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ESG SCORE, BOARD STRUCTURE AND THE IMPACT OF THE EU 95/2014 DIRECTIVE ON EUROPEAN FIRMS

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Abstract

The primary objective of this research is to examine the potential relationship between board of directors' characteristics and ESG scores among 835 European companies listed from 2002-2020. Empirical results indicate that gender diversity, cultural diversity, a higher number of independent directors on the board, and the presence of a CSR committee significantly contribute to a higher ESG score. Specifically, companies with a CSR committee have an ESG score that is 11 points higher than companies without one, all other variables being equal. The study also reveals that the Non-Financial Reporting Directive 95/2014, which mandates reporting by large EU firms on various environment, social, and governance issues, has had a significant impact on increasing companies' ESG scores. The directive has also reduced the ESG gap between companies with and without a CSR committee, while other board characteristics have maintained their relevance.

JEL Classification: G32, G34

Keywords: ESG score, board characteristics, gender diversity, cultural diversity, EU 95/2014 Directive.

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1. Introduction

Today, investment decisions are increasingly influenced not only by financial parameters but also by their impact on environmental, social, and governance factors - collectively known as ESG (Environmental, Social, and Governance) factors. Investors are considering these factors more often when making investment decisions. The ESG rating or sustainability rating therefore expresses a synthetic judgment on the soundness of a company with reference to attention paid to environmental, social and governance aspects. It obviously does not replace the traditional credit rating but complements it (Brogi et al, 2022), increasing the available information set to make more conscious investment and financing choices aimed at long-term sustainability.

The literature that has tried to explain the factors that push companies towards greater ESG/CSR activity and higher scores assigned to them, has highlighted factors related to countries, sectors, and individual companies (Boubaker et al. 2018, Gillan et al., 2021). Differences between countries with regard to the degree of development, religion, culture, legal system, and the presence of civil and political rights, constitute the main determinant of CSR/ESG commitment at the international level, especially for companies that do not have multinational characteristics (Cai et al., 2016, Pizzi et al 2021, Hunjra et al., 2021). The importance of the regulation in which they operate is also found by Liang and Renneboog (2017), who argue the legal family of the country of origin to be the main determinant of the ESG performance of companies. Within a homogeneous regulation, Jha and Cox (2015) find that the ESG performance is determined by the level of social capital in the county where the legal headquarters of US companies are located. When corporate governance components are excluded, social and environmental practices of ESG/CSR also appear to be significantly associated with the industry to which the companies belong (Borghesi et al, 2004). In relation to the characteristics of companies and ESG/CSR scores, many studies have focused on the company's ownership structure, the characteristics of the CEO, and the structure of their remuneration (for a comprehensive review, see Gillan et al., 2021). With reference to the characteristics of the board, some studies have mostly found that a higher ESG/CSR score is associated with the presence of female CEOs (Borghesi et al., 2014, Cronqvist and Yu, