Journal of Cleaner Production 528 (2025) 146746

Contents lists available at ScienceDirect

Journal of Cleaner Production

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

When do female directors curb corporate ESG controversies? Evidence from the USA

Ammar Ali Gull [a,b], Inam Ul Haq [a], Abdul Ghafoor [c], Tanveer Ahsan [d,*], Yasar Bayraktar [c]

[a] *De Vinci Higher Education, De Vinci Research Center, Paris, France*
[b] *International School, Vietnam National University, Hanoi, Viet Nam*
[c] *Business School, Birmingham City University, United Kingdom*
[d] *Rennes School of Business, Rennes, France*

HIGHLIGHTS

- We investigate when female directors are effective in curbing ESG controversies
- Female directors mitigate ESG controversies when serving as independent directors
- Female directors are effective in firms with sustainability-linked compensation
- Female directors have a stronger effect in firms with weak governance mechanisms
- Female directors are more effective in environmentally sensitive industries

ARTICLE INFO

JEL classification:
C23
G30
M14

Keywords:
ESG controversies
Female directors
Gender socialization theory
Agency theory
Contingency theory

ABSTRACT

Global concerns regarding sustainability and gender equality prompt corporations to restructure their operations. In response to the stakeholders' pressure, they have increasingly started prioritizing the United Nations' Sustainable Development Goals *(SDGs)*. This shift towards sustainability pushes them to pursue stakeholders' legitimacy. Consequently, corporations have initiated appointing more female directors to boards to mitigate ESG controversies. The literature reveals that board gender diversity improves corporate sustainability performance. However, there is still a need to clarify when female directors have the most positive effect on corporate behavior. To this end, we aim to investigate when specifically female directors curb corporate ESG controversies. Interestingly, we find that they mitigate ESG controversies when acting as independent directors, not executive ones. Additionally, their impact in curbing ESG controversies is significant in firms with sustainability-linked compensation policies, weak governance mechanisms, and those that belong to environmentally sensitive industries. The mechanism analysis reveals that female independent directors mitigate ESG controversies by enhancing transparency through their effective monitoring. The results of our study are robust to endogeneity regarding reverse causality, industry, and time-fixed effects. Our results offer several contributions to the governance and sustainability literature by documenting the significant role of female directors in addressing sustainability issues.

1. Introduction

Disclosing corporate sustainability performance via integrated reporting, including ESG initiatives, has become crucial for stakeholders. The ESG score is often used to measure this performance (Qureshi et al., 2020). Negative press and publicity regarding firms' environmental, social, and governance lawsuits, failures, or scandals, called ESG controversies, affect firms' ESG scores (Aouadi and Marsat, 2018; Agnese et al., 2023). When corporations fail to comply with sustainability standards, it damages firms' reputation as much as causes costs such as fines, product recalls, remediations, etc. Furthermore, these controversies have a significant effect on society, leading to

* Corresponding author.
E-mail addresses: ammarshaukit@gmail.com (A.A. Gull), inam.ul_haq@devinci.fr (I.U. Haq), a.ghafoor44@hotmail.com (A. Ghafoor), tanveer.ahsan@rennes-sb.com (T. Ahsan), Yasar.Bayraktar@bcu.ac.uk (Y. Bayraktar).

https://doi.org/10.1016/j.jclepro.2025.146746
Received 8 January 2025; Received in revised form 1 September 2025; Accepted 26 September 2025
Available online 2 October 2025

shareholders' losses, harming the environment, and public health (Aouadi and Marsat, 2018; Nirino et al., 2021). For instance, the BP Deepwater Horizon oil spill in 2010 caused a 50 % drop in market price and caused $65 billion in fines and compensation. It took four years to recover the firm's pre-disaster value (Vaughan, 2022). The devastating consequences of corporate failures undermined the urgent necessity of aligning business operations with the United Nations SDGs, especially ones regarding sustainability. To prevent such failures, corporate leadership necessitates board diversity to make better decisions and manage risks related to ESG controversies. The United Nations Development Program (UNDP) identifies gender equality as one of the key objectives in its 2030 agenda to empower women (UNDP, 2015). Many countries, such as Malaysia, Brazil, the UK, Norway, Sweden, and Spain, encourage corporations to increase female representation on their boards (Nekhili et al., 2022). Moreover, several countries have adopted gender quota legislation for women to ensure their presence on corporate boards (Qureshi et al., 2020). Such legislation addresses the ethical aspect that women, despite having equal competence as men, are underrepresented.

The board of directors plays a key role in shaping corporate social and sustainability initiatives. The relationship between the board structures and firms' sustainability performance has become a widely discussed topic in the literature (Qureshi et al., 2020; Shahab et al., 2022). Particularly, *the gender socialization theory* (Chodorow, 1978) suggests that women generally exhibit a more community-oriented and protective behavior, making them effective as executives or directors at managing stakeholder relationships (Rjiba and Thavaharan, 2022). Likewise, the *resource-based theory* (Wernerfelt, 1984) posits that the diverse perspectives/approaches brought by females result in better decision-making on the boards (De Masi et al., 2022). Based on these, research reveals the interaction between female presence on boards *(board gender diversity - BDG)* and the sustainability performance measured with ESG scores (Qureshi et al., 2020). Thus, BGD promotes environmental performance (Altunbas et al., 2022), higher market valuation (Qureshi et al., 2020), better governance quality, and eco-innovation initiatives (Nadeem et al., 2020). Additionally, in preventing unlawful business practices and related lawsuits, female directors encourage more responsible corporate behavior (Gull et al., 2023b).

Board composition and organization affect sustainability practices (Shahab et al., 2022; Gull et al., 2023b), and the presence of female directors improves corporate financial and sustainability performance (Qureshi et al., 2020; Altunbas et al., 2022). Nevertheless, the studies on how gender diversity influences ESG controversies suggest mixed results. For instance, while Issa and Hanaysha (2023) find female representation on the board decreases corporate ESG controversies, Mallidis et al. (2024) reveal a negative correlation between the proportion of female directors and CSR controversies performance. These contradictions regarding the impact of female representation on the board can be due to differences in the measurement proxies of the dependent variable, as Mallidis et al. (2024) use CSR controversies while Issa and Hanaysha (2023) use ESG controversies. ESG includes the governance pillar explicitly, while CSR includes governance issues indirectly as they relate to environmental and social considerations. CSR is broader, while ESG focuses on three specific areas: Environmental, Social, and Governance (Gillan et al., 2021). Therefore, we argue that these contradicting results regarding the impact of female representation on corporate boards may not be due to the differences between the measurement proxies but due to other moderating factors. Such as the role played by the female directors as independent female directors, may have more sensitivity about ESG/CSR issues (Al-Najjar and Salama, 2022), sustainability-linked compensation may also enhance the effectiveness of female directors regarding ESG/CSR issues (Gull et al., 2023a), and an overall corporate governance quality may support female directors in handling ESG/CSR controversies effectively (Qureshi et al., 2024). These plausible factors for conflicting results and limited research regarding BDG's effect on ESG controversies underscore the need for further research, specifically into when the presence of female directors curbs corporate ESG controversies (Issa and Hanaysha, 2023; Mallidis et al., 2024). We, therefore, address this research gap by investigating the role of female directors (executive vs independent) in curbing ESG controversies. We also use the presence of sustainable compensation policies, governance quality, and sensitivity of firms' industries towards the environment as moderating mechanisms to explain this relationship further.

We offer several contributions to corporate governance and sustainability literature. *First,* we examine female directors' effect on ESG controversies within the US context. *Second*, we differentiate between executive and non-executive female directors to better understand their role in mitigating the ESG controversies. Consistent with agency theory, we document that compared to female executive directors, non-executive female directors reduce the firms' ESG controversies. *Third*, we investigate how the sustainability-linked compensation policies influence female board members on ESG controversies. Supporting contingency theory, we find that they intend to reduce ESG controversies only in firms with such policies. This demonstrates that adopting such compensation with sustainability performance incentivizes the female board of directors (BoDs) to promote ESG practices, thereby avoiding any controversies (Radu and Smaili, 2021). *Fourth,* considering the governance quality, we further examine the effect of female directors on ESG controversies. We find that female BoDs curb ESG controversies in firms with low governance quality. This reveals their important stakeholder-oriented role in undermining sustainability issues that might be overlooked due to weak governance mechanisms. However, without well-structured governance, it is less effective in tackling ESG concerns. *Fifth*, we find that the female BoDs curb ESG controversies when working for environmentally sensitive industries. They tend to be more cautious, risk-averse, and meticulous in decision-making, thereby decreasing the potential negative impacts of operations. *Finally*, we investigate the mechanism behind the impact of female BoDs in curbing ESG controversies and observe that female-independent BoDs curb ESG controversies by enhancing transparency through their effective monitoring. These findings have substantial implications as they confirm the significance of independent female directors in enhancing corporate transparency and reducing corporate controversies.

We structure our paper as follows. Section 2 discusses the theoretical framework and hypotheses of the study. Section 3 describes the study sample, definitions of variables, and estimation method. Section 4 documents the study's findings. Section 5 presents a discussion of the results. Section 6 presents the conclusion.

2. Theoretical framework and hypotheses development

The ESG score is expected to reflect how well a firm performs and how sustainable it is before any controversies occur. Therefore, the ESG rating should remain relatively consistent after facing corporate misconduct (Avetisyan and Hockerts, 2017). Corporations engage in ESG activities not to obtain financial gain directly, as the costs and benefits do not typically appear in financial statements (Qureshi et al., 2020). Instead, firms promote such ESG efforts to avoid potential controversies. When facing any issues, they strictly attempt to justify their actions by making ESG efforts visible and increasing ESG-related investments to ensure stakeholders' trust (Agnese et al., 2023). However, such controversies dramatically damage firms' reputations and cause remarkable profit loss (Aouadi and Marsat, 2018), which in turn limits them economically to invest in ESG activities.

A robust governance framework fosters transparency and accountability, ensuring proactive identification, mitigation, and resolution of ESG controversies while strengthening stakeholder trust and corporate integrity (Gull et al., 2023b). Gender diversity in BoDs has become a critical aspect of the governance structures worldwide (Nekhili et al., 2022). Studies suggest that boards with female directors pay more attention to ESG issues as they have more focus on society welfare and philanthropy, whereas males typically prioritize financial achievements (Nadeem et al., 2020; Qureshi et al., 2020). The *gender socialization theory of* Chodorow (1978) states that female directors possessing community-oriented traits such as supportiveness, empathy, and courtesy foster better communication with stakeholders by avoiding information asymmetry and resolving misunderstandings. Influenced by their socialization, female directors are more likely to value ethical leadership and transparent corporate practices. They tend to prioritize open communication with stakeholders, reducing information asymmetry—a major factor contributing to ESG controversies. Female directors can mitigate reputational damage and enhance investor trust by ensuring that environmental and social risks are disclosed properly (Altunbas et al., 2022; Farooq et al., 2022; Wang and Yang, 2025). As female directors encourage social responsibility, firms tend to adopt more sustainability practices. Thus, BoDs with higher female representation act more socially responsible compared to those with fewer or no females (Qureshi et al., 2020; Altunbas et al., 2022). Moreover, Wernerfelt (1984) *resource-based theory* suggests that female directors bring diverse backgrounds, leading to innovative strategies and solutions for ESG issues beyond the traditional (Nerantzidis et al., 2022). Having female directors on BoDs promotes ESG initiatives, and helps to address ESG issues more effectively and transparently (De Masi et al., 2022; Nekhili et al., 2022). Building on these insights, we formulate the first hypothesis of our study:

H1. Female representation on corporate boards reduces ESG controversies in US firms.

The *agency theory* (Fama, 1980) suggests that the relationship between executives and shareholders relies on resolving conflicts and aligning interests among stakeholders (Fama and Jensen, 1983; Dawar, 2014). It asserts that independent directors act autonomously to pay regard to shareholders' interests, whereas executive directors might compromise the board's monitoring role. Therefore, a higher representation of independent directors in corporate boards helps to balance firms' financial targets with their social responsibilities and to be recognized as a socially responsible organization (Zhu et al., 2016; Jizi, 2017). Furthermore, independent female directors increase the board's monitoring capabilities, resulting in greater transparency, less agency cost, and corporate financial fraud (Sial et al., 2019; Li and Li, 2020). They also contribute to increasing the firms' market value by steering managerial decisions toward sustainable practices that make them more profitable (Zhu et al., 2016; Jin et al., 2021). On the other hand, female independent directors motivate employees to perform well and improve ESG disclosure quality (Jizi, 2017). Compared to their male counterparts, females with financial expertise and leadership skills are regarded as more effective in corporate governance (Adams and Ferreira, 2009; Li and Li, 2020). Additionally, independent female directors demonstrate stronger concerns about corporate social responsibility (CSR) and ESG compared to executive directors (Al-Najjar and Salama, 2022). Based on these insights, we develop our second hypothesis as below:

H2. Firms face fewer ESG controversies in firms with independent female directors than with executive female directors.

The BoDs is primarily responsible for guidance and oversight on corporate policies and governance (Agnese et al., 2023). Therefore, it plays a substantial role in addressing environmental concerns for the interest of all stakeholders. Research indicates that linking executive compensation to ESG performance results in both financial and non-financial benefits (Nekhili et al., 2021; Wong and Neher, 2024). Thus, *contingency theory* supports the idea that tying executive compensation to ESG performance motivates the BoDs to be more eco-friendly. Additionally, existing studies also document the positive effect of diverse BoDs on corporate financial performance (Qureshi et al., 2020; Issa and Hanaysha, 2023). The studies also show that the diverse BoDs with ESG-linked compensation outperform their peers (Gull et al., 2023a). Building on these insights, we formulate the third hypothesis as below:

H3. Firms with female directors face fewer ESG controversies when they have sustainability-linked compensation policies in place.

Having female representation on corporate boards is widely acknowledged for promoting diversity, developing effective communication, and increasing both firm value and sustainability performance (Nadeem et al., 2020; Qureshi et al., 2020; Altunbas et al., 2022). A strong governance structure builds transparency and accountability in addressing ESG controversies (Gull et al., 2023b). Conversely, a weak one, formed with inadequate policies and practices, hinders effective ESG management (Shakil et al., 2021). As such, the female BoDs might face difficulties due to a lack of resources. This leads to more prominent controversies as their efforts in addressing such issues might clash with disruptive governance practices (Shakil et al., 2021; Mallidis et al., 2024). Besides, their presence might expose the firms' weaknesses in tackling ESG issues, making controversies more visible (Issa and Hanaysha, 2023; Mallidis et al., 2024). Issa and Hanaysha (2023) reveal that high ESG-scored firms typically show board diversity alongside strong governance structures and policies. This highlights the significance of board diversity in increasing ESG performance, especially in firms already practicing strong governance and eco-friendliness. Additionally, these firms are better positioned to realize the potential benefits that board diversity brings to the decision-making process (Abdelkader et al., 2024; Elamer and Boulhaga, 2024). We use the governance quality score provided by ASSET4 to quantify corporate governance quality. The score ranges between 0 and 100, and a higher score indicates a higher governance quality (Gull et al., 2023b). Building on these insights, we propose our fourth hypothesis as follows:

H4. Firms' governance quality significantly moderates the effect of female directors on ESG controversies.

In environmentally sensitive industries, managers who prioritize their power typically practice value-destroying activities (Nadeem et al., 2020). Therefore, they often encounter intense pressure from stakeholders to adopt eco-friendly practices and reduce environmental pollution (Ahsan et al., 2024). These concerns mostly result in the managerial manipulation of overstating sustainable performance or understating ESG controversies (Nadeem et al., 2020). From a theoretical perspective, *managerial power* tends to be exploited while reporting firms' actual environmental performance either excessively or minimally. However, diverse BoDs enable a counterbalance by increasing scrutiny and improving decision-making (Wahid, 2019; Issa and Hanaysha, 2023). Besides, as female directors exhibit risk aversion in general, they bring foresight and proactiveness into the decision-making process of the firms (Manita et al., 2018), thereby mitigating the potential negative societal and environmental impacts (Issa and Hanaysha, 2023). Environmentally sensitive industries are those that heavily depend on natural resources or significantly influence the environment through direct or indirect impacts (Nadeem et al., 2020). Building on these insights, we propose our fifth hypothesis as below:

H5. Industry sensitivity significantly moderates the effect of female directors on ESG controversies.

3. Sample, variables, and estimation method

Our study sample consists of US-listed firms (non-financial) from 2002 to 2019.[1] To obtain the data for the ESG controversies score, we use Thomson Reuters Eikon as the primary data source utilized in previous research (Aouadi and Marsat, 2018; Agnese et al., 2023; Issa and Hanaysha, 2023). The ESG controversies score (*CONT_SC*) is calculated

[1] ESG data are available from 2002 in Eikon. We limit the sample period to 2019 to prevent any potential biases due to the Covid-19 Pandemic.

considering 23 ESG controversial topics. A higher score indicates lower ESG controversies and vice versa. This score shows the firm's level of exposure to environmental, social, and governance controversies reported globally. We measure female representation as the percentage of female directors on corporate boards. We obtain this data from BoardEx (Nadeem et al., 2020). Following the recent studies—e.g. (Issa and Hanaysha, 2023; Qureshi et al., 2024), —, we include control variables and obtain data from ASSET4, BoardEx, and Worldscope. After merging these data sets, we get 2347 US firms with 15,175 firm-year observations. To examine the relationship between female directors and ESG controversies, we estimate the following regression model:

$$CONT\_SC_{i,t} = \beta_0 + \beta_1 CONT\_SC_{i,t-1} + \beta_2 FD\_PRO_{i,t} + \theta Z_{i,t} + Ind_i + Yr_t + \varepsilon_{i,t} \ldots \quad (1)$$

$CONT\_SC_{i,t}$ is the dependent variable representing the ESG controversies score. $CONT\_SC_{i,t-1}$ shows the ESG controversies score from the previous period; $FD\_PRO_{i,t}$ indicates the proportion of female directors on a corporate board; Z shows a vector of our control variables. Ind_i and Yr_t show industry and year-fixed effects, respectively. ε_{it} is the error term. We employ the generalized method of moments (GMM System - Two step) to examine this baseline regression model, as it addresses potential endogeneity issues (Roodman, 2009). The breakdown of our variables is explained in Table 1.

4. Empirical results

4.1. Data description and correlation analyses

In Table 2, we present the descriptive statistics. The mean and standard deviation of *CONT_SC are* 89.775 and 23.975, respectively. The mean value of *CONT_DUM* is 0.201, which indicates that almost 20 % of the sample firms have at least one ESG controversy. Furthermore, the *FD_PRO* mean value is 0.192, suggesting that 19 % *(approximately)* of the boards of our sample firms are female directors. The average values of 0.184 for *FD_IND* and 0.008 for *FD_EX* indicate that, on average, approximately 18 % of the female directors are independent and almost 1 % are executive. Table 3 shows a pairwise correlation analysis. We do not find a significant association between the independent variables, and therefore, the issue of multicollinearity is not present.

4.2. Regression results

In Table 4, we report our regression results using dynamic regression analysis *(GMM System)*. In column 1, we document a positive and statistically significant coefficient of *FD_PRO* (0.302***) on *CONT_SC*, suggesting that female directors reduce ESG controversies in US firms *(accept H_1)*. The economic significance suggests that a one-standard-deviation increase in the percentage of female directors reduces ESG controversies of firms by 6.46 %.[2] The findings are similar to previous research (Nadeem et al., 2020; Qureshi et al., 2020) and align with the *gender socialization theory*. In other words, it posits that female directors are more sensitive about stakeholders' welfare and proactive in avoiding ESG controversies (Farooq et al., 2022; Gull et al., 2023b; Issa and Hanaysha, 2023). The diverse boards improve the decision-making process, strengthen governance, and consequently mitigate ESG controversies (Issa and Hanaysha, 2023). Conversely, Mallidis et al. (2024) find a negative relationship between board gender diversity and corporate social responsibility performance scores.

In Column 2 (Table 4), we document the regression results of our second hypothesis, which examines the effect of independent and executive female directors on firms' ESG controversies. We document a positive and significant effect of *FD_IND* (0.105***) on *CONT_SC*. However, the effect of *FD_EX* is statistically insignificant. These results indicate that independent female directors significantly decrease ESG controversies in US firms, whereas the impact of female executive

Table 1
Definition of variables.

Variable name	Notation	Definition	Source
ESG controversies score	*CONT_SC*	Environmental, social, and governance (ESG) controversies score of the US firms as provided by Asset4-Thomson Reuters. The higher the score, the lower the firms' engagement in ESG controversies.	Asset4
ESG controversies dummy	*CONT_DUM*	Dummy variable equals 1 if the company has at least one ESG controversy and 0 otherwise.	Same
Proportion of female directors	*FD_PRO*	The proportion of female directors on the board.	BoardEx
Presence of female directors	*FD_DUM*	Dummy variable equals 1 if firm has at least one female director and 0 otherwise.	Same
Blau diversity index	*BLAU*	$= 1 - \sum_{i=1}^{n} P_i^2$, where P_i is the percentage of board members in each category (two: male/female) and n is the number of categories.	Same
Shannon diversity index	*SHAN*	$= -\sum_{i=1}^{n} P_i \ln(P_i)$, where P_i is the percentage of board members in each category (two: male/female) and n is the number of categories.	Same
Female independent directors	*FD_IND*	The proportion of female independent directors on the board.	Same
Female executive directors	*FD_EX*	The proportion of female executive directors on the board.	Same
Board size	*B_SIZE*	Natural log of the number of directors on the board.	Same
Board independence	*B_IND*	The proportion of independent directors on the board.	Same
CEO role duality	*DUAL*	Dummy variable coded 1 if the CEO and chairman positions are held by the same individual and 0 otherwise.	Asset4
CSR committee	*CSR_COM*	Dummy variable coded 1 if the firm has a CSR committee and 0 otherwise.	Same
Sustainable compensation	*SUS_COMP*	Dummy variable coded 1 if the company has a sustainable compensation policy for executives and 0 otherwise.	Same
Research and development intensity	*RD_INT*	The ratio of research and development expenditure to sales.	WorldScope
Capital intensity	*CAP_INT*	The ratio of capital expenditure to sales.	Same
Profitability	*ROA*	Net income/loss divided by total assets.	Same
Tobin's Q	*TQ*	The ratio of the sum of market capitalization and total assets minus the book value of shareholders' equity divided by total assets.	Same
Cash holdings	*CASH*	The ratio of cash and short-term investments to total assets.	Same
Financial leverage	*LEV*	The ratio of a firm's total debt to total assets.	Same
Firm size	*SIZE*	Natural log of total sales.	Same
Firm age	*AGE*	The age of the firm.	Same

Note: All continuous variables are winsorized at the bottom 1 % and top 99 % levels.

[2] It is calculated as [0.192 x (0.302/0.8977)] = 0.06459*100 = 6.46 %.

Table 2
Descriptive statistics.

Variables	Mean	SD	Min	Median	Max
CONT_SC	89.775	23.975	0.620	100	100
CONT_DUM	0.201	0.401	0	0	1
FD_PRO	0.192	0.145	0	0.167	0.700
FD_DUM	0.844	0.363	0	1	1
BLAU	0.268	0.150	0	0.278	0.500
SHAN	0.213	0.109	0	0.235	0.347
FD_IND	0.184	0.141	0	0.167	0.667
FD_EX	0.008	0.032	0	0	0.286
B_SIZE	2.241	0.244	1.099	2.197	2.890
B_IND	0.844	0.092	0.000	0.875	1.000
B_MEET	2.005	0.404	1.386	1.946	3.296
DUAL	0.353	0.477	0	0	1
CSR_COM	0.268	0.443	0	0	1
SUS_COMP	0.246	0.431	0	0	1
RD_INT	0.071	0.256	0	0	1.849
CAP_INT	0.139	0.370	0	0.038	4.260
ROA	0.043	0.117	−0.640	0.050	0.353
TQ	2.111	1.506	0.632	1.572	9.215
CASH	0.145	0.185	0	0.069	0.900
LEV	0.271	0.208	0	0.248	0.911
SIZE	15.345	1.613	9.642	15.266	21.712
AGE	5.363	4.289	1	4	18

Note: This table presents the summary statistics for all variables used in the analysis.
All variables are as defined in Table 1.

directors on ESG controversies is statistically insignificant. In economic terms, we find that firms face fewer ESG controversies by 2.15 %[3] if female representation of independent directors on the board is increased by one percent. These findings align with the *agency theory,* suggesting the independent directors' effective monitoring role in mitigating agency problems, specifically for ESG issues (Zhu et al., 2016; Sial et al., 2019; Jin et al., 2021).

In Columns 3 and 4, we report the regression results for our *hypothesis 3*, which investigates the role of ESG-linked compensation policy in determining the relationship between female directors and ESG controversies. We document a positive and significant impact of *FD_PRO* on *CONT_SC* (0.318**) for the firms with a sustainability-linked compensation policy, supporting H_3 and *contingency theory*. This exhibits that sustainability-linked compensation motivates female directors to strive for superior ESG performance (Gull et al., 2023a), which in turn mitigates ESG controversies. In contrast, there is a significantly negative relationship (−0.243***) between *FD_PRO* and *CONT_SC* for the firms with no ESG-linked compensation policy, showing the symbolic representation of female directors on corporate boards.

Furthermore, we document the regression results of our hypothesis *4* in columns 5 and 6 of Table 4, which explores the role of corporate governance (CG) quality in determining the relationship between female directors and ESG controversies. Based on the industry-year average of the corporate governance quality score of Eikon, we split the study sample into two groups: high-governance quality firms and low-governance quality firms. For firms with low governance quality, we document a positive and statistically significant relationship (0.229**) between *FD_PRO* and *CONT_SC*. However, for the high governance quality firms, this relationship is insignificant. These results suggest that female directors provide an effective monitoring mechanism in mitigating the ESG controversies for poor governance quality firms. The findings align with (Gull et al., 2023b) who suggest that gender diversity plays a significant role in corporate outcomes, with poor governance quality.

Columns 7 and 8 (Table 4) document the regression results for our *hypothesis 5*, which examines the moderating role of industry sensitivity in determining the effect of female directors on ESG controversies. We

[3] It is calculated as [0.184 x (0.105/0.8977)] = 0.02152*100 = 2.15 %.

Table 3
Correlation matrix.

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	*FD_PRO*	1.000														
2.	*B_SIZE*	0.255*	1.000													
3.	*B_IND*	0.059*	0.216*	1.000												
4.	*B_MEET*	0.056*	0.060*	0.088*	1.000											
5.	*DUAL*	−0.050*	−0.098*	0.085*	0.075*	1.000										
6.	*CSR_COM*	0.324*	0.269*	0.163*	0.058*	−0.052*	1.000									
7.	*SUS_COMP*	0.122*	0.125*	0.111*	0.077*	0.001	0.285*	1.000								
8.	*RD_INT*	−0.054*	−0.166*	−0.010	−0.011	0.131*	−0.101*	−0.061*	1.000							
9.	*CAP_INT*	−0.101*	−0.118*	−0.037*	0.000	0.025*	−0.041*	0.007	0.175*	1.000						
10.	*ROA*	0.081*	0.079*	−0.030*	−0.110*	−0.115*	0.102*	0.020	−0.617*	−0.178*	1.000					
11.	*TQ*	0.017	−0.211*	−0.121*	−0.156*	0.005	−0.082*	−0.078*	0.292*	−0.045*	0.072*	1.000				
12.	*CASH*	−0.068*	−0.271*	−0.115*	−0.052*	0.078*	−0.109*	−0.098*	0.619*	−0.014	−0.267*	0.544*	1.000			
13.	*LEV*	0.018	−0.016	0.059*	0.056*	0.017	0.060*	0.067*	−0.110*	0.137*	0.002	−0.095*	−0.248*	1.000		
14.	*SIZE*	0.299*	0.558*	0.128*	0.157*	−0.157*	0.381*	0.175*	−0.320*	−0.033*	0.159*	−0.395*	−0.435*	0.089*	1.000	
15.	*AGE*	0.342*	0.277*	0.127*	0.005	−0.082*	0.421*	0.189*	−0.120*	−0.052*	0.134*	−0.068*	−0.111*	0.068*	0.429*	1.000

Note: All variables are as defined in Table 1.
* shows significance at the 0.01 level.

Table 4
Hypotheses testing.

	Whole sample		With *SUS_COMP*	Without *SUS_COMP*	High Governance	Low Governance	Sensitive Industries	Non-sensitive Industries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	CONT_SC							
LAG_CONT_SC	0.353***	0.312***	0.326***	0.364***	0.357***	0.317***	0.375***	0.427***
	(22.27)	(23.82)	(12.81)	(19.78)	(18.99)	(13.18)	(18.61)	(24.75)
FD_PRO	0.302***		0.318**	−0.243***	−0.003	0.229**	0.363***	−0.432***
	(3.42)		(2.05)	(-4.77)	(-0.03)	(2.44)	(4.83)	(-7.96)
FD_IND		0.105***						
		(2.66)						
FD_EX		−0.010						
		(-0.15)						
B_SIZE	0.065***	0.055***	0.036	0.047**	0.040*	0.070**	−0.028	0.029*
	(2.98)	(3.71)	(0.87)	(1.99)	(1.67)	(2.29)	(-1.44)	(1.86)
B_IND	−0.103***	−0.087***	−0.118	−0.023	−0.021	−0.088**	0.013	0.001
	(-3.59)	(-3.87)	(-1.52)	(-0.76)	(-0.56)	(-2.46)	(0.30)	(0.03)
B_MEET	−0.052***	−0.038***	−0.063***	−0.017**	−0.033***	−0.057***	−0.031***	−0.015**
	(-5.16)	(-6.63)	(-3.89)	(-2.02)	(-3.99)	(-4.86)	(-3.36)	(-2.03)
DUAL	−0.010	0.006	0.012	0.000	−0.004	−0.004	−0.001	0.007
	(-1.43)	(1.16)	(0.94)	(0.05)	(-0.67)	(-0.50)	(-0.07)	(1.15)
CSR_COM	−0.036***	−0.022***	−0.055***	0.000	−0.011	−0.045***	−0.039***	0.003
	(-4.28)	(-3.82)	(-2.91)	(0.05)	(-1.11)	(-3.61)	(-3.94)	(0.33)
SUS_COMP	−0.017*	−0.020***			−0.007	−0.031**	−0.007	−0.011
	(-1.73)	(-3.36)			(-1.11)	(-2.51)	(-1.02)	(-1.50)
RD_INT	0.038**	0.021	0.033	0.039**	0.039**	0.042**	0.008	0.026
	(2.04)	(1.50)	(0.79)	(2.25)	(1.97)	(1.97)	(0.47)	(1.38)
CAP_INT	0.003	0.002	0.017	−0.029*	−0.002	−0.017	0.050***	0.001
	(0.32)	(0.32)	(0.84)	(-1.80)	(-0.36)	(-0.87)	(4.27)	(0.14)
ROA	0.001***	0.001***	0.002**	0.001***	0.001***	0.002***	0.001***	0.001***
	(3.68)	(4.79)	(2.41)	(4.47)	(2.96)	(4.01)	(2.61)	(2.99)
TQ	−0.010***	−0.006***	−0.012*	−0.003	−0.001	−0.007**	−0.003	−0.003
	(-3.38)	(-3.63)	(-1.89)	(-1.27)	(-0.31)	(-2.23)	(-1.26)	(-1.48)
CASH	−0.066***	−0.047***	−0.131**	−0.064***	−0.116***	−0.038	−0.083***	−0.058**
	(-2.98)	(-2.78)	(-2.26)	(-3.13)	(-4.23)	(-1.44)	(-3.41)	(-2.37)
LEV	0.083***	0.048***	0.009	0.026	0.023	0.086***	0.027	−0.000
	(3.40)	(3.54)	(0.16)	(1.38)	(1.29)	(3.32)	(1.35)	(-0.01)
SIZE	−0.047***	−0.040***	−0.059***	−0.023***	−0.046***	−0.028***	−0.040***	−0.018***
	(-8.49)	(-10.67)	(-5.21)	(-6.25)	(-9.19)	(-4.54)	(-9.05)	(-5.34)
AGE	−0.001	0.000	0.001	0.000	0.002**	−0.004**	0.001	0.003***
	(-0.85)	(0.16)	(0.33)	(0.50)	(2.06)	(-2.28)	(0.69)	(3.58)
Intercept	1.786***	1.334***	1.738***	2.535**	1.812***	1.852***	1.267***	0.857***
	(3.55)	(4.19)	(7.78)	(2.49)	(6.90)	(3.03)	(14.52)	(14.04)
Observations	12,148	12,148	3205	8943	6572	5538	3404	8744
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR (1) test	−16.46	−16.52	−10.02	−13.97	−12.78	−10.95	−9.163	−14.31
AR (1) p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sargan test	235.8	686.8	128.2	8122.5	348.7	264	173.7	7715.2
Sargan p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.028	0.000

