Accounting and Management Information Systems
Vol. 24, No. 1, pp. 173-202, 2025
DOI: http://dx.doi.org/10.24818/jamis.2025.01006

Does gender diversity moderate the relationship between corporate social responsibility and financial distress in European firms?

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Abstract

Purpose: this study provides a valuable contribution by exploring the moderating effect of gender diversity on the relationship between corporate social responsibility and financial distress.

Design/Methodology/Approach: the study is based on a sample consisting of 488 European firms over the 2010–2022 period. This paper is motivated by moderation model that specify the interaction between corporate social responsibility, financial distress, and gender diversity.

Findings: our results show that a high level of corporate social responsibility is negatively associated with financial distress in firms with a higher percentage of gender diversity.

Practical implications: the findings of this study may interest academic researchers, investors, and regulators. Academic researchers will find value in exploring the dynamic relationship between corporate social responsibility (CSR), financial distress, and gender diversity. For investors, our results indicate that the presence of female directors on the board is associated with increased financial distress. For regulators, our findings suggest that policymakers worldwide should emphasize the importance of female roles in enhancing firms' engagement in corporate social responsibility reporting.

Originality/value: This paper contributes to the existing literature by examining the moderating effect of gender diversity on the relationship between corporate social responsibility and financial distress within the European context.

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Article History: Received 18 May 2024; Accepted 16 March 2025.
Accepted by: Nadia Albu.

Keywords: corporate social responsibility, financial distress, gender diversity, female directors.

JEL codes: M14

1. Introduction

Corporate social responsibility (CSR) has become a focal point today. For this reason, when viewed strategically, CSR stems from the vision and values of top management. It's not seen as an expense but rather as a strategic initiative embraced by organizations to distinguish themselves from competitors. (Beji *et al*., 2021; Porter & Kramer, 2006; Serra-Cantallops *et al.*, 2018). CSR is predominantly being viewed as a strategic issue (Zerbini, 2017), and such a strategic interest of organizations towards CSR needs to be addressed by scholars when we take into consideration the significant time and resources invested in implementing CSR strategically within the organization (Bansal *et al.*, 2015). CSR performance has also been the subject of scrutiny by various parties. In this context, Carroll (1979) argues that corporate social responsibility (CSR) involves integrating economic, legal, ethical, and philanthropic responsibilities into corporate decision-making. This approach advocates for firms to prioritize the interests of stakeholders beyond their shareholders. Companies that fail often face significant financial difficulties or distress. In this area, Lucky and Michael (2019) and Santoso and Nugrahanti (2022) define financial distress as a state in which a company cannot meet its maturing financial obligations. Platt and Platt (2002) further explain that financial distress signifies a significant decline in a company's financial health, potentially leading to more severe outcomes like liquidation or bankruptcy. Companies in financial distress face substantial financial challenges and restricted access to external funding.

Recently, researchers have studied the impact of CSR on financial distress. In fact, Utami *et al* (2021) showed that CSR has an effect significant negative about financial distress, which means that more companies disclose information about CSR, less companies are likely to find themselves in a situation of financial distress. In this study, we examine the impact of Corporate Social Responsibility (CSR) on financial distress, focusing on how female executives moderate this relationship. By doing so, we aim to reconcile the differences found in existing studies. The European Commission (2001) has articulated a business case for CSR, stating that “companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis”. This vision imposes new responsibilities on boards and individual directors regarding corporate activities and accountability, which raises the question of a possible link between gender diversity and a firm's CSR disclosure.

Previous CSR studies have not addressed the moderating role of female executives in the relationship between CSR and financial distress. Regarding CSR issues, a large body of literature has examined extensively the relationship between CSR and financial distress on the one hand and the relationship between CSR and gender diversity on the other hand. Furthermore, few studies have examined the contribution of the role of women executive to CSR and to financial distress. Given these gaps in the literature, this study makes several contributions that can be described as follows. Corporate social responsibility (CSR) has become a focal point today. When viewed strategically, CSR stems from the vision and values of top management. First, this paper offers a theoretical contribution to the literature on gender diversity, financial distress, and CSR by explaining the relationship between financial distress, female executives, and CSR. Second, it provides a practical contribution by examining the moderating effect of female executives on the relationship between CSR and financial distress. Specifically, the empirical findings of this study provide answers to questions about the direct relationship between financial distress and CSR and the effect of gender diversity on this relationship.

Our findings have practical implications that may be useful to the academic researchers, practitioners, who are interested in discovering corporate governance practices and their relationship with CSR. In this area, the presence of female executives can enhance the positive impact of CSR initiatives on a firm's financial stability, particularly in times of financial distress. This suggests that firms with more gender-diverse leadership teams may be better positioned to leverage their CSR efforts to mitigate financial risks. For companies and policymakers, this study highlights the importance of promoting gender diversity at the executive level as a strategic measure. Companies may benefit from intentionally fostering a diverse leadership team, not only to enhance their CSR efforts but also to strengthen their resilience against financial challenges.

Moreover, investors and stakeholders can consider gender diversity as a key factor when assessing a firm's risk profile and its potential for sustainable growth. This could lead to increased support for policies and practices that encourage greater representation of women in top management positions. In fact, female executives often bring different perspectives and experiences to the table, which can enhance decision-making processes. This diversity can lead to more comprehensive assessments of risks and opportunities associated with CSR initiatives. In times of financial distress, having a leadership team that can evaluate situations from multiple angles can result in more robust strategies to navigate challenges. Therefore, studies have shown that female leaders may prioritize ethical considerations and stakeholder welfare more than their male counterparts. This can align closely with CSR objectives, ensuring that the firm's social and environmental responsibilities are not compromised even in tough economic times. As a result, companies may maintain better relationships with stakeholders, including customers, suppliers, and the community, which can be crucial for long-term survival and recovery during

financial distress. For firms, a practical implication is the need to develop policies and practices that promote gender diversity at all levels, especially in leadership positions. This could include targeted recruitment efforts, mentorship programs, and policies that support work-life balance, which are critical for retaining female talent. Companies might also focus on creating an inclusive corporate culture that values diverse perspectives and fosters equitable opportunities for all employees. The central question of this paper investigates how a higher percentage of women on the board of directors can moderate the relationship between CSR and financial distress. Data for this study were collected using DataStream, composed by 488 European non-financial companies from 2010 to 2022. The structure of the paper is as follows. Section 2 presents a review of the literature and the research hypotheses. Section 3 outlines the methodology, including a description of the sample, definitions of the variables, and the analyses used. Section 4 presents the main empirical results and section 5 presents a robustness test. Finally, concluding remarks are provided in Section 6.

