

# Board characteristics and ESG performance. Evidence from the European utilities sector

Elisa Menicucci

*Department of Business Studies, Roma Tre University, Rome, Italy, and*

Guido Paolucci

*Department of Management, Polytechnic University of Marche, Ancona, Italy*

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## Abstract

**Purpose** – This paper aims to inspect the influence of board characteristics on environmental, social and governance (ESG) performance in the utilities sector. The study investigates the impact of a comprehensive set of board characteristics [i.e. board size, gender diversity, board independence, chief executive officer (CEO) duality and corporate social responsibility (CSR)/sustainability committee] on the ESG performance score.

**Design/methodology/approach** – The authors analyzed a sample of 119 listed utility companies for the period 2018–2024 and the authors developed an econometric model applying unbalanced panel data regression with firm fixed effects and controls per year. To test the research hypotheses, the authors measured ESG dimensions by using the ESG score provided by Eikon Refinitiv database.

**Findings** – Findings prove that board size, board independence and the presence of a specific CSR/sustainability committee positively impact on ESG performance. Also, the relationship between gender-balanced board of directors (BoDs) and ESG performance is positive and statistically significant, once a critical mass of women is reached on BoD. The study would inspire utility companies to define the internal governance mechanisms thoroughly, giving prime attention to an accurate choice of the BoDs' members.

**Research limitations/implications** – This study has implications for practitioners, policymakers and regulators in designing specific ESG mechanisms for utilities. From a managerial perspective, the study also provides insights on how to improve ESG performance through a comprehensive set of specific board characteristics.

**Originality/value** – This paper offers an in-depth examination of the CG practices of utility companies, and it attempts to bridge the gap in prior literature on the determinants of ESG issues in the European utilities industry. To the best of the authors' knowledge, this is the first study that investigates the relationship between the board diversity and the ESG dimensions measured by the Refinitiv Eikon score.

**Keywords** Board characteristics, ESG, Utility companies, European utilities sector

**Paper type** Research paper

## 1. Introduction

In recent years, stakeholders have paid increasing attention on environmental and social issues and to what companies incorporate a sustainable perspective into their business models and strategies. Investors give growing importance to environmental, social and governance (ESG) information to assess companies' risk profiles and to value investments



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accurately (Christensen *et al.*, 2021; Veltri *et al.*, 2023). Hence, ESG performance has become an institutionalized corporate priority to satisfy the investors' and other stakeholders' information needs in different sectors, although for a long-time sustainability issues have been regarded as a secondary objective compared to the priority of maximizing shareholders' returns. ESG issues are crucial for the competitive advantage of a company, and they are a crucial marker of management competence to generate value for all stakeholders in capital markets. In this regard, the board of directors (BoD) is the internal governance mechanism that plays a strategic role in embedding sustainability into the business strategy and in aligning the corporate financial objectives toward ESG goals. Especially directors are responsible for defining corporate strategic policies, improving social corporate responsibility and supervise the achievement of ESG performance. Hence, the composition and the characteristics of the BoD are key in setting strategic decision-making process concerning ESG dimensions and in keeping responsible behaviors toward social sustainability performance and social manageability execution (Michelon and Parbonetti, 2012; Post *et al.*, 2015; Cuadrado-Ballesteros *et al.*, 2017). In fact, a growing number of researchers discussed the importance of defining a proper composition of the BoD to ensure that the corporate governance (CG) system effectively copes with the ESG issues (Khan *et al.*, 2013; Cucari *et al.*, 2018; Hussain *et al.*, 2018; Arayssi *et al.*, 2020; Mohammadi *et al.*, 2021).

The specific purpose of the paper is to explore whether particular CG characteristics influence ESG performance. In doing so, this paper extends the academic literature on CG and offers a comprehensive snapshot of the explanatory factors of ESG performance in the utilities sector. ESG performance is crucial especially for utility companies since they should balance the creation of economic value for shareholders with the public value for the community. In this regard, ESG performance is becoming a crucial driver on which utility companies should focus to demonstrate an active environmental and social commitment toward sustainable development and to attest the compliance with the expectations of the public institutions and the social system (Nicolò *et al.*, 2022; Camilleri, 2022). To attain the research aims, we investigate 119 European listed utility firms, through a panel data regression analysis of the sample over a five-year period (2018–2022). More specifically, in line with the existing literature (Rao and Tilt, 2016a, b; Menicucci and Paolucci, 2022a, b), our study investigates the impact of a comprehensive set of board characteristics [i.e. board size, gender diversity, board independence, chief executive officer (CEO) duality and corporate social responsibility (CSR)/sustainability committee] on the ESG performance score. The main empirical results prove that board size, board independence and the presence of a CSR/sustainability committee positively influence ESG performance, while a negative significant relationship between CEO duality and ESG performance is found. The relationship between gender-balanced BoDs and ESG performance is positive and statistically significant, once a critical mass of women is reached on BoD. Hence, our findings highlight how board diversity can foster a sustainable managing of environmental and social issues through the processing, the sharing and the coordination of core competencies, knowledge and information between directors (Awan *et al.*, 2018). This study significantly attempts to bridge the research gap on the relationship between board characteristics and ESG performance in the European utilities sector. Although prior literature on sustainability is mature for environmentally sensitive sectors (Freedman and Stagliano, 2008; Shima and Fung, 2019; García-Meca and Martínez-Ferrero, 2021; Chouaibi *et al.*, 2021; Chouaibi *et al.*, 2022), ESG performance still represents an under-explored field in the context of utilities. In this regard, our study is the first one that investigates the effects of board diversity on ESG performance in the European utilities sector by applying the ESG

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score provided by Refinitiv Eikon database (Nicolò *et al.*, 2023; Mehmood *et al.*, 2023b). Moreover, this study supports the critical mass theory concerning a certain threshold of female board members and its effect on the ESG performance of utility firms.

The remaining part of the paper proceeds as follows. Section 2 presents the literature review and describes the research hypotheses. Section 3 illustrates the sample, the variables and the methodology applied in estimating the econometric model. Section 4 discusses the empirical results and finally, Section 5 provides the conclusions, limitations and implications of the study as well as the suggestions for future research.

## 2. Literature review

### 2.1 Literature review on environmental, social and governance performance

Prior academic literature examined the role of CG mechanisms in affecting ESG performance levels, by adopting a broad theoretical framework that combines different theories (Andrades *et al.*, 2024; Traxler and Greiling, 2019; Eng and Friku, 2022; Imperiale *et al.*, 2023). Similarly, this paper deepens the role of internal CG mechanisms in influencing utilities' ESG performance levels by adopting different complementary theoretical perspectives crossing from agency to legitimacy, critical mass and resource dependence theories (Hillman and Dalziel, 2003; Holder-Webb *et al.*, 2009). Corporate sustainable behaviors are currently a persistent research topic among scholars and particularly how the board structure influences sustainability reporting attracted the interest of prior literature (Bear *et al.*, 2010; Post *et al.*, 2011; Zhang *et al.*, 2013; Chan *et al.*, 2014; Shamil *et al.*, 2014; Shaukat *et al.*, 2016; Argento *et al.*, 2019; Erin *et al.*, 2022). Nevertheless, little is known about how board characteristics affect ESG performance (Birindelli *et al.*, 2018; Yadav and Prashar, 2022; Mehmood *et al.*, 2023a) because few studies examined this relationship in various developed and emerging markets (Disli *et al.*, 2022; Nicolò *et al.*, 2023; Menicucci and Paolucci, 2022b). Hence, this topic entails further inspection, especially in the utilities sector that is ESG sensitive.

