

Does board gender diversity moderate the relationship between cash holding and corporate social responsibility disclosure? A worldwide perspective

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Abstract

Purpose – The objective of the study is to explore the combined impact of cash holding and Corporate Social Responsibility (CSR) disclosure. This research also explores the moderating role of female directors on corporate boards in the association between cash holding and CSR disclosure.

Design/methodology/approach – The sample comprises 13,266 international firm-year observations over the period 2012–2021, covering 38 countries and 9 different industries. The model proposed in this study is estimated through the generalised method of moments estimator.

Findings – The findings show that companies with cash holdings have higher CSR disclosure, due to reduced agency conflicts and, at the same time, higher investment in CSR reporting. Our findings also find that board gender diversity negatively moderates the relationship between cash holding and CSR disclosure.

Originality/value – This is the first study to explore the moderating effect of female directors on the association between cash holding and CSR disclosure. The study provides actionable insights for helping policymakers, regulators and stakeholders to emphasise the relevance of cash holding in CSR matters.

Keywords Cash holding, CSR reporting, Female directors, Agency theory

Paper type Research article

1. Introduction

Previous literature on finance has focused its attention on corporate cash holdings: the cash retained by companies at the end of the year (Isshaq *et al.*, 2009), which represents a significant

JEL Classification — M14, M2, M4

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proportion of their total assets (Opler *et al.*, 1999) and plays an important role in their financial decisions. Companies should maintain liquidity to cope with unexpected problems which may require immediate cash, in order to reduce the risk of misallocation (Dittmar and Mahrt-Smith, 2007) and avoid costs relating to both financing and future underinvestment (Faulkender and Wang, 2006).

Opler *et al.* (1999), based on agency theory, find that companies with internal funds are able to mitigate the information asymmetries and agency problems caused by external capital. Following this perspective, Almeida *et al.* (2004) demonstrate that companies with cash holdings may invest even when they are limited financially and, may ensure long-term investments, for example in research and development (Brown and Petersen, 2011). In this sense, companies with excess cash holdings can expect future profits given their effect on market performance (Aslam *et al.*, 2019).

Recent studies explore the effect of cash holding from different perspectives. Faulkender and Wang (2006), for example, argue that cash holding has an influence on financial policy, while Pinkowitz and Williamson (2001) support the view that cash holding affects investment opportunities. Kalcheva and Lins (2007) show that companies operating in countries with strong shareholder protection have greater cash holdings, while Martínez-Sola *et al.* (2013) find that the cash holdings of US industrial companies in 2001–2007 were 10%. The authors provide evidence of a curvilinear relationship between cash holding and firm value, which helps to determine the optimum cash level. Habib *et al.* (2021) argue that the personal characteristics of managers and managerial ownership influence cash-holding decisions, since these are relevant aspects impacting firm performance. This evidence leads us to suggest that managers who respond to shareholders' demands for lower cash holdings may also react to external concerns about CSR disclosure. Although cash holding creates a risk of misallocation, since managers thus have easy access to cash and can use it at their discretion, as Dittmar and Mahrt-Smith (2007) argue, cash holding can be considered as a "safeguard" for unexpected events, helping to absorb negative shocks and increasing the probability of survival in poor business conditions. Apart from these benefits, cash holding can also be used to invest in projects such as CSR activities or CSR disclosure because these activities will enhance the firm's reputation. Firms are under public scrutiny and stakeholders may perceive negatively those which have cash holdings but are not engaged with CSR issues. This may lead firms with more cash to disclose more CSR information. Companies will tend to hold more cash to face uncertainty and risk, and to meet the needs and demands of stakeholders who require greater transparency in the disclosure of financial and non-financial information (CSR reporting). The disclosure of CSR information may reduce information asymmetries between managers and shareholders and reduce agency problems.

Past international empirical evidence shows that CSR disclosure has a positive influence on levels of cash holding (Cheung, 2016) and the value of cash assets in capital markets (Lu *et al.*, 2017). However, to the best of our knowledge, no existing research has explored the direct effect of cash holding on CSR disclosure, and the moderating effect of female directors on corporate boards in this relationship. Motivated by the relevance of cash holding in firms and the influence of CSR matters on important firm decisions, in this study, we examine the impact of cash holding on CSR disclosure. In this regard, this article attempts to answer two important questions in the international context: How does cash holding influence CSR disclosure and how do female directors on boards moderate the link between cash holding and CSR disclosure? This study uses an international sample comprising 13,266 international firm-year observations from 2012–2021 from the Thomson Reuters database, which provides an ideal opportunity to analyse the influence of the cash holding of firms on their CSR disclosure.

Regarding the contributions of this research, this study makes several main contributions to the literature. First, it extends and enriches the research based on exploring the effect of cash holding on the disclosure of CSR information. Previous research has focused primarily on the association between CSR disclosure and cash holding (Hendijani Zadeh *et al.*, 2023) or has examined each variable separately (Chen *et al.*, 2019; Khajar and Kusumaningtyas, 2021). To

the best of our knowledge, no past papers analyse the effect of cash holding on CSR reporting. In this regard, our evidence is a novelty for the CSR literature because we find that cash holding reduces agency problems and increases the likelihood of disclosing CSR information. It allows companies to make a range of strategic decisions and manage unexpected problems. Second, as far as we know, none of the previous research has focused on analysing the moderating effect of female directors on the association between cash holding and CSR disclosure. Other researchers have, however, explored the moderating effect of female directors on boards in other respects, such as family-managed firms and firm indebtedness (López-Delgado and Diéguez-Soto, 2020), earnings management and annual report readability (Shauki and Oktavini, 2022), CSR disclosure and board sub-committees (Pucheta-Martínez *et al.*, 2021), among others. Thus, the inclusion of female directors on corporate boards as a moderating variable may help to extend the existing evidence of the moderating impact of board gender diversity on business outcomes. In this regard, Ahmed and Hussain (2024) support the view that the participation of women on corporate boards can be regarded as a control mechanism that influences corporate decision-making, including cash holding policies. Therefore, since female directors on corporate boards tend to moderate CSR disclosure when cash is held, it is reasonable to assume that this study will provide further insight into the moderating role they play in the relationship between cash holding and CSR disclosure.