2. Literature review and hypotheses development

A substantial and expanding body of literature has explored the connection between CSR and financial distress. One of the non-financial factors that can influence financial difficulties, or financial distress is the disclosure of corporate social responsibility, often referred to as Corporate Social Responsibility Disclosure (Al Hadi *et al*., 2017; Walliya, 2023). Stakeholder theory suggested that moral capital or goodwill can be generated through enhanced investments in CSR, acting as an insurance mechanism that reduces a firm's risk exposure. Lee and Faff (2009) argued that investment decisions should consider both financial and non-financial criteria, predicting that socially responsible companies would attract more investors, thereby reducing the company's risk. Sun and Stuebs (2012) examined the relationship between CSR and firm productivity using a sample of chemical industry companies in Italy, concluding that CSR positively influences firm competitiveness through a cycle of learning and innovation. Saorin *et al.* (2018) studied the relationship between CSR and operational inefficiency in French firms from 2004 to 2015, finding that CSR engagement benefits firms by enhancing reputation, providing insurance-like protection, improving shareholder wealth, managing risk better, boosting market demand, increasing transparency in disclosure and reporting, and facilitating better access to financial markets. Boubaker *et al.* (2020) found that companies with higher CSR levels have a lower financial distress risk (FDR), indicating that strong CSR performance enhances creditworthiness and financing access, thus reducing default risk. However, the role of CSR is increasingly recognized in the literature, but some areas remain so far unexplored. Recent studies on CSR and the availability of credit show that firms with a high CSR ranking can leverage their reputation to obtain financing at lower borrowing costs. (Boubaker *et al*., 2020). Consistent with these findings, Farooq *et al.* (2022), and Aziz (2023)

reported a significant negative impact of CSR on financial distress, supporting the view that CSR aligns shareholder and stakeholder interests while mitigating financial distress risk. Thus, we formulate this hypothesis.

H1. *The level of corporate social responsibility is negatively related with financial distress.*

A cluster of evidence suggests that female representation on boards could enhance the transparency and ethical compliance of companies. In this context, we propose an exploration of how women executives impact the relationship between CSR and financial distress. Gender diversity is more likely to understand stakeholders' preferences and the environment that the business operates in which in turn promote CSR initiatives and strategies (Wasiuzzaman & Wan Mohammad, 2020). Moreover, women are more ethically sensitive and more concerned about ethical issues than men. Alternatively, women are less tolerant of unethical practices (Ho *et al*., 2015). Less tolerance toward unethical behaviors could partially demonstrate why women tend to be more aware of ethical issues such as CSR (Galbreath, 2018). Since women in the boardroom are more attentive to corporate social responsibilities, they are expected to encourage more sustainable corporate practices, among which would be eco-innovation (Carvajal *et al.,* 2022; Ayman Issa, 2023). According to the authors who study the positive relationship between women in the boards and CSR (Issa & Bensalem, 2023). Women on the board of directors bring different values and interests, and a different understanding of values (Post & Byron, 2015). For example, women directors tend to have more university degrees and are more likely to hold graduate degrees so they may also influence decision-making processes within the board (Adams & Funk, 2012). They are also more likely to bring marketing and sales strengths which can contribute to more holistic thinking and a better assessment of CSR risks and opportunities. Birindelli *et al*. (2019) found companies with more women on their boards tend to perform better financially. A high level of financial performance can provide the company with the resources to invest more in CSR initiatives (Lara *et al.*, 2017).

Therefore, having a female CEO is expected to improve the company's performance and mitigate the risk of financial distress (Kristanti, 2019).Financial distress is one of the conditions that makes the company’s board of directors’ face difficulties in paying off obligations caused by the company’s total assets can no longer cover obligations to creditors which, if this condition is left unchecked, can lead the company towards financial difficulties, thereby triggering management to manipulate financial reports (Silviana & Sambuaga 2022). According to research conducted by Kristanti (2015) gender diversity has been identified as having a detrimental effect on financial distress. Female directors bring less financial distress due to their lower risk preference, thus reducing financing costs (Harris *et al.,* 2019). This contradicts the findings of research by Sholikhah (2018) which concluded that CEO gender does not influence financial distress. Diverse boards are in a better

position to perform an advisory role because heterogeneous members bring high-quality resources in the form of skills, knowledge, information, and outside connections at their disposal (Hillman *et al.,* 2003; Loukil *et al.,* 2019). Thus, based on agency and resource-based views, it is argued that a more diverse board has better monitoring and advisory capabilities, which can ultimately improve the performance and mitigate financial distress (Yousaf *et al.,* 2021). Additionally, there is a broad literature that suggests women tend to make less risky decisions and exhibit lower levels of overconfidence than men (Croson & Gneezy, 2009). Women have also been shown to focus more on strategies that avoid the worst outcomes and offer greater security, including lower likelihood of financial misreporting (Gupta *et al.,* 2020) and a lower propensity to issue debt, which reduce the risk of financial distress (Garcia and Herrero 2021). Women on the board of directors improves the oversight role and accountability of executives (Adams *et al.,* 2011), which will enhance the effectiveness of the company. A higher rate of gender diversity on the board improved performance through effective business oversight *et al*ignment of risk preference between executives and shareholders (Chen *et al.,* 2019; Wang 2020), which may increase the likelihood of financial distress risk (Yousaf *et al.*, 2021). Therefore, our second assumption is formulated as follows:

H2. *Women on the board moderate the relationship between corporate social responsibility and financial distress.*

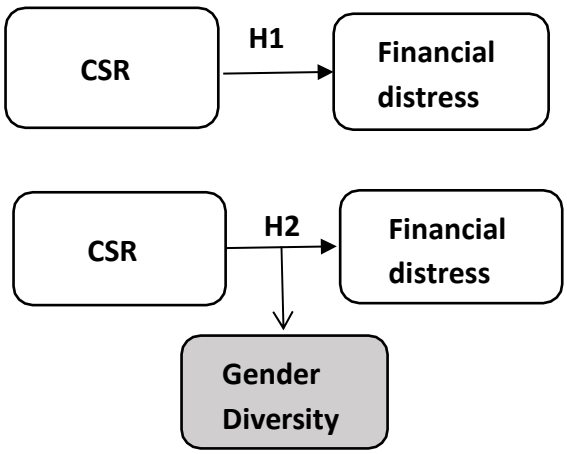

Figure 1. Conceptual framework

3. Research methodology

3.1 Sample selection

This paper utilized a sample composed by **488** European listed companies in the non-financial sector. The study period spans from the beginning of **2010** to the end of **2022**. **Table** 1 provides an overview of the distribution of the listed firms in our sample. Hence, our dataset consists of **488** firms and **5381** observations, as detailed in **Table 1** below. The data have been collected from the DataStream database.

Table 1. Sample selection

Sample	of firms
Initial sample	600
Financial firms	(100)
Companies with missing data	(12)
Final sample	488
Duration of study	13
Total observations	6344

3.2 Variables measurement

3.2.1 Dependent variable

The dependent variable in this analysis is the magnitude of financial distress. Financial distress is measured by Z-score. Thus, is an indicator used to assess the financial health of a company. It is based on several key financial ratios and is used to predict the probability of a company's bankruptcy. The general formula of the Z score was developed by Edward I. Altman in (1968) and is calculated as follows:

$$Z\ score = 1.2X1+1.4X2+3.3X3+0.6X4+0.9X5$$

Where:
X1: working capital/total assets.
X2: retained earnings/total assets.
X3: earnings before interest and taxes/total assets.
X4: market value equity/book value of total debt.
X5: sales/total assets.

Where **X1** is the percentage of working capital to total assets, **X2** is the percentage of retained earnings to total assets, **X3** is the percentage of earnings before interest and taxes to total assets, **X4** is the percentage of the market value of equity to total liabilities, and **X5** is the percentage of sales to total assets. According to the **Z-score**, a firm is in the safe zone for values greater than 2.99 and in the distress zone for values lower than 1.81. The intermediate values between these two extremes represent the so- called "gray area", which signals uncertainty regarding a firm's viability.

3.3.2 Independent variables

Corporate Social Responsibility (CSR)

The independent variable in this study is the CSR score assigned to companies by Thomson Reuters in the ASSET4 database. This score is based on over 750 individual data points and represents the weighted average of assessments in four key dimensions: economic performance, environmental performance, social performance, and corporate governance. Scores range from 0 to 100, with higher scores indicating stronger performance. The composite score across these dimensions, termed CSR in this study, serves as the measure of corporate social responsibility.

CSR = Average (Score_Envt + Score_Soc+Score_Gov)

Gender diversity:
Having women on a board can bring a different perspective to a company's governance and decision-making. Eagly *et al.* (2003) show that when women are in leadership positions, they are less hierarchical, more cooperative, and collaborative and seek opportunities to enhance and enhance the value of other employers. However, gender diversity is the representation of women on the firm's board of directors. It often refers to a quota of women on the board of directors (Blickenstaff, 2005; Campbell *et al.,* 2008).

Gender diversity*= Number of women on the board /Total number of directors.*

3.3.3 Control variables

Size:
According to Lanis and Richardson (2012), larger firms tend to adopt more aggressive tax policies compared to smaller firms. Gupta and Newberry (1997) argue that size can influence tax avoidance strategies in certain contexts. Therefore, we include size (SIZE) as a control variable in our analysis, which is measured as the natural logarithm of total assets.

Leverage (LEV):
Chasbiandani and Martani (2012) used leverage as a control variable. They found that firms having debts would be more aggressive in gaining an opportunity to apply tax reduction as consequence of interest payment (Sari & Tjen, 2017). LEV is measured by total debts divided by total assets.

Return on assets (ROA):
is measured as pre-tax income divided by total asset (Mafrolla and D'Amico 2016). Companies engage in tax avoidance to improve performance. To control for overall performance, we include ROA.

3.3 Regression model

Our research model was as follows: To test my hypothesis, we estimate the following model:

$$\boldsymbol{FDit} = Q_0 + Q_1\boldsymbol{CSR}_{it} + Q_2\boldsymbol{SIZE}_{it} + Q_3\,\boldsymbol{LEV}_{it} + Q_4\,\boldsymbol{ROA}_{it} + \boldsymbol{year\ fixed\ effect}_{it} + \boldsymbol{firm\ fixed\ effect}_{it} + s_{it} \textbf{ (model 1)}$$

FD: Financial distress Z-score; CSR: corporate social responsibility score; SIZE: is calculated as a natural logarithm of total assets; LEV: is calculated as the ratio of total debt to total assets; ROA: is measured as pre-tax income divided by total asset.

To investigate how environmental, social, and corporate governance performance influence the relationship between corporate social responsibility (CSR) and the level of financial distress, we propose the following three empirical models:

$$\boldsymbol{FDit} = Q_0 + Q_1\boldsymbol{CSRENV}_{it} + Q_2\boldsymbol{SIZE}_{it} + Q_3\,\boldsymbol{LEV}_{it} + Q_4\,\boldsymbol{ROA}_{it} + \boldsymbol{year\ fixed\ effect}_{it} + \boldsymbol{firm\ fixed\ effect}_{it} + s_{it} \textbf{ (model 1.1)}$$

$$\boldsymbol{FDit} = Q_0 + Q_1\boldsymbol{CSRSOC}_{it} + Q_2\boldsymbol{SIZE}_{it} + Q_3\,\boldsymbol{LEV}_{it} + Q_4\,\boldsymbol{ROA}_{it} + \boldsymbol{year\ fixed\ effect}_{it} + \boldsymbol{firm\ fixed\ effect}_{it} + s_{it} \textbf{ (model 1.2)}$$

$$\boldsymbol{FDit} = Q_0 + Q_1\boldsymbol{CSRGOV}_{it} + Q_2\boldsymbol{SIZE}_{it} + Q_3\,\boldsymbol{LEV}_{it} + Q_4\,\boldsymbol{ROA}_{it} + \boldsymbol{year\ fixed\ effect}_{it} + \boldsymbol{firm\ fixed\ effect}_{it} + s_{it} \textbf{ (model 1.3)}$$

FD: Financial distress Z-score; CSR: corporate social responsibility score; CSRENV ; the environmental dimension, measured by a score determined by the ASSET4 database (model 1.1) ;CSRSOC: the social dimension, measured by a score determined by the ASSET4 database (model 1.2);CSRGOV: the dimension of corporate governance, measured by a score determined by the ASSET4 database (model 1.3) SIZE: is calculated as a natural logarithm of total assets; LEV: is calculated as the ratio of total debt to total assets; ROA: is measured as pre-tax income divided by total asset.

Equation (1) allows the estimation of the main effects of CSR. According to hypothesis 1 we expect that β1 is positive in model (1). To test the hypothesis that the presence of women on the board moderates the relationship between financial

distress and corporate social responsibility (CSR). We estimate equation, which includes women on the board. According to hypothesis 2, we estimate the model (2) as described below:

$$\boldsymbol{FDit} = Q_0 + Q_1\boldsymbol{CSR_{it}} + Q_2\boldsymbol{GD_{it}} + Q_3\boldsymbol{CSR * GD_{it}} + Q_4\boldsymbol{SIZE_{it}} + Q_5\boldsymbol{LEV_{it}} + Q_6\boldsymbol{ROA_{it}} + \boldsymbol{year\ fixed\ effect_{it}} + \boldsymbol{firm\ fixed\ effect_{it}} + s_{it}\ \textbf{\textit{(model 2)}}$$

FD: Financial distress Z-score; GD: percentage of women on the board; CSR: corporate social responsibility score; SIZE: is calculated as a natural logarithm of total assets; LEV: is calculated as the ratio of total debt to total assets; ROA: is measured as pre-tax income divided by total asset.

The study employs Ordinary Least Squares (OLS) regression analysis to investigate the moderating effect of women on the board on the relation between corporate social responsibility and financial distress.

4. Empirical results

4.1 Descriptive statistical analysis

Table 2 presents descriptive statistics of all the variable; we find that the variable FD displays a minimum of -0.17 with a maximum of 4.30 while the average is 1.50. These results are consistent with the figures reported in the previous literature (Altman, 1968; Hsu *et al.,* 2022; Kassem & Turksen, 2021) this means when the company was not considered a problem in the financial situation, it had a Z-score higher than 2.9 while when the company experienced some financial problems (not serious) it had 2.7 < Z-score < 2.9 and when the company will have financial problems if it does not make significant improvements in its management and financial structure, it had 1.8 < Z-score < 2.6 and finally when the company has serious financial problems, it had a Z-score below 1.8.

