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The Moderating Role of CEO Gender in the Relationship between Psychological Biases and Corporate Social Responsibility

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Résumé

La responsabilité sociétale des entreprises (RSE) est devenue un domaine de plus en plus important pour les entreprises et leurs parties prenantes. Comprendre les facteurs qui influencent la RSE, notamment les traits des directeurs généraux (PDG), est crucial pour promouvoir des pratiques commerciales durables. Cette étude examine l'impact des biais comportementaux des PDG, en particulier le narcissisme et la surconfiance, sur la RSE. Elle explore également le rôle modérateur du sexe du PDG dans la relation entre ces biais et les résultats de la RSE. À partir de données de 362 entreprises européennes cotées sur l'indice STOXX 600 entre 2019 et 2023, l'étude utilise une analyse quantitative pour évaluer la relation entre les biais comportementaux des PDG et la performance en matière de RSE. Les résultats montrent que le narcissisme et la surconfiance des PDG contribuent de manière significative à un engagement accru dans la RSE. De plus, l'étude révèle que les PDG féminines modèrent positivement la relation entre ces biais et la RSE, mettant en lumière le rôle potentiel du genre dans la définition des pratiques de responsabilité sociétale. Ces résultats suggèrent que les entreprises pourraient bénéficier de la prise en compte des profils psychologiques de leurs PDG lors de l'élaboration de stratégies de RSE et que le leadership féminin pourrait offrir des avantages distincts dans la promotion des initiatives de RSE.

Abstract

Corporate social responsibility (CSR) has increasingly become a critical focus for businesses and their stakeholders. Understanding the factors influencing CSR, especially the traits of Chief Executive Officers (CEOs), is essential for promoting sustainable business practices. This study investigates the impact of CEO behavioral biases, specifically narcissism and overconfidence, on CSR. Additionally, it explores the moderating role of CEO gender in the relationship between these biases and CSR outcomes. Using data from 362 European companies listed on the STOXX 600 index between 2019 and 2023, the study employs quantitative analysis to assess the relationship between CEO behavioral biases and CSR performance. The results demonstrate that both CEO narcissism and overconfidence significantly contribute to enhanced CSR engagement. Furthermore, the study finds that female CEOs positively moderate the relationship between these biases and CSR, highlighting the potential role of gender in shaping corporate responsibility practices. These findings suggest that companies may benefit from considering the psychological

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profiles of their CEOs when developing CSR strategies, and that female leadership could offer distinct advantages in promoting CSR initiatives.

Key words: CEO Narcissism, CEO Overconfidence, CEO Gender, CSR, CSR Dimension

JEL Classification: G3. G4. M14

1. Introduction

Given the rapid changes in the market landscape, including the emergence of new markets and increased competition, adapting management practices has become crucial. As a result, companies must adopt a responsible approach to continue delivering value efficiently and respond to an ever-evolving environment (Chwiłkowska-Kubala et al., 2023). This approach is reflected in their Corporate Social Responsibility (CSR) efforts, which involve initiatives that go beyond the company's self-interest to improve societal well-being (McWilliams and Siegel, 2001). According to Kidaye and Saoussany (2021), Corporate Social Responsibility is a practice that emphasizes a company's ethical intentions and values. It has evolved from a voluntary initiative to a mandatory component of corporate strategy, contributing to the creation of shared value (Phan et al., 2024). CSR goes beyond meeting the needs of investors and customers; it fundamentally represents a company's commitment to being responsible toward all its stakeholders. At the heart of CSR, it is about balancing the interests of stakeholders and shareholders, while responding to societal, environmental, and economic responsibilities (Rahman et al., 2024). Previous studies have mainly focused on external factors, such as market pressures and stakeholder expectations, overlooking how CEO personal traits, such as narcissism and overconfidence, affect CSR strategies. Understanding how CEO biases impact CSR decisions is crucial, given the emphasis on individual leadership. Additionally, the moderating role of CEO gender in these dynamics remains underexplored. This study aims to fill these gaps by examining the relationship between CEO behavioral biases, CSR, and the influence of CEO gender.

However, despite the growing importance of CSR, the underlying research problem addressed in this study lies in the lack of understanding of the impact of the psychological traits of leaders, particularly the behavioral biases of CEOs, on companies' engagement in CSR initiatives. While studies have explored CSR from various angles, very few have focused on the psychological influences of leaders on CSR practices. CEO narcissism and overconfidence, for example, are underexplored traits that may play a crucial role in strategic decision-making related to CSR. This study aims to fill this gap by examining how these behavioral biases influence CEOs' decisions and, consequently, how companies engage in responsible actions.

In this study, the Upper Echelons Theory proposed by Hambrick and Mason (1984) is followed as a conceptual framework. This theory is valuable for understanding how the personal values of CEOs contribute to the variability in CSR practices. It posits that the CEO plays a central role in the CSR process, with their managerial background, personal values, and attributes deeply influencing their decisions and actions (Long et al., 2022; Bhaskar et al., 2023; Erdiaw-Kwasie et al., 2023).