In line with the idea of a sustainable CG, an appropriate composition of the BoD is essential to increase the social and environmental influence of corporate operations and their compliance with the stakeholders' legitimate ESG interests (Prado-Lorenzo and Garcia-Sanchez, 2010; Rao *et al.*, 2016; Velte, 2023). In this regard, utilities could prove an active commitment toward sustainable development to maintain the legitimacy of their operations (Valenza and Damiano, 2023; Veltri *et al.*, 2023) in line with the legitimacy theory. Starting from this theoretical position, the BoD's attributes play a pivotal role in shaping corporate strategies wherein ESG factors are integrated with operational and financial objectives. However, the utilities sector is still an under-investigated research field. Previous researches are mostly focused on the environmental dimension of ESG reporting (Post *et al.*, 2015; Kraft, 2018; Talbot and Boiral, 2018; Venturelli *et al.*, 2023; Ligorio *et al.*, 2022), while only a number of studies considered utilities' practices regarding to all ESG dimensions (Mio, 2010; Ortiz-de-Mandojana and Aragon-Correa, 2015; Slacik and Greiling, 2020; Paolone *et al.*, 2021; Eng and Friku, 2022; Imperiale *et al.*, 2023; Mehmood *et al.*, 2023b; Nicolò *et al.*, 2023; Valenza and Damiano, 2023). Grounded on the rationale of the theories mentioned above, this study analyses the influence of five CG attributes (board size, board gender diversity, board independence, board CSR/sustainability committee and CEO duality) on the ESG performance levels of a sample of utilities companies. We developed our hypotheses for each of these board characteristics in the following subsections.

### 2.2 Theoretical background and hypotheses development

**2.2.1 Board size.** The resource dependence theory states that board members influence corporate performance through their psychological characteristics, background, competencies

and experience (Kyaw *et al.*, 2017; Manita *et al.*, 2018). This point of view is also coherent with the legitimacy theory, according to which a greater number of directors may inspire higher ESG performance to assure the legitimacy of corporate business operations, mostly in utilities and other environmentally sensitive sectors (Nùm *et al.*, 2013; Traxler and Greiling, 2019; Imperiale *et al.*, 2023). On the subject, a large BoD is more able to fulfil legitimate stakeholders' and investors' claims because it incorporates a larger and varied range of skills, expertise and knowledge on specific issues. Regarding to the influence of board size on ESG performance, the agency theory states that more directors have a better chance of influencing managers in delivering disclosure on ESG issues to reduce information asymmetry and, in turn, agency costs. Nevertheless, agency theory also suggests that when the board size exceeds a certain threshold, decision-making process become more difficult, hindering unanimous decisions (Cerbioni and Parbonetti, 2007; Said *et al.*, 2009; Jizi, 2017; Hussain *et al.*, 2018). In this perspective, smaller boards are usually more effective in avoiding managers' opportunistic behaviors and promoting better reporting on ESG dimensions. Small boards feature high levels of teamwork, coordination and commitment but, on the other hand, they might be characterized by less variety in expertise, stakeholder representation and education level and low degree of gender diversity. Moreover, small boards come with high responsibilities and workloads for the directors, who might therefore perform their oversight role less effectively (Jizi *et al.*, 2014). So, according to Husted and de Sousa-Filho (2019), the concept that a large BoD offers different strategic viewpoints to management is more shareable than considering they might have difficulties in decision-making.

Our hypothesis shares the results of previous studies that identified a positive effect of board size on sustainability practices (Said *et al.*, 2009; Jizi *et al.*, 2014, 2017; Shamil *et al.*, 2014; Pucheta-Martínez and Gallego-Álvarez, 2019; Erin *et al.*, 2022) and on ESG disclosure (Husted and de Sousa-Filho, 2019). According to the rationale of prior theories, we hypothesized that board size is positively related to ESG performance. Hence, we postulate:

*H1.* There is a positive relationship between board size and ESG performance.

*2.2.2 Board gender diversity.* Personal and professional skills of board members are essential for good governance practices regardless of gender (Girardone *et al.*, 2021). However, it is claimed that female directors show greater sensitivity to sustainability initiatives (Birindelli *et al.*, 2018; Samara *et al.*, 2023) than men due to their psychological characteristics (i.e. helpfulness, sensitivity, etc.), educational background and professional experience (Kyaw *et al.*, 2017; Manita *et al.*, 2018; Burgess and Tharenou, 2002; Hollindale *et al.*, 2019). Accordingly, resource dependence theory can explain the relationship between gender diversity and ESG performance since the peculiar resources of female board members allow companies to engage more closely with stakeholders' concerns related to social and environmental themes (Nguyen *et al.*, 2015; Velte, 2016; Kyaw *et al.*, 2017). Furthermore, the legitimacy theory recognizes board gender diversity as a positive aspect promoting more ESG disclosure. In this context, female directors are more sensible toward socially responsible practices reflecting stakeholders' legitimate concerns (Hussain *et al.*, 2018; Arayssi *et al.*, 2020; Nicolò *et al.*, 2022). In this regard, to enhance gender balance in corporate bodies for a leadership that creates value in organizations and communities, in the past years EU governments have provided for soft or hard gender quotas in boards through specific regulatory developments to be designed at national level in the EU Member States.

Previous research examined the effect of board gender diversity on ESG performance in both industrial and financial firms as well as in developing and developed countries. The evidence is mixed on this relationship. Some studies have shown the presence of a positive effect of female directors (Setó-Pamies, 2015; Hollindale *et al.*, 2019; Arayssi *et al.*, 2020;

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Romano *et al.*, 2020; Shakil *et al.*, 2020; Wasiuzzaman and Wan Mohammad, 2020; Wang *et al.*, 2021; Disli *et al.*, 2022; Pareek *et al.*, 2023) while others stated a negative impact (Cucari *et al.*, 2018; Husted and de Sousa-Filho, 2019; Dang *et al.*, 2021) or revealed insignificant evidence (Manita *et al.*, 2018). In recent times, scholars have above all analyzed sustainability issues in utility firms, mainly considering the environmental and social effects of the business (Arena *et al.*, 2019; Shima and Fung, 2019; García-Meca and Martínez-Ferrero, 2021; Eng and Frikou, 2022; Imperiale *et al.*, 2023). Nevertheless, little prior evidence exists on the relationship between board gender diversity and ESG performance in the utilities sector (Mehmood *et al.*, 2023b; Nicolò *et al.*, 2023). Grounded on the greater disclosure of ESG data by utility firms than other companies operating in less environmentally sensitive sectors and on the critical role of female directors in strategic decision-making process, we postulate that board gender diversity has a relevant positive effect on the ESG performance of the European utility companies. Even considering that prior literature on gender diversity and ESG performance in the utilities sector is limited, we formulate the following research hypothesis:

*H2a.* There is a positive relationship between women on board and ESG performance.

We also considered the relationship between board gender diversity and ESG performance through the critical mass theory (Karter, 1977). As stated by this theory, when the dimensions of a minority group reach a certain threshold (at least three), the interactions and the activities among the members of a group increase (Konrad *et al.*, 2008; Torchia *et al.*, 2011) and the subgroup can have a greater influence. Therefore, starting from this assumption, the presence of a greater number of women on the BoD can influence a firms' sensitivity toward social and environmental themes but the impact is positive only if a significant threshold (a critical mass) is reached. About this, some previous research results showed that a critical mass of female directors leads to better CSR and environmental performance (Glass *et al.*, 2016; Cabeza-García *et al.*, 2017; Yarram and Adapa, 2021) while other studies found a negative relationship between these variables (Deschênes *et al.*, 2015) or no significant associations (Alazzani *et al.*, 2017). Consistent with the critical mass theory, most studies indicated the presence of a significant positive relationship between a certain threshold (three) of female directors and ESG performance specifically (Yadav and Prashar, 2022; Manita *et al.*, 2018; Cambrea *et al.*, 2023).

An in-depth investigation on the existing literature revealed a gap in previous studies because few of them contain an empirical investigation on the relationship between the presence of women on BoD or in top management positions and ESG performance using the theoretical framework of the critical mass theory in Europe (Karter, 1977; Saggari *et al.*, 2021; Menicucci and Paolucci, 2022a, b; Pareek *et al.*, 2023). Furthermore, there is very limited prior investigation on this relationship in the utilities sector (Mehmood *et al.*, 2023a; Nicolò *et al.*, 2023) and no previous evidence on this topic in the European utilities industry. Grounded on the critical mass theory, we assumed that board gender diversity positively influences utility companies' ESG performance only when a certain threshold (a critical mass of at least three) female directors is reached. Thus, we postulate the following hypothesis:

*H2b.* There is a positive relationship between a critical mass of women on the board of directors and ESG performance.

**2.2.3 Board independence.** The variable most frequently used by scholars to illustrate the structure of the BoD is board independence since it is a fundamental characteristic for corporate strategic policies to remain oriented toward stakeholders' expectations and

interests (Ortas *et al.*, 2017; Cucari *et al.*, 2018). In accordance with the stakeholder theory, the presence of independent directors on boards pushes management to defend stakeholders and to reduce the conflicts of interests between them (Patelli and Prencipe, 2007). In line with the agency theory, directors with nonofficial roles in the firm and no relationships with owners or management facilitate effective oversight on board practices. Specifically, agency theory states that independent directors reduce agency conflicts and mitigate information asymmetry because they are more efficient and unbiased in controlling managers' self-interested behaviors (Elshandidy and Neri, 2015). Additionally, consistent with the legitimacy theory, independent directors are expected to contribute to corporate sustainable development in alignment with stakeholders' expectations. Several studies (Jo and Harjoto, 2011; Jizi *et al.*, 2014) showed that having more independent directors serves as a legitimacy tool that encourages a full commitment for a broader CSR (Haniffa and Cooke, 2005; Prado-Lorenzo and Garcia-Sanchez, 2010; Michelin and Parbonetti, 2012). In this context, independent directors are more likely to undertake sustainable initiatives, addressing the asymmetric information problem through increased ESG disclosure (Chau and Gray, 2010).

In prior literature, several researches investigating the influence of board independence on CSR disclosure confirmed a positive relation between board independence and CSR reporting (Khan *et al.*, 2013; Jizi *et al.*, 2014; Ortiz-de-Mandojana and Aragon-Correa, 2015; Garas and ElMassah, 2018; Jizi, 2017), while other studies found that the presence of nonexecutive and independent directors on boards negatively impacts social and environmental disclosure (Haniffa and Cooke, 2005; Mallin *et al.*, 2013). As most of the previous literature demonstrated a positive impact of independent directors on ESG performance (Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020), we assume:

H3. There is a positive relationship between board independence and ESG performance.

*2.2.4 Corporate social responsibility/sustainability committee.* In recent years, companies have progressively shown their commitment to sustainability by establishing a CSR/sustainability committee within their BoD. The presence of such a committee signifies its members' dedication to integrating sustainability into strategic operations and reflects directors' interest in enhancing the implementation of socially and environmentally responsible initiatives. The CSR/sustainability committee acts as a key driver in ensuring the quality and the accuracy of the ESG strategic process (Gerwing *et al.*, 2022) systematically supporting the BoD in executing sustainable projects, in managing CSR activities and in monitoring sustainability risks (Mahmood *et al.*, 2018). From a legitimacy perspective, a CSR/sustainability committee also plays a critical role in overseeing the legitimacy of the corporate operations and ensuring compliance with expectations and demands of the different stakeholders, particularly within the utilities sector.

In light of these considerations, setting up a CSR/sustainability committee is an appropriate strategy for companies aiming to increase ESG performance. Correspondingly, many authors found a positive relationship between the presence of such a committee and the extent of sustainability disclosure (Michelin and Parbonetti, 2012; Amran *et al.*, 2014; Liao *et al.*, 2015; Helfaya and Moussa, 2017; Pucheta-Martínez and Gallego-Álvarez, 2019; Gerwing *et al.*, 2022). For instance, Amran *et al.* (2014) demonstrated that a CSR/sustainability committee enhances the quality of sustainability reporting and promotes shareholders' involvement in the company's ethical culture. Additionally, Cucari *et al.* (2018) indicated that the presence of a CSR committee rises the ESG disclosure score provided by the Bloomberg database. Finally, Spitzbeck (2009) showed that a CSR committee fosters the achieving of high amounts of CSR activities, thus resulting in higher performance. Conversely, a limited number of studies identified a negative relationship between the

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attendance of a CSR/sustainability committee and CSR performance (Rupley *et al.*, 2012). Based on the literature review, we postulate the following hypothesis:

H4. There is a positive relationship between the establishment of a CSR/sustainability committee and ESG performance.

**2.2.5 Chief executive officer duality.** From an agency theory perspective, CEO duality consolidates executive and control powers, as the same person holds both the CEO and chairman roles (Jain and Jamali, 2016; Husted and de Sousa-Filho, 2019). This concentration diminishes board's independence and compromises its efficacy in monitoring executives' behaviors, resulting in a corporate governance system that hinders the decisions. Consequently, the CEO/chair tend to prioritize its self-utility, favoring short-term profit-maximization investments over sustainability long-term initiatives. The legitimacy theory supports these assertions suggesting that the CEO/chair is less inclined to endorse decisions in conflict with his/her interests even if they satisfy the stakeholders' legitimate expectations (Arayssi *et al.*, 2020). Therefore, utilities may benefit from separating the role of board's chairman and CEO to preserve a higher degree of legitimacy for the environmentally sensitive corporate strategies and to improve ESG performance.

Regarding the dual leadership structure and its capacity to oversee managers and to attend diverse stakeholders' legitimate claims through the achievement of high ESG performance, empirical evidence remains inconclusive. Some studies indicated that CEO duality has a negative impact on sustainability disclosure (Shamil *et al.*, 2014) and ESG disclosure (Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020), whereas others found a positive effect on CSR disclosure (Jizi *et al.*, 2014; Pucheta-Martínez and Gallego-Álvarez, 2019). We propose that CEO duality has a negative impact on ESG performance consistent with the theoretical rationale of agency and legitimacy theories. Thus, we postulate:

H5. There is a negative relationship between CEO duality and ESG performance.

We summarize the existing literature on the correlation between board diversity and ESG performance in Table 1. In addition, to get some perspectives on the hypotheses underlying our analysis, refer to the theoretical framework depicted in Table 2.