Starting with the CSR variable, the descriptive statistics show that the level of societal engagement of the companies in our sample varies by a minimum score of 2.6 reflecting a low level of interest gives social concerns, environmental and governance and a maximum score of 95.99 reflecting a strong concern for societal issues. Our examination of the variable CSRENV, CSRSOC and CSRGOV found a minimum of 0, 1.16 and 2.78 and a maximum of 99.09, 98.3 and 98.73 with an average of 64.13, 66.23 and 60.44. This is explained by the fact that most European companies are increasingly engaged in societal practices and pay particular attention to environmental factors, social and corporate governance decisions. This result is consistent with the authors (Utami *et al.,* 2021; Oware, 2023; Tarighi, 2022 and Zheng, 2019). For the variable GD The results indicate that the average of women board members in the sampled companies is 27.16%. This result is consistent with the authors (Wu & Liu 2022; Huang & Kisgen, 2013).

Table 2. Descriptive statistics

Variable	Median	Average	Minimum	Maximum	Standard deviation
FD	1.33	1.50	-0.17	4.30	1.12
DG	28.57	27.16	0	75	13.70
CSR	67.32	63.81	2.6	95.99	18.54
CSRENV	69.48	64.13	0	99.09	24.07
CSRSOC	71.32	66.23	1.16	98.3	21.67
CSRGOV	63.95	60.44	2.78	98.73	21.80
SIZE	16.20	16.27	10.33	21.10	1.55
LEV	25.49	26.23	0	85.61	15.15
ROA	6.14	7.23	-53.22	80.13	7.35

FD: Financial distress Z-score; GD: percentage of women on the board; CSR: corporate social responsibility score; SIZE: is calculated as a natural logarithm of total assets; LEV: is calculated as the ratio of total debt to total assets; ROA: is measured as pre-tax income divided by total asset.

4.2 Correlations analysis

Table 3 presents the correlations among the variables. The results show a strong correlation of 0.893 between the CSR and CSRSOC variables, which is significant at the 10% level. Similarly, the CSR and CSRENV variables exhibit a strong positive correlation of 0.807, also significant at the 10% level. Additionally, the control variable Size shows low positive correlations with CSR (0.194), CSRENV (0.167), CSRSOC (0.202), CSRGOV (0.110), and LEV (0.220), all significant at the 10% level. Then, the ROA control variable has negative correlations with most other variables, suggesting an inverse relationship with these variables. However, the LEV control variable has positive correlations with most other variables, although these correlations are not very high, this matrix provides a preliminary view of the relationship between dependent and independent variables.

Table 3. Correlation analysis

	CSR	CSRENV	CSRSOC	CSRGOV	GD	LEV	ENDET	ROA
CSR	1							
CSRENV	0.807*	1						
CSRSOC	0.893*	0.687*	1					
CSRGOV	0.694*	0.332*	0.415*	1				
GD	0.124*	0.112*	0.024*	0.113	1			
SIZE	0.194*	0.167*	0.202*	0.110*	0.220*	1		
LEV	0.059*	0.045*	0.044*	0.069*	0.081*	0.186*	1	
ROA	-0.088*	-0.069*	-0.074*	-0.074*	0.023	-0.265*	-0.182*	1

FD: Financial distress Z-score; GD: percentage of women on the board; CSR: corporate social responsibility score; SIZE: is calculated as a natural logarithm of total assets; LEV: is calculated as the ratio of total debt to total assets; ROA: is measured as pre-tax income divided by total asset.
**** indicates significance at a level below 1%, ** indicates significance at a level below 5%, * indicates significance at a level below 10%.*

4.3 Results and discussion

4.3.1 Essential statistical tests

Table 4 indicates that the tolerance levels for all variables are close to 1, confirming the hypothesis that there is no multicollinearity issue among the variables. Additionally, the variance inflation factors (VIF), all of which are less than 10 (following Myers, 1990), further support that multicollinearity does not appear to be a problem in our empirical models.

Table 4. Collinearity test between independent variables

Variables	Collinearity statistics	
	VIP	**tolerances**
CSR	1.04	0.960
CSRENV	1.03	0.971
CSRSOC	1.04	0.959
CSRGOV	1.02	0.984
GD	1.06	0.941
SIZE	1.13	0.882
LEV	1.06	0.946
ROA	1.10	0.910

**** indicates significance at a level below 1%, ** indicates significance at a level below 5%, * indicates significance at a level below 10%.*

The table 5 below displays the results of heteroscedasticity tests conducted for two multiple regression models. For detecting heteroscedasticity, we utilized the Breusch-Pagan test, which tests the null hypothesis that the coefficients of the regression of squared residuals are zero. The Breusch-Pagan test indicates significant results for both models, indicating the presence of heteroscedasticity issues in these models.

Table 5. Heteroscedasticity test

The dependent variables				
	Model1	Model1.1	Model1.2	Model1.3
Chi-2 test	644.12***	635.15***	642.56***	635.97***
Sig	0.000	0.000	0.000	0.000

**** indicates significance at a level below 1%, ** indicates significance at a level below 5%, * indicates significance at a level below 10%*

The following table 6 presents the heteroscedasticity test results for multiple regression Model 2. For detecting heteroscedasticity, we opted for the Breusch-Pagan test. In this context, we test the null hypothesis, which states that the coefficients of the regression of squared residuals are zero. The Breusch-Pagan heteroscedasticity test for Model 2 is significant, indicating that there is a

heteroscedasticity problem for this model. In fact, the presence of heteroscedasticity in a regression model can affect the validity of the results in several ways[i]:

a. **Biased Standard Errors**: Heteroscedasticity occurs when the variance of the errors is not constant across observations. This can lead to biased standard errors of the estimated coefficients. As a result, hypothesis tests, such as t-tests and F-tests, may yield inaccurate p-values, leading to incorrect conclusions about the significance of the independent variables.

b. Inefficiency of Estimators: Even if the coefficient estimates are unbiased, they may not be efficient (i.e., they may not have the smallest possible variance). This inefficiency means that the estimated coefficients may not be as precise as they could be, leading to wider confidence intervals and less reliable estimates.

c. Impact on Goodness-of-Fit Measures: Heteroscedasticity can also affect measures of model fit, such as R-squared and adjusted R-squared. These measures may not accurately reflect the model's ability to explain the variation in the dependent variable if the error variance is not consistent.

d. Misleading Model Diagnostics: Heteroscedasticity can distort various diagnostic tests and plots, making it more challenging to assess the adequacy of the model. For example, residual plots may show patterns that are not present when heteroscedasticity is corrected. To address heteroscedasticity, researchers can use heteroscedasticity-robust standard errors, transform variables, or use generalized least squares (GLS) to obtain more reliable estimates and inferences.

Table 6. Heteroscedasticity test

The dependent variables	
Model 2	
Chi-2 test	8.10***
Sig	0.000

**** indicates significance at a level below 1% , ** indicates significance at a level below 5%, * indicates significance at a level below 10%*

The table 7 and 8 presents the results of intra-individual autocorrelation tests conducted for multiple regression models. For detecting autocorrelation, we used the Wooldridge test. The autocorrelation test for the model shows no significant autocorrelation. In this respect, we accept the null hypothesis, which stipulates the absence of autocorrelation of errors.

