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Gender Diversity Leadership and ESG Performance: The Influence of Women on Boards and in Management

Davide Sandretto^{1,2}  | Alessandro Rizzi¹ | Gabriella Esposito¹

¹Department of Management, University of Turin, Torino, Italy | ²School of Accounting and Finance, University of Vaasa, Vaasa, Finland

Correspondence: Davide Sandretto (davide.sandretto@unito.it)

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ABSTRACT

In recent years, there has been a growing interest among companies and regulatory bodies in adhering to environmental, social, and governance (ESG) standards, alongside an increased involvement of women in organizational decision-making processes. In this study, we investigate the potential advantages of female representation in leadership positions on the firms' ESG performance. Using a dataset comprising 2646 public companies across Europe, America, and Asia from 2013 to 2022, we find a significant positive correlation between gender diversity and companies' sustainability performance. However, a granular analysis of the three pillars (environment, social, and governance) reveals nuanced results. Specifically, board gender diversity is only positively related to the governance score, but females in managerial positions are associated with higher social scores. These findings consistently hold after conducting a series of robustness tests to address endogeneity concerns. Our study provides practical implications for policymakers and practitioners, advocating for greater engagement of women in leadership roles.

JEL Classification: G30, G34, Q54

1 | Introduction

The promotion of gender diversity within the corporate context has become central nowadays (Ahmed et al. 2017). As outlined by Point 5 of the United Nations (UN) Agenda 2030, institutions have the responsibility of “ensuring full and effective female participation and equal opportunities for leadership at all decision-making levels in the political, economic, and public life” (United Nations Organisation 2015). Recently, national and international regulators have shown a growing interest in this topic. Norway emerged as a forerunner in this regard, having enacted a pioneering law mandating companies to ensure a minimum quota of women on their board of directors (BoDs) (Seierstad and Opsahl 2011). In 2005, the Nordic country introduced a requirement for publicly listed companies to achieve a gender balance of at least 40% on their boards, setting a noteworthy precedent for other countries. Afterwards, in 2011, both

France and Italy enacted legislation aimed at enhancing female representation on corporate boards. France adopted a phased approach, requiring 20% female representation on the boards of publicly listed companies by 2014 and 40% by 2017. This mandate is also extended to unlisted entities with over 500 employees and revenues or total assets exceeding 50 million euros for three consecutive years (Law No. 103/2011 2011). Italy, on the other hand, took a comparatively moderate stance, mandating a women's quota of 1/5 for the initial board renewal and 1/3 for subsequent mandates (Law No. 120/2011 2011). More recently, the European Union required that from 2026 onwards, large companies—defined as those with over 250 employees—must allocate 40% of directorial positions to non-executive members and 33% to women (Directive No. 2022/2381 2022). However, in other parts of the world, such as Asia or America, gender quotas have not elicited substantial interest from national authorities (Konigsburg and Thorne 2022).

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The growing interest in gender diversity aligns with the rising concerns regarding climate and social sustainability issues. The Sustainable Development Goals (SDGs) delineated in the UN Agenda 2030, also address environmental, social, and governance (ESG) themes, encouraging companies to move beyond purely financial objectives. Specifically, the agenda advocates for firms to adopt proactive strategies, means, and efforts to efficiently meet the outlined targets and tackle these challenges.

In recent decades, academic research has extensively explored how attributes, particularly gender diversity, can impact organizational dynamics and outcomes. Brahma, Nwafor, and Boateng (2021), through a study of UK companies from 2005 to 2016, identified a positive correlation between gender diversity and improved financial performance. Liu, Wei, and Xie (2014), analyzing Chinese companies from 1999 to 2011, pointed out that female executives have a stronger positive effect on firm performance than female independent directors, indicating that the executive role has a greater influence than the monitoring one. Conversely, Adams and Ferreira (2009) found a negative relationship between board gender diversity and corporate performance in US companies, addressing endogeneity issues arising between the two variables. They argued that the negative effects on shareholder value are looked for companies with strong governance as a result of female over-monitoring phenomena, but for those with weaker governance, they found a positive association with performance. On the managerial front, Dezsö and Ross (2012) contend that the presence of females in top management brings about social diversity benefits, thereby enhancing the behaviors of both managers and women in middle management, leading to improved profitability. Similarly, Ferrary and Déo (2023) found a positive effect of women in middle management and staff levels on firm performance. Moreover, other studies have examined the relationship between gender diversity and various other financial metrics, including earnings quality (García-Sánchez, Ferrero, and Meca 2017), stock market liquidity (Loukil, Yousfi, and Yerbanga 2019), corporate debt structure choice (Datta, Doan, and Toscano 2021), and firm risk (Bruna et al. 2019; Lenard et al. 2014; Safiullah et al. 2022).

A growing body of literature has recently started to explore the potential nexus between gender diversity and sustainability companies' performance (Cambrea, Paolone, and Cucari 2023; Cucari, Esposito Falco, and Orlando 2018; Khatri 2023; Mehmood, Luca, and Quach 2023; Provasi and Harasheh 2021). According to several theories such as agency theory (Jensen and Meckling 1976), gender social role theory (Eagly 1987), resource dependency theory (Pfeffer and Salancik 1978), and human capital theory (Becker 1964), women contribute a distinct range of educational backgrounds, skills, and experiences to both board and management roles. Additionally, they often exhibit a stronger commitment to ethical conduct, social welfare, and environmental awareness (Khatri 2023; Liu, Wei, and Xie 2014; Safiullah et al. 2022). Drawing upon these theoretical frameworks, this study examines the connection between gender diversity at both board and management levels, considering the different dimensions of the ESG firms' performance. In order to perform our analysis, we download from the Refinitiv Eikon database information about 2646 registered public companies from Europe, America, and Asia from 2013 to 2022. The period

under analysis is the aftermath of the European debt crisis and the Rio de Janeiro conference in 2012, where the members of the UN decided to start the process of developing the SDGs.

The study's contributions address pivotal gaps and provide interesting implications for academics and practitioners. Using one of the largest samples ever employed of almost 10,000 firms observations, we present a novel international perspective, in contrast to the prevailing focus in the current literature, which has only examined specific sector or nation, yielding mixed results (Cucari, Esposito Falco, and Orlando 2018; Khan and Vieito 2013; Manita et al. 2018; Mehmood, Luca, and Quach 2023; Tauringana et al. 2017). In addition, we rigorously address potential endogeneity arising from reverse causality and short panel bias issues through a battery of robustness tests (Adams and Ferreira 2009; Flannery and Hankins 2013). To the best of our knowledge, we explore for the first time the potential influence of females at all managerial levels on ESG performance, considering their impact through the execution of corporate strategy (Hemingway and Maclagan 2004). Moreover, we contribute to the literature by conducting a detailed analysis of the ESG pillars in order to assess which aspects of sustainability are most influenced by gender diversity and identify those that drive the aggregate score.

The results of our fixed effects regression reveal a positive and significant relationship between both women on the board and in managerial roles and ESG performance. However, when we break down the ESG factor into its three pillars, the fixed effects models indicate that gender board diversity is solely related to the governance score, whereas gender managerial diversity is only associated with the social score. Finally, we employ several models to mitigate the endogeneity issues arising from the structure of board characteristics (Liu, Wei, and Xie 2014; Usman et al. 2018). Our findings show that the positive and statistically significant relationship of board gender diversity persists, but the correlation between female managers and ESG performance loses its significance, even though its effect on the social score pillar holds.

These findings encounter both practitioners' and academics' interest as they enrich the current body of literature by presenting an international perspective on the link between gender diversity and sustainability performance. In addition, our results provide valuable insights for policymakers, assisting them in making informed decisions regarding the implementation of new laws concerning gender quotas within corporate boards.

The remainder of the paper is as follows. Section 2 discusses the literature and the development of our research hypothesis. Section 3 outlines the methodological approach adopted and the dataset. Section 4 presents the results. Section 5 includes robustness checks, and Section 6 describes the discussions and conclusions.

2 | Literature Review and Hypothesis Development

The relationship between gender diversity and sustainable performance is supported by various theoretical frameworks, each

shedding light on different aspects of this dynamic. One prominent framework that contributes to our understanding is the agency theory, conceptualized by Jensen and Meckling (1976). This theory delves into the company dynamics between the principal (shareholders) and the agent (managers), highlighting potential challenges arising when their objectives diverge. This phenomenon primarily stems from information asymmetry that favors the agent (Ortas et al. 2015). Agency theory underscores the importance of monitoring corporate objectives by the board of directors to mitigate the risk of conflicts of interest. Indeed, adopting a guideline and efficient monitoring as a division of decision-making allows the objectives of both to be aligned (Fama and Jensen 1983). Gender diversity plays a significant role in this context on the one hand to increase monitoring (Adams and Ferreira 2009; Adams, Nowland, and Grey 2011) and on the other hand to enhance corporate performance (Carter, Simkins, and Simpson 2003; Adams and Ferreira 2009; Adams, Nowland, and Grey 2011). According to Jensen and Meckling (1976), a diverse board of directors with a significant number of independent directors allows for better monitoring of agent decisions, a reduction of agency costs, and better management of aspects related to sustainable development by providing new insights (Galbreath 2010).

Another theory that justifies the influence of gender on corporate dynamics is the gender social role theory (Eagly 1987). This theory delves into the attributes and social roles associated with gender, drawing distinctions in the behavioral tendencies of men and women. Eagly (1987) emphasizes the assertive and aggressive nature of men, in contrast to the more gentle and flexible tendencies observed in women. As confirmed by literature, women focus especially on environmental issues (Liu 2018; Nadeem et al. 2020) and have a greater focus on social welfare (Atif et al. 2021; Burkhardt, Nguyen, and Poincelot 2020; Krishnan and Parsons 2007). The presence of women in BoDs allows a decrease in legal disputes related to environmental regulations (Liu 2018), an increased orientation towards environmental innovation (Nadeem et al. 2020), and greater attention towards climate change (Ben-Amar, Chang, and McIlkenny 2015). This context underscores the importance of gender diversity in a company's BoD for achieving positive business outcomes. It fosters a collaborative environment where diverse perspectives, expertise, and visions are shared, leading to more creative discussions and effective decision-making processes (Certo and Semadeni 2006; Heavey and Simsek 2013; Talke, Salomo, and Rost 2010).

To ensure effective decision-making within the organizational structure, it is essential to have access to diverse perspectives and information, which can be enriched by gender diversity (Levi, Li, and Zhang 2014). Additionally, women often excel in effectively communicating social and environmental initiatives to stakeholders, thereby promoting sustainable development (Pucheta-Martínez, Gallego-Alvarez, and Bel-Oms 2021).

