

# Board gender equality and ESG performance. Evidence from European banking sector

Elisa Menicucci and Guido Paolucci

## Abstract

**Purpose** – *The purpose of this paper is to investigate the relationship between board gender equality and environmental, social and governance (ESG) performance in the European banking sector. The study examines whether and how the presence of women on the board of directors (BoD) influences ESG dimensions.*

**Design/methodology/approach** – *The authors analyzed a sample of 72 European Union banks for the period 2015–2021 and developed an econometric model applying unbalanced panel data regression with firm fixed effects and controls per year. To test the research hypotheses, the authors considered gender equality in terms of female participation on the BoD and measured ESG dimensions by using the ESG score provided by Refinitiv.*

**Findings** – *The findings suggest a significant positive relationship between the number of women on BoD and the ESG performance of European banks only up to a certain threshold of female directors (at least three women). The study also explores how the proportion of women on BoD influences the individual ESG pillars. The results show that the percentage of female directors has a positive and statistically significant impact on the social dimension of the ESG framework.*

**Research limitations/implications** – *The investigation is highly relevant to investors considering ESG issues in their decision-making process. The overall findings support policymakers and regulators on how to improve ESG performance through the design and the application of corporate governance (CG) mechanisms. From a managerial perspective, the study suggests that managers and CEOs should focus their efforts on establishing the right gender combination of directors on bank BoDs.*

**Originality/value** – *This paper offers an in-depth examination of the CG practices of banks, and it attempts to bridge the gap in prior literature on the determinants of ESG issues in the European banking industry. To the best of the authors' knowledge, this study is the first that investigates the relationship between the representation of women on BoDs and the ESG dimensions measured by the Refinitiv Eikon score. The use of critical mass theory adds a fresh perspective to the literature on ESG in Europe since the influence of board gender diversity on ESG performance of the European banks is still unaccounted for. This study addresses this pressing research issue drawing on resource dependence, agency and legitimacy theories.*

**Keywords** *Board of directors, ESG performance, Gender equality, Corporate governance, European banking sector*

**Paper type** *Research paper*

Elisa Menicucci is based at the Department of Business Studies, Roma Tre University, Rome, Italy. Guido Paolucci is based at the Department of Management, Polytechnic University of Marche, Ancona, Italy.

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## 1. Introduction

In recent years, financial markets and public authorities showed an increasing attention for sustainable finance and environmental, social and governance (ESG) performance has progressively become a relevant topic for financial institutions and banks. ESG issues are not just an ethical concern, but they will soon enough turn into an economic question since they have a direct and deep influence on financial stability in the economy (Adams and Ferreira, 2009; Ferrero-Ferrero *et al.*, 2015; Jitmaneeroj, 2016; Buallay, 2019). ESG dimensions are

essential components of corporate sustainability, and they are increasingly incorporated in banking strategies and business models. Effective strategic decisions injecting resources and capital to improve the commitments to ESG help banks to achieve a sound financial position and to upsurge customer loyalty (Arlı and Lasmono, 2010; Shakil *et al.*, 2019; Buallay *et al.*, 2021). The evolution of the banking environment requires management to implement business models that are consistent with economic and management principles as well as compatible with social and environmental sustainability risks [European Banking Authority (EBA), 2019; European Banking Authority (EBA), 2020a; European Banking Authority (EBA), 2020b].

One of the main aspects of the corporate governance (CG) system is the board of directors (BoD) (de Andres and Vallelado, 2008) because its task is to ensure the joining between the business and the external environment (Carter *et al.*, 2010). Directors are responsible for placing an emphasis on business ethics and corporate responsibility, improving corporate culture and overseeing the achievement of strategic goals (Aguilera *et al.*, 2006; Jo and Harjoto, 2011; Rao and Tilt, 2016a; Villanueva-Villar *et al.*, 2016; Mohammadi *et al.*, 2021). In this regard, the BoD plays a central role in integrating sustainability into the business strategy and in aligning the interests of the bank and the shareholders toward ESG goals (de Andres and Vallelado, 2008; Birindelli *et al.*, 2018; De Haan and Vlahu, 2016). Hence, the composition and the characteristics of the BoD are crucial in defining socially responsible behaviors and strategic decision-making concerning ESG dimensions (Forbes and Milliken, 1999; Post *et al.*, 2011, 2015; Michelin and Parbonetti, 2012; Setó-Pamies, 2015; Cuadrado-Ballesteros *et al.*, 2017). In particular, the influence of board gender equality on ESG performance of the European banks is still partly unaccounted for. Hence, this study aims to address the following research question:

*RQ1.* Does female participation on BoD influence the ESG performance of European banks?

Following a survey of the existing literature on the present phenomena, we also observed that only a limited number of studies in the banking setting have addressed the issue of board gender equality according to the theoretical underpinning of the critical mass theory, when the size of a minority group grows. Particularly, in the European banking industry, board diversity has not yet been inspected to verify how a critical mass of women on BoD affects ESG dimensions. Therefore, the paper pursues to fill this gap in the literature by testing how, if any, ESG performance is influenced by a threshold of female directors. Drawing on resource dependence, agency and legitimacy theories, the study addresses the challenging research question mentioned above and tests the Kanter's theory (Kanter, 1977) on the critical mass of women in BoD (Rossi *et al.*, 2017). Is there a case for critical mass of female directors in European banks? In doing so, this study extends the traditional research on CG and offers a preliminary snapshot of the potential relationship between board gender equality and ESG performance in 72 European Union (EU) banks, through a panel data regression analysis over a seven-year period. The observed sample includes 504 bank-year observations for the period 2015–2021. The methodology applied for the analysis is based on a multivariate panel data regression model. In this regard, we evaluated the impact of board gender equality on both the ESG framework and its individual pillars (environmental, social and governance) to reveal which dimensions of ESG performance receives more importance in the sample banks by using the ESG score provided by Refinitiv.

This study contributes to the literature of gender diversity (Cucari *et al.*, 2018; Manita *et al.*, 2018; Birindelli *et al.*, 2019; Arayssi *et al.*, 2020) and ESG performance in banking sector by demonstrating that the participation of women on the BoD positively affects the ESG performance of European banks. The positive relationship between gender diversity and ESG performance supports the resource dependence theory by exhibiting women's characteristics as critical resources for banks (Kyaw *et al.*, 2017) and the legitimacy theory due to female directors' sensitivity to environmental and social activities

(Aouadi and Marsat, 2018). This paper seeks to make the following contributions to the existing literature. First, to the best of our knowledge, current studies analyzing the relationship between CG variables and sustainability in banking sector are new but limited and mainly focused on the ESG disclosure (and not ESG performance) (Birindelli *et al.*, 2018; Shakil *et al.*, 2021; Gurol and Lagasio, 2022). Second, this study advances literature on ESG in the European banking sector (Perrini *et al.*, 2006) since our findings represent the first empirical evidence of the relationship between board gender equality and the ESG dimensions in such a context. In this regard, prior literature deals with board diversity rather than on the gender aspect of diversity in particular. Third, the paper investigates this topic applying the ESG score provided by Refinitiv Eikon database. Fourth, this study provides evidence for the critical mass theory concerning a certain threshold of female board members and its effect on ESG performance in European banks.

The remainder of the paper is organized as follows. Section 2 describes the background. Section 3 provides the literature review and the research hypotheses. Section 4 describes the source of data, the sample, the variables and the methodology used in estimating the econometric model. Section 5 presents the descriptive statistics and discusses regression results. Finally, Section 6 sets out the conclusions, limitations and implications of the study for future research.

## 2. Background

The promotion of equality between women and men in all its aspects (e.g. business, politics and society as a whole) ranks high on the political agenda in EU. Regulators and standard-setters in several European countries embrace favorable regulations to appoint a certain percentage of female members on BoDs. In this sense, various international organizations and institutions underlined gender diversity as part of the overall good governance of any institution. In this regard, gender inequality is visible at the level of both EU institutions and bodies and supervised banks whether small or large. In the specific context of economic, financial and monetary affairs, EU institutions recently agreed on a directive aimed at increasing the number of women on corporate boards by requiring Member States to ensure that companies listed on stock exchanges have at least 40% of the underrepresented gender among nonexecutive directors or 33% among all directors. On November 22, 2022, the European Parliament gave its final approval on the final text of the Directive on gender balance on corporate boards. The new EU rules, which will have to be transposed into national law, promote a more balanced gender representation on BoDs of listed companies throughout the EU. In particular, by July 2026, all big publicly listed companies in the EU will have to take measures to increase women's presence at their helm. In this context, the topic of gender equality is part of the overall CG of any institution, and it is a pressing issue of the debate on the complexity of governance principles for banks [European Banking Authority (EBA), 2020a; Ahmed *et al.*, 2006] since gender quotas on BoDs have expanded women's participation (female representation on boardrooms). Although the topic has gain increasing attention in recent years, there is a gap in the literature as scholars have devoted little attention to the investigation of both gender equality on BoD and ESG performance in the banking industry. Actually, gender equality in BoD is broadly studied in existing CG literature but previous researches mainly focused on the relationship between board gender diversity and bank performance (Pathan and Faff, 2013; Garcia-Meca *et al.*, 2015; Owen and Temesvary, 2018).