Note: This table presents results for the relationship between the proportion of female directors on board, independent vs. executive female directors, and ESG controversies. *, **, *** Represent significance at 0.1, 0.05, and 0.01 levels, respectively. Z statistics are given in parentheses. All variables are as defined in Table 1.

divide the sample based on industry nature and create two sample firms: environmentally sensitive and non-sensitive firms. Firms in the agricultural, chemical, forestry, fishing, mining, metal, petroleum, and construction sectors are classified as environmentally sensitive industries, while all other firms are categorized as non-sensitive industries (Nadeem et al., 2020). We document a positive and statistically significant (0.363***) impact of *FD_PRO* on *CONT_SC* for the environmentally sensitive sample firms. However, for non-sensitive sample firms, the effect of *FD_PRO* on *CONT_SC* is significantly negative (−0.432***). These results are aligned with the existing studies that suggest that environmentally-sensitive industries face strict regulatory scrutiny compared to non-sensitive industries (Qureshi et al., 2020).

4.3. Robustness analyses

In this section, we ensure the robustness of our findings regarding the sensitivity to proxies, namely ESG controversies and female directors. In doing that, we create a dummy variable (*CONT_DUM*) which equals 1 if a sample firm faces ESG controversies in a particular year, and 0 if not. Table 5 (Column 1) indicates the regression results using this alternate proxy of ESG controversies. We find a significantly negative effect (−0.605***) of *FD_PRO* on *CONT_DUM*. It confirms the main findings, i.e., *female representation on corporate boards reduces their ESG controversies*. Additionally, we use various alternate measures for female representation on corporate boards. Firstly, we employ a dummy variable (*FD_DUM*) which equals 1 if a firm has a female director(s) on the board, and 0 if there is no female representation (Table 5, Column 2). Secondly, we utilize Blau (1977) Diversity Index (*BLAU*) and Shannon (1948) Index of Diversity (*SHAN*) to determine the relative female representation on corporate boards (Table 5, Columns 3 and 4). These indices quantify gender diversity on a continuous scale and consider both the number of groups (two: male/female) in a population or sample and their relative representation, as a measure of gender diversity (Nadeem et al., 2020). The results indicate highly significant positive associations of *FD_DUM* (0.105***), *BLAU* (0.184***), and *SHAN* (0.230***) with *CONT_SC*. These findings further confirm the robustness of our baseline

Table 5
Robustness analysis.

Variables	(1)	(2)	(3)	(4)
	CONT_DUM	CONT_SC		
LAG_CONT_DUM/SC	0.260***	0.336***	0.350***	0.351***
	(16.53)	(16.96)	(27.30)	(27.43)
FD_PRO	−0.605***			
	(-3.23)			
FD_DUM		0.105***		
		(2.61)		
BLAU			0.184***	
			(3.40)	
SHAN				0.230***
				(3.16)
Controls	Yes	Yes	Yes	Yes
Observations	12,148	12,148	12,148	12,148
Industry & Year	Yes	Yes	Yes	Yes
AR (1) test	−19.45	−17.01	−16.22	−16.21
AR (1) p-value	0.000	0.000	0.000	0.000
Sargan test	170.7	84.73	377.7	380.9
Sargan p-value	0.000	0.002	0.000	0.000

Note: This table presents results for the relationship between female directors and ESG controversies using alternate measures of board gender diversity and ESG controversies. *, **, *** Represent significance at 0.1, 0.05, and 0.01 levels, respectively. Z statistics are given in parentheses. All variables are as defined in Table 1.

results, revealing that they are not sensitive to alternative proxies of board gender diversity.

4.4. Additional analysis

Our findings indicate a significant role of independent female directors in mitigating ESG controversies, whereas executive directors have an insignificant impact (Table 4). For further investigation, we explore the role of female independent and executive directors on ESG controversies for different sub-samples employed in *hypotheses 3–5*. We present our results in Table 6.

In Columns 1 and 2 (Table 6), we document the regression results for the effect of female independent and executive directors on ESG controversies for firms with and without ESG-linked compensation. We find a highly significant positive effect (0.314***) of *FD_IND* on *CONT_SC* for the firms with ESG-linked compensation policy and a moderately significant positive impact (0.101**) of *FD_IND* on *CONT_SC* for the firms without it. There is also no significant relationship between *FD_EX* and *CONT_SC*. These results highlight that ESG-linked compensation exclusively amplifies female independent directors' stakeholders' orientation. Further, they strive for superior corporate ESG performance even when there is none.

In Columns 3 and 4, we document the regression results for the effect of female independent and executive directors on ESG controversies for high and low governance quality firms. We find significant positive effects of *FD_IND* on *CONT_SC* for the firms with high (0.190*) as well as low (0.180***) governance quality. Again, there is also no significant relationship between *FD_EX* and *CONT_SC*. These results emphasize that female independent directors contribute to effective monitoring in mitigating the ESG controversies for firms, irrespective of corporate governance quality. Conversely, female executive directors fail to curb ESG controversies, regardless of corporate governance quality.

In Columns 5 and 6, we present the regression results for the impact of female independent and executive directors on ESG controversies for firms classified based on industry sensitivity. Our findings suggest that for firms that belong to environmentally sensitive industries, the effect of *FD_IND* is positive and statistically significant at the 1 percent level (0.271***). For non-sensitive sample firms, the coefficient of *FD_IND* on *CONT_SC* is also positive but less significant (at a 5 percent level) (0.154**). However, we show that the effect of *FD_EX* on *CONT_SC for sensitive sample firms is* negative and statistically significant (−0.288***) at a 1 percent level. These results reveal that independent female directors remain highly responsive to corporate sustainability issues when working for sustainability-sensitive firms, whereas their responsiveness decreases when working for non-sensitive firms. On the other hand, the executive female directors' presence in firms operating in sustainability-sensitive industries increases ESG controversies due to their dual roles as both managers and directors.