The skills of female leaders are valuable to companies. According to resource dependency theory, which posits that access to resources is critical to organizational success (Pfeffer and Salancik 1978), women contribute a distinct set of competencies to both BoDs and management, potentially influencing corporate performance (Kyaw, Olugbode, and Petracci 2017; Manita

et al. 2018). Each BoD member's expertise is essential for strategic decision-making, and gender diversity adds value by incorporating varied perspectives that address stakeholders' needs (Hillman and Dalziel 2003). As noted by Kyaw, Olugbode, and Petracci (2017), women often make strategic decisions aligned with the company's ESG profile, potentially enhancing financial performance (Husted and Sousa-Filho 2019). Moreover, research suggests that women tend to prioritize stakeholder relations and environmental and social issues more than their male counterparts (Hollindale et al. 2019; Huse, Nielsen, and Hagen 2009; Disli, Yilmaz, and Mohamed 2022).

Gender diversity on BoDs is therefore crucial, as it helps secure essential resources for the company's success (Bear, Rahman, and Post 2010; Nadeem, Suleman, and Ahmed 2019). Diverse BoDs foster a collaborative environment where members' differing experiences and perspectives lead to more comprehensive decision-making. Human capital theory further underscores the role of women in contributing to ESG performance by highlighting how education, skills, and experience enhance both individual and organizational productivity (Becker 1964).

However, challenges persist. Internal conflicts may arise, particularly when male administrators resist granting women opportunities for training, development, or promotion, often due to perceptions that women lack the necessary human capital for board roles (Oakley 2000; Davidson and Burke 2000). Despite this, evidence shows that a substantial percentage of women hold university degrees or MBAs, particularly in Europe and the United States (Singh, Terjesen, and Vinnicombe 2008; Davies 2011), and their presence on BoDs positively impacts company performance (Smith, Smith, and Verner 2006). This supports the view that women's contributions not only strengthen human capital but also enhance corporate value (Brahma, Nwafor, and Boateng 2021).

Empirically, there has been notable growth in the literature in recent years. Altunbas et al. (2022) revealed a negative correlation between female managers and firms' carbon emissions. On the other hand, Cambrea, Paolone, and Cucari (2023), Cucari, Esposito Falco, and Orlando (2018), and Provasi and Harasheh (2021) found a positive relationship between board gender diversity and sustainability performance analyzing the Italian context. Similarly, Khatri (2023) and Mehmood, Luca, and Quach (2023) achieved analogous results by examining samples from Nordic countries and European utility firms, respectively. However, several studies have shown mixed or insignificant results (Rao and Tilt 2016). For instance, Manita et al. (2018), analyzing the US context, observed an insignificant connection between ESG disclosure and board gender diversity, whereas Boulouta (2013) found no positive association between gender diversity and environmental performance. Moreover, Glass, Cook, and Ingersoll (2016) employed a dataset of the environmental record of Fortune 500 companies ten 10 years, finding no evidence that women CEOs are more likely than men to improve the company's environmental practices.

Based on the aforementioned arguments, we hypothesize that:

Hypothesis 1. *Females on board influence the sustainability performance of a company.*

Hypothesis 2. *Females in managerial positions influence the sustainability performance of a company.*

3 | Data and Methodology

We use an unbalanced panel dataset of 2646 public companies from Europe, America, and Asia over 10 years from 2013 to 2022. The data are sourced from Refinitiv Eikon, which provides information on financials, board characteristics, ESG scores, and firms' sectors.¹ Initially, we include all companies available in this database. However, due to missing data for ESG and board characteristics variables, we lose a consistent portion of observations, resulting in a final sample of 9841-year observations. Table 1 shows the distribution of companies by country and sector.² As reported, our sample considers 70 countries, encompassing developing, emerging, and frontier economies, with the United States and China representing the majority at 30% and 13%, respectively.

3.1 | Dependent Variables

To thoroughly investigate the relationship between female leadership and a company's sustainable performance, we examine various dependent variables. Initially, we utilize the *ESGScore* as a measure of ESG performance, obtained from Thomson Reuters ASSET4, a high-quality database with multiple sustainability metrics for firms. This score, employed in previous studies (Khatri 2023; Naciti 2019), is calculated as the weighted average score of three aspects concerning ESG, based on verifiable reported data in the public domain. The environmental pillar includes aspects of emission, innovation, and resource use; the social pillar includes community, human rights, product responsibility, and workforce; and the governance pillar comprises corporate social responsibility (CSR) strategy, management, and shareholders categories.

Furthermore, we delve into the performance of each aforementioned pillar—*EScore*, *SScore*, and *GScore*—following the methodology outlined in Yahya (2023). This analysis seeks to clarify the relationship between our explanatory variables and the performance of each component of the ESG score, which drives the overall result. All these variables range from 0 (reflecting the worst) to 100 (reflecting the best).

3.2 | Independent Variables

In this study, two key variables are examined. To test the first hypothesis, we use the percentage of women directors on the board (*BoardDiv*) as a measure of board gender diversity, a practice commonly used in literature (Bennouri et al. 2018). Additionally, the study employs the *WomenManagers* variable (Altunbas et al. 2022), which is calculated as the percentage of female managers (top, senior, middle, and junior) over the total of managers. Both variables are retrieved from Refinitiv Eikon.

Additionally, we include several controls commonly used in literature that can affect the sustainable performance of a firm. We control for the ESG compensation incentive for managers

(*ExecutiveESGComp*) (Cohen et al. 2023), which is a binary variable taking value 1 if the company has an extra executive compensation related to ESG performance and 0 otherwise. As directors' backgrounds can influence the environmental performance of a company (De Villiers, Naiker, and Staden 2011), we insert in the regression model the variable *BoardExp*, computed as the percentage of board members with strong financial or industry-specific knowledge. The number of independent board members and the size of the board are included, as the former, according to agency theory, positively impacts environmental and social performance (Hussain, Rigoni, and Orij 2018), but the effect of the latter is still unclear. Although a higher number of directors can bring differentiated knowledge and experiences, thus enhancing the likelihood of having experts on sustainability-related themes (De Villiers, Naiker, and Staden 2011), an excess of them might compromise the effective functioning of the board (Jensen 1993). Finally, we control for different financial measures. We include a variable for the size of firms, as they have more resources to allocate to sustainable practices (Alkhawaja et al. 2023) and leverage, as high debt levels make investing in ESG more difficult due to shareholders pressure (Barnea and Rubin 2010; Altunbas et al. 2022). Moreover, we control for the return on equity ratio (ROE), because firms with high economic resources are more likely to engage in ESG activities (Sarhan and Al-Najjar 2023), and liquidity, as higher cash flows facilitate ESG investments (Cambrea, Paolone, and Cucari 2023). Table 2 summarizes all the variables employed in the regression model with their definitions.

3.3 | Descriptive Statistics

Table 3 presents the descriptive statistics. Notably, the average ESG score is approximately 59, with the Social pillar consistently ranking the highest at an average of 62. Regarding gender diversity, the average percentage of women on corporate boards is 22.54%, but females hold approximately 31% of managerial positions. Interestingly, 39% of the sampled firms provide additional compensation to top executives based on ESG performance, and over 80% of board members are independent. As commonly done in literature, the financial control variables have been winsorized at the 1st and 99th percentiles to minimize the potential impact of outliers (Flannery and Hankins 2013).

Figure 1 illustrates the historical trend of women's representation on corporate boards, categorized by regions representing Europe, America, and Asia. Since 2013, the presence of women directors has increased for all three regions, and as expected, European companies lead in terms of board gender diversity quota, followed by American firms. Asian companies, on the other hand, exhibit the lowest percentage of female board members. In contrast, Figure 2 depicts a different overview of women in managerial positions. Both America and Europe show a noteworthy surge in the average number of female managers, exhibiting similar trends. Conversely, Asia's growth is much less pronounced, with a slower rate of change in the average number of female managers in that region.

Table 4 presents the correlation matrix between dependent and independent variables. Notably, none of the independent variables has a Pearson correlation coefficient higher than

TABLE 1 | Number of companies by country and sector.

| Country | Number of companies by sector | | | | | | | | | | | Total |
|----------------|-------------------------------|----|----|----|----|----|----|----|----|----|----|-------|
| | CS | CD | CO | EN | FI | HC | IN | IT | MA | RE | UT | |
| Argentina | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 6 |
| Austria | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 6 |
| Bahamas | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Bahrain | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Belgium | 3 | 0 | 0 | 0 | 1 | 6 | 0 | 3 | 0 | 4 | 1 | 18 |
| Bermuda | 0 | 0 | 0 | 7 | 6 | 0 | 2 | 0 | 0 | 1 | 0 | 16 |
| Brazil | 3 | 9 | 8 | 4 | 9 | 4 | 12 | 0 | 6 | 0 | 16 | 71 |
| Cambodia | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Canada | 6 | 6 | 4 | 31 | 23 | 3 | 16 | 4 | 47 | 18 | 14 | 172 |
| Cayman Islands | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| Chile | 1 | 2 | 5 | 0 | 4 | 0 | 5 | 1 | 1 | 1 | 6 | 26 |
| China | 15 | 29 | 36 | 11 | 41 | 45 | 55 | 41 | 42 | 19 | 15 | 349 |
| Colombia | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 0 | 2 | 0 | 1 | 8 |
| Costa Rica | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Cyprus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| Czech Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Denmark | 2 | 0 | 0 | 0 | 0 | 8 | 0 | 3 | 0 | 0 | 1 | 14 |
| Finland | 4 | 0 | 0 | 0 | 1 | 3 | 0 | 10 | 0 | 2 | 1 | 21 |
| France | 10 | 0 | 0 | 0 | 6 | 12 | 0 | 8 | 0 | 11 | 5 | 52 |
| Germany | 10 | 0 | 0 | 0 | 6 | 15 | 0 | 27 | 0 | 10 | 3 | 71 |
| Greece | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| Guernsey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Hong Kong | 5 | 5 | 7 | 0 | 9 | 4 | 7 | 1 | 1 | 16 | 8 | 63 |
| Hungary | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Iceland | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| India | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 4 |
| Indonesia | 6 | 2 | 8 | 4 | 14 | 1 | 3 | 0 | 4 | 4 | 2 | 48 |
| Ireland | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 5 |
| Isle of Man | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Israel | 1 | 0 | 0 | 0 | 5 | 1 | 3 | 6 | 1 | 1 | 0 | 18 |
| Italy | 5 | 0 | 0 | 0 | 6 | 8 | 0 | 7 | 0 | 1 | 11 | 38 |
| Japan | 1 | 8 | 15 | 1 | 0 | 5 | 10 | 8 | 4 | 2 | 0 | 54 |
| Jersey | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Jordan | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| Kazakhstan | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 |
| South Korea | 2 | 4 | 2 | 1 | 5 | 2 | 8 | 4 | 4 | 0 | 2 | 34 |
| Kuwait | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

(Continues)