## 3. Literature review

### 3.1 Theoretical literature review

How the board structure affects the ESG performance has attracted the attention of researchers and practitioners (Velte, 2016; Elmghaamez *et al.*, 2023). In prior literature, this

topic has been discussed in depth and some studies adopted multiple theories and systematic reviews to frame this issue (Nguyen *et al.*, 2020; Alatawi *et al.*, 2023). Among these, academics proposed the resource dependence theory, the agency theory (Yoder, 1994; Shapiro, 2005; Davis and Cobb, 2010; Shahbaz *et al.*, 2020; Ullah *et al.*, 2020) and the legitimacy theory (Nguyen *et al.*, 2021; Number and Velte, 2021) around the role of female directors in enhancing the effectiveness of the BoD. Personal and professional skills of board members are essential for good governance practices regardless of whether they are men or women (Girardone *et al.*, 2021). However, it is argued that female directors are more sensitive toward sustainability initiatives (Birindelli *et al.*, 2018; Samara *et al.*, 2019) than men because of female psychological traits (i.e. helpfulness, sensitivity, kindness, cooperativeness, etc.), educational background and professional experience (Burgess and Tharenou, 2002; Kyaw *et al.*, 2017; Manita *et al.*, 2018; Hollindale *et al.*, 2019). Previous studies examined the effect of board gender diversity on ESG disclosure in both nonfinancial and financial firms as well as in developed and emerging countries. The evidence is mixed on this relationship: some studies demonstrated a positive impact of female directors (Setó-Pamies, 2015; Hollindale *et al.*, 2019; Arayssi *et al.*, 2020; Shakil *et al.*, 2019; Wasiuzzaman and Wan Mohammad, 2020; Wang *et al.*, 2021; Disli *et al.*, 2022; Pareek *et al.*, 2023), while other few studies stated a negative effect (Cucari *et al.*, 2018; Husted and de Sousa-Filho, 2019; Dang *et al.*, 2021) or no significant associations (Manita *et al.*, 2018, Nguyen *et al.*, 2021).

### 3.2 Empirical literature review and hypotheses development

*3.2.1 Board gender equality and ESG performance.* The BoD is a significant supplier of critical resources (Hillman and Dalziel, 2003) to take corporate strategic decisions and to steer pressures from stakeholders (Hillman and Dalziel, 2003; Post *et al.*, 2015). In line with the dependence resource theory, the firm performance depends on the critical characteristics of the directors, such as background, psychological characteristics, competencies, expertise and experience (Kyaw *et al.*, 2017; Manita *et al.*, 2018). In this regard, some explanations about the relationship between female directors and ESG activities depend on the various features of the women themselves (Nguyen *et al.*, 2015). According to Cordeiro *et al.* (2020), gender equality in the BoD allows for a greater source of new capital as well as a higher quality of resources and information due to the better interrelations of the female directors with the market and the competitors. In this sense, previous studies agreed that female directors help the company to secure critical resources because they have better networking characteristics than men (Bear *et al.*, 2010; Nadeem *et al.*, 2019; Pucheta-Martínez and Gallego-Álvarez, 2020). Women appear to be more responsive toward sustainability initiatives (Birindelli *et al.*, 2018; Samara *et al.*, 2019) than men because of female psychological traits (i.e. helpfulness, sensitivity, etc.), educational backgrounds, psychological characteristics and professional experience (Kyaw *et al.*, 2017; Manita *et al.*, 2018). Accordingly, resource dependence theory can explain the positive association between gender diversity and ESG performance since the critical resources of female board members help firms to be more engage in stakeholders' concerns regarding social and environmental issues (Nguyen *et al.*, 2015; Velte, 2016; Kyaw *et al.*, 2017, Elmagrhi *et al.*, 2019). For example, some authors highlighted that female directors provide the top management with a better understanding of the complexities of the organizational environment, generating beneficial effects on the strategic decisions and, as a consequence, on bank ESG performance (Dwyer *et al.*, 2003; De Luis-Carnicer *et al.*, 2008; Luanglath *et al.*, 2019; Valls Martínez *et al.*, 2019). In line with the agency theory, several studies (Adams and Ferreira, 2009; Moreno-Gómez *et al.*, 2018) focused on the effects that a greater percentage of female participation on BoD has on business decisions, showing that female managers have more empathy toward shareholders' interests and expectations (Birindelli *et al.*, 2018; Samara *et al.*, 2019). From an agency theory

perspective, women are considered more committed, more democratic and less self-oriented than men, enhancing higher levels of accountability and transparency about sustainable issues. Also, the legitimacy theory identifies board gender diversity as a positive factor promoting more ESG disclosure. In this perspective, female directors are more sensitive toward socially responsible practices reflecting stakeholders' legitimate interests (Hussain *et al.*, 2018; Arayssi *et al.*, 2020; Nicolò *et al.*, 2022). Legitimacy theory (Dowling and Pfeffer, 1975; Nguyen *et al.*, 2021; Number and Velte, 2021) asserts that the organizations are expected to fulfill society's desires, which may go beyond the contractual obligations. In line with this theory, intellectual and interpersonal attributes of female directors assist companies to achieve the legitimate performance in ESG (Jizi, 2017) due to women directors' sensitivity to environmental and social activities.

The literature on board gender diversity and ESG performance in banking sector is few (Cucari *et al.*, 2018; Shakil *et al.*, 2021) and little is known about how women on BoD affect ESG performance (Zhang *et al.*, 2013; Rao and Tilt, 2016b; Trireksani and Djajadikerta, 2016) in such a context. Some research (Hafsi and Turgut, 2013; Hollindale *et al.*, 2019; Rockey and Zakir, 2020; Atif *et al.*, 2021; Pareek *et al.*, 2023; Wang *et al.*, 2021) demonstrated a favorable relationship between the proportion of female directors and ESG disclosure, while others show a negative correlation (Dang *et al.*, 2021; Nguyen *et al.*, 2021). For example, Girardone *et al.* (2021) postulated that board gender diversity is an important aspect of the ESG framework in creating long-term values for a firm. Similarly, Mc Guinness *et al.* (2017) and Disli *et al.* (2022) proved that the presence of female directors fosters CSR performance while the empirical findings of Pareek *et al.* (2023) showed a positive and significant relationship between women on BoD and sustainability performance. On the contrary, Manita *et al.* (2018) and Lafuente and Vaillant (2019) attested no significant relations between board gender diversity and ESG disclosure. Otherwise Birindelli *et al.* (2018) demonstrated that the relationship between women's ratio on BoD and bank's ESG disclosure is an inverted U-shaped. Besides, some researchers investigated the effect of gender mix in the bank boardroom on ESG performance and found both a positive and a negative impact (Cucari *et al.*, 2018; Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020; Wasiuzzaman and Wan Mohammad, 2020).

Although prior literature on board gender diversity and ESG performance in the context of banks is limited and the empirical results are varied, our research expectations are positive in line with the view of the resource dependence theory. Hence, we assume that board gender equality has a significant positive effect on ESG performance of banks because women on BoD can carry their sensitivity on environmental and social issues to bank management. The following hypotheses are formulated:

- H1.* There is a positive relationship between the proportion of women on BoD and ESG performance.
- H1a.* There is a positive relationship between the proportion of women on BoD and environmental performance.
- H1b.* There is a positive relationship between the proportion of women on BoD and social performance.
- H1c.* There is a positive relationship between the proportion of women on BoD and governance performance.

**3.2.2 Critical mass of women and ESG performance.** In this study, we also regarded the theoretical underpinnings of the critical mass theory (Kanter, 1977) to assess the effects of board gender equality on ESG performance. Following a survey of the existing literature on this topic, we observed a gap in the extant research because few studies have empirically investigated the relationship between female directors on BoD and sustainability performance using the theoretical framework of the critical mass theory in Europe (Kanter, 1977; Pareek *et al.*, 2023; Saggur *et al.*, 2021; Menicucci and Paolucci, 2022a, 2022b). In

this regard, prior studies found conflicting results because of the presence of a nonlinear relationship between board gender diversity and sustainability performance. For example, [Kiliç et al. \(2015\)](#) and [Glass et al. \(2016\)](#) identified a weak statistically significant positive effect of female directors on sustainability practices, [Deschênes et al. \(2015\)](#) verified a negative relationship between the aforementioned variables, while [Khan \(2010\)](#) and [Alazzani et al. \(2017\)](#) found no significant association.