Recent studies have focused on understanding the conditions and factors that drive companies to adopt socially responsible behaviors (Bhaskar et al., 2023). Research by Petrenko et al. (2016) and Tang et al. (2018) suggests that certain CSR initiatives may stem from the personal needs of the

CEO. In this regard, the study explores how behavioral and psychological factors, specifically narcissism and overconfidence, are linked to CSR practices. Additionally, the originality of this research lies in its analysis of the moderating role of CEO gender, a factor rarely explored in the CSR context. In the current business environment, corporate social practices have gained importance, as they provide a crucial means to strengthen relationships with key stakeholders (Choi et al., 2023; Chwiłkowska-Kubala et al., 2023). Several studies observe that CSR is increasingly seen by practitioners as a tool to attract investors, qualified employees, suppliers, and target customers, while meeting social expectations alongside economic goals (Atif et al., 2023; Puchakayala et al., 2023). The concept of stakeholder diversification, inspired by Freeman's Stakeholder Theory (2001), provides a comprehensive explanation of the diverse nature of stakeholders and their impact on CSR activities. This theory remains central in CSR analysis due to its ability to account for stakeholder diversity. Consequently, companies seek to foster a positive image of their CSR commitment to effectively manage stakeholder perceptions (Wright and Ferris, 1997; Bingham et al., 2011; Liang et al., 2024).

The main research question addressed in this study is to understand the relationship between behavioral biases (narcissism and overconfidence) and Corporate Social Responsibility (CSR) as a whole, as well as within each CSR category. The second question explores the moderating effect of CEO gender on the relationship between CEO behavioral biases and CSR. This research contributes to the theoretical understanding of Corporate Social Responsibility by investigating the impact of CEO behavioral biases, specifically narcissism and overconfidence, on CSR practices. It advances Upper Echelons Theory by linking these psychological traits to both overall CSR and its various categories.

The significance of this study lies in its ability to shed light on an underexplored area of Corporate Social Responsibility (CSR): the impact of CEO behavioral biases on strategic decision-making related to CSR. The findings will contribute to academic literature by offering new insights into how CEOs' psychological biases can influence CSR practices. The applicability of this study is significant for companies, which will be better able to understand how the personal characteristics of their CEOs shape CSR strategies. Moreover, the introduction of CEO gender as a moderating factor will provide practical insights for companies seeking to increase diversity in their leadership teams to optimize the impact of CSR initiatives.

This theoretical framework enhances the understanding of the interactions between CEOs' individual characteristics and corporate social behavior, providing valuable insights for both academic research and practical applications.

The remainder of this paper is organized as follows: Section 2 provides the literature review and hypothesis development; Section 3 outlines the research methodology; Section 4 presents the modeling techniques selected for the research; Section 5 evaluates and discusses the empirical results; and, finally, Section 6 concludes the study.

2. Literature review

Recent trends indicate that companies worldwide are increasingly incorporating corporate social responsibility (CSR) into their business strategies (Qiu et al., 2021; Lal et al., 2022; Bhaskar et al., 2023; Phan and Ha, 2024; Rehman et al., 2024). Numerous studies highlight the positive impact of CSR on environmental sustainability, economic growth, profitability, and stock performance (Awawdeh et al., 2021; Ho et al., 2022).

Firstly, CSR has emerged as a crucial tool for creating value among stakeholders within business organizations (Le et al., 2021; Chen and Xie, 2022; Bhaskar et al., 2023; Shahzadi et al., 2024). Secondly, CSR is increasingly recognized as a fundamental aspect of standard business operations (Yang and Jiang, 2023; Elbardan et al., 2023). Finally, existing literature also shows that CSR has quickly become a significant priority for CEOs and their firms (Abbey, 2022). The extensive body of research on CSR has focused on understanding the factors that drive CEOs to adopt CSR as a strategic initiative. This research indicates that CEOs' psychological traits are crucial in determining their inclination toward CSR activities (Petrenko et al., 2016; Zhang et al., 2017; Tang et al., 2018; Bhaskar et al., 2023; Liang et al., 2024). Thus, based on the existing literature, the theoretical connections between various CEO characteristics and CSR engagement are explored.

2.1. The impact of the CEO overconfidence on the CSR and on its categories

Research indicates that the psychological biases of corporate CEOs significantly influence their decision-making processes (Wang, 2023). One such bias, CEO overconfidence, has become increasingly relevant in the context of corporate social responsibility (CSR), a critical area closely tied to the characteristics of the CEO (Bhaskar et al., 2023; Grove et al., 2024). An overconfident CEO, who tends to overestimate their capabilities and prospects, is likely to view CSR initiatives as opportunities to enhance the company's image and drive long-term success (Chang, 2015; Campbell and Helleloid, 2016; Erdiaw-Kwasie et al., 2023). This heightened confidence can lead to bold and ambitious decisions in sustainability and social engagement, underpinned by a strong belief in the potential of these initiatives to generate a competitive edge. Moreover, CEO overconfidence can significantly impact CSR by making the CEO more inclined to invest in CSR initiatives, driven by the conviction that these efforts will improve the company's reputation and create long-term value (Kim et al., 2018; Puchakayala et al., 2023). Such confidence can result in ambitious strategies for sustainability and community engagement, even in the absence of immediate tangible evidence of success. In this regard, the following hypothesis is formulated:

Hypothesis 1: CEO overconfidence is positively associated with CSR and its dimensions.