### 3. Data and methodology

#### 3.1 Sample and data sources

This paper investigates in depth the correlation between board diversity and ESG performance in the European utilities sector. To provide deeper insights, we conducted an analysis of publicly available information on the CG structures of the listed utility firms headquartered in Europe from 2018 to 2022. The utilities industry serves as a pertinent research context for ESG initiatives as it comprises firms largely engaged in providing essential public services and infrastructure such as electricity generation and distribution, natural gas supply, water management and waste collection and treatment for both residential and corporate entities. As providers of crucial public services such as energy, water supply and waste collection systems, utility companies play a pivotal role in developing a modern and sustainable society addressing a wide range of stakeholders' needs (Giacomini *et al.*, 2020). In recent years, the European utilities industry has experienced substantial transformations due to the ongoing market liberalization and deregulation. These changes have led to a significant reduction in entry and exit barriers, resulting in a notable increase in the number of companies operating within this sector (Bresnihan, 2016; Kraft, 2018; Traxler and Greiling, 2019). The free market fashioned through liberalization allows smaller companies to operate in the industry, thus creating an

**Table 1.** Explanation of variables

Variable	Description measure	References
<i>Dependent variable</i>		
ESG variable (source: Refinitiv)	Comprehensive scoring of the environment, social and governance performance by the weighted average of the ESG scores and ESG controversies (captured from global media sources) (see Table 1)	Laksmana (2008); Said <i>et al.</i> (2009); Michelon and Parbonetti (2012); Amran <i>et al.</i> (2014); Arayssi <i>et al.</i> (2020); Jizi <i>et al.</i> (2014, 2017); Wasuazzaman and Wan Mohammad (2020); Imperiale <i>et al.</i> (2023); Mehmood <i>et al.</i> (2023a, b)
<i>Independent variables</i>		
Board size (B_size)	Total number of directors on the bank's board at the end of the fiscal year	Laksmana (2008); Said <i>et al.</i> (2009); Michelon and Parbonetti (2012); Amran <i>et al.</i> (2014); Arayssi <i>et al.</i> (2020); Jizi <i>et al.</i> (2014, 2017); Wasuazzaman and Wan Mohammad (2020); Imperiale <i>et al.</i> (2023); Mehmood <i>et al.</i> (2023a, b)
Board gender diversity (B_gend)	Percentage of female directors on the board (number of female directors divided by total number of board members)	Barako and Brown (2008); Adams and Ferreira (2009); Amran <i>et al.</i> (2014); Galbreath (2016); Rao and Tilt (2016a, b); Cucari <i>et al.</i> (2018); Husted and de Sousa-Filho (2019); Arayssi <i>et al.</i> (2020); Cordairo <i>et al.</i> (2020); Imperiale <i>et al.</i> (2023); Gerwing <i>et al.</i> (2022); Mehmood <i>et al.</i> (2023a, b) Post <i>et al.</i> (2011); Fernandez-Feijoo <i>et al.</i> (2012, 2014), Liu (2018), Ben-Amar <i>et al.</i> (2017)
Board mass of gender diversity (B_mgend)	Dummy variable that takes value 1 if the board has at least three women, 0 otherwise	Chau and Gray (2010); Michelon and Parbonetti (2012); Jizi <i>et al.</i> (2014); Rao and Tilt (2016a, b); Husted and de Sousa-Filho (2019); Arayssi <i>et al.</i> (2020); Wasuazzaman and Wan Mohammad (2020); Imperiale <i>et al.</i> (2023); Mehmood <i>et al.</i> (2023a), (2023b); Nicolò <i>et al.</i> (2023)
Board independence (B_ind)	Percentage of independent or outside directors on the board	Rao and Tilt (2016a, b); Liao <i>et al.</i> (2015); Hussain <i>et al.</i> (2018); Husted and de Sousa-Filho (2019); Arayssi <i>et al.</i> (2020); Gerwing <i>et al.</i> (2022); Wasuazzaman and Wan Mohammad (2020); Imperiale <i>et al.</i> (2023); Mehmood <i>et al.</i> (2023a, b)
CSR/sustainability committee (CSR_com)	Dummy variable equal to 1 if the bank has a CSR committee or a sustainability committee, 0 otherwise	Michelon and Parbonetti (2012); Jizi <i>et al.</i> (2014); Loukil <i>et al.</i> , 2019; Zaid <i>et al.</i> , 2020; Arayssi <i>et al.</i> (2020); Imperiale <i>et al.</i> (2023); Mehmood <i>et al.</i> (2023a, b); Nicolò <i>et al.</i> (2023)
CEO duality (CEO_dual)	Dummy variable that equals to 1 if the CEO is chairman of the board and zero otherwise	Setó-Panmies (2015); Helfaya and Moussa (2017) Arayssi <i>et al.</i> (2020); Wasuazzaman and Wan Mohammad (2020); Mehmood <i>et al.</i> (2023a, b); Nicolò
Size (SIZE)*	Natural logarithm of total assets of the firm (euro)	Mohammad (2020); Mehmood <i>et al.</i> (2023a, b); Nicolò <i>et al.</i> (2023)
Return on equity (ROE)	Net income divided by the value of total shareholders' equity	Setó-Panmies (2015); Helfaya and Moussa (2017) Arayssi <i>et al.</i> (2020) Mehmood <i>et al.</i> (2023a, b)
Leverage (LEV)	Total debt divided by total assets	Helfaya and Moussa (2017); Wasuazzaman and Wan Mohammad (2020); Mehmood <i>et al.</i> (2023a, b); Nicolò <i>et al.</i> (2023)
GDP per capita (GDP)*	Gross domestic product (GDP) per capita	Fernandez-Feijoo <i>et al.</i> (2014); Hu and Scholtens (2014)

**Note(s):** \*Natural logarithmic transformations of the numerical (nonindex) variables

**Source(s):** Authors' own creation

**Table 2.** Theoretical framework and evidences of the study

Dependent variable	Independent variables	Hypotheses	Theories	Expected evidence	Empirical evidence
ESG	Board diversity	H1	Agency theory (-) resource dependence theory (+) legitimacy theory (+)	+	+
	Board size	H2	Resource dependence theory (+) legitimacy theory (+)	+	No evidence
	Board gender diversity	H2a	legitimacy theory (+)	+	+
	Critical mass of women on BoD	H2b	Critical mass theory (+)	+	+
	Board independence	H3	Legitimacy theory (+)	+	+
CSR/sustainability committee	H4	Legitimacy theory (+)	+	+	
CEO duality	H5	Agency theory (-) legitimacy theory (-)	Agency theory (-) legitimacy theory (-)	-	-

**Source(s):** Authors' own creation

opportunity for a larger number of firms to compete. The European utilities sector is a relevant subject to debate since it has become a competitive, customer-centred, flexible and nondiscriminatory industry in the past few years. The sampling process begins with the selection of listed utility firms in European countries using data available from the Orbis Bureau Van Dijk database. Hence, data on ESG performance and CG attributes were gathered from the Refinitiv Eikon hosted by Thomson Reuters database since these data have commonly been applied in prior studies (Arayssi *et al.*, 2020; Nicolò *et al.*, 2022). As a result of the selection process, an initial sample of 126 listed utility firms was identified, totaling 630 firm-year observations. These companies were chosen based on the business classification provided by Refinitiv Eikon. Specifically, we considered utility companies from five industries: natural gas utilities, electric utilities, water and related utilities, independent power producers and multiline utilities.

According to the selection procedure, our initial data set of utility companies had to meet the following criteria:

- be active during the period 2018–2022;
- have not been turned off or merged with other industrial or utility companies during the research period; and
- have complete and relevant data for all the five consecutive years of the research period.

From the entire population of the European listed utility firms, we excluded any companies that did not fulfill the prerequisites specified above. Notably, seven utilities were excluded due to incomplete information (e.g. missing ESG variables and CG data). Thus, the final sample consists of 119 utility companies, all active and located in 22 European countries, resulting in 595 firm-year observations from 2018 to 2022. This period was chosen due to data availability: although Refinitiv Eikon provides data over an extended time range, we opted for the 2018–2022 period because few utility companies had sufficient available ESG information in the earlier years.