According to the critical mass theory, when the size of a minority group reaches a threshold (at least three) or a critical mass, the interactions and the activities among the members of a group grow ([Kanter, 1977](#)). To test this theory in a more general proposal, we look for a nonlinear U-shaped relationship between gender equality and ESG performance. Based on the critical mass theory, board gender equality positively influences the bank's social and environmental initiatives only when at least a significant threshold (a critical mass) of women in a BoD is reached. In line with this assumption, previous research findings ([Bear et al., 2010](#); [Post et al., 2011](#)) stated that a critical mass of female directors leads to better CSR and environmental performance. For example, [Cabeza-García et al. \(2017\)](#) found that a number of at least three female directors increases CSR disclosure. [Yarram and Adapa \(2021\)](#) examined the impact of a critical mass of women in Australian BoDs on corporate social performance and they observed a significant positive correlation between the two factors. According to this evidence, [Manita et al. \(2018\)](#) showed that the relationship between board gender diversity and ESG disclosure is not statistically significant below the level of three female directors. However, [Birindelli et al. \(2018\)](#) found no positive correlation between the sustainability practices of US banks and the number of women directors, even after a critical mass is achieved for female directors. There has been a tendency in the top management to appoint female directors under regulatory pressure, which serves as a mere token. Nevertheless, the presence of women on BoDs should not be viewed as a mere symbolic gesture because the club initiative for a critical mass of female board participation is widely accepted to be closely related to an organization's socially responsible behavior ([Yarram and Adapa, 2021](#)). According to the critical mass theory, we hypothesize that the presence of a certain threshold (at least three) of women on BoD can shape a firm's sensitivity toward ESG issues. Hence, we propose the following hypotheses:

- H2.* There is a positive relationship between a critical mass of women on BoD and ESG performance.
- H2a.* There is a positive relationship between a critical mass of women on BoD and environmental performance.
- H2b.* There is a positive relationship between a critical mass of women on BoD and social performance.
- H2c.* There is a positive relationship between a critical mass of women on BoD and governance performance.

To get some perspectives on the predictions and on the hypotheses underlying our analysis, refer to the theoretical framework portrayed in [Figure 2](#).

## 4. Research design

### 4.1 Sample selection and data sources

This paper investigates in depth the relationship between board gender equality and ESG dimensions in the European context. The Economic Governance Support Unit (EGOV) analyzed available information on the CG structures of the European banks supervised by the European Central Bank (ECB) to determine the gender balance on the BoDs. To shed more light on this issue, we examined publicly available information on the CG structures of the largest ("significant institutions" according to EGOV) banks headquartered in the Euro-area under the direct watch of the ECB, as regularly disclosed in the bank's annual reports.



We measured the number of women sitting on the bank's BoD and we determined the share of female directors; for this purpose and based on the empirical data available, we considered female to be the underrepresented gender. Our initial data set of banks have to fulfill the following assumptions. The analysis refers to the population of the significant banks that were directly supervised by the ECB as individual entities during the period 2015–2021, and for which data on the composition of their BoDs is publicly available. The sample consists of 72 significant European banks that are all active and geographically localized in EU according to the EBA benchmark report updated to December 31, 2021 (see [Appendix Table A1](#)). This data set offers three key advantages for the investigation of the relationship between board diversity and ESG dimensions in the banking sector. First, our sample is large and homogeneous as the selected banks carry out similar activities, within the same European regulatory environment and under the same supervision of the ECB. Second, the sample consists of significant banks predominantly involved in corporate, investment and commercial banking activities with similar funding opportunities. Third, all banks have a large and complex management structure, and they are characterized by similar business models.

These following criteria were respected when collecting the banks for the analysis:

- are European Union banks (either private or state-owned);
- are significant institutions according to EGOV;
- are organized as joint-stock companies;
- are active during the period 2015–2021;
- have not been turned off or merged with other banks during the research period; and
- are kept in the sample as long as their LEI code remained the same although their names slightly changed in the period 2015–2021.

The data on board gender composition was primarily retrieved from the annual financial statements of each bank; differently, we used other publicly available secondary sources, such as the information on the bank's websites if the annual financial statements did not disclose the required information. Board CG structures differ across the European Member States; banks in some countries have one-tier BoDs, while others have two-tier ones. The former type of BoD comprises both executive and nonexecutive (supervisory) directors, while the latter type formally separates between the different roles. One-tier BoDs are common in Belgium, Ireland, Greece, Spain, Cyprus, Malta and Portugal. Two-tier BoDs, on the other hand, are common (or mandatory) in Germany, Estonia, Italy, Latvia, The Netherlands, Austria and Slovenia. In Luxembourg, Finland and France, banks can either have one- or two-tier BoDs.

The data on ESG performance were collected from Refinitiv database as it is a trusted international data source that comprises one of the most complete ESG data, counting more than 450 different ESG metrics that are historically available. This databank has a strong and transparent procedure for ESG data available on its official website and it is frequently used by researchers in studies concerning the banking sector ([Esteban-Sanchez et al., 2017](#); [Helfaya and Moussa, 2017](#); [Birindelli et al., 2019](#); [Gangi et al., 2019](#); [Miralles-Quirós et al., 2019](#); [Shakil et al., 2019](#); [Bătae et al., 2021](#)). From data availability, the final sample to be examined consists of 504 bank-year observations from 2015 to 2021, resulting in an unbalanced panel data set.

## 4.2 Dependent variable

Based on previous literature, this study applies ESG score by Refinitiv ESG data ([Arayssi et al., 2020](#)) as a proxy for the ESG performance of banks. Since a big chunk of empirical research has investigated solely the composite ESG score ([Bravo and Reguera-Alvarado, 2019](#);

Chams and García-Blandóm, 2019; Shahbaz *et al.*, 2020; Sharma *et al.*, 2020), we also evaluate the impact of board gender equality on both the ESG framework and its individual pillars (environmental, social and governance) to verify which or which ones are the most affected by the presence of women on BoD. Refinitiv uses 68 environmental, 62 social and 56 CG key performance indicators to measure the ESG score of banks and it provides a score in percentage between 0 and 100. The overall ESG performance score (ESG\_perf) is the primary predicted variable in this research (Bravo and Reguera-Alvarado, 2019; Qureshi *et al.*, 2020; Sharma *et al.*, 2020). In supplement to the composite ESG score, individual pillar scores (i.e. environmental, social and governance) are used to derive additional meaningful insights. ESG\_perf reflects the bank's weighted average of ESG scores and ESG controversies (captured from global media sources) to provide a comprehensive assessment of the sustainable and societal impact of corporate conduct. Based on prior literature (Bătae, 2021), we use the ESG score by Refinitiv as a proxy for the ESG performance of EU banks. The overall ESG score is expressed as a percentage ranging from 0% to 100%. The independent variable ESG\_perf is measured using three ESG pillars (the environmental pillar [ENV], the social pillar [SOC] and the governance pillar [GOV]) (de Villiers *et al.*, 2017). The combined indicator of them (ESG\_perf) is a comprehensive scoring of ESG performance according to previous banking studies (Peni and Vähämaa, 2012; Esteban-Sanchez *et al.*, 2017; Shakil *et al.*, 2019; Buallay *et al.*, 2021). A pillar is the weighted average of ten correlated dimensions, while each ESG dimension is composed by individual elements. Refinitiv database comprises a calculated score for each ESG dimension. ESG data used in this study are detailed in Table 1.

Refinitiv database comprises 34 indicators relating to the environmental pillar score (ENV) and clustered in three dimensions: resource use efficiency (ENV\_Ru), emission and waste reduction (ENV\_Em) and environmental innovation (ENV\_In). The Refinitiv Eikon data set includes 40 indicators referring to the social pillar score (SOC) and grouped them in four dimensions: workforce (Soc\_Wf); human rights (Soc\_Hr); community (Soc\_Com) and product responsibility (Soc\_Prd). The governance pillar (GOV) embraces three dimensions: management and oversight (Gov\_Mo), stakeholder rights (Gov\_Shr) and CSR strategy (Gov\_Csr).

### 4.3 Independent variables

For the understanding of how female directors can influence ESG performance of EU banks, board gender equality (B\_GEq) is taken as an independent variable for the study (Chams and García-Blandóm, 2019; Atif *et al.*, 2021; Yarram and Adapa, 2021). According to previous research, we considered the proportion of female directors (%B\_GEq) (Bear *et al.*, 2010; Sanan, 2016; Cucari *et al.*, 2018; Galbreath, 2018; Husted and de Sousa-Filho, 2019; Cordeiro *et al.*, 2020; Beji *et al.*, 2021; Pareek *et al.*, 2023; Saggari *et al.*, 2021; Wang *et al.*, 2021) and the absolute number of women on BoD (nB\_GEq) (Chams and García-Blandóm, 2019; Hollindale *et al.*, 2019) as proxy indicators of the predictor variable in the regression analysis (B\_GEq). In addition, to test how a critical mass of female directors can be a predictor variable, we also used a dummy variable (massB\_GEq) coded as 1 if females on the BoD are more than three, and 0 otherwise (Lafuente and Vaillant, 2019; De Masi *et al.*, 2021; Number and Velte, 2021; Yarram and Adapa, 2021).

