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The effect of board diversity and tenure on environmental performance. Evidence from family and non-family firms

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Abstract

Purpose – The aim of this paper is to examine the effect of structural and demographic board diversity as well as board tenure on family firms' environmental performance, by analyzing the differences between family and non-family businesses and within family firms.

Design/methodology/approach – Tobit regressions are applied to investigate the effect of independent directors, CEO non-duality, board gender diversity and board tenure on environmental performance. The study also controls for other board and firm characteristics, as well as for time, industry and country-fixed effects. In doing so, the authors rely on a sample of non-financial listed firms from France, Germany, Italy, Spain and Portugal over the period 2014–2021.

Findings – The authors find that women on the board positively influence environmental performance and this effect is significant only in family firms, although board tenure negatively moderates the relationship. Board independence significantly affects environmental performance only in non-family firms. A strong presence of family directors has a negative effect on family firms' environmental performance, especially when directors' turnover is low.

Originality/value – This paper examines the unexplored relationship between structural board diversity and environmental performance in family companies. This study provides empirical evidence on the association between gender diversity and family firms' environmental performance focusing for the first time on a European setting. Moreover, this study provides evidence of a different effect of board tenure in family and non-family businesses.

Keywords Environmental performance, Family firms, Board independence, Board gender diversity, CEO duality, Board tenure

Paper type Research paper

1. Introduction

Preservation of the environment has become a major concern over recent decades and companies face increasing societal pressure to reduce their environmental footprint. Legislative interventions, worldwide, aim at enhancing firms' environmental sustainability and directing investments towards economic activities that substantially contribute to the mitigation of climate change and, more generally, to the protection of the natural environment. Literature has also highlighted the role of environmental operational practices in enhancing a firm's competitive advantage (Rousseau *et al.*, 2019). Therefore, environmental engagement challenges corporate governance as boards of directors play a fundamental role in establishing strategic

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objectives and are ultimately responsible for a firm's financial as well as social and environmental performance (Veltri *et al.*, 2021). Environmental performance constitutes a relevant dimension of operations performance (de Burgos Jiménez and Céspedes Lorente, 2001) as it measures the impact of a company's environmental strategies, in terms of reduction of natural resource consumption, emissions and environmental costs for customers. Boards are diverse in terms of their structural characteristics, such as size, board independence, CEO duality and tenure and their members' demographic attributes such as gender, age, education and nationality. Literature refers to "diversity of boards" when dealing with structural board diversity features and to "diversity in boards" when considering director demographic diversity traits (Veltri *et al.*, 2021). Therefore, research has pointed out the importance of analyzing the effect of specific board characteristics on environmental performance (Hussain *et al.*, 2018).

Previous studies have provided conflicting results regarding the relationship between structural board diversity and environmental performance (De Villiers *et al.*, 2011; Post *et al.*, 2011, 2015; Walls *et al.*, 2012; Arena *et al.*, 2015; Shaukat *et al.*, 2016; Hussain *et al.*, 2018; García Martín and Herrero, 2020; Orazalin and Mahmood, 2021). This stream of research has not taken into account the effect of a firm ownership type addressing the possible differences between family and non-family companies, as well as within family businesses. Very few studies have analyzed the effect of board tenure on environmental performance (De Villiers *et al.*, 2011; Paolone *et al.*, 2023). In particular, no study has verified how tenure may moderate the relationship between board diversity and environmental performance in family firms although there is evidence of a different effect of tenure on family and non-family firms' risk aversion (Huybrechts *et al.*, 2013) as well as financial performance (Tao-Schuchardt and Kammerlander, 2023). Research has also addressed the association between demographic board diversity and environmental performance, mostly focusing on gender diversity, with mixed findings (see, among others: Post *et al.*, 2011; Li *et al.*, 2017; Lu and Herremans, 2019; Francoeur *et al.*, 2019; García Martín and Herrero, 2020; Orazalin and Mahmood, 2021; Islam *et al.*, 2022). A very limited number of studies, focusing on U.K. and U.S. companies, have considered the relationship between demographic board diversity and environmental performance, controlling for a firm's family nature (Cordeiro *et al.*, 2020; Nadeem *et al.*, 2020). Research on family firms' environmental performance has mainly focused on differences in family and non-family companies (Berrone *et al.*, 2010), family involvement in management and level of ownership (Samara *et al.*, 2018; Graafland, 2020; Miroshnychenko *et al.*, 2022). Other studies have investigated peculiar sources of heterogeneity in family firms' environmental performance such as training and development practices (Dal Maso *et al.*, 2020), relations with the social community (Dekker and Hasso, 2016), long-term orientation (Dou *et al.*, 2019) and stakeholder pressure (Neubaum *et al.*, 2012). At present, no study has focused on the effect of board structural diversity on family firms' environmental performance and literature provides limited empirical evidence on the effect of demographic board diversity (Cordeiro *et al.*, 2020; Nadeem *et al.*, 2020). The relationship between board diversity and environmental performance in family firms is under explored despite family firms constituting the backbone of most economies across the world (Anderson and Reeb, 2003): they produce 70–90% of gross domestic product around the world (De Massis *et al.*, 2018) and board characteristics are a relevant source of heterogeneity among them (Daspit *et al.*, 2021).

Drawing on different and competing theoretical perspectives, research has formulated arguments for a positive or negative relationship between family firms and environmental performance while empirical studies have also failed to provide unambiguous results regarding the direction of the family effect on environmental performance (Miroshnychenko *et al.*, 2022). On the one hand, some studies reveal a positive association between family firm status and environmental performance (Berrone *et al.*, 2010; Gomez-Mejia *et al.*, 2019; López-González *et al.*, 2019). On the other hand, some contributions highlight a negative association (Dal Maso *et al.*, 2020) or do not find a significant relationship between family firms and environmental performance (Cruz *et al.*, 2014). Therefore, it is relevant to address the issue of

how governance characteristics, other than ownership structure, may affect family firms' environmental performance.

Our research questions are: How does board diversity affect family firms' environmental performance? Does board tenure moderate the effect?

We address the questions by analyzing a sample of French, German, Italian, Portuguese and Spanish non-financial listed firms for the period 2014–2021. The sample is of interest because of the lack of studies on board diversity and environmental performance in family firms in European countries. Family firms have been playing a major role in continental European economies for centuries, particularly in the countries we focus on, where they reach the highest percentage of companies [1].

This paper draws on Agency Theory and Stewardship Theory, integrated by the Socioemotional wealth (SEW) perspective, as the aim of the paper is to analyze the effect of board diversity on environmental performance in family and non-family companies, as well as within family businesses, in order to highlight possible sources of heterogeneity among family companies' environmental performance. We articulate board diversity into structural diversity (proxied by board independence) and demographic diversity (proxied by gender), consistent with Veltri *et al.* (2021). Focusing on family firms, we add the proportion of family members on the board as a further demographic diversity variable. We also analyze the possible moderating effect of board tenure on the relationship between the above-mentioned forms of board diversity and environmental performance. We control for board size, as well as for other firm characteristics related to profitability, capital structure and socioemotional wealth, such as the owner's identity in the company name, family CEO and family ownership stake.

Our findings contribute to extant literature in different ways.

We contribute to environmental performance studies by pointing out that, in family firms, environmental performance is affected only by demographic diversity whilst environmental performance is significantly affected by structural board diversity, in terms of board independence and board size, as well as by gender diversity in non-family firms. This is the first study to analyze the relationship between structural board diversity and environmental performance in family firms and it is the first piece of research to provide empirical evidence on the association between gender diversity and family firm's environmental performance in a European setting.

We add to family firms' literature as we find that gender diversity has a positive and more significant impact in family firms than in non-family firms, but that the effect tends to diminish as board tenure increases. Moreover, within family firms, family members on the board tend to decrease environmental performance and the effect is higher for long tenured boards.

We contribute to board diversity literature as, to the best of our knowledge, ours is the first study to provide evidence of a different effect of board tenure in family and non-family firms. Our results suggest that, in family companies, the effect of demographic board diversity on environmental performance is moderated by board tenure, but that this effect does not hold for non-family companies.

The paper continues as follows: section 2 explains the theoretical framework; section 3 introduces the literature review and develops hypotheses; section 4 presents data and methods; section 5 presents and discusses the results; section 6 concludes the paper, highlighting the scientific contribution, implications for theory and practice, limitations of the research and avenues for further research.

2. Theoretical framework

Two competitive perspectives inform family firm environmental performance studies, leading to mixed results (Miroshnychenko *et al.*, 2022). The positive or negative valence of

family control and influence is related to an owning family agency or stewardship view (Le Breton-Miller and Miller, 2016).

According to Agency theory, a company's commitment to activities favoring stakeholders is linked to three types of agency conflict. The first type relates to the conflict between owners and managers, nevertheless family businesses present a concentrated ownership structure that increases by monitoring incentives as well as capabilities, and reduces agency conflicts between owners and managers (Shleifer and Vishny, 1986; Anderson and Reeb, 2003). Moreover, an owning family may exert an indirect as well as a direct influence on management through family members' involvement in management. In this case, family managers may be risk-averse to the adoption of sustainability initiatives as they bear the residual risk of management decisions (Ernst *et al.*, 2022), to the detriment of environmental performance.

The second type of agency conflict arises between majority and minority shareholders. According to literature, family firms experience more severe second type agency conflicts than non-family businesses as family blockholders may extract private benefits from the business (Villalonga and Amit, 2006). Second type agency conflicts may negatively affect environmental performance as they arise from a family-centered view of the business as well as from the family's wealth concentration in the firm (Purkayastha *et al.*, 2022). Noteworthy is the example of Zara, the first fast fashion company in the world, managed under a family-centered model, which shows no sign of slowing down its fast business and diminishing the high carbon footprint of its supply chains [2]. Namely, the presence of strong family ties may result in the prioritization of family members' needs, nepotism, entrenchment and the appointment of unskilled family managers to the detriment of organizational performance and of other stakeholders' interests (Schulze *et al.*, 2001). Negative familism may demotivate non-family employees with negative effects on their performance and on their commitment to activities in support of the environment when these are not directly related to their duties (Sendlhofer, 2020). Agency conflicts of the second type may result in poor performance and, as a consequence, in the limited availability of resources to support environmental activities (Miroshnychenko *et al.*, 2022). Moreover, family blockholders present under-diversified portfolios and a large part of a family wealth is invested in the business. For this reason, they are less likely to invest in uncertain projects (Gomez-Mejia *et al.*, 2007) such as pro-environment projects, they are less prone to engage in social and environmental investments as most of the cost falls onto the owning family (Barnea and Rubin, 2010).

A third type of agency conflict emerges between shareholders and lenders (Mauer and Sarkar, 2005). On the one hand, shareholders may expropriate lenders wealth by the means of asset substitution operations (Jensen and Meckling, 1976). On the other hand, lenders tend to prevent this negative effect by demanding high remuneration and costly measures to monitor borrowers (Miroshnychenko *et al.*, 2022). There is evidence that family businesses prefer to finance growth with debt rather than external equity (Romano *et al.*, 2001) in order to maintain tight control, therefore costs related to agency conflicts with lenders may reduce the resources available for pro-environmental practices.

According to Agency theory, family businesses would be less prone to engage in environmental activities because of the peculiarities of their agency conflicts. Effective boards may limit agency conflicts by means of their monitoring capabilities (Jensen and Meckling, 1976), improve openness to change (Haniffa and Cooke, 2002) and provide resources to enhance environmental performance (De Villiers *et al.*, 2011). Board effectiveness and interest in environmental activities are affected by board characteristics (García Martín and Herrero, 2020) and, from an Agency perspective, effective boards need to be composed of independent directors (Rhoades *et al.*, 2000) and demographic diversity should enhance board monitoring because of the resultant less family-oriented system of values and thinking.

From the point of view of tenure, long-tenured directors may continue in the role because they are cronies of the owning family or management, their decisions are aligned with the

interests of the owners and management, therefore board long tenure does not reduce agency conflicts (Le-Breton-Miller *et al.*, 2015). From an agency perspective, a long average tenure may moderate the positive effect of board independence and gender diversity on environmental performance as independence tends to be only formal and the board is less prone to change the status quo and leave room for diverse thinking and innovation (Westphal and Zajac, 1995).

Stewardship theory may be seen as a particular case of Agency theory in which the principal and the agents have similar goals, thus minimizing first type agency conflicts (Caers *et al.*, 2006). According to Stewardship theory, many leaders and executives are driven by more than economic self-interest in their jobs: they often behave with altruism towards the organization and its stakeholders, and these attitudes would be prevalent among family companies whose leaders are either family members or who are emotionally linked to the owning family (Miller and Le Breton-Miller, 2006). From the Stewardship perspective, family firms' managers behave like good stewards as they aim to preserve the business for the family and for subsequent generations (Le Breton–Miller and Miller, 2006). A long-term orientation together with a strong family commitment to the continuity of the family, and to the firm's identity, results in family ownership having a positive effect on the adoption of proactive environmental strategies as an ethical form of behavior (Dou *et al.*, 2019) that creates a long-term business sustainability. Barilla, a century-old family business operating in the food sector, offers an example of this behavior through its long-lasting commitment in terms of sustainable packaging, raw materials and regenerative agriculture (Ruini *et al.*, 2016).

According to the Stewardship perspective, family firms are interested in long-term sustainability and, for this reason, they are prone to invest in CSR activities in order to straighten relationships with their internal and external stakeholders such as non-family employees, customers, suppliers and the environment (Le Breton-Miller and Miller, 2016). Family CEOs rely on a long tenure and later generations' care implies a long-term perspective. These governance characteristics result in lengthy investment time horizons and incentives to invest that may favor environmental activities that do not lead to a short run return but that improve environmental performance. Under this perspective, the role of the board is to support management in pursuing a company's goals, therefore a firm's board and management act as a single stewardship team for the business.

Unlike the Agency perspective, Stewardship Theory argues that internal directors are more beneficial to the firm (Donaldson, 1990; Donaldson and Davis, 1994). From this view, internal directors are good stewards of the company's interests, they will behave more diligently to preserve the business for future generations and invest in a longer-term perspective than independent directors (Baysinger and Hoskisson, 1990; Hill and Snell, 1988) and thus they may be more prone to invest in environmental activities. Under a Stewardship lens, a longer average tenure increases independent directors' experience and commitment to the firm in a longer-term perspective (Vafeas, 2003) as over time directors develop social ties that foster the identification with the firm (Sundaramurthy and Lewis, 2003) to the benefit of environmental engagement. Board demographic diversity can enhance stewardship by improving a firm's decision-making process by means of diverse views, experiences and sensitiveness (Nguyen *et al.*, 2021), thus broadening stewardship to benefit a wider range of stakeholders and the environment. Under this view, a longer board tenure reduces board's discussions and may uniform views and opinions inside the board (Davis *et al.*, 2007), moderating the positive effect of demographic diversity on environmental performance. In family firms this implies an alignment to the owning family priorities and translates into a lower propensity to entrepreneurial risk (Huybrechts *et al.*, 2013) and the pursuit of environmentally risky strategies.

Stewardship behavior and agency conflicts in family firms are affected by the relevance non-financial goals assume in this type of company (Chrisman, 2019). Under the Socioemotional wealth (SEW) perspective, family firms' behavior is led by non-financial

goals that consist in the preservation of the systems of emotional values a family extracts from the business by the means of ownership control (Gomez-Mejia *et al.*, 2007). A number of dimensions pertain to the SEW concept. Family control and influence on the business provide the family with visibility and reputation; family members feel a relevant sense of identification with the firm that projects a strong family image in society; a family builds social ties through the business deriving status and reputation; dynastic succession renews family bonds to the business (Berrone *et al.*, 2012).

