), 745-760. https://doi.org/10.1108/GM-12-2022-0384
8. Booth, A. L., & Nolen, P. (2012). Gender differences in risk behavior: Does nurture matter? *The Economic Journal, 122*(558), F56-F78. https://doi.org/10.1111/j.1468-0297.2011.02480.x
9. Borghans, L., Golsteyn, B. H. H., Heckman, J. J., & Meijers, H. (2009). Gender differences in risk aversion and ambiguity aversion. *Journal of the European Economic Association, 7*(2-3), 649-658. https://doi.org/10.1162/JEEA.2009.7.2-3.649
10. Boubaker, S., Derouiche, I., & Nguyen, D. K. (2015). Does the board of directors affect cash holdings? A study of French listed firms. *Journal of Management & Governance, 19,* 341-370. Retrieved from https://ideas.repec.org/a/kap/jmgtgv/v19y-2015i2p341-370.html
11. Brockman, P., & Unlu, E. (2009). Dividend policy, creditor rights, and the agency costs of debt. *Journal of Financial Economics, 92*(2), 276-299. https://doi.org/10.1016/j.jfineco.2008.03.007
12. Cambrea, D. R., Calabrò, A., La Rocca, M., & Paolone, F. (2022). The impact of boards of directors' characteristics on cash holdings in uncertain times. *Journal of Management and Governance, 26*(1), 189-221. Retrieved from https://ideas.repec.org/a/kap/jmgtgv/v26y2022i1d10.1007_s10997-020-09557-3.html
13. Cambrea, D. R., Tenuta, P., & Vastola, V. (2020). Female directors and corporate cash holdings: monitoring vs executive roles.

http://dx.doi.org/10.21511/imfi.23(1).2026.15

Management Decision, 58(2), 295-312. https://doi.org/10.1108/MD-11-2018-1289

14. Chen, G. O., Yang, Y., & Zaynutdinova, G. R. (2020). Corporate governance and cash holdings: Evidence from worldwide board reforms. *Journal of Corporate Finance, 65,* 101771. https://doi.org/10.1016/j.jcorpfin.2020.101771
15. Chen, H., Yang, D., Zhang, J. H., & Zhou, H. (2020). Internal controls, risk management, and cash holdings. *Journal of Corporate Finance, 64,* 101695. https://doi.org/10.1016/j.jcorpfin.2020.101695
16. Chen, R., & Chen, X. C. (2025). Regulatory influence on corporate cash holdings: Minority shareholder activism by regulators. *International Review of Financial Analysis,* 104105. https://doi.org/10.1016/j.irfa.2025.104105
17. Chen, S., Ni, X., & Tong, J. Y. (2016). Gender diversity in the boardroom and risk management: A case of R&D investment. *Journal of Business Ethics, 136*(3), 599-621. Retrieved from https://ideas.repec.org/a/kap/jbuset/v136y2016i3d10.1007_s10551-014-2528-6.html
18. Davydov, D., King, T., & Weill, L. (2024). Managing bank liquidity hoarding during uncertain times: The role of board gender diversity. *Financial Markets, Institutions & Instruments, 33*(3), 323-348. https://doi.org/10.1111/fmii.12202
19. Dimitropoulos, P. E., & Koronios, K. (2021). Board gender diversity and cash holdings: empirical evidence from the European sport and leisure sector. *International Journal of Financial Studies, 9*(4), 64. https://doi.org/10.3390/ijfs9040064
20. Doan, T., & Iskandar-Datta, M. (2020). Are female top executives more risk-averse or more ethical? Evidence from corporate cash holdings policy. *Journal of Empirical Finance, 55,* 161-176. https://doi.org/10.1016/j.jempfin.2019.11.005
21. Drobetz, W., Grüninger, M., & Hirschvogl, S. (2010). Information asymmetry and the value of cash. *Journal of Banking & Finance, 34*(9), 2168-2184. https://doi.org/10.1016/j.jbankfin.2010.02.002
22. Elamer, A. A., & Utham, V. (2024). Cash is queen? Impact of gender-diverse boards on firms' cash holdings during COVID-19. *International Review of Financial Analysis, 95,* 103490. https://doi.org/10.1016/j.irfa.2024.103490
23. Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and Economics, 26*(2), 301-325. https://doi.org/10.1086/467037
24. Fleitas-Castillo, G. D. C., Pérez-Alemán, J., & Santana-Martín, D. J. (2025). Board gender diversity and cash holding: the effect of family ties. *Review of Managerial Science, 19*(4), 1161-1193. Retrieved from https://ideas.repec.org/a/spr/rvmgts/v19y2025i4d10.1007_s11846-024-00788-4.html
25. Harford, J., Mansi, S. A., & Maxwell, W. F. (2008). Corporate governance and firm cash holdings in the US. *Journal of Financial Economics, 87*(3), 535-555. https://doi.org/10.1016/j.jfineco.2007.04.002
26. Hasan Samara, H., Bazbaz, A., Anton Alslaibi, N., Kamal Khaled Abu Farha, E., & Kharoub, T. (2025). Accounting culture and the quality of financial reporting: Corporate governance as a moderator in Palestinian and Jordanian banking sectors. *EDPACS,* 1-16. https://doi.org/10.1080/07366981.2025.2581362
27. Hausman, J. (1978) Specification Tests in Econometrics. *Econometrica, 46*, 1251-1271. https://doi.org/10.2307/1913827
28. Huang, Y., Elkinawy, S., & Jain, P. K. (2013). Investor protection and cash holdings: Evidence from US cross-listing. *Journal of Banking & Finance, 37*(3), 937-951. https://doi.org/10.1016/j.jbankfin.2012.10.022
29. Ilyas, M., Mian, R. U., & Mian, A. (2023). Foreign institutional investors and the value of excess cash holdings: international evidence. *International Journal of Accounting & Information Management, 31*(5), 705-725. Retrieved from https://ideas.repec.org/a/eme/ijaimp/ijaim-04-2023-0078.html
30. Iskandar-Datta, M. E., & Jia, Y. (2014). Investor protection and corporate cash holdings around the world: new evidence. *Review of Quantitative Finance and Accounting, 43,* 245-273. Retrieved from https://ideas.repec.org/a/kap/rqfnac/v43y2014i2p245-273.html
31. Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review, 76*(2), 323-329. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=99580
32. Jilani, I., Lakhal, F., & Lakhal, N. (2023). Women on boards and on top management positions and excess cash holdings: a quantile regression approach. *Corporate Governance: The International Journal of Business in Society, 23*(7), 1585-1606. https://doi.org/10.1108/CG-10-2022-0435
33. Kramer, V. W. (2006). *Critical mass on corporate boards: Why three or more women enhance governance.* Wellesley Centers for Women.
34. La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *Journal of Finance, 52*(3), 1131-1150. https://doi.org/10.1111/j.1540-6261.1997.tb02727.x
35. La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics, 58*(1-2), 3-27. https://doi.org/10.1016/S0304-405X(00)00065-9
36. La Rocca, M., & Cambrea, D. R. (2019). The effect of cash holdings on firm performance in large Italian companies. *Journal of International Financial Management & Accounting, 30*(1), 30-59. https://doi.org/10.1111/jifm.12094
37. La Rocca, M., La Rocca, T., Staglianò, R., Vecellio, P., & Montalto, F. (2019). Gender diversity, cash