2.2. The impact of the CEO narcissism on the CSR and on its dimensions

Narcissism is defined as a personality trait characterized by an excessive preoccupation with oneself, a need for admiration, and a lack of empathy for others (Morf and Rhodewalt, 2001). CEO narcissism, a prominent manifestation of this trait, significantly influences decision-making, making it a key area of interest for both scholars and practitioners (Byun and Al-Shammari, 2021; Chatterjee and Pollock, 2017; Zhang et al., 2017; Shan et al., 2023). While narcissistic CEOs are often perceived as self-centered and egotistical, their desire for admiration and recognition can drive them to adopt Corporate Social Responsibility (CSR) initiatives as a means to enhance both their own public image and that of their organization (Al-Shammari et al., 2019). Narcissistic leaders are inclined to make bold decisions and pursue ambitious projects, including those related to CSR, in order to distinguish themselves from their peers (Petrenko et al., 2016). This pursuit of distinction not only serves to consolidate their power but also to legitimize their leadership in the eyes of stakeholders. Under certain conditions, these traits may positively influence CSR practices, as narcissistic CEOs aim to be perceived as visionary and morally responsible (Morf and Rhodewalt, 2001; Campbell et al., 2004; Resick et al., 2009; O'Reilly et al., 2014; Maccoby, 2017; Chi et al., 2019). Therefore, the following hypothesis is proposed:

Hypothesis 2: There is a positive relationship between the CEO narcissism, and the CSR and its dimensions.

Table 1: Chronological Summary of Literature Review

Authors	Year	Key Findings
Campbell et al.	2004	Narcissistic leaders adopt ambitious projects for self-promotion.
Petrenko et al.	2016	Narcissistic CEOs pursue CSR initiatives to enhance their public image.
Chang	2015	Overconfident CEOs view CSR as an opportunity to achieve competitive advantage.
Zhang et al.	2017	CEO personality traits significantly shape CSR practices.
Kim et al.	2018	Overconfident CEOs invest in CSR for long-term value creation and reputation.
Al-Shammari et al.	2019	Narcissistic CEOs use CSR to enhance both their own and their organization's image.
Byun and Al-Shammari	2021	Narcissistic leaders make bold decisions, including CSR, to differentiate themselves.
Bhaskar et al.	2023	CEO traits such as overconfidence and narcissism influence CSR engagement.
Wang	2023	CEO biases (e.g., overconfidence) influence corporate strategies.
Grove et al.	2024	Overconfident CEOs tend to invest more in CSR initiatives despite uncertain outcomes.
Liang et al.	2024	Narcissistic CEOs prioritize CSR to bolster their image and distinguish themselves.

Phan and Ha	2024	CSR is increasingly a priority for CEOs and integrated into strategic decisions.
Rehman et al.	2024	Psychological traits of CEOs play a central role in advancing sustainability goals.

2.3. The moderating effect of the CEO gender on the relationship between the CEO overconfidence and overall CSR

Based on studies conducted over the last few decades, it has been demonstrated that female CEOs exhibit stronger ethical views and more positive attitudes toward CSR compared to their male counterparts (Harjoto and Rossi, 2019). Chu et al. (2023) highlight the greater importance that women place on sustainable development and corporate environmental and social responsibilities, suggesting that these priorities align well with their skills and psychological traits, such as conflict resolution, adaptability to change, and the ability to motivate and inspire others, while also alleviating stress for subordinates and reducing turnover probability. Thus, women are generally better equipped and more rational than men when it comes to investing in CSR-related decisions and activities (Furlotti et al., 2019; Wernicke et al., 2022; Choi et al., 2023; Liang et al., 2024).

Women leaders are often described as having greater empathy and a stronger ability to understand and respond to the needs of others. This trait could amplify the impact of overconfidence on CSR decisions, as a female CEO might not only believe in her capability but also feel a moral responsibility to make a positive difference. Therefore, if overconfident CEOs are inclined to prioritize CSR, a female CEO could further enhance these CSR activities. This leads to the following hypothesis:

Hypothesis 3: A female CEO positively moderates the relationship between CEO overconfidence and overall CSR.

2.4. The moderating effect of the CEO gender on the relationship between the CEO narcissism and overall CSR

The gender of the CEO may significantly moderate the relationship between narcissism and CSR, particularly when the CEO is female.

First, female CEOs are often perceived as more ethical and more concerned with sustainability and social responsibility. A narcissistic female CEO may be especially motivated to leverage CSR to enhance her image, while ensuring these initiatives align with strong ethical values. Second, female leaders are frequently associated with greater empathy and sensitivity to stakeholder needs. This empathy could strengthen the link between narcissism and CSR, as a female CEO may feel that she not only has the power but also the moral responsibility to make a positive impact. Third, a narcissistic female CEO might adopt a long-term perspective on her own image and the company's reputation, investing more in CSR to ensure a lasting and positive legacy.

To explore how CEO gender reinforces this relationship, we propose the following hypothesis:

Hypothesis 4: A female CEO positively moderates the relationship between CEO narcissism and overall CSR.

3. Research methodology

3.1. The sample and data collection

This study examines a sample of European firms listed on the STOXX 600 index, covering the period from 2019 to 2023. The dataset includes 362 companies, yielding 1810 firm-year observations. The empirical analysis draws on multiple sources: CSR data were obtained from Thomson Reuters ASSET4, while financial information was sourced from the Datastream database. CEO behavioral biases were manually collected through a review of Bloomberg, annual reports, company websites, and financial statements. Statistical analysis was performed using STATA software.