After this introduction, Section 2 presents the theoretical review, Sections 3 provides the literature review and research hypotheses and Section 4 describes the sample, variables and research model. These are followed by Section 5, where the empirical findings are interpreted and discussed and, finally, Section 6, which focuses on the conclusions, limitations and future lines of research.

2. Theoretical background

The Commission of the European Community (2001) defines CSR as the voluntary integration of environmental, governance and social issues in business interactions and transactions with stakeholders. CSR practices are viewed as a form of investment which helps to improve the reputation and the corporate image of companies (Hart, 2005). In this regard, the disclosure of CSR information is considered a strategic decision (Lozano and Martínez-Ferrero, 2022). Arouri and Pijourlet (2017) document that, in countries with strong investor protection, firms may be more engaged with CSR practices to maximise shareholder wealth.

Drawing on agency theory, the separation of shareholders (principals) and managers (agents) may generate information asymmetries and agency problems (Jensen and Meckling, 1976). To avoid this situation, agency approach supports the premise that an external corporate governance mechanism will reduce such information asymmetries (Egginton and McBrayer, 2019); CSR activities are a voluntary initiative that reduces agency problems and information asymmetries and enhances firms' reputation (Jizi, 2017). In this regard, the interest in corporate performance on the part of shareholders and stakeholders leads CSR issues to have greater relevance in cash management policies (Chen *et al.*, 2019). According to stakeholder theory, businesses should strive to create value for all stakeholders rather than exclusively focusing on maximising shareholder wealth (Freeman, 1984). This theory posits that companies have an ethical responsibility to balance the interests of all parties affected by their activities. Therefore, companies are expected to promote sustainability and corporate social responsibility (CSR) through their financial strategies. Stakeholder theory also suggests that companies disclose CSR-related information to satisfy different stakeholder groups, such as investors, regulators, customers and society. In this respect, companies that actively engage in CSR practices may allocate their cash reserves to activities that create value for stakeholders, such as environmental sustainability initiatives or social programs.

Companies need cash to carry out their daily operations, take future investment opportunities and cope with unexpected developments. For this reason, the holding of high amounts of cash brings benefits for companies, but when the cash holding is higher than the

firm needs, this may lead to issues such as agency problems (Jensen, 1986) or lower rates of return (Martínez-Sola *et al.*, 2013). Jensen (1986) finds that managers, who hold more cash, prefer to invest in projects that may increase their personal wealth instead of choosing optimal investments since the latter may bring risk. The majority of existing studies on cash holding are focused on agency perspective (Dittmar *et al.*, 2003). Dittmar *et al.* (2003), drawing on this approach, indicate that entrenched managers prefer to own cash rather than distribute dividends to shareholders. DeAngelo and DeAngelo (2007) show that the accumulation of cash holding encourages financial flexibility for the company but leads to increased agency costs. Arouri and Pijourlet (2017) find that, in countries where investor protection is strong, investors assign more value to the cash holdings of companies that engage in CSR issues.

To avoid agency problems caused by cash holding, companies must have efficient internal and external control mechanisms in place (Fama and Jensen, 1983); in this respect, CSR disclosure may act as both an internal and external control tool (Lu *et al.*, 2017).

Past research analysing the effect of CSR disclosure on cash holding is based on agency theory (Lu *et al.*, 2017; Hendijani Zadeh *et al.*, 2023). However, to the best of our knowledge, no existing research focuses on exploring how cash holding affects CSR disclosure, the inverse relationship. In this regard, we believe that this topic merits attention due to the relevance of CSR disclosure for stakeholders.

3. Literature review and research hypotheses

3.1 Literature review

As stated above, past international empirical evidence shows that CSR disclosure has a positive influence on levels of cash holding (Cheung, 2016) and the value of cash assets in capital markets (Lu *et al.*, 2017). In this regard, Arouri and Pijourlet (2017) note that CSR performance positively affects cash holding in companies located in countries where institutional quality is high and shareholders are well protected from managers' expropriation.

Marie *et al.* (2025) claim that there is a positive relationship between cash holding and CSR, noting that companies with CSR practices prioritise long-term sustainability and risk management, which require larger cash reserves to pursue initiatives related to research and other forms of corporate investment (Zhang and Liu, 2022).

Whereas the mentioned studies analyse the effect of CSR disclosure on cash holding, our research aims to analyse the inverse relationship: the impact of cash holding on CSR disclosure. This topic is relevant because the availability of cash can affect the ability, incentives and credibility of companies to develop and communicate sustainable practices; furthermore, companies with higher levels of cash holdings tend to disclose more information about CSR because they have greater financial resources and stronger incentives to reduce agency conflicts and strengthen their corporate reputation.

From an agency theory perspective, executives who manage excess cash may be suspected of misappropriating resources. To mitigate these concerns, companies can increase their disclosure of CSR information. At the same time, companies with greater liquidity tend to disclose more detailed sustainability reports, and those with more cash typically receive higher CSR ratings. Companies with larger cash reserves have greater financial flexibility to invest in CSR activities and use CSR disclosure to build reputation and stakeholder trust. In this regard, Waddock and Graves (2000), although not directly studying cash holding, argue that companies with greater financial resources have a greater capacity to develop and disclose CSR practices and, therefore, the availability of resources supports long-term sustainable strategies. Chen (2008) indicates that companies must also maintain cash reserves to respond to unexpected risks. In other words, they must retain a certain level of cash to enhance investment opportunities, generate value and minimise financial losses.

Furthermore, Choi and Ryu (2021) believe that companies need cash to perform essential activities, such as commercial transactions and investment, and also state that maintaining an optimal level of cash is important for a firm's capital structure. In a study based on South

Korean firms over the 2011–2018 period, these authors examine how investors assess the value of the cash holdings of firms that take an active part in CSR activities that enhance their image and reputation in the Korean market, concluding that CSR investments are commonly financed through cash holdings. Other studies carried out in emerging markets offer comprehensive perspectives on the relationship between CSR and cash holdings. In this regard, [Jadiyappa et al. \(2021\)](#) find a positive correlation between CSR activities and cash holdings in India, driven by regulatory changes that increase the value placed on cash holdings.