Table 6
Additional analysis.

	With *SUS_COMP*	Without *SUS_COMP*	High Governance	Low Governance	Sensitive Industries	Non-sensitive Industries
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	CONT_SC					
LAG_CONT_SC	0.336***	0.330***	0.354***	0.325***	0.342***	0.322***
	(13.32)	(27.97)	(18.66)	(20.19)	(62.30)	(19.60)
FD_IND	0.314***	0.101**	0.190*	0.180***	0.271***	0.154**
	(3.58)	(2.43)	(1.89)	(4.07)	(13.13)	(2.30)
FD_EX	−0.108	−0.051	−0.172	−0.006	−0.288***	0.045
	(-0.76)	(-0.70)	(-0.66)	(-0.16)	(-6.55)	(0.55)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3205	8943	6572	5538	3404	8744
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes
AR (1) test	−9.965	−13.38	−12.58	−10.64	−8.838	−13.90
AR (1) p-value	0.000	0.000	0.000	0.000	0.000	0.000
Sargan test	128.8	526.8	84.55	352.3	351.3	486.7
Sargan p-value	0.000	0.000	0.072	0.000	0.000	0.000

Note: This table presents results for the relationship between independent vs. executive female directors and ESG controversies using sub-samples of firms with high vs. low corporate governance quality, firms belonging to environmentally sensitive vs. non-sensitive industries, and firms with vs. without sustainable compensation policy for executives. *The high governance* sample includes firms with ASSET4 corporate governance performance scores higher than the sample median of corporate governance performance score and the *low governance* sample consists of firms whose ASSET4 corporate governance performance score is less than the sample median of corporate governance performance score. Firms operating in the agricultural, chemical, forestry, fishing and mining, metal, petroleum, and construction industries are included in the environmentally *sensitive industries* sample, and the rest of the firms are included in the *non-sensitive industries* sample (Cho et al., 2010; Gull et al., 2023a). *, **, *** Represent significance at 0.1, 0.05, and 0.01 levels, respectively. Z statistics are given in parentheses. All variables are as defined in Table 1.

4.5. Mechanism analysis

The findings of our main (Table 4) and additional analyses (Table 6) indicate a significant role of independent female directors only in mitigating ESG controversies. Therefore, we argue that independent female directors enhance transparency due to their better monitoring (Sial et al., 2019) and consequently, decrease ESG controversies. We test this mechanism based on third-party assurance of CSR reports. We observe a significant positive association of *FD_PRO* (0.111**) with *ASSURANCE* (Table 7, Column 1), suggesting that female directors enhance third-party assurance of sample firms. Further, we observe a significant positive association of *FD_PRO* (0.269**) with *CONT_SC* (Table 7, Column 2) only for the firms having third-party CSR assurance. These results emphasize that female directors mitigate ESG controversies by bringing transparency. To further investigate this argument, we repeat the analysis for female independent and executive directors and observe a significantly positive (negative) association of *FD_PRO (FD_EX)* with *ASSURANCE* (Table 7, Column 4), suggesting that female independent directors (executive) enhance (decrease) third-party assurance of sample firms. Moreover, we observe significant positive associations of *FD_IND* only with *CONT_SC* for the firms having third-party CSR assurance (Table 7, Column 5) as well as with no CSR assurance (Table 7, Column 6), indicating a significant role of female independent directors only in mitigating ESG controversies by enhancing transparency. This mechanism analysis aligns with the *agency theory* and supports the effective monitoring role of female independent directors in mitigating agency problems, specifically for ESG issues (Sial et al., 2019; García-Sánchez et al., 2025).

5. Discussion of the results

Our results reveal that the representation of female directors on corporate boards mitigates ESG controversies. The female directors' communication skills and monitoring capabilities facilitate raising any potential stakeholders' concerns. This improvement contributes to reducing information asymmetry (*resource-based theory*). Besides, female BoDs prioritize social and environmental issues extending beyond financial considerations in decision-making, an inclination aligned with *gender socialization theory* (Farooq et al., 2022). Additionally, empirical research shows that female directors focus on sustainability, fostering transparency and stakeholder trust, and our mechanism analysis also supports this. This gender-driven divergence leads to fewer ESG controversies (Nekhili et al., 2022; Gull et al., 2023b). While gender socialization theory provides a foundational lens to explain why female directors may prioritize ethical and social concerns, we acknowledge that its application can sometimes lead to overly deterministic assumptions. Recent literature cautions against essentializing female leadership traits, such as empathy and stakeholder orientation, as inherently beneficial for ESG outcomes. For instance, Campopiano et al. (2023) highlight that the positive influence of women on corporate social performance is contingent upon both board-level and institutional factors, and that simplistic associations between gender and ethical behavior risk reinforcing stereotypes.

Furthermore, independent directors, by virtue of their oversight role and relative autonomy, are better positioned to challenge management decisions and advocate for ethical and sustainable practices. Campopiano et al. (2023) emphasize that the effectiveness of female directors is contingent upon board-level structures and institutional contexts, with independent roles offering greater scope for influence. Similarly, Bear et al. (2010) find that the gender composition has a positive effect on CSR ratings and corporate reputation, particularly when women hold roles that allow for strategic oversight. In contrast, executive female directors may face role constraints due to their embeddedness in operational hierarchies, which can limit their ability to act independently on ESG matters. This aligns with broader literature suggesting that the mere presence of women on boards is insufficient unless accompanied by structural empowerment and role clarity. From a strategic perspective, our findings suggest that firms seeking to improve their ESG performance should not only increase female representation but also prioritize appointing women to independent board roles. This approach can strengthen board accountability and reduce the likelihood of ESG controversies.

From a perspective of the role of ESG-linked compensation, female BoDs working with such policies are incentivized to engage more with stakeholders, foster CSR commitments, and strive for higher ESG performance. Considering governance quality, female directors play a

Table 7
Mechanism analysis based on third-party assurance of CSR reports.

	Whole Sample	CSR Assurance	No CSR Assurance	Whole Sample	CSR Assurance	No CSR Assurance
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	ASSURANCE	CONT_SC		ASSURANCE	CONT_SC	
LAG_ASSURANCE	0.885***			0.844***		
	(70.98)			(98.15)		
LAG_CONT_SC		0.378***	0.311***		0.397***	0.320***
		(14.05)	(11.62)		(20.90)	(13.46)
FD_PRO	0.111**	0.269**	0.033			
	(2.52)	(2.47)	(0.33)			
FD_IND				0.118***	0.259***	0.225**
				(3.85)	(2.98)	(2.08)
FD_EX				−0.153***	0.066	0.322
				(-4.07)	(0.23)	(1.20)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2777	851	2329	2777	851	2329
Industry & Year	Yes	Yes	Yes	Yes	Yes	Yes
AR (1) test	−5.684	−5.229	−8.151	−5.595	−5.260	−8.229
AR (1) p-value	0.000	0.000	0.000	0.000	0.000	0.000
Sargan test	2417	75.84	100.4	2413	121.9	111.2
Sargan p-value	0.000	0.002	0.027	0.000	0.001	0.002

Note: This table presents results for the relationship between female directors, independent vs. executive female directors, and ESG controversies based on the firms' likelihood of seeking third-party assurance of CSR reports to enhance transparency. *ASSURANCE* is a dummy variable coded 1 if the CSR report was assured by an external auditor and 0 otherwise. The *CSR Assurance* sample includes firms seeking CSR assurance services and the *No CSR Assurance* sample consists of firms not seeking CSR assurance services.*, **, *** Represent significance at 0.1, 0.05, and 0.01 levels, respectively. Z statistics are given in parentheses. All variables are as defined in Table 1.

substantial role, especially for firms with low governance quality. In such organizations, female BoDs bring a more holistic perspective to corporate governance and navigate the complex interplay between firms' and stakeholders' expectations by managing ESG controversies (Issa and Hanaysha, 2023). Regulatory bodies and institutional investors should consider targeted interventions to promote the appointment of independent female directors in these firms. Measures could include board diversity mandates, ESG-linked governance incentives, or enhanced disclosure requirements to ensure that female directors are not only present but empowered to influence ESG outcomes. In environmentally sensitive industries, female directors' traits, such as being risk-averse and prudent, affect their decision-making (Manita et al., 2018), thereby mitigating the potential societal and environmental negative impact of firms' operations (Issa and Hanaysha, 2023). These firms should be prioritized in board diversity initiatives, as the presence of independent female directors can serve as a critical mechanism for ESG oversight and risk mitigation. Policymakers and institutional investors may consider sector-specific guidelines or incentives to encourage the appointment of independent female directors in these sensitive industries.