TABLE 1 | (Continued)

| Country | Number of companies by sector | | | | | | | | | | | Total |
|--------------------------|-------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| | CS | CD | CO | EN | FI | HC | IN | IT | MA | RE | UT | |
| Luxembourg | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 | 0 | 11 |
| Macau | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Malaysia | 7 | 6 | 16 | 7 | 10 | 5 | 20 | 6 | 6 | 8 | 5 | 96 |
| Malta | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Mexico | 3 | 4 | 8 | 1 | 6 | 2 | 10 | 0 | 6 | 3 | 0 | 43 |
| Mongolia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Netherlands | 4 | 0 | 0 | 0 | 2 | 3 | 0 | 5 | 0 | 3 | 0 | 17 |
| Norway | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 8 | 0 | 3 | 2 | 18 |
| Oman | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Pakistan | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Panama | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Peru | 0 | 0 | 2 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 7 |
| Philippines | 1 | 2 | 3 | 0 | 7 | 0 | 3 | 0 | 0 | 3 | 3 | 22 |
| Poland | 4 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 11 |
| Portugal | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| Puerto Rico | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Qatar | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Russia | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| Saudi Arabia | 0 | 0 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Singapore | 3 | 1 | 3 | 1 | 3 | 0 | 6 | 1 | 0 | 6 | 1 | 25 |
| Slovenia | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Spain | 5 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 0 | 3 | 10 | 24 |
| Sweden | 12 | 0 | 0 | 0 | 9 | 28 | 0 | 24 | 0 | 17 | 1 | 91 |
| Switzerland | 3 | 0 | 0 | 0 | 6 | 13 | 0 | 6 | 0 | 7 | 0 | 35 |
| Taiwan | 1 | 4 | 0 | 0 | 14 | 0 | 3 | 15 | 2 | 0 | 0 | 39 |
| Thailand | 3 | 11 | 9 | 7 | 12 | 4 | 4 | 2 | 6 | 6 | 10 | 74 |
| Turkey | 1 | 10 | 8 | 1 | 15 | 1 | 10 | 2 | 5 | 2 | 9 | 64 |
| United Arab Emirates | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 5 |
| United Kingdom | 15 | 0 | 0 | 0 | 16 | 13 | 0 | 11 | 0 | 12 | 3 | 70 |
| United States of America | 32 | 80 | 27 | 76 | 162 | 107 | 110 | 76 | 51 | 73 | 34 | 828 |
| Uruguay | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Vietnam | 0 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 7 |
| Total | 183 | 191 | 166 | 155 | 443 | 309 | 292 | 289 | 193 | 246 | 179 | 2646 |

Abbreviations: CD = consumer discretionary, CO = consumer staples, ECS = communication services, FI = financials, HC = health care, IN = industrial, IT = information technology, MA = materials, N = energy, RE = real estate, UT = utilities.

0.50, indicating no multicollinearity problems (Koutoupis and Malisiovas 2023). This fact is further confirmed by the variance inflation factor (VIF) test for multicollinearity. Specifically, the

highest value is equal to 1.66, and the mean VIF is 1.24, hence below the cutoff of 10 suggested in the literature (Hilary and Hui 2009).

TABLE 2 | Variables description.

| Variables | Description | Definition |
|-------------------------|----------------------|---|
| <i>ESGScore</i> | Dependent variable | Overall company score based on the self-reported information in the environmental, social and corporate governance pillars |
| <i>EScore</i> | Dependent variable | Weighted average relative rating of a company based on the reported environmental information and the resulting three environmental category scores |
| <i>SScore</i> | Dependent variable | Weighted average relative rating of a company based on the reported governance information and the resulting three governance category scores |
| <i>GScore</i> | Dependent variable | Weighted average relative rating of a company based on the reported social information and the resulting four social category scores |
| <i>BoardDiv</i> | Independent variable | Percentage of females on the board |
| <i>WomenManagers</i> | Independent variable | Percentage of female managers (top, senior, middle and junior) over total managers |
| <i>ExecutiveESGComp</i> | Control variable | Dummy variable that takes value 1 if a company has an extra executive compensation related to ESG performance and 0 otherwise |
| <i>BoardExp</i> | Control variable | Percentage of board members who have either an industry specific background or a strong financial background |
| <i>IndepBoard</i> | Control variable | Percentage of independent board members |
| <i>BoardSize</i> | Control variable | Total number of board members |
| <i>Leverage</i> | Control variable | Total debt/total assets |
| <i>LTotalAssets</i> | Control variable | Natural logarithm of total assets |
| <i>Cash</i> | Control variable | Total cash and cash equivalents/total assets |
| <i>ROE</i> | Control variable | Net Income/total equity |

TABLE 3 | Summary statistics.

| | Obs | Mean | SD | Min | Max |
|-------------------------|------------|-------------|-----------|------------|------------|
| <i>ESGScore</i> | 9861 | 59.17 | 16.89 | 2.60 | 95.86 |
| <i>EScore</i> | 9861 | 53.71 | 24.64 | 0.00 | 98.84 |
| <i>SScore</i> | 9846 | 61.97 | 19.61 | 0.57 | 98.37 |
| <i>GScore</i> | 9861 | 59.23 | 20.50 | 0.89 | 99.44 |
| <i>BoardDiv</i> | 9861 | 22.54 | 14.06 | 0.00 | 100.00 |
| <i>WomenManagers</i> | 9861 | 30.77 | 14.76 | 0.00 | 89.00 |
| <i>ExecutiveESGComp</i> | 9861 | 0.39 | 0.49 | 0.00 | 1.00 |
| <i>BoardExp</i> | 9861 | 46.81 | 21.83 | 0.00 | 100.00 |
| <i>IndepBoard</i> | 9861 | 80.66 | 15.23 | 0.00 | 100.00 |
| <i>BoardSize</i> | 9861 | 10.22 | 3.16 | 1.00 | 26.00 |
| <i>Leverage</i> | 9861 | 0.28 | 0.20 | 0.00 | 1.82 |
| <i>LTotalAssets</i> | 9861 | 22.82 | 1.77 | 15.96 | 25.64 |
| <i>Cash</i> | 9861 | 0.11 | 0.12 | 0.00 | 0.92 |
| <i>ROE</i> | 9861 | 0.10 | 0.47 | -3.84 | 2.63 |

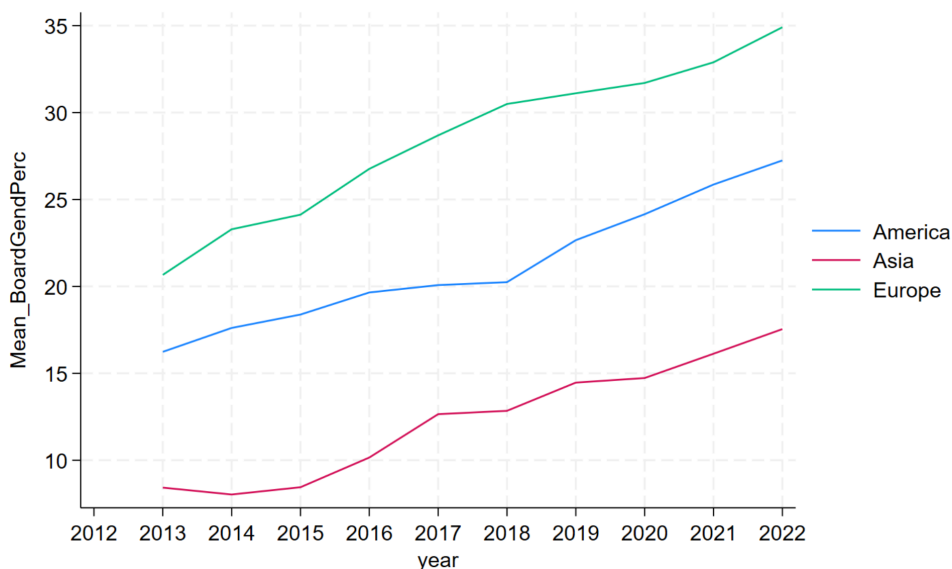


FIGURE 1 | Average % of women on boards of directors for America, Europe, and Asia region. *Source:* Authors' elaboration.

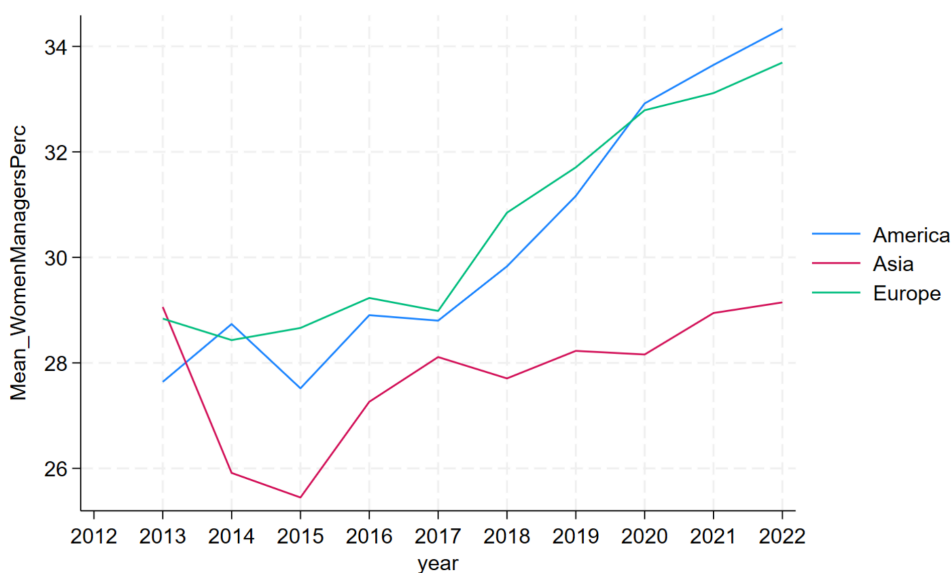


FIGURE 2 | Average % of women in managerial positions for America, Europe, and Asia region. *Source:* Authors' elaboration.

3.4 | Estimation Strategy

To investigate our hypotheses we employ the following panel fixed effects regression model:

$$ESGScore_{it} = a_i + B_1 BoardDiv_{it} + B_2 WomenManagers_{it} + B_3 X_{it} + \lambda_t + \epsilon_{it} \quad (1)$$

where *BoardDiv* is the percentage of females on board, *WomenManagers* is the percentage of female managers (top, senior, middle, and junior) over total managers, *X* is a vector of control variables related to board and firm characteristics, and ϵ_{it} is the stochastic error term. *a* represents firm-fixed effects employed to eliminate time-invariant omitted variables effects, or in other words, the firm-level unobserved

heterogeneity (Flannery and Hankins 2013), whereas λ denotes time-fixed effects that control for variables constant across entities but vary over time. To understand the relationship between our variables of interest and the ESG pillars, we use the same estimation model, changing the dependent variable with *EnvScore*, *SocialScore*, and *GovScore*, respectively.