holdings and the role of the institutional environment: empirical evidence in Europe. *Applied Economics, 51*(29), 3137-3152. https://doi.org/10.1080/00036846.2019.1566687

38. Lefley, F., & Janeček, V. (2024). Board gender diversity, quotas and critical mass theory. *Corporate Communications: An International Journal, 29*(2), 139-151. https://doi.org/10.1108/CCIJ-01-2023-0010

39. Magerakis, E., Gkillas, K., Tsagkanos, A., & Siriopoulos, C. (2020). Firm Size Does Matter: New Evidence on the Determinants of Cash Holdings. *Journal of Risk and Financial Management, 13*(8), 163. https://doi.org/10.3390/jrfm13080163

40. Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics, 5*(2), 147-175. https://doi.org/10.1016/0304-405X(77)90015-0

41. Sah, N. B., Adhikari, H. P., Krolikowski, M. W., Malm, J., & Nguyen, T. T. (2022). CEO gender and risk aversion: Further evidence using the composition of firm's cash. *Journal of Behavioral and Experimental Finance, 33,* 100595. https://doi.org/10.1016/j.jbef.2021.100595

42. Sarang, A. A. A., Aubert, N., & Hollandts, X. (2021). Board gender diversity and corporate cash holdings. *Finance, 42*(1), 7-49. Retrieved from https://ideas.repec.org/a/cai/finpug/fina_421_0007.html

43. Seifert, B., & Gonenc, H. (2018). The effects of country and firm-level governance on cash management. *Journal of International Financial Markets, Institutions and Money, 52,* 1-16. https://doi.org/10.1016/j.intfin.2017.12.001

44. Silva, J., Febra, L., & Costa, M. (2024). The impact of investor protection on stock market volatility. *Review of Accounting and Finance, 23*(1), 80-103. https://doi.org/10.1108/RAF-09-2022-0244

45. Tran, Q. T. (2020). Corporate cash holdings and financial crisis: new evidence from an emerging market. *Eurasian Business Review, 10*(2), 271-285. https://doi.org/10.1007/s40821-019-00134-9

46. Vo, T. T. A., & Thai, T. H. A. (2025). Investor protection and stock performance: theoretical mechanisms and global empirical evidence. *Journal of Economics and Development, 27*(3), 233-245. https://doi.org/10.1108/JED-06-2024-0224

47. Wan Ismail, W. A., Kamarudin, K. A., Gupta, N., & Harymawan, I. (2022). Gender diversity in the boardroom and corporate cash holdings: the moderating effect of investor protection. *Risks, 10*(3), 60. https://doi.org/10.3390/risks10030060

48. Yung, K., & Nafar, N. A. (2014). Creditor rights and corporate cash holdings: International evidence. *International Review of Economics & Finance, 33,* 111-127. https://doi.org/10.1016/j.iref.2014.03.011

http://dx.doi.org/10.21511/imfi.23(1).2026.15