Using a sample of 254 European firms listed on the STOXX Europe 600 Index, [Gallucci et al. \(2025\)](#) explore the influence of cash holdings on CSR practices, specifically the environmental dimension. Their findings are significant and reveal that companies with large cash holdings tend to engage in comprehensive environmental disclosure, especially in relation to energy, water efficiency, emissions, waste and supplier evaluations, which helps to reduce opacity and can indicate lower risk of expropriation. By contrast, firms with low cash levels usually offer limited or selective information, generally focused on energy and emissions, while neglecting other important areas such as materials, biodiversity and the impact of the supply chain. This situation may lead to opacity in corporate decision-making, which could raise concerns among minority shareholders about hidden risks and a lack of alignment of management actions with the overall interests of stakeholders. According to the results, large cash holdings acquire a different meaning when they are combined with thorough environmental disclosure.

As a result, it can be said that companies with higher cash holdings are more likely to support CSR reporting and environmental activities. In addition, investors believe that firms with a strong cash position have the potential to make better use of their assets, including cash, than firms with a weak cash position and poor CSR ratings. Hence, a positive relationship between cash holdings and CSR disclosure is expected because cash-rich firms not only have greater ability but also stronger incentives to engage in transparency and sustainability reporting.

3.2 Cash holding and CSR disclosure

Firms use cash holdings to conduct daily operations-related activities. Consequently, they should maintain an optimal level of cash holding to enable them to respond to unexpected risks and avoid transaction costs. [Harford \(1999\)](#) notes that companies with uncertainty around future cash flows and with strong growth opportunities retain greater cash holdings.

From an agency perspective, the separation of managers and owners leads to increased cash holdings, which managers may use in their own interests, retaining cash reserves to extract private corporate benefits ([Jensen, 1986](#)). The existence of a large free cash flow may stimulate controversial behaviours among managers, whereby they may act against the shareholders' interests ([Jensen, 1986](#)) and use the free cash flow for their own benefit. Previous research has examined the effect of cash holding size on firms' decisions. In this regard, [Kalcheva and Lins \(2007\)](#) note that firms with large amounts of cash are considered more solid and powerful from a financial perspective, while less cash can be seen as a negative signal, which can create conflicts of interest between managers and shareholders.

Prior studies find that cash holding influences certain aspects of corporate governance, such as firm value ([Khajjar and Kusumaningtyas, 2021](#)), or dividends ([Al-Najjar and Belghitar, 2011](#)), among others. Cash holding mitigates the pressure exerted on managers by external capital providers, whose goal is to look out for their own interests rather than those of shareholders ([Jensen, 1986](#)).

[Denis and Sibilkov \(2010\)](#), among others, argue that cash holding is considered an effective tool to solve the problem of under-investment from the perspective of profitability, and [Al-Najjar and Belghitar \(2011\)](#) explain that cash holding is used to encourage dividend payments since it is a mechanism of interchangeability. The two studies have very different characteristics that can each influence CSR disclosure. In this regard, cash holding allows

firms to make a range of decisions such as the payment of dividends, which aligns the interests of managers and shareholders by providing more financial and non-financial information, such as through CSR disclosure. According to [Huang and Zhang \(2012\)](#), cash holding positively influences information disclosure. Along these lines, [Benlemlih and Bitar \(2018\)](#) report that large companies with high levels of cash holding and growth opportunities have higher CSR scores. Moreover, [Lu et al. \(2017\)](#) find that CSR disclosure is positively associated with the value of cash holding.

These arguments allow us to predict a positive effect of cash holding on CSR disclosure. Companies tend to hold cash to take advantage of business environment opportunities and inform stakeholders about CSR activities with the aim of ensuring that the latter trust management decisions. Additionally, the retention of cash in companies allows shareholders and managers to use it to carry out CSR activities because it can improve firm reputation and is generally viewed positively by stakeholders. Furthermore, CSR disclosure may reduce information asymmetries and align the interests of managers and stakeholders. Thus, we formulate the following hypothesis:

H1. Corporate cash holding has a positive influence on CSR disclosure.

3.3 The moderating role of female directors on boards

Based on agency theory, the inclusion of female directors on corporate boards is considered a relevant mechanism for controlling managers ([Liu et al., 2023](#); [Abdelkader et al., 2024](#)) and reducing agency costs and information asymmetries ([Carter et al., 2010](#)), which may encourage the disclosure of CSR information. Agency theory and stakeholder theory are often used together when analysing research on gender diversity and CSR. According to [Prado-Lorenzo and García-Sánchez \(2010\)](#), the stakeholder perspective extends agency theory to a multilateral relationship that involves diverse stakeholders. [Amorelli and García-Sánchez \(2021\)](#) are in line with the perspective that gender diversity is a characteristic of board independence and a good indicator of stakeholder relationship management, as it is related to more comprehensive business practices and stakeholder expectations, which increases sensitivity towards stakeholders' demands and concerns. Therefore, a greater presence of women on boards is more likely to favour strategic decision-making that integrates stakeholders' interests ([Fernandez-Feijoo et al., 2014](#)). In keeping with this view, [Alkhawaja et al. \(2023\)](#) argue that the implementation of stakeholder theory should create value for all stakeholders through CSR disclosure.

In this regard, [Pucheta-Martínez et al. \(2016\)](#) find that the incorporation of female directors on corporate boards enhances the quality of financial reporting, encourages good business practices and affects strategic decisions such as CSR issues. In this vein, [García-Sánchez et al. \(2019\)](#) consider that the participation of female directors on corporate boards can strengthen companies' governance practices, ensuring a more CSR-oriented management team that engages in CSR-aware activities. [Amorelli and García-Sánchez \(2020\)](#) examine the effect of the presence of female directors on management boards on CSR disclosure, focusing on the critical mass required. Their findings reveal a positive impact of gender diversity on management boards on the voluntary disclosure of CSR by analysing the presence of at least three women on the board: the critical mass. [Orazalin and Baydauletov \(2020\)](#) state that a higher number of female directors on the board enhances social and environmental performance, and [Ben Fatma and Chouaibi \(2021\)](#) reach the same conclusion for the financial sector. Other researchers, including [Biswas et al. \(2022\)](#), find that female directors support CSR reporting if they are unaffiliated female board directors, in both family and non-family companies. [Ramon-Llorens et al. \(2021\)](#) show that female directors with specific skills and technical expertise enhance an orientation towards CSR disclosure.