### 4.4 Control variables

Some control variables are included in the regression model due to their significant influence on ESG performance of banks according to previous studies (Arayssi *et al.*, 2016, 2020; Velte, 2016; Husted and de Sousa-Filho, 2019; Shakil *et al.*, 2019; Albitar *et al.*, 2020). In particular, board-level characteristics (Post *et al.*, 2011; Shaukat *et al.*, 2016; Bravo and Reguera-Alvarado, 2019), such as board size (B\_size) and board independence (B\_ind) are involved as control variables in our study. Additionally, the CSR/sustainability committee serves as a check (Eberhardt-Toth, 2017) to verify whether female directors play an



**Table 1** Definition of ESG variables

Variable	ESG performance, ESG pillars and ESG dimensions (source: Refinitiv)	
	Description measure	ESG predictor
ESG performance (ESG_perf)	Weighted average of the ESG scores and ESG controversies (captured from global media sources)	It is a combined indicator of ESG pillars [i.e. the environmental pillar (ENV), the social pillar (SOC), the governance pillar (GOV)], discounted for ESG controversies
ESG pillar	Description Measure	ESG dimensions
Environmental (ENV)	Environmental performance measures a company's capacity to reduce environmental emissions, to efficiently use natural resources in the production processes and to support the research and development of eco-efficient products and services	It is based on three dimensions: ENV_Ru (resource use efficiency), ENV_Em (emission and waste reduction), ENV_In (environmental innovation) ENV_Ru = bank's efficiency in reducing the use of materials, energy or water and capacity to find more eco-efficient solutions for the business processes ENV_Em = bank's commitment and effectiveness in reducing environmental emissions and waste in operational activities ENV_In = bank's capacity to reduce the environmental burdens and costs for its clients and to create new opportunities for eco-designed products and services
Social (SOC)	Social performance measures a company's capacity to generate trust and loyalty in its workforce, to respect the fundamental conventions of human rights, to be a good citizen, to protect public health, to respect business ethics and to create value-added products and services	It is based on four dimensions: SOC_Wf (workforce), SOC_Hr (human rights), SOC_Com (community), SOC_Prd (product responsibility) SOC_Wf = bank's effectiveness toward job satisfaction, safe and healthy workplace, while developing both equal and diversity opportunity SOC_Hr = bank's effectiveness in respecting fundamental human rights conventions SOC_Com = bank's commitment to being a good citizen, respecting business ethics and protecting public health SOC_Prd = bank's capacity to offer high quality products and services, regarding the customers' health and safety, data privacy and integrity
Governance (GOV)	Corporate governance performance measures a company's capacity to act in the best interest of its shareholders through company management systems and processes (structure and functions of the board of directors, compensation policy, etc.)	It combines three dimensions: GOV_Mo (management and oversight), GOV_Shr (shareholders rights), GOV_Csr (CSR strategy) GOV_Mo = bank's commitment and effectiveness in following corporate governance principles GOV_Shr = bank's effectiveness in treating its shareholders in an equal manner GOV_Csr = bank's way to incorporate social and environmental dimensions in its decision-making processes

Source: Table created by authors

important role in ESG decision-making to improve social and environmental standards. In line with the existing literature on ESG (Setó-Pamies, 2015; Helfaya and Moussa, 2017; Jizi, 2017; Buallay, 2020; Bhaskaran *et al.*, 2021; Prashar, 2021), we also identify the following most widely studied bank-specific control variables: bank size (SIZE), return on equity (ROE) and bank leverage (LEV). Bank size (SIZE) is calculated as the natural logarithm of total assets (Platonova *et al.*, 2018; Nizam *et al.*, 2019; Shahbaz *et al.*, 2020). In previous banking studies, some authors reported that large banks easily attract cheaper resources because they are more diversified across different segments and more scrutinized by the community and the media. Consequently, large banks access more capitals to invest in CSR activities (Setó-Pamies, 2015; Helfaya and Moussa, 2017). We also considered ROE as an indicator of bank profitability (Harjoto *et al.*, 2015; Cordeiro *et al.*, 2020; Sharma *et al.*, 2020) and LEV measured by Tier 1 capital to total assets (Brammer and Millington, 2008; Harjoto *et al.*, 2015; Velte, 2016). Finally, we comprised a CG variable: one-tier/two-tier BoD. We used a CG specification as a control variable to explain the role of the board on ESG activities. Recent studies indicate that the composition and the structure of the BoD may serve as important drivers to increase ESG performance (Birindelli *et al.*, 2018). In line

with previous literature focused on the banking sector, we used governance structure as a valuable control variable. Descriptions and formulas of the variables are presented in Table 2.

#### 4.5 Model specifications

To test the research hypotheses, we applied a linear regression model using the OLS method because of its general quality of minimized bias and variance (Greene, 2004). The empirical fixed-effect panel regression model relating ESG performance (Model 1) to various board gender equality attributes and bank-level economic indicators is estimated as follows:

**Table 2** Explanation of variables

Variable	Description measure	Reference	Expected effect on ESG performance
<i>Dependent variable</i>			
<i>ESG variable (source: Refinitiv)</i>			
ESG performance (ESG_perf)	Comprehensive scoring of the environment, social and governance performance by the weighted average of the ESG scores and ESG controversies (captured from global media sources) (see Table 1)		
Environmental performance (ENV_perf)	Comprehensive scoring of the environment performance by the average of its three dimensions (see Table 1)		
Social performance (SOC_perf)	Comprehensive scoring of the social performance by the average of its four dimensions (see Table 1)		
Governance performance (GOV_perf)	Comprehensive scoring of the governance performance by the average of its three dimensions (see Table 1)		
<i>Independent variables</i>			
<i>Board gender equality variables (B_GEq)</i>			
Board gender equality (%) (%B_GEq)	Percentage of women on BoD (number of female directors divided by total number of board members)	Barako and Brown (2008), Adams and Ferreira (2009), Rupley <i>et al.</i> (2012), Amran <i>et al.</i> (2014), Rao and Tilt (2016a, 2016b), Husted and de Sousa-Filho (2019), Cucari <i>et al.</i> (2018), Galbreath (2018), Cordeiro <i>et al.</i> (2020)	Nonlinear
Board gender equality (n) (nB_GEq)	Number of women on BoD		
Board mass of gender equality (massB_GEq)	Dummy variable that takes value 1 if the bank's board has at least three women, 0 otherwise	Post <i>et al.</i> (2011), Fernandez-Feijoo <i>et al.</i> (2014), Liu (2018), Ben-Amar and McIlkenny (2015), Shoham <i>et al.</i> (2017)	Positive
<i>Control variables</i>			
Board size (B_size)*	Total number of directors on the bank's board at the end of the fiscal year	Said <i>et al.</i> (2009), Amran <i>et al.</i> (2014), Jensen (1993), de Andres and Vallelado (2008), Laksmana (2008)	Positive
Board independence (B_ind)	Percentage of independent or outside directors on the bank's board	Ahmed <i>et al.</i> (2006), Chau and Gray (2010), Rao and Tilt (2016a, b)	Positive/negative
CSR/sustainability committee (CSR_com)	Dummy variable equal to 1 if the bank has a CSR committee, 0 otherwise	Liao <i>et al.</i> (2015), Hussain <i>et al.</i> (2018)	Positive
Bank size (SIZE)*	Natural logarithm of total assets of the bank (Euro)	Setó-Pamies (2015), Helfaya and Moussa (2017)	Positive
Return on equity (ROE)	Net income divided by the value of total shareholders' equity	Setó-Pamies (2015), Helfaya and Moussa (2017)	Positive/negative
Leverage (LEV)	The ratio of Tier 1 capital to total assets (proxy for the Basel 3 leverage ratio)	Helfaya and Moussa (2017)	Positive
Governance model (Gov_mod)	Dummy variable equal to 1 if the bank has a two-tier board, 0 if the bank has a one-tier board	Gotti <i>et al.</i> (2021), Birindelli <i>et al.</i> (2018)	Positive/negative
<b>Note:</b> *Natural logarithmic transformations of the numerical (nonindex) variables			
<b>Source:</b> Table created by authors			

$$\begin{aligned} \text{ESG\_perf}_{it} = & \beta_1 \text{B\_Eq}_{n,it} + \beta_2 \text{B\_size}_{it} + \beta_3 \text{B\_ind}_{it} + \beta_4 \text{CSR\_com}_{it} + \beta_5 \text{SIZE} + \beta_6 \text{ROE} \\ & + \beta_7 \text{LEV} + \beta_8 \text{GDP} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where  $\text{ESG\_perf}_{n,it}$  is the combined ESG performance score for each bank;  $i$  refers to a bank;  $t$  refers to the year and  $\varepsilon_{it}$  is a stochastic error term. The estimated regression coefficients for the above-mentioned variables are denoted by  $\beta_1$  to  $\beta_8$ ;  $\mu_{it}$  controls for unobserved from heterogeneity; and  $\varepsilon_{it}$  represents the disturbance error. Board gender equality ( $\text{B\_Eq}_{n,it}$ ) indicates the female representation on the BoD and it is expressed as the above-described different variables: %B\_GEq, nB\_GEq and massB\_GEq. To quantify the effect of board diversity proxies on ESG performance, we also control for some board attributes and bank's key financial metrics that could potentially affect a bank's ESG appetite (control variables,  $t$ ). The CG variables are time-invariant, but they differ across banks. All the variables are listed in [Table 2](#).

