Research in International Business and Finance 69 (2024) 102235

Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Greenwashing, bank financial performance and the moderating role of gender diversity

Giuliana Birindelli [a,*], Helen Chiappini [b], Raja Nabeel-Ud-Din Jalal [b]

[a] Department of Economics and Management, University of Pisa, Via C. Ridolfi, 10, 56124 Pisa, Italy
[b] Department of Management and Business Administration, G. d'Annunzio University of Chieti-Pescara, Viale Pindaro 42, 65127 Pescara, Italy

ARTICLE INFO

JEL Classifications:
G20
G21

Keywords:
Banks
Greenwashing
Financial performance
Gender diversity
ESG
Corporate governance

ABSTRACT

Drawing on legitimacy and upper echelons theories, the study explores the impact of greenwashing on bank performance and whether women on boards play a moderating role in this relationship. Using a sample of European listed banks over the period 2013–2020, our findings show greenwashing has a negative effect on bank performance, yet female directors play a moderating role in this relationship. Overall, our research contributes to the emerging literature on the impact of greenwashing on corporate financial performance, shedding new light on the role played by board gender diversity. Our study, therefore, has significant implications for policymakers, regulators and banks.

"Over recent years, mainstream banks have increasingly positioned themselves around their social purpose and environmental goals. This rhetoric must be backed up by real commitments and action" (Martin Rohner, Executive Director, Global Alliance for Banking on Values)

1. Introduction

Greenwashing is a substantive and timely issue for banks and for the financial sector in general. Greenwashing seems to potentially affect financial entities, products, and services and, in turn, the investors' trust and the channelling of private investments toward sustainable activities (European Securities and Markets Authority – ESMA, 2023.).[1] Not surprisingly, the European supervisory authorities are actively involved in mitigating the issues of greenwashing, protecting investors, the market integrity and the trust in sustainable investments.

* Corresponding author.
E-mail addresses: giuliana.birindelli@unipi.it (G. Birindelli), helen.chiappini@unich.it (H. Chiappini), nabeel.jalal@unich.it (R.N.-U.-D. Jalal).

[1] The EU has long been tackling greenwashing in the financial market by promoting sustainable finance policies and laws. They have recently improved transparency (European Union, 2022) and laid the groundwork to help investors identify credible investment opportunities and potential risks. Significant steps for are found in the Sustainable Finance Disclosure Regulation (European Union, 2019) and the Taxonomy Regulation (European Union, 2020), as well as various ongoing proposals, such as the European Commission's proposal for a European Green Bond Regulation, which reached a political agreement in March 2023 (European Commission, 2021). In the context of increasing transparency and sustainability in the financial market, the three European Supervisory Authorities (ESAs) launched a joint call to gather information aimed at understanding the drivers, salient features and risks associated with greenwashing, including collecting examples of potential greenwashing practices (ESAs, 2022).

https://doi.org/10.1016/j.ribaf.2024.102235
Received 1 July 2023; Received in revised form 4 January 2024; Accepted 9 January 2024
Available online 15 January 2024

Greenwashing is also a relevant issue for academia, as indicated by the growing span of research mapped in recent literature reviews (e.g., De Freitas Netto et al., 2020; Gatti et al., 2019; Montero-Navarro et al., 2021; Montgomery et al., 2023, Santos et al., 2023; Talpur et al., 2023; Yang et al., 2020). Although the literature on greenwashing is growing, a consistent yet unexplored research topic is whether greenwashing affects banks' financial performance. To the best of our knowledge, only Wu and Shen (2013, p. 3544) investigate this, concluding that "greenwashing banks provide only lip service, which does not affect their income and cost". Although their study considers a large set of banks and countries, it embraces a corporate social responsibility measure, without directly testing greenwashing and does not consider a period when there is clear awareness of greenwashing by mature investors and supervisors.

The debate over the impact of greenwashing is also still ongoing for non-financial firms. Some studies show that greenwashing has a negative effect on the performance of non-financial firms (Darendeli et al., 2022; Walker and Wan, 2012), while others find a positive effect (Li et al., 2023). Theoretically, the negative effect is justified by the fact that greenwashing could send a negative signal to the community if discovered by stakeholders (Walker and Wan, 2012). On the other hand, the positive performance (Lee and Raschke, 2023; Li et al., 2023) may be justified through recovered or enhanced legitimacy (Suchman, 1995).

To date, research has focused on a few characteristics that make non-financial firms more or less prone to greenwashing, such as ownership (Yu et al., 2020), CEO power and duality (Gull et al., 2023; Hu et al., 2023), board gender diversity (Eliwa et al., 2023; Gull et al., 2023), and board size and independence (Amin et al., 2022; Gull et al., 2023; Yu et al., 2020). Under the upper echelon theory (Hambrick and Mason, 1984; Hambrick, 2007; Byron and Post, 2016) women and men, taking part in a governance decision process, bring different values and sensibilities encouraging different governance decision-making. Empirical evidence shows women clearly care for the environment, which can encourage positive environmental behaviours (Ciocirlan and Pettersson, 2012; Glass et al., 2016), reducing the greenwashing attitude and thus, favourably impacting firm financial performance. Gender diversity, however, to the best of our knowledge has never been considered as a moderating factor in the relationship between greenwashing and the financial performance of banks.

In this article, we aim to fill the gap in academic literature by posing the following research questions:

1) Does greenwashing (positively/negatively) affect bank financial performance?
2) Do female directors moderate the relationship between greenwashing and bank financial performance?

Using the peer-relative greenwashing score by Yu et al. (2020) and a sample of European listed banks over the years 2013–2020, our findings provide evidence that greenwashing negatively affects bank performance. However, gender diversity moderates this relationship.

In addition to addressing the lack of research analysing the effect of greenwashing on bank financial performance and on the moderating role of gender diversity, our paper enriches the broad stream of literature on environmental, social and governance (ESG) factors (for a review see Galletta et al., 2022a), gender diversity in banks (e.g., Birindelli et al., 2020; Owen and Temesvary, 2018) and the recent debate on women-ESG performance in the banking industry (Gallego-Sosa et al., 2020; Shakil et al., 2021). The paper also provides timely contributions for a set of actors including financial sector supervisors, policymakers, and banks. Our results offer a response to financial sector supervisors and policymakers providing an empirical understanding of the relationship between greenwashing and bank performance and of possible actions aimed at reducing the negative effects and providing supervisory authorities with evidence to help reduce bank greenwashing practices.

In addition, our study provides banks with an empirical demonstration that greenwashing is a losing game and that a gender-balanced board of directors may limit this phenomenon and, hence, the negative financial consequences resulting from it.

The remainder of the paper is structured as follows: Section 2 reviews the literature and develops the research hypotheses, Section 3 describes the data, Section 4 illustrates the methodology, Section 5 presents and discusses the findings, Section 6 explains the robustness checks and finally, Section 7 concludes.

2. Literature review and hypotheses development

2.1. Greenwashing definition

The literature on greenwashing is relatively new, however, scholars have identified a set of practices and related definitions of greenwashing.

First, some researchers (Lyon and Maxwell, 2011; Lyon et al., 2013) define greenwashing as a firm practice of reporting positive information regarding environmental or social performance, while deliberately withholding the negative information. In other words, firms mask their poor environmental/social performance by selectively disclosing positive information to create an overall positive company image, which will attract stakeholders (Clarkson et al., 2008; Du, 2015; Ferrón-Vílchez et al., 2021; Marquis et al., 2016).

Second, scholars identify greenwashing as the gap between (rich and positive) symbolic communications and (poor) environmental actions (Delmas and Burbano, 2011), also known as the "discrepancy between the green talk and green walk" (Walker and Wan, 2012, p. 231). In other words, the gap between "symbolic" and "substantive" actions invokes a decoupling behaviour (Guo et al., 2014).

Third, greenwashing occurs when firms manipulate and mislead their product and service-related information to attract green customers (Lyon and Montgomery, 2015; Parguel et al., 2011).

In a nutshell, the literature on greenwashing highlights different but interrelated concepts such as "selective disclosure", "act of misleading", "poor environmental performance" and "symbolic information" (Delmas and Burbano, 2011; Lyon and Maxwell, 2011; Parguel et al., 2011). Common to these concepts is the emphasis on communication by manipulating, altering or concealing actual

environmental or, in a broader perspective, environmental, social and governance commitment to creating a favourable, social and eco-friendly company image (Ferrón-Vílchez et al., 2021). Recently, the ESMA (2023, p.5) has defined greenwashing as a "*practice where sustainability-related statements, declarations, actions, or communications do not clearly and fairly reflect the underlying sustainability profile of an entity, a financial product, or financial services. This practice may be misleading to consumers, investors, or other market participants… [and] … can occur and spread either intentionally or unintentionally*". In our study, we embrace the definition of greenwashing based on the discrepancy between talking and walking, thus, in line with other studies (Hu et al., 2023; Yu et al., 2020; Zhang, 2022a, 2022a, 2022b) we define greenwashing as the gap between the amount of bank environmental information disclosed and actual environmental performance.