6. Conclusion

Financial Times Editorial Report (2024) [4] indicates that ESG funds have faced withdrawals of $40bn as ESG controversies lead to growing concerns among various stakeholders. As such, firms take decisive steps to reconsider their strategies regarding environmental, social, and governance issues. Board diversity is one of the key aspects of addressing ESG controversies. Thus, having a diverse board contributes to promoting better corporate governance practices and enhancing firm performance (Qureshi et al., 2020; Brahma et al., 2021; Galletta et al., 2022). To this end, we aim to investigate when specifically female directors curb corporate ESG controversies. Using a panel of 2347 US-listed non-financial firms' data from 2002 to 2019, we show that board gender diversity mitigates the ESG controversies. Especially, independent female directors play an effective and efficient role in such issues. Besides, we consider specific firm characteristics such as ESG-linked compensation, corporate governance quality, and industry sensitivity. We show the significant effect of female directors in mitigating ESG controversies for firms with poor governance quality, operating in highly sensitive industries, and those that have a sustainability-linked compensation policy.

We contribute to the globally hot topic of gender equality (Adams, 2024) and board diversity. The results emphasize the female directors' roles in corporate governance. Increasing female representation on boards plays a substantial role in mitigating ESG controversies. Besides, gender-diverse boards are highly likely to formulate and implement eco-friendly policies as members bring different experiences and perspectives. This might foster greater transparency and accountability in terms of ESG disclosures. Therefore, policymakers need to consider such essential information as ESG transparency is crucial for maintaining stakeholders' trust, sustainable corporate performance, and avoiding any ESG issues.

Furthermore, corporate boards' structure has been under societal and legislative pressure over the past decade. The push for increased female representation on boards highlights the importance of diversity in decision-making. This enhances the board's effectiveness and corporate sustainability performance. Especially, female independent directors are noteworthy for achieving stronger corporate governance. We also contribute to the existing literature by increasing theoretical and practical awareness of female independent directors' roles in ESG controversies. Notably, it reveals the mechanism for the effective role of female directors and indicates how independent female representation is essential for consequential shifts in corporate governance and sustainability practices. Moving forward, the findings draw policymakers' attention to the value recognition of board gender diversity as not only a matter of gender equality but a pivotal element for sustainability. The effective monitoring role of independent female directors by enhancing transparency has policy implications for devising better internal governance mechanisms to help reduce corporate controversies.

While this research contributes to governance and sustainability literature, it is important to acknowledge its limitations to point to avenues for future research. Female directors' characteristics, such as qualifications, experience, and complementary analyses on the effect of the feminization of executive officers on ESG controversies, can be incorporated into future studies.

[4] The unsustainable hype around ESG (Financial Times – 2024).

CRediT authorship contribution statement

Ammar Ali Gull: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Inam Ul Haq:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Conceptualization. **Abdul Ghafoor:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Conceptualization. **Tanveer Ahsan:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Yasar Bayraktar:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

References

Abdelkader, M.G., Gao, Y., Elamer, A.A., 2024. Board gender diversity and ESG performance: the mediating role of temporal orientation in South Africa context. J. Clean. Prod. 440, 140728. https://doi.org/10.1016/j.jclepro.2024.140728.

Adams, R.B., 2024. A woman's world: evidence from five artworks. Working paper. https://www.linkedin.com/feed/update/urn:li:activity:7206930981121835008/.

Adams, R.B., Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance. Journal of Financial Economics 94 (2), 291–309. https://doi.org/10.1016/j.jfineco.2008.10.007.

Agnese, P., Battaglia, F., Busato, F., Taddeo, S., 2023. ESG controversies and governance: evidence from the banking industry. Finance Res. Lett. 53 (3), 103397. https://doi.org/10.1016/j.frl.2022.103397.

Ahsan, T., Al-Gamrh, B., Qureshi, M.A., Gull, A.A., 2024. Does eco-innovation foster or hinder environmental performance? Recent evidence from Europe. Int. J. Green Energy 21 (2), 205–215. https://doi.org/10.1080/15435075.2023.2194982.

Al-Najjar, B., Salama, A., 2022. Mind the gap: are female directors and executives more sensitive to the environment in high-tech US firms? Technol. Forecast. Soc. Change 184 (11), 122024. https://doi.org/10.1016/j.techfore.2022.122024.

Altunbas, Y., Gambacorta, L., Reghezza, A., Velliscig, G., 2022. Does gender diversity in the workplace mitigate climate change? J. Corp. Finance 77, 102303. https://doi.org/10.1016/j.jcorpfin.2022.102303. December.

Aouadi, A., Marsat, S., 2018. Do ESG controversies matter for firm value? Evidence from international data. J. Bus. Ethics 151 (4), 1027–1047. https://doi.org/10.1007/s10551-016-3213-8.

Avetisyan, E., Hockerts, K., 2017. The consolidation of the ESG rating industry as an enactment of institutional retrogression. Bus. Strat. Environ. 26 (3), 316–330. https://doi.org/10.1002/bse.1919.