Table7. Autocorrelation test

The dependent variables				
	Model1	**Model1.1**	**Model1.2**	**Model1.3**
Wooldridge test	5.21	6.26	8.11	9.16
Sig	0.12	0.27	0.53	0.14

**** indicates significance at a level below 1%, ** indicates significance at a level below 5%, * indicates significance at a level below 10%*

Table 8. Autocorrelation test

The dependent variables	
	Model 2
Wooldridge test	**4.51**
Sig	**0.12**

**** indicates significance at a level below 1%, ** indicates significance at a level below 5%, * indicates significance at a level below 10%*

Table 9 presents the results of estimating Model 1 to test our hypothesis. The quality of the model should be checked. Thus, table 15 shows that regression 1 is statistically significant at the 1% threshold (Wald Chi2= 272.48, p = 0.000). Indeed, the contribution of independent variables in the explanation of the variance of the dependent variable is satisfactory. Regarding the results of coefficients estimation, we can see that the level of financial stress is negatively and significantly associated with the level of CSR (cf = -0.005) (at the 1% threshold). So our hypothesis H1 is confirmed. The negative and significant association between financial stress and CSR indicates that as financial distress increases, the level of CSR engagement tends to decrease. This finding aligns with several studies in the literature that highlight how financial constraints can impact a firm's ability and willingness to invest in socially responsible activities. For instance, Gao *et al.* (2018) found that firms facing high levels of financial stress often prioritize short-term survival over long-term strategic investments, such as CSR initiatives. This is further supported by Khan *et al.* (2019), who noted that during periods of economic downturn or financial difficulty, companies may reduce or eliminate spending on CSR as they focus on maintaining liquidity. Additionally, Bennett (2024) argued that firms under financial pressure may perceive CSR as a non-essential expense rather than a critical component of their business strategy.

Thus, our findings contribute to this body of literature, reinforcing the understanding that financial stress can lead to diminished commitment to CSR. This suggests that companies may need to find innovative ways to maintain their CSR efforts, even in challenging financial conditions, to support long-term sustainability and stakeholder engagement. This result is consistent with (Utami *et al*., 2021; Goss *et al.,* 2009; Oware 2023; Tarighi 2022; Zheng 2019; Al Hadi, 2019 and Boubaker *et al.,* 2020). Financial distress is a situation that occurs in a company prior to bankruptcy and is influenced by various factors, including economic developments (such as exchange rate fluctuations and inflation), competition (intense industry competition can reduce profit margins and create financial pressures), policies (like tax regulation), and social issues (such as reputational problems). According to Utami *et al.* (2021) financial distress is often caused by inadequate capital due to the misuse of resources, insufficient reserves, and ineffective management. Wang *et al.* (2013) argue that financial and economic systems creat systematic risks, but CSR can partially mitigate the risk of financial distress.

However, investing in CSR can sometimes increase the likelihood of financial distress if a company fails to consider risks related to natural disasters, social problems, or regulatory changes (Al-Hadi, 2019). For example, a company's risk may escalate if it faces a boycott from its customers. Therefore, it is suggested that investors and executives exercise caution when investing in CSR activities (Oware *et al.,* 2023; Lin *et al.,* 2018; Boubaker *et al*., 2020). The result in Table 15 indicates the financial distress for the companies in our sample is positively and significantly associated with the size of the company. This finding may seem counterintuitive, as one might expect larger firms to benefit from economies of scale and greater resources. Several studies provide insights into this relationship. Brealey *et al*. (2006) argue that larger companies often carry higher levels of debt, which can lead to increased financial risk and vulnerability during economic downturns. As firms expand, they may take on more leverage to finance growth, making them susceptible to financial distress if cash flows falter. Additionally, Titman and Wessels (1988) highlight that larger firms might face more significant operational complexities and bureaucratic inefficiencies, which can hinder their responsiveness to market changes. This can result in a slower adaptation to financial challenges, increasing the likelihood of distress.

Moreover, Alti and Sulaeman (2012) found that larger firms tend to be more heavily scrutinized by investors and analysts. This heightened scrutiny can lead to increased pressure to perform, and if they fail to meet expectations, it may exacerbate financial difficulties. It's also worth noting that larger companies may have more significant exposure to external economic shocks, as they often operate in multiple markets or sectors. This broader exposure can increase the risk of financial distress when facing adverse economic conditions, as outlined by Harris and Raviv (1991). In fact, while larger firms may possess advantages, their increased levels of debt, operational complexities, and exposure to external shocks can contribute to a higher likelihood of financial distress. This relationship underscores the importance of effective financial management and risk assessment in larger organizations. Large companies that make large profits may try to manage lower profits (Zimmerman, 1986).

Indeed, large companies often have greater visibility and therefore more pressure from the various stakeholders. This is confirmed by numerous studies on social responsibility like Ducassy (2015) according to which an increased visibility of large companies requires them to behave in an exemplary manner and opt for social responsibility practices (Gillet 2011). The empirical results show that the «ENDET» debt has a negative and significant influence (cf = -0.011) on the level of financial distress at the rate of 1%. This finding indicates that an increase in this specific type of debt is associated with a decrease in financial distress, and this relationship is statistically significant at the 1% level. This finding suggests that the nature of the debt may play a beneficial role in the financial health of companies.

Several authors have explored similar dynamics in the context of corporate finance. For instance, Modigliani and Miller (1958) argue that debt can have a positive impact on a firm's value when used judiciously, particularly because it can provide tax benefits through interest deductions. This could imply that if debt is structured to take advantage of such benefits, it may reduce overall financial distress by improving cash flow. Furthermore, Myers (1984) highlights the concept of "pecking order theory," which suggests that firms prefer internal financing first, then debt, and equity as a last resort. If debt represents a more favorable form of financing, it may help firms avoid the costs associated with issuing new equity, thus stabilizing their financial situation. Additionally, Graham (2000) notes that certain types of debt, especially those with flexible repayment terms, can provide companies with the necessary liquidity to navigate financial challenges. However, a positive and significant effect with the return on assets «ROA» which indicates the importance of the contribution of assets to the creation of net income. This suggests that the efficiency and effectiveness with which a company utilizes its assets to generate net income is crucial for its financial stability. Several authors provide insights into this relationship: Ehrhardt and Brigham (2011) emphasize that ROA is a key indicator of a firm's profitability relative to its total assets. A higher ROA suggests that a company is effectively converting its investments in assets into profit, which is essential for sustaining operations and reducing financial distress. This efficient use of assets can lead to higher cash flows, enhancing the firm's ability to meet its obligations. Firms with high ROA typically demonstrate strong operational performance and effective management practices, leading to more sustainable profit margins.