2.2. Greenwashing and bank performance

The literature on the relationship between greenwashing and financial performance is still scarce, especially for banks. A few studies report the positive impact of greenwashing on firm financial performance (Lee and Raschke, 2023; Li et al., 2023), explained in the light of the legitimacy theory (Suchman, 1995), according to which companies with low environmental performance align with the community and attract stakeholders through miscommunication and manipulation of environmental information to gain economic benefits (Lyon and Montgomery, 2015; Marquis et al., 2016). In this scenario, green talk can generate a positive signal in the market, influencing customers' and investors' choices (Berrone et al., 2017; Du, 2015; Kim, 2019).

The positive relationship between greenwashing and financial performance assumes that greenwashing is not perceived and discovered by stakeholders (Li et al., 2023). This stems from asymmetric information in the markets (Schons and Steinmeier, 2016) and the associated limited information held by stakeholders, including the lack of professional knowledge required for a thorough understanding and evaluation of corporate environmental disclosure and underlying performance (Parguel et al., 2015).

In contrast, other studies highlight the negative impact of greenwashing on financial performance (Darendeli et al., 2022; Walker and Wan, 2012). Du (2015) reports that when greenwashing is perceived, the market reacts with anger at the betrayal of trust, resulting in a drop in share prices. Plausible consequences if greenwashing is discovered are consumer scepticism and confusion (Leonidou and Skarmeas, 2017), outflow of experienced personnel and the estrangement of business and industry partners.

Finally, some studies find no significant relationship between greenwashing and firm performance, such as Testa et al. (2018) and Wu and Shen (2013). Using a corporate social responsibility measure not directly testing the relationship between greenwashing and bank performance, Wu and Shen (2013) conclude that "greenwashing banks provide only lip service" (p. 3544), which does not affect their profitability and cost structure. Though this study considers a wide set of banks and countries (162 and 22, respectively), it suffers from not considering a period when investors and supervisors could have been aware of greenwashing, thus the de-legitimacy theory does not properly work.

In our context, the expectations of stakeholders, including regulators and policymakers, are very high, and stakeholder awareness and scrutiny of greenwashing by the community are equally high. Investors may express concerns regarding the gap between communication and practices. In these cases, greenwashing will be punished, lowering the market value and the profitability of the greenwashers, therefore, the search for legitimacy turns into a loss of legitimacy, leading to a deterioration of company performance.

Thus, we formulate the following hypothesis:

Hypothesis 1. (H1): Greenwashing decreases a bank's financial performance.

2.3. The moderating effect of women directors

Corporate governance mechanisms and the composition of the board of directors play a pivotal role in "supervision, strategic decision-making, and determination of socially responsible behavior" (Kahloul et al., 2022, p. 303), and not surprisingly, there is a large body of literature empirically investigating their effect on financial performance. Board diversity (e.g., age, expertise, gender) has earned scholarly attention (e.g., Chen and Keefe, 2020; Frijns et al., 2016; Owen and Temesvary, 2018), with a set of studies specifically focused on gender diversity. Several studies find that women directors influence the corporate decision-making process and performance. For instance, women on boards reduce the information asymmetry in the stock market (Abad et al., 2017) and decrease bank riskiness (Cardillo et al., 2021). According to other studies, women on boards have a positive effect on bank performance and risk when a critical threshold of women is reached (Birindelli et al., 2020; Owen and Temesvary, 2018; Venturelli et al., 2024).

Studies also reveal that women are more likely to pursue long-term strategies and stakeholder-oriented outcomes, which are instrumental to the success of environmental practices (Glass et al., 2016; Matsa and Miller, 2013). Accordingly, empirical evidence reveals that women are more inclined than men to adopt environmentally friendly behaviour, which can significantly improve a company's environmental performance (Ciocirlan and Pettersson, 2012; Glass et al., 2016; Kassinis et al., 2016; Li et al., 2017). Galletta et al. (2022b) also obtained similar evidence for banks.

Recently, Chen and Dagestani (2023) and Eliwa et al. (2023) found that female directors inhibit firm greenwashing. Finally, other recent studies (Kahloul et al., 2022; Pekovic and Vogt, 2021), empirically demonstrate that women on boards positively moderate the relationship between corporate social responsibility and financial performance.

The main theoretical framework underlying these findings is the upper echelons theory (Hambrick and Mason, 1984; Hambrick, 2007), which hypothesises a close link between "observable managerial characteristics" of the leaders, such as age, gender and education, on the one hand, and the performance outcomes of corporate strategy on the other (Boeker, 1997). In this context, given that women and men bring different values, views, sensitivities and knowledge to the decision-making process, it is reasonable to expect

that decisions on environmental issues depend on the gender composition of boards of directors (Byron and Post, 2016).

In light of the existing literature, we believe that the presence of women on boards can reduce the negative impact of greenwashing on a bank's performance by weakening the bank's greenwashing behaviour.

Thus, we formulate the following hypothesis:

Hypothesis 2. (H2): Women on boards moderate the negative relationship between greenwashing and bank performance.

3. Data

3.1. Sample

To examine the relationship between greenwashing and bank performance, and the moderating role of gender diversity, we use a sample of 77 European listed banks over the period 2013–2020. We focus on European banks, given the spotlight that supervisory authorities place on this issue for financial institutions and markets.

To identify our sample of banks, we retrieved data on European listed banks from two databases (Refinitiv and Bloomberg). We eliminated the banks from the sample that did not have available information on environmental performance and environmental disclosure, as it is the basis for our greenwashing score (see sub-Section 3.2.2). The data on bank environmental, accounting and market performance, as well as the data on women on boards and the other control variables, are from Refinitiv. The data on bank environmental disclosure are from Bloomberg, while the data on country gross domestic product are from the World Bank.

Appendix 1 provides a detailed description of our sample.

3.2. Variables

3.2.1. Dependent variables

We use both market-based (stock returns and Tobin's Q) and accounting-based measures (Return on Assets) as proxies for bank performance, in line with the main literature (e.g., De Andres and Vallelado, 2008; García-Sánchez et al., 2018; Menicucci and Paolucci, 2023; Nizam et al., 2019). Market-based performance shows real-time fluctuations in stock prices, reflecting stakeholder concerns about firm decisions and practices (Du, 2015). On the other hand, accounting-based performance is directly measured by the company and may be subject to manipulation (Dainelli et al., 2013). We, therefore, use both market and accounting proxies, to conduct a more in-depth analysis. Table 1 offers details of the dependent variables.

3.2.2. Greenwashing measure

The literature has proposed some measures of greenwashing, opening up a field of study still in its infancy (Du et al., 2018, 2021; Kassinis et al., 2022; Yu et al., 2020).

We use a peer-relative greenwashing score developed by Yu et al. (2020). Our greenwashing score is measured as a normalized measure representing a firm's relative position to its peers in the distribution of the Bloomberg Environmental disclosure score minus a normalized measure representing a firm's relative position to its peers in the distribution of the Refinitiv Environmental performance

Table 1
Variable description.

Variables	Description	Source
Panel A: Dependent variables		
Stock Return (SR)	Annual Stock Return	Refinitiv
Tobin's Q (TQ)	Ratio of the market value of the bank to the replacement cost of its assets	Refinitiv
Return on Assets (ROA)	Net income after taxes divided by total assets	Refinitiv
Panel B: Independent and Moderating Variables		
Greenwashing	A firm's peer-relative greenwashing score = (a normalized measure representing a firm's relative position to its peers in the distribution of the Bloomberg Environment disclosure score) - (a normalized measure representing a firm's relative position to its peers in the distribution of Refinitiv Environmental performance score)	Bloomberg and Refinitiv
Women on Board	Total number of women on board divided by total number of directors	Refinitiv
Panel C: Vector of Firm financial and governance variables		
Independent Directors	Total number of independent directors on the board divided by total number of directors	Refinitiv
Board Size	Total number of board directors	Refinitiv
CEO Duality	A variable equal to "1" if the same individual serves as CEO and chairman of the board of directors, otherwise "0"	Refinitiv
Bank Size	Log of total assets	Refinitiv
Debt Ratio	Total Debt to Equity	Refinitiv
Liquidity Asset Ratio	Cash and due from banks plus other earning assets divided by total assets	Refinitiv
Loans to Deposits Ratio	Net loans divided by total deposits	Refinitiv
Country level Variable		
GDP Growth Rate	Growth rate of gross domestic product within a country	World Bank

score. Eqs. 1 and 2 were used to normalize the environmental disclosure and performance scores. The greenwashing score was then calculated as shown in Eq. 3.

$$Normalized \quad Bloomberg \quad Environmental \quad Discloure \quad score = \left(\frac{BENVD_{it} - \overline{X}_{BENVD}}{\sigma_{BENVD}}\right) \tag{1}$$

$$Normalized \quad Refinitiv \quad Environmental \quad Performance \quad Score = \left(\frac{ENVP_{it} - \overline{X}_{ENVP}}{\sigma_{ENVP}}\right) \tag{2}$$

$$Greenwashing_{it} = Normalized \quad BENVD_{it} - Normalized \quad ENVP_{it} \tag{3}$$

where $BENVD_{it}$ is the Bloomberg Environmental disclosure score for a bank i at time t, $ENVP_{it}$ is the Environmental performance score of Refitiniv for a bank i at time t, $\overline{X}_{BENVD}$ and $\overline{X}_{ENVP}$ are the mean of environmental scores. The σ_{BENVD} and σ_{ENVP} are the standard deviations.

The reason for the normalization of both environmental disclosure and performance scores is to convert both scores to the same scale (Yu et al., 2020; Zhang, 2022a, 2022a). In the last step (Eq. 3), we subtracted the normalized environmental performance score from the normalized environmental disclosure score, which gives us our greenwashing score (Table 1).

3.2.3. Women on boards

To investigate the moderating impact of women directors on the association between greenwashing and bank performance, we employ the percentage of women on the board of directors. In the robustness checks (Section 6) we use other measures, namely a dummy variable named critical mass (Kanter, 1977) that equals 1 when the board has three or more female directors, 0 otherwise, and Blau's (1977) index for gender heterogeneity.

3.2.4. Control variables

We consider governance, financial and country-level control variables. Regarding bank governance, we use independent directors, board size and CEO duality as control variables. Independent directors prioritise transparency and substantially mitigate moral hazard through monitoring (Liang et al., 2013). We also control for board size as larger boards can be less effective in the decision-making process (De Andres and Vallelado, 2008; Liang et al., 2013). Finally, we control for CEO duality because his/her dual role -as CEO and Chair of the board- can influence the bank's decision-making (Duru et al., 2016).

We use bank size, loan-to-deposit ratio, liquidity asset ratio, and debt-to-equity ratio as financial controls. Bank size is measured through the natural logarithm of total assets (Li et al., 2023; Menicucci and Paolucci, 2023; Nizam et al., 2019). Generally, larger banks can invest larger resources in environmental practices and communications (Siueia et al., 2019). Additionally, we use the loan-to-deposit ratio to capture how much the loans are financed through the customer's deposits and, hence, how much profit is made from loans financed in this way (Menicucci and Paolucci, 2023; Wu and Shen, 2013). We use the liquidity asset ratio to gauge bank risk management; a lower ratio suggests a higher risk tolerance. To capture bank indebtedness, we use the debt ratio (Testa et al., 2018; Shankar and Francis, 2023). Finally, we used the GDP growth rate as country-level control since macroeconomic factors can impact bank performance (Menicucci and Paolucci, 2023). Table 1 provides detailed information on variables. Also, all accounting variables were winsorised to reduce the impact of non-credible outliers.

4. Methodology

4.1. Baseline model

To investigate the impact of greenwashing on bank performance and the moderating effect of women on boards, we employ the feasible generalized least squares (FGLS) model after conducting the Lagrange Multiplier (Breusch-Pagan LM) test and Hausman's (1978) specification test to ensure the model's validity. Our main econometric models are the following:

$$BP_{it} = \beta_0 + \beta_1 GW_{it-1} + \beta_N Controls_{it-1} + \varepsilon_{it} \tag{4}$$

$$BP_{it} = \beta_0 + \beta_1 GW_{it-1} + \beta_2 WOB_{it-1} + \beta_3 GW_{it-1} \quad X \quad WOB_{it-1} + \beta_N Controls_{it-1} + \varepsilon_{it} \tag{5}$$

where i and t are bank i and year t, respectively, BP is bank performance measured by stock return, Tobin's Q and ROA, GW is the greenwashing score, WOB is the percentage of women on boards, $GW\ x\ WOB$ is the interaction term which captures the moderating effect of women on boards, and $Controls$ includes independent directors, board size, CEO duality, bank size, debt ratio, liquidity asset ratio, loans to deposits ratio, and GDP growth rate (Table 1). We lag all explanatory variables and controls by one year and we include year, bank, and country effects.

4.2. Endogeneity

Endogeneity represents a potential methodological concern for research on the link between greenwashing and performance. One source of endogeneity relates to the simultaneity (reverse causality) for which greenwashing influences bank performance but may be

also true that bank greenwashing behaviour is a result of past performance (Wintoki et al., 2012). To address this endogeneity issue, following a large body of literature (e.g., Farag and Mallin, 2017; Zhang et al., 2021; Kahloul et. al, 2022) and recent literature on greenwashing (Li et al., 2023), we use the two-step system generalized method of moments (GMM). According to literature (e.g., Arellano and Bond, 1991; Kahloul et al., 2022), this method is preferable to the two-stage least square regression (2SLS) due to issues related to the choice of proper instrumental variables. This dynamic panel allows us to use internal historical variables as instruments (Wintoki et al., 2012). Therefore, we use past dependent and control variables as internal instruments (Roodman, 2009). The validity of our model specifications is tested using the Hansen (1982) test and Arellano-Bond (1991) test.

5. Empirical results and discussion

5.1. Descriptive statistics

Table 2 reports the descriptive statistics and pairwise correlations.

The mean for greenwashing is 0.024, indicating that on average banks in our sample practice greenwashing. On average women constitute 26.5% of the bank board members, showing a picture that is still far from gender equality. The dependent variables show very different averages: they range from negative values (−0.163 for stock return) to positive values for the other two (0.113 and 0.541 for Tobin's Q and ROA respectively). Additionally, the mean of the country-level control variable, GDP growth rate, is 1.24% indicating that the economy is growing, though slowly.

The correlation analysis points out a negative correlation between greenwashing, on one hand, and stock return, Tobin's Q and return on assets, on the other. Instead, the variable women on boards is positively associated with the dependent variables. Correlation among some explanatory variables hints at multicollinearity, but the VIF values are below the tolerance level, suggesting that multicollinearity is not an issue (Allison, 1999; Farooq et al., 2022; Gull et al., 2023).

5.2. The effect of greenwashing on bank financial performance

Table 3 presents the results of the FGLS estimator for the influence of greenwashing on bank performance. The results indicate that greenwashing has a significant negative effect on performance suggesting that banks engaging in greenwashing practices have poorer market and accounting performance. Hence, our H1 is confirmed. In essence, our findings are in line with the other studies on non-financial firms (Darendeli et al., 2022; Walker and Wan, 2012), which conclude that greenwashing provides no economic benefit to a firm seeking to improve its image and legitimacy. Our findings support studies pointing out that greenwashers, once discovered, are penalised by the market (Du, 2015; Kim and Lyon, 2015; Malkiel, 2005). The decline in accounting and market performance measures is probably due to the negative reactions from investors, customers, qualified personnel, and the community at large. In light of the above motivations, our research suggests banks should avoid greenwashing and prioritize implementing genuine sustainability initiatives to enhance performance. Indeed, the banking sector has long been in the spotlight and the efforts by banking authorities to fight greenwashing increasingly urge the public to verify the contents and truthfulness of green disclosures. Paradoxically, in this context, a bank's pursuit of legitimacy seems to result in delegitimization because greenwashing practices are more easily unmasked nowadays than in the past.

5.3. The moderating role of gender diversity

Following Baron and Kenny (1986), we explored the moderating role of women on boards in the relationship between greenwashing and bank performance. Table 4 reports FGLS regressions with greenwashing, women on boards and the interactive effect between these two variables. The results reveal that women on boards have a highly significant positive impact on bank performance. In addition, the interaction between greenwashing and women on boards is positive and significant, which confirms that women on boards moderate the negative impact of greenwashing on bank performance. This finding also holds for all our performance measures and confirms H2. Overall, the results are consistent with the extant literature, which highlights that female directors bring more ethical and environmental behaviour compared to men, including a higher distrust of greenwashing practices (among others, Ciocirlan and Pettersson, 2012; Eliwa et al., 2023; Gul et al., 2011; Harakeh et al., 2022; Usman et al., 2019), obtaining an increased financial performance (Li et al., 2022; Pathan and Faff, 2013; Proença et al., 2020). Table 5 includes the results of this possible channel, showing that women on boards have a positive effect on bank greenwashing. In other words, more balanced boards seem able to reduce greenwashing practices. This is in line with the guidelines of the supervisory authorities, according to which "Solid governance around ESG claims may act as a mitigating factor of greenwashing" (ESMA, 2023, p. 24).

6. Robustness checks

6.1. Endogeneity

To account for endogeneity, we use the two-step system GMM. GMM uses a firm's past attributes as valid instruments to address unobserved heterogeneity and simultaneity (Roodman, 2009; Wintoki et al., 2012).

Table 6 reports the results for our GMM model with past dependent and control variables as internal instruments. Meanwhile, the Arellano-Bond (1991) test for residual autocorrelation shows that the second order autocorrelation is not significant, meaning no

Table 2
Descriptive Statistics and Correlation.

Variables	Mean	SD	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Greenwashing	0.024	1.021	1.66	1												
2. Women on Board	0.265	0.137	1.24	-0.099**	1											
3. Independent Directors	6.317	3.415	1.72	-0.006	0.268***	1										
4. Board size	11.773	4.132	1.98	-0.048**	0.057**	0.580***	1									
5. CEO Duality	0.079	0.271	1.07	0.025	-0.112***	-0.020	0.163***	1								
6. Bank Size	7.813	0.744	1.54	-0.069**	0.196***	0.374***	0.517***	0.029**	1							
7. Debt ratio	0.574	0.0786	1.05	0.036**	-0.076**	-0.053**	-0.102**	0.034**	-0.189***	1						
8. Liquidity Asset Ratio	0.28	0.185	1.12	-0.102*	0.390*	0.232*	0.240*	0.412*	0.140*	0.167*	1					
9. Loans to Deposits Ratio	0.71	0.158	1.13	-0.137***	0.020	-0.022	-0.077**	-0.082**	0.185***	-0.025	-0.034	1				
10. GDP growth rate	1.245	3.296	1.07	0.006*	-0.180***	-0.129***	-0.109**	-0.029**	-0.038**	0.083**	0.194*	0.096**	1			
11. Stock Return	-0.163	0.456	–	-0.163***	0.083**	-0.033**	-0.085**	0.008	0.018	-0.063**	0.412*	0.066**	0.014	1		
12. Tobin's Q	0.113	0.141	–	-0.091**	-0.016	-0.181***	-0.326***	0.030**	-0.469***	0.069**	0.584*	0.095**	0.090**	0.076**	1	
13. Return on Assets	0.541	0.470	–	-0.187***	0.031**	-0.317***	-0.273***	0.067**	-0.422***	0.051**	-0.120*	0.028**	0.191***	0.204***	0.383***	1

Notes: This table reports descriptive statistics and correlations. SD denotes standard deviation. All variables are defined in Table 1.
Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3
Greenwashing and Bank Performance relationship.

	SR	TQ	ROA
Greenwashing (lag)	-0.937**	-0.261***	-0.0213***
	(0.368)	(0.0432)	(0.00252)
Independent Directors (lag)	0.0402***	0.0529***	0.00439***
	(0.0133)	(0.0137)	(0.000613)
Board Size (lag)	-0.0113***	-0.000883***	-0.000127***
	(0.00389)	(0.000290)	(3.33e-05)
CEO Duality (lag)	0.0493***	0.0221**	0.00176***
	(0.00836)	(0.00929)	(0.000421)
Bank Size (lag, log)	-0.221***	-0.0698***	-0.00257***
	(0.0437)	(0.00481)	(0.000192)
Debt Ratio (lag)	-0.0355***	-0.0428*	-0.00250***
	(0.00831)	(0.0250)	(0.000587)
Liquidity Asset Ratio (lag)	0.0583	0.0514***	0.00190**
	(0.0852)	(0.0151)	(0.000851)
Loans to Deposits Ratio (lag)	-0.114	-0.0177	-0.000252
	(0.0867)	(0.0198)	(0.000937)
GDP growth rate (lag)	-0.0199**	0.00257	0.000330***
	(0.00956)	(0.00178)	(8.88e-05)
Constant	1.151***	0.944***	0.0524***
	(0.435)	(0.0706)	(0.00314)
Year effect	Yes	Yes	Yes
Bank effect	Yes	Yes	Yes
Country effect	Yes	Yes	Yes

Notes: This table reports the panel feasible generalized least squares (FGLS) estimation results. All the explanatory variables are lagged by 1 year (lag) and are described in Table 1. All columns include the bank, country, and year effects but are not reported here. Standard errors in parentheses, Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ and N observations= 439.

Table 4
Moderating role of Women on Board on the relationship between Greenwashing and Bank Performance.

	SR	TQ	ROA
Greenwashing (lag)	-0.976***	-0.227***	-0.0207***
	(0.372)	(0.0415)	(0.00287)
Women on Board (lag)	0.398***	0.117***	0.00732***
	(0.123)	(0.0255)	(0.00114)
Women on Board x Greenwashing (lag)	0.260*	0.0456*	0.015***
	(0.149)	(0.0256)	(0.00116)
Independent Directors (lag)	0.0859*	0.0369***	0.00515***
	(0.0445)	(0.0137)	(0.000571)
Board Size (lag)	-0.00970**	-0.0298***	-0.000133***
	(0.00382)	(0.00815)	(3.38e-05)
CEO Duality (lag)	0.0859*	0.0251***	0.00227***
	(0.0445)	(0.00903)	(0.000438)
Bank Size (lag, log)	-0.236***	-0.0754***	-0.00286***
	(0.0444)	(0.00485)	(0.000207)
Debt Ratio (lag)	-0.0298***	-0.0484*	-0.00206***
	(0.00815)	(0.0252)	(0.000756)
Liquidity Asset Ratio (lag)	0.111	0.0489***	0.00187**
	(0.0839)	(0.0159)	(0.000862)
Loans to Deposits Ratio(lag)	-0.129	-0.0373*	-0.000875
	(0.0864)	(0.0208)	(0.000973)
GDP Growth Rate (lag)	-0.0157	0.00303*	0.000415***
	(0.00991)	(0.00173)	(9.45e-05)
Constant	1.287***	0.964***	0.0533***
	(0.440)	(0.0688)	(0.00348)
Year effect	Yes	Yes	Yes
Bank effect	Yes	Yes	Yes
Country effect	Yes	Yes	Yes

Notes: This table reports the panel feasible generalized least squares (FGLS) estimation results. All the explanatory variables are lagged by 1 year (lag) and are described in Table 1. All columns include the bank, country, and year effects but are not reported here.
Standard errors in parentheses, Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ and N observations= 439.

Table 5
Channel Effect.

	Greenwashing		
Women on Board (lag)	-1.737***		
	(0.172)		
Critical Mass (lag)		-0.414 * **	
		(0.0467)	
Blau's Index (lag)			-1.562 * **
			(0.211)
Independent Directors (lag)	-0.0833***	-0.0916 * **	-0.0817 * **
	(0.00706)	(0.00719)	(0.00685)
Board Size (lag)	0.0169**	0.0427 * **	0.0256 * **
	(0.00667)	(0.00679)	(0.00737)
CEO Duality (lag)	-0.0950	-0.0888	-0.0954
	(0.0928)	(0.0919)	(0.0927)
Bank Size (lag, log)	-0.426***	-0.420 * **	-0.423 * **
	(0.0343)	(0.0350)	(0.0344)
Debt Ratio (lag)	-5.58e-07***	-4.36e-07 *	-4.02e-07 * *
	(1.93e-07)	(2.28e-07)	(1.62e-07)
Liquidity Asset Ratio (lag)	-1.135***	-1.128 * **	-1.182 * **
	(0.154)	(0.163)	(0.174)
Loans to Deposits Ratio(lag)	-0.133	-0.0303	-0.199
	(0.206)	(0.210)	(0.212)
GDP Growth Rate (lag)	-0.0453***	-0.0394 * **	-0.0372 * *
	(0.0167)	(0.0144)	(0.0162)
Constant	4.737***	4.140 * **	4.744 * **
	(0.256)	(0.287)	(0.263)
Year effect	Yes	Yes	Yes
Bank effect	Yes	Yes	Yes
Country effect	Yes	Yes	Yes

Notes: This table reports the panel feasible generalized least squares (FGLS) estimation results. All the explanatory variables are lagged by 1 year (lag) and are described in Table 1. All columns include the bank, country, and year effects but are not reported here. Standard errors in parentheses, Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. N observations= 439.

simultaneity issue, and the Hansen test of overidentifying restrictions is not significant meaning that the instruments are valid. The two-step GMM regression shows that greenwashing decreases bank performance and women on board moderate this negative relationship (Table 6). The results are consistent with all proxies of bank performance for both models. In conclusion, the two-step system GMM in Table 6 suggests that the baseline model results in Tables 3 and 4 are free from endogeneity.

6.2. *Alternative measures of gender diversity*

As alternative proxies for gender diversity, we use critical mass and Blau's index. According to the Critical mass theory (Kanter, 1977), the presence of a significant number of women in the decision-making process ("threshold" or "critical mass") allows women to provide new views and skills, positively influencing the group's culture and performance (Joecks et al., 2013). Many studies (e.g., Konrad et al., 2008; Kramer et al., 2006) show that an absolute number of at least three women directors is useful to hold significant power and substantially change the dynamics and processes within the board. Thus, in line with the literature, we pose our critical mass variable equal to three.

In addition, we measure board gender diversity using Blau's (1977) heterogeneity index. According to Blau's index, a perfectly balanced board will have a diversity score of 0.50 for both genders (males and females).[2] In cases of no gender diversity, the index score will be "0" indicating a 100% male-dominant board.

Table 7 confirms the negative impact of greenwashing on bank performance. In addition, critical mass has a positive relationship with performance. The interaction between greenwashing and critical mass is positive and highly significant, which confirms that the presence of at least three women on a board moderates the negative impact of greenwashing. The results obtained using Blau's index are consistent with the previous ones.

[2] The formula for calculating the Blau's Index is as follows:

$$Blau \quad Index = 1 - \sum_{i=1}^{p} x_i{}^2$$

where x_i is the percentage of members in each gender and p is the total genders within the board. Blau's index takes a value of 0 when there is no gender diversity, meaning there are only male or female members, and 0.5 when there is an equal proportion of male and female members in each category.

Table 6
GMM robustness.