In addition to the overall ESG performance score ( $\text{ESG\_perf}$ ), we developed three separate models (Model 2, Model 3 and Model 4) for each ESG pillar, respectively ( $\text{ENV\_perf}$ ,  $\text{SOC\_perf}$ ,  $\text{GOV\_perf}$ ). The individual pillar scores are hypothesized in addition to the combined ESG performance indicator to check which pillar of the ESG framework receives more favorable attention from gender-diverse BoDs in the EU banks.

The models are presented as follows:

$$\begin{aligned} \text{ENV\_perf}_{it} = & \beta_1 \text{B\_Eq}_{n,it} + \beta_2 \text{B\_size}_{it} + \beta_3 \text{B\_ind}_{it} + \beta_4 \text{CSR\_com}_{it} + \beta_5 \text{SIZE} + \beta_6 \text{ROE} \\ & + \beta_7 \text{LEV} + \beta_8 \text{GDP} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{SOC\_perf}_{it} = & \beta_1 \text{B\_Eq}_{n,it} + \beta_2 \text{B\_size}_{it} + \beta_3 \text{B\_ind}_{it} + \beta_4 \text{CSR\_com}_{it} + \beta_5 \text{SIZE} + \beta_6 \text{ROE} \\ & + \beta_7 \text{LEV} + \beta_8 \text{GDP} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} \text{GOV\_perf}_{it} = & \beta_1 \text{B\_Eq}_{n,it} + \beta_2 \text{B\_size}_{it} + \beta_3 \text{B\_ind}_{it} + \beta_4 \text{CSR\_com}_{it} + \beta_5 \text{SIZE} + \beta_6 \text{ROE} \\ & + \beta_7 \text{LEV} + \beta_8 \text{GDP} + \mu_{it} + \varepsilon_{it} \end{aligned} \quad (4)$$

In accordance with [Baltagi \(2001\)](#), we applied panel data which give more variability and less collinearity among the variables. We controlled for individual heterogeneity using a fixed effects estimation with standard errors clustered at the bank level. The selection of a fixed effects model rather than a random effects one was verified by means of the Hausman test run on all specifications ([Baltagi, 2001](#)). We also applied the Breusch–Pagan test to check for residual heteroscedasticity. We eliminated the firm-level heterogeneity using cross-sectional mean deviation data ([Greene, 2004](#)). Given the dynamic nature of our model, least squares estimation methods would have generated biased and inconsistent evaluations. Hence, we used techniques for dynamic panel estimation to deal with the biases of our estimates. To manage issues related to endogeneity, the identification of exogenous changes from mandatory executive retirements in board characteristics is made by applying difference-in-difference estimation techniques as in [Berger et al. \(2014\)](#).

## 5. Empirical results and discussion

This section examines the impact of board gender equality variables on ESG performance. First, we present descriptive statistics and correlations. Then, we analyze the main estimation results, and lastly, we examine some robustness checks.

According to the EBA benchmark report, the representation of women in banks' management bodies somewhat improved overall, but it is far from a full gender balance in the period under investigation. More specifically, the share of women in BoDs with a management function raised slightly from 13.6% in 2015 to 15.1% in 2021, while their share in management bodies with a

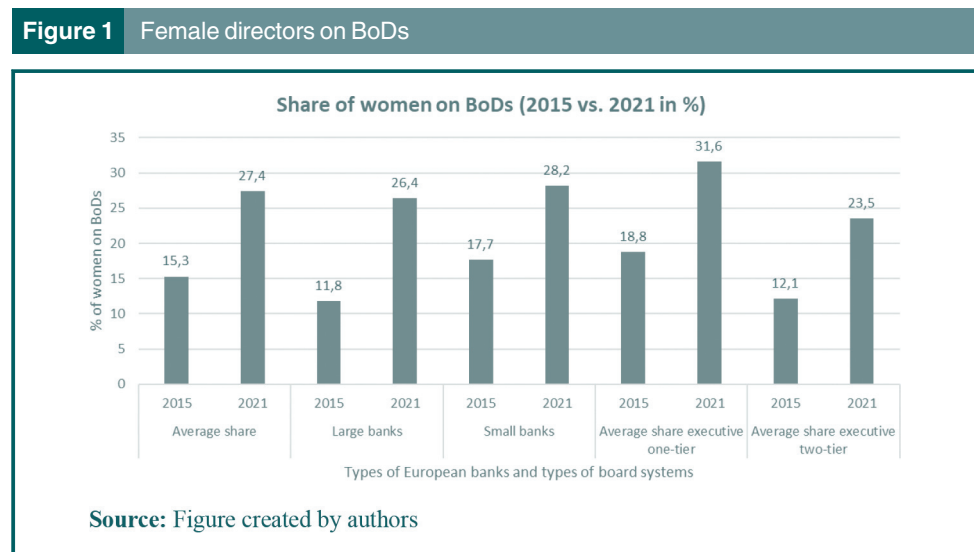
supervisory function improved more strongly, from 18.9% in 2015 to 24.0% in 2021. Female directors are in the minority, as evidenced by the average percentage of female directors in the EU banks in the sample period. As shown in [Figure 1](#), overall, the share of female executive directors has increased steadily in significant banks from 15.3% to 27.4% over the sample period, demonstrating that the levels are still quite distant from an equal gender distribution. The relative increase is higher (+124%) for large banks, which in 2015 had a significant lower share of female directors (11.8%) than smaller banks (17.7%); in 2021, the share of female directors is approximately the same in small and large banks. When comparing BoDs with different CG structures, one notices that one-tier BoDs are more gender balanced than the average of two-tier BoDs. One-tier BoDs' share of female executive directors increased by 68% versus a 94% increase for two-tier BoDs; overall, for two-tier banks, there has been a 94% increase in the share of female directors in executive ones. For a more nuanced picture, we differentiated between small (42) and large banks (30) within the sample.

### 5.1 Descriptive statistics

The descriptive statistics of the main variables for the entire sample are presented in [Table 3](#).

The average rank of ESG\_perf of the banks examined is 45.9975 ( $\pm 11.3937$  standard deviations) with a maximum equal to 62.7231. This reveals that the banks' sustainability performance, for the period 2015–2021, is very satisfactory by the standards of the score definition. The European banks maintain a good ESG performance, although they also have a high level of ESG controversies (i.e. the average ESG controversy score is 32.84%). The environmental pillar of ESG framework reported the lowest average score ( $36.5960 \pm 15.1386$  standard deviation), compared to the score of the social pillar ( $50.3476 \pm 16.6264$ , standard deviation) and the governance performance score ( $50.1467 \pm 8.0112$  standard deviation).

The average representation of women on BoDs (B\_gend) seems still low, considering that some banks' BoDs do not engage any female directors (the minimal value is equal to 0). On average, 27.42% of directors on EU banks' BoDs are females. [Table 3](#) also shows that 31.65% of the banks have at least three females in the boardroom on average. However, ESG performance and board gender equality variables show a relatively high SD due to substantial variation of their values among the European banks. Additionally, bank-specific control variables are presented in [Table 3](#). Mean bank size (SIZE), return on assets (ROE) and leverage of bank (LEV) are 9.8264, 0.0094 and 0.0768, respectively.



**Table 3** Descriptive statistics of the variables. Panel data for the period 2015–2021

	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Median</i>	<i>Std. dev.</i>
<i>Dependent variables</i>					
ESG_perf	14.9124	62.7231	45.9975	48.2548	11.3937
ENV_perf	2.6856	59.8342	36.5960	40.1619	15.1386
SOC_perf	3.3387	76.4042	48.1256	50.3476	16.6264
GOV_perf	28.645	71.4438	52.8562	50.1467	8.0112
<i>Independent variables</i>					
%B_GEq	0	0.5330	0.2742	0.3024	0.3277
nB_GEq	0	10	3.2230	3.3548	0.9246
massB_GEq	0	1	0.3165	0.3796	0.3058
<i>Control variables</i>					
Board size (B_size)	7	23	14.7502	14.1643	4.7672
Board independence (B_ind)	0.0	81.2	50.92	51.04	10.98
CSR/sustainability committee (CSR_com)	0	1	0.5942	0.5889	0.4928
SIZE	8.8632	11.4307	9.8264	9.8026	0.7544
ROE	-6.8730	0.3565	0.0094	0.0679	0.5771
LEV	0.0154	0.2167	0.0768	0.0853	0.0324
Governance model (Gov_mod)	0	1	0.5722	0.5482	0.5673

Source: Table created by authors

We have calculated the Pearson correlations to check for multicollinearity among continuous variables (Hair *et al.*, 2006). Table 4, below, display the correlation coefficients between the variables comprised in the regression model.

