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Women in CEO duality and firm performance in Europe

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Abstract

This paper investigates gender dimensions in the relationship between CEO duality and firm performance, combining feminist theories and stewardship arguments. Using a large sample of listed firms from 23 European countries in the 2014–2020 period, we have found that CEO duality has a positive effect on corporate performance when a woman holds both the roles of CEO and board chair. These findings highlight the 'bright side' of women in governance, suggesting the presence of women in double leadership positions can amplify benefits and/or limits costs related to CEO duality. Having a woman in CEO-chair leadership could optimize a firm's use of its resources and more effectively contribute to improving performance. Directions for future research could include a better understanding of women in leadership in the organizational domain. Our results have a number of managerial and political implications.

Keywords Woman in governance · CEO duality · Women in CEO duality · Leadership structure · Women's leadership · Firm performance

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1 Introduction

Thirty years of literature, starting in the nineties (Ali et al., 2022; Alves et al., 2017; Cadbury report, 1992; Finkelstein & D'Aveni, 1994; Hsu et al., 2021; Mubeen et al., 2020; Mutlu et al., 2018; Rashid, 2013; Rechner & Dalton, 1991), has shown great interest in the value of Chief Executive Officer (CEO) duality,[1] and this is still one of the most hotly debated managerial phenomena. The momentous paper by Fama and Jensen (1983) shed light on the importance of a separation between ownership and control positions to guarantee the survival of organizations. Starting from this contribution, most of the literature has found that when a CEO also serves as chair of the board of directors, directly accountable for shareholders' interest, this situation is more likely to damage a firm's performance (Cadbury, 1992; Chen et al., 2005; Dalton & Dalton, 2011; Fama & Jensen, 1983; Fosberg & Nelson, 1999; Pi & Timme, 1993; Rechner & Dalton, 1991). Notable instances of corporate governance failure, such as the Enron case, have demonstrated that CEO duality can negatively influence firm performance, leading to the recommendation that it is best to separate these two positions. This negative effect suggests it is ideal to have an independent chairperson to promote and oversee the highest standards of corporate governance within the board and the company (Krause et al., 2014; Mohammadi et al., 2015).

However, there are different perspectives. Some studies (Baliga et al., 1996; Brickley et al., 1997; Daily & Dalton, 1992, 1993; Rhoades et al., 2001; Yan Lam & Kam Lee, 2008;) have found CEO duality has no statistically significant impact on firm performance. In addition, a different stream of research (Anderson & Anthony, 1986; Donaldson & Davis, 1991; Stoeberl & Sherony, 1985) has pointed out that combining the two positions in one individual can provide unambiguous leadership (Davidson et al., 2008), which offers a clearer focus on the objectives and operations of the firm, with positive effects on corporate performance, according to stewardship arguments.[2]

Adams and Ferreira (2009) and Khan and Vieto (2013) study the positive effect women have when in governance positions, while Donaldson and Davis (1991) suggest that the presence of a person who holds both the role of CEO and board chair appears to lead to higher effectiveness in decision-making and performance compared to firms with separate roles; in other words, managers are good stewards of corporate resources.

These mixed results have also been highlighted by the literature reviews on CEO duality performed by Krause et al. (2014) and Yu (2022), who argue that, despite the fact the topic has been of academic interest for many years, there is still much that we do not know in this field of research and further research is needed to fill this gap and have a better understanding of the effect that CEO-duality has on corporate

[1] CEO-duality is a corporate governance mechanism where the CEO and the chair of the company board is the same person (Krause et al., 2014).

[2] According to Davis et al. (2018) 'stewardship theory defines situations in which managers are not motivated by individual goals, but rather are stewards whose motives are aligned with the objectives of their principals".

performance. For instance, the effect of CEO duality could be driven by certain factors that have not yet been explored in management literature (Yu, 2022). The controversial effects of CEO duality could be an outgrowth of the lack of consideration of CEO characteristics. For instance, Faleye (2007) suggests that 'whether CEO duality benefits or hurts the firm is contingent on firm and CEO characteristics'. In this direction, our paper sheds light upon the manner in which corporate performance could be influenced by board leadership structure when assuming a gender perspective, i.e., the gender of the person in the position of CEO-duality. Specifically, in light of feminist theories[3] that provide the theoretical anchor for our research investigation, we suggest that the effect that CEO duality has on firm performance differs according to the gender of the person in charge. Feminist theories are profoundly interested in social context and they allow us to understand how managerial choices are influenced by gender (Ahl, 2006, Bell et al., 2020; Expósito et al., 2021; Fischer et al., 1993). Studying the role of a woman taking on the dual position of CEO and chair of the board provides an ideal setting to test feminist theory predictions. This is an opportunity to verify whether a woman with a very authoritative position in a firm, as is the case with CEO duality, is able to affect the quality and value of corporate decision-making processes and, as a consequence, corporate performance.

We analyse whether the positive influence that women's presence in management can have on a firm's performance, which is broadly suggested in the literature (Adams & Ferreira, 2009; Carter et al., 2010; Dezsö & Ross, 2012; Low et al., 2015; Tyrowicz et al., 2020; Whelan & Humphries, 2020; Zhang, 2020), can provide benefits for a business in cases of CEO duality as well. Any negative effects of CEO duality on firm performance might be counterbalanced by benefits related to women's traits. According to stewardship theory as well (Donaldson & Davis, 1991), it can be assumed that women are better stewards of a company than their counterparts who are men, and this case can be supported by stewardship arguments that a CEO-duality leadership structure improves company performance. Thus, we combine the feminist and stewardship arguments to provide a theoretical framework for interpreting the role of women when they simultaneously take on the position of CEO and of chair of the board (CEO Duality).

Therefore, in this study we want to investigate and answer the following research question: 'Can the presence of a woman in the double leadership position of CEO and chair of the board exploit the 'bright side' of governance?' Furthermore, the role of the external context in which firms operate is of interest in our work. The literature on corporate governance suggests there is a significant moderating role that national governance systems have in terms of the effects governance mechanisms play in firm performance (Nguyen et al., 2015), with CEO duality having high potential explanatory power (García-Meca et al., 2015; Schiehll & Martins, 2016). In particular, Krenn (2016) proposes the role of cultural forces in shaping corporate governance. Moreover, women and men are considered similar if they have analogous resources, backgrounds

[3] 'Feminist theory encompasses a broad range of thinking about the roles and experiences of women" (Derry, 1999).

and opportunities (Expósito et al., 2021). However, it is the context that can create gender inequalities, generating differences in terms of perceptions, cognitive schemes of analysis and values and, as a consequence, different behaviour in running a business (Boehnke, 2011; House et al., 2004; Knudsen & Waerness, 2001; Richardson et al., 2004). In this respect, we first studied the effects produced by women in CEO duality in terms of performance and then the moderating role of the country-based context, which is expected to provide explanatory power regarding our main effect (women in CEO duality relative to performance). While Terjesen et al. (2016) carried out a cross-country analysis of the impact women directors have on firm performance, no one has considered the moderating role of country-based variables relating to social and cultural factors as potential moderators of the effect women in CEO duality have on firm performance. Thus, as our final point of research, we scrutinize the role of social and cultural country-based variables as moderators in the main relationship studied.

Our findings, based on feminist and stewardship theories, provide evidence that women in CEO leadership duality roles increase corporate performance by offering strong leadership and effective monitoring. We argue that when women hold both the roles of CEO and chairperson of the board, firms can perform more effectively by reducing managerial opportunism and CEO entrenchment or act more effectively and with greater responsibility. Moreover, we found that the social and cultural context a company operates in can have an important effect, which suggests that in a country with high gender disparity, having CEO duality for women provides different perspectives that can enrich a business.

Hence, we provide new insights for the literature on gender, feminist theories and corporate performance, providing a better understanding of the role of women in leadership positions and delivering further support for the view that a woman's presence has a positive effect on organizational performance. We not only improve our understanding of previous contradictory CEO duality literature but also contribute to the corporate governance, management and finance literature. Moreover, using a cross-country sample allows us to include firms with different institutional environments, making the generalization of our results possible (Terjesen et al., 2016). In addition, our cross-country dataset also allows us to contribute to the existing literature on the effect that women in leadership can have on firm performance because most of the previous studies had been conducted on single-country data samples, such as the US, the Netherlands and Denmark (Marinova et al., 2016; Perryman et al., 2016). Only a few studies have been based on cross-country European datasets (e.g., Christiansen et al., 2016; Zhang, 2020).

The remainder of the article is structured as follows. Section 2 presents a literature review and our development of the research question. Section 3 shows our data, models and variables. Section 4 highlights the empirical results. Section 5 concludes and describes implications for management.

2 Literature review and research question

2.1 CEO duality: review of the literature

In the corporate governance literature, leadership structure has been considered one of the most crucial and visible aspects of a firm (Yu, 2022). The term 'leadership structure' refers to the apex roles within a firm, held by the CEO and chairperson of the company board (Kang & Zardkoohi, 2005). As argued by Zelechowski and Bilimoria (2004), these are the two most powerful positions in organizations. The CEO's work involves the management of operations, whereas the chair's main role is to monitor the organization's activities. In general, situations of 'CEO duality' refers to a form of leadership in which one person wears two hats simultaneously—one as CEO of the firm and the other as chairperson of the company board (Dalton & Dalton, 2011; Yu, 2022). In contrast, independent leadership is the case where two different people are in the two positions of CEO and company chair.