To the best of our knowledge, there is no prior empirical evidence on the moderating role of female directors in the relationship between cash holdings and CSR reporting. However, some

studies, such as [Li et al. \(2022\)](#), argue that female directors on boards positively moderate the effect of CSR strengths on firm financial performance because they enhance the credibility, monitoring and strategic integration of CSR initiatives. In this line, authors such as [Lassoued and Khanchel \(2023\)](#) show that the inclusion of female directors on corporate boards has a positive influence on the relationship between CEO narcissism and CSR disclosure in the largest US companies. Studies such as [Toukabri and Kateb \(2023\)](#) report that female directors improve corporate board effectiveness by mitigating earnings manipulation, enhancing the quality of financial reporting and encouraging CSR activities since female directors tend to show greater sensitivity towards ethical, social and transparency-related values, which fosters stronger CSR practices and reduces incentives to manipulate accounting results. Additionally, [Marie et al. \(2025\)](#) explain that when the representation of female directors on the board is higher, their effect on the relationship between cash holdings and environmental, social and governance (ESG) performance becomes positive because they encourage the allocation of cash towards long-term ESG investments and risk reduction strategies.

In line with the above arguments, board gender diversity might positively moderate the relation between cash holdings and CSR disclosure. It can be argued that female directors enhance the effect of cash holdings on CSR disclosure. As [Bear et al. \(2010\)](#) point out, female directors are generally more sensitive towards issues of CSR and, thus, more inclined to commit available funds to socially responsible undertakings, while male directors tend to be more concerned with investment and risk-related decisions. This difference in priorities indicates that the gender composition of the boards will inevitably influence the treatment of undistributed resources with respect to CSR investment and disclosure. In addition, female directors facilitate better communication and responsiveness to stakeholders, providing more support for the positive effect of cash holdings on transparency practices. Thus, we propose the next hypothesis:

- H2.* The influence of cash holding on CSR disclosure is positively moderated by female directors on boards.

4. Method

4.1 Sample

The sample of this study comprises 14,003 international firm-year observations from 2012–2021. Financial, accounting and corporate governance information comes from the Thomson Reuter database. Financial companies were removed from the sample because they comply with different accounting rules, which makes the comparison of annual financial statements between financial and non-financial firms difficult. We also excluded observations where data for the relevant variables were unavailable. The final sample used in this article consists of an unbalanced panel with a total of 13,266 international firm-year observations. [Table 1](#) shows the number of observations by country.

Moreover, nine sectors are represented in the final sample. We have used the TRBC economic sector classification provided by the Thomson Reuters database. [Table 2](#) shows the classifications and the proportions of companies operating in each industry.

4.2 Variable measures

The dependent variable in this research is CSR disclosure (CSR_DISC), measured as the ratio of the aggregation of 123 items concerning social and environmental issues and the total items (123), consistent with [Gallego-Álvarez and Pucheta-Martínez \(2022\)](#). Each of these items is coded as a dummy variable that will take the value 1 if companies disclose this item and 0 otherwise. The CSR index ranges between 0 and 1. Thus, if the index score is 1, firms provide information about all CSR items. Companies with 0.6–0.9 points disclose between 60% and

Table 1. Number of observations by country

Country	Observations	Percentage	Cum.
Argentina	94	0.71	0.72
Australia	686	5.17	5.89
Austria	24	0.18	6.07
Belgium	70	0.53	6.60
Bermuda	15	0.11	6.71
Brazil	264	1.99	8.70
Canada	1,033	7.79	16.49
China	1,672	12.60	29.09
Cyprus	9	0.07	29.16
Czech Rep	12	0.09	29.25
Denmark	80	0.60	29.85
Egypt	147	1.11	30.96
Finland	36	0.27	31.23
France	401	3.02	34.25
Germany	316	2.38	36.64
Hong Kong	168	1.27	37.90
India	120	0.90	38.81
Ireland	125	0.94	39.75
Isle of M	12	0.09	39.84
Israel	12	0.09	39.93
Italy	75	0.57	40.49
Japan	2,181	16.44	56.94
Jersey	12	0.09	57.03
Korea; Re	1,648	12.42	69.45
Luxembour	19	0.14	69.59
Macau	12	0.09	69.68
Mexico	175	1.32	71.00
Netherlan	149	1.12	72.12
New Zeala	33	0.25	72.37
Portugal	24	0.18	72.55
Russia	156	1.18	73.73
Singapore	56	0.42	74.15
South Afr	61	0.46	74.61
Spain	171	1.29	75.90
Sweden	179	1.35	77.25
Switzerla	207	1.56	78.81
United Ki	667	5.03	83.84
United St	2,144	16.16	100.00
<i>Total</i>	<i>13,266</i>	<i>100%</i>	

90% of the items, while companies with 0.1–0.5 points have moderate CSR reporting and those with 0 points do not report CSR information.

The independent variable is cash holding (CASH_HOLD), which is calculated as the ratio of cash and cash equivalents divided by total assets (Lu *et al.*, 2017; Choi and Ryu, 2021). This study also includes female directors on corporate boards as a moderating variable (BOARD_GEN_DIVER), measured as the ratio between the total number of female directors on the board and the total number of board directors (Alonso-Almeida *et al.*, 2015).

To avoid bias in the findings, and based on several previous studies, this study includes the following control variables: return on assets (Wibowo, 2012), leverage (Gallego-Álvarez and Pucheta-Martínez, 2020), firm size (Gallego-Álvarez and Quina-Custodio, 2017), board independent (Gallego-Álvarez and Pucheta-Martínez, 2020), board size (Ramón-Llorens *et al.*, 2019), board meetings (Ramón-Llorens *et al.*, 2019), CEO duality (Pucheta-Martínez and Gallego-Álvarez, 2019), CSR committee (Pucheta-Martínez *et al.*, 2021) and the industry

Table 2. Number of observations by activity sector

TRBC economic sector name	Number of observations	Percentage	Cum.
Basic materials	2,111	15.91	15.91
Consumer cyclical	2,220	16.73	32.64
Consumer non-cyclical	1,619	12.20	44.85
Energy	1,085	8.18	53.03
Healthcare	1,183	8.92	61.95
Industrial	2,425	18.28	80.23
Technology	1,384	10.43	90.66
Telecommunications services	333	2.51	93.17
Utilities	905	6.82	100
<i>Total</i>	<i>13,266</i>	<i>100€</i>	

(Gallego-Álvarez and Quina-Custodio, 2017). Finally, the year effects are controlled (YEAR) in the model proposed, including a set of dummy variables. Table 3 shows the descriptions of the variables.