We perform the Hausman test (Hausman 1978), which compares the estimates of fixed effects and random effects and suggests which model we should adopt. The test rejects the null hypothesis ($\chi^2 = 393.35$; $p = 0,000$) and therefore fixed effects adoption is preferred. Finally, we use firm-clustered standard errors robust to heteroskedasticity and autocorrelation (Arellano 1987), as suggested by the White test ($\chi^2 = 477.52$; $p = 0,000$), which rejects the null hypothesis that the conditional variance of the error term is constant (White 1980).

TABLE 4 | Correlation matrix and VIF.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---------------------|---------|----------|----------|----------|----------|---------|----------|----------|----------|----------|----------|----------|----------|------|
| 1. ESGScore | 1.38 | 1.00 | | | | | | | | | | | | |
| 2. EScore | 0.80*** | 1.00 | | | | | | | | | | | | |
| 3. SScore | 0.86*** | 0.64*** | 1.00 | | | | | | | | | | | |
| 4. GScore | 0.67*** | 0.31*** | 0.34*** | 1.00 | | | | | | | | | | |
| 5. BoardDiv | 1.23 | 0.18*** | 0.07*** | 0.19*** | 1.00 | | | | | | | | | |
| 6. WomenManagers | 1.08 | 0.06*** | -0.06*** | 0.14*** | 0.23*** | 1.00 | | | | | | | | |
| 7. ExecutiveESGComp | 1.21 | 0.32*** | 0.24*** | 0.31*** | 0.26*** | 0.00 | 1.00 | | | | | | | |
| 8. BoardExp | 1.14 | -0.02* | -0.03*** | 0.11*** | -0.03*** | -0.01 | 0.02** | 1.00 | | | | | | |
| 9. IndepBoard | 1.28 | 0.19*** | 0.17*** | 0.23*** | 0.26*** | 0.15*** | 0.23*** | -0.32*** | 1.00 | | | | | |
| 10. BoardSize | 1.33 | 0.25*** | 0.23*** | 0.05*** | 0.00 | 0.06*** | 0.09*** | -0.09*** | 0.09*** | 1.00 | | | | |
| 11. Leverage | 1.06 | 0.05*** | 0.05*** | 0.01 | 0.04*** | -0.02** | 0.06*** | -0.06*** | 0.06*** | 0.01 | 1.00 | | | |
| 12. LTotalAssets | 1.66 | 0.40*** | 0.34*** | 0.21*** | -0.08*** | 0.04*** | 0.11*** | 0.01 | 0.09*** | 0.49*** | 0.02** | 1.00 | | |
| 13. Cash | 1.19 | -0.14*** | -0.11*** | -0.08*** | 0.00 | -0.02** | -0.09*** | 0.01 | -0.09*** | -0.16*** | -0.21*** | -0.34*** | 1.00 | |
| 14. ROE | 1.01 | 0.06*** | 0.05*** | 0.03*** | -0.01 | 0.01 | -0.01 | -0.01 | 0.00 | 0.02** | -0.05*** | 0.03*** | -0.04*** | 1.00 |
| Mean VIF | 1.24 | | | | | | | | | | | | | |

TABLE 5 | Fixed effects model regression: ESG score.

| | (1) | (2) | (3) | (4) |
|-------------------------|---------------------|---------------------|---------------------|---------------------|
| | ESG score | ESG score | ESG score | ESG score |
| <i>BoardDiv</i> | 0.072*** (0.018) | 0.148*** (0.021) | 0.227*** (0.022) | 0.230*** (0.022) |
| <i>WomenManagers</i> | 0.047** (0.022) | 0.043** (0.022) | -0.005 (0.019) | 0.042** (0.021) |
| <i>ExecutiveESGComp</i> | 3.495*** (0.480) | 7.836*** (0.536) | 8.188*** (0.548) | 7.993*** (0.523) |
| <i>BoardExp</i> | 0.075*** (0.010) | 0.002 (0.012) | 0.078*** (0.014) | 0.076*** (0.013) |
| <i>IndepBoard</i> | 0.150*** (0.018) | 0.091*** (0.020) | 0.163*** (0.023) | 0.172*** (0.023) |
| <i>BoardSize</i> | -0.081 (0.085) | 0.294*** (0.106) | 0.082 (0.110) | 0.132 (0.106) |
| <i>Leverage</i> | -0.488 (1.745) | 0.031 (1.403) | 2.568* (1.376) | 0.323 (1.376) |
| <i>LTotalAssets</i> | 3.818*** (0.565) | 4.277*** (0.195) | 3.810*** (0.198) | 4.681*** (0.201) |
| <i>Cash</i> | 0.602 (2.335) | 2.330 (2.386) | 5.380** (2.311) | 4.531* (2.349) |
| <i>ROE</i> | -0.042 (0.205) | 1.862*** (0.406) | 1.578*** (0.402) | 1.476*** (0.387) |
| Time FE | Yes | Yes | Yes | Yes |
| Firm FE | Yes | No | No | No |
| Sector FE | No | Yes | No | Yes |
| Country FE | No | No | Yes | Yes |
| Observations | 9861 | 9861 | 9861 | 9861 |
| R-squared | 0.395 | 0.313 | 0.368 | 0.411 |
| Number of ID | 2646 | 2646 | 2646 | 2646 |

Note: Robust standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

4 | Results

Using a panel fixed effects regression model, we explore the relationship between the ESG performance of firms and the presence of females at both board and management levels.

Table 5 reports the outcomes of our analysis. In Column 1, our explanatory variables, *BoardDiv* and *WomenManagers*, emerge as significant contributors to ESG performance, positively affecting the score at 1% and 5% significance levels, respectively. This supports all the theoretical frameworks discussed, suggesting that having women in both board and management positions

enhances overall sustainability performance. This evidence provides an initial acceptance to Hypotheses 1 and 2 derived according to the literature. Concerning the relation between the dependent variable and the controls, we notice that the size of the company, the number of independent directors, and the expertise of the board are positively associated with the ESG score, in line with previous literature (Cambrea, Paolone, and Cucari 2023; Harjoto, Laksmana, and Yang 2018). Moreover, we notice that the coefficient on ESG executive compensation is significant, standing at 3.495. In Columns 2–4, we replicate the estimations using sector and country fixed effects, observing that our results hold.

TABLE 6 | Fixed effects model regression: ESG pillars score.

| | (1) | (2) | (3) |
|-------------------------|---------------------|---------------------|----------------------|
| | E score | S score | G score |
| <i>BoardDiv</i> | 0.020 (0.025) | −0.018 (0.022) | 0.236*** (0.028) |
| <i>WomenManagers</i> | 0.050 (0.033) | 0.074*** (0.026) | 0.004 (0.032) |
| <i>ExecutiveESGComp</i> | 2.739*** (0.653) | 2.638*** (0.554) | 4.991*** (0.737) |
| <i>BoardExp</i> | 0.044*** (0.014) | 0.034*** (0.012) | 0.166*** (0.017) |
| <i>IndepBoard</i> | −0.007 (0.026) | 0.034 (0.022) | 0.431*** (0.030) |
| <i>BoardSize</i> | 0.027 (0.122) | 0.150 (0.110) | −0.544*** (0.139) |
| <i>Leverage</i> | 0.929 (2.337) | −3.715* (2.234) | 2.078 (2.743) |
| <i>LTotalAssets</i> | 4.450*** (0.941) | 2.229*** (0.782) | 3.247*** (0.887) |
| <i>Cash</i> | −0.309 (3.410) | 0.135 (0.216) | −0.274 (0.270) |
| <i>ROE</i> | 0.043 (0.309) | 0.304 (0.278) | −0.591* (0.343) |
| Time FE | Yes | Yes | Yes |
| Firm FE | Yes | Yes | Yes |
| Observations | 9861 | 9846 | 9861 |
| R-squared | 0.226 | 0.279 | 0.246 |
| Number of ID | 2646 | 2638 | 2646 |

Note: Robust standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

Moving beyond the overall ESG score, Table 6 examines the specific pillars. Our results assert that a 1 percentage point increase in females on the board solely enhances the governance score of a firm by 0.24 points, but the same increment in women managers results in a 0.074-point variation in the social score. Both variables demonstrate a positive relation with the environmental score, although statistically insignificant. Conversely, the presence of an ESG executive compensation leads to improvements in all three ESG pillars. The background of board members and the size of the firm are associated with all dependent variables, whereas the number of independent directors and the size of the board tend to have a positive and negative correlation, respectively, solely on the governance score.

Although the primary aim of this analysis is to draw general conclusions about the relationship between gender diversity and sustainability, we also report results for different regions. Table 7 presents the fixed effects regression results for the three geographical areas in our sample. We observe that the findings vary slightly across regions and in comparison to the overall evidence. This variation is likely due to heterogeneous factors that may shape the association between gender diversity and sustainability differently.

The first four columns of Table 7 display regression results for the overall ESG score and its individual pillars in the American region. Our analysis suggests that although board diversity is positively associated with the overall ESG score, this effect primarily operates through the governance score. Conversely, the proportion of women in managerial positions does not show a significant coefficient on any of the ESG pillars in this sample.

However, in the Asian context (Columns 5–8), female managers appear to play a significant role in shaping firms' sustainability profiles, particularly contributing to the social score. On the other hand, board diversity exhibits only a marginal association with the governance score in this region.

For European firms (Columns 9–12), the results remain consistent with the overall evidence. We find a strong nexus between board diversity and both the overall ESG score and the governance score, whereas the social score is significantly correlated with the presence of female managers. Notably, gender diversity does not appear to be significantly linked to environmental performance, except in Asia, where women in managerial positions show a positive and significant correlation, and in America, where board diversity exhibits a significant but weak association with the environmental score.

In summary, we observe some deviations from our full-sample findings regarding management diversity in America and board diversity in Asia. According to the literature, these differences may be explained by cultural factors, which our full-sample regression captures through fixed effects, assuming these factors remain constant over time. For instance, variations in social norms, institutional acceptance of gender diversity (Zhang 2020), or cultural dimensions (Naghavi, Sharif, and Hussain 2021) could account for the cross-country differences observed when analyzing the data by region.