Bear, S., Rahman, N., Post, C., 2010. The impact of board diversity and gender composition on corporate social responsibility and firm reputation. J. Bus. Ethics 97 (2), 207–221. https://doi.org/10.1007/s10551-010-0505-2.
Blau, P.M., 1977. Inequality and Heterogeneity: a Primitive Theory of Social Structure. Free Press, New York.
Brahma, S., Nwafor, C., Boateng, A., 2021. Board gender diversity and firm performance: the UK evidence. Int. J. Finance Econ. 26 (4), 5704–5719. https://doi.org/10.1002/ijfe.2089.
Campopiano, G., Gabaldón, P., Gimenez-Jimenez, D., 2023. Women directors and corporate social performance: an integrative review of the literature and a future research agenda. J. Bus. Ethics 182 (3), 717–746. https://doi.org/10.1007/s10551-021-04999-7.
Cho, C.H., Roberts, R.W., Patten, D.M., 2010. The language of US corporate environmental disclosure. Accounting, Organizations and Society 35 (4), 431–443. https://doi.org/10.1016/j.aos.2009.10.002.
Chodorow, N., 1978. The Reproduction of Mothering: Psychoanalysis and the Sociology of Gender. Standford University Press, Redwood City.
Dawar, V., 2014. Agency theory, capital structure and firm performance: some Indian evidence. Manag. Finance 40 (12), 1190–1206. https://doi.org/10.1108/MF-10-2013-0275.
De Masi, S., Słomka-Gołębiowska, A., Paci, A., 2022. Women on boards and corporate environmental performance in Italian companies: the importance of nomination background. Bus. Ethics Environ. Responsib. 31 (4), 981–998. https://doi.org/10.1111/beer.12467.
Elamer, A.A., Boulhaga, M., 2024. ESG controversies and corporate performance: the moderating effect of governance mechanisms and ESG practices. Corp. Soc. Responsib. Environ. Manag. Early View 31, 4. https://doi.org/10.1002/csr.2749.
Fama, E.F., 1980. Agency problems and the theory of the firm. J. Polit. Econ. 88 (2), 288–307. https://doi.org/10.1086/260866.
Fama, E.F., Jensen, M.C., 1983. Separation of ownership and control. J. Law Econ. 26 (2), 301–325. https://doi.org/10.1086/467037.
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. Finance Res. Lett. 47 (B), 102730. https://doi.org/10.1016/j.frl.2022.102730.
Galletta, S., Mazzù, S., Naciti, V., Vermiglio, C., 2022. 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., Núñez-Torrado, M., Aibar-Guzmán, C., Aibar-Guzmán, B., 2025. Beyond climate targets: exploring when and how female directors influence corporate decarbonization transparency. Bus. Strat. Environ. 34 (3), 3892–3912. https://doi.org/10.1002/bse.4183.
Gillan, S.L., Koch, A., Starks, L.T., 2021. Firms and social responsibility: a review of ESG and CSR research in corporate finance. J. Corp. Finance 66, 101889. https://doi.org/10.1016/j.jcorpfin.2021.101889. February.
Gull, A.A., Atif, M., Hussain, N., 2023a. Board gender composition and waste management: cross-Country evidence. Br. Account. Rev. 55 (1), 101097. https://doi.org/10.1016/j.bar.2022.101097.
Gull, A.A., Hussain, N., Akbar Khan, S., Nadeem, M., Mansour Zalata, A., 2023b. Walking the talk? A corporate governance perspective on corporate social responsibility decoupling. Br. J. Manag. 34 (4), 2186–2211. https://doi.org/10.1111/1467-8551.12695.
Issa, A., Hanaysha, J.R., 2023. Breaking the glass ceiling for a sustainable future: the power of women on corporate boards in reducing ESG controversies. Int. J. Account. Inf. Manag. 31 (4), 623–646. https://doi.org/10.1108/IJAIM-03-2023-0053.
Jin, R., Jiang, X., Hu, H.W., 2021. Internal and external CSR in China: how do women independent directors matter? Asia Pac. J. Manag. 40 (1), 169–204. https://doi.org/10.1007/s10490-021-09783-9.
Jizi, M., 2017. The influence of board composition on sustainable development disclosure. Bus. Strat. Environ. 26 (5), 640–655. https://doi.org/10.1002/bse.1943.
Li, X., Li, Y., 2020. Female independent directors and financial irregularities in Chinese listed firms: from the perspective of audit committee chairpersons. Finance Res. Lett. 32 (1), 101320. https://doi.org/10.1016/j.frl.2019.101320.
Mallidis, I., Giannarakis, G., Sariannidis, N., 2024. Impact of board gender diversity on environmental, social and ESG controversies performance: the moderating role of united nations global compact and ISO. J. Clean. Prod. 444, 141047. https://doi.org/10.1016/j.jclepro.2024.141047.
Manita, R., Bruna, M.G., Dang, R., Houanti, L.H., 2018. Board gender diversity and ESG disclosure: evidence from the USA. J. Appl. Account. Res. 19 (2), 206–224. https://doi.org/10.1108/JAAR-01-2017-0024.
Nadeem, M., Bahadar, S., Gull, A.A., Iqbal, U., 2020. Are women eco-friendly? Board gender diversity and environmental innovation. Bus. Strat. Environ. 29 (8), 3146–3161. https://doi.org/10.1002/bse.2563.
Nekhili, M., Bennouri, M., Nagati, H., 2022. Do board gender quotas benefit minority shareholders? An illustration through related-party transactions. Br. J. Manag. 33 (2), 724–752. https://doi.org/10.1111/1467-8551.12467.
Nekhili, M., Boukadhaba, A., Nagati, H., 2021. The ESG–financial performance relationship: does the type of employee board representation matter? Corp. Govern. Int. Rev. 29 (2), 134–161. https://doi.org/10.1111/corg.12345.
Nerantzidis, M., Tzeremes, P., Koutoupis, A., Pourgias, A., 2022. Exploring the Black box: board gender diversity and corporate social performance. Finance Res. Lett. 48, 102987. https://doi.org/10.1016/j.frl.2022.102987. August.
Nirino, N., Santoro, G., Miglietta, N., Quaglia, R., 2021. Corporate controversies and company's financial performance: exploring the moderating role of ESG practices. Technol. Forecast. Soc. Change 162 (1), 120341. https://doi.org/10.1016/j.frl.2022.103397.
Qureshi, M. Azeem, Gull, A.A., Ahsan, T., 2024. Sentry eyes? Women directors and corporate penalties. J. Clean. Prod. 484, 144297. https://doi.org/10.1016/j.jclepro.2024.144297. December.
Qureshi, M.A., Kirkerud, S., Theresa, K., Ahsan, T., 2020. The impact of sustainability (environmental, social, and governance) disclosure and board diversity on firm value: the moderating role of industry sensitivity. Bus. Strat. Environ. 29 (3), 1199–1214. https://doi.org/10.1002/bse.2427.
Radu, C., Smaili, N., 2021. Alignment versus monitoring: an examination of the effect of the CSR committee and CSR-Linked executive compensation on CSR performance. J. Bus. Ethics 180 (1), 145–163. https://doi.org/10.1007/s10551-021-04904-2.
Rjiba, H., Thavaharan, T., 2022. Female representation on boards and carbon emissions: international evidence. Finance Res. Lett. 49, 103079. https://doi.org/10.1016/j.frl.2022.103079. October.
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/10.1177/2F1536867X0900900106.
Shahab, Y., Gull, A.A., Rind, A.A., Ahsan, A., Ahsan, T., 2022. Do corporate governance mechanisms curb the anti-environmental behavior of firms worldwide? An illustration through waste management. J. Environ. Manag. 310, 114707. https://doi.org/10.1016/j.jenvman.2022.114707. May.
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 Market. 39 (4), 661–677. https://doi.org/10.1108/IJBM-04-2020-0210.
Shannon, C.E., 1948. A mathematical theory of communication. Bell Syst. Tech. J. 27 (3), 379–423. https://doi.org/10.1002/j.1538-7305.1948.tb01338.x.
Sial, M.S., Chunmei, Z., Khuong, N.V., 2019. Do female and independent directors explain the two-way relationship between corporate social responsibility and earnings management of Chinese listed firms? Int. J. Account. Inf. Manag. 27 (3), 442–460. https://doi.org/10.1108/IJAIM-03-2018-0027.
Vaughan, A., 2022. Deepwater horizon oil spill did no harm to BP's long-term share value [Online]. Available: https://www.newscientist.com/article/2324039-deepwater-horizon-oil-spill-did-no-harm-to-bps-long-term-share-value/. (Accessed 2 November 2023).
Wahid, A.S., 2019. The effects and the mechanisms of board gender diversity: evidence from financial manipulation. J. Bus. Ethics 159 (3), 705–725. https://doi.org/10.1007/s10551-018-3785-6.
Wang, B., Yang, Y., 2025. The impact of female board representation on corporate environmental, social and governance performance: a dual perspective based on institutional environment and market competition. Corp. Soc. Responsib. Environ. Manag. Early view. https://doi.org/10.1002/csr.3156.
Wernerfelt, B., 1984. A resource-based view of the firm. Strateg. Manag. J. 5 (2), 171–180. https://doi.org/10.1002/smj.4250050207.
Wong, A., Neher, A., 2024. ESG performance and board of directors compensation: a European perspective. Handbook of Environmental and Green Finance: toward a Sustainable Future. World Scientific.
Zhu, J., Ye, K., Tucker, J.W., Chan, K.J.C., 2016. Board hierarchy, independent directors, and firm value: evidence from China. J. Corp. Finance 41, 262–279. https://doi.org/10.1016/j.jcorpfin.2016.09.009. December.