4.3 Research model

The hypothesis will be checked by running the following base model:

Table 3. Variables description

Variables	Description
CSR_DISC	CSR disclosure is the ratio between the aggregation of 123 items concerning social and environmental issues and the total items (123)
CASH_HOLD	Cash holding is the ratio of cash and cash equivalents divided by total assets
BOARD_GEN_DIVER	Board gender diversity is the ratio between the total number of female directors on board divided by the total number of board directors
ROA	Return on assets measured as the proportion of operate income before interests and taxes over total assets
LEV	Leverage ratio calculated as the ratio of total debt to total assets
SIZE	Logarithm of total assets
BOARD_IND	The proportion of independent directors on boards = Total number of independent directors on boards/ Total number of directors on boards
BOARD_SIZE	Number of directors on corporate boards
BOARD_MEET	Board meetings is the number of meetings held by boards a year
CEODUALITY	Dummy variable that takes the value 1 if the same person serves simultaneously as CEO and President of the board and 0, otherwise
CSR_COMMIT	Dummy variable that takes the value 1 if the company has a CSR committee, and 0 otherwise
BASIC MATERIALS	Dummy variable: 1 = Basic Materials; 0 = Otherwise
CONSUMER CYCLICAL	Dummy variable: 1 = Consumer Cyclical; 0 = Otherwise
CONSUMER NON-CYCLICAL	Dummy variable: 1 = Consumer Non-Cyclical; 0 = Otherwise
ENERGY	Dummy variable: 1 = Energy; 0 = Otherwise
HEALTHCARE	Dummy variable: 1 = Healthcare; 0 = Otherwise
INDUSTRIALS	Dummy variable: 1 = Industrial; 0 = Otherwise
TECHNOLOGY	Dummy variable: 1 = Technology; 0 = Otherwise
TELECOMMUNICATION SERVICES	Dummy variable: 1 = Telecommunication Services; 0 = Otherwise
UTILITIES	Dummy variable: 1 = Utilities; 0 = Otherwise

$$\begin{aligned} \text{CSR_DISC} = & \beta_0 + \beta_1 \text{CASH_HOLD}_{it} + \beta_2 \text{BOARD_GEN_DIVER}_{it} \\ & + \beta_3 \text{CASH_HOLD} \times \text{BOARD_GEN_DIVER}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{LEV}_{it} \\ & + \beta_6 \text{SIZE}_{it} + \beta_7 \text{BOARD_IND}_{it} + \beta_8 \text{BOARD_SIZE}_{it} + \beta_9 \text{BOARD_MEET}_{it} \\ & + \beta_{10} \text{CEODUALITY}_{it} + \beta_{11} \text{CSR_COMMIT}_{it} + \sum \beta_k \text{SECTOR}_{it} \\ & + \sum \beta_j \text{YEAR}_t + \Psi_i + \text{D}_{it} \end{aligned}$$

The panel data require consideration of the individual effect of the firm “i”, the time point “t”, the unobserved firm-specific effects (unobserved heterogeneity) “Ψ_i” and the error term “D_{it}”.

The methodology used to control for endogeneity is the generalised method of moments (GMM), an estimator suggested by [Arellano and Bond \(1991\)](#). This technique controls for unobservable heterogeneity (Ψ_i) more efficiently than other methods and allows us to detect particular behavioural patterns caused by the individuals within a company who take CSR decisions ([Martínez-Ferrero et al., 2016](#)). The GMM methodology includes the Wald χ² test, the Arellano–Bond tests AR (1) and AR (2), and the Hansen test. The Wald χ² test allows us to confirm the model fitness. The Arellano–Bond statistic AR (2) supports the presence of a second-order serial correlation in the first difference residuals. When the null hypothesis is rejected, that is, there is no serial correlation, this confirms the non-existence of this correlation. Finally, the Hansen test finds the appropriateness of the instruments used in the proposed model when the null hypothesis of non-correlation between the error term and the instruments is rejected.

5. Empirical results and discussion

5.1 Descriptive statistics

[Table 4](#) presents the mean and standard errors of the variables. The statistics show that CSR disclosure, on average, is made on 20 items out of 123 concerning social and environmental issues. In this sense, the level of CSR information disclosed by companies is moderate. Furthermore, on average, companies in our firms have a cash-holding ratio of 10% (CASH_HOLD) and female directors account for 8.73% (BOARD_GEN_DIVER).

[Table 5](#) reports the correlation matrix. The findings confirm that none of the correlation coefficients is higher than 0.80 ([Shrestha, 2020](#)). Thus, there are no multicollinearity problems in this analysis. Moreover, the highest variance inflation factor (VIF) is 2.61, which is below the threshold of 10 ([Kutner et al., 2005](#)), a further indicator of non-multicollinearity.

5.2 Multivariate analysis

[Table 6](#) presents the findings for checking the hypotheses. Model 1 explores the effect of corporate cash holding on CSR disclosure, while Model 2 examines the moderating effect of female directors on boards between cash holding and CSR disclosure.