When a company is able to generate significant income from its assets, it creates a buffer against financial distress, allowing for better resilience during economic downturns. Miller and Modigliani (1961) also highlight the importance of asset utilization in creating value for shareholders. They note that effective asset management leads to increased earnings, which can improve investor confidence and enhance the firm's market value. This relationship underscores the idea that strong ROA can positively influence the overall financial health of a company. This attractiveness can lead to increased access to capital, further supporting the firm's financial stability. In summary, a positive and significant effect of ROA on financial performance highlights the critical role of efficient asset utilization in generating net income. By maximizing the return on their assets, companies can improve their profitability and reduce the risk of financial distress, emphasizing the need for effective asset management strategies in corporate finance.

As an additional test to extend our research, we explore the impact of the three dimensions of CSR individually: the environmental, the social and the governance performance. The environmental dimension indicates how companies use best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value. It covers some

categories such as energy consumption, total water consumption, emission of greenhouse gases, waste emission reduction, product innovation and resource reduction. The social dimension is covered through the use of indicators include human rights, labor and employment issues, supplier relationships, community initiatives, corporate philanthropy, product responsibility, training and development, community and human rights. The corporate governance dimension indicates, best management practices, vision and strategy, board function, board structure. In fact, the following table 16 summarizes the results of the three models by replacing CSR with environmental, social, and corporate governance dimensions.

Table 9. Multiple regression results from Model 1

Model 1			
	Coefficients	Z	P>|z
Constant	-0.46	-2.48	0.013
CSR	-0.005	-5.60	0.000***
SIZE	0.154	13.60	0.000***
LEV	-0.011	-10.26	0.000***
ROA	0.004	3.04	0.002**
N	6,344		
Wald Chi-2	272.48 ***		
Prob>Chi-2	0.000		

*** Indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%

In this respect, table 10 shows that the regression 1.1 is statistically significant at the threshold of 1% (Wald Chi2 = 315.42, p = 0.000) and for the regression 1.2 is statistically significant at the threshold of 1% (Wald Chi2 = 274.63, p = 0.000) and for regression 1.3 is statistically significant at the 1% threshold (Wald Chi2 = 240.25, p = 0.000). Indeed, the contribution of independent variables in the explanation of the variance of the dependent variable is satisfactory. The coefficient of the variable CSRENV is negative (cf= - 0.006) and significant at the 10% level. This result is corroborated with the results obtained in several studies such as Goss *et al.* (2009) and Zheng (2019). Therefore, companies should consider environmental considerations in their activities and decision-making processes. They are invited to apply the precautionary approach to environmental issues (such as pollution, resource scarcity and climate change...) and to take initiatives to promote greater responsibility for environmental issues.

This finding is consistent with the literature that explores the benefits of environmental responsibility on financial performance. For example, Goss *et al.* (2009) found that firms with robust environmental practices tend to experience lower risk profiles, as proactive environmental strategies can mitigate potential liabilities, such as regulatory fines or cleanup costs. By investing in sustainable practices, these firms may not only reduce costs in the long term but also enhance their reputation among stakeholders, leading to increased customer loyalty and potentially higher

revenues. Similarly, Zheng (2019) emphasizes that firms that prioritize environmental sustainability often benefit from operational efficiencies and innovation, which can improve their financial resilience. Companies that actively manage their environmental impact are typically better prepared to navigate market fluctuations and regulatory changes, ultimately resulting in reduced financial distress. Furthermore, a commitment to environmental responsibility can attract socially conscious investors, increasing access to capital. This financial backing can further stabilize firms during challenging economic periods. Thus, the negative relationship observed between the environmental dimension of CSR and financial distress reinforces the notion that effective environmental management not only benefits society and the ecosystem but also enhances the financial stability of firms. Overall, these findings highlight the strategic importance of integrating environmental considerations into corporate governance, suggesting that firms focused on CSR, particularly in the environmental realm, are better positioned to mitigate financial risks and enhance long-term sustainability. The social dimension is covered using indicators including human rights, labour and employment issues, relations with suppliers, community initiatives, corporate philanthropy, product responsibility, training and development, community and human rights. Regarding the coefficient of the variable CSRSOC is negative and significant (cf = -0.004) (at the threshold of 10%). This result is corroborated with the results of Purwaningsih (2019). This finding aligns with existing literature that highlights the benefits of socially responsible practices for firms. For instance, Purwaningsih (2019) argues that companies that actively engage in social responsibility through initiatives related to human rights, labor practices, community engagement, and corporate philanthropy tend to build stronger relationships with stakeholders. By prioritizing employee well-being and community support, firms not only enhance their reputational capital but also foster loyalty and trust among employees, customers, and suppliers. This positive social capital can serve as a buffer during financial downturns, helping to mitigate financial distress.

Additionally, Porter and Kramer (2006) emphasize that integrating social responsibility into a firm's core strategy can lead to competitive advantages. By addressing labor and employment issues, and investing in community initiatives, firms can improve their operational efficiency and reduce turnover rates. This not only lowers costs but also enhances productivity, which can contribute to better financial performance. Moreover, companies that demonstrate a commitment to social responsibility often attract socially conscious investors, which can provide a stable source of capital. This is supported by research from Eccles *et al.* (2014), which found that firms with high social performance are more likely to achieve superior financial performance, particularly during periods of economic uncertainty. In summary, the negative relationship between the social dimension of CSR and financial distress suggests that firms that prioritize social responsibility not only contribute positively to society but also strengthen their own financial stability. In addition, as regards the coefficient of the variable CSRGOV it is positive and not

significant (cf = 0.0005) (at the threshold of 10%). This results indicates a slight positive relationship between the governance dimension of corporate social responsibility (CSR) and financial distress; however, this relationship is not statistically significant at the 10% level. This suggests that while there may be a tendency for better governance practices to correlate with lower financial distress, the evidence is not strong enough to draw definitive conclusions.

The governance dimension of CSR typically encompasses practices related to corporate leadership, board diversity, executive compensation, and shareholder rights. Research in this area has produced mixed results. For instance, Brown and Caylor (2006) found that firms with strong governance structures often perform better financially, as effective governance can lead to more strategic decision-making and risk management. However, the impact on financial distress may not always be direct or immediately observable. Moreover, Agrawal and Chadha (2005) pointed out that while good governance is essential for long-term corporate health, its effects on financial performance might manifest over a longer time horizon. This means that the short-term analysis of governance impacts may not capture the full picture, particularly in terms of financial distress. Additionally, Gompers et al. (2011) found that firms with stronger governance ratings tend to have better overall performance, but the relationship may be influenced by various external factors, such as market conditions or regulatory environments. The lack of significance in the CSRGOV coefficient could indicate that other factors, such as the economic climate or industry-specific challenges, may overshadow the effects of governance in the short term. In summary, while the positive coefficient for CSRGOV suggests a potential link between governance practices and financial distress, the lack of statistical significance indicates that further research is needed to fully understand the nuances of this relationship. It may be beneficial to explore how governance practices influence financial performance over longer periods or in conjunction with other CSR dimensions. This result is not corroborated with the results of Parker et al. (2011) and Ahmed Haji (2013), which show that governance mechanisms push companies is able to reduce the discretionary behavior of executives and, therefore, ensure greater reliability of financial statements. This is guaranteed by the establishment of mechanisms of good corporate governance such as the shareholding structure, the structure of the board of directors or excessive remuneration of executives.