Table 2: Sample descriptive

Panel A: the selection steps of the final sample	
Description	**Number of companies**
Initial sample listed on the STOXX 600	600
Financial firms	138
Firms with insufficient annual reports	63
Firms with insufficient data	37
Final sample	362
Study period	5
Total observations	1810

Panel B: Distribution of the sample by sector		
Sectors	**N**	**%**
Oil and gas	16	4.4%
Basic materials	25	6.8%
Industries	74	20.2%
Consumer goods	58	15.8%

Health Care	29	7.9%
Consumer Services	56	15.3%
Telecommunications	24	6.5%
Utilities	33	8.9%
Technologies	47	14.2%
Total	362	100%

Panel C: Countries of the European region in the STOXX Europe 600 Index

Switzerland	Norway	Finland
Britain	Poland	France
Austria	Portugal	Germany
Belgium	Spain	Ireland
Denmark	Sweden	Italy
Netherlands		Luxembourg

3.2. Measurements of variables

3.2.1. Measurements of the dependent variables

Based on findings from Mattingly and Berman (2006), McCarthy et al. (2017), Wang et al. (2018), Escrig-Olmedo et al. (2019), Adeneye et al. (2023), and Ma et al. (2023), we use ESG scores as a measure of corporate social responsibility (CSR). The CSR score is sourced from the ASSET4 database within Thomson Reuters DataStream, and it ranges from 0 to 100. In this study, we adopt the CSR score calculated by ASSET4 to ensure comparability across companies.

Table 3. Measurements of dependent variables

Dependent variables	**Measurements**	**Authors**
Overall CSR	The social responsibility score of each firm were calculated based of index scores in five categories was considered the overall CSR score of.	Jo and Harjoto (2012); Ghoul et al. (2017); Ahn and Lee (2019); Choi et al. (2023); Chen et al. (2023).
Environment	The environmental score assesses a company's influence on the entire ecosystem, encompassing both living and non-living components like air, soil, water, and energy use. It evaluates how effectively	Jo and Harjoto (2012); Ghoul et al. (2017);

	the company implements sustainable practices to mitigate environmental risks and preserve natural resources.	Ahn and Lee (2019); Choi et al. (2023); Chen et al. (2023).
Social	The social score evaluates how well a company fosters trust and loyalty among its stakeholders, including society and customers, by implementing effective management practices. It assesses the company's performance in areas such as employee engagement, workplace safety, diversity, and equality within the workforce.	Jo and Harjoto (2012); Ghoul et al. (2017); Ahn and Lee (2019); Choi et al. (2023); Chen et al. (2023).
Governance	The governance score evaluates a company's adherence to and effectiveness in upholding corporate governance principles. It includes metrics such as the frequency of board meetings and the presence of independent directors.	Jo and Harjoto (2012); Ghoul et al. (2017); Ahn and Lee (2019); Choi et al. (2023); Chen et al. (2023).

3.2.2. Measurements of the independent variables

CEO narcissism

We measure the extent of the CEO narcissism via a four-point index, as developed by Chatterjee and Hambrick (2007). It includes:

(1) The importance of the CEO image size in the company's annual report.

(2) The importance of mentioning the CEO name in corporate press releases.

(3) The importance of the CEO monetary remuneration.

(4) The importance of the non-monetary CEO remuneration.

These elements reflect one or more general aspects of a narcissistic personality. To obtain a single index of narcissism for every CEO, it is necessary to compute the mean of these four indicators, following the approach of Chatterjee and Hambrick (2007); Oesterle et al. (2016) and Al-Shammari et al. (2019).

CEO overconfidence

For the study of Schrand and Zechman (2012), the overconfidence is a score involving five measures. They are as follows:

(1) Investment excess adjusted by industry.

(2) The net amount of acquisitions achieved by the company in industry.

(3) The company's industry-adjusted debt-to-equity ratio.

(4) Risky debt.

(5) The dividend yield.

After calculating the five dimensions, we determine the overconfidence score. In this context, "Over" is a dummy variable coded 1 if no less than three out of the five dimensions indicate that the company is more likely to have an overconfident CEO, and 0 otherwise (Shrand and Zechman 2012; Kouaib and Jarboui 2016).

3.2.3 Measurements of the Moderate variable

The CEO gender (GENDER): We use a binary variable equal to 1 if the CEO is male, and 0 otherwise (Manner 2010; Marquis and Lee 2013; McCarthy et al. 2017; Zou et al.2018 and Chu et al. 2023).

Table 4. Measurements of independent and moderate variables

Independent variables	**Measurements**	**Authors**
OVER	The indicator variable is coded 1 if at least three out of five components of the score indicate that the firm is more likely to have overconfident CEOs, and 0 otherwise: ▪ XSINVEST_INDADJ is greater than 0, ▪ ACQUIRE_INDADJ is greater than 0, ▪ DERATIO_INDADJ is greater than 0, ▪ RISKYDT is equal to 1, and ▪ DIVYLD is equal to 1.	Schrand and Zechman (2012); kouaib and Jarboui (2016).
NARCI	The narcissism variable is the weighted average equal to four dimensions: ▪ The importance of the size of the CEO photography in the annual report of the company. ▪ The importance of mentioning the name of the CEO in the press releases of the companies. ▪ The importance of the CEO monetary remuneration. ▪ The importance of the CEO's non-monetary remuneration.	Chatterjee and Hambrick (2007); Ahn and Kwon (2020).