On the one hand, the identification of the family with the firm and the desire to ensure its long-term survival may increase a propensity towards environmentally sustainable practices (Berrone *et al.*, 2010; Agostino and Ruberto, 2021). On the other hand, SEW preservation may result in a family centered decision-making process to the detriment of the environment and to a firm's stakeholders at large (Kellermanns *et al.*, 2012, p. 1179). Family control and influence over the firm may reinforce risk aversion and result in dysfunctional conservatism (Miller and Le Breton-Miller, 2014), reducing the propensity to engage in environmentally friendly initiatives. In this vein, family ownership and control negatively affect the adoption of green product innovation, which may put at risk family assets (Huang *et al.*, 2016). Board diversity may moderate the possible negative effect of SEW on environmental performance, bringing different and less family-centered values and sensitivities onto the board (Gavana *et al.*, 2023).

3. Literature review and hypotheses development

3.1 Independent directors and environmental performance

According to Stewardship theory, internal directors are better stewards of a business than independent directors and they invest in a longer-term sustainability perspective (Hill and Snell, 1988; Baysinger and Hoskisson, 1990), which may benefit environmental investments and by its means environmental performance. Nevertheless, only a limited number of studies points out a negative effect of independent directors on environmental performance (Walls *et al.*, 2012; Orazalin and Mahmood, 2021). According to Agency theory, a higher proportion of independent directors can monitor the opportunistic behavior of managers more effectively (Luan and Tang, 2007). Independent directors feel less pressure toward financial goals and exhibit greater concerns for CSR (Ibrahim and Angelidis, 1995), promoting the balance between financial and environmental objectives and between short-term and long-term goals (Liao *et al.*, 2015). They are more prone to use their competencies and experiences to improve environmental performance in order to strengthen their relationship with stakeholders and achieve reputational rewards (Mallin *et al.*, 2013). Accordingly, a majority of empirical studies show that increasing the number of independent directors positively contributes to environmental performance (De Villers *et al.*, 2011; Post *et al.*, 2011, 2015). A greater number of independent directors helps the board to formulate and implement a proactive and comprehensive CSR strategy and, in turn, to achieve higher environmental performance (Shaukat *et al.*, 2016). None of the previous studies have analyzed the effect of independent directors controlling for the nature of the firm, in terms of family or non-family ownership control. Nevertheless, the literature suggests that family business status is a specific company condition that may influence the relationship between board diversity and non-financial performance (Veltri *et al.*, 2021). There is evidence that family firms' independent directors tend to be related to the controlling family, and in so doing, they are less effective in lowering agency conflicts (Chen and Jaggi, 2000) that may jeopardize environmental performance. Moreover, according to literature, family firms' CSR behavior is guided not only by financial objectives but also by the pursuit of socio-emotional wealth. Under an Agency perspective, SEW reduces agency conflicts (Gavana *et al.*, 2022) and may lower the beneficial effect of independent directors on environmental performance. From a Stewardship view, SEW provides internal directors with a long-term perspective (Berrone

et al., 2012) suitable for environmental investment that would result in a lower effect of independent directors on environmental performance in family than in non-family firms.

H1. The beneficial effect of independent directors on environmental performance is lower in family than in non-family firms

3.2 CEO non-duality and environmental performance

Under an Agency perspective, CEO duality can reduce board independence, blur the borderline between management and control (Luan and Tang, 2007) as well as undermine the effectiveness of board monitoring (Mallin *et al.*, 2013), whilst non-dual leadership structures are more prone to pursue with diligence their monitoring role. On the one hand, dual CEOs may be more profit-oriented than non-dual CEOs and the latter would benefit social and environmental activities (Zhang, 2012). Accordingly, certain empirical studies have shown that CEO duality is negatively associated with environmental performance (De Villers *et al.*, 2011; Hussain *et al.*, 2018). On the other hand, more powerful CEOs of firms operating in polluting industries may increase environmental performance to extract resources from the business, as good environmental performance enhances CEO pay (Berrone and Gomez-Mejia, 2009) and CEO non-duality would limit this opportunistic behavior. Under an Agency perspective, we would expect a stronger effect of CEO non-duality for non-family firms as agency conflicts of the first type are tougher than in family firms.

Under a stewardship perspective, managers are good stewards of a business, they operate in order to ensure a firm's long-term sustainability. Donaldson and Davis argue that the overlapping position of board chair and CEO favors a CEO's steward commitment (Donaldson and Davis, 1991). CEO duality favors strong leadership and effective strategic decision-making (Hewa Wellalage and Locke, 2011) also to the benefit of the environment. Consistently, Arena *et al.* (2015) find a positive relationship between CEO duality and environmental performance and Walls *et al.* (2012) point out that environmental performance decreases in absence of CEO duality. Therefore, CEO non-duality would be less effective in favoring environmental performance. There is evidence that some CEO characteristics differently affect family and non-family firms' environmental performance because of the relevance of the SEW and its beneficial effect for the environment (Berrone *et al.*, 2010). Splitting the authority between the board chair and the CEO may reduce family influence (Cabrera-Suárez and Martín-Santana, 2015). Nevertheless, on the one hand, family CEOs are led by non-financial goals (Blanzo-Mazagatos *et al.*, 2022) and, on the other hand, non-family CEOs tend to develop over time a sense of psychological ownership and share family goals and values (Huybrechts *et al.*, 2013). Therefore, we expect that the possible negative effect of CEO non-duality on environmental performance is lower in family than in non-family firms because of the beneficial effect of the SEW.

H2. The effect of CEO non-duality on environmental performance is lower in family than in non-family firms

3.3 Women on the board and environmental performance

Regarding boards' demographic characteristics, literature has addressed the effect of board gender diversity on environmental performance, reaching mixed results. Under an Agency theory perspective, female directors may reduce agency conflicts to the benefit of CSR performance because of their enhanced monitoring capabilities and sensitiveness (Veltri *et al.*, 2021) unless their appointment derives from formal criteria, not allowing them to affect strategic decision-making (Fernandez-Feijoo *et al.*, 2014). According to Stewardship theory, board members support a firm's management rather than monitor its behavior (Corbetta and Salvato, 2004). Directors and managers act together in favor of the long-term sustainability of

the business and the presence of women favors stewards' behavior towards other stakeholders and the environment.

Several empirical studies have revealed a positive association between the presence of women on the board and environmental performance. Women bring to the board different skills and resources, and this benefits environmental performance, especially in more polluting industries where there is a higher complexity in managing firms' environmental impact (Li *et al.*, 2017; Lu and Herremans, 2019). Women enrich the board with different values, ideas, knowledge and perspectives. They exhibit diverse thinking styles, are more prone than men to meet the needs of multiple stakeholders and present a long-term orientation that enhances environmental performance (Nadeem *et al.*, 2020; Orazalin and Mahmood, 2021; Islam *et al.*, 2022). Women care for others more than men and, among a firm's stakeholders, female directors tend to prioritize less powerful stakeholders, such as the environment (Francoeur *et al.*, 2019). The educational background of female directors, more oriented towards humanities and education, as well as their different professional experiences, help the board to improve a firm's environmental performance (García Martín and Herrero, 2020). Increasing the number of women on the board raises the likelihood of forming sustainability-themed alliances beneficial for environmental performance (Post *et al.*, 2015), even if research points out that women are able to positively influence a firm's environmental performance when reaching a critical mass on the board (Post *et al.*, 2011). A limited number of contributions finds a non-significant or a weak effect of women on the board on environmental performance (Walls *et al.*, 2012; Hussain *et al.*, 2018). Family firms are characterized by a long-term perspective as their decision-making process is led by non-financial goals, such as maintaining family influence on the business in order to pass the business on to future generations (Berrone *et al.*, 2012). They are particularly concerned about a firm's reputation and image risk (Santos *et al.*, 2022), as a company's public image affects the SEW endowment derived from the business (Razzak and Jassem, 2019). For this reason, they are very attentive to the judgment of the community in which they operate and they try to satisfy stakeholders' needs related to environment preservation (Berrone *et al.*, 2010). Women enrich the board with greater sensitivity towards stakeholder needs; family owners are aware of this and rely on female directors to implement their environmental CSR agenda (Cordeiro *et al.*, 2020). Based on this discussion, we expect that an increase in the ratio of female directors on the board would be particularly effective in enhancing environmental performance in family firms.