The coefficients confirm a high positive correlation between the comprehensive scoring of ESG (ESG\_perf) and the individual pillars score (ENV\_perf, SOC\_perf, GOV\_perf). ESG\_perf is found to be positively related with B\_size and CSR\_com ( $p \leq 0.01$ ), while LEV negatively correlates with the ESG score and its pillars. More specifically, the results confirm that the highest correlation is between ESG\_perf and SOC\_perf, while the correlation between ESG\_perf and LEV is the lowest. Besides, B\_GEq shows an insignificant correlation with ESG\_perf, SOC\_perf and GOV\_perf. These relationships demonstrate that the banks most engaged in ESG issues appoint more directors in their BoDs and often establish a committee especially dedicated to sustainability. Interestingly, B\_GEq variables are positively associated with both SIZE and LEV, suggesting that banks having more female directors on BoDs are larger and have a higher leverage ratio than less gender-balanced banks. Similarly, B\_ind is also positively correlated with the bank's economic performance (ROE) and SIZE. In contrast, environmental score (ENV\_perf) and the B\_size are negatively correlated with the percentage of women on BoD (%B\_GEq).

The matrix (Table 4) shows that the correlations between the variables are not strong. The value of variance inflation factors (VIF-test) reveals that multicollinearity is not a severe issue since it is found far below the critical value. The correlation coefficients of variables are lower than the threshold level of 0.90, demonstrating an insignificant multicollinearity among variables (Hair *et al.*, 2006). The correlation coefficients indicate that the used model is reliable and very satisfactory as there is not a high correlation between each of the variables even at its maximum degree.

## 5.2 Regression findings

We performed estimates by using three gender equality variables and we looked at the effects of these explanatory variables on the ESG performance of the EU banks. The regression results from the fixed-effect panel model are displayed in Tables 5, 6 and 7.

**Table 4** Pearson correlations

Variables	ESG_perf	ENV_perf	SOC_perf	GOV_perf	%B_GEq	nB_GEq	massB_GEq	B_size	B_ind	CSR_com	SIZE	ROE	LEV	Gov_mod	VIF
ESG_perf	1.000	0.678**	0.792**	0.625**	-0.055	-0.005	-0.004	0.216**	-0.020	0.022**	0.339**	-0.024	-0.137**	0.013**	
ENV_perf		1.000	0.701**	0.702**	-0.100**	-0.062	-0.073	0.175**	0.035	0.099**	0.287**	-0.046	-0.140**	0.034***	
SOC_perf			1.000	0.609**	-0.005	0.027	0.032	0.143**	0.042	0.072**	0.195**	-0.004	-0.166**	0.092***	
GOV_perf				1.000	-0.018	0.019	0.021	0.167**	0.017	0.177**	0.385**	-0.088*	-0.088*	0.103**	
%B_GEq					1.000	0.729**	0.704**	-0.115**	0.154**	0.256**	0.027	-0.030	0.006	0.144**	1.132
nB_GEq						1.000	0.711*	0.205**	0.142**	0.228**	0.061	-0.072	0.027	-0.099	1.076
massB_GEq							1.000	0.201**	0.151**	0.221**	0.069	-0.074	0.0029	-0.065	1.089
B_size								1.000	-0.029	0.050	0.287**	-0.103**	0.015	-0.127	1.074
B_ind									1.000	-0.030	-0.091*	0.110**	-0.055	0.326***	1.138
CSR_com										1.000	0.162**	-0.013	0.007	-0.174**	1.142
SIZE											1.000	-0.564**	0.507**	-0.089	2.001
ROE												1.000	-0.435**	0.1147	1.583
LEV													1.000	0.106**	1.498
Gov_mod														1.000	1.689

Notes: \*, \*\*, and \*\*\* denote level of significance at the 0.10, 0.05 and 0.01 levels, respectively. For description of variables, refer to Table 2

Source: Table created by authors



**Table 5** Panel regression results for predictors with robust standard errors

Variables	Model 1 ESG_perf	Model 2 ENV_perf	Model 3 SOC_perf	Model 4 GOV_perf
<i>Independent variable</i>				
%B_GEq	0.067 (1.57)	0.005 (0.722)	0.115 (1.78)*	0.039 (1.14)
<i>Control variables</i>				
B_size	0.155 (0.877)	-0.003 (-0.009)	0.398 (1.50)*	0.039 (0.27)
B_ind	0.008 (0.222)	-0.021 (-0.399)	-0.037 (-0.70)	0.044 (1.57)
CSR_com	2.939 (3.733)***	0.991 (0.904)	0.815 (0.684)	0.427 (0.70)
SIZE	16.048 (8.66)***	4.699 (1.83)*	15.778 (5.60)***	8.522 (5.97)***
ROE	0.137 (2.21)**	0.072 (0.833)	0.015 (0.160)	0.008 (0.192)
LEV	-0.635 (-2.70)***	0.064 (0.194)	-0.245 (-0.69)	-0.452 (-2.50)***
Gov_mod	0.023 (0.172)	0.004 (0.246)	0.007 (0.318)	0.009 (0.201)
Fixed/random effects	Fixed	Fixed	Fixed	Fixed
Adjusted R square	0.852	0.778	0.707	0.714
F statistics	40.32	25.46	17.71	18.15
Probability	<0.01	<0.01	<0.01	<0.01

**Notes:** Testing H1 – Percentage of women on BoD  $N = 72$  (number of European banks).  $\sum_i T_i N = 504$  (number of bank-year observations).  $t$ -statistics are shown in parenthesis. The robust standard errors of the estimated coefficients are clustered at the bank level. \*, \*\* and \*\*\* denote level of significance at the 0.10, 0.05 and 0.01 levels, respectively; Model 1, Model 2, Model 3 and Model 4 correlate the percentage of women on BoD (dependent variable) to the comprehensive ESG scoring, the environmental scoring, the social scoring and the governance scoring, respectively

**Source:** Table created by authors

**Table 6** Panel regression results for predictors with robust standard errors

Variables	Model 1 ESG_perf	Model 2 ENV_perf	Model 3 SOC_perf	Model 4 GOV_perf
<i>Independent variables</i>				
nB_GEq	1.84 (1.95)	2.116 (1.64)	1.724 (1.32)	0.783 (0.82)
<i>Control variables</i>				
B_size	0.134 (0.76)	-0.023 (-0.19)	0.467 (1.382)	0.027 (0.22)
B_ind	0.009 (0.25)	-0.011 (-0.23)	-0.037 (-0.66)	0.043 (1.63)
CSR_com	3.189 (4.15)***	1.177 (1.09)	1.339 (1.05)	0.567 (0.94)
SIZE	16.355 (9.20)***	4.523 (1.85)*	16.724 (6.20)***	8.873 (6.47)**
ROE	0.245 (2.14)**	0.076 (0.93)	0.027 (0.25)	0.014 (0.28)
LEV	-0.651 (-2.76)***	0.049 (0.12)	-0.217 (-0.73)	-0.459 (-2.53)**
Goc_mod	0.008 (0.212)	0.006 (0.144)	0.005 (0.104)	0.008 (0.114)
Fixed/random effects	Fixed	Fixed	Fixed	Fixed
Adjusted R square	0.873	0.814	0.753	0.754
F statistics	40.50	25.59	17.67	18.13
Probability	<0.01	<0.01	<0.01	<0.01

**Notes:** Testing H2 – number of women on BoD  $N = 72$  (number of European banks).  $\sum_i T_i N = 504$  (number of bank-year observations).  $t$ -statistics are shown in parenthesis. The robust standard errors of the estimated coefficients are clustered at the bank level. \*, \*\* and \*\*\* denote level of significance at the 0.10, 0.05 and 0.01 levels, respectively Model 1, Model 2, Model 3 and Model 4 correlate the number of women on BoD (dependent variable) to the comprehensive ESG scoring, the environmental scoring, the social scoring and the governance scoring, respectively

**Source:** Table created by authors

Tables 5, 6 and 7 summarizes the regression results for each model. For firm heterogeneity, we used cross-section or firm fixed-effect control. Table 5 presents the regression results for the relationship between board gender equality and ESG performance ( $H1$ ,  $H1a$ ,  $H1b$  and  $H1c$ ), testing the proportion of female directors on BoD (%B\_GEq) as regressor of board gender equality. In Model 1, the calculated beta coefficients demonstrate that % B\_GEq has no impact on the combined ESG performance score (ESG\_perf) of sample banks ( $p$ -value > 0.1). Hence,  $H1$  is not supported by the empirical evidence. Similarly, in Models 2 and 4, which take the environmental pillar score (ENV\_perf) and the governance