### 3.2 *Dependent variables*

The research uses ESG score by Refinitiv Eikon data to measure ESG performance as dependent variable. This database features a robust and transparent procedure for ESG data accessible on its official website and it is often used by scholars in research related to industrial sectors. Following previous studies (Arayssi *et al.*, 2020; Qureshi *et al.*, 2020; Luo and Tang, 2022; Menicucci and Paolucci, 2022a, b; Veltri *et al.*, 2023), we use the ESG score by Refinitiv Eikon as an indicator for the ESG performance of European utility firms. The dependent variable (ESG\_perf) represents the bank's weighted average of ESG scores and ESG controversies (gathered from global media sources) to offer a comprehensive assessment of the sustainable and societal impact of corporate actions in this context. The overall ESG score is presented as a percentage ranging from 0% to 100%. ESG\_perf is evaluated using three ESG pillars [the environmental pillar (ENV), the social pillar (SOC) and the governance pillar (GOV)]. Each pillar is the weighted average of ten interrelated dimensions, and each ESG dimension consist of individual elements. The Refinitiv database provides a computed score for each ESG dimension. Table 3 below exhibits the ESG data used in this study.

Refinitiv comprises 34 indicators related to the environmental pillar score (ENV), grouped into three dimensions: resource use efficiency (ENV\_Ru), emission and waste reduction (ENV\_Em) and environmental innovation (ENV\_In). The Refinitiv Eikon data set

**Table 3.** Definition of ESG variables

Variable	Description measure	ESG performance, ESG pillars and ESG dimensions (source: Refinitiv) ESG predictor
ESG performance (ESG_perf)	Weighted average of the ESG scores and ESG controversies (captured from global media sources)	It is a combined indicator of ESG pillars [i.e. the environmental pillar (ENV), the social pillar (SOC), the governance pillar (GOV)], discounted for ESG controversies
<i>ESG pillar</i> Environmental (ENV)	<i>Description measure</i> Environmental performance measures a company's capacity to reduce environmental emissions, to efficiently use natural resources in the production processes and to support the research and development of eco-efficient products and services	<i>ESG dimensions</i> It is based on three dimensions: ENV_Ru (resource use efficiency), ENV_Em (emission and waste reduction), ENV_In (environmental innovation) ENV_Ru = efficiency in reducing the use of materials, energy or water and capacity to find more eco-efficient solutions for the business processes ENV_Em = commitment and effectiveness in reducing environmental emissions and waste in operational activities ENV_In = capacity to reduce the environmental burdens and costs for its clients and to create new opportunities for eco-designed products and services
Social (SOC)	Social performance measures a company's capacity to generate trust and loyalty in its workforce, to respect the fundamental conventions of human rights, to be a good citizen, to protect public health, to respect business ethics and to create value-added products and services	It is based on four dimensions: SOC_Wf (workforce), SOC_Hr (human rights), SOC_com (community), SOC_prd (product responsibility) SOC_Wf = effectiveness toward job satisfaction, safe and healthy workplace, while developing both equal and diversity opportunity SOC_Hr = effectiveness in respecting fundamental human rights conventions SOC_com = commitment to being a good citizen, respecting business ethics and protecting public health
Governance (GOV)	Corporate governance performance measures a company's capacity to act in the best interest of its shareholders through management systems and processes (structure and functions of the board of directors, compensation policy, etc.)	SOC_prd = capacity to offer high quality products and services, regarding the customers' health and safety, data privacy and integrity It combines three dimensions: GOV_Mo (management and oversight), GOV_shr (shareholders rights), GOV_csr (CSR strategy) GOV_Mo = commitment and effectiveness in following corporate governance principles GOV_shr = effectiveness in treating its shareholders in an equal manner GOV_csr = way to incorporate social and environmental dimensions in its decision-making processes

**Source(s):** Authors' own creation

includes 40 indicators pertaining to the social pillar score (SOC), organized into four dimensions: workforce (Soc\_Wf), human rights (Soc\_Hr), community (Soc\_Com) and product responsibility (Soc\_Prđ). The governance pillar (GOV) includes three dimensions: management and oversight (Gov\_Mo), stakeholder rights (Gov\_Shr) and CSR strategy (Gov\_Csr).

### 3.3 Independent variables

We used five independent variables to assess data related to board diversity. Consistent with previous research and theories on this topic, the independent variables incorporated into the econometric model are the total number of directors on the board (B\_size), the percentage of female directors on the board (B\_gend), the critical mass of female directors on the board (B\_mgend), the proportion of independent board members (B\_ind), the presence of a CSR/sustainability committee (CSR\_com) and the CEO duality (CEO\_dual).

### 3.4 Control variables

To prevent model misspecification, we monitored additional variables that could influence ESG scores. Three control variables are integrated into the regression model due to their significant impact on CSR and ESG disclosure as evidenced in prior studies (Husted and de Sousa-Filho, 2019; Albitar *et al.*, 2020; Arayssi *et al.*, 2020; Mehmood *et al.*, 2023b; Nicolò *et al.*, 2023). We included the following well-studied firm-specific control variables to mitigate potential biased results: size (SIZE), return on equity (ROE) and leverage (LEV) (Arayssi *et al.*, 2016; Disli *et al.*, 2022; Yadav and Prashar, 2022). Additionally, we incorporated one country-specific control variable: GDP growth (GDP) serving as a representative of macroeconomic dynamics. Using a macroeconomic specification as a control variable addresses endogeneity issues commonly encountered in research on economics-based sustainable report such as simultaneity, reverse causality and correlated variables (Nikolaev and Van Lent, 2005; Larcker and Rusticus, 2010; Contractor *et al.*, 2016). Description and references for all the used variables is provided in Table 1.

### 3.5 Model specifications

To test the research hypotheses, we used a linear regression model using the ordinary least squares (OLS) method due to its effectiveness in minimizing bias and variance (Greene, 2004). The OLS technique is normally applied to estimate the parameters of the linear regression models. OLS provides a systematic approach to identify a line that best represents the relationship between the independent variables and the dependent variable by minimizing the sum of the squared residuals. The robust standard errors are used to control heteroskedasticity and residuals including within-firm correlation. We applied regression using panel data to mitigate omitted variable bias when there is no information on variables that are related to both the regressors of interest and the dependent variable over a long period. Panel data modeling techniques decrease the collinearity among independent variables and increase the control of unobserved heterogeneity.

We first explored the relationships among the model variables within the same year of observation. The model is estimated as follows:

$$ESG\_perf_{i,t} = \alpha_0 + \beta B\_div\ variables_{i,t} + \gamma Control\ variables_{i,t} + \varepsilon_{i,t} \quad (1)$$

where *i* refers to a firm; *t* refers to the year and  $\varepsilon_{i,t}$  is a stochastic error term. B\_div is defined as the afore mentioned alternative board variables: Board size (B\_size), Board gender diversity (B\_gend), Board critical mass of gender diversity (B\_mgend), Board independence

(B\_ind), CSR/sustainability committee (CSR\_com) and CEO duality (CEO\_dual). To assess the impact of board diversity proxies on ESG performance, we also controlled for some variables that could potentially influence ESG performance (control variables<sub>*i,t*</sub>) according to previous literature. All variables are detailed in [Table 1](#).

To capture the impact of board diversity on ESG performance over time, as effects appear, and to mitigate potential endogeneity issues, we related B\_div variables from each year to the ESG measure of the subsequent two years. We used one- and two-year lags because the influence of the independent variables on ESG performance score can take time to be effectually integrated into a firm's ESG performance. Therefore, the explanatory variables are lagged by one and two years.