	SR	TQ	ROA	SR	TQ	ROA
Stock Return (lag)	0.213***			-0.0603		
	(0.0262)			(0.0482)		
Tobin's Q (lag)		0.674***			0.611***	
		(0.0251)			(0.0409)	
Return on Assets (lag)			0.269***			0.244***
			(0.0312)			(0.0611)
Greenwashing (lag)	-0.0256***	-0.0330***	-0.0258***	-0.0126***	-0.171***	-0.0123***
	-0.00419	-0.00303	(0.00280)	(0.00431)	(0.0422)	(0.00403)
Women on Board (lag)				-0.300	0.00819	0.00797***
				(0.319)	(0.0308)	(0.00199)
Women on Board x Greenwashing (lag)				-1.611***	0.00665	0.00643**
				(0.561)	(0.0320)	(0.00298)
Independent Directors (lag)	0.0141**	0.000127***	0.000170***	0.0158**	0.185***	0.000200***
	(0.00539)	(3.42e-05)	(3.00e-05)	(0.00633)	(0.0396)	(4.59e-05)
Board Size (lag)	-0.0210***	-0.00114***	-3.88e-05*	-0.0225***	-0.00218***	-0.00700***
	(0.00455)	(0.000427)	(2.29e-05)	(0.00541)	(0.000536)	(0.00184)
CEO Duality (lag)	0.0718**	0.0194***	0.00162***	0.0733***	0.0164***	0.00188***
	(0.0275)	(0.00300)	(0.000153)	(0.0248)	(0.00501)	(0.000179)
Bank Size (lag, log)	-0.00119***	-0.0160***	-0.00171***	-0.0440*	-0.0264***	-0.00169***
	(0.000198)	(0.00463)	(0.000166)	(0.0238)	(0.00873)	(0.000282)
Debt Ratio (lag)	-0.195***	-0.139***	0.00920***	-0.0335**	-0.0105***	-0.00391*
	(0.0490)	(0.0249)	(0.00204)	(0.0144)	(0.00247)	(0.00215)
Liquidity Asset Ratio (lag)	0.284***	0.0460***	0.00167***	0.0752	0.0711***	0.00187**
	(0.0823)	(0.00829)	(0.000515)	(0.117)	(0.0100)	(0.000767)
Loans to Deposits Ratio (lag)	-0.0976***	-0.00556***	0.000366***	-0.0306	-0.0111***	0.000564***
	(0.0152)	(0.00160)	(9.45e-05)	(0.0269)	(0.00247)	(0.000209)
GDP Growth Rate (lag)	0.189	0.123**	0.0393***	0.471	0.229***	0.0285***
	(0.544)	(0.0593)	(0.00342)	(0.839)	(0.0768)	(0.00557)
F-stat	72.51***	1789***	2226***	1291***	1567***	2784***
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Bank effect	Yes	Yes	Yes	Yes	Yes	Yes
Country effect	Yes	Yes	Yes	Yes	Yes	Yes
AR (1) p-value	-3.757***	-2.341***	-3.514***	-3.643***	-1.968***	-3.693***
AR (2) p-value	-0.248	0.146	-0.869	-1.337	0.0550	-0.653
Hansen J-Statistics	55.07	46.82	53.47	46.96	42.73	42.81

Notes: The table reports two-step system GMM regressions. Arellano–Bond test for AR (2) is used to look for possible autocorrelation issues. The Hansen test is used to look for possible over-identification restrictions in the model. Robust standard errors are in parentheses below the coefficients. All columns include the bank, country, and year effects but are not reported here. Robust Standard errors in parentheses, Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. N observations= 439.

7. Conclusions

The findings indicate that banks practicing greenwashing tactics report lower financial performance and this negative effect is moderated through gender diversity on bank boards. Our study fills multiple gaps in the literature adding the banking sector focus, while previous studies explored non-financial firms, and by testing the role played by female directors on bank boards, which – to the best of our knowledge – is currently unexplored.

Overall, our paper contributes to different research streams. First, it contributes to the emerging research stream on greenwashing (De Freitas Netto et al., 2020; Gatti et al., 2019; Montero-Navarro et al., 2021; Montgomery et al., 2023; Santos et al., 2023; Talpur et al., 2023; Yang et al., 2020) and, in a broad sense, to the literature on ESG factors and banking industry (Galletta et al., 2022a). Second, it contributes to the research stream on bank gender diversity, financial performance (e.g., Birindelli et al., 2020; Owen and Temesvary, 2018), and ESG performance (Gallego-Sosa et al., 2020; Shakil et al., 2021). The implications of our findings are significant for different groups of stakeholders, including policymakers, regulators, corporate boards, and investors. Our results suggest that regulators and policymakers should focus on enforcing regulatory frameworks that discourage greenwashing and incentivize banks to prioritize the effective implementation of sustainability practices. In this way, investors would benefit from more credible disclosure by banks, be able to make more informed decisions and allocate their capital towards banks with a stronger commitment to sustainable practices. Banks can also benefit from these findings by prioritizing gender diversity and increasing the representation of women on their boards to reduce greenwashing and mitigate the adverse effects on financial performance. Therefore, our study contributes to the ongoing debate by providing insights into pursuing multiple, interconnected goals: protecting consumers and investors from greenwashing by enabling them to make informed purchase/investment decisions, raising awareness about the centrality of environmentally protective behaviour, and creating the conditions to accelerate the green transition to a circular economy (ESAs, 2022; European Commission, 2023).

We recognize some limitations of our study. First, our sample, consisting of 77 European banks over the period 2013–2020, only includes listed banks. It would be interesting to extend the sample to listed banks located in other geographic areas and analyse the role

Table 7
Alternative measures of gender diversity.

	SR	TQ	ROA	SR	TQ	ROA	SR	TQ	ROA	SR	TQ	ROA
Stock Return (lag)	-0.0465			-0.0642			0.106*			0.884***		
	(0.0531)			(0.0547)			(0.0613)			(0.0562)		
Tobin's Q (lag)		0.624***			0.664***			0.708***			0.670***	
		(0.0400)			(0.0461)			(0.0472)			(0.0573)	
Return on Assets (lag)			0.252***			0.286***			0.172**			0.296***
			(0.0566)			(0.0525)			(0.0700)			(0.0660)
Greenwashing (lag)	-1.011*	-0.219*	-0.0114***	-0.902*	-0.168***	-0.0121***	-0.112***	-0.0446***	-0.00115**	-0.128***	-0.0404**	-0.0555***
	(0.588)	(0.128)	(0.00413)	(0.534)	(0.0430)	(0.00446)	(0.0105)	(0.00890)	(0.000549)	(0.0176)	(0.0158)	(0.00801)
Critical Mass (lag)	0.249**	0.0182***	0.000902*				0.191*	0.0211***	0.00158***			
	(0.0983)	(0.00434)	(0.000499)				(0.107)	(0.00791)	(0.000535)			
Critical Mass x Greenwashing (lag)	0.0910*	0.0401*	0.000820*				0.0889***	0.0455***	0.000763***			
	(0.0513)	(0.0213)7	(0.000426)				(0.00877)	(0.00847)	(0.000135)			
Blau's Index (lag)				0.0829***	0.345***	0.00651***				0.301***	0.150***	0.368***
				(0.0142)	(0.112)	(0.00234)				(0.0405)	(0.0294)	(0.00231)
Blau's Index x Greenwashing (lag)				0.460***	0.0128	0.00242***				0.632*	0.0581***	0.00470**
				(0.167)	(0.0144)	(0.000906)				(0.351)	(0.00431)	(0.00191)
Independent Directors (lag)	0.0290***	0.0193***	0.000141***	0.0263***	0.314**	0.000134**	0.0344***	0.00207**	0.000841**	0.0210**	0.00242***	0.000897***
	(0.00801)	(0.00352)	(4.77e-05)	(0.00769)	(0.151)	(5.73e-05)	(0.00927)	(0.000997)	(0.000333)	(0.00902)	(0.000847)	(0.000314)
Board Size (lag)	-0.0235***	-0.00185***	-0.000363**	-0.0283***	-0.00169***	-0.0256***	-0.0267***	-0.00311***	-4.36e-05	-0.0270***	-0.00258***	-0.00132**
	(0.00634)	(0.000544)	(0.000149)	(0.00524)	(0.000558)	(0.00481)	(0.00806)	(0.000621)	(4.48e-05)	(0.00711)	(0.000584)	(0.000627)
CEO Duality (lag)	0.00218**	0.0200***	0.00173***	0.0618*	0.0140**	0.00192***	0.0326*	0.0750***	0.00220***	0.0307*	0.0173**	0.00231***
							(0.0193)	(0.00687)	(0.000306)	(0.0173)	(0.00676)	(0.000294)
CSR committee (lag)							-0.0552*	-0.0157***	-0.000904***	-0.106*	-0.0149***	-0.00144***
							(0.0318)	(0.00558)	(0.000330)	(0.0607)	(0.00502)	(0.000332)
Bank Size (lag, log)	-0.106***	-0.0214**	-0.00174***	-0.0804*	-0.0180*	-0.00141***	-0.146***	-0.0212**	-0.00184***	-0.0904**	-0.0214**	-0.00149***
	(0.0332)	(0.00923)	(0.000265)	(0.0414)	(0.00924)	(0.000243)	(0.0404)	(0.00851)	(0.000260)	(0.0373)	(0.0104)	(0.000285)
Leverage (lag)							-0.00207	0.00247***	0.000207***	-0.00528	0.000963	0.000167**
							(0.00736)	(0.000851)	(6.53e-05)	(0.00566)	(0.000894)	(7.53e-05)
Debt ratio	-0.195***	-0.00270***	0.000627	-0.802**	-0.000287*	-0.285***						
	(0.0490)	(0.000919)	(0.00231)	(0.397)	(0.000162)	(0.107)						
Liquidity Asset Ratio(lag)	0.00755	0.0725***	0.00233**	0.314**	0.0720***	0.00262***	0.204*	0.0671***	0.00543***	0.318*	0.0798***	0.00487***
	(0.120)	(0.00983)	(0.000931)	(0.151)	(0.0123)	(0.000940)	(0.114)	(0.0174)	(0.00154)	(0.179)	(0.0169)	(0.00172)
Loans to Deposits Ratio (lag)	-0.00357	-0.00892***	0.000361**	-0.0245	-0.0115***	0.000353**	0.0828	0.0268	0.00712*	-0.0467	0.0635*	0.00890**
	(0.0297)	(0.00263)	(0.000159)	(0.0276)	(0.00252)	(0.000154)	(0.438)	(0.0488)	(0.00396)	(0.462)	(0.0362)	(0.00428)
GDP Growth Rate (lag)	0.565	0.197**	0.0298***	0.772	0.173**	0.0243***	-0.0357	-0.00566**	0.000807***	-0.0608*	-0.00554*	0.000855***