**Table 7** Panel regression results for predictors with robust standard errors

Variables	Model 1 ESG_perf	Model 2 ENV_perf	Model 3 SOC_perf	Model 4 GOV_perf
<i>Independent variables</i>				
massB_GEq	1.76 (1.72)**	2.328 (1.51)	1.960 (1.32)	0.594 (0.74)
<i>Control variables</i>				
B_size	0.154 (0.74)	-0.024 (-0.09)	0.367 (1.382)	0.027 (0.22)
B_ind	0.009 (0.22)	-0.022 (-0.43)	-0.042 (-0.68)	0.044 (1.63)
CSR_com	3.188 (4.15)***	1.178 (1.09)	1.238 (1.09)	0.569 (0.94)
SIZE	16.369 (9.20)***	4.522 (1.84)*	16.714 (6.22)***	8.873 (6.47)***
ROE	0.115 (2.34)**	0.076 (0.94)	0.027 (0.25)	0.014 (0.28)
LEV	-0.651 (-2.76)***	0.050 (0.18)	-0.257 (-0.73)	-0.459 (-2.53)***
Goc_mod	0.009 (0.213)	0.007 (0.145)	0.005 (0.104)	0.008 (0.114)
Fixed/random effects	Fixed	Fixed	Fixed	Fixed
Adjusted R square	0.874	0.811	0.754	0.753
F statistics	40.52	25.49	17.66	18.13
Probability	<0.01	<0.01	<0.01	<0.01

**Notes:** Testing H2 – Critical mass of women on BoD;  $N = 72$  (number of European banks).  $\Sigma i.N = 504$  (number of bank-year observations).  $t$ -statistics are shown in parenthesis. The robust standard errors of the estimated coefficients are clustered at the bank level. \*, \*\* and \*\*\* denote level of significance at the 0.10, 0.05 and 0.01 levels, respectively; Model 1, Model 2, Model 3 and Model 4 correlate the number of women on BoD (dependent variable) to the comprehensive ESG scoring, the environmental scoring, the social scoring and the governance scoring, respectively

**Source:** Table created by authors

pillar score (GOV\_perf) as dependent variables, respectively, empirical results do not support *H1a* and *H1c*. In contrast, Model 3 shows a positive and statistically significant (significance at 0.01 level) relationship between %B\_GEq and SOC\_perf ( $\beta = 0.115$  and  $t$ -statistic = 1.78). Hence, the percentage of women on BoD has no impact on banks' environmental and governance performance scores while it has a significant effect on the social pillar of the ESG framework. These results align with the agency theory and the legitimate theory. The evidence underlines that board gender diversity is a positive factor stimulating more disclosure on social issues probably because women are more sensitive to societal demands and more inclined to address sustainability concerns of all stakeholders. In this regard, female directors are more likely to support decisions that contemplate stakeholders' legitimate claims even in contrast with their interests. In line with the legitimacy theory, the findings underline how gender equality supports bank boards to mitigate external pressures and to face stakeholders' concerns through higher ESG issues. Therefore, from these theories' perspectives, a gender-balanced board can stimulate socially responsible practices, assist people both inside and outside the banks and then improve ESG performance.

Based on the theoretical fundamentals of the critical mass theory, we also include in the models the number of female board members (nB\_GEq) as independent variable and the predictor mass B\_GEq to test *H2*, *H2a*, *H2b* and *H2c* individually for each independent variable. The regression results in Table 6 suggest that the number of women on BoD has no impact on the comprehensive ESG performance scoring (ESG\_perf). On the contrary, Table 7 shows that once the BoD achieves the critical threshold of three women, the presence of the female directors has a significant impact on the overall ESG dependent variable (ESG\_perf) (significance at 5% level). Thus, the results of Model 1 corroborate *H2* (critical mass theory), which predicts that a critical mass of female directors on BoD has a positive effect on bank's ESG performance ( $p$ -value is statistically significant at 0.05 level;  $\beta = 1.76$  and  $t$ -statistic = 1.72) (Number and Velte, 2021). Our findings are consistent with previous research on board gender diversity and sustainability (Post et al., 2011; Lafuente and Vaillant, 2019; Nguyen et al., 2021; Yarram and Adapa, 2021), which claims that having token women (a symbolic presence of a woman or few women) on the BoD has no effect on

ESG/sustainability performance. Our study confirms that the tokenism approach that appoints a percentage of women on BoD to meet regulatory requirements does not represent a mechanism to stimulate more ESG performance.

The empirical analysis supports the resource dependent theory and the extant literature (Kyaw *et al.*, 2017; Manita *et al.*, 2018; Arayssi *et al.*, 2020; Shakil *et al.*, 2021; Disli *et al.*, 2022; Wasiuzzaman and Wan Mohammad, 2020) by signifying women director's intellectual and interpersonal characteristics as critical resources for EU banks to attain high ESG performance (Kyaw *et al.*, 2017; Jizi, 2017). The critical resources of female directors help banks in strategic decision-making related to ESG issues and ultimately in paying attention to sustainable initiatives that increase ESG performance. The findings also support the legitimacy theory (Arayssi *et al.*, 2020) due to female director's sensitivity for social activities (Aouadi and Marsat, 2018). Female board members' unconditional commitment to an ethical standard and climate change helps them to address the ESG issues more sensibly (Ciorcirlan and Pettersson, 2012; Ben-Amar and McIlkenny, 2015). It appears that engaging more women in banks' BoDs is not merely to tick the box of gender requirements but it improves the social board functions (Arayssi *et al.*, 2016).

Models 2, 3 and 4 assess the relationship between the number of women on BoDs and the ESG pillars (ENV\_perf, SOC\_perf and GOV\_perf), respectively. There is no evidence supporting hypotheses, H2a, H2b and H2c. Likewise, the presence of a critical mass of women on BoDs has a negligible impact on banks' individual ESG pillar scores (Table 7). Hence, findings indicate that the number of female directors on BoDs does not even affect the ESG individual pillar scores when the number of female directors is beyond the threshold of three women (critical mass) (Atif *et al.*, 2021; Lafuente and Vaillant, 2019). The regression models show that the gender effect (measured as the number of women and the critical mass of women on BoD) has an impact only on the overall ESG indicator, i.e. the combined score that reflects the amount of ESG data the company discloses. From the investigation, there was no evidence for a direct influence of any number of female directors and the specific disclosure of environmental data, social activities and governance processes.

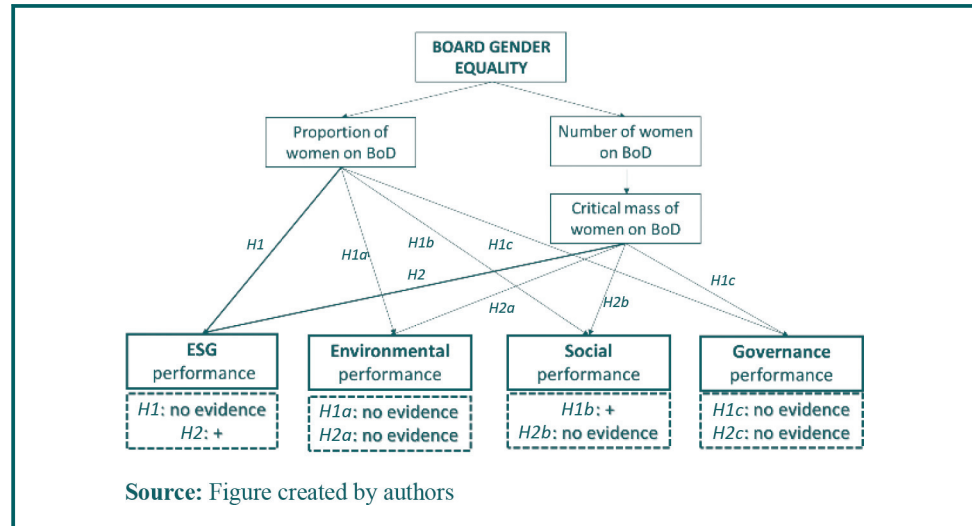
Finally, Tables 5, 6 and 7 illustrate data of the control variables. In line with several prior studies (Buallay, 2020; Sharma *et al.*, 2020; Bhaskaran *et al.*, 2021), the findings highlight that both bank size (SIZE) and economic performance (ROE) have a positive and a statistically significant effect on ESG\_perf, at 0.01 and 0.5, respectively. Hence, empirical evidence reveals that high sustainability performance is mostly achieved by large and more profitable banks (Baselga-Pascual *et al.*, 2018) because they have affluent resources and workforce to invest in ESG activities. On the contrary, bank's LEV is negatively related with ESG\_perf; thus, banks having high leverage show low ESG performance in accordance with previous literature (Velte, 2016; Manita *et al.*, 2018; Arayssi *et al.*, 2020).

For an outlook on the hypotheses and the current findings concerning the relationship between board gender equality and ESG performance, we depict the theoretical framework underlying the current study in Figure 2.

### 5.3 Robustness test

To verify the robustness of the results, we reestimated the main models by incorporating two different indicators. First, we ascertain that the relationship between board gender equality and ESG\_perf is not affected by the size of the bank. Hence, we included SIZE as an explanatory variable; namely, this indicator can be considered a control variable of major importance as it embodies the structure of assets. Since some studies consider this variable a measure of ESG capacity (Baselga-Pascual *et al.*, 2018), we decided not to comprise SIZE in our main estimations but to test its inclusion to confirm the main findings. We reestimated the main models considering the classification between large and small banks in the econometric models. Except for the nB\_GEq, which has a negative and

**Figure 2** Theoretical framework and evidences of the study



statistically insignificant impact on ESG performance, the estimations of these additional regressions are mostly consistent with the evidence of our main analysis. Regression results for small banks confirm that ESG\_perf is statistically positively related with the number of women on BoD (significance at 10% level) beyond the critical threshold of three female directors. The presence of women on BoDs has no statistically significant impact on banks' individual ESG pillar scores. Anyway, the less significant results for small banks can be attributed to the low number of observations on which panel data analysis is run.