CEO duality leadership is a highly debated topic in corporate governance and strategic management (Yu, 2022), with a vast body of research having been devoted to the question of whether one person should serve in both positions, as CEO and chairperson of a company, or if it is better to have two different individuals perform these roles. In general, two opposite theoretical frameworks, based on stewardship arguments and agency perspectives respectively, have been used in previous studies (Krause et al., 2014; Yu, 2022). The former argues that CEO duality in leadership supports a strong and unambiguous leadership rationale with positive effects on corporate performance, while the latter holds that opportunism and ineffective monitoring could damage a firm. The following scheme synthetizes the main benefits and costs related to CEO duality.

Benefits and costs related to CEO duality.

Benefits	Costs
Strong, unified and unambiguous leadership (Anderson & Anthony, 1986; Stoeberl & Sherony, 1985)	Strong concentration of power and opportunism (Fama & Jensen, 1983)
Faster and greater effectiveness in decision-making (Donaldson & Davis, 1991)	Low standards of corporate governance due to ineffective monitoring (Krause et al., 2014; Mohammadi et al., 2015)
Reduced information costs between CEO and chairman (Brickley et al., 1997)	CEO entrenchment (Finkelstein & D'aveni, 1994)

On the one hand, the stewardship theorists argue that managers are good stewards of corporate capital (Donaldson & Davis, 1991), and so CEO duality creates benefits when managing a company, allowing for full comprehension of business and operational choices. Empirical studies (i.e., Boyd, 1995; Donaldson & Davis, 1991; Mallette & Fowler, 1992; Peng et al., 2007) and recent reviews (Krause et al., 2014; Yu, 2022) have indicated potential benefits arising from CEO duality leadership. These include unity of command, as the CEO-chair can provide strong and unambiguous leadership that may increase when power is not shared, facilitation of internal efficiencies thanks to unity of command, elimination of potential conflicts between two bosses, i.e., CEO and chair, (Brickley et al., 1997; Finkelstein & D'Aveni, 1994; Lewellyn & Fainshmidt, 2017) and, finally, avoiding the ambiguity of having two spokespersons to address the firm's stakeholders. In particular, Brickley et al. (1997) also suggested that CEO duality can reduce the information costs that arise in the presence of information flow between the CEO and chair. In addition, Donaldson (1990) also argues that with CEO duality leadership there is no issue of any blame game between management and the board of directors because the CEO is also in charge of corporate decisions, and he/she controls and cannot blame anyone else for poor results. In line with stewardship theory, some studies have reported that CEO duality can have a positive effect (Boyd, 1995; Donaldson & Davis, 1991; Mallette & Fowler, 1992; Peng et al., 2007). Consequently, it could be concluded that CEO duality leadership leads to effective actions and therefore to better financial performance.

On the other hand, in line with the agency perspective, Brickley et al. (1997) observed that shareholder activists, regulators, legislators and board reformers have often observed that combining the positions of CEO and board chairperson can be seen as CEOs grading their own work; therefore, the two roles should be separated. Since the Cadbury report (1992), it has been suggested that the two posts of CEO and board chairperson should be disjointed in order to achieve effective governance of a company, i.e., in order to avoid a strong concentration of power. According to agency theory, there are conflicts of interest between managers and shareholders, and the board of directors plays a central role as a monitoring device (Fama & Jensen, 1983; Jensen & Meckling, 1976). Nevertheless, to ensure the effective functioning of the monitoring process, it is essential to separate decision management (e.g., rights to initiate and implement recommendations for resource allocation) from decision control (e.g., rights to ratify and monitor resource commitments) within the company. Indeed, according to Fama and Jensen (1983), CEO duality 'signals the absence of separation of decision management and decision control'; the board of directors is not able to effectively monitor and control the activities of the CEO and top management team. Moreover, CEO entrenchment will be promoted and the control device (i.e., the board of directors) will cease to be independent and effective (Finkelstein & D'aveni, 1994).[4] Recently, Aktas et al. (2019) pointed out that CEO duality also has a negative impact on investment efficiency, as CEOs tend to spend company liquidity in order to undertake projects with low growth opportunities.

As a result, CEO duality leadership increases CEO entrenchment, reduces the board's monitoring effectiveness, damages the board of directors' independence from management, and leads to a failure to obtain advice and direction from the board chairperson. Therefore, this implies that CEO duality leadership has a negative impact on a firm's financial performance (Berg & Smith, 1978; Chen et al., 2005; Fosberg & Nelson, 1999; Pi & Timme, 1993; Rechner & Dalton, 1991).

[4] CEO duality and opportunism can create many kinds of costs, such as higher levels of executive compensation (Boyd, 1995), the awarding of golden parachutes (Singh & Harianto, 1989), and the adoption of 'poison pills' (Mallette & Fowler, 1992).

To sum up the findings reviewed above, there is great interest in the value of CEO duality. We can conclude that even though most of the literature indicates that CEO duality has a negative effect on firm performance (Krause et al., 2014; Mohammadi et al., 2015), some empirical studies present different results, observing a positive effect in line with stewardship theory (Boyd, 1995; Donaldson & Davis, 1991; Mallette & Fowler, 1992; Peng et al., 2007) or simply no statistically significant relationship (Baliga et al., 1996; Brickley et al., 1997; Yan Lam & Kam Lee, 2008).

These mixed findings reveal a potential knowledge gap due to a degree of uncertainty regarding the relationship between CEO duality leadership and financial performance. Some have suggested the potential explanatory power of considering the moderating role of many other factors, like a competitive environment (Boyd, 1995; Yang & Zhao, 2014), economic policy uncertainty (Chang et al., 2019), and board involvement (Wijethilake & Ekanayake, 2020), or the inadequacy of past analysis that needs to be done better (Dalton & Dalton, 2011). Yet, a long time ago, Boyd (1995) asked this question: 'under what circumstances does the concentration of power and decision-making afforded by duality outweigh the potential abuses described by the agency model?' He observed that, in a context with high environmental uncertainty, CEO duality would be beneficial for firms, because a joint role as CEO and chairperson provides singular managerial direction. Even today, a recent review by Yu (2022) provides similar insights, among many others, regarding the relevance of scrutinizing moderators. In particular, one of the most promising streams of research that tries to explain the effect of CEO duality for firms is the study of CEO features or the demographic characteristics of leaders. Krause et al. (2014) interestingly point out that 'the issue with the greatest potential to generate insight, and yet with the least amount of research attention so far devoted to it, is the issue of CEOs' and board chairs' individual characteristics. In many cases, the likelihood that CEO duality begets self-interested behaviour at shareholders' expense depends almost entirely on who the CEO is and what his or her values, beliefs, and priorities are. We hope research in this area will take the issue of CEO-chair characteristics head-on.' Thus, the potential explanatory power of a moderating role for factors related to CEO characteristics is high.

2.2 CEO duality, women's role and feminist theories

Given the knowledge gap arising from controversial empirical results in the CEO duality literature, the presence of a woman is suggested as a potentially significant and unexplored factor shaping the relationship between CEO duality and firm performance. The role of women has attracted great attention from researchers in board and top management studies and could be an important unstudied variable in explaining the value of CEO duality. A focus on the gender characteristic of CEO duality (i.e., men in CEO duality vs *women in CEO duality*) might generate a potentially compelling area of inquiry regarding the relationship between CEO duality and firm performance. Considering the relevance of the gender dimension, it is interesting to explore this aspect of CEO duality more deeply than it has been so far, as this could deliver significant insights into the issue. The work of

Table 1 Variable definitions

Variables	Description
Performance measure	
Return on Assets (ROA)	EBIT/Total Assets
Duality variables	
CEO Duality	Dummy equals 1 if the CEO and chairperson of the company is the same person and 0 otherwise
Women in CEO Duality	Dummy equals 1 if the CEO and chairperson of the company are the same person and this person is also woman, and 0 otherwise
Country-based gender equality measure	
Gender parity index (World Bank)	Gender parity index for the gross enrolment ratio in tertiary education is the ratio of women to men enrolled at tertiary level in public and private schools
Control variables	
Board independence	ratio of independent members to board size
Board size	Natural logarithm of the number of board members
CEO tenure	Tenure of the CEO
Firm age	Natural logarithm of the number of years since the year of a firm's foundation
Firm size	Natural logarithm of total assets
Tangibility	Ratio of tangible fixed assets to total assets
Tobin Q	Market value of a company divided by its book assets value
Debt	Ratio of financial debt to total assets
Cash holdings	Natural logarithm of cash & cash-equivalents to total assets
GDP growth	Annual percentage growth in GDP
Credit market size	Domestic credit to private sector by banks (% of GDP)

Peni (2014) sheds light on the role of gender differences in a CEO's/chairperson's success. Inspired by the contribution of Peni (2014), who interestingly pointed out that the gender dimension plays an important role in the success of CEOs and chairpersons, we suggest that the presence of a woman might amplify or reduce the weight of benefits and costs regarding CEO duality and its overall impact on firm performance. Moreover, the paper by Bannò et al. (2022) shows how relevant the presence of women on a board can be. Interestingly, the authors build their arguments on social construction theory, finding that firms could be affected by stereotypical social views.