H3. The positive effect of women ratio on the board is higher in family than in non-family firms

3.4 Family members on the board and environmental performance

Family firms may behave differently towards environmental performance depending on the presence of family directors on the board (López-González *et al.*, 2019), a further and peculiar source of demographic board diversity for family businesses (Gavana *et al.*, 2023). Family involvement in management may influence negatively or positively strategic decisions, such as engagement in social and environmental activities. Under an Agency theory perspective, the presence of the family on the board increases second type agency conflicts and may lead to a family-centered decision making-process, to the detriment of minority shareholders as well as external stakeholders (Le Breton-Miller and Miller, 2016). Moreover, family involvement may exacerbate conflicts among family members, especially when they belong to different branches of the family. These branches may strive for different goals, causing disagreement on the firm's strategic orientation (Eddleston and Kellermanns, 2007) to the detriment of environmental performance. Under a Stewardship view, family business leaders are particularly motivated to serve as stewards for the collective good as they belong, or are linked to, the owning family (Miller and Le Breton-Miller, 2006). The presence of family members on the board may support a firm's management in pursuing a firm's long-term

sustainability and in engaging in investments characterized by long-term returns such as environmental activities. Family involvement in management may result in a higher sense of identification of the family with the firm and prompt family members to undertake actions, such as CSR initiatives, that favor the firm's reputation and image (Khojastehpour and Johns, 2014; Kuttner *et al.*, 2021), contributing to SEW preservation and the firm's survival (Sageder *et al.*, 2018). Empirical research provides evidence that a larger presence of family members on the board further boosts social and environmental performance (López-González *et al.*, 2019). Conversely, the study by Graafland (2020) shows that environmental performance is higher for family firms managed by a balanced mix of family and non-family members. This is because family firms fully managed by family members may prioritize the interests of the family over those of other stakeholders, whereas the absence of family managers reduces identification with the firm and, in turn, the importance of the firm's image and reputation.

H4. The ratio of family members on the board affects family firms' environmental performance

3.5 Board tenure and environmental performance

Under a Stewardship perspective, a longer board tenure can support management in improving a firm's environmental performance, particularly in family firms due to their long-term sustainability perspective. Directors with longer tenure are more familiar with the firm's operations (Fischer and Pollock, 2004). This in-depth and specific knowledge enables them to better assess risks and seize opportunities stemming from the environmental challenges that the company should face (Katmon *et al.*, 2019) and better allocate resources to meet stakeholders' need, with a positive effect on environmental performance (Paolone *et al.*, 2023). From an Agency theory perspective, low director turnover may result in entrenchment and lower monitoring capabilities as long-tenured directors may be left in place because they are linked to the management and to the owning family (Le Breton Miller *et al.*, 2015). Moreover, literature points out that a long board tenure may result in directors developing close friendships with managers and loosening monitoring over them. Further, the lack of director turnover may prevent new perspectives and fresh ideas from reaching the board (Vafeas, 2003), slowing down innovation in social and environmental activities (Patro *et al.*, 2018). This implies that a long tenure may reduce monitoring effectiveness of board independence and its influence on environmental performance as it inhibits diverse thinking that is beneficial to environmental performance (Elmagrhi *et al.*, 2019). There is evidence that non-family CEOs' long tenure levels out entrepreneurial risk-taking because of an alignment with the owning family' goals and perspective (Huybrechts *et al.*, 2013), and longer tenured boards may operate in a family-centered perspective. Literature points out that a low turnover may slow down innovation in family firms as it results in high groupthink, limiting openness to external knowledge and to strategic changes (Rondi *et al.*, 2021) such as those implied by environmental challenges. This suggests that a long tenure may limit the beneficial effect of board demographic diversity on environmental performance because of an alignment of values and perspectives among board members. Board diversity improves environmental performance as different perspectives and values help the board to evaluate the needs and expectations of different stakeholders (Islam *et al.*, 2022). Long tenure may increase directors' risk aversion and *inertia* to change (Golden and Zajac, 2001) and develop groupthink inside the board (Forbes and Milliken, 1999). In particular, family directors' long tenure can create reluctance in adopting practices that improve environmental performance as they bring a family-oriented view to the board for a long period of time (Le Breton-Miller and Miller, 2016).

H5. Board tenure differently affects the relationship between board diversity and environmental performance in family and non-family firms and within family firms.

4. Data and methods

4.1 Data collection

The data sample includes non-financial firms listed on the French, German, Italian, Portugal and Spanish exchanges (Euronext Paris, Deutsche Börse, Euronext Milan, Euronext Lisbon, Bolsa de Madrid) in the period 2014–2021. French, German, Italian, Portugal and Spanish are civil-law countries with comparable legal settings and similar level of financial market development. These countries are characterized by a strong presence of closely family-controlled companies (Franks *et al.*, 2012; Faccio and Lang, 2002). Before the issuing of the EU Non-Financial Reporting Directive (2014) a limited number of companies disclosed their non-financial performance and we focused the analyses on the period 2014–2021 in order to maximize data availability in the Refinitiv Eikon database, which elaborates information retrieved from companies' sustainability reports. The initial sample comprised firms with available Environmental performance pillar score (ENVP) in the Refinitiv Eikon database. After removing observations with missing data the final sample consisted, on average, of an unbalanced panel of 434 firms. We define a family company as one where a family is the ultimate controlling owner, with a minimum control threshold of 20%. Other research, focused on the U.S., categorizes a company as a family firm when "the founder or at least one member of his or her family acts as a director or an executive officer and the founding family owns at least 5%" (Martins and Pires, 2023). Our threshold is consistent with those used in research focused on European listed companies, as these countries are characterized by a higher ownership concentration than the U.S. (Ellul, 2010; Faccio and Lang, 2002). Consistently with literature focused on listed companies (Croci *et al.*, 2011) we use an ownership-based definition as it allows us to point out the effect of different levels of family involvement based on ownership control, percentage of family members on the board, presence of a family CEO and company-family name identity on environmental performance. In doing so, we end up with a final sample of 171 family firms and 263 non-family firms and 1897 observations.

We hand-collected information on ownership and board characteristics from companies' corporate governance reports. The balance-sheet data comes from Orbis, the global Bureau van Dijk database. The Environmental performance pillar score derives from the Refinitiv Eikon database.

4.2 Variables

Environmental performance measures the impacts of an organization's environmental policies. We proxy the environmental performance with the firm's score calculated annually in the Refinitiv Eikon database. Refinitiv Environmental Pillar Score is a proxy to measure the level of environmental performance and it has already been tested in recent scientific research (Paolone *et al.*, 2023; Orazalin and Mahmood, 2021; Guérin and Suntheim, 2021; García Martín and Herrero, 2020; Nadeem *et al.*, 2020). KLD ratings, based on 14 environmental "strength" and "concerns" variables, have been used in less recent studies on the link between corporate governance and social performance (Walls *et al.*, 2012). Nowadays, the Refinitiv Eikon Datastream is the leading database for environmental, social and governance data worldwide (Shakil *et al.*, 2022). The environmental global score gathers information on 68 metrics grouped in three categories related to resource use, emissions and innovation (Nadeem *et al.*, 2020; Refinitiv, 2022). The first category refers to the reduction in water, energy, land and air consumption due to more eco-efficient solutions. The second category relates to the reduction of environmental emissions in business operations and the third category to the reduction of environmental costs for customers by means of new environmental technologies and processes. The Environmental Pillar Score bases on 20 indicators of resource use, 28 indicators of emissions and 20 indicators of innovation (Refinitiv Eikon Datastream, 2022).