To ensure that the main models are correctly stated, we include ESG performance measures forwarded by 12 months ( $t + 12$ ) which increased our confidence in findings. In the robustness checks, we use the 12-month forwarded values for the dependent variables to test whether the proposed effect of gender equality on ESG dimensions expands to a further time period. Hence, to verify that past conditions related to women on BoD can affect future ESG performance scores, we apply the 12-month forwarded values of ESG performance where the scores refer to the same month of the independent variable a year later. Results largely support our main analysis. The data sets of the robustness test for ESG\_perf estimations are not reported in tabular form in the interest of saving space and enhancing the readability of the paper.

## 6. Summary and conclusions

The purpose of this study is to investigate the relationship between board gender equality and ESG performance in the European banks using a panel fixed-effect model to account for unobserved heterogeneity. The results outline that only a critical mass of female directors has an impact on ESG performance. The findings demonstrate that bank's BoD with at least three female directors influence the overall ESG performance score. On the contrary, the presence of a critical mass of women on BoDs has an insignificant effect on banks' individual ESG pillar scores. In this regard, our study contributes to the gender diversity and ESG literature of banks by showing that having token women on BoD is tested not statistically favorable for ESG performance measured by the combined ESG score. Hence, when women are appointed in bank BoD due to a type of tokenism only to meet a regulatory requirement percentage, the potential efforts of a gender-balanced BoD on ESG performance do not upsurge (Saggar *et al.*, 2021).

This paper contributes to banking literature in many ways. First, to the best of our knowledge, current studies analyzing the relationship between CG variables and sustainability in banking sector are new but limited and mainly deal with the ESG disclosure (and not ESG performance) (Birindelli *et al.*, 2018; Shakil *et al.*, 2021; Gurol and Lagasio, 2022). Second, this study advances literature on ESG in the European banking sector (Perrini *et al.*, 2006) since our findings represent the first empirical evidence of the relationship between board gender equality and ESG performance in such a context. In this regard, prior literature focused on board diversity rather than on the aspects of gender diversity in particular (Gurol and Lagasio, 2022). Third, a big chunk of empirical research has relied solely on the composite ESG performance score, which provides only a limited amount of information about the sample businesses' sustainability practice (Bravo and Reguera-Alvarado, 2019; Chams and García-Blandóm, 2019; Shahbaz *et al.*, 2020; Sharma *et al.*, 2020). As a result, evaluating individual pillars of the ESG framework has the ability to reveal significant information, such as which aspect receives more priority in the sample firms. Fourth, the paper is the first that investigates the relationship between CG variables and ESG dimensions in the European banking context by using the ESG score provided by Refinitiv.

Furthermore, practical implications that encourage gender diversity among policymakers and regulators arise from this research. Investors' increased emphasis on ESG has prompted directors to become more concerned about issues such as climate change, social impact and governance. This increases policymakers' understanding of how to instill a gender-balanced approach as well as sustainability practices. Our findings draw the attention of the policymakers toward the growing importance of sustainability practices and women empowerment in organizations, which has the potential to contribute to the sustainable development goals.

The study also presents some limitations. Considering both the review of the existing studies and our findings on this phenomenon, we suggest some future directions or extensions that may contribute to expand the literature. First, the empirical analysis relies on the assumption that ESG performance is an effective measure of the banks' sustainability performance. Second, we measured ESG performance using scores retrieved from the Eikon Refinitiv database. The empirical analysis assumes that the Refinitiv ESG score is an effective measure of banks' ESG performance. It would be interesting to examine the impact of board gender equality on ESG dimensions by adopting other measures of ESG performance and an extensive range of time for the analysis. Hence, using a larger sample of banks and an extensive research period to examine how ESG performance is affected by the presence of females on BoD is worth pursuing. To date, however, data availability remains an issue to increase the number of banks' observations in future research studies.

The limitations of this study provide opportunities for further research. First, future research may apply a different database (e.g. Bloomberg) to measure ESG performance and an automated software to extract ESG information directly from nonfinancial reports. Second, we have studied the percentage and the number of female directors while future research could concentrate also on other specific CG attributes (i.e. board size, board independence, CEO duality, the presence of a CSR/sustainability committee) or it could focus on other diversity attitudes and critical resources that female members of the BoD hold (e.g. the nationality, seniority, background, experience and skills of directors), in line with the resource dependence theory. Third, since we applied data covering the European Economic Area, future research should design a comparative analysis across European countries as well. Due to differences in CG regulations, policies and stages of economic development, a potential research gap in the literature would be to compare the impact of board gender equality on sustainability practices among European countries. Furthermore, future studies could better control for contextual factors by incorporating different macroeconomic variables.

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## Appendix

**Table A1** Bank data table

<i>Bank's name</i>	<i>Country</i>
AXA Bank Belgium SA; AXA Bank Belgium NV	Belgium
Belfius Banque SA; Belfius Bank NV; Belfius Bank SA	Belgium
KBC Group NV	Belgium
The Bank of New York Mellon SA	Belgium
Aareal Bank AG	Germany
Bayerische Landesbank	Germany
COMMERZBANK Aktiengesellschaft	Germany
DekaBank Deutsche Girozentrale	Germany
Deutsche Apotheker-und ärztebank eG	Germany
Deutsche Bank AG	Germany
Deutsche Pfandbriefbank AG	Germany
DZ BANK AG Deutsche Zentral-Genossenschaftsbank	Germany
HASPA Finanzholding	Germany
Landesbank Baden-Württemberg	Germany
Ladensbank Hessen-Thüringen Girozentrale	Germany
Münchener Hypothekenbank eG	Germany
Norddeutsche Landesbank-Girozentrale-	Germany
AS SEB Pank	Estonia
Swedbank AS	Estonia
AIB Group plc	Ireland
Ulster Bank Ireland Designated Activity Company	Ireland
Alpha Bank AE	Greece
Eurobank Ergasias Services and Holdings S.A	Greece
National Bank of Greece S.A	Greece
Piraneus Financial Holdings S.A. Greece	Greece
Banco Bilbao Vizcaya Argentaria, S.A	Spain
Banco de Crédito Social Cooperativo, S.A	Spain
Banco de Sabadell, S.A	Spain
Banco Santander, S.A	Spain
Bankinter, S.A	Spain
Kutxabank, S.A	Spain
Liberbank, S.A	Spain
Unicaja Banco, S.A	Spain
BNP Paribas S.A	France
BPCE S.A	France
Bpifrance S.A. (Banque Publique d'Investissement)	France
C.R.H. – Caisse de Refinancement de l'Habitat	France
Confédération Nationale du Crédit Mutuel	France
Crédit Agricole S.A	France
HSBC Continental Europe	France
La Banque Postale	France
SFIL S.A	France
Société Générale S.A	France
Banca Carige S.p.A. – Cassa di Risparmio di Genova e Imperia	Italy
Banca Monte dei Paschi di Siena S.p.A	Italy
Banca Popolare di Sondrio, Società Cooperativa per Azioni	Italy
BPER Banca S.p.A	Italy
Intesa Sanpaolo S.p.A	Italy
Mediobanca – Banca di Credito Finanziario S.p.A	Italy
Unicredit S.p.A	Italy
Bank of Cyprus Holdings Public Limited Company	Cyprus
Hellenic Bank Public Company Limited	Cyprus
RCB Bank LTD	Cyprus
AS "SEB banka"	Latvia

(continued)

**Table A1**

<i>Bank's name</i>	<i>Country</i>
"Swedbank" AS	Latvia
Banque et Caisse d'Epargne de l'Etat, Luxembourg	Luxembourg
Precision Capital S.A. (KLB/Quintet)	Luxembourg
Bank of Valletta plc	Malta
HSBC Bank Malta p.l.c	Malta
ABN AMRO Bank N.V	The Netherlands
BNG Bank N.V	The Netherlands
Coöperatieve Rabobank U.A	The Netherlands
ING Groep N.V	The Netherlands
Nederlandse Waterschapsbank N.V	The Netherlands
Erste Group Bank AG	Austria
Raiffeisen Bank International AG	Austria
Raiffeisenbankengruppe Oö Verbund eGen	Austria
Banco Comercial Português, SA	Portugal
Caixa Geral de Depósitos, SA	Portugal
Nova Ljubljanska Banka d.d. Ljubljana	Slovenia
Nordea Bank Abp	Finland
OP Osuuskunta	Finland
<b>Source:</b> Created by authors	

### Corresponding author

Elisa Menicucci can be contacted at: [elisa.menicucci@uniroma3.it](mailto:elisa.menicucci@uniroma3.it)

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