Moderate variables	Measurements	Authors
CEO GENDER	A dichotomous variable equals 1 when the CEO is male and 0 otherwise.	McCarthy et al. (2017); Zou et al.,(2018); Lim et al., (2021).

3.2.4. Measurements of the control variables

McCarthy et al. (2017) and Pan et al. (2021) suggest that various proxies used to control for firm characteristics can potentially affect the CEO's decisions regarding corporate social responsibility.

Firm Performance (ROA): Firm performance is assessed using the ratio of net income to total assets in year t.

Firm Size (SIZE): Firm size is determined by the logarithm of total assets.

Firm Age (AGE): Firm age is measured by the natural log of number of years of existence of the company since its creation.

Debt (DEBT): Firm debt is calculated as the ratio of total debt to total assets.

This study incorporates several firm-level control variables, drawn from the existing literature, which may influence CSR activities. Numerous studies (Chatterjee and Hambrick 2007; McCarthy et al. 2017; Drempetic et al. 2020; Biju et al. 2023; Erdiaw-Kwasie et al. 2023; Puchakayala et al. 2023; Yan et al. 2023; Bagh et al. 2024) indicate that factors such as firm performance, size, age, and debt are likely to affect a company's CSR initiatives.

Table 5. Measurements of control variables

Control variables	Measurements	Authors
ROA	It is the company performance as measured by the ratio of operating income to total assets.	Tang et al. (2018)
SIZE	The natural log of total assets.	Orij et al. (2021)
AGE	The natural log of number of years of existence of the company since its creation.	Činčalová and Hedija (2020)
DEBT	Total debt divided by total assets.	Benlemlih,(2017); Pan et al. (2021)

4. Research models

Econometrically, we employ regression models to test and validate our previously formulated hypotheses.

Model 1

$$CSRit = \beta_0 + \beta_1(OVER) + \beta_2(NARCI) + \beta_3(ROA) + \beta_4(SIZE) + \beta_5(AGE) + \beta_6(DEBT) + \varepsilon_{it}$$

The moderating effect occurs when the moderating variable Z alters the strength of the relationship between the independent variable X and the dependent variable Y (Baron and Kenny, 1986). In our study, CEO gender serves as a moderating factor in the relationship between behavioral biases (overconfidence and narcissism) and overall CSR.

Model 2

$$\text{Overall CSRit} = \beta_0 + \beta_1(OVER) + \beta_2(GENDER) + \beta_3(GENDER * OVER) + \beta_4(ROA) + \beta_5(SIZE) + \beta_6(AGE) + \beta_7(DEBT) + \varepsilon_{it}$$

Model 3

$$\text{OverallCSRit} = \beta_0 + \beta_1(NARCI) + \beta_2(GENDER) + \beta_3(GENDER * NARCI) + \beta_4(ROA) + \beta_5(SIZE) + \beta_6(AGE) + \beta_7(DEBT) + \varepsilon_{it}$$

With:

Overall CSR: it denotes the overall CSR score; OVER: it designates the CEO confidence level; NARCI: it stands for the narcissism degree; GENDER: it designates the gender of CE; ROA: it denotes the firm performance; SIZE: it refers to the firm size; AGE: it denotes the firm age; DEBT: it stands for the debt ratio; and$\mathcal{E}$: it is a constant.

5. Empirical results and discussion

5.1 Descriptive statistics

The descriptive statistics presented in Table 6 reveal that the average overall CSR score for the period from 2019 to 2023 is 62.63%. The averages for each CSR category are 63.07% (model 1.1), 60.17% (model 1.2), and 66.31% (model 1.3), respectively. This indicates that companies in our sample are actively engaged in nearly all categories of social responsibility throughout the sampling period.

Table 6. Descriptive statistics of variables

Panel A: Summary on statistics of dependent variables						
Variables	**N**	**Mean**	**SD**	**Minmum**	**Maximum**	**Median**
Overall CSR	1810	62,63	14,90	10,43	95,3	66,41
Environment	1810	63,07	28,45	0	99,79	68,59
Social	1810	60,17	25,76	0	99,79	63,59
Governance	1810	66,31	27,00	0	99,15	73,53
Panel B: Summary on statistics of independent variables						
OVER	1810	0,76	0,42	0	1	1
NARCI	1810	0,62	0,62	-1	1	1
Panel C: Summary on statistics of control variables						
SIZE		16,23	1,54	10,32	19,87	84,36
AGE		3,83	0,93	0,45	6,21	3,79
ROA		7,61	7,99	-24,54	69,32	6
DEBT		23.46	16,58	0	92,74	22,74
Panel D: Summary on statistics of Moderate variables						
	Modalities	**Frequencies**	**Percentage**			
CEO GENDER	**0**	**322**	**17.8%**			
	1	**1488**	**82.2%**			