The models are presented as follows:

$$ESG\_perf_{i,t+1} = \alpha_0 + \beta B\_div\ variables_{i,t} + \gamma Control\ variables_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$ESG\_perf_{i,t+2} = \alpha_0 + \beta B\_div\ variables_{i,t} + \gamma Control\ variables_{i,t} + \varepsilon_{i,t} \quad (3)$$

Following [Baltagi \(2001\)](#), we used panel data which delivers more variability and less collinearity among the variables. We controlled for individual heterogeneity using a fixed effects estimation with standard errors clustered at the bank level. The choice of a fixed effects model over a random effects model was validated using the Hausman test on all specifications. Additionally, we conducted the Breusch-Pagan test to detect residual heteroscedasticity. Firm-level heterogeneity was mitigated through the use of cross-sectional mean deviation data. Due to the dynamic nature of our model, least squares estimation methods would have led to biased and inconsistent results. Therefore, we applied dynamic panel estimation techniques to mitigate potential biases in our estimates. To address endogeneity concerns, we identify exogenous variations arising from mandatory executive retirements impacting board characteristics. This is done by using difference-in-difference estimation techniques as in [Berger et al. \(2014\)](#).

#### 4. Empirical results and discussion

This section investigates the impact of B\_div variables on ESG performance. First, we examine descriptive statistics and correlations. Then, we analyze the main estimation findings, and finally, we present the robustness checks to validate our findings.

##### 4.1 Descriptive statistics

The descriptive statistics of the main variables for the entire sample are presented in [Table 4](#), below.

The average level of ESG\_perf for utility firms is 61.3263 with a maximum equal to 91.4387, indicating a very satisfactory ESG performance of the analyzed utilities based on the score definition. European utilities companies maintain a good ESG performance, although they also face significant ESG controversies, as evidenced by an average ESG controversy score of 43.75%. The B\_ind shows an adequate average value of 0.6276, with a maximum value of 1. However, the average representation of women on boards (B\_gend) still appears low, with some boards having no female directors (minimal value of 0) and an average of 21% of board members being female. For comparison, the average representation of women on Italian bank boards is 32.4%. Additionally, specific control variables are detailed in [Table 4](#). The mean values for size (Size), leverage (Lev) and return on equity (Roe) are 7.8267, 0.0672 and 0.0372, respectively.

**Table 4.** Descriptive statistics of the variables. Panel data for the period 2018–2022

Variable	Min.	Max.	Mean	Median	SD
<i>Dependent variables</i>					
ESG performance (ESG_perf)	20.1625	91.4387	61.3263	61.8532	13.6438
<i>Independent variables</i>					
Board size (B_size)	23	7	12.4604	12.2344	4.7765
Board gender diversity (B_gend)	0	0.3367	0.2145	0.1018	0.3867
Board mass of gender diversity (B_mgend)	0	1	0.3054	0.3782	0.3248
Board independence (B_ind)	0	1	0.6276	0.6255	0.2854
CSR/sustainability committee (CSR_com)	0	1	0.5750	0.5899	0.4984
CEO duality (CEO_dual)	0	1	0.7054	0.6952	0.3043
<i>Control variables</i>					
Bank size (size)	6.7732	9.4510	7.8267	7.8039	0.6567
Leverage (lev)	0.0137	0.2382	0.0672	0.0885	0.0483
Return on equity (roe)	-2.9777	0.7196	0.0372	0.0770	0.2025
GDP per capita (gdp)	-11.5154	9.4376	0.0729	0.1687	3.6432

**Source(s):** Authors' own creation

We calculated the Pearson correlations to assess multicollinearity among continuous variables (Hair *et al.*, 2006). Table 5, below, presents the correlation coefficients between the variables included in the regression model.

The correlation matrix (Table 5) highlights significant relationships among the main variables of the study. ESG\_perf shows positive correlation with B\_size, B\_ind and CSR\_com. More specifically, the strongest correlation is observed between ESG\_perf and B\_size, whereas the correlation between CSR\_com and ESG\_perf is the weakest. Additionally, B\_gend is positively related to ESG\_perf (significance at 0.05). These findings suggest that the utility firms emphasizing ESG issues tend to hire more female directors in their BoDs and often they establish a dedicated sustainability committee. Notably, the B\_gend variable also shows positive correlations with both SIZE and ROE, indicating that utility firms with more female than male directors on their boards are larger and more profitable compared to those with gender-balanced BoDs.

The matrix (Table 5) reveals that the correlations between the variables are not strong. The variance inflation factors (VIF-test) value indicates that multicollinearity is not a significant issue as it is well below the critical threshold (Gujarati *et al.*, 2020). The correlation coefficients of variables are lower than 0.90, indicating insignificant multicollinearity (Hair *et al.*, 2006). These results suggest that the model is reliable and very satisfactory, as there is not a high correlation between each of the variables, even at its maximum degree.

#### 4.2 Regression findings

We conducted estimations using five board variables to examine their effects on the ESG performance of a sample of European utilities. Table 6 presents the estimation results of equations (1)–(3).

Our findings indicate that B\_div influences ESG data across all models (no lag, one-year lag and two-year lag). Specifically, there is a positive relationship between B\_size and ESG score, which supports *H1* and aligns with previous literature (Said *et al.*, 2009; Jizi *et al.*, 2014; Shamil *et al.*, 2014; Husted and de Sousa-Filho, 2019). In Models 2 and 3 empirical results are significant at 0.05 and consistent with the correlation data. The econometric

**Table 5.** Pearson correlations

Variables	ESG_perf	B_size	B_gend	B_mgend	B_ind	CSR_com	CEO_dual	Size	Lev	Roe	Gdp	VIF
ESG_perf	1.0000	0.7574**	0.5782***	0.4744***	0.6856**	0.0886***	0.6799	0.7680***	-0.2345***	0.0774	0.2139	1.25
B_size		1.0000	-0.1499	0.3135***	0.0132	-0.3717***	0.1813***	0.2721***	-0.2325***	0.0055	-0.4285***	1.13
B_gend			1.0000	0.7452***	-0.1156***	0.1216**	0.3463***	0.4840***	-0.1725***	0.1413**	0.1415**	1.67
B_mgend				1.0000	-0.2173**	0.0236	0.3177***	0.3999***	-0.1922***	0.0877	-0.0767	1.36
B_ind					1.0000	0.1218	0.0188	0.1105	0.3655***	0.1325**	0.4556***	1.37
CSR_com						1.0000	0.0355	0.4450***	-0.3331***	-0.0778	-0.1647***	2.52
CEO_dual							1.0000	0.1197***	0.2123***	-0.2243**	-0.0068	1.16
Size								1.0000	-0.2676***	0.0272	-0.0775	2.45
Lev									1.0000	0.1953***	0.1764***	1.10
Roe										1.0000	0.1843	2.30
Gdp											1.0000	1.70