5 | Robustness Checks

As pointed out by prior studies, board of directors' variables suffer from endogeneity issues (Adams and Ferreira 2009; Li et al. 2021). Although fixed effects specifications address omitted variables issues, bias in estimated coefficients may persist due to reverse causality. Specifically, male directors and male managers sensitive to sustainable concerns may impact the gender diversity percentage in a firm (Altunbas et al. 2022; Chen, Leung, and Goergen 2017). Moreover, as argued by Atif et al. (2021), in light of the scarcity of qualified women, female directors or managers have the freedom to choose leadership positions in alignment with their personal preferences, including

TABLE 7 | Fixed effects model regression for different regions.

| | America | | | | | Asia | | | | | Europe | | | | |
|-------------------------|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|--|--|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | | | |
| | ESG | E | S | G | ESG | E | S | G | ESG | E | S | G | | | |
| <i>BoardDiv</i> | 0.101*** (0.025) | 0.075* (0.040) | -0.027 (0.033) | 0.285*** (0.038) | 0.063 (0.040) | -0.002 (0.056) | 0.089* (0.048) | 0.109* (0.059) | 0.085*** (0.030) | 0.042 (0.038) | -0.030 (0.033) | 0.243*** (0.048) | | | |
| <i>WomenManagers</i> | -0.004 (0.033) | 0.001 (0.049) | 0.019 (0.039) | -0.047 (0.051) | 0.097** (0.038) | 0.158*** (0.060) | 0.120*** (0.044) | 0.014 (0.059) | 0.040 (0.038) | 0.008 (0.052) | 0.096** (0.044) | -0.008 (0.049) | | | |
| <i>ExecutiveESGComp</i> | 3.349*** (0.744) | 2.861*** (0.965) | 1.994** (0.893) | 5.107*** (1.110) | 3.522*** (1.058) | 2.480 (1.573) | 3.536*** (1.166) | 3.870** (1.531) | 3.600*** (0.725) | 3.797*** (0.980) | 3.490*** (0.836) | 3.366*** (1.210) | | | |
| <i>BoardExp</i> | 0.084*** (0.014) | 0.034* (0.020) | 0.021 (0.018) | 0.210*** (0.022) | 0.083*** (0.018) | 0.090*** (0.028) | 0.074*** (0.020) | 0.126*** (0.033) | 0.065*** (0.019) | 0.006 (0.027) | 0.010 (0.023) | 0.176*** (0.028) | | | |
| <i>IndepBoard</i> | 0.155*** (0.033) | -0.077* (0.043) | 0.023 (0.035) | 0.523*** (0.057) | 0.122*** (0.031) | 0.054 (0.047) | 0.067* (0.038) | 0.317*** (0.050) | 0.155*** (0.030) | 0.007 (0.042) | -0.010 (0.038) | 0.438*** (0.049) | | | |
| <i>BoardSize</i> | -0.030 (0.106) | 0.187 (0.166) | 0.320** (0.150) | -0.672*** (0.186) | -0.258 (0.166) | 0.057 (0.258) | -0.063 (0.188) | -0.625** (0.273) | 0.257 (0.170) | 0.086 (0.205) | 0.491** (0.241) | -0.256 (0.285) | | | |
| <i>Leverage</i> | 1.793 (2.219) | 2.721 (2.941) | 0.551 (3.174) | 1.331 (4.002) | -1.737 (4.187) | -2.167 (5.584) | -5.843 (4.717) | 7.922 (6.828) | -2.283 (2.934) | -0.015 (4.003) | -6.591* (3.510) | -0.006 (3.895) | | | |
| <i>LTotalAssets</i> | 3.285*** (0.911) | 4.375*** (1.265) | 3.585*** (1.312) | 1.306 (1.437) | 4.020*** (1.324) | 4.722** (1.913) | 3.271** (1.323) | 3.941* (2.064) | 3.157*** (0.793) | 3.645** (1.437) | 2.456** (1.065) | 4.336*** (1.077) | | | |
| <i>Cash</i> | 0.406 (3.460) | -2.790 (5.359) | 8.240* (4.653) | -7.655 (5.152) | -0.206 (4.927) | -4.400 (6.889) | 2.203 (6.073) | -2.115 (6.708) | -1.393 (3.284) | 2.663 (5.014) | -7.298* (4.083) | 3.858 (4.682) | | | |
| <i>ROE</i> | 0.026 (0.232) | 0.378 (0.364) | 0.333 (0.311) | -0.690* (0.378) | 1.246* (0.708) | -0.446 (0.629) | 0.962 (0.965) | 2.372** (1.049) | -0.800 (0.612) | -0.656 (0.701) | 0.206 (0.745) | -1.773* (0.944) | | | |
| Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | | | |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | | | |
| Observations | 4271 | 4271 | 4256 | 4271 | 3096 | 3096 | 3096 | 3096 | 2494 | 2494 | 2494 | 2494 | | | |
| R-squared | 0.340 | 0.187 | 0.230 | 0.252 | 0.458 | 0.330 | 0.389 | 0.161 | 0.450 | 0.209 | 0.282 | 0.383 | | | |
| Number of ID | 1189 | 1189 | 1181 | 1189 | 928 | 928 | 928 | 928 | 529 | 529 | 529 | 529 | | | |

Note: Robust standard errors in parentheses.
 ***p < 0.01.
 **p < 0.05.
 *p < 0.1.

firms with high levels of CSR. This raises concerns about potential self-selection bias affecting gender diversity variables.

One further issue is related to the length of the sample. Flannery and Hankins (2013) discussed the presence of a “short panel bias” when a fixed effects specification is employed with a short-length sample. This problem occurs because, by removing time-invariant unobserved heterogeneity from the model, the fixed effects regression establishes a correlation between the dependent variable lag and the error term, potentially distorting the results. However, increasing the length of the panel diminishes the correlation between the two terms.

Although the authors do not specify an adequate time dimension, it appears that even with a $T = 30$, potentially severe biases

may persist. Considering the main conclusions of Judson and Owen (1999), we acknowledge that our dataset is affected by a “short panel bias.” To address these aforementioned issues, we conduct several robustness checks.

Firstly, we rerun our fixed effects regression excluding US firms. In our sample, approximately 30% of companies are from this country; thus, repeating the calculations without these firms allows us to examine whether the results are driven by these observations (Fu et al. 2022). The results in Table 8 indicate that, though our main results are still consistent, the correlation between female managers and ESG performance loses its statistical significance.

Secondly, following previous literature, we employ one-year lagged independent variables to minimize simultaneity issues

TABLE 8 | Fixed effects model regression: excluding US firms.

| | (1) | (2) | (3) | (4) |
|-------------------------|---------------------|---------------------|---------------------|----------------------|
| | ESG score | E score | S score | G score |
| <i>BoardDiv</i> | 0.052** (0.021) | -0.007 (0.028) | -0.018 (0.025) | 0.204*** (0.034) |
| <i>WomenManagers</i> | 0.040 (0.024) | 0.040 (0.037) | 0.061** (0.029) | 0.017 (0.034) |
| <i>ExecutiveESGComp</i> | 3.662*** (0.549) | 3.164*** (0.762) | 2.914*** (0.632) | 4.862*** (0.830) |
| <i>BoardExp</i> | 0.066*** (0.012) | 0.037** (0.017) | 0.040*** (0.014) | 0.138*** (0.019) |
| <i>IndepBoard</i> | 0.124*** (0.020) | -0.016 (0.029) | 0.036 (0.025) | 0.371*** (0.032) |
| <i>BoardSize</i> | -0.023 (0.098) | 0.052 (0.139) | 0.220* (0.125) | -0.467*** (0.161) |
| <i>Leverage</i> | -2.433 (2.148) | -1.742 (3.093) | -4.887* (2.711) | 0.448 (3.410) |
| <i>LTotalAssets</i> | 3.997*** (0.649) | 4.380*** (1.132) | 3.510*** (0.830) | 4.103*** (1.015) |
| <i>Cash</i> | -0.418 (2.782) | -1.278 (4.017) | -0.733 (3.533) | -0.468 (3.806) |
| <i>ROE</i> | 0.014 (0.384) | -0.464 (0.415) | 0.384 (0.503) | -0.192 (0.589) |
| Time FE | Yes | Yes | Yes | Yes |
| Firm FE | Yes | Yes | Yes | Yes |
| Observations | 7038 | 7038 | 7035 | 7038 |
| R-squared | 0.415 | 0.247 | 0.296 | 0.244 |
| Number of ID | 1818 | 1818 | 1816 | 1818 |

Note: Robust standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

(Cabeza-García, Fernández-Gago, and Nieto 2018; Cambrea, Paolone, and Cucari 2023). This specification is motivated by the time required for both female directors or managers and board characteristics to exert an influence on firm performance (Liu, Wei, and Xie 2014). As shown in Table 9, whereas *BoardDiv* confirms its significant relationship with the dependent variables, *WomenManagers* do not correlate with ESG score and Social score.

Finally, we use the two-step system GMM estimator to further address omitted variables and reverse causality (Blundell and Bond 1998). This dynamic model exploits lagged dependent and independent variables as instruments to solve endogeneity, eliminating the need for external instruments (Wintoki, Linck, and Netter 2012). Additionally, this model seems to be

the best choice in the presence of endogeneity, and it is suitable for panel data with short periods (small T) and large numbers of cross-sections (large N) (Flannery and Hankins 2013). To determine how many dependent lags we need to include in the models to capture all information from the past, we estimate a regression for each dependent variable as in Wintoki, Linck, and Netter (2012). We find that two lags are necessary to capture the persistence of performance. Then, assuming that all independent variables are not strictly exogenous, except the year dummies (Liu, Wei, and Xie 2014), we use the forward orthogonal deviations transformation (Arellano and Bover 1995) and employ the collapsing method, which constrains the number of instruments used, increasing the efficiency and power of the model (Bowsher 2002). Table 10 presents the results of the system GMM analysis. The AR(1),

TABLE 9 | Fixed effects model regression with lagged variables.

| | (1) | (2) | (3) | (4) |
|-------------------------|---------------------|---------------------|---------------------|----------------------|
| | ESG score | E score | S score | G score |
| <i>BoardDiv</i> | 0.072*** (0.021) | 0.016 (0.028) | 0.029 (0.026) | 0.168*** (0.035) |
| <i>WomenManagers</i> | 0.015 (0.025) | 0.059 (0.042) | 0.013 (0.031) | -0.025 (0.043) |
| <i>ExecutiveESGComp</i> | 1.330*** (0.475) | 0.406 (0.630) | 0.688 (0.558) | 2.937*** (0.867) |
| <i>BoardExp</i> | 0.030*** (0.010) | 0.030* (0.016) | 0.031*** (0.012) | 0.032* (0.017) |
| <i>IndepBoard</i> | 0.061*** (0.019) | 0.039 (0.027) | 0.037 (0.024) | 0.101*** (0.034) |
| <i>BoardSize</i> | -0.091 (0.081) | 0.007 (0.129) | 0.112 (0.112) | -0.471*** (0.150) |
| <i>Leverage</i> | -1.923 (1.791) | -2.193 (2.403) | -3.289 (2.384) | 0.693 (2.922) |
| <i>LTotalAssets</i> | 3.256*** (0.618) | 4.058*** (0.936) | 2.278*** (0.779) | 3.560*** (1.090) |
| <i>Cash</i> | 3.340 (2.476) | 3.578 (3.502) | 2.483 (3.251) | 3.212 (3.831) |
| <i>ROE</i> | -0.429** (0.178) | -0.277 (0.235) | -0.135 (0.240) | -0.881** (0.414) |
| Time FE | Yes | Yes | Yes | Yes |
| Firm FE | Yes | Yes | Yes | Yes |
| Observations | 6970 | 6970 | 6963 | 6970 |
| R-squared | 0.332 | 0.175 | 0.225 | 0.154 |
| Number of ID | 2003 | 2003 | 1999 | 2003 |