The overall CSR score in the sample ranges from a minimum of 10.43% to a maximum of 95.3%, with a standard deviation of 14.9%. Across the various CSR dimensions, scores range from 0% to 99%. Regarding the independent variable, CEO overconfidence (OVER), the average level of overconfidence is 0.76, indicating that 76% of the CEOs in the sample exhibit high overconfidence. For the narcissism variable (NARCI), the average score is 0.62, suggesting that the CEOs generally display narcissistic traits. Panel C of Table 6 summarizes the control variables. The average firm size, measured as the logarithm of total assets, is 16.23, equivalent to approximately $2.79 million. The average firm age, calculated as the logarithm of the number of years since incorporation, is 3.83, which corresponds to approximately 46.43 years. The average return on assets (ROA) is 7.61%, with a minimum of -24.54% and a maximum of 69.32%. The company leverage ratio, defined as total debt to total assets, has an average of 23.46%, with a minimum of 0% and a maximum of 92.74%. Panel D of Table 6 shows the descriptive statistics for the moderating variables. It reveals that 82.2% of the CEOs in our sample are men, while 17.8% are women.

Table 7. Results of the multicollinearity test

	OVER	NARCI	ROA	SIZE	AGE	DEBT	GENDER	VIF
OVER	**1,0000**							1,02
NARCI	0,0400 (0,0891)	**1,0000**						1,01
GENDER	0,0905 (0,0001)	0,0577 (0,0036)						1.01
ROA	0,0160 (0,4971)	0,0486 (0,0389)	**1,0000**					1,20
SIZE	-0,0991 (0,0000)	0,0564 (0,0164)	0,0819 (0,0004)	**1,0000**				1,08
AGE	0,0966 (0,0000)	-0,0063 (0,7900)	-0,2966 (0,0000)	0,0106 (0,0000)	**1,0000**			1,29
DEBT	-0,0214 (0,3640)	-0,0600 (0,0108)	0,0651 (0,0056)	0,1141 (0,0000)	0,3365 (0,0021)	**1,0000**		1,07

5.2 Correlation

At this stage, conducting a pairwise correlation test is essential to detect any potential multicollinearity among the variables. The Spearman correlation matrix (Table 7) shows that most of the correlations are below 0.8, indicating that multicollinearity is not a major concern among the independent variables. The next step is to calculate the Variance Inflation Factor (VIF). As shown in Table 7, all VIF values for the variables in the main model are below 10. These results confirm that multicollinearity is not an issue, allowing us to proceed with the multivariate regressions in our analysis.

5.3 Results of the regression analysis

Multivariate tests: Individual-effects tests/ Hausman test/ heteroscedasticity test

Our regression modeling frameworks indicate that the individual effects test results support the use of panel data econometrics. The Hausman test reveals a chi-squared statistic with a p-value below 1%, leading us to select a fixed effects model over a random effects model. Furthermore, we identified persistent issues with heteroscedasticity. In response, we addressed both serial autocorrelation and heteroscedasticity. As a result, we excluded the fixed effects robust and OLS-based techniques. After careful consideration, we determined that the Feasible Generalized Least Squares (FGLS) method is the most appropriate for estimating our models.

Table 8. The results of the individual-effects tests

Tests Models	Homogeneity test Fisher test	Specification test Hausman test	Heteroscedasticity Breush Pagan test
M1	**1969.72** (0,0000)***	**106.78** (0,0000)***	**333.65** (0,0000)***
M(1.1)	**1793.32** (0,0000)***	**69.49** (0,0000)***	**618.99** (0,0000)***
M(1.2)	**1719.00** (0,0000)***	**21.16** (0,0035)**	**600.09** (0,0000)***
M(1.3)	**1434.31** (0,0000)***	**28.88** (0,0002)***	**694.1**4 (0,0000)***

Overall estimation

The impact of the CEO overconfidence on the CSR and on its categories

Our research examines the correlation between CEO overconfidence and corporate social responsibility (CSR), including its various dimensions (Karavitis et al., 2024). As presented in Table 9, CEO overconfidence is positively correlated with CSR activities across the proposed model specifications: overall CSR and its environmental, social, and governance dimensions, thus fully supporting Hypothesis 1. For example, in the environmental dimension, Hirshleifer et al. (2012) argue that a CEO with strong confidence in their vision is more likely to direct R&D efforts toward solutions that not only satisfy market needs but also address societal and environmental challenges. This may include the development of recyclable materials, renewable energy sources, or waste-reducing products. This perspective helps explain the positive relationship between CEO overconfidence and the environmental dimension of CSR (McCarthy et al., 2017; Grove et al., 2024). Consistent with these findings, our results indicate that overconfident CEOs tend to prioritize innovative sustainability projects, which not only enhance the firm’s competitive advantage but also improve its environmental impact. In the context of the social pillar (model 1.2), a highly confident CEO is often more inclined to undertake large-scale social initiatives, driven by a strong belief in their success. These initiatives may include community support programs, diversity and inclusion efforts, or investments in employee well-being. Such projects can reinforce the company’s social commitment and elevate its reputation. The positive effect of CEO overconfidence on the social dimension of CSR is consistent with prior research highlighting the role of confident leaders in promoting ambitious, socially responsible projects (Campbell et al., 2004; Zhang et al., 2017; Bhaskar et al., 2023; Grove et al., 2024).