**Note(s):** \*, \*\* and \*\*\*denotes level of significance at the 0.10, 0.05 and 0.01 levels, respectively

**Source(s):** Authors' own creation

**Table 6.** Panel regression results for predictors with robust standard errors

Variable	Model 1 ESG_perf Coeff. (p-value) No lag	Model 2 ESG_perf Coeff. (p-value) One-year lag	Model 3 ESG_perf Coeff. (p-value) Two-years lag
B_size	0.0769 (0.0354)	0.0583** (0.0355)	0.0672** (0.0371)
B_gend	0.1765 (0.0872)	0.2880 (0.1402)	0.4466 (0.1832)
B_mgend	0.2198* (0.1675)	0.3159** (0.1626)	0.6945** (0.3638)
B_ind	0.0554* (0.0306)	0.0593** (0.0299)	0.0625** (0.0307)
CSR_com	0.0339* (0.0234)	0.0386* (0.0223)	0.0368* (0.0237)
CEO_dual	-0.0125(0.0166)*	-0.0137 (0.0154)	-0.0125 (0.0162)
Size	0.0173*** (0.0056)	0.0147*** (0.0066)	0.0167*** (0.0046)
Lev	-0.3905 (0.7493)	-0.4077* (0.7534)	-0.3342* (0.7426)
Roe	0.0146** (0.0067)	0.0148** (0.0059)	0.0157** (0.0053)
Gdp	0.0155 (0.1613)	0.0011 (0.1383)	0.0057 (0.1478)
RegressionF	18.73***	15.88***	17.31***
R <sup>2</sup> within	0.4317	0.2369	0.1266
R <sup>2</sup> between	0.5710	0.4986	0.0133
R <sup>2</sup> overall	0.4587	0.3705	0.0019
Wald $\chi^2$	79.23**		
Hausman $\chi^2$	23.54	29.95*	37.71
Fixed/random effects	Fixed	Fixed	Fixed

**Note(s):**  $n = 119$  (number of utility firms).  $\sum_i T_i n = 595$  (number of utility firm-year observations). The robust standard errors of the estimated coefficients reported in parentheses are clustered at the firm level \*, \*\* and \*\*\*denotes level of significance at the 0.10, 0.05 and 0.01 levels, respectively

**Source(s):** Authors' own creation

models demonstrate that larger boards of utility firms positively impact ESG performance. Larger boards are likely to comprise directors with diverse expertise in ESG issues and a strong inclination toward fostering a sustainability culture. This evidence corroborates agency theory, as large BoDs exert greater monitoring pressure on managers, thereby reducing information asymmetries through enhanced environmental and social disclosures (Shamil *et al.*, 2014; Erin *et al.*, 2022). According to legitimacy theory, these findings also suggest that larger boards help utility firms to moderate external pressures and expectations regarding corporate sustainable development through robust ESG disclosure. Moreover, the presence of female directors on boards has a positive effect on ESG performance, although the impact is not statistically significant across all models. However, in line with critical mass theory, the regression models indicate that firms with at least three female board members are better able to enhance ESG performance. This critical threshold of three women (B\_mgend) serves as a significant positive predictor of the comprehensive ESG performance scoring (ESG\_perf) in Model 1 at a significance level of 0.1, and in Models 2 and 3 at a significance level of 0.5. These findings are in contrast with *H2a* but support *H2b* and are consistent with critical mass theory (Karter, 1977) and prior literature (Schwartz-Ziv, 2017; Manita *et al.*, 2018; Lafuente and Vaillant, 2019; Qureshi *et al.*, 2020; Yarram and Adapa, 2021; Yadav and Prashar, 2022). The presence of at least three women on the board (critical mass) enables female directors to effectively influence board discussions and decisions, particularly engaging ESG issues in the strategic decision-making processes (Konrad *et al.*, 2008; Torchia *et al.*, 2011). Thus, these empirical results indicate that reaching a critical mass of female directors prompts utility firms to enhance their environmental and social initiatives and promote sustainability practices. In this regard, the findings are in line with the enforced female representation in corporate boards due to regulatory developments on gender quotas in various European countries in the recent decade.

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Our findings show that board independence (B\_ind) positively impacts ESG\_perf. The coefficient associated with B\_ind is positive and significant across all models, confirming *H3* and aligning with legitimacy theory and previous research (Jizi *et al.*, 2014; Jizi, 2017; Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020). The empirical evidence suggests that independent directors enhance both shareholders' and stakeholders' interests concerning ESG matters. In this regard, independent board members ensure better oversight of managers' initiatives and assist companies in acknowledging the concerns of all stakeholders for sustainability. From an agency theory perspective, appointing more independent directors on the utilities' board preserves their role as impartial referees and ensure there is no complicity with insider directors fostering greater transparency. Consequently, the presence of more independent directors reinforces the legitimizing role of the board in promoting increased ESG disclosure demonstrating how utilities' activities comply with social and environmental requirements (Walker and Wan, 2012; Deegan, 2019).

In our analysis, the establishment of a CSR/sustainability committee (CSR\_com) is positively related (significance at 0.1) to the overall ESG performance score across all models. These findings support *H4* and align with prior research suggesting that boards with such a committee are likely to be more environmentally and socially responsive (Michelon and Parbonetti, 2012; Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020). The empirical analysis indicates that the presence of such a committee enhances the firm's ESG commitment and its aim to make sustainability a significant strategic issue within the governance system. According to legitimacy theory, the findings confirm that a CSR committee helps utility firms to build credibility in sustainability matters and to improve the legitimacy of stakeholders on this specific topic, since the members of such committees possess knowledge, experience and skills focused on CSR issues. Thus, the results demonstrate that establishing a specific CSR/sustainability committee plays a crucial role in integrating sustainability issues into utilities' business models and strategies and in reducing the legitimacy gap between the society's expectations and the firm's operations.

In accordance with previous research (Huang, 2013; Giannarakis, 2014; Gurol and Lagasio, 2022), results indicate a significant negative correlation between CEO\_dual and ESG\_perf. These findings are only validated in Model 1, allowing for partial acceptance of *H5*. Consistent with the agency theory's rationale, utilities' CEO/chair tend to manipulate CG mechanisms leading to information asymmetries (Husted and de Sousa-Filho, 2019; Arayssi *et al.*, 2020). A legitimacy-based interpretation of these results also suggests that the CEO holding the chairman position is less likely to make decisions that meet stakeholders' legitimate demands.

Finally, Table 6 illustrates the data concerning the control variables. Consistent with numerous previous studies, the findings emphasize that both size (SIZE) and economic performance (ROE) exert a positive and a statistically significant impact on ESG\_perf, at 0.01 and 0.5 respectively. Consequently, empirical evidence demonstrates that high sustainability performance is mainly attained by large and more profitable utility companies (Baselga-Pascual *et al.*, 2018) as they possess abundant personnel and resources to devote to ESG activities. Conversely, the variable Lev is negatively associated to ESG\_perf across all models.

We portray the theoretical framework underlying the hypotheses and the findings of the current study in Table 2.

To check the robustness of the empirical data, we conducted checks to determine whether the relationship between gender diversity and ESG\_perf is influenced by the business model of the utilities. We reestimate the Models by including the classification of monoutilities and multiutilities firms in the econometric models, thus considering two clusters of utility

companies. The estimates of these additional regressions are consistent with the main analysis results. However, the less significant results for multiutilities can be ascribed to the low number of observations used in the panel data analysis. The robustness test results for ESG estimations are not presented in tabular form to save space and improve the readability of the paper. To gain a comprehensive understanding of the relationship between board diversity and ESG performance, we conducted further Model estimations with two additional variables. Table 7 summarizes these estimations. First, we included the age of board directors as an explanatory variable to ensure that the diversity effect is not influenced by age. The results of the robustness analysis confirm the main findings across all Models. Second, we examined the role of macroeconomic context by incorporating the level of registered employment in the European countries where the utility firm is headquartered. The variable aim to account for both the local economic environment and the global economic conditions of companies across different European regions. Our main findings are confirmed.