Theoretically, our study seeks to combine the insights provided by both stewardship and agency theory, at the core of literature on CEO duality, with the arguments provided by feminist theories (Ahl, 2006; Expósito et al., 2021; Fischer et al., 1993) on women and business. These theoretical perspectives may help to interpret the role of women in a double position as CEO and chair of the board. While stewardship and agency theory suggest the role a responsible manager may have in countering opportunism in business, neither of these has focused on the issue of gender. Thus, in this paper we consider both business literature and social feminist theories to test our hypotheses.

As summarized by Orser et al. (2010),[5] two main approaches reflect feminist theories: liberal feminist theory and social feminist theory. According to Expósito et al. (2021), liberal feminist theory suggests that men and women are similar. Thus, managers of any gender having similar available resources (and characteristics) can manage a firm in the same way and their presence has similar effects on firm performance. In line with liberal feminist theory, women in CEO duality should not influence corporate performance, and, according to Expósito et al., (2021) 'if differences by gender are observed, they are due to discrimination or structural barriers, such as unequal access to resources'. In contrast, social feminist theories argues there are differences between men and women because of societal hierarchical structure. Consequently, men and women have different perceptions, cognitive schemes of analysis and values. Thus, women's approach to strategic decisions is influenced by such differences and it affects the way they manage companies (Weber & Geneste, 2014). According to social feminist theories, gender is a socialization construct affecting managerial perceptions, behaviour and business decisions, and, therefore, gender differences in management would remain even after controlling for systemic differences in specific attributes at business levels.

Machold et al. (2008) discuss the feminist perspective in corporate governance and business ethics and suggest that factoring in the role of women in leadership positions can increase the explanatory power of ongoing theoretical approaches (stewardship vs agency). Therefore, both managerial and social feminist theory reveal potential differences between women and men that could have an impact on the role of women at the top levels of a company. In particular, the former has as its starting point the stereotypical figure of women who, according to vast portions of management literature, are expected to be more ethical, socially responsible and less power-oriented (Duckworth & Seligman, 2006; Ferrell & Skinner, 1988; Ford & Richardson, 1994; Ruegger & King, 1992; Stedham et al., 2007; Williams, 2003). The latter highlights a potentially different sensitivity of women toward strategic decisions (Expósito, 2021). Combining the former with the latter, we would expect that the presence of a woman in the double position of CEO and chair of the board would actually have a different impact on corporate performance compared to men. It is important to combine two such theories because managerial theories alone would be not sufficient to explain role played by the presence of women. This is due to the confirmation bias, simplistic thinking, and publication bias that characterize research, as underscored by Nelson (2020). The role of gender-based stereotypes has also been investigated by the recent work of Bannò et al. (2022), which provides a comprehensive overview of socially constructed stereotypes. This is why it is important to bring feminist theories into play, in order to understand the mechanisms that could make the presence of a woman in the CEO-chair position produce a different impact on firm performance compared to men.

[5] Orser et al. (2010) summarize the different nature and features of various approaches in feminist theories in Table 1.

It could be imagined that a woman having the roles of both CEO and board chairperson could perform more effectively by reducing managerial opportunism and CEO entrenchment, because their higher level of ethical behaviour, morality and greater universal concern might prevent them from enjoying their power and position at the cost of others (owners or shareholders and other stakeholders). The work of Derry (1999) explores feminist theory and its role in business ethics, indicating that there are theories that study the caring attitude of women and their different ethical attributes compared to men (Tong, 1995). The 'dark side' of CEO duality, in terms of strong power concentration and managerial dominance, could become less relevant in the case of a woman CEO-chair, thanks to the characteristics of women. In line with the perspectives of stewardship theory, the 'bright side' of CEO duality is that a firm with a woman in CEO-chair leadership might be more likely to enjoy the classic benefits of combined leadership by providing unity of direction and of command, as well as offering lower information costs (Brickley et al., 1997). It is commonly known that CEO duality has costs as well as benefits and it is possible that women's behavioural characteristics can enhance these benefits and/or reduce the corresponding costs.

Thus, despite the fact that previous contributions to management literature mainly provided evidence of a negative effect between CEO duality and corporate performance, it is possible that a woman who holds both the positions of CEO and chair of the board may minimize opportunistic problems and maximize social responsibility in the firm, improve board activities and monitoring, bring strong and unambiguous leadership and a unified direction to her firm, and contribute to increasing corporate performance.

Therefore, we wish to investigate whether a woman in a double leadership position, simultaneously CEO and chair of the board, is able to turn the negative value of CEO duality into a positive effect. The following research hypothesis was thus formulated:

Hypothesis 1 *In contrast with CEO duality generally, women in CEO duality have a positive effect on firm performance.*

2.3 The value of CEO duality: the moderating role of country-based gender egalitarianism

According to the review by Yu (2022), one possible research direction concerns an investigation of the role of institutional context, to better understand the role of CEO duality in firm performance. In general, the literature is plentiful on the role of national systems as moderators of the governance–performance relationship for firms (Nguyen et al., 2015). Institutional environments affect the way agency theory works and the effectiveness of corporate governance mechanisms (Aguilera & Jackson, 2003). The likelihood of agency abuses and the benefits of stewardship may vary in different countries. In particular, García-Meca et al. (2015) showed that the institutional effect on the CEO duality–performance relationship has been ignored, revealing a positive moderating role of institutional factors in the effect that gender diversity has on performance. Boyd et al. (1997), and more recently Schiehll and Martins (2016), observed a lack of consideration of country governance factors and suggest scrutinising the role of CEO duality in cross-national studies that take different institutional settings into account. Rhoades et al. (2001) argue that it is important to study in which situations two heads are better than one, because firms' internal and external governance environments are jointly at play in affecting the CEO duality–performance relationship.

Starting from the observation that 'institutions matter' (Aguilera & Jackson, 2003), Krenn (2016) reveals the role of cultural forces in shaping corporate governance, suggesting the need for cross-country studies. In a similar vein, the social concept of gender arises from the way society is built, leading to stereotypes about differences between men and women in attitudes, abilities and behavioural patterns (Croson & Gneezy, 2009). The idea that differences between women and men are based on contextual factors, as the outcome of cultural values, education and socialization processes and interactions, is dominant in social feminist theories (Ahl, 2006; Fischer et al., 1993).[6] If equal access to the opportunities available to men, such as education, work experience and other resources, is given to women, they will grow their businesses equally as well (Ali, 2018). Thus, social norms that are embedded in the context and are rooted in historical and cultural traditions affect women's ability in management (Richardson et al., 2004).

The significance of social feminist theories is the importance of the context in shaping the role women play in business. Boehnke (2011), using the outcome of surveys as a starting point, discussed gender role attitudes around the world, comparing egalitarian and traditional perspectives. He found the role of both structural societal features and socio-cultural factors was significant, offering an explanation for cross-cultural variation in gender roles. Similar results regarding the importance of societal and cultural factors in shaping gender role attitudes are presented by Knudsen and Waerness (2001) in a cross-country analysis. Boehnke (2011) highlights the finding that, in the last fifty years in developed countries, there was a pronounced improvement toward more egalitarian gender role attitudes, in favour of women's expansion and success in business. According to House et al., (2004, Table 14.2, p. 359), in countries showing high gender egalitarianism there are more women in positions of authority with a greater decision-making role in community affairs, less occupational sex segregation, and similar levels of educational attainment for men and women. Vice versa, in countries reporting low gender egalitarianism there are fewer women in positions of authority, with little or no decision-making role in community affairs, more occupational sex segregation, and a lower level of educational attainment of women, compared to that of males.

In a similar vein, the cultural climate at country level shapes gender attributes. Gender culture differences across countries became a topic of interest in

[6] While liberal feminist theory (Unger & Crawforg, 1992) suggests that having similar opportunities in terms of education, work experiences and other resources will produce similar behaviour in men and women, social feminist theory, in contrast (Ahl, 2006), assumes that men and women have different points of view.

management (Chang & Noorbakhsh, 2009) thanks to Hofstede's ()[7] approach to measuring cultural differences between countries (www.geert-hofstede.com). Structural differences across countries provide insights that help understand managers' behaviour in different countries, with effects on final corporate outcomes (La Rocca et al., 2020). In particular, the *masculinity* dimension of Hofstede's index measures the preference for gender role distinctions between men and women. High-masculinity societies strive for the maximum social distinction between men and women, while low-masculinity societies strive for the minimum social distinction between them. According to Boehnke (2011), in cultures characterized by a high level of masculinity, as described by Hofstede (2001), the endorsement of egalitarian gender role attitudes should generally be low. Countries that report a high level of masculinity are countries in which male culture is dominant and gender disparity is high.

To sum up, if we take societal and cultural factors at country level into account it is possible to appreciate different degrees of gender egalitarianism, masculinity dominance and gender equality. In an environment that emphasizes low gender discrimination, equal opportunity employment schemes, no gender salary gap and similar structural features favouring gender equality, egalitarian gender role attitudes are assumed to be more likely (Boehnke, 2011). This is an item of great interest for the purposes of our paper because it allows us to understand the significance of investigating the role played by women fulfilling CEO duality vis-à-vis firm performance, depending on the differing degrees of gender egalitarianism in different countries.