The impact of the CEO narcissism on the CSR and on its categories

As shown in Table 9, a positive and significant relationship exists between CEO narcissism and the environmental, social, and governance dimensions of CSR, consistent with the findings of

Petrenko et al. (2016) and Kim et al. (2018). Additionally, the results from models (1.1) (environmental dimension) and (1.2) (social dimension) reveal a positive and significant correlation. These findings support the conclusions of Petrenko et al. (2016) and Kim et al. (2018), suggesting that CEO narcissism generally has a favorable impact on CSR activities. Narcissistic CEOs are often driven by a desire to be seen as visionary and socially responsible leaders, motivating them to initiate and promote ambitious social projects such as diversity and inclusion programs, community support initiatives, or philanthropic endeavors (Jaafar Kadhim Alataby and Alkhafaji, 2024).

However, the governance dimension shows a negative and significant relationship at the 1% level, consistent with the findings of Ahn and Lee (2019). This result is not entirely surprising, as Tang et al. (2018) argue that hubristic CEOs, who share traits with narcissistic CEOs, can have a detrimental impact on CSR initiatives. Narcissistic CEOs often prioritize financial performance over other activities (Ahn and Lee, 2019). Indeed, CEOs with pronounced narcissistic tendencies tend to be more focused on financial outcomes than on other aspects of the business (Anderson and Tirrell, 2004; Resick et al., 2009; Amernic and Craig, 2010; Hales et al., 2012; Rijsenbilt and Commandeur, 2013; Patel and Cooper, 2014; Olsen and Stekelberg, 2016; Ahn and Lee, 2019; Erdiaw-Kwasie et al., 2023).

In this context, the differing priorities of narcissistic CEOs become evident depending on the specific CSR dimension under consideration (Ahn and Kwon, 2020; Shan et al., 2023; Jaafar Kadhim Alataby and Alkhafaji, 2024).

Table 9. Regression results of model (1)

Variables	**Model (1)**		**Model (1.1)**		**Model (1.2)**		**Model (1.3)**	
	Z	**p-value**	**Z**	**p-value**	**Z**	**p-value**	**Z**	**p-value**
OVER	3,00	0,003***	1,86	0,006***	15,17	0,000***	0,98	0,000***
NARCI	0,75	0,076**	4,94	0,000***	3,14	0,002***	-0,32	0,000***
ROA	2,65	0,008***	1,35	0,178	3,55	0,000***	7,15	0,000***
SIZE	14,98	0,000***	19, 17	0,000***	9,03	0,000***	19,47	0,000***
AGE	7,81	0,000***	4,82	0,000***	2,68	0,007***	10,60	0,000***
DEBT	2,14	0,032**	-0,75	0,455	5,56	0,000***	2,34	0,019**
R-square	0.9920		0.9805		0.9965		0.9854	
Prob>F	0,0000		0,0000		0,0000		0,0000	
Wald Chi2	2165.03		2387.01		1050.24		1151.32	
Prob> chi2	0,0000		0,0000		0,0000		0,0000	

The moderating effect of Gender CEO on the relationship between the CEO overconfidence and overall CSR

Table 10 shows that the results from Column Model 2 indicate a positive relationship between OVER*GENDER and CSR at the 1% significance level (p < 0.001). This evidence supports Hypothesis 3, highlighting the effectiveness of female CEOs in driving CSR. In summary, CEO overconfidence can indeed motivate a company to invest more in CSR, with this effect being even more pronounced when the CEO is female. This dynamic underscores the complex interaction between personality traits, gender, and societal expectations of leadership. Companies led by overconfident female CEOs may, therefore, not only strive for high financial performance but also engage more deeply in innovative and impactful CSR practices.

The moderating effect of Gender CEO on the relationship between the CEO narcissic and overall CSR

The results from Column Model 3 of Table 10 show that NARCI*GENDER is positively related to CSR at the 1% significance level (p < 0.001). This evidence supports Hypothesis 3, indicating that a female CEO positively moderates the relationship between CEO narcissism and overall CSR. A narcissistic CEO is naturally inclined to engage in CSR activities, driven by a desire for recognition and prestige. This tendency is particularly reinforced when the CEO is female, as leadership qualities often associated with women—such as ethics, empathy, and a long-term sense of responsibility—enhance the impact of narcissism on CSR decision-making.

Variables	**Model (2)**		**Model (3)**	
	Z	**p-value**	**Z**	**p-value**
OVER	3,39	0,001***		
OVER*GENDER	1,12	0,000***		
NARCI			0,90	0,000***
NARCI*GENDER			1,65	0,000***
ROA	4,56	0,000***	5,34	0,000***
SIZE	4,62	0,000***	4, 17	0,000***
AGE	6,50	0,000***	6,98	0,000***
DEBT	-1,46	0,032**	-1,21	0,225
R-square	0.9890		0.9894	
Prob>F	0,0000		0,0000	
Wald Chi2	11120.11		11627.18	
Prob> chi2	0,0000		0,0000	

Table 10. Regression results of models (2) and (3)

The effects of control variables

CEO overconfidence and narcissism are not the only factors influencing CSR. In fact, there is a positive and significant relationship between Return on Assets (ROA) and CSR (Campbell et al., 2004; Tang et al., 2018). Higher profitability provides companies with additional resources, increasing their likelihood of engaging in various CSR activities. Additionally, firm size and age are positively correlated with CSR, as shown by research from Drempetic et al. (2020) and Biju et al. (2023), which demonstrates a significant positive correlation between firm size and CSR scores. Furthermore, the level of debt also shows a positive relationship with certain dimensions of CSR, supporting the findings of Pan et al. (2021) and Karavitis et al. (2024).