In Model 1, the cash holding variable (CASH_HOLD) exhibits the expected sign and is statistically significant. This leads us to not reject the first hypothesis. This result suggests that firms with higher cash holdings are more likely to disclose CSR information. Therefore, our findings reveal that companies with large cash holdings are more concerned about CSR issues, in contrast to agency perspective, which argues that managers prefer to invest in projects that enhance their personal wealth rather than those oriented towards CSR issues. It seems that firms holding more cash are focused on CSR practices, suggesting that they are more interested in meeting the needs of their stakeholders and in creating a more socially and environmentally aware image. Companies with higher cash holdings may be interested in showing a positive image, reducing information asymmetries and aligning the interests of managers and

Table 4. Descriptive analysis

Variable	Obs	Mean	Std. dev.
CSR_DISC	13,266	0.20	0.18
CASH_HOLD	13,266	0.10	0.11
BOARD_GEN_DIVER	13,266	8.73	11.79
ROA	13,266	5.21	8.23
LEV	13,266	25.74	19.66
SIZE	13,266	22.11	1.77
BOARD_IND	13,266	38.16	34.91
BOARD_SIZE	13,266	7.66	5.81
BOARD_MEET	13,266	5.85	6.45
CEODUALITY	13,266	30.19	45.91
CSR_COMMIT	13,266	0.48	0.50
BASIC MATERIALS	13,266	0.16	0.37
CONSUMER CYCLICAL	13,266	0.17	0.37
CONSUMER NON-CYCLICAL	13,266	0.12	0.33
ENERGY	13,266	0.08	0.27
HEALTHCARE	13,266	0.09	0.28
INDUSTRIALS	13,266	0.18	0.39
TECHNOLOGY	13,266	0.10	0.31
TELECOMMUNICATION SERVICES	13,266	0.02	0.16
UTILITIES	13,266	0.07	0.25

Note(s): Mean and standard deviation. CSR_DISC is the ratio between the aggregation of 123 items concerning social and environmental issues and the total items (123); CASH_HOLD is the ratio between the ratio of cash and cash equivalents divided by total assets; BOARD_GEN_DIVER is the ratio between the total number of female directors on board divided by the total number of board directors; ROA is the proportion of operate income before interests and taxes over total assets; LEV is the ratio calculated as the ratio of total debt to total assets; SIZE is the logarithm of total assets; BOARD_IND is the proportion of independent directors on boards; BOARD_SIZE is the number of directors on corporate boards; BOARD_MEET is the number of meetings held by boards a year; CEODUALITY is the dummy variable that takes the value 1 if the same person serves simultaneously as CEO and President of the board and 0, otherwise; CSR_COMMIT is the dummy variable that takes the value 1 if the company has a CSR committee, and 0 otherwise; Basic Materials if the company operates in Basic Materials sector and 0, otherwise; Consumer Cyclical if the company operates in Consumer Cyclical sector and 0, otherwise; Consumer Non-Cyclical if the company operates in Consumer Non-Cyclical sector and 0, otherwise; Energy if the company operates in Energy sector and 0, otherwise; Healthcare if the company operates in Healthcare sector and 0, otherwise; Industrials if the company operates in Industrials sector and 0, otherwise; Technology if the company operates in Technology sector and 0, otherwise; Telecommunication Services if the company operates in Telecommunication Services sector and 0, otherwise; Utilities if the company operates in Utilities sector and 0, otherwise

stakeholders by disclosing CSR information. Our evidence aligns with the findings of [Benlemlih and Bitar \(2018\)](#), who state that large firms with high levels of cash holding, and which have growth opportunities, have better CSR scores. Furthermore, firms will try to mitigate conflicts of interest between shareholders and managers through the existence of cash holding, since this is a signal of corporate board effectiveness, which may help to promote investment in social, economic and environmental activities.

In Model 2, we check the moderating effect of female directors on boards on the relationship between cash holding and CSR disclosure. The coefficient of the interaction between cash holding and female directors on boards (CASH_HOLD x BOARD_GEN_DIVER) presents a negative sign and is statistically significant. This leads us to reject the second hypothesis. This result indicates that the presence of female directors on boards negatively moderates the positive effect of cash holding on the disclosure of CSR information. Thus, the inclusion of female directors on corporate boards discourages CSR disclosure when companies have higher levels of cash holdings. This could be that female directors on boards

Table 5. Correlation matrix

	VIFs	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CSR_DISC (1)		1.000								
CASH_HOLD (2)	1.59	−0.079***								
BOARD_GEN_DIVER (3)	2.61	0.522***	0.522***	1.000						
ROA (4)	1.18	0.036***	0.151***	0.148***	1.000					
LEV (5)	1.23	0.062***	−0.261***	0.045***	−0.325***	1.000				
SIZE (6)	2.05	0.683***	−0.192***	0.343***	−0.107***	0.224***	1.000			
BOARD_IND (7)	2.03	0.585***	−0.145***	0.677***	0.141***	0.025***	0.392***	1.000		
BOARD_SIZE (8)	2.50	0.745***	−0.119***	0.499***	0.028***	0.084***	0.652***	0.528***	1.000	
BOARD_MEET (9)	1.45	0.603***	−0.112***	0.466***	0.012	0.028***	0.411***	0.580***	0.531***	1.000
CEODUALITY (10)	1.28	0.374***	−0.015*	0.225***	0.054***	0.007	0.330***	0.332***	0.393***	0.272***
CSR_COMMIT (11)	1.72	0.764***	−0.102***	0.372***	−0.031***	0.067***	0.524***	0.447***	0.564***	0.483***
BASIC MATERIALS (12)	1.67	−0.042***	−0.050***	−0.078***	−0.074***	0.021**	−0.078***	−0.052***	−0.088***	−0.060***
CONSUMER CYCLICAL (13)	1.74	0.016*	−0.002	0.022**	0.062***	−0.062***	−0.035***	0.016*	0.003	0.016*
CONSUMER NON-CYCLICAL (14)	1.57	−0.059***	−0.020*	−0.016*	0.035***	0.015*	−0.112***	−0.083***	−0.079***	−0.086***
ENERGY (15)	1.41	−0.083***	−0.073***	−0.041***	−0.037***	−0.009	0.013	0.035***	−0.051***	−0.016
HEALTHCARE (16)	1.47	−0.051***	0.080***	0.056***	0.096***	−0.035***	−0.081***	0.037***	−0.051***	0.021**
INDUSTRIALS (17)	1.83	0.133***	0.035***	0.028***	−0.058***	0.076***	0.150***	0.042***	0.185***	0.078***
TECHNOLOGY (18)	1.57	−0.010***	0.210***	−0.036***	0.074***	−0.197***	−0.071***	−0.024**	−0.067***	−0.029***
TELECOMMUNICATION SERVICES (19)	1.16	0.025**	−0.064***	0.029***	−0.080***	0.073***	0.122***	0.023*	0.055***	0.042***
UTILITIES (20)	1.40	0.055***	−0.178***	0.067***	−0.092***	0.168***	0.168***	0.030***	0.101***	0.056***
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
CSR_DISC (1)										
CASH_HOLD (2)										
BOARD_GEN_DIVER (3)										
ROA (4)										