Note: Robust standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

TABLE 10 | Two-step system GMM.

| | (1) ESG score | (2) E score | (3) S score | (4) G score |
|-------------------------|---------------------|---------------------|---------------------|----------------------|
| $ESGScore_{t-1}$ | 0.690*** (0.102) | | | |
| $ESGScore_{t-2}$ | 0.111 (0.081) | | | |
| $EScore_{t-1}$ | | 0.997*** (0.097) | | |
| $EScore_{t-2}$ | | -0.180** (0.081) | | |
| $SScore_{t-1}$ | | | 0.613*** (0.097) | |
| $SScore_{t-2}$ | | | 0.172** (0.080) | |
| $GScore_{t-1}$ | | | | 0.571*** (0.067) |
| $GScore_{t-2}$ | | | | 0.108*** (0.041) |
| <i>BoardDiv</i> | 0.066** (0.029) | 0.026 (0.031) | -0.003 (0.033) | 0.179*** (0.052) |
| <i>WomenManagers</i> | -0.001 (0.047) | -0.002 (0.044) | 0.148*** (0.053) | -0.036 (0.078) |
| <i>ExecutiveESGComp</i> | 1.073* (0.580) | 2.191*** (0.663) | 2.508*** (0.738) | 2.498** (1.027) |
| <i>BoardExp</i> | 0.007 (0.018) | 0.007 (0.016) | -0.002 (0.017) | -0.031 (0.029) |
| <i>IndepBoard</i> | 0.000 (0.055) | -0.032 (0.041) | -0.026 (0.037) | 0.052 (0.098) |
| <i>BoardSize</i> | -0.452** (0.205) | -0.062 (0.160) | 0.088 (0.156) | -1.068*** (0.379) |
| <i>Leverage</i> | 2.450 (2.961) | 3.736 (3.477) | -5.444 (3.554) | 7.253 (5.933) |
| <i>LTotalsAssets</i> | 0.386 (0.389) | 0.417 (0.440) | -0.258 (0.444) | 1.245* (0.639) |
| <i>Cash</i> | 2.271 (6.526) | -1.026 (6.190) | 6.667 (5.432) | 2.196 (9.665) |
| <i>ROE</i> | 1.339 (1.135) | 0.440 (0.387) | 0.597 (0.388) | 0.220 (2.651) |

(Continues)

TABLE 10 | (Continued)

| | (1) ESG score | (2) E score | (3) S score | (4) G score |
|--------------|---------------------|---------------------|---------------------|---------------------|
| AR(1) | -3.76*** (0.000) | -5.33*** (0.000) | -3.88*** (0.000) | -6.53*** (0.000) |
| AR(2) | -1.08 (0.280) | 1.92* (0.055) | -0.73 (0.464) | -0.71 (0.476) |
| Hansen Test | 34.23 (0.129) | 103.56 (0.281) | 108.43 (0.182) | 28.68 (0.326) |
| Observations | 4891 | 4891 | 4888 | 4891 |
| Number of ID | 1456 | 1456 | 1455 | 1456 |

AR(2), and Hansen *J*-test of over-identification are provided. AR(1) and AR(2) are, respectively, the tests for first-order and second-order serial correlation in the first-differenced residuals under the null hypothesis of no serial correlation. The Hansen test assesses the validity of instruments used under the null hypothesis that all instruments are valid. All three tests affirm the validity of the instruments, as the autocorrelation test indicates an absence of serial correlation, and the Hansen test consistently rejects the null hypothesis, aligning closely with the significance range recommended in the literature, between 0.10 and 0.25 (Roodman 2009).

Once again, our main results hold after controlling for endogeneity issues. We find a positive significant relation between *WomenManagers* and the Social Score at the 1% level, but we confirm no correlation with the overall ESG score, as indicated by previous robustness specifications. Therefore, we can conclude that the first hypothesis is supported by our results, whereas the second is only partially confirmed.

6 | Discussion and Conclusion

This study investigates the contemporary dynamics of gender diversity within corporate governance and management, a pressing issue raised by global initiatives such as the UN's Agenda 2030. The legislative strides made by countries like Norway, France, and Italy, coupled with the European Union's 2022 Directive, signify a collective effort to promote female participation and leadership in decision-making roles.

This study advances the literature on gender diversity by exploring the connection between women's representation in corporate leadership roles and ESG performance. For the first time, we extend the focus beyond board positions, examining the presence of females in various management tiers (top, senior, middle, and junior) within an international context.

We leverage one of the largest samples to date, comprising 2646 public companies across Europe, America, and Asia, from 2013 to 2022. Our results show a positive and significant relationship between women on boards, women in managerial roles, and

overall ESG performance. However, the dissection of the ESG factor into its three pillars reveals nuanced influences. Gender board diversity is predominantly associated with the governance score pillar, whereas gender managerial diversity correlates only with the social score pillar. This aligns with the findings of Yahya (2023), who observed a positive impact of female CEOs on social scores in firms operating in Nordic markets. Moreover, our study does not identify any relationship between gender diversity and the environmental score, consistent with the observations of Glass, Cook, and Ingersoll (2016) who find that neither women CEOs nor gender-diverse boards are associated with environmental concerns. Galbreath (2011) suggests that sex-based biases or stereotyping by male directors might hinder the influence of female directors on environmental issues. His work consistently highlights that women might face resistance in decision-making processes, limiting their impact on sustainable outcomes.

Furthermore, to address potential endogeneity issues, the study conducts a thorough battery of robustness checks. In this regard, we employ a system GMM estimation model, recognized as particularly effective in handling short panel bias and mitigating concerns related to reverse causality (Flannery and Hankins 2013). The results confirm the consistency of a significant relationship between the presence of women on boards and ESG performance driven by the governance score. Conversely, the correlation between women in managerial positions and the overall score does not hold. It is observed that gender diversity at the managerial level is associated only with the social score pillar.

The results of our investigation hold relevance for a diverse audience, including academics, managers, and policymakers. This study provides further empirical evidence for the theories discussed that link gender diversity and corporate dynamics. Even though the presence of women managers does not correlate with higher overall ESG scores, the distinct traits and altruistic characteristics of women managers enhance the social performance of a firm. Concerning managerial implications, our findings suggest fostering a workplace culture that prioritizes the hiring and internal promotion of women, considering the positive effects that female managers at any hierarchical level can have on the social performance of firms.

Recognizing that this dynamic can potentially yield benefits for overall firm financial performance (Maji and Lohia 2022), we suggest a higher integration of gender diversity policies into managerial decision-making processes. Furthermore, the overall finding that gender diversity correlates positively with sustainability performance can provide a strong case in supporting the prevailing legislative frameworks established in European nations and outlined in the European directive concerning gender quotas within board compositions (Directive No. 2022/2381 2022). American and Asian countries, which exhibit either a soft stance or lack a defined position on this matter, are encouraged to consider the beneficial outcomes associated with augmenting the representation of females in the hierarchical echelons of corporate structure.

Moreover, the implications extend to the UN's SDGs. It is evident that the presence of women in leadership positions fosters a virtuous cycle, enhancing both a company's sustainability performance and its alignment with these global objectives. Gender diversity at the executive level strengthens corporate governance and promotes an ethical decision-making and the adoption of socially responsible practices. Given that social equality is a fundamental pillar of the SDGs, advancing female leadership is not merely a matter of equity but also a key factor that leads businesses to integrate sustainability principles while creating long-term value for both society and stakeholders.

This study acknowledges some limitations, which, in turn, may serve as fertile grounds for future research opportunities. Different aspects that could diverge across countries have not been taken into account, including, but not limited to, the demographic characteristics of directors and managers such as age, ethnicity, nationality, or educational background. Future studies could further investigate constituent facets of each pillar, particularly governance and social dimensions, to better understand through which channels and by which mechanisms gender diversity manifests its influence. Moreover, other studies may employ different methodologies to address endogeneity concerns, such as the 2SLS or Heckman selection model, which can be considered for future empirical analysis.

Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

¹ Firms are divided in 11 sectors following the GICS classification: communication services, consumer discretionary, consumer staples, energy, financials, health care, industrial, information technology, materials, real estate, and utilities (<https://www.msci.com/our-solutions/indexes/gics>).

² We include financial institutions in our sample. Our results hold even if we exclude them from the analysis. However, for the sake of brevity, we do not provide the regression results.

References

Adams, R. B., and D. Ferreira. 2009. "Women in the Boardroom and Their Impact on Governance and Performance." *Journal of Financial Economics* 94: 291–309. <https://doi.org/10.1016/j.jfineco.2008.10.007>.

Adams, R. B., J. Nowland, and S. Grey. 2011. "Does Gender Matter in the Boardroom? Evidence From the Market Reaction to Mandatory New Director Announcements." *Social Science Research Network Electronic Journal*: 1–55. <https://doi.org/10.2139/ssrn.1953152>.

Ahmed, A., R. M. Monem, D. Delaney, and C. Ng. 2017. "Gender Diversity in Corporate Boards and Continuous Disclosure: Evidence From Australia." *Journal of Contemporary Accounting and Economics* 13: 89–107. <https://doi.org/10.1016/j.jcae.2017.05.004>.

Alkhawaja, A., F. Hu, S. Johl, and S. Nadarajah. 2023. "Board Gender Diversity, Quotas, and ESG Disclosure: Global Evidence." *International Review of Financial Analysis* 90: 102823. <https://doi.org/10.1016/j.irfa.2023.102823>.

Altunbas, Y., L. Gambacorta, A. Reghezza, and G. Velliscig. 2022. "Does Gender Diversity in the Workplace Mitigate Climate Change?" *Journal of Corporate Finance* 77: 102303. <https://doi.org/10.1016/j.jcorpfin.2022.102303>.

Arellano, M. 1987. "Practitioners' Corner: Computing Robust Standard Errors for Within-Groups Estimators*." *Oxford Bulletin of Economics and Statistics* 49: 431–434. <https://doi.org/10.1111/j.1468-0084.1987.mp49004006.x>.

Arellano, M., and O. Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68: 29–51. [https://doi.org/10.1016/0304-4076\(94\)01642-D](https://doi.org/10.1016/0304-4076(94)01642-D).

Atif, M., M. Hossain, M. S. Alam, and M. Goergen. 2021. "Does Board Gender Diversity Affect Renewable Energy Consumption?" *Journal of Corporate Finance* 66: 101665. <https://doi.org/10.1016/j.jcorpfin.2020.101665>.

Barnea, A., and A. Rubin. 2010. "Corporate Social Responsibility as a Conflict Between Shareholders." *Journal of Business Ethics* 97: 71–86. <https://doi.org/10.1007/s10551-010-0496-z>.

Bear, S., N. Rahman, and C. Post. 2010. "The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation." *Journal of Business Ethics* 97, no. 2: 207–221.

Becker, G. 1964. *Human Capital: A Theoretical and Empirical Analysis With Special Reference to Education*. First ed, 1–412. University of Chicago Press.

Ben-Amar, W., M. Chang, and P. McIlkenny. 2015. "Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence From the Carbon Disclosure Project." *Journal of Business Ethics* 142: 369–383.

Bennouri, M., T. Chtioui, H. Nagati, and M. Nekhili. 2018. "Female Board Directorship and Firm Performance: What Really Matters?" *Journal of Banking & Finance* 88: 267–291. <https://doi.org/10.1016/j.jbankfin.2017.12.010>.

Blundell, R., and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87: 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8).

Boulouta, I. 2013. "Hidden Connections: The Link Between Board Gender Diversity and Corporate Social Performance." *Journal of Business Ethics* 113: 185–197. <https://doi.org/10.1007/s10551-012-1293-7>.

Bowsher, C. G. 2002. "On Testing Overidentifying Restrictions in Dynamic Panel Data Models." *Economics Letters* 77: 211–220. [https://doi.org/10.1016/S0165-1765\(02\)00130-1](https://doi.org/10.1016/S0165-1765(02)00130-1).

Brahma, S., C. Nwafor, and A. Boateng. 2021. "Board Gender Diversity and Firm Performance: The UK Evidence." *International Journal of Finance and Economics* 26: 5704–5719. <https://doi.org/10.1002/ijfe.2089>.

Bruna, M. G., R. Dang, M. J. Scotto, and A. Ammari. 2019. "Does Board Gender Diversity Affect Firm Risk-Taking? Evidence From the French Stock Market." *Journal of Management and Governance* 23: 915–938. <https://doi.org/10.1007/s10997-019-09473-1>.

Burkhardt, K., P. Nguyen, and E. Poincelot. 2020. "Agents of Change: Women in Top Management and Corporate Environmental

- Performance.” *Corporate Social Responsibility and Environmental Management* 27: 1591–1604. <https://doi.org/10.1002/csr.1907>.
- Cabeza-García, L., R. Fernández-Gago, and M. Nieto. 2018. “Do Board Gender Diversity and Director Typology Impact CSR Reporting?” *European Management Review* 15: 559–575. <https://doi.org/10.1111/emre.12143>.
- Cambrea, D. R., F. Paolone, and N. Cucari. 2023. “Advisory or Monitoring Role in ESG Scenario: Which Women Directors Are More Influential in the Italian Context?” *Business Strategy and the Environment* 32: 4299–4314. <https://doi.org/10.1002/bse.3366>.
- Carter, D. A., B. J. Simkins, and W. G. Simpson. 2003. “Corporate Governance, Board Diversity, and Firm Value.” *Financial Review* 38: 33–53. <https://doi.org/10.1111/1540-6288.00034>.
- Certo, S. T., and M. Semadeni. 2006. “Strategy Research and Panel Data: Evidence and Implications.” *Journal of Management* 32: 449–471. <https://doi.org/10.1177/0149206305283320>.
- Chen, J., W. S. Leung, and M. Goergen. 2017. “The Impact of Board Gender Composition on Dividend Payouts.” *Journal of Corporate Finance* 43: 86–115. <https://doi.org/10.1016/j.jcorpfin.2017.01.001>.
- Cohen, S., I. Kadach, G. Ormazabal, and S. Reichelstein. 2023. “Executive Compensation Tied to ESG Performance: International Evidence.” *Journal of Accounting Research* 61: 805–853. <https://doi.org/10.1111/1475-679X.12481>.
- Cucari, N., S. De Esposito Falco, and B. Orlando. 2018. “Diversity of Board of Directors and Environmental Social Governance: Evidence From Italian Listed Companies.” *Corporate Social Responsibility and Environmental Management* 25: 250–266. <https://doi.org/10.1002/csr.1452>.
- Datta, S., T. Doan, and F. Toscano. 2021. “Top Executive Gender, Board Gender Diversity, and Financing Decisions: Evidence From Debt Structure Choice.” *Journal of Banking & Finance* 125: 106070. <https://doi.org/10.1016/j.jbankfin.2021.106070>.
- Davidson, M. J., and R. J. Burke, eds. 2000. *Women in Management: Current Research Issues*. Vol. 2. Sage. <https://doi.org/10.4135/9781446219775>.
- Davies, M. 2011. “Concept Mapping, Mind Mapping and Argument Mapping: What Are the Differences and Do They Matter?” *Higher Education* 62: 279–301. <https://doi.org/10.1007/s10734-010-9387-6>.
- De Villiers, C., V. Naiker, and C. J. Van Staden. 2011. “The Effect of Board Characteristics on Firm Environmental Performance.” *Journal of Management* 37: 1636–1663. <https://doi.org/10.1177/0149206311411506>.
- Dezsö, C. L., and D. G. Ross. 2012. “Does Female Representation in top Management Improve Firm Performance? A Panel Data Investigation.” *Strategic Management Journal* 33: 1072–1089. <https://doi.org/10.1002/smj.1955>.
- Directive (EU) 2022/2381. 2022. “On Improving the Gender Balance Among Directors of Listed Companies and Related Measures” European Parliament.
- Disli, M., M. K. Yilmaz, and F. F. M. Mohamed. 2022. “Board Characteristics and Sustainability Performance: Empirical Evidence From Emerging Markets.” *Sustainability Accounting, Management and Policy Journal* 13: 929–952. <https://doi.org/10.1108/SAMPJ-09-2020-0313>.
- Eagly, A. H. 1987. *Sex Differences in Social Behavior: A Social-Role Interpretation*. Vol. 5. Lawrence Erlbaum Associates, Inc.
- Fama, E. F., and M. C. Jensen. 1983. “Separation of Ownership and Control.” *Journal of Law and Economics* 26: 301–325. <https://doi.org/10.2139/ssrn.94034>.
- Ferrary, M., and S. Déo. 2023. “Gender Diversity and Firm Performance: When Diversity at Middle Management and Staff Levels Matter.” *International Journal of Human Resource Management* 34: 2797–2831. <https://doi.org/10.1080/09585192.2022.2093121>.
- Flannery, M. J., and K. W. Hankins. 2013. “Estimating Dynamic Panel Models in Corporate Finance.” *Journal of Corporate Finance* 19: 1–19. <https://doi.org/10.1016/j.jcorpfin.2012.09.004>.
- Fu, T., J. Leng, M.-T. Lin, and J. W. Goodell. 2022. “External Investor Protection and Internal Corporate Governance: Substitutes or Complements for Motivating Foreign Portfolio Investment?” *Journal of International Financial Markets Institutions and Money* 81: 101686. <https://doi.org/10.1016/j.intfin.2022.101686>.
- Galbreath, J. 2010. “Drivers of Corporate Social Responsibility: The Role of Formal Strategic Planning and Firm Culture.” *British Journal of Management* 21: 511–525. <https://doi.org/10.1111/j.1467-8551.2009.00633.x>.
- Galbreath, J. 2011. “Are There Gender-Related Influences on Corporate Sustainability? A Study of Women on Boards of Directors.” *Journal of Management & Organization* 17: 17–38. <https://doi.org/10.5172/jmo.2011.17.1.17>.
- García-Sánchez, I. M., J. Martínez-Ferrero, and E. García-Meca. 2017. “Gender Diversity, Financial Expertise and Its Effects on Accounting Quality.” *Management Decision* 55: 347–382. <https://doi.org/10.1108/MD-02-2016-0090>.
- Glass, C., A. Cook, and A. R. Ingersoll. 2016. “Do Women Leaders Promote Sustainability? Analyzing the Effect of Corporate Governance Composition on Environmental Performance.” *Business Strategy and the Environment* 25: 495–511. <https://doi.org/10.1002/bse.1879>.
- Harjoto, M. A., I. Laksmana, and Y. w. Yang. 2018. “Board Nationality and Educational Background Diversity and Corporate Social Performance.” *Corporate Governance: The International Journal of Business in Society* 19: 217–239. <https://doi.org/10.1108/CG-04-2018-0138>.
- Hausman, J. A. 1978. “Specification Tests in Econometrics.” *Econometrica* 46: 1251. <https://doi.org/10.2307/1913827>.
- Heavey, C., and Z. Simsek. 2013. “Top Management Compositional Effects on Corporate Entrepreneurship: The Moderating Role of Perceived Technological Uncertainty.” *Journal of Product Innovation Management* 30: 837–855. <https://doi.org/10.1111/jpim.12033>.
- Hemingway, C. A., and P. W. MacLagan. 2004. “Managers’ Personal Values as Drivers of Corporate Social Responsibility.” *Journal of Business Ethics* 50: 33–44. <https://doi.org/10.1023/B:BUSI.0000020964.80208.c9>.
- Hilary, G., and K. W. Hui. 2009. “Does Religion Matter in Corporate Decision Making in America?” *Journal of Financial Economics* 93: 455–473. <https://doi.org/10.1016/j.jfineco.2008.10.001>.
- Hillman, A. J., and T. Dalziel. 2003. “Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives.” *Academy of Management Review* 28: 383–396. <https://doi.org/10.2307/30040728>.
- Hollindale, J., P. Kent, J. Routledge, and L. Chapple. 2019. “Women on Boards and Greenhouse Gas Emission Disclosures.” *Accounting and Finance* 59: 277–308. <https://doi.org/10.1111/acfi.12258>.
- Huse, M., S. T. Nielsen, and I. M. Hagen. 2009. “Women and Employee-Elected Board Members, and Their Contributions to Board Control Tasks.” *Journal of Business Ethics* 89: 581–597. <https://doi.org/10.1007/s10551-008-0018-4>.
- Hussain, N., U. Rigoni, and R. P. Oriji. 2018. “Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance.” *Journal of Business Ethics* 149: 411–432. <https://doi.org/10.1007/s10551-016-3099-5>.
- Husted, B. W., and J. M. d. Sousa-Filho. 2019. “Board Structure and Environmental, Social, and Governance Disclosure in Latin America.” *Journal of Business Research* 102: 220–227. <https://doi.org/10.1016/j.jbusres.2018.01.017>.