6. Conclusion

This research aims to explore the impact of CEO psychological and behavioral characteristics on Corporate Social Responsibility (CSR) and its various dimensions. It also investigates whether the presence of a female CEO positively moderates the relationship between CEO behavioral biases and overall CSR. Using a sample of 362 firms listed on the STOXX Europe 600 index from 2019 to 2023, we employed FGLS regression models to draw our conclusions. Our analysis reveals that overconfident CEOs tend to invest across all CSR dimensions (Bhaskar et al., 2023; Grove et al., 2024). In contrast, narcissistic CEOs are more inclined to focus their investments on the environmental and social dimensions specifically (Ahn and Kwon, 2020; Shan et al., 2023; Jaafar Kadhim Alataby and Alkhafaji, 2024). Moreover, our findings suggest that the presence of a female CEO strengthens the overall relationship between CEO overconfidence and CSR (Hypothesis 3). Similarly, a female CEO enhances the link between CEO narcissism and CSR.

The findings of our study offer several practical implications for academic researchers, stakeholders, and policymakers.

For academic researchers, the insights gained from examining the relationship between CEO characteristics, such as overconfidence and narcissism, and CSR practices provide a new direction for future research. Specifically, exploring the psychological traits of CEOs in relation to CSR can offer deeper insights into how leadership influences corporate behavior. Our study also opens opportunities for further investigation into the moderating role of CEO gender, providing a more nuanced understanding of leadership dynamics in CSR decision-making.

For stakeholders, particularly investors, understanding CEO traits can be a valuable tool in evaluating how these characteristics shape CSR strategies within companies. Overconfident or narcissistic leaders may be more inclined to pursue ambitious and authentic CSR initiatives, which, while potentially risky, could present attractive investment opportunities. Investors can use this knowledge to assess how CEO personality traits align with long-term sustainability goals, helping identify companies with strong CSR commitments.

For policymakers, our study lays the groundwork for developing regulations and policies that promote leadership behaviors conducive to effective CSR practices. Recognizing the influence of CEO traits on CSR outcomes can guide the creation of policies that encourage responsible leadership. For instance, policies aimed at increasing diversity in leadership roles, such as enhancing the representation of women in executive positions, could have a significant positive impact on CSR practices. Additionally, policymakers could introduce regulatory frameworks that incentivize companies to invest in CSR initiatives through tax breaks, subsidies, or public recognition programs. These strategies would align leadership behaviors with societal and environmental objectives, fostering more sustainable and impactful CSR practices across industries.

Building on the above implications, our study also offers valuable insights for portfolio managers and practitioners involved in investment decision-making. By recognizing the impact of CEO psychological traits on CSR practices, portfolio managers can refine their investment strategies. Overconfident or narcissistic leaders may drive companies to undertake bold and innovative CSR initiatives, potentially leading to higher long-term returns despite the associated risks. By incorporating CEO traits into ESG evaluations, portfolio managers can better assess the sustainability of their investments and identify companies with a robust commitment to CSR.

Furthermore, from a practitioner's standpoint, understanding how CEO traits influence CSR decisions provides actionable insights for corporate decision-makers. Companies can leverage this knowledge to select leaders whose traits align with their CSR objectives, ensuring that leadership behaviors foster long-term sustainability goals. This approach can help mitigate the risks of overly ambitious CSR initiatives while maximizing their positive social and environmental impact.

However, like any research, our study has certain limitations. It is based on a relatively small sample of companies, which may limit the generalizability of our findings. Additionally, the narrow focus on specific psychological traits of CEOs is due to the unavailability of comprehensive data, which constrains the scope of our conclusions. Future research could build on this study by exploring additional psychological biases that may impact CSR performance. For instance, biases such as CEO over-optimism, risk aversion, or narcissistic supply could be examined to assess their influence on decisions related to CSR initiatives. While the absence of specific data on these biases in our sample limits this exploration, it opens an intriguing avenue for future research that could further deepen our understanding of the psychological factors influencing CSR engagement. These biases can be effectively identified using a combination of qualitative and quantitative methods, such as the Narcissistic Personality Inventory (NPI), interviews, or surveys. Moreover, future studies could address these limitations by incorporating additional CEO factors that may affect CSR commitment and activity selection, such as compensation, ownership structure, entrenchment, and role duality. Exploring other corporate factors, such as board characteristics (size, diversity, and independence), could also provide a more comprehensive understanding of the determinants of CSR.

Ethical Statement

This manuscript is an original work of the authors. It has not been published previously and is not under consideration for publication elsewhere. There are no conflicts of interest to declare that are relevant to the content of this article. This research does not involve any human participants, human data, or human tissue. The authors declare that there was no external funding for this research.

Contributions

Bouzguenda Mariem worked on conceptualization, methodology and writing original draft. Jarboui Anis has played a crucial role in visualization, reviewing and supervision.

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