Table 1 reports the dependent, independent and control variables used in this study. IBD, NCD, BS, BT proxy for structural board diversity in terms of weight of independent directors, CEO non-duality, board size and board tenure. Boards of directors may differ in their level of independence. Two of the main characteristics that express board independence are the proportion of independent directors and the lack of overlap between the CEO and the board chairman (Zhang, 2012). Independent directors can have a positive effect on firm's environmental performance (Post *et al.*, 2015). CEO non-duality may affect board independence and environmental performance

Variable type	Variable	Measurement	Measure of	Source
Dependent variable	ENVP	Environmental performance pillar score	Environmental performance	Refinitiv Eikon
Independent variables	IBD	Number of independent directors divided to the number of directors on the board	Diversity of the board	Corporate governance reports
	NCD	A dummy variable that coded 1 if the CEO is not also the chairperson of the board of directors	Diversity of the board	Corporate governance reports
	WBD	Ratio of female director to total number of directors	Diversity on the board	Corporate governance reports
	FBD	Ratio of family directors to total number of directors	Diversity on the board	Corporate governance reports
Moderator	BT	Average board tenure	Diversity of the board	Refinitiv Eikon
Control variables	BS	Number of board members	Other board structure characteristic	Corporate governance reports
	FCEO	A dummy variable coded 1 when the CEO belongs to a family that owns at least 20% of the firm's common shares	Family influence	Corporate governance reports, companies websites
	FOWN	Sum of the controlling family's equity stakes (%)	Family influence and capital structure	ORBIS, Consob website
	ID	A dummy variable coded 1 when the name of the family or controlling shareholders appears in the company name	Family/controlling shareholder's identification with the firm	Hand-collected from companies websites
	CEOAGE	Age of the CEO in years	CEO characteristic	ORBIS, companies websites
	CEOB	A dummy variable coded 1 when the CEO is a member of the board	CEO characteristic	Corporate governance reports, companies websites
	LEV	Ratio of total financial debt divided by equity	Capital structure	ORBIS
	SIZE	Log of total assets	Firm's visibility	ORBIS
	AGE	Age of the firm in years	Firm's visibility	ORBIS
	ROE	Return on equity, ratio of operating income divided by equity	Profitability	ORBIS

Source(s): Authors own creation

Table 1. Description of variables

(Hussain *et al.*, 2018). Board size is the number of board directors, board tenure is the average board tenure of all board members of a given firm (Paolone *et al.*, 2023).

WBD and FBD proxy for demographic board diversity in terms of weight of female directors on the board and proportion of family members on the board, both proxies may affect the firm's environmental performance (Dal Maso *et al.*, 2020; Li *et al.*, 2017; López-González *et al.*, 2019; Nadeem *et al.*, 2020; Orazalin and Mahmood, 2021).

FCEO controls for the presence of a family CEO, while FOWN measures family ownership. We used the identity of the firm's and first owner names to construct an identification proxy (ID). We also control for leverage (LEV), performance (ROE) and for firms' log of assets (SIZE) and age (AGE). Finally, we defined dummy variables to take into account the possible effects of industry, year and country.

4.3 Model and methods

The basic model we estimate to analyze the impact of demographic and structural board diversity on environmental performance for family and non-family firms is the following:

$$ENVP = \alpha_0 + \beta_1 IBD + \beta_2 NCD + \beta_3 WBD + \beta_4 BS + \beta_5 BT + \beta_6 ID + \beta_7 ROE + \beta_8 LEV + \beta_9 SIZE + \beta_{10} AGE + \sum_{j=1}^{j} \gamma_j I_{j,it} + \sum_{t=1}^{T} \delta_t D_t + \sum_{h=1}^{H} \varphi_h C_{h,it} \quad (1)$$

With model (1) we measure the effect of structural and demographic board diversity for family and non-family firms controlling for the influence of financial performance, leverage, size and firm age.

We also estimate an augmented model to verify the moderating effect of board tenure on the relationship between board diversity and environmental performance. Specifically, we verify hypothesis H5 estimating the interaction effects of BT with NCD, IND and WBD:

$$ENVP = \alpha_0 + \beta_1 IBD + \beta_2 NCD + \beta_3 WBD + \beta_4 BS + \beta_5 BT + \beta_6 ID + \beta_7 ROE + \beta_8 LEV + \beta_9 SIZE + \beta_{10} AGE + \sum_{n=1}^{N} BTinteractions + \sum_{j=1}^{j} \gamma_j I_{j,it} + \sum_{t=1}^{T} \delta_t D_t + \sum_{h=1}^{H} \varphi_h C_{h,it} \quad (2)$$

Finally, to verify the robustness of the results for family firms, we introduce specific governance variables in order to control for the presence of family members on the board, a family CEO and for family ownership:

$$ENVP = \alpha_0 + \beta_1 IBD + \beta_2 NCD + \beta_3 WBD + \beta_4 BS + \beta_5 BT + \beta_6 ID + \beta_7 ROE + \beta_8 LEV + \beta_9 SIZE + \beta_{10} AGE + \beta_{11} FBD + \beta_{12} FCEO + \beta_{13} FOWN + \sum_{j=1}^{j} \gamma_j I_{j,it} + \sum_{t=1}^{T} \delta_t D_t + \sum_{h=1}^{H} \varphi_h C_{h,it} \quad (3)$$

The last model permit us to verify the moderating effect of board tenure on the relationship between board diversity and environmental performance in family firms controlling for the presence of family members on the board, a family CEO and for family ownership:

$$ENVP = \alpha_0 + \beta_1 IBD + \beta_2 NCD + \beta_3 WBD + \beta_4 BS + \beta_5 BT + \beta_6 ID + \beta_7 ROE + \beta_8 LEV + \beta_9 SIZE + \beta_{10} AGE + \beta_{11} FBD + \beta_{12} FCEO + \beta_{13} FOWN + \sum_{n=1}^{N} BTinteractions + \sum_{j=1}^{j} \gamma_j I_{j,it} + \sum_{t=1}^{T} \delta_t D_t + \sum_{h=1}^{H} \varphi_h C_{h,it} \quad (4)$$

To take into account the impact on the results of the presence of firms of different countries, industries and years, we control for fixed effects along these three dimensions. The dependent variable in the above models is censored assuming values from 0 to 100, we estimate models (1)–(4) using Tobit regression models separately for family and non-family firms, and control for time, country and industry fixed effects using dummies (Gao and Connors, 2011; Nguyen *et al.*, 2021).

5. Results and discussion

5.1 Results

In Table 2 we present the descriptive statistics for environmental performance, explanatory and control variables. The environmental performance score varied from 0 (minimum) to 99.20 (maximum), with a mean of 56.90 and a median score of 61.69. Board tenure ranged from less than 1 year to 33 years. The separate analysis of family and non-family firms shows significant differences in the means of most of the variables at the one percent level of the *t*-statistics.

Table 3 reports the Pearson correlation coefficients, most of the correlations among variables are low or moderate. The only variable that shows a high correlation is the ratio of family directors on board (FBD) with the family CEO dummy (FCEO), but this is reasonable. Furthermore, the correlations between explanatory variables as well as the VIF factors are relatively small, and we can rule out multicollinearity effects on the reliability of the estimated parameters. Influence diagnostics indicated no problematic outliers in the data sample.

Table 4 presents of the impact of board structural and demographic diversity on firms' environmental performance, taking into account the possible moderating effect of board tenure. In particular, columns 1 and 2 respectively report the results of model (1), testing the first three hypotheses (H1-H3) relatives to the impact of independent directors, CEO non-duality and women presence on the board for non-family and family firms. Columns 3 and 4 show the results of model (2), testing with the same set of variables the moderating effect of board tenure for non-family and family firms (hypothesis H5). Finally, columns 5 and 6 display the results of models (3) and (4) for family firms, regarding the impact of family members on the board and the interaction with board tenure (hypotheses H4-H5).