Therefore, taking cultural influences at country-level into account, in high gender equality countries we assume there is gender parity for women and men with similar backgrounds, education, values and opportunities. In such contexts there should be more women in management and no significant gender difference in decision-making process and quality. As a consequence, men and women in charge, in important management roles, do not affect variations in performance, and thus the value of women in CEO duality should not be different from men in CEO duality. Vice versa, in low gender equality countries it is assumed that there is gender disparity and discrimination, with women expected to have different education levels and backgrounds, different experiences and values, and a tough path to achieving success. In such a context, there are a few women who are able to reach a certain position in the hierarchy of firms, and the few who do are expected to be strong at management and highly skilled, if they have risen to such roles. As a consequence, women in CEO duality exhibit different roles than men in CEO duality, and the attributes stereotypical of women are at the core of a stronger, valuable effect on firm performance. Thus, the following research hypothesis is formulated:

[7] According to Hofstede, culture is a collective programming of the mind that distinguishes the members of one group or category of people from another. He identifies four basic problem areas seen as dimensions of cultures: power distance, collectivism versus individualism, femininity versus masculinity, and uncertainty avoidance. Hofstede surveyed data on the values of people in over 50 countries around the world. These people worked in the local subsidiaries of one large multinational corporation, IBM. Following the statistical analysis of their responses, he observed that IBM employees in different countries presented common problems, but that the solutions differed from country to country.

Hypothesis 2 : *A low degree of gender equality at country level amplifies the positive effect that women in CEO duality have on firm performance.*

3 Research design

3.1 Data

Multiple sources of data have been used to achieve the aim of this paper. Firm-specific data was collected from the Amadeus-Orbis database by Bureau Van Dijk; it contains detailed accounting, financial and business information on European companies. Information on corporate leadership structure was provided by the NRG metrics database,[8] which provides accurate data on the corporate governance of listed companies in Europe, especially in the realm of ownership structure. Another source of data was the World Bank, which provides macro-data about institutional variables.

Our sample included publicly listed European firms, which ensured a higher degree of generalizability of results. The following criteria were used to collect data. Firstly, we excluded firms which belong to educational, financial and social sectors, as their business and financing activities tend to be influenced by regulatory and other specific features. Secondly, we also excluded public authorities and non-profit organizations, as their objective functioning does not seek profit maximisation. To avoid any kind of human error in reporting information, we eliminated all firms for which there was information with outliers or improbable values (such as negative values for debt or tangible fixed assets). Furthermore, we excluded firms for which information was missing regarding any of the variables that are used in the main regression estimation model. Consequently, the final sample included 7969 firm-year observations in the period from 2014 to 2020 for firms from 23 European countries. All the continuous accounting variables were winsorized at the 1st and 99th percentiles to limit the impact of outliers and data coding errors on estimation results.

3.2 Models and variables

The objective of this study is to analyse the relationship between women in CEO duality and firm performance using the following two models.

The first model, related to hypothesis 1 (H.1), has the goal of testing the main effect that women in CEO duality have on firm performance.

$$\text{Firm Performance} = f(\text{women in CEO duality, control variables}) \tag{1}$$

With regard to model (1), a positive and statistically significant sign is expected for the coefficient of women in CEO duality, confirming hypothesis 1 (H.1). A

8 Available at https://nrgmetrics.com/

premise to the above model is to first verify that CEO duality actually has an overall effect on firm performance, without considering the gender of the person in this double position.

Regarding the second hypothesis (H.2), we sought to test the argument of social feminist theories concerning the significance of social and cultural context in shaping the role of women in business. According to this theoretical argument, it is assumed that the main effect women in CEO duality have on firm performance is conditioned by certain country-based cultural and social variables that are related to the role of women in society. Thus, an interaction term has to be applied by multiplying the main explanatory variable (women in CEO duality) by a country-based cultural variable. The model to be tested is the following:

$$\begin{aligned}\text{Firm Performance } =&f(\text{women in CEO duality, women in CEO duality}\\ &\times \text{country} - \text{based cultural variable, control variables})\end{aligned} \tag{2}$$

Table 1 displays the definitions of all variables included in the analyses.

Our dependent variable is *Return on Assets* (*ROA*), which is an accounting-based measure of the financial performance of a firm. This measure of performance is in line with prior studies (e.g., Zona et al., 2015). *ROA* is defined as the ratio of earnings before interest and taxes (EBIT) to total assets and is a commonly used measure of firm performance (Adams & Ferreira, 2009; Easterwood et al., 2012). The main explanatory variables are *CEO duality*, which is a dummy equal to 1 if the CEO and chairperson are the same individual and 0 otherwise, and *Women in CEO duality*, which is a dummy equal to 1 if the CEO and chairperson of the firm are the same individual and a woman, and 0 otherwise.

Concerning the role of context-based social and cultural factors, which are expected to shape the effect of women in CEO duality, we considered a country-based variable related to gender parity attitudes that are in favour of women's presence and success in business. Specifically, we considered the variable *Gender parity index* provided by the World Bank, which is the ratio of women to men enrolled at tertiary level in public and private schools. The variable *Gender parity index* indicates parity between women and men. A low value on this index suggests women are more disadvantaged than men regarding learning opportunities, while a high value on this index suggests the opposite. It is an instrument at the service of equality, ensuring the access of women and men to the same opportunities and rights to choose material conditions while respecting their specificities; it suggests that eliminating gender disparities in education would help increase the status and capabilities of women.[9]

As control variables, in line with the extant literature, we used several firm-specific, management- governance and macro factors. *Board independence* is the ratio of independent members to board size (Cambrea et al., 2022). *Board size* is the number of board members (Cambrea et al., 2022). *CEO tenure* is the tenure of the

[9] For more information: https://www.indexmundi.com/facts/indicators/SE.ENR.TERT.FM.ZS.

Table 2 Descriptive statistics

	Mean	Median	SD	Min	25° percentile	75° percentile	Max
ROA	0.046	0.055	0.141	− 1.741	0.021	0.095	1.304
Women in CEO Duality	0.005	0.000	0.067	0.000	0.000	0.000	1.000
CEO Duality	0.159	0.000	0.366	0.000	0.000	0.000	1.000
Gender parity index	1.201	1.236	0.112	0.898	1.155	1.271	1.376
Board independence	0.595	0.570	0.244	0.050	0.410	0.770	1.000
Board size	2.306	2.303	0.297	1.099	2.079	2.485	3.178
CEO tenure	8.561	6.000	8.196	0.000	2.000	13.000	55.000
Firm age	3.612	3.526	0.842	0.693	3.045	4.248	5.903
Firm size	13.687	13.666	2.056	7.572	12.206	15.083	20.006
Tangibility	0.235	0.178	0.216	0.000	0.055	0.357	0.963
Tobin Q	2.150	1.716	1.530	1.000	1.383	2.327	31.171
Debt	0.188	0.162	0.190	0.000	0.055	0.277	8.712
Cash holdings	0.122	0.085	0.126	0.000	0.041	0.153	0.999
GDP growth	0.822	1.672	3.365	− 10.823	0.956	2.263	25.176
Credit market size	1.113	1.126	0.297	0.247	0.885	1.313	2.525

The table reports descriptive statistics for continuous and dummy variables used in our empirical analysis. All the variables are defined in Table 1

No. of Observations: 7969

CEO, which could affect firm value (Nguyen et al., 2018). *Firm age* is defined as the natural logarithm of the number of years since a firm's foundation (Cariola et al., 2020; Low et al., 2015). We included *Firm size,* measured by the natural logarithm of total assets (Campbell & Mínguez-Vera, 2008). *Tangibility* is the ratio of tangible fixed assets to total assets (Korner, 2007). *Tobin Q* is the market value of a company divided by total assets (Daines, 2001). *Debt* is measured as the ratio of long-term financial debt to total assets (La Rocca et al., 2011). *Cash holdings* is calculated as the natural logarithm of cash and cash equivalents scaled to total assets (Cambrea & La Rocca, 2019). In addition, following Cerrato et al. (2019) and Fasano and La Rocca (2021), in order to control for changes in economic environments and for size and access to financial markets, we considered a variable for *GDP growth* and a measure of domestic credit to private sector by banks scaled to GDP (*Credit market size*). Furthermore, we also controlled for country fixed effects, as many other institutional and macroeconomic factors at the national level could influence corporate performance.

Table 3 Number of observations and mean values of the variables ROA, women in CEO duality and CEO duality per each year

Year	Obs	ROA	Women in CEO Duality	CEO Duality
2014	1009	0.055	0.0029	0.1556
2015	1018	0.053	0.0029	0.1566
2016	1068	0.058	0.0037	0.1488
2017	1094	0.061	0.0045	0.1426
2018	1348	0.048	0.0059	0.1639
2019	1376	0.032	0.0051	0.1635
2020	1056	0.014	0.0057	0.1827

4 Empirical results

4.1 Descriptive statistics

Table 2 provides the descriptive statistics for all the variables in the model. It presents the mean, median, standard deviation, maximum value, and minimum value at the 25th and 75th percentiles for all variables.

The ROA (Return on Assets) is, on average, 0.046. In particular, we observed the number of cases of CEO duality was equal to 1270 out of 7969 firm-year observations (about 16%), and, regarding women in CEO duality, there were just 36 out of 7969 firm-year observations (about 0.5%, based on 12 firms, from 1 to 6 years of women in CEO-duality).[10] These numbers are not surprising because, according to the European Women on Boards 2019 Report,[11] among firms enrolled in the STOXX Europe 600,[12] less than 5% of them had a woman CEO and less than 7% had a woman as chair of the board. As further descriptive statistics, in Table 3 we report the number of observations and the mean values of the variables ROA, CEO duality and women in CEO duality per each year. In addition, in Table 4 we provide country-specific figures for all the variables included in the empirical model.

Table 5 provides the correlation matrix for our variables.

The correlation matrix shows the lack of multicollinearity problems; the magnitude of the correlation between explanatory variables is not very high, indicating that multicollinearity is unlikely to cause bias in the coefficients of estimation. Moreover, we also executed the variance inflation factor (VIF) test and found that our analysis is not threatened by this type of problem; maximum VIF is 2.02, below the generally accepted threshold of 5 (Fasano & Cappa, 2022; Fasano & Deloof, 2021).

[10] In the US, a country where the CEO duality is widespread in listed companies, there are cases of duality in 41% of S&P 500 companies, as highlighted by the Spencer Stuart Board Index Report 2021 available at https://www.spencerstuart.com/-/media/2021/october/ssbi2021/us-spencer-stuart-board-index-2021.pdf.

[11] Available at https://europeanwomenonboards.eu/wp-content/uploads/2019/11/EWoB-GDI-final-report_20200108-incl.-EU-disclaimer.pdf.

[12] STOXX Europe 600 is a stock index composed of 600 of the main European market capitalizations.

Table 4 Descriptives by country (mean values)

Country	ROA	Women in CEO Duality	CEO Duality	Board inde-pendence	Board size	CEO tenure	Firm age	Firm size	Tangibil-ity	Tobin Q	Debt	Cash holdings	Gender parity index	GDP growth	Credit market size
Austria	0.05	0.000	0.00	0.69	2.43	11.96	4.20	14.30	0.36	1.63	0.21	0.11	1.16	1.65	0.85
Belgium	0.02	0.003	0.03	0.44	2.39	7.28	3.57	13.61	0.20	2.14	0.25	0.12	1.24	0.57	0.65
Croatia	0.07	0.000	0.00	0.78	2.25	4.54	3.76	1.34	0.35	2.13	0.08	0.13	1.27	2.24	0.59
Cyprus	0.056	0.000	0.05	0.41	2.32	1.94	3.39	1.27	0.37	1.19	0.21	0.06	1.15	3.99	1.80
Czech	0.16	0.000	0.00	0.91	2.17	5.61	3.22	14.83	0.37	2.39	0.14	0.19	1.28	3.60	0.50
Denmark	0.06	0.000	0.00	0.65	2.21	6.88	3.73	13.07	0.26	3.14	0.16	0.16	1.27	2.32	1.65
Finland	0.05	0.000	0.01	0.89	2.12	7.31	3.71	12.94	0.21	2.17	0.18	0.12	1.16	0.92	0.95
France	0.02	0.007	0.75	0.45	2.49	12.33	3.64	14.69	0.18	1.88	0.22	0.15	1.19	−0.25	1.04
Germany	0.05	0.000	0.00	0.78	2.29	7.76	3.70	14.31	0.19	2.18	0.18	0.14	1.00	1.75	0.78
Greece	0.03	0.036	0.47	0.31	2.28	5.81	3.66	11.67	0.38	1.37	0.15	0.10	1.02	−0.03	1.01
Hungary	0.08	0.000	0.00	0.82	2.12	12.39	3.74	12.53	0.42	1.65	0.12	0.05	1.19	4.05	0.35
Ireland	0.06	0.000	0.00	0.55	2.46	8.88	3.05	14.24	0.20	2.38	0.19	0.11	1.10	8.56	0.46
Italy	0.05	0.002	0.35	0.47	2.43	11.16	3.64	13.67	0.21	1.83	0.18	0.12	1.26	−0.90	0.81
Nether-lands	0.04	0.000	0.00	0.89	1.97	8.37	3.67	13.89	0.19	2.08	0.16	0.11	1.12	2.07	1.09
Norway	0.01	0.000	0.01	0.79	2.14	5.25	3.27	13.12	0.31	2.16	0.21	0.13	1.32	1.22	1.24
Romania	0.06	0.000	0.00	0.44	2.02	7.79	3.88	13.77	0.51	1.43	0.16	0.05	1.21	3.36	0.27
Russia	0.36	0.000	0.00	0.43	2.63	7.35	2.86	16.12	0.38	2.81	0.20	0.04	1.15	0.98	0.53
Slovenia	0.06	0.000	0.00	0.74	2.34	6.69	4.03	13.83	0.56	1.46	0.18	0.03	1.30	3.44	0.47
Spain	0.05	0.007	0.24	0.40	2.50	8.21	3.79	14.24	0.27	1.89	0.22	0.11	1.16	0.35	1.08
Sweden	0.06	0.000	0.00	0.71	2.28	7.84	3.60	13.41	0.16	2.59	0.17	0.12	1.36	1.59	1.32
Switzer-land	0.05	0.000	0.09	0.82	2.15	6.43	3.96	13.83	0.20	2.79	0.18	0.16	1.02	1.25	1.67
Turkey	0.09	0.049	0.04	0.27	2.38	6.73	3.65	13.17	0.22	1.90	0.17	0.09	0.90	4.05	0.64

Table 4 (continued)

Country	ROA	Women in CEO Duality	CEO Duality	Board independence	Board size	CEO tenure	Firm age	Firm size	Tangibility	Tobin Q	Debt	Cash holdings	Gender parity index	GDP growth	Credit market size
United Kingdom	0.06	0.001	0.02	0.54	2.32	9.93	3.43	14.15	0.24	2.28	0.19	0.11	1.26	0.28	1.34

Table 5 Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	VIF
1	ROA	1.00															
2	Women in CEO duality	−0.02	1.00														1.02
3	CEO duality	−0.04	0.08	1.00													1.17
4	Gender parity index	−0.01	−0.08	−0.14	1.00												1.15
5	Board independence	0.00	−0.07	−0.31	0.06	1.00											1.39
6	Board size	0.11	−0.01	0.11	0.04	−0.34	1.00										2.02
7	CEO tenure	0.06	−0.01	0.21	0.06	−0.09	0.06	1.00									1.07
8	Firm age	0.08	0.01	0.03	−0.10	−0.04	0.15	0.06	1.00								1.06
9	Firm size	0.20	−0.08	−0.03	0.06	0.04	0.61	0.08	0.15	1.00							1.93
10	Tangibility	0.01	0.05	0.02	−0.07	−0.08	0.07	−0.06	0.08	0.10	1.00						1.11
11	Tobin Q	0.17	−0.04	−0.10	0.09	0.13	−0.11	0.01	−0.09	−0.16	−0.18	1.00					1.10
12	Debt	−0.19	−0.01	−0.02	0.04	0.00	0.09	−0.05	−0.05	0.19	0.19	−0.13	1.00				1.09
13	Cash holdings	−0.11	−0.03	0.03	−0.01	0.06	−0.10	0.01	−0.13	−0.20	−0.24	0.38	−0.16	1.00			1.20
14	GDP growth	0.09	−0.02	−0.12	−0.07	0.09	−0.04	−0.07	−0.02	0.01	0.03	0.03	−0.07	−0.07	1.00		1.06
15	Credit market size	−0.00	−0.03	−0.14	0.27	0.16	−0.14	−0.04	−0.01	−0.01	−0.03	0.16	−0.02	0.05	−0.09	1.00	1.23

Table 6 Results concerning the effect women in CEO duality have on firm performance in Europe

	(1)	(2)	(3) Model [1]	(4) Model [2]
Estimation technique	Panel FE	Panel FE	Panel FE	Panel FE
Dependent variable	ROA	ROA	ROA	
Women in CEO duality		0.031***	0.030***	0.110***
		(0.007)	(0.007)	(0.038)
CEO duality	0.007		0.006	0.006
	(0.007)		(0.007)	(0.007)
Women CEO duality × Gender parity index				−0.073*
				(0.037)
Gender parity index	−0.059	−0.052	−0.054	−0.053
	(0.091)	(0.085)	(0.085)	(0.085)
Board independence	−0.004	−0.004	−0.004	−0.004
	(0.022)	(0.022)	(0.022)	(0.022)
Board size	−0.022	−0.022	−0.022	−0.022
	(0.019)	(0.019)	(0.019)	(0.019)
CEO tenure	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Firm age	−0.028***	−0.027***	−0.027***	−0.027***
	(0.009)	(0.009)	(0.009)	(0.009)
Firm size	0.054***	0.054***	0.054***	0.054***
	(0.009)	(0.009)	(0.009)	(0.009)
Tangibility	0.047	0.047	0.047	0.047
	(0.030)	(0.030)	(0.030)	(0.030)
Tobin Q	0.021***	0.021***	0.021***	0.021***
	(0.005)	(0.005)	(0.005)	(0.005)
Debt	−0.129***	−0.130***	−0.130***	−0.130***
	(0.014)	(0.014)	(0.014)	(0.014)
Cash holdings	0.076**	0.076**	0.076**	0.076**
	(0.034)	(0.034)	(0.034)	(0.034)
GDP growth	0.002***	0.002***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Credit market size	−0.014	−0.016	−0.015	−0.015
	(0.017)	(0.014)	(0.014)	(0.014)
R^2	0.1090	0.1090	0.1091	0.1092
Observations	7969	7969	7969	7969

Robust standard errors, clustered by countries, are reported in brackets. Year and country dummies are included in the model but not reported in the Table. ***Denotes significance at the 1% level; **Denotes significance at the 5% level; *Denotes significance at the 10% level. For descriptions of the variables, see Table 1

4.2 Main model: regression results

Having an unbalanced panel dataset, we based our empirical analysis on the panel model technique, in order to control for unobservable heterogeneity. Before launching our regressions, we first performed the Hausman test, which suggests whether a fixed or random effects panel model should be employed. The null hypothesis of the Hausman test is that the preferred model is random effects. As the p-value of the Hausman test is statistically significant ($\chi^2 = 221.62$ and p-value = 0.000), we rejected the null hypothesis, and thus concluded that the fixed effects (FE) model fit our data better.