(*continued on next page*)

Table 7 (*continued*)

	SR	TQ	ROA	SR	TQ	ROA	SR	TQ	ROA	SR	TQ	ROA
	(0.819)	(0.0791)	(0.00501)	(0.786)	(0.0828)	(0.00618)	(0.0293)	(0.00246)	(0.000181)	(0.0347)	(0.00307)	(0.000237)
Constant	0.255	0.627***	0.0325***	0.0671***	0.0610***	0.293***	-1.030*	0.141*	0.00898**	-0.526	0.130	0.00356
	(0.175)	(0.0400)	(0.00170)	(0.00498)	(0.0105)	(0.0441)	(0.561)	(0.0711)	(0.00398)	(0.448)	(0.0943)	(0.00414)
F-stat	298.2***	1352***	839.3***	2933***	1558***	958.3***	157.5***	9405***	2308***	687.12***	1356***	955.3***
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (1)	-3.602***	-1.981**	-3.680***	-3.410***	-2.051***	-4.000***	-3.193***	-1.873*	-3.280***	-3.046***	-1.872*	-4.102***
AR (2)	-1.075	0.0323	-0.928	-0.703	0.0766	-0.629	-1.443	-0.0577	-0.784	-1.176	0.0652	-0.197
Hansen J-Statistics	51.05	40.56	42.90	48.05	38.50	45.36	42.57	30.95	41.67	42.47	29.82	37.67

Notes: The table reports two-step system GMM regressions. Arellano–Bond test for AR (2) is used to look for possible autocorrelation issues. The Hansen test is used to look for possible over-identification restrictions in the model. Robust standard errors are in parentheses below the coefficients. All columns include the bank, country, and year effects but are not reported here. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. N observations= 439.

of the institutional setting. Similarly, further research may focus on unlisted banks, which are less exposed to reputational risks and, generally, have fewer human and financial resources to invest in environmental actions. However, the analysis of unlisted banks comes up against the availability of data on greenwashing. It would also be beneficial to extend the analysis over a longer time frame, as some green activities may take many years to be fully implemented and the returns might occur over an extended period. Future research could also go further, focusing for instance on the qualitative analysis of the motivations behind the gap between symbolic and substantive activities or on the impact played by other forms of diversity, such as those by age, nationality and the skills of board members. The extension of greenwashing to the social and governance dimensions – not considered in our study – would also be an interesting and relevant direction for future research, also in light of the emerging regulatory and policy-making orientations.

CRediT authorship contribution statement

Birindelli Giuliana: Conceptualization, Investigation, Supervision, Validation, Writing – original draft, Writing – review & editing. **Chiappini Helen:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing. **Jalal Raja Nabeel-Ud-Din:** Formal analysis, Investigation, Methodology, Software, Validation, Writing – original draft.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

Appendix 1. Sample

Country Name	Number of Banks	Percentage
Austria	3	3.9
Czech Republic	1	1.3
Denmark	4	5.2
France	1	1.3
Germany	3	3.9
Greece	7	9.1
Ireland	1	1.3
Italy	15	19.5
Netherlands	1	1.3
Norway	4	5.2
Poland	8	10.4
Spain	6	7.8
Sweden	5	6.5
Switzerland	7	9.1
United Kingdom	11	14.3
Total	77	100.0

References

Abad, D., Lucas-Pérez, M.E., Minguez-Vera, A., Yagüe, J., 2017. Does gender diversity on corporate boards reduce information asymmetry in equity markets? BRQ Bus. Res. Q. 20 (3), 192–205. https://doi.org/10.1016/j.brq.2017.04.001.

Allison, P.D., 1999. Multicollinearity. Logist. Regres. Using SAS Syst.: Theory Appl. 48–51.

Amin, M.H., Ali, H., Mohamed, E.K.A., 2022. Corporate social responsibility disclosure on Twitter: Signalling or greenwashing? Evidence from the UK. Int. J. Financ. Econ. 1–17. https://doi.org/10.1002/ijfe.2762.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev. Econ. Stud. 58 (2), 277–297. https://doi.org/10.2307/2297968.

Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. J. Personal. Soc. Psychol. 51 (6), 1173. https://doi.org/10.1007/s10551-015-2816-9.

Berrone, P., Fosfuri, A., Gelabert, L., 2017. Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy. J. Bus. Ethics 144, 363–379. https://doi.org/10.1007/s10551-015-2816-9.

Birindelli, G., Chiappini, H., Savioli, M., 2020. When do women on board of directors reduce bank risk? Corp. Gov.: Int. J. Bus. Soc. https://doi.org/10.1108/CG-03-2020-0089.

Blau, P.M., 1977. Inequality and heterogeneity: A primitive theory of social structure. The Free Press,, New York, NY.

Boeker, W., 1997. Strategic change: The influence of managerial characteristics and organizational growth. Acad. Manag. J. 40, 152–170. https://doi.org/10.5465/257024.