(continued)

Table 5. Continued

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
LEV (5)										
SIZE (6)										
BOARD_IND (7)										
BOARD_SIZE (8)										
BOARD_MEET (9)										
CEODUALITY (10)	1.000									
CSR_COMMIT (11)	0.267***	1.000								
BASIC MATERIALS (12)	−0.069***	0.007	1.000							
CONSUMER CYCLICAL (13)	0.034***	−0.008	−0.195	1.000						
CONSUMER NON-CYCLICAL (14)	−0.044***	−0.067***	−0.162***	−0.167***	1.000					
ENERGY (15)	−0.032***	−0.014	−0.130***	−0.134***	−0.111***	1.000				
HEALTHCARE (16)	0.015*	−0.056***	−0.136***	−0.140***	−0.117***	−0.093***	1.000			
INDUSTRIALS (17)	0.068***	0.102***	−0.206***	−0.212***	−0.176***	−0.141***	−0.148***	1.000		
TECHNOLOGY (18)	0.039***	−0.053***	−0.149***	−0.153***	−0.127***	−0.102***	−0.107***	−0.161***	1.000	
TELECOMMUNICATION SERVICES (19)	−0.009	0.020**	−0.070***	−0.072***	−0.060***	−0.048***	−0.050***	−0.076***	−0.055***	1.000
UTILITIES (20)	−0.023*	0.064***	−0.118***	−0.121***	−0.101***	−0.081***	−0.084***	−0.128***	−0.092***	−0.043***

Note(s): Matrix Correlations. CSR_DISC is the ratio between the aggregation of 123 items concerning social and environmental issues and the total items (123); CASH_HOLD is the ratio between the ratio of cash and cash equivalents divided by total assets; BOARD_GEN_DIVER is the ratio between the total number of female directors on board divided by the total number of board directors; ROA is the proportion of operate income before interests and taxes over total assets; LEV is the ratio calculated as the ratio of total debt to total assets; SIZE is the logarithm of total assets; BOARD_IND is the proportion of independent directors on boards; BOARD_SIZE is the number of directors on corporate boards; BOARD_MEET is the number of meetings held by boards a year; CEODUALITY is the dummy variable that takes the value 1 if the same person serves simultaneously as CEO and President of the board and 0, otherwise; CSR_COMMIT is the dummy variable that takes the value 1 if the company has a CSR committee, and 0 otherwise; Basic Materials if the company operates in Basic Materials sector and 0, otherwise; Consumer Cyclical if the company operates in Consumer Cyclical sector and 0, otherwise; Consumer Non-Cyclical if the company operates in Consumer Non-Cyclical sector and 0, otherwise; Energy if the company operates in Energy sector and 0, otherwise; Healthcare if the company operates in Healthcare sector and 0, otherwise; Industrials if the company operates in Industrials sector and 0, otherwise; Technology if the company operates in Technology sector and 0, otherwise; Telecommunication Services if the company operates in Telecommunication Services sector and 0, otherwise; Utilities if the company operates in Utilities sector and 0, otherwise. *p-value < 0.1 **p-value < 0.05 ***p-value < 0.01

Table 6. Multivariate analysis results of the generalised method of moments

	MODEL 1 Coef.	MODEL 2 Coef.
CSR_DISC($t-1$)	0.176*** (0.005)	0.234*** (0.000)
CASH_HOLD	0.078*** (0.000)	0.090*** (0.000)
ROA	0.002* (0.061)	0.001 (0.224)
LEV	−0.057 (0.522)	0.057 (0.361)
SIZE	0.004 (0.580)	−0.004 (0.432)
BOARD_IND	0.010** (0.010)	0.000 (0.796)
BOARD_SIZE	0.015*** (0.000)	0.021*** (0.000)
BOARD_MEET	−0.007*** (0.003)	−0.004*** (0.032)
CEODUALITY	0.027 (0.396)	−0.014** (0.036)
CSR_COMMIT	0.180*** (0.000)	0.176*** (0.000)
CONSUMER CYCLICAL	−0.120 (0.103)	−0.143** (0.013)
CONSUMER NON-CYCLICAL	0.006 (0.950)	−0.081 (0.200)
ENERGY	−0.128 (0.136)	−0.058 (0.439)
HEALTHCARE	−0.076 (0.502)	−0.178*** (0.004)
INDUSTRIALS	0.038 (0.601)	−0.125** (0.015)
TECHNOLOGY	0.022 (0.770)	0.037 (0.533)
TELECOMMUNICATION SERVICES	−0.016 (0.939)	−0.111 (0.415)
UTILITIES	−0.183 (0.161)	−0.226*** (0.002)
BOARD_GEN_DIVER		0.005 (0.276)
CASH_HOLD x BOARD_GEN_DIVER		−0.003*** (0.004)
Year effects	Yes	Yes
Wald χ^2 test	4.233 ⁰² ***	4.066 ²⁰ ***
Arellano—Bond test AR(1) (z , $p > z $)	−5.94 (0.000)	−8.32 (0.008)
Arellano—Bond test AR(2) (z , $p > z $)	−1.27 (0.204)	−1.13 (0.259)
Hansen test (χ^2 -square, $p > \chi^2 $)	15.50 (0.488)	27.66 (0.770)
Note(s): Multivariate analysis results of the Generalised Method of Moments. CSR_DISC is the ratio between the aggregation of 123 items concerning social and environmental issues and the total items (123); CASH_HOLD is the ratio between the ratio of cash and cash equivalents divided by total assets; BOARD_GEN_DIVER is the ratio between the total number of female directors on the board divided by the total number of board directors; ROA is the proportion of operate income before interests and taxes over total assets; LEV is the ratio calculated as the ratio of total debt to total assets; SIZE is the logarithm of total assets; BOARD_IND is the proportion of independent directors on boards; BOARD_SIZE is the number of directors on corporate boards; BOARD_MEET is the number of meetings held by boards a year; CEODUALITY is the dummy variable that takes the value 1 if the same person serves simultaneously as CEO and President of the board and 0, otherwise; CSR_COMMIT is the dummy variable that takes the value 1 if the company has a CSR committee, and 0 otherwise; Basic Materials if the company operates in Basic Materials sector and 0, otherwise; Consumer Cyclical if the company operates in Consumer Cyclical sector and 0, otherwise; Consumer Non-Cyclical if the company operates in Consumer Non-Cyclical sector and 0, otherwise; Energy if the company operates in Energy sector and 0, otherwise; Healthcare if the company operates in Healthcare sector and 0, otherwise; Industrials if the company operates in Industrials sector and 0, otherwise; Technology if the company operates in Technology sector and 0, otherwise; Telecommunication Services if the company operates in Telecommunication Services sector and 0, otherwise; Utilities if the company operates in Utilities sector and 0, otherwise. * p -value < 0.1 ** p -value < 0.05 *** p -value < 0.01		