Table 6 reports the outcome of the panel FE. In particular, in Table 6 we present the outcome of the main effects concerning the relationship between women in CEO duality and firm performance.

Table 6 shows that the coefficient of the variable *CEO duality* in columns 1 and 3 is not statistically significant, in line with certain other sources of empirical evidence (e.g., Brickley et al., 1997; Yan Lam & Kam Lee, 2008). The coefficient of *Women in CEO duality* in columns 2 and 3 is positive and statistically significant at the 1% level, suggesting that the presence of a woman in the role of both CEO and chairperson of the board has a beneficial effect on corporate performance These findings are consistent with the view that the presence of women improves corporate performance overall.

It is generally acknowledged that CEO duality tends to decrease firm performance due to the presence of agency conflicts. This is because, in the absence of any separation between control and management, a CEO who is also chair could start to diverge from shareholders' interests and constrain board information. Hence, in the case of CEO duality, the company board loses its independence, as well as its monitoring and managerial disciplinary capability, and it becomes unable to govern the firm in an effective manner. However, our empirical results, interestingly, reveal that women in CEO duality may have the opposite impact on the governance and overall performance of a firm. Due to the stereotypical features of women (Duckworth & Seligman, 2006; Ford & Richardson, 1994; Stedham et al., 2007; Williams, 2003), the positive effect their presence has on the business is related to the ethical, altruistic and cooperative characteristics that make women more responsible in terms of their duties towards firms and make them less likely to be opportunistic. In other words, a woman holding the position of both CEO and chair of the company would feel even more responsible and highly obliged to perform her duties effectively, especially in positions that are generally considered typical situations for opportunism. It would be expected that a woman holding both CEO and chair positions would motivate management and board members to work even more effectively and force them to pursue the ultimate mutual goals of the firm. Therefore, it is to be expected that a woman's higher level of ethical preferences and responsible behaviour would make her more influential in performing her duties more effectively and without selfishness, leading the management and board teams on the path of achieving organization goals.

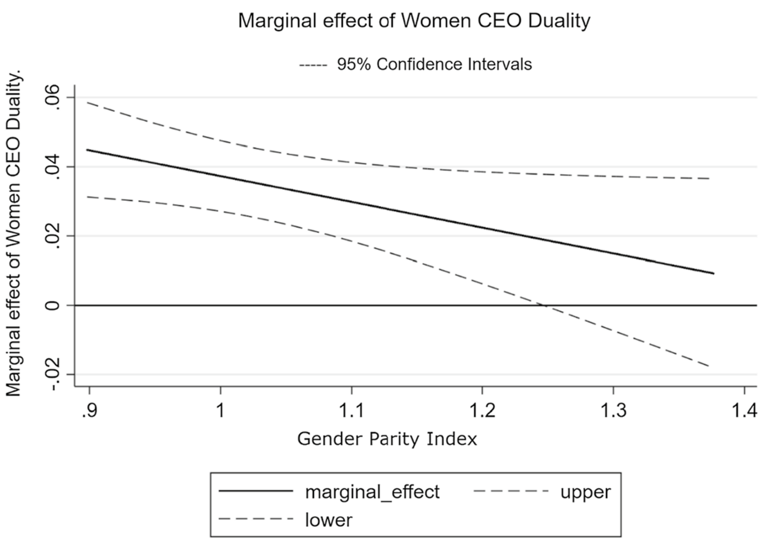

Fig. 1 The moderating effect the country-based gender parity index has on the relationship between women in CEO duality and firm performance. The figure is based on the output of Table 6 column 4, model [2]. 75% of the observations are in statistically significant areas.

4.3 Women in CEO Duality and performance: results concerning the moderating role of country-based gender parity

To test the argument of social feminist theories regarding the importance of context in shaping the role women play in business, it is assumed that the main effect women in CEO duality have on firm performance is conditioned by certain context-based cultural and social variables that are strongly linked to the role of women in that society. We considered the role of context at country level, looking for macro-variables at work. In particular, as shown in Table 6 column 4, we used the gender parity index in interaction with the variable *Women in CEO duality*. An interaction term has to be applied by multiplying the main explanatory variable (*Women in CEO Duality*) with a country-based cultural variable (*Gender parity index*). As assumed in hypothesis 2 (H.2) we found a negative and statistically significant sign for this coefficient. The negative effect of the interaction (−0.073) reduces the main positive effect of women in CEO duality (0.110), which still remains positive even in cases of a high level of gender parity. Considering that we are measuring the interaction between two continuous variables, it is necessary to appreciate the effect graphically. We used Fig. 1 to represent the changing relationship between women in CEO duality and performance along different levels of gender parity.

Figure 1 confirm that the main positive effect that women in CEO duality have on firm performance decreases for higher levels of gender parity. Indeed, this effect become statistically insignificant for high levels of gender parity (75% of the observations are in a statistically significant area). This means that for low levels of gender parity, women who are able to reach top positions in management are highly skilled and able to positively affect firm performance, whereas for high levels of gender parity such a different effect between women and men is diminished.

From a feminist theoretical perspective, this result is consistent with social feminist theories that claim that that gender is a socialization construct affecting managerial behaviour. Thus, gender differences are dependent on the institutional features of the context.

4.4 Robustness and further tests

We performed many additional sets of analyses to assess the robustness of our results and to enrich the analysis with further tests.

4.5 Alternative variables

As a robustness analysis, we employed alternative measures of key variables. In Table 7 we tested whether the results concerning the effect women in CEO duality have on corporate performance are confirmed using alternative measures of the variables employed. In particular, in column 1 we considered an alternative measure of *Board independence* (that is, *Board independence2,* calculated as the natural logarithm of the number of Board Independence members), *Tobin Q* (that is, *Ind-Adj Tobin Q*, computed as the adjusted Tobin Q), and *Cash holdings* (*ln(cash stock),* calculated as the natural logarithm of the amount of cash held by the firm). Moreover, in column 2 we ran our main model substituting the variable *CEO duality* with the variable *Chair executive*, which considers the case of a chair who also holds an executive role other than that of CEO at the firm. Then in column 3 we substituted the variable *CEO duality* with the variable *Chair independence*, which indicates whether the board chair is an independent, i.e., non-executive manager or CEO, or performs any kind of operative task. The regression results for Table 7 columns 1, 2 and 3 also confirm the validity of our findings using alternative measures of the variables.

Moreover, columns 4 and 5 report regression results respectively using alternative measures of the dependent variable, namely *Industry adjusted-ROA*, which was also used, for example, by La Rocca et al. (2019), and Return on Equity (*ROE*), used by Shahrier et al. (2020). The former takes into account potential differences regarding levels of ROA in different industries, while the latter is useful to take into account a measure of performance on behalf of shareholders (residual claimer of the firm).

4.6 Other econometric robustness tests

Endogeneity can be a concern during the examination of the relationship between CEO duality and firm performance, as the gender issue can be considered an endogenous variable in the literature (Carter et al., 2003; Hermalin & Weisbach, 2001)

Table 7 Robustness and further tests concerning the effect women in CEO duality have on firm performance in Europe

	(1) Alternative explanatory variables	(2) Chair-executives instead of CEO duality	(3) Chair-independent instead of CEO duality	(4) Industry adjusted-ROA	(5) ROE	(6) Alternative econometric technique—2SLS-IV	(7) Differences between Eastern and Western Europe	(8) World Bank CG variables as controls
Women in CEO duality	0.029***	0.031***	0.031***	0.026***	0.027*	20.336***	0.025***	0.029***
	(0.008)	(0.007)	(0.008)	(0.007)	(0.015)	(7.653)	(0.008)	(0.006)
CEO duality	0.002			0.004	0.010	4.587**	0.006	0.006
	(0.007)			(0.006)	(0.010)	(1.859)	(0.007)	(0.007)
Chair executive		−0.001						
		(0.006)						
Chair independence			−0.004					
			(0.006)					
Women in CEO duality × Dummy Eastern Europe							0.020** (0.008)	
Board independence		−0.004	−0.000	−0.014	0.001	0.131	−0.004	−0.006
		(0.021)	(0.017)	(0.023)	(0.019)	(0.136)	(0.022)	(0.022)
Board independence2	−0.005							
	(0.010)							
Board size	−0.012	−0.022	−0.023	−0.014	−0.015	0.222	−0.022	−0.021
	(0.023)	(0.019)	(0.019)	(0.018)	(0.017)	(0.155)	(0.019)	(0.019)
CEO tenure	−0.000	−0.000	−0.000	−0.000	−0.000	−0.025**	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)
Firm age	−0.029***	−0.027***	−0.025***	−0.007	−0.033***	0.007	−0.027***	−0.027***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.007)	(0.182)	(0.009)	(0.009)
Firm size	0.045***	0.054***	0.055***	0.060***	0.074***	0.159***	0.054***	0.055***
	(0.010)	(0.009)	(0.009)	(0.009)	(0.013)	(0.058)	(0.009)	(0.010)
Tangibility	0.041	0.047	0.045	0.031	0.067**	−0.067	0.047	0.044