Byron, K., Post, C., 2016. Women on boards of directors and corporate social performance: A meta-analysis. Corp. Gov.: Int. Rev. 24 (4), 428–442. https://doi.org/10.1111/corg.12165.
Cardillo, G., Onali, E., Torluccio, G., 2021. Does gender diversity on banks' boards matter? Evidence from public bailouts. J. Corp. Financ. 71, 101560 https://doi.org/10.1016/j.jcorpfin.2020.101560.
Chen, P., Dagestani, A.A., 2023. Greenwashing behavior and firm value–From the perspective of board characteristics. Corp. Soc. Responsib. Environ. Manag. https://doi.org/10.1002/csr.2488.
Chen, Z., Keefe, M.O.C., 2020. Rookie directors and firm performance: Evidence from China. J. Corp. Financ. 60, 101511 https://doi.org/10.1016/j.jcorpfin.2019.101511.
Ciocirlan, C., Pettersson, C., 2012. Does workforce diversity matter in the fight against climate change? An analysis of Fortune 500 companies. Corp. Soc. Responsib. Environ. Manag. 19 (1), 47–62. https://doi.org/10.1002/csr.279.
Clarkson, P.M., Li, Y., Richardson, G.D., Vasvari, F.P., 2008. Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. Accounting. Organ. Soc. 33 (4–5), 303–327. https://doi.org/10.1016/j.jclepro.2016.03.039.
Dainelli, F., Bini, L., Giunta, F., 2013. Signaling strategies in annual reports: Evidence from the disclosure of performance indicators. Adv. Account. 29 (2), 267–277. https://doi.org/10.1016/j.adiac.2013.09.003.
Darendeli, A., Law, K.K., Shen, M., 2022. Green new hiring. Rev. Account. Stud. 27 (3), 986–1037. https://doi.org/10.1007/s11142-022-09696-y.
De Andres, P., Vallelado, E., 2008. Corporate governance in banking: The role of the board of directors. J. Bank. Financ. 32 (12), 2570–2580. https://doi.org/10.1016/j.jbankfin.2008.05.008.
De Freitas Netto, S.V., Sobral, M.F.F., Ribeiro, A.R.B., Soares, G.R.D.L., 2020. Concepts and forms of greenwashing: A systematic review. Environ. Sci. Eur. 32 (1), 1–12. https://doi.org/10.1186/s12302-020-0300-3.
Delmas, M.A., Burbano, V.C., 2011. The drivers of greenwashing. Calif. Manag. Rev. 54 (1), 64–87. https://doi.org/10.1525/cmr.2011.54.1.64.
Du, X., 2015. How the market values greenwashing? Evidence from China. J. Bus. Ethics 128 (3), 547–574. https://doi.org/10.1007/s10551-014-2122-y.
Du, X., Jian, W., Zeng, Q., Chang, Y., 2018. Do auditors applaud corporate environmental performance? Evidence from China. J. Bus. Ethics 151, 1049–1080. https://doi.org/10.1007/s10551-016-3223-6.
Du, X., Zeng, Q., Zhang, Y., 2021. Talk the talk, but walk the walk: what do we know about marital demography and corporate greenwashing? J. Manag. Organ. 1–42. https://doi.org/10.1017/jmo.2021.12.
Duru, A., Iyengar, R.J., Zampelli, E.M., 2016. The dynamic relationship between CEO duality and firm performance: The moderating role of board independence. J. Bus. Res. 69 (10), 4269–4277. https://doi.org/10.1016/j.jbusres.2016.04.001.
Eliwa, Y., Aboud, A., Saleh, A., 2023. Board gender diversity and ESG decoupling: Does religiosity matter? Bus. Strategy Environ. https://doi.org/10.1002/bse.3353.
ESAs, 2022. ESAs Call for evidence on better understanding greenwashing. European Banking Authority, European Insurance and Occupational Pensions Authority and European Securities and Market Authority. https://www.esma.europa.eu/press-news/esma-news/esas-launch-joint- call-evidence-greenwashing.
European Commission., 2021. Proposal for a Regulation of the European Parliament and of the Council on European green bonds. ⟨https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0391⟩.
European Commission., 2023. Proposal for a directive of the European Parliament and of the Council on substantiation and communication of explicit environmental claims (Green Claims Directive). ⟨https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A0166%3AFIN⟩.
European Securities and Markets Authority (ESMA). 2023. Progress Report on Greenwashing Response to the European Commission's request for input on "greenwashing risks and the supervision of sustainable finance policies". ESMA30–1668416927-2498. ⟨https://www.esma.europa.eu/sites/default/files/2023–06/ESMA30–1668416927-2498_Progress_Report_ESMA_response_to_COM_RfI_on_greenwashing_risks.pdf⟩.
European Union., 2019. Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector. Official Journal of the European Union, 1–114.
European Union., 2020. Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 (Text with EEA relevance). ⟨https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32020R0852⟩.
European Union., 2022. Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (Text with EEA relevance), Official Journal of the European Union. ⟨https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464⟩.
Farag, H., Mallin, C., 2017. Board diversity and financial fragility: Evidence from European banks. International Review of Financial. Analysis 49, 98–112.
Farooq, M.U., Su, K., Boubaker, S., Gull, A.A., 2022. Does gender promote ethical and risk-averse behavior among CEOs? An illustration through related-party transactions. Financ. Res. Lett. 47, 102730 https://doi.org/10.1016/j.frl.2022.102730.
Ferrón-Vílchez, V., Valero-Gil, J., Suárez-Perales, I., 2021. How does greenwashing influence managers' decision-making? An experimental approach under stakeholder view. Corp. Soc. Responsib. Environ. Manag. 28 (2), 860–880. https://doi.org/10.1002/csr.2095.
Frijns, B., Dodd, O., Cimerova, H., 2016. The impact of cultural diversity in corporate boards on firm performance. J. Corp. Financ. 41, 521–541. https://doi.org/10.1016/j.jcorpfin.2016.07.014.
Gallego-Sosa, C., Fernández-Torres, Y., Gutiérrez-Fernández, M., 2020. Does Gender Diversity Affect the Environmental Performance of Banks? Sustainability 12 (23), 10172. https://doi.org/10.3390/su122310172.
Galletta, S., Mazzù, S., Naciti, V., 2022a. A bibliometric analysis of ESG performance in the banking industry: From the current status to future directions. Res. Int. Bus. Financ. 62, 101684.
Galletta, S., Mazzù, S., Naciti, V., Vermiglio, C., 2022b. Gender diversity and sustainability performance in the banking industry. Corp. Soc. Responsib. Environ. Manag. 29 (1), 161–174. https://doi.org/10.1002/csr.2191.
García-Sánchez, I.M., Martínez-Ferrero, J., García-Meca, E., 2018. Board of directors and CSR in banking: the moderating role of bank regulation and investor protection strength. Australian. Account. Rev. 28 (3), 428–445. https://doi.org/10.1111/auar.1219.
Gatti, L., Seele, P., Rademacher, L., 2019. Grey zone in–greenwash out. A review of greenwashing research and implications for the voluntary-mandatory transition of CSR. Int. J. Corp. Soc. Responsib. 4 (1), 1–15. https://doi.org/10.1186/s40991-019-0044-9.
Glass, C., Cook, A., Ingersoll, A.R., 2016. Do women leaders promote sustainability? Analyzing the effect of corporate governance composition on environmental performance. Bus. Strategy Environ. 25 (7), 495–511. https://doi.org/10.1002/bse.1879.
Gul, F.A., Srinidhi, B., Ng, A.C., 2011. Does board gender diversity improve the informativeness of stock prices? J. Account. Econ. 51 (3), 314–338. https://doi.org/10.1016/j.jacceco.2011.01.005.
Gull, A.A., Atif, M., Hussain, N., 2023. Board gender composition and waste management: Cross-country evidence. Br. Account. Rev. 55 (1), 101097 https://doi.org/10.1016/j.bar.2022.101097.
Guo, R., Tao, L., Yan, L., Gao, P., 2014. The effect path of greenwashing brand trust in Chinese microbiological industry from decoupling view. Indian J. 10 (7), 1827–1831.
Hambrick, D.C., 2007. Upper echelons theory: An update. Acad. Manag. Rev. 32 (2), 334–343. https://doi.org/10.5465/amr.2007.24345254.
Hambrick, D.C., Mason, P.A., 1984. Upper echelons: The organization as a reflection of its top managers. Acad. Manag. Rev. 9 (2), 193–206. https://doi.org/10.5465/amr.1984.4277628.
Hansen, L.P., 1982. Large sample properties of generalized method of moments estimators. Econometrica 50, 1029–1054. https://doi.org/10.2307/1912775.
Harakeh, M., Leventis, S., El Masri, T., Tsileponis, N., 2022. The moderating role of board gender diversity on the relationship between firm opacity and stock returns. Br. Account. Rev., 101145 https://doi.org/10.1016/j.bar.2022.101145.
Hausman, J.A., 1978. Specification tests in econometrics. Économ.: J. Econom. Soc. 1251–1271. https://doi.org/10.2307/1913827.
Hu, X., Hua, R., Liu, Q., Wang, C., 2023. The green fog: Environmental rating disagreement and corporate greenwashing. Pac. -Basin Financ. J. 78, 101952 https://doi.org/10.1016/j.pacfin.2023.101952.