## 5. Conclusions

The objective of this study is to explore the correlation between board diversity and ESG performance within the European utilities sector. Given the heightened attention on social and environmental issues from regulators, policymakers and other stakeholders, ESG initiatives have become crucial for utility firms to prove compliance with institutional expectations and then to enhance their legitimacy. In accordance with agency and legitimacy theories, this study emphasizes the role of specific characteristics of BoD in enhancing transparency regarding ESG dimensions. The implementation of appropriate internal CG mechanisms is pivotal for utilities to improve legitimacy for their environmentally sensitive actions among stakeholders and to mitigate information asymmetry. By integrating insights

**Table 7.** Robustness checks

Variable	Model 1 ESG_perf Coeff. (p-value) No lag	Model 2 ESG_perf Coeff. (p-value) One-year lag	Model 3 ESG_perf Coeff. (p-value) Two-years lag
B_size	0.0899 (0.0345)	0.0572** (0.0366)	0.0683** (0.0392)
B_gend	0.1734 (0.0860)	0.2894 (0.1405)	0.4477 (0.1892)
B_mgend	0.2163* (0.1684)	0.3161** (0.1632)	0.6973** (0.3689)
B_ind	0.0563* (0.0317)	0.0589** (0.0277)	0.0632** (0.0313)
CSR_com	0.0342* (0.0237)	0.0388* (0.0224)	0.0365* (0.0242)
CEO_dual	-0.0127 (0.0166)*	-0.0138 (0.0163)	-0.0127 (0.0164)
Board age	0.0324	0.0062	0.0019
Control variables	Yes	Yes	Yes
R <sup>2</sup>	0.4355	0.5346	0.3887
B_size	0.0768 (0.0347)	0.0585** (0.0366)	0.0675** (0.0374)
B_gend	0.1767 (0.0863)	0.2882 (0.1410)	0.4459 (0.1852)
B_mgend	0.2196* (0.1663)	0.3160** (0.1632)	0.6947** (0.3640)
B_ind	0.0584* (0.0312)	0.0597** (0.0266)	0.0630** (0.0315)
CSR_com	0.0347* (0.0242)	0.0379* (0.0235)	0.0372* (0.0297)
CEO_dual	-0.0127 (0.0177)*	-0.0138 (0.0152)	-0.0125 (0.0147)
Control variables	Yes	Yes	Yes
R <sup>2</sup>	0.4544	0.5583	0.3594

**Note(s):**  $n = 119$  (number of utility firms).  $\sum_i T_i n = 595$  (number of utility firm-year observations). Panel fixed effects (within) estimation (significant Hausman test). Firm-level clustered robust standard errors are in brackets \*, \*\* and \*\*\* denotes level of significance at the 0.10, 0.05 and 0.01 levels, respectively

**Source(s):** Authors' own creation

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from established theories, this research investigates the influence of five board attributes (board size, board independence, board gender diversity, CEO duality and board CSR/sustainability committee) on ESG performance of a sample of 119 companies operating in the European utilities sector during the period 2018–2022. The empirical findings demonstrate that board size, board independence, and the presence of a CSR/sustainability committee positively impact ESG performance of European utility firms, while a negative significant relationship between CEO duality and ESG performance was found. Moreover, our study contributes novel insights into the relationship between gender diversity and ESG, revealing a significant positive effect of female directors on ESG performance when a critical mass of at least three women is present on BoD, aligning with critical mass theory.

This study has some theoretical and practical implications for future research. Theoretically, this paper enhances the literature on utilities' ESG practices by analyzing how board diversity mechanisms influence ESG performance. In particular, the current literature presents little empirical evidence addressing this relationship and no previous research has specifically examined the topic within the European utilities sector. Therefore, our study contributes to the existing literature on how board composition impacts ESG dimensions in several ways. First, the utilities industry is relatively underexplored despite the advanced academic debate on sustainability and ESG reporting in the industrial context. Furthermore, as far as we know, existing studies analyzing the connection between CG variables and sustainability in utilities sector are novel but limited, focusing primarily on ESG disclosure rather than ESG performance (Mehmood *et al.*, 2023b; Nicolò *et al.*, 2023). Consequently, there is still much to discover about the probable CG drivers of utilities' ESG performance. Second, this research is the first one exploring the relationship between board diversity and ESG performance specifically in the European utility companies using the ESG score provided by Refinitiv Eikon database. Third, existing research on the utilities sector predominantly centers on the energy subsector (Talbot and Boiral, 2018; Traxler and Greiling, 2019; Slacik and Greiling, 2020) and it is generally country-specific (Freedman and Stagliano, 2008; Shima and Fung, 2019; Giacomini *et al.*, 2020; Eng and Friku, 2022). Thus, this study develops previous literature by shading light on a sample of firms operating in a multicountry context (i.e. Europe) and across different subindustries of the utilities sector.

From a practical perspective, our analysis aids practitioners, policymakers and regulators in establishing specific ESG disclosure practices for utilities to be compliant with environmental and social expectations of different stakeholders and specifically of sustainability-oriented investors. The study also offers managerial implications by providing insights on how to enhance ESG performance through the development of targeted governance mechanisms. From a managerial standpoint, the results indicate that CEOs should pay closer attention to board composition to boost ESG performance. Hence, the makeup of the BoD could be a strategy to manage reputational risk and to increase appeal of companies in an environmentally sensitive sector like that of utilities. Specifically, the findings encourage utility companies to appropriately identify their internal CG mechanisms, emphasizing the careful selection of BoDs' members. As large boards allow to reach high levels of ESG performance, managers should involve both male and female directors to expand the board size and to ensure gender diversity in BoD. Particularly, utilities should increase the presence of female and independent directors to foster greater sensitivity toward ESG issues, thereby achieving high ESG performance. Additionally, our study highlights the importance of establishing a CSR/sustainability committee as a strategic means to ensure corporate commitment to sustainability. A dedicated CSR/sustainability committee focused on ESG matters seems to be an effective governance practice that utility companies must adopt to implement successful ESG strategies.

This study also presents some limitations. First, the empirical investigation assumes that the Refinitiv ESG score is a successful measure of utilities' ESG performance. It would be more beneficial to inspect the impact of board diversity on ESG dimensions using other ESG performance measures. Furthermore, we have explored specific CG characteristics while we could have inspected other possible CG mechanisms affecting ESG performance levels. Furthermore, using a larger sample of utility companies and an extended time range to explore how ESG performance is influenced by the presence of certain attributes of the BoD is worthwhile pursuing. Currently, data availability poses a challenge in increasing the number of utilities' observations in this type of investigation. Although the findings might not be generalized for European unlisted utility companies or for utilities operating in non-European countries, the paper offers very interesting insights for developing future research at least comparatively. In this regard, the limitations of this study provide opportunities for future research. First, while our study has examined several board characteristics, further research could focus on other diverse features and essential resources that board members possess (e.g. experience, skills, seniority, background and nationality), according to the resource dependence theory. Second, although we applied data from a panel of European countries, similar investigations could also be applied to individual European countries and/or involve comparative analyses across these developed countries. Additionally, future research could concentrate on other emerging countries to extract valuable new information on ESG performance. Third, future studies might use a different data set (e.g. Bloomberg) to measure ESG performance, or alternatively use an automatic software to extract ESG information straight from nonfinancial reports. Finally, future research could incorporate various macroeconomic variables or other contextual factors that might moderate or mediate the relationship between CG mechanisms and utilities' ESG performance.

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**Corresponding author**

Elisa Menicucci can be contacted at: [elisa.menicucci@uniroma3.it](mailto:elisa.menicucci@uniroma3.it)