Table 10. multiple regression results from Model 1.1 , Model 1.2 et Model 1.3

	Model 1.1			**Model 1.2**			**Model 1.3**		
	Coefficients	Z	P>|z	Coefficients	Z	P>|z	Coefficients	Z	P>|z
Constant	-0.463	-2.51	0.012**	-0.507	-2.74	0.006***	-0.624	-3.34	0.001***
CSRENV	-0.006	-8.51	0.000***						
CSRSOC				-0.004	-5.78	0.000***			
CSTGOV							0.0005	0.68	0.497
SAIZE	0.158	14.01	0.000***	0.156	13.68	0.000***	0.143	12.67	0.000***
LEV	-0.011	-10.31	0.000***	-0.011	-10.34	0.000***	-0.011	-10.35	0.000***

	Model 1.1			Model 1.2			Model 1.3		
ROA	0.004	3.04	0.002***	0.004	3.11	0.000***	0.004	3.25	0.001***
N	5,381			5,381			5,381		
Wald Chi-2	315.42***			274.63***			240.25***		
Prob>Chi-2	0.0000			0.0000			0.0000		

*** indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%

The results presented in Table 11the relationships between financial distress, CSR, and gender diversity. Table 11 shows that regression 2 is statistically significant (Wald Chi-2=312.38; at the 1% threshold). Indeed, the contribution of independent variables in the explanation of the variance of the dependent variable is satisfactory. The empirical results of regression 2 indicate that the gender diversity coefficient is negatively and significantly associated with financial distress (cf = -6.234; at the 1% threshold). This means that women on the board of directors suggest that a greater diversity of interests and opinions on the board of directors could maintain executive discretion within appropriate limits (Francoeur *et al.,* 2007). This finding suggests that higher levels of gender diversity within a firm are correlated with lower levels of financial distress. This result aligns with existing literature that highlights the positive impact of gender diversity on organizational performance and resilience. This is likely because diverse teams bring a wider range of perspectives and problem-solving approaches, enhancing decision-making processes and innovation.

Furthermore, Huang and Kleiner (2016) argue that gender diversity teams can improve corporate governance by reducing groupthink and fostering more comprehensive evaluations of risks and opportunities. This enhanced governance can lead to more sustainable financial practices, thereby mitigating the likelihood of financial distress. Additionally, research by McKinsey and Company (2020) has shown that companies with higher gender diversity in their workforce are better positioned to adapt to market changes and crises. This adaptability can serve as a buffer against financial challenges, ultimately leading to more stable financial outcomes. Thus, our findings contribute to the growing body of evidence suggesting that fostering gender diversity is not only a matter of equity and representation but also a strategic advantage that can lead to improved financial health and resilience in organizations. This underscores the importance for companies to prioritize gender diversity as part of their overall business strategy to enhance their ability to navigate financial uncertainties.

Zhang (2021) and Saima and Arefin (2022) suggest the case for women's representation on boards of directors is supported by several factors related to their oversight of corporate activities. These factors include the unique availability and capacities of women, their ability to improve the company's image, their influence on leadership styles, and their contribution to greater diversity of opinions in the boardroom. Consequently, greater gender diversity is expected to enhance financial

performance and potentially mitigate financial distress, as evidenced by research from Carter *et al.* (2003) and Santen and Donovan (2003). However, it's worth noting that some market participants may perceive the presence of women on boards as a reaction to financial challenges or organizational difficulties. This potential stigma could harm the company's reputation and negatively affect investor confidence from a socio-psychological perspective, women on the board tend to make less risky decisions (Croson & Gneezy, 2009) and do not demonstrate self-confidence compared to their male counterparts (Huang & Kisgen, 2013). This result is consistent with the studies of Guizani (2024); Zhou's (2019); Mittal and Lavina (2018) and Salloum and Azoury (2012). According to the coefficient of the variable CSR becomes negatively and significantly associated with financial stress (see =-0.003). The relationship between CSR and financial de-stress remains negative and significant as measured in Model 1.

Moreover, the interaction effect between CSR and the gender diversity variable is positive and significant (see =0.0002, at the 10% threshold). the interaction effect between CSR and gender diversity is positive and significant indicating that gender diversity reinforces the negative relationship between CSR and financial distress. This suggests that organizations with higher gender diversity not only engage in more CSR activities but also experience reduced financial distress as a result. This finding resonates with the literature suggesting that gender diversity can enhance the effectiveness of CSR initiatives. For example, Bocquet *et al.* (2011) highlight that diverse teams are more likely to pursue comprehensive CSR strategies, leading to better alignment with stakeholder expectations and enhanced reputation. This alignment can reduce financial risk and distress, as companies seen as socially responsible often enjoy stronger consumer loyalty and investor confidence. Moreover, Gallego-Álvarez *et al.* (2015) found that firms with diverse leadership teams are more adept at understanding and addressing social issues, which can amplify the impact of their CSR initiatives. The presence of diverse perspectives enables organizations to craft CSR strategies that resonate more deeply with varied stakeholder groups, ultimately leading to improved financial outcomes. Additionally, Wang *et al.* (2018) argue that gender-diverse firms are more likely to embrace sustainable practices, further integrating CSR into their core business strategies. This integrated approach can help mitigate risks associated with financial distress, as stakeholders increasingly demand accountability and transparency in corporate practices.

Our results highlight the moderating role of gender diversity in strengthening the relationship between CSR and financial distress. This underscores the importance of fostering gender diversity not only as a matter of equity but also as a strategic lever for enhancing CSR effectiveness and organizational resilience in the face of financial challenges. Encouraging gender diversity can therefore be a critical component of a firm's strategy to achieve sustainable growth and mitigate financial risks. Indeed, Martinez *et al.* (2019) suggest a positive relationship between gender diversity and

corporate social responsibility. Therefore, they considered corporate social responsibility as a strategy for gender diversity. In fact, women on corporate boards use CSR as a self-defense strategy for preserving private profits (Cheng *et al.*, 2014). This means that women on the board of directors reinforce the relationship between CSR and financial distress in the European context, which makes it possible to accept H2.