Table 7 (continued)

	(1) Alternative explanatory variables	(2) Chair-executives instead of CEO duality	(3) Chair-independent instead of CEO duality	(4) Industry adjusted-ROA	(5) ROE	(6) Alternative econometric technique—2SLS-IV	(7) Differences between Eastern and Western Europe	(8) World Bank CG variables as controls
	(0.027)	(0.030)	(0.031)	(0.020)	(0.028)	(0.208)	(0.030)	(0.031)
Tobin Q		0.021***	0.021***	0.021***	0.013**	0.046**	0.021***	0.021***
		(0.005)	(0.005)	(0.004)	(0.005)	(0.020)	(0.005)	(0.005)
Ind-Adj Tobin Q	0.019***							
	(0.004)							
Debt		−0.130***	−0.129***	−0.117***	−0.234***	−0.061	−0.130***	−0.129***
		(0.014)	(0.014)	(0.012)	(0.035)	(0.105)	(0.014)	(0.014)
Debt2	−0.178***							
	(0.036)							
Cash holdings		0.076**	0.078**	0.038	0.116***	0.059	0.076**	0.077**
		(0.034)	(0.035)	(0.032)	(0.041)	(0.199)	(0.034)	(0.034)
ln(cash stock)	0.005**							
	(0.003)							
Control Corruption								−0.001
								(0.001)
Government Effectiveness								−0.002*
								(0.001)
Political Stability								−0.000
								(0.000)
Regulatory Quality								0.001
								(0.001)
Rule of Law								−0.001
								(0.001)

Table 7 (continued)

	(1) Alternative explanatory variables	(2) Chair-executives instead of CEO duality	(3) Chair-independent instead of CEO duality	(4) Industry adjusted-ROA	(5) ROE	(6) Alternative econometric technique—2SLS-IV	(7) Differences between Eastern and Western Europe	(8) World Bank CG variables as controls
Voice and Accountability								0.002**
								(0.001)
R^2	0.1404	0.1091	0.1095	0.0876	0.1379	−0.0001	0.1092	0.1109
Observations	7969	7969	7969	7969	7969	7969	7969	7969

(1): For the description of the variables, see Table 1. Robust standard errors clustered by country are reported in brackets. Year dummies are included in the model but not reported in the table. ***Denotes significance at the 1% level; **Denotes significance at the 5% level; *Denotes significance at the 10% level

(2): In column (1) we applied alternative measures of explanatory variables. In particular, board independence2 is the natural log of numbers of independent board members; Ind-Adj Tobin Q is the industry adjusted Tobin Q; Debt2 is the ratio of long- and short-term debt scaled to total assets; Cash holdings2 is the natural log of cash and cash equivalent

(3): In column (2) and (3) different measures of the dependent variables are used: industry adjusted ROA and ROE, alternatively

(4): In column (4) and (5), instead of CEO duality we used, alternatively: Executive as chair, a dummy equal to one if the chair of the board is an executive, and independent chair, a dummy equal to one if the chair of the board is independent from management and ownership

(5): Although the Durbin-Wu-Hausman endogeneity test suggests the absence of an endogeneity issue, in column (6) we also checked whether the results were still valid when controlling for this kind of potential bias by using the 2SLS technique. The F-test statistic of the first stage indicates that the instruments are always jointly significant. The p-value of the instruments is statistically significant and the absence of statistical significance of the Hansen-J statistic confirms the validity of the instruments. Moreover, the non-statistically significant p-value of the Kleibergen-Paap rk LM statistic test demonstrates the significance of the instruments. The R^2 is meaningless in 2SLS, for which negative values are normal conditions

(6): In column (7) we tested the different role of women in CEO duality in Eastern and Western European countries. We used an interaction variable: Women in CEO Duality × Dummy Eastern Europe

(4): In column (8) all the corporate governance indicators, provided by World Bank, are included as further explanatory variables and, potentially, the probability of women in CEO duality might be influenced by some unobservable factors that could be involved in the error term.

First of all, we tested the existence of this kind of problem in our relationship by running the Durbin-Wu-Hausman endogeneity test of endogenous regressors on the variables called *Women in CEO duality* and also on *CEO duality*. Although the test suggests the absence of an endogeneity issue, we also checked whether the results are still valid when controlling for this kind of potentially relevant bias by using the 2SLS technique. In particularly, we used three instrumental variables (IV) that are expected to be correlated with *CEO duality* and *Women in CEO duality* and that do not have any direct impact on the dependent variable measuring firm performance. It is generally hard to get valid instrumental variables (Bascle et al., 2008; Hamilton & Nickerson, 2003), especially in the field of corporate governance (Adams & Ferreira, 2009). We used the industry-adjusted variables as IVs, based on the first digit, for the frequency of women in CEO duality, the average age of board members and the average age of executives. The industry frequency of women in CEO duality is the sum of firms having women in CEO duality in a specific industry scaled to the total number of firms in the industry and related to the probability of having women in CEO duality in each firm affiliated with a specific industry. The average age of board members and the average age of executives is related to the assumption that older people tend to accept the role of duality or, vice versa, tend to refuse the role of women in duality (Wang et al., 2019). Table 7 column 6 reports regression results using the 2SLS method with IVs. In the 2SLS model, the main explanatory variables, *CEO duality* and *Women in CEO duality*, alternatively used, are the fitted values from the first stage of regression. For the 2SLS regressions, the F-test statistic of the first stage indicates that the instruments are always jointly significant. The p-value of the instruments is statistically significant and the absence of statistical significance of the Hansen-J statistic confirms the validity of the instruments. Moreover, the non-statistically significant p-value of the Kleibergen-Paap rk LM statistic test demonstrates the relevance of the instruments, as the latter is correlated with the endogenous regressors. The 2SLS regressions show the same results as our main model.

To sum up, the endogeneity test suggested the absence of this kind of bias in the relationship we studied. Moreover, even assuming the existence of endogeneity, the results of the 2SLS technique confirm our main findings.

4.7 Western and Eastern European countries

Eastern and Western European countries show different levels of gender equality (Beham et al., 2019). As Western states typically have more norms and higher consideration for gender issues, it is interesting to investigate the effect of women in CEO duality by considering differences between Eastern and Western European countries. Table 7 column 7 reports regression results. Thus, we used the interaction term that multiplies the variable *Women in CEO duality* with the dummy *Eastern Europe*, which equals one if a country is located in Eastern Europe, and zero otherwise. We observed that in Western European countries, where the degree of

Table 8 Robustness of the effect women in CEO duality have on firm performance: the moderating role of alternative measures of country-based gender parity

	(1)	(3)
	FE	FE
Women in CEO duality	0.128**	0.061*
	(0.057)	(0.035)
Women in CEO duality × Global gender egalitarianism index	−0.028	
	(0.018)	
Women in CEO duality × Hofstede masculinity index		−0.060
		(0.070)
Control variables	Yes	Yes
R^2	0.1051	0.1024
Observations	7076	7770

For the description of the variables, see Table 1. Robust standard errors, clustered by countries, are reported in brackets. Year dummies are included in the model but not reported in the table: ***Denotes significance at the 1% level. **Denotes significance at the 5% level. *Denotes significance at the 10% level

gender equality is lower compared to Eastern European countries, the positive effect of women CEO duality observed for our first hypothesis is stronger. It seems that in contexts where there is less attention towards gender problems, when women reach an important position (such as that of CEO-chair), they try to do their best to prove their worth with consequent positive implications for corporate performance.

4.8 Controlling for differences in institutional and corporate governance systems

Chang and Noorbakhsh (2009) find that cultural traits, beyond corporate governance and legal systems, affect the behaviour of managers and reflect final outcomes. To verify that our results on gender equality were not affected by any kind of country-based corporate governance feature, we include World Bank Corporate Governance measures in the model regarding *Control of Corruption*, *Government Effectiveness*, *Political Stability*, *Regulatory Quality*, *Rule of Law*, and *Voice and Accountability*. In this case as well, our results were confirmed.

4.9 Alternative measures of country-based gender equality

Concerning context-based social and cultural factors that are expected to affect the role of women in CEO duality, in order to validate our results based on the gender parity index of the World Bank, we considered two other variables, alternatively, in Table 8. These two variables are country-based.