Joecks, J., Pull, K., Vetter, K., 2013. Gender diversity in the boardroom and firm performance: What exactly constitutes a “critical mass?”. J. Bus. Ethics 118, 61–72. https://doi.org/10.1007/s10551-012-1553-6.
Kahloul, I., Sbai, H., Grira, J., 2022. Does Corporate Social Responsibility reporting improve financial performance? The moderating role of board diversity and gender composition. Q. Rev. Econ. Financ. 84, 305–314. https://doi.org/10.1016/j.qref.2022.03.001.
Kanter, R., 1977. Some effects of proportions on group life: Skewed sex ratios and responses to token women. Am. J. Sociol. 82 (5), 965–990. https://doi.org/10.1086/226425.
Kassinis, G.I., Kay, A.A., Papagiannakis, G., Vlachos, P.A., 2022. Stigma as moral insurance: How stigma buffers firms from the market consequences of greenwashing. J. Manag. Stud. 59 (8), 2154–2190. https://doi.org/10.1111/joms.12873.
Kassinis, G., Panayiotou, A., Dimou, A., Katsifaraki, G., 2016. Gender and environmental sustainability: A longitudinal analysis. Corp. Soc. Responsib. Environ. Manag. 23 (6), 399–412. https://doi.org/10.1002/csr.1386.
Kim, E.H., Lyon, T.P., 2015. Greenwash vs. brownwash: Exaggeration and undue modesty in corporate sustainability disclosure. Organ. Sci. 26 (3), 705–723. https://doi.org/10.1287/orsc.2014.0949.
Kim, S., 2019. The process model of corporate social responsibility (CSR) communication: CSR communication and its relationship with consumers’ CSR knowledge, trust, and corporate reputation perception. J. Bus. Ethics 154 (4), 1143–1159. https://doi.org/10.1007/s10551-017-3433-6.
Konrad, A.M., Kramer, V., Erkut, S., 2008. The impact of three or more women on corporate boards. Organ. Dyn. 37 (2), 145–164. https://doi.org/10.1016/j.orgdyn.2008.02.005.
Kramer, V.W., Konrad, A.M., Erkut, S., Hooper, M.J., 2006. Critical mass on corporate boards: Why three or more women enhance governance (pp. 2–4). Wellesley, MA: Wellesley Centers for Women.
Lee, M.T., Raschke, R.L., 2023. Stakeholder legitimacy in firm greening and financial performance: What about greenwashing temptations? J. Bus. Res. 155, 113393 https://doi.org/10.1016/j.jbusres.2022.113393.
Leonidou, C.N., Skarmeas, D., 2017. Gray shades of green: Causes and consequences of green skepticism. J. Bus. Ethics 144, 401–415. https://doi.org/10.1007/s10551-015-2829-4.
Li, J., Zhao, F., Chen, S., Jiang, W., Liu, T., Shi, S., 2017. Environmental policy gender diversity on boards and firms’ environmental policy. Bus. Strategy Environ. 26 (3), 306–315. https://doi.org/10.1002/bse.1918.
Li, W., Li, W., Seppänen, V., Koivumäki, T., 2023. Effects of greenwashing on financial performance: Moderation through local environmental regulation and media coverage. Bus. Strategy Environ. ⟨https://doi.org/10.1002/bse.31777⟩.
Li, Y., de Villiers, C., Li, L.Z., Li, L., 2022. The moderating effect of board gender diversity on the relation between corporate social responsibility and firm value. J. Manag. Control 33 (1), 109–143. https://doi.org/10.1007/s00187-022-00334-x.
Liang, Q., Xu, P., Jiraporn, P., 2013. Board characteristics and Chinese bank performance. J. Bank. Financ. 37 (8), 2953–2968. https://doi.org/10.1016/j.jbankfin.2013.04.018.
Lyon, T.P., Lu, Y., Shi, X., Yin, Q., 2013. How do investors respond to Green Company Awards in China? Ecol. Econ. 94, 1–8. https://doi.org/10.1016/j.ecolecon.2013.06.020.
Lyon, T.P., Maxwell, J.W., 2011. Greenwash: Corporate Environmenttal disclosure under threat of audit. J. Econ. Manag. Strategy 20 (1), 3–41. https://doi.org/10.1111/j.1530-9134.2010.00282.x.
Lyon, T.P., Montgomery, A.W., 2015. The means and end of greenwash. Organ. Environ. 28 (2), 223–249. https://doi.org/10.1177/1086026615575332.
Malkiel, B.G., 2005. Reflections on the efficient market hypothesis: 30 years later. Financ. Rev. 40 (1), 1–9. https://doi.org/10.1111/j.0732-8516.2005.00090.x.
Marquis, C., Toffel, M.W., Zhou, Y., 2016. Scrutiny, norms, and selective disclosure: A global study of greenwashing. Organ. Sci. 27 (2), 483–504. https://doi.org/10.1287/orsc.2015.1039.
Matsa, D.A., Miller, A.R., 2013. A female style in corporate leadership? Evidence from quotas. Am. Econ. J. 5 (3), 136–169. ⟨https://www.jstor.org/stable/43189445⟩.
Menicucci, E., Paolucci, G., 2023. ESG dimensions and bank performance: An empirical investigation in Italy. Corp. Gov.: Int. J. Bus. Soc. 23 (3), 563–586. https://doi.org/10.1108/CG-03-2022-0094.
Montero-Navarro, A., González-Torres, T., Rodríguez-Sánchez, J.L., Gallego-Losada, R., 2021. A bibliometric analysis of greenwashing research: a closer look at agriculture, food industry and food retail. Br. Food J. 123 (13), 547–560. https://doi.org/10.1108/BFJ-06-2021-0708.
Montgomery, A.W., Lyon, T.P., Barg, J., 2023. No End in Sight? A Greenwash Review and Research Agenda, 10860266231168905 Organ. Environ.. https://doi.org/10.1177/10860266231168905.
Nizam, E., Ng, A., Dewandaru, G., Nagayev, R., Nkoba, M.A., 2019. The impact of social and environmental sustainability on financial performance: A global analysis of the banking sector. J. Multinatl. Financ. Manag. 49, 35–53. https://doi.org/10.1016/j.mulfin.2019.01.002.
Owen, A.L., Temesvary, J., 2018. The performance effects of gender diversity on bank boards. J. Bank. Financ. 90, 50–63.
Parguel, B., Benoît-Moreau, F., Larceneux, F., 2011. How sustainability ratings might deter ‘greenwashing’: A closer look at ethical corporate communication. J. Bus. Ethics 102, 15–28. https://doi.org/10.1007/s10551-011-0901-2.
Parguel, B., Benoit-Moreau, F., Russell, C.A., 2015. Can evoking nature in advertising mislead consumers? The power of ‘executional greenwashing. Int. J. Advert. 34 (1), 107–134. https://doi.org/10.1080/02650487.2014.996116.
Pathan, S., Faff, R., 2013. Does board structure in banks really affect their performance? J. Bank. Financ. 37 (5), 1573–1589. https://doi.org/10.1016/j.jbankfin.2012.12.016.
Pekovic, S., Vogt, S., 2021. The fit between corporate social responsibility and corporate governance: the impact on a firm’s financial performance. Rev. Manag. Sci. 15, 1095–1125. https://doi.org/10.1007/s11846-020-00389-x.
Proença, C., Augusto, M., Murteira, J., 2020. Political connections and banking performance: the moderating effect of gender diversity. Corp. Gov.: Int. J. Bus. Soc. 20 (6), 1001–1028. https://doi.org/10.1108/CG-01-2020-0018.
Roodman, D., 2009. How to do xtabond2: An introduction to difference and system GMM in Stata. Stata J. 9 (1), 86–136. https://doi.org/10.1177/1536867×0900900106.
Santos, C., Coelho, A., Marques, A., 2023. A systematic literature review on greenwashing and its relationship to stakeholders: state of art and future research agenda. Manag. Rev. Q. 1–25. https://doi.org/10.1007/s11301-023-00337-5.
Schons, L., Steinmeier, M., 2016. Walk the talk? How symbolic and substantive CSR actions affect firm performance depending on stakeholder proximity. Corp. Soc. Responsib. Environ. Manag. 23 (6), 358–372. https://doi.org/10.1002/csr.1381.
Shankar, N., Francis, B.B., 2023. CEO inside-debt compensation and strategic emphasis. Mark. Lett. 1–15. https://doi.org/10.1007/s11002-023-09673-8.
Shakil, M.H., Tasnia, M., Mostafiz, M.I., 2021. Board gender diversity and environmental, social and governance performance of US banks: Moderating role of environmental, social, and corporate governance controversies. Int. J. Bank Mark. 39 (4), 661–677. https://doi.org/10.1108/IJBM-04-2020-0210.
Siueia, T.T., Wang, J., Deladem, T.G., 2019. Corporate Social Responsibility and financial performance: A comparative study in the Sub-Saharan Africa banking sector. J. Clean. Prod. 226, 658–668.
Suchman, M.C., 1995. Managing legitimacy: Strategic and institutional approaches. Acad. Manag. Rev. 20 (3), 571–610. https://doi.org/10.5465/amr.1995.9508080331.
Talpur, S., Nadeem, M., Roberts, H., 2023. Corporate social responsibility decoupling: a systematic literature review and future research agenda. J. Appl. Account. Res. https://doi.org/10.1108/JAAR-08-2022-0223.
Testa, F., Miroshnychenko, I., Barontini, R., Frey, M., 2018. Does it pay to be a greenwasher or a brownwasher? Bus. Strat Env 27, 1104–1116. https://doi.org/10.1002/bse.2058.
Usman, M., Farooq, M.U., Zhang, J., Makki, M.A.M., Khan, M.K., 2019. Female directors and the cost of debt: does gender diversity in the boardroom matter to lenders? Manag. Audit. J. https://doi.org/10.1108/MAJ-04-2018-1863.
Venturelli, V., Pedrazzoli, A., Pennetta, D., Gualandri, E., 2024. Pinkwashing in the banking industry: The relevance of board characteristics. Res. Int. Bus. Financ. 67, 102111.

Walker, K., Wan, F., 2012. The harm of symbolic actions and greenwashing: Corporate actions and communications on environmental performance and their financial implications. J. Bus. Ethics 109 (2), 227–242. https://doi.org/10.1007/s10551-011-1122-4.

Wintoki, M.B., Linck, J.S., Netter, J.M., 2012. Endogeneity and the dynamics of internal corporate governance. J. Financ. Econ. 105 (3), 581–606. https://doi.org/10.1016/j.ujfineco.2012.03.005.

Wu, M.W., Shen, C.H., 2013. Corporate social responsibility in the banking industry: Motives and financial performance. J. Bank. Financ. 37 (9), 3529–3547. https://doi.org/10.1016/j.jbankfin.2013.04.023.

Yang, Z., Nguyen, T.T.H., Nguyen, H.N., Nguyen, T.T.N., Cao, T.T., 2020. Greenwashing behaviours: Causes, taxonomy and consequences based on a systematic literature review. J. Bus. Econ. Manag. 21 (5), 1486–1507. https://doi.org/10.3846/jbem.2020.13225.

Yu, E.P.Y., Van Luu, B., Chen, C.H., 2020. Greenwashing in environmental, social and governance disclosures. Res. Int. Bus. Financ. 52, 101192 https://doi.org/10.1016/j.ribaf.2020.101192.

Zhang, D., 2022a. Environmental regulation and firm product quality improvement: How does the greenwashing response? Int. Rev. Financ. Anal. 80, 102058 https://doi.org/10.1016/j.irfa.2022.102058.

Zhang, D., 2022a. Environmental regulation, green innovation, and export product quality: What is the role of greenwashing? Int. Rev. Financ. Anal. 83, 102311 https://doi.org/10.1016/j.irfa.2022.102311.

Zhang, D., 2022b. Are firms motivated to greenwash by financial constraints? Evidence from global firms' data. J. Int. Financ. Manag. Account. 33 (3), 459–479. https://doi.org/10.1111/jifm.12153.

Zhang, X., Li, F., Ortiz, J., 2021. Internal risk governance and external capital regulation affecting bank risk-taking and performance: Evidence from PR China. Int. Rev. Econ. Financ. 74, 276–292. https://doi.org/10.1016/j.iref.2021.03.008.