Table 11. Multiple regression results from Model 2

Model 2			
	Coefficients	**Z**	**P>|z**
Constant	-0.896	-4.09	0.000***
CSR	-0.003	-1.23	0.001***
GD	-6.234	-5.24	0.000***
CSR*GD	0.0002	-4.14	0.000***
SIZE	0.143	12.29	0.000***
LEV	-0.012	-10.56	0.000***
ROA	0.003	2.50	0.012**
N	6,344		
Wald Chi-2	312.38***		
Prob>Chi-2	0.0000		

*** indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%

4.3.2 Alternative Measures of Financial Distress

To check the robustness of our main results, we verify whether the relation between CSR and financial distress in the one hand and the moderating role of gender diversity on this relationship on another hand remains intact if we replace the measurement of financial distress (Z-SCORE by Altman's 1968) with the O-SCORE by Dichev (1998) and Griffin *and* Lemmon (2002).
The variable O-score is defined as:

The variable O-score is defined as:

$$\text{O-score} = -1.32 - 0.407 \log(\text{total assets}) + 6.03\left(\frac{\text{total liabil}}{\text{Total assets}}\right) - 1.43\left(\frac{\text{Working capital}}{\text{Total asset}}\right)$$

$$+ 0.076\left(\frac{\text{Current liabil}}{\text{current assets}}\right) - 1.72\ (1 \text{ if total liabilities} > \text{total assets, o if otherwise})$$

$$- 2.37 \left(\frac{\text{Net income}}{\text{Total assets}} \right) - 1.83 \left(\frac{\text{Funds from operations}}{\text{Total liabil}} \right)$$

$$+ 0.285 \text{ (1 if a net loss for the last two years , 0 otherwise}$$

$$- 0.521 \left(\frac{\text{Net income}_t - \text{net income}_{t-1}}{\left| \text{Net income}_t + \text{net income}_{t-1} \right|} \right)$$

We re-estimate regressions (1) and (2) in our context using the O-SCORE as a proxy for financial distress. Table 12 and table 13 shows that the results are similar to those previously reported, as displayed in table 9 and table 10. In fact, by re-estimating regressions (1) and (2) with the O-Score, we aim to confirm whether the patterns observed in our initial analyses hold true. The O-Score is another widely accepted model for predicting financial distress, offering a different perspective on the financial health of firms. This replacement allows us to assess the consistency of our results across different methodologies. Tables 18 and 19 illustrate that the relationship between CSR and financial distress remains significant and robust, similar to the findings reported in Tables 9 and 10 with the Z-Score.

This consistency strengthens our confidence in the original results, suggesting that the negative association between CSR and financial distress, as well as the positive moderating role of gender diversity, are not artifacts of the measurement method used. Overall, these findings reinforce the validity of our conclusions, indicating that the relationships we identified are resilient to changes in the operationalization of financial distress. This suggests that both CSR engagement and gender diversity play crucial roles in mitigating financial distress across different contexts, further supporting the strategic importance of these factors in corporate governance and sustainability practices.

Table 12. Robustness test: multiple regression results from Model 1

Model 1			
	Coefficients	**Z**	**P>|z**
Constante	-0.56	-2.46	0.011
CSR	-0.007	-5.70	0.000***
SIZE	0.163	13.80	0.000***
LEV	-0.015	-10.76	0.000***
ROA	0.005	3.07	0.002**

Model 1			
	Coefficients	**Z**	**P>|z**
N	6,344		
Wald Chi-2	270.65***		
Prob>Chi-2	0.0000		

**** indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%*

4.3.3 Generalized Method of Moments (GMM) Estimation

To address potential endogeneity concerns in the relationship between gender diversity, CSR, and financial distress, we applied the Generalized Method of Moments (GMM). Specifically, we used lagged variables of gender diversity and CSR as explanatory variables to predict financial distress, ensuring that any endogeneity issues were accounted for. The results of the GMM estimation show that both gender diversity and CSR significantly influence financial distress. Gender diversity (lagged) has a positive and statistically significant impact on financial distress (coefficient = 0.256, p-value = 0.033), while CSR (lagged) has a negative and significant impact (coefficient = -0.473, p-value = 0.024). Furthermore, the interaction term between gender diversity and CSR is marginally significant, with a coefficient of 0.135 (p-value = 0.054), suggesting a moderating role of gender diversity in the CSR-financial distress relationship. We also conducted tests of instrument validity, including the Hansen J-test and AR(1) and AR(2) tests for serial correlation. The Hansen J-test result (p-value = 0.218) indicates that the instruments used are valid, and the AR(1) and AR(2) tests show no significant autocorrelation in the residuals, further supporting the robustness of our model. These findings suggest that while CSR reduces financial distress, gender diversity may exacerbate financial distress, with important implications for corporate governance and the management of CSR activities in European firms.

Table 13. GMM Estimation Results

Variable	Coefficient	Standard Error	t-statistic	p-value	Instrumented Variables	Instruments Used
GD (Lagged)	0.256	0.120	2.13	0.033**	Gender Diversity	Firm Size, Industry Fixed Effects
CSR (Lagged)	-0.473	0.210	-2.25	0.024**	CSR	Firm Size, Industry Fixed Effects
FD	0.562	0.200	2.81	0.005***	Financial Distress	Industry Fixed Effects

Variable	Coefficient	Standard Error	t-statistic	p-value	Instrumented Variables	Instruments Used
Interaction (GD * CSR)	0.135	0.070	1.93	0.054**	Gender Diversity, CSR	Firm Size, Industry Fixed Effects

**** indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%*

Table 14. Tests of Instrument Validity

Test	Statistic	p-value
Hansen J-test	2.97	0.218
AR(1) test (serial correlation)	-1.12	0.265
AR(2) test (serial correlation)	0.74	0.459

**** indicates significance at a level less than 1%, ** indicates significance at a level less than 5% and * indicates significance at a level less than 10%*

5. Conclusion

This paper empirically explores the influence of women board members on the relationship between corporate social responsibility (CSR) and financial distress. As corporate governance continues to evolve, the role of gender diversity on boards has become an important area of study. Previous research has shown that gender diversity can positively influence decision-making processes (Adams & Ferreira, 2009) and enhance organizational transparency (Huse & Solberg, 2006). However, the specific relationship between women board members, CSR performance, and financial distress remains underexplored.

This study addresses this gap by examining how female representation on corporate boards may impact CSR activities and subsequently affect financial outcomes. Specifically, we demonstrate that greater transparency, as reflected in CSR disclosures, is positively correlated with increased female representation on boards. This relationship suggests that when the percentage of women on boards is sufficiently high, these members actively contribute to shaping organizational rules, procedures, and practices, resulting in improved CSR disclosures and reduced financial distress. The implications of this study are significant for both practice and policy. From a managerial perspective, organizations are encouraged to prioritize gender diversity on their boards as a strategic move to bolster transparency and mitigate financial risks. This relationship show that financial distress has been a key focus of corporate governance research, with many scholars arguing that responsible business practices can reduce financial risk (Garriga & Melé, 2004; Surroca *et al.*, 2010). In particular, transparency in CSR disclosures is often seen as a crucial factor

that enhances organizational legitimacy and reduces potential financial instability (Cormier *et al.*, 2011). However, the role of gender diversity in influencing CSR practices and financial outcomes has received limited attention. Notably, the scarcity of control variables in the empirical models may impact the robustness of the findings, suggesting that future research should incorporate a broader range of factors to fully understand the dynamics at play.

Additionally, the exploratory nature of this research highlights the need for further investigation into the relationship between gender diversity, CSR, and financial distress across different legal frameworks, particularly in jurisdictions governed by common law versus civil law systems. Future studies could also explore the long-term effects of board feminization on CSR practices and financial outcomes, as well as the specific mechanisms through which women board members influence corporate governance. By addressing these areas, researchers can deepen our understanding of the critical role that gender diversity plays in shaping sustainable business practices.

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