have limited power to affect strategic decisions of cash holding related to whether free cash flow resources are invested to CSR disclosure and sustain efforts or not. This finding could also be rationalised in the light of the female representation on corporate boards in our international sample, which is still marginal when compared to the one reported by [Alkhawaja et al. \(2023\)](#). In this sense, the mere presence of female directors on boards may not be sufficient to significantly influence how firms use cash holdings to support CSR disclosure and sustainability activities. Alternatively, the professional experiences and priorities of female directors may focus board attention more on financial and economic issues related to cash

management rather than on issues of CSR disclosure. Our evidence also suggests that female directors on corporate boards change the beliefs and ethical perspectives of the overall board when firms have high cash holdings, which may modify the decision-making process, especially in relation to disclosure. Female directors may be interested in projects that are not oriented towards CSR issues when firms have cash holdings, either because their power to influence board decisions is limited or because their firms' orientation has changed towards economic or financial issues as a result of occupying a top position. In addition, the effect of female directors on CSR issues may be dependent on the institutional environment and the characteristics of the countries in which the firm operates, as the paper of [Wasiuzzaman and Subramaniam \(2023\)](#) suggests. More precisely, contrasting patterns of stakeholder-oriented versus shareholder-oriented governance systems may correspond to contrasting possibilities for female directors to impact CSR disclosure practices related to the use and the management of the corporate cash reserves. Furthermore, in such countries influenced by a stakeholder model, in which more attention is paid to different constituencies, female directors may be more likely to promote transparency and sustainability reporting with high levels of corporate cash when this cash is used to finance and support CSR disclosures and sustainability initiatives. In this regard, our results reveal that, although female directors have an important effect on decision-making processes, they do not affect the association between cash holding and CSR disclosure, in line with the findings of [Biswas et al. \(2022\)](#), who document the scant interest of female directors in CSR when they are in positions of responsibility in family firms.

6. Conclusions

This article seeks to extend existing research analysing the cash holding–CSR disclosure nexus by incorporating the moderating effect of female directors in the relationship.

Our findings have several implications. First, the results provide evidence that cash holding enhances CSR disclosure. Cash holding can be seen as a mechanism to reduce agency problems by encouraging CSR disclosure, in contrast to agency theory, which postulates that managers prefer to use the cash to further their personal interests instead of using it to satisfy stakeholders' needs. Given the absence of previous research on the effect of cash holding on CSR disclosure, these results inform financial markets about the behaviour of companies with cash holdings and the influence of the latter on the disclosure of CSR information. Moreover, these results have significant implications for the practice level for the strategies of corporate governance and CSR disclosure, indicating that firms may strategically employ cash holdings to increase transparency, foster relations with stakeholders, and increase the credibility of sustainability reporting. Hence, cash management decisions may be embedded within broader policies on sustainability and disclosure, which managers could leverage to enhance the perception of their stakeholders and their corporate image. Second, the results obtained may help policymakers and regulators to formulate policies to encourage companies to disclose CSR information. According to our findings, cash holding encourages CSR disclosure, but this relationship is mitigated when there are female directors on the board, although CSR practices may reduce agency problems and enhance the development of companies and capital markets. Although previous empirical research provides evidence that the presence of female directors on corporate boards encourages CSR disclosure, this relationship does not hold when female directors are present alongside cash holding. In this regard, policymakers should consider the encouragement of female directors on boards when companies have low cash holdings, since their interaction reduces CSR disclosure. Moreover, regulators and governance agencies may draw from these results to develop the design of a more balanced corporate governance mechanism that considers the board structure and the policy on CSR disclosure to enhance firms' board of directors, management and CSR providers accountability and transparency. Our findings may further inform the development of guidelines for policymakers to urge firms to converge with reporting standards over CSR, conditional on holding high levels of cash reserves. Third, the theoretical implication of this research is to show that cash holdings do not

always increase agency problems, as agency theory suggests, since holding high levels of cash has a positive influence on CSR disclosure. This premise is supported by our results, which find that companies with higher cash holdings may reduce information asymmetries and align the interests of managers and stakeholders by reporting CSR information. Finally, our findings should encourage scholars to explore the effect of cash holding on CSR disclosure, taking into account different theoretical perspectives such as stakeholder theory or institutional theory.

Having identified avenues for future research, we must acknowledge that this research has certain limitations. First, it is based on non-financial international firms since financial entities are governed by different accounting rules. Second, this article uses data from 2012 to 2021, and does not separate items before and after the COVID-19 pandemic, when it is possible that the levels of cash holding differ. Third, we have attempted to include as many countries as possible in our international sample, but we have not separated cash holdings by country, and it is possible that the strength of investor protection may influence cash holding. Similarly, further studies should extend the analysis to other corporate governance mechanisms such as board independence, board committees or CEO duality, among others, or in other institutional settings. Future research may also consider the impact of macroeconomic variables, such as GDP growth and business cycles, as well as industry-specific factors. These types of analyses would offer a more complete picture of the determinants of the CSR-cash holdings nexus.

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