- Jensen, M. C. 1993. "The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems." *Journal of Finance* 48: 831–880. <https://doi.org/10.1111/j.1540-6261.1993.tb04022.x>.
- Jensen, M. C., and W. H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3: 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X).
- Judson, R. A., and A. L. Owen. 1999. "Estimating Dynamic Panel Data Models: A Guide for Macroeconomists." *Economics Letters* 65: 9–15. [https://doi.org/10.1016/S0165-1765\(99\)00130-5](https://doi.org/10.1016/S0165-1765(99)00130-5).
- Khan, W. A., and J. P. Vieito. 2013. "Ceo Gender and Firm Performance." *Journal of Economics and Business* 67: 55–66. <https://doi.org/10.1016/j.jeconbus.2013.01.003>.
- Khatri, I. 2023. "Board Gender Diversity and Sustainability Performance: Nordic Evidence." *Corporate Social Responsibility and Environmental Management* 30: 1495–1507. <https://doi.org/10.1002/csr.2432>.
- Konigsburg, D., and S. Thorne. 2022. "Women in the Boardroom a Global Perspective." Deloitte. <https://www.deloitte.com/global/en/services/risk-advisory/research/women-in-the-boardroom-seventh-edition.html>.
- Koutoupis, A. G., and T. Malisiovas. 2023. "The Effects of the Internal Control System on the Risk, Profitability, and Compliance of the U.S. Banking Sector: A Quantitative Approach." *International Journal of Finance and Economics* 28: 1638–1652. <https://doi.org/10.1002/ijfe.2498>.
- Krishnan, G. V., and L. M. Parsons. 2007. "Getting to the Bottom Line: An Exploration of Gender and Earnings Quality." *Journal of Business Ethics* 78: 65–76. <https://doi.org/10.1007/s10551-006-9314-z>.
- Kyaw, K., M. Olugbode, and B. Petracci. 2017. "Can Board Gender Diversity Promote Corporate Social Performance?" *Corporate Governance* 17: 789–802. <https://doi.org/10.1108/CG-09-2016-0183>.
- Law No. 103/2011. 2011. "LOI n° 2011-103 du 27 janvier 2011 Relative à la Représentation Équilibrée des Femmes et des hommes au sein des conseils d'administration et de surveillance et à l'égalité professionnelle." Parlement français.
- Law No. 120/2011. 2011. "Modifiche al testo unico delle disposizioni in materia di intermediazione finanziaria, di cui al decreto legislativo 24 febbraio 1998, n. 58, concernenti la parità di accesso agli organi di amministrazione e di controllo delle società" quotate in mercati regolamentati." Italian Parliament.
- Lenard, J., M., B. Yu, A. York E., and S. Wu. 2014. "Impact of Board Gender Diversity on Firm Risk." *Managerial Finance* 40: 787–803. <https://doi.org/10.1108/MF-06-2013-0164>.
- Levi, M., K. Li, and F. Zhang. 2014. "Director Gender and Mergers and Acquisitions." *Journal of Corporate Finance* 28: 185–200. <https://doi.org/10.1016/j.jcorpfin.2013.11.005>.
- Li, J., H. Ding, Y. Hu, and G. Wan. 2021. "Dealing With Dynamic Endogeneity in International Business Research." *Journal of International Business Studies* 52: 339–362. <https://doi.org/10.1057/s41267-020-00398-8>.
- Liu, C. 2018. "Are Women Greener? Corporate Gender Diversity and Environmental Violations." *Journal of Corporate Finance* 52: 118–142. <https://doi.org/10.1016/j.jcorpfin.2018.08.004>.
- Liu, Y., Z. Wei, and F. Xie. 2014. "Do Women Directors Improve Firm Performance in China?" *Journal of Corporate Finance* 28: 169–184. <https://doi.org/10.1016/j.jcorpfin.2013.11.016>.
- Loukil, N., O. Yousfi, and R. Yerbanga. 2019. "Does Gender Diversity on Boards Influence Stock Market Liquidity? Empirical Evidence From the French Market." *Corporate Governance: The International Journal of Business in Society* 19: 669–703. <https://doi.org/10.1108/CG-09-2018-0291>.
- Maji, S. G., and P. Lohia. 2022. "Environmental, Social and Governance (ESG) Performance and Firm Performance in India." *Society and Business Review* 18: 175–194. <https://doi.org/10.1108/SBR-06-2022-0162>.
- Manita, R., M. G. Bruna, R. Dang, and L. Houanti. 2018. "Board Gender Diversity and ESG Disclosure: Evidence From the USA." *Journal of Applied Accounting Research* 19: 206–224. <https://doi.org/10.1108/JAAR-01-2017-0024>.
- Mehmood, A., F. De Luca, and H. Quach. 2023. "Investigating how Board Gender Diversity Affects Environmental, Social and Governance Performance: Evidence From the Utilities Sector." *Utilities Policy* 83: 101588. <https://doi.org/10.1016/j.jup.2023.101588>.
- Naciti, V. 2019. "Corporate Governance and Board of Directors: The Effect of a Board Composition on Firm Sustainability Performance." *Journal of Cleaner Production* 237: 117727. <https://doi.org/10.1016/j.jclepro.2019.117727>.
- Nadeem, M., S. Bahadar, A. A. Gull, and U. Iqbal. 2020. "Are Women Eco-Friendly? Board Gender Diversity and Environmental Innovation." *Business Strategy and the Environment* 29: 3146–3161. <https://doi.org/10.1002/bse.2563>.
- Nadeem, M., T. Suleman, and A. Ahmed. 2019. "Women on Boards, Firm Risk and the Profitability nexus: Does Gender Diversity Moderate the Risk and Return Relationship?" *International Review of Economics and Finance* 64: 427–442. <https://doi.org/10.1016/j.iref.2019.08.007>.
- Naghavi, N., S. P. Sharif, and H. B. I. Hussain. 2021. "The Role of National Culture in the Impact of Board Gender Diversity on Firm Performance: Evidence From a Multi-Country Study." *Equality, Diversity and Inclusion: An International Journal* 40: 631–650.
- Oakley, J. G. 2000. "Gender-Based Barriers to Senior Management Positions: Understanding the Scarcity of Female CEOs." *Journal of Business Ethics* 27: 321–334. <https://doi.org/10.1023/A:1006226129868>.
- Ortas, E., I. Alvarez, J. Jaussaud, and A. Garayar. 2015. "The Impact of Institutional and Social Context on Corporate Environmental, Social and Governance Performance of Companies Committed to Voluntary Corporate Social Responsibility Initiatives." *Journal of Cleaner Production* 108: 673–684. <https://doi.org/10.1016/j.jclepro.2015.06.089>.
- Pfeffer, J., and G. R. Salancik. 1978. *The External Control of Organizations: A Resource Dependence Perspective*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.
- Provasi, R., and M. Harasheh. 2021. "Gender Diversity and Corporate Performance: Emphasis on Sustainability Performance." *Corporate Social Responsibility and Environmental Management* 28: 127–137. <https://doi.org/10.1002/csr.2037>.
- Pucheta-Martínez, M. C., I. Gallego-Alvarez, and I. Bel-Oms. 2021. "Corporate Social and Environmental Disclosure as a Sustainable Development Tool Provided by Board Sub-Committees: Do Women Directors Play a Relevant Moderating Role?" *Business Strategy and the Environment* 30: 3485–3501. <https://doi.org/10.1002/bse.2815>.
- Rao, K., and C. Tilt. 2016. "Board Composition and Corporate Social Responsibility: The Role of Diversity, Gender, Strategy and Decision Making." *Journal of Business Ethics* 138: 327–347. <https://doi.org/10.1007/s10551-015-2613-5>.
- Roodman, D. 2009. "How to Do Xtabond2: An Introduction to Difference and System GMM in Stata." *Stata Journal* 9: 86–136. <https://doi.org/10.1177/1536867X0900900106>.
- Safiullah, M., T. Akhter, P. Saona, and A. K. Azad. 2022. "Gender Diversity on Corporate Boards, Firm Performance, and Risk-Taking: New Evidence From Spain." *Journal of Behavioral and Experimental Finance* 35: 100721. <https://doi.org/10.1016/j.jbef.2022.100721>.
- Sarhan, A. A., and B. Al-Najjar. 2023. "The Influence of Corporate Governance and Shareholding Structure on Corporate Social Responsibility: The Key Role of Executive Compensation." *International Journal of Finance and Economics* 28: 4532–4556. <https://doi.org/10.1002/ijfe.2663>.

- Seierstad, C., and T. Opsahl. 2011. "For the Few Not the Many? The Effects of Affirmative Action on Presence, Prominence, and Social Capital of Women Directors in Norway." *Scandinavian Journal of Management* Part Special Topic Forum on "Architectural Competitions" 27: 44–54. <https://doi.org/10.1016/j.scaman.2010.10.002>.
- Singh, V., S. Terjesen, and S. Vinnicombe. 2008. "Newly Appointed Directors in the Boardroom: How Do Women and Men Differ." *European Management Journal* 26: 48–58. <https://doi.org/10.1016/j.emj.2007.10.002>.
- Smith, N., V. Smith, and M. Verner. 2006. "Do Women in Top Management Affect Firm Performance? A Panel Study of 2,500 Danish Firms." *International Journal of Productivity and Performance Management* 55: 569–593. <https://doi.org/10.1108/17410400610702160>.
- Talke, K., S. Salomo, and K. Rost. 2010. "How Top Management Team Diversity Affects Innovativeness and Performance via the Strategic Choice to Focus on Innovation Fields." *Research Policy* 39: 907–918. <https://doi.org/10.1016/j.respol.2010.04.001>.
- Tauringana, V., D. Radicic, A. Kirkpatrick, and R. Konadu. 2017. "Corporate Boards and Environmental Offence Conviction: Evidence From the United Kingdom." *Corporate Governance* 17: 341–362. <https://doi.org/10.1108/CG-05-2016-0105>.
- United Nations Organisation. 2015. "Transforming Our World: The 2030 Agenda for Sustainable Development." <https://documents.un.org/doc/undoc/gen/n15/291/89/pdf/n1529189.pdf?token=5LSBF1LGNq m0IiiOjq&fe=true>.
- Usman, M., J. Zhang, M. U. Farooq, M. A. M. Makki, and N. Dong. 2018. "Female Directors and CEO Power." *Economics Letters* 165: 44–47. <https://doi.org/10.1016/j.econlet.2018.01.030>.
- White, H. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica* 48: 817–838. <https://doi.org/10.2307/1912934>.
- Wintoki, M. B., J. S. Linck, and J. M. Netter. 2012. "Endogeneity and the Dynamics of Internal Corporate Governance." *Journal of Financial Economics* 105: 581–606. <https://doi.org/10.1016/j.jfineco.2012.03.005>.
- Yahya, H. 2023. "Female Leadership and ESG Performance of Firms: Nordic Evidence." *Corporate Governance* 25: 109–127. <https://doi.org/10.1108/CG-03-2023-0129>.
- Zhang, L. 2020. "An Institutional Approach to Gender Diversity and Firm Performance." *Organization Science* 31: 439–457.