To verify the robustness of these results we also added some other control variables to capture the impact of CEO characteristics and of the possible existence of an inverted U-shaped relationship between environmental performance and family ownership. The results of these additional analyses are tabulated in Table 5. CEO age as well as CEOB - a dummy to control if the CEO is also member of the board - positively affect family firm's environmental performance whilst an inverted U-shaped relationships relates environmental performance to family ownership. After controlling for these variables the results on the effect of structural and demographic board diversity remain qualitatively the same.

5.2 Discussion

Our findings point out that environmental performance is significantly lower in family than in non-family firms. This result is consistent with an Agency perspective, under which the

	All firms	Non-FF	FF	*t*-test
ENVP	56.90 (26.46)	58.22 (26.92)	54.57 (25.48)	3.12 ***
IBD	0.41 (0.19)	0.44 (0.19)	0.36 (0.18)	12.24***
NCD	0.79 (0.41)	0.83 (0.38)	0.72 (0.45)	8.02***
BS	11.89 (4.87)	11.89 (5.09)	11.89 (4.52)	0.02
WBD	0.30 (0.15)	0.30 (0.15)	0.30 (0.15)	−0.61
FBD	0.09 (0.15)		0.21 (0.16)	
BT	6.82 (3.29)	5.97 (2.80)	8.18 (3.54)	−19.69***
CEOAGE	57.67 (7.93)	57.74 (8.06)	57.55 (7.69)	0.53
CEOB	0.55 (0.50)	0.51 (0.50)	0.61 (0.49)	−4.45***
FCEO	0.26 (0.44)		0.47 (0.50)	
FOWN	0.21 (0.27)		0.52 (0.16)	
LEV	2.10 (2.86)	2.22 (3.22)	1.91 (2.17)	3.48***
ROE	0.13 (0.19)	0.12 (0.20)	0.14 (0.16)	−4.76***
ID	0.11 (0.32)	0.02 (0.13)	0.26 (0.44)	−20.46***
SIZE	14.57 (2.09)	14.73 (2.25)	14.33 (1.77)	5.99***
AGE	61.05 (49.04)	55.04 (47.76)	70.56 (49.55)	−9.47***
FIRMS	434	263	171	

Table 2. Descriptive statistics

Note(s): ***, **, *: 1, 5 and 10% significance levels, respectively
Source(s): Authors own creation

concentration of family wealth in a business makes family firms more risk averse than non-family companies as well as lowering their environmental engagement and performance (Dal Maso *et al.*, 2020). Environmental innovation in a firm's processes and products is risky (Zaman *et al.*, 2023), and due to controlling family undiversified portfolios, family companies are less prone to engage in these strategies to the detriment of environmental performance. Our finding is also consistent with empirical evidence reporting a negative relationship between family blockholders and environmental performance (Dal Maso *et al.*, 2020; Forés *et al.*, 2022). Our findings reveal that environmental performance in family firms varies according to the level of family ownership under an inverted U-shaped relationship. This suggests that family ownership tends to increase environmental performance because non-financial objectives related to reputation prevail (Berrone *et al.*, 2010) on short-term financial goals. Conversely, beyond an optimum level of family ownership (52,2% of the share capital), uncertain future financial returns of innovation investments may jeopardize SEW preservation in the long run (Chrisman and Patel, 2012). The concern for financial sustainability and the desire to preserve family wealth for future generations (Geng *et al.*, 2023) make family companies less prone to invest in risky activities (Mitter *et al.*, 2014) to the detriment of environmental performance.

According to literature, board diversity may influence environmental performance via structural as well as demographic characteristics (García Martín and Herrero, 2020; Orazalin and Mahmood, 2021; Islam *et al.*, 2022). Structural diversity impacts on board monitoring role to the benefit of the firm's different stakeholders and demographic diversity widens the board's perspective towards more stakeholder-oriented strategies (Liao *et al.*, 2015; Elmagrhi *et al.*, 2019). We find that board diversity differently affects environmental performance in family and non-family firms. Non-family firms' environmental performance is affected by diversity of board structure as well as demographic board diversity, whilst family companies' environmental activities are significantly related only to the latter.

As for structural board diversity, we find that CEO non-duality negatively affects environmental performance, but that the effect is significant only for non-family companies, supporting H2. Under an Agency perspective, duality provides CEOs with great power, allowing

	IBD	BS	NCD	WBD	ID	BT	FBD	FCEO	FOWN	ROE	LEV	SIZE	AGE	CEO AGE	CEOB
ENVP	*0.15*	*0.37*	*−0.13*	*0.33*	−0.02	*−0.06*	*−0.13*	*−0.13*	*−0.09*	0.02	*0.12*	*0.63*	*0.16*	*0.06*	*0.21*
IBD		*−0.18*	*0.07*	*0.14*	*−0.05*	*−0.15*	*−0.24*	*−0.12*	*−0.24*	0.03	0.02	*0.22*	*−0.06*	*0.12*	*0.17*
BS			*0.12*	*0.19*	*0.11*	*−0.04*	*−0.13*	*−0.22*	−0.02	*0.05*	*0.12*	*0.55*	*0.17*	*−0.08*	*−0.24*
NCD				*−0.23*	0.03	*−0.13*	*−0.27*	*−0.37*	*−0.16*	*−0.05*	*−0.04*	−0.02	−0.02	*−0.10*	*−0.33*
WBD					−0.01	0.01	*0.08*	−0.02	0.03	0.02	*0.06*	*0.37*	*0.06*	*0.07*	*0.34*
ID						*0.17*	*0.26*	*0.21*	*0.34*	*0.4*	−0.02	*0.06*	*0.22*	*−0.08*	−0.03
BT							*0.39*	*0.23*	*0.35*	*0.09*	*−0.07*	*−0.04*	*0.12*	*0.06*	*0.14*
FBD								*0.47*	*0.70*	*0.05*	*−0.06*	*−0.16*	*0.08*	*0.09*	*0.25*
FCEO									*0.39*	*0.06*	−0.02	*−0.22*	*−0.01*	0.04	*0.20*
FOWN										*0.08*	*−0.07*	*−0.12*	*0.14*	0.01	*0.14*
ROE											−0.02	−0.01	0.02	−0.02	0.00
LEV												*0.16*	0.02	*−0.05*	*0.06*
SIZE													*0.19*	*0.06*	*0.09*
AGE														0.01	*−0.09*
CEOAGE															*0.16*