First of all, we considered 'GLOBE gender egalitarianism', which is defined as 'the degree to which a collective minimizes gender inequality' (House et al., 2004,

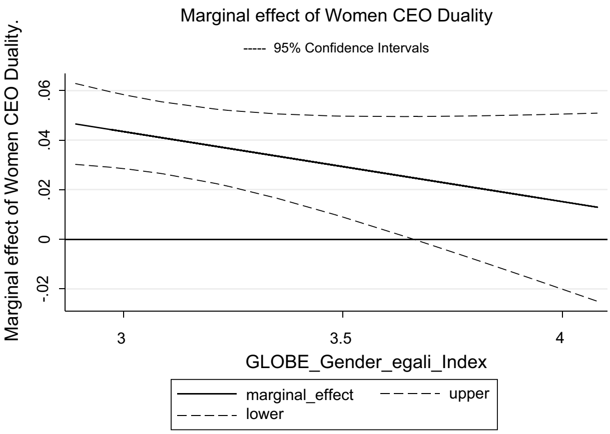

Fig. 2 The moderating effect of country-based gender parity, in terms of the global gender egalitarianism index, on the relationship between women in CEO duality and firm performance

p. 30).[13] This variable, on a scale from 1 (low egalitarianism or high gender parity) to 7 (high egalitarianism or low gender parity), is based on the findings of GLOBE research,[14] which allowed us to sort out different characteristics of countries/contexts that have high or low gender egalitarianism (based on House et al., 2004, Table 14.2, p. 359). In particular, the GLOBE project investigates how cultural values are related to organizational practices, conceptions of leadership and the economic competitiveness of societies. It has identified several cultural dimensions, and one of these units of measurement relates to 'gender egalitarianism', which has proved to be an important predictor of successful leaders.

In addition, similar to the GLOBE gender egalitarianism index, it is possible to test the validity of our results using Hofstede's Masculinity (MAS) index (Hofstede, 1980, 1991), which refers to the distribution of roles between genders in a country, the degree of difference between men's values and women's values between countries, and what motivates people. A high score (Masculine) on this dimension indicates that the society in question will be driven by competition, achievement and success, with noteworthy differences between men and women. A low score (Feminine) on the dimension means that the dominant values in society are caring for quality of life, with similar values on gender diversity.

Table 8 and Figs. 2 and 3 report the results for these robustness tests. In both cases, the main results of Table 6 column 4 are confirmed.

[13] We had to use an assumption in the data, i.e., considering average data related to Sweden and Finland for Norway.

[14] GLOBE is the acronym of 'Global Leadership and Organizational Behavior Effectiveness" (https://globeproject.com). In general, the GLOBE project is a unique international large-scale study of culture, organizations and leadership effectiveness, including 150 countries in collaboration with nearly 500 researchers.

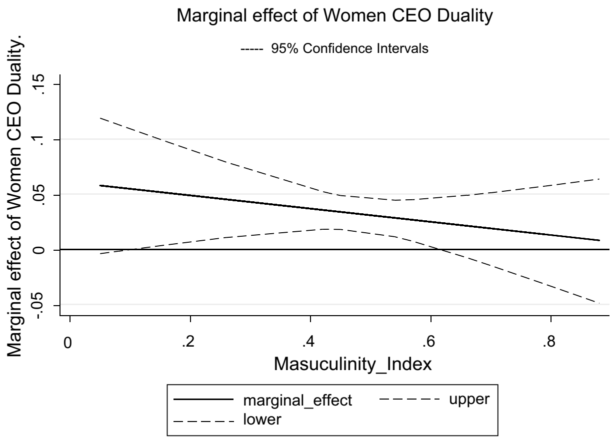

Fig. 3 The moderating effect of country-based gender parity, in terms of the Hofstede masculinity index, on the relationship between women in CEO duality and firm performance

5 Conclusion and implications

Our analysis adds support and an original perspective to earlier empirical studies on the impact gender has on corporate performance. Moreover, it also enriches the corporate governance literature investigating CEO duality. Our paper suggests it is worth investigating women in CEO duality to achieve a better understanding of gender-diverse leadership within the organizational domain. In particular, this paper highlights the 'bright side' of women in governance. Moreover, our contribution extends theoretical perspectives on this topic through a combination of feminist arguments with stewardship theory to address the potential effect that women in leadership positions have on company success.

We studied a large sample of listed European firms in the 2014–2020 period and observed the effect of CEO duality in company performance when a woman held both the positions of CEO and board chair. Our analysis of gender leadership structure indicates that women in CEO duality have a strong positive influence on firm performance, which is in line with stewardship theory (Boyd, 1995; Donaldson & Davis, 1991; Mallette & Fowler, 1992; Peng et al., 2007), whereas the effect general CEO duality has on firm performance is not statistically significant, which is consistent with previous controversial empirical evidence on this topic (e.g., Brickley et al., 1997; Yan Lam & Kam Lee, 2008). Drawing on social feminist theory, we found that the presence of women is a factor that engenders positive entrepreneurial behaviour and is positively associated with firm performance.

We suggest that women in CEO-chair leadership might be more likely to be good stewards in the proper use of a firm's resources and might more effectively contribute to improving corporate performance. This finding is consistent with the view that women who simultaneously serve in the roles of both CEO and board chair can work more effectively by reducing managerial opportunism and CEO entrenchment thanks to their higher levels of ethical behaviour and social responsibility, which may prevent them from exploiting their power and positions at the expense of owners or shareholders. Thus, women in leadership positions amplify the benefits and/or reduce the costs of CEO duality. We support the view that the 'dark side' of CEO duality—namely strong power concentration and managerial dominance—is less likely when women are in CEO-chair contexts. Consistent with the perspectives of stewardship theory, the 'bright side' of CEO duality leadership can become pronounced, making it possible to enjoy the classic benefits of combined leadership in providing unity of direction and command, as well as offering lower information costs (Brickley et al., 1997), if women are chosen as CEO-chairs of firms.

The validity and the reliability of our empirical analysis is supported in many ways. Regarding the validity and accuracy of the measures we employed, we used authoritative sources of data, such as the Amadeus-Orbis database provided by Bureau Van Dijk, the NRG metrics database, the World Bank database, and others. Moreover, we used a long period of analysis to support the reliability of our findings and we also used different measures to capture the phenomenon of women in CEO duality as well as different measures of firm performance. Furthermore, several additional robustness tests corroborate our findings.

Our work has important practical and research implications for both companies and researchers, as it highlights the importance of women being present in management and on corporate boards. It also indicates the need for consequent strategies that empower women and seek a proper gender balance, which can improve the overall governance and performance of companies.

In light of the positive effect observed in our results, future research should further study the phenomenon of women in CEO duality as regards a number of characteristic features. Since CEO duality does not always have negative effects on corporate value, firms should explore the reasons that make women in CEO duality a valuable driver of corporate performance. For instance, ethical issues could be at the core of the positive effect of women in CEO duality that we observed in this research. It would be interesting to investigate whether the positive effects of women in CEO duality could be a by-product of the specific features of women, compared to men, that lead to a reduction in the opportunism and information costs that typically characterize CEO duality. Conversely, researchers could find this is a by-product of women's greater focus on social responsibility and ethical issues, which in general suggests that women in leadership positions are more socially responsible; this, in turn, is appreciated by the market. Therefore, future research should disentangle whether gender is most relevant or whether the effect that CEO duality has on firm performance depends on certain specific characteristics or profiles of the persons involved.

In addition, another study question could be whether women in high level leadership roles are valuable thanks to a sort of corporate image effect, since women's empowerment has been a hot topic in the last century, and it has had an impact on economic development (Duflo, 2012). Researchers could scrutinize whether women as CEO-chairs, performing both roles, are beneficial in terms of different perspectives/motivations/values or whether it is an issue related to corporate image. Thus, it could be clarified whether, when seeking to improve corporate reputation, appointing women to leadership positions can act as an instrument that heightens reputation and company image on the market. It is important to clarify whether firms could promote the role of women as a strength for their business in the eyes of the market.

Finally, future studies could investigate the impact that women in CEO duality can have on the performance of companies in different industries. The positive effect of women in CEO duality could be industry specific. It is possible that in some industries, for example the fashion sector (clothing, cosmetics, etc.), women in leadership positions could produce better performance than in others. Thus, future research should clarify whether the effect in our findings is industry specific.

It is also very interesting to notice that the positive effect produced by women in CEO duality regarding firm performance is amplified in countries with low gender parity attributes. In line with feminist theories, it seems that in countries where gender parity is a stated or consolidated value, the positive effect of women in CEO duality vis-à-vis performance is low or not statistically significant. Vice versa, in countries where there are greater gender differences, it seems that women who are able to climb to top leadership positions are particularly capable of boosting corporate performance.

Furthermore, from a political point of view, it is important for countries not to pass legislation that forces a separation between the roles of CEO and chair of the board of directors. Policymakers should not force a separation between the roles of CEO and chairperson because, under certain conditions, it could be beneficial for corporate performance. On the contrary, uniting these roles should actually be encouraged when it is advantageous for the company. Thus, our work overturns views that call for the separation of the roles of CEO and chair of the board of directors. A possible limitation of our study is that feminist theories have been scarcely used in managerial studies. However, through this paper, we hope to contribute, in part, to the literature that overcomes a stereotyped view of gender characteristics.

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Declarations

Conflict of interest The authors have no conflicts of interest to disclose.

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