Note(s): Italic: 5% significance level
Source(s): Authors own creation

Table 3.
Correlation matrix

Table 4.
Tobit results

	Model 1 NFF	Model 1 FF	Model 2 NFF	Model 2 FF	Model 3 FF	Model 4 FF
INT	−52.37 (6.98)***	−72.55 (11.19)***	−44.71 (8.63)***	−100.79 (14.59)***	−66.63 (11.17)***	−96.57 (15.62)***
IBD	19.19 (3.59)***	5.62 (4.59)	6.30 (8.97)	10.40 (10.83)	−1.13 (4.57)	7.53 (12.02)
NCD	−2.34 (1.44)*	1.11 (1.89)	−0.62 (3.55)	4.03 (4.75)	0.58 (2.10)	6.46 (5.00)
WBD	5.51 (5.82)	30.27 (6.65)***	−5.07 (12.81)	79.71(13.78)***	26.46 (6.54)***	52.98 (14.00)***
BS	1.52 (0.16)***	0.64 (0.23)***	1.52 (0.16)***	0.50 (0.23)**	0.50 (0.23)**	0.56 (0.24)**
BT	−0.62 (0.24)***	−0.66 (0.21)***	−1.82 (0.91)**	2.05 (0.95)**	−0.41 (0.21)*	2.97 (1.13)***
FBD					−43.41 (6.17)***	6.08 (17.08)
FCEO					2.04 (1.86)	0.02 (1.88)
FOWN					−0.07 (4.98)	−1.18 (5.02)
ID	−3.87 (3.69)	−4.44 (1.64)***	−4.58 (3.71)	−5.16 (1.64)***	−3.61 (1.66)**	−3.08 (1.67)*
ROE	0.08 (0.03)**	0.03 (0.04)	0.08 (0.03)***	0.03 (0.04)	0.03 (0.04)	0.02 (0.04)
LEV	0.13 (0.18)	0.81 (0.31)***	0.13 (0.18)	0.75 (0.31)**	0.86 (0.30)***	0.83 (0.230)***
SIZE	4.71 (0.40)***	7.63 (0.64)***	4.71 (0.41)***	7.88 (0.64)***	7.27 (0.63)***	6.94 (0.65)***
AGE	0.06 (0.01)***	0.04 (0.02)**	0.05 (0.01)***	0.04 (0.02)**	0.04 (0.02)***	0.04 (0.02)**
Year	yes	yes	yes	yes	yes	yes
Industry	yes	yes	yes	yes	yes	yes
Country	yes	yes	yes	yes	yes	yes
BT*NCD			−0.26 (0.52)	−0.29 (0.51)		−0.80 (0.54)
BT*IBD			2.08 (1.36)	−0.95 (1.22)		−1.10 (1.31)
BT*WBD			1.69 (2.13)	−5.27 (1.36)***		−2.30 (1.44)
BT*FBD						−5.70 (1.90)***
Rho	0.67	0.69	0.67	0.70	0.72	0.73
Log Likelihood	−5187	−2941	−5185	−2931	−2917	−2904
obs	1,208	689	1,208	689	689	689

Note(s): ***, **, *: 1, 5 and 10% significance levels, respectively
Source(s): Authors own creation

Table 5. Tobit results - robustness check

	Model 1 NFF	Model 1 FF	Model 2 NFF	Model 2 FF	Model 3 FF	Model 4 FF
INT	−45.26 (7.65)***	−66.19 (13.64)***	−37.22 (9.22)***	−99.69 (18.25)***	−110.54 (14.86)***	−147.16 (20.38)***
IBD	20.16 (3.59)***	4.82 (4.70)	8.56 (9.01)	19.78 (11.07)*	−4.73 (4.55)	13.77 (12.12)
NCD	−2.59 (1.49)*	2.13 (1.92)	−1.32 (3.57)	−1.40 (4.97)	2.46 (2.04)	3.93 (5.19)
WBD	5.32 (5.88)	30.21 (6.89)***	−7.32 (13.02)	75.95 (14.50)***	29.47 (6.60)***	63.50 (14.14)***
BS	1.51 (0.16)***	0.59 (0.24)**	1.50 (0.16)***	0.43 (0.24)*	0.11 (0.23)	0.10 (0.24)
BT	−0.60 (0.24)**	−0.86 (0.22)***	−1.89 (0.91)**	1.79 (0.99)*	−0.57 (0.21)***	2.80 (1.17)**
FBD					−50.91 (6.35)***	−20.10 (17.57)
CEOAGE	−0.16 (0.07)**	0.29 (0.10)***	−0.16 (0.07)**	0.34 (0.10)***	0.44 (0.09)***	0.44 (0.09)***
CEOB	−0.70 (1.89)	4.41 (3.07)	−0.60 (1.90)	4.71 (3.06)	5.94 (2.92)**	5.15 (2.93)*
FCEO					2.02 (1.89)	0.09 (1.94)
FOWN					146.74 (24.59)***	144.50 (24.94)***
FOWN2					−140.59 (23.07)***	−137.95 (23.28)***
ID	−4.54 (3.71)	−3.59 (1.67)**	−5.18 (3.73)	−4.48 (1.67)***	−2.22 (1.64)	−2.11 (1.66)
ROE	0.09 (0.03)***	0.02 (0.04)	0.09 (0.03)***	0.02 (0.04)	0.01 (0.04)	−0.01 (0.04)
LEV	0.08 (0.18)	0.71 (0.37)*	0.08 (0.18)	0.86 (0.37)**	0.97 (0.35)***	1.13 (0.35)***
SIZE	4.83 (0.41)***	8.16 (0.65)***	4.84 (0.41)***	8.51 (0.65)***	8.68 (0.63)***	8.61 (0.67)***
AGE	0.06 (0.01)***	0.02 (0.02)	0.05 (0.01)***	0.02 (0.02)	0.01 (0.02)	0.01 (0.02)
Year	yes	yes	yes	yes	yes	yes
Industry	yes	yes	yes	yes	yes	yes
Country	yes	yes	yes	yes	yes	yes
BT*NCD			−0.18 (0.52)	0.45 (0.54)		−0.27 (0.57)
BT*IBD			1.85 (1.36)	−2.18 (1.24)*		−2.33 (1.31)*
BT*WBD			2.09 (2.16)	−4.97 (1.43)***		−3.53 (1.44)**
BT*FBD						−3.31 (1.91)*
Rho	0.68	0.71	0.68	0.72	0.75	0.76
Log Likelihood	−5145	−2789	−5143	−2780	−2745	−2737
LR test 1(p-value)		28 (<0.0001)		34 (<0.0001)		
LR test 2(p-value)		38 (<0.0001)		46 (<0.0001)		
obs	1,199	655	1,199	655	655	655

Note(s): ***, **, *: 1, 5 and 10% significance levels, respectively
Source(s): Authors own creation

them to use discretion to divert resources at the expense of minority shareholders (Francoeur *et al.*, 2021) and view environmental engagement as a means to extract rent from shareholders' resources and hide poor financial performance (Berrone and Gomez-Mejia, 2009). CEO non-duality prevents the opportunistic use of environmental activities and an increase of environmental performance related to agency conflicts of the first type. Principal-agent conflicts are less severe in family firms and the positive effect of CEO non-duality is not significant. Moreover, non-dual CEOs are less prone to respond to external pressure for environmental activities as they are more pressured to achieve short-term results (Walls and Berrone, 2017), but in family firms the relevance of non-financial goals may mitigate the pressure for short-term financial performance, rendering the negative effect of CEO non-duality on environmental performance not significant. Consistent with previous research (De Villiers *et al.*, 2011), our findings indicate that board structures characterized by a large presence of independent directors improves environmental performance but that the effect is significant only for non-family firms, supporting H1. Family firms' independent directors are often closely related to the owning family and aligned with its goals (Chen and Jaggi, 2000). They may behave as delegates of the owning family and exert less effective monitoring compared to non-family firms' independent directors (Cuadrado-Ballesteros *et al.*, 2015). Family firms' independent director decisions tend to be led by the controlling family's needs rather than by the expectations of other stakeholders (Chen and Jaggi, 2000), preventing them from making the difference in terms of environmental performance. Consistently, we find that long directors' tenure significantly lowers family firms' environmental performance as it favors collusion between board members and an owning family whilst the effect is never significant for non-family companies. Board size has a significant positive effect on environmental performance for both types of company due to the positive contribution larger boards can provide in terms of different knowledge, experiences and values (Dalton *et al.*, 1999) that may broaden a company's goals, benefiting environmental interests (Cosma *et al.*, 2021).

As for demographic board diversity, our results indicate that the ratio of female directors on the board exerts a significant positive effect on family firms' environmental performance. These findings confirm the positive effect of female directors on environmental performance (Orazalin and Mahmood, 2021; Islam *et al.*, 2022; Galletta *et al.*, 2022; Muhammad and Migliori, 2022) pointing out that the effect is significant only for family companies. The greater flexibility of family firms compared to non-family companies allows them to better exploit the different skills of women directors (Mubarka and Kammerlander, 2022) to the benefit of environmental performance. This result supports H3, is consistent with, and extends to Europe, the results of the limited stream of literature that has analyzed board gender diversity in family firms in Anglo-Saxon settings (Cordeiro *et al.*, 2020; Nadeem *et al.*, 2020).

Moreover, our results do not support the view that the identification of the owner with the firm, and the quest for reputational assets to ensure long-term sustainability, more effectively affects environmental performance in family than in non-family firms, increasing environmental engagement and performance (Berrone *et al.*, 2010; Agostino and Ruberto, 2021). We find a negative relationship between the name of the owner in a company's name and environmental performance, but the effect is significant only for family firms. Literature suggests that when the family's name is part of the firm's name, family members sense of identification with the firm is higher and SEW is more relevant (Sageder *et al.*, 2018; Calabrò *et al.*, 2022, Saeed *et al.*, 2023). Correlation analyses indicate that having the family name in the name of the company is significantly related to the presence of family members on the board, family CEO and family ownership control as well as a higher average board tenure. Therefore, these findings suggest that a high identification between the family and the business may be related to the dark side of SEW, and "SEW may also serve as a driver of self-serving behavior on the side of the family" to the detriment of other stakeholders' interests (Kellermanns *et al.*, 2012, p. 1179) and of environmental performance.

Size is strongly significant for both types of company, confirming that larger firms should be more sensitive than smaller companies to the control of media and stakeholders (Branco and Rodrigues, 2008), and the effect in terms of environmental performance does not differ between family and non-family firms. Our findings indicate that older family firms are likely to improve environmental performance. The result is consistent with research pointing out that the risk aversion of family firms negatively affects their environmental innovation activities in the early stages, when the uncertainty of such activities is greater. However, in the long-run, concern for the survival of the firm becomes dominant and induces family firms to adopt such innovations (Doluca *et al.*, 2018). Our results also point out that the effect of age is more significant for non-family companies. This is probably because, on the one hand, older firms rely on more stable cash flows and profitability and can afford to engage more in social and environmental activities (Withisuphakorn and Jiraporn, 2016), but, on the other hand, various branches of the family, rather than the founder's family or direct descendants, control older family firms. These branches may even be in conflict with each other and short-term economic interest takes over (Le Breton–Miller and Miller, 2013), slowing the growth of environmental activities compared to non-family companies.

Focusing on family firms, we find that an increase in the percentage of family members on the board lowers environmental performance, supporting H4, but controlling for the interaction with board tenure, we find that the effect is significant for long tenured boards. Unlike Stewardship predictions, this result suggests that when directors sit for a longer time on a board where the family is massively present, they may align their decisions to family-oriented objectives to the detriment of other stakeholders and of environmental performance. Consistently, we find that when female directors sit on low-turnover boards their beneficial effect on environmental performance decreases as long-tenured directors may be left in place because they are major owners (Le Breton Miller *et al.*, 2015) and may support a family-centered decision-making process to the detriment of environmental activities. Therefore, our results support H5 regarding the different moderating effect of board tenure on board diversity in family and non-family firms, and within family firms only for demographic board diversity.

6. Conclusions

6.1 Scientific contribution

This paper studies the effect of structural and demographic board diversity on environmental performance in family firms by focusing on the differences between family and non-family companies as well as within family businesses. In doing so, it addresses the call of Barbera *et al.* (2022) to study the effect of governance characteristics on family firms' non-financial performance and contributes to literature in several ways.

The study contributes to environmental performance research by analyzing, for the first time, the effect of independent directors and CEO non-duality in family firms. It also adds to this stream of literature by providing information on the association between gender diversity and family firms' environmental performance in a European setting, for the first time. In doing so, it contributes to environmental research by pointing out that structural board diversity and demographic board diversity differently affect environmental performance according to a firm's nature, that is, family or non-family owned.

Consistently with prior research focused on U.S. companies (Cordeiro *et al.*, 2020; Nadeem *et al.*, 2020) the present study points out that family firms compared to non-family companies are more effective in exploiting women directors' peculiarities to the benefit of environmental performance. Nevertheless, this paper goes beyond previous literature indicating that the positive effect of board gender diversity decreases as board tenure increases.

Previous research (Graafland, 2020) has analyzed the effect of the presence of family members in management on environmental performance basing on three states: fully non-family-managed firms, companies managed by a mix of family and non-family members, fully

family-managed firms finding that environmental performance is better when a mix of family and non-family members manages the business. This paper adds to family firm research by pointing out that as the ratio of family members on the board increases environmental performance decreases, and that the effect is significantly higher as tenure lengthens.

The present study also contributes to board diversity studies. To the best of our knowledge, it is the first piece of research to underline the different effect of board tenure in family and non-family firms. In doing so, it answers the call for expanding the limited literature on board tenure (Qiang *et al.*, 2023). Actually, our findings suggest that board tenure moderates the effect of demographic board diversity on environmental performance in family companies, but the effect does not hold for non-family firms.

This research contributes to Agency theory by highlighting that, in family firms, board tenure negatively moderates the beneficial effect of board diversity on agency conflicts as it develops family-centered group thinking and lowers monitoring capabilities, to the detriment of environmental performance.

It also contributes to Socioemotional wealth research by providing evidence that some SEW dimensions may also not favor a firm's engagement in environmental activities. Namely, a high sense of identification of the family with the business, as well as a direct influence of the family on the board by the means of a strong presence of its members, may limit environmental performance especially when board member turnover is low.

6.2 Implications for theory and practice

Our findings have implications for firms, regulators and sustainable investors.

Firms should take into account the appointment of a greater number of female directors to the board in order to improve a firm's environmental performance as our findings provide evidence that women on the board can strengthen the firm's environmental agenda and benefit its implementation, especially in family firms. This result has relevant implications for family businesses as it indicates that they may rely on female directors' sensitiveness and experiences in order to enhance environmental performance, but that groupthink tends to substitute diverse thinking as director turnover decreases. More generally, our findings suggest that firms should design boards which, in terms of size, representation of independent directors, leadership structure and specific demographic characteristics of their members, can ensure board monitoring capability, the effectiveness of decision-making processes, as well as a balanced orientation toward financial and environmental performance.

Our results have implications at a national and international level for regulators developing legislative initiatives on climate change mitigation and environmental preservation and quality. Actually, our findings indicate that specific board characteristics can foster companies' environmental commitment and improve their environmental performance whilst others can be a constraint for firms facing current and future environmental challenges. The effect of certain structural board characteristics on environmental performance differs in family and in non-family companies and the strong presence of long-tenured family directors has a negative impact, suggesting that entrenchment may prevent this type of board diversity from improving environmental activities. Therefore, regulators should take into account this evidence when setting measures aimed at promoting board diversity as a means to enhance the effectiveness of environmental legislation.

Moreover, our results have implications for investors who engage in sustainable investments, as they should be aware that board structural and demographic characteristics differently affect the environmental performance of family and non-family businesses.

6.3 Limitations and future research

This study has several limitations, which represent opportunities for further studies.

This paper analyzes the effect of board diversity on an overall measure of environmental performance; future research could engage in a more grained analysis, studying the impact of board diversity on the different components of environmental performance. Moreover, we focus on board independence and gender diversity, controlling for the effect of board size and tenure. The differences we point out in family and non-family firms suggest that it may be of interest to take into account other forms of board diversity, especially other sources of demographic board diversity such as age, education or nationality. Moreover, within family businesses we use the percentage of family members on the board as a type of demographic board diversity related to family influence but other sources of diversity among family directors may affect environmental performance in family firms. Therefore, future research could analyze the effect of education and generational diversity, within family members on the board, on environmental performance.

We focus on a sample from European countries. This choice ensures that we focus on the relationship between board diversity and environmental performance, limiting the possible noise of differences in the legal regime. Future research could investigate whether the economic and institutional environment as well as country specific cultural aspects influences the results.

Notes

1. https://europeanfamilybusinesses.eu/about-european-family-businesses/ accessed on 10 March 2023.
2. https://earth.org/fast-fashion-companies/ accessed on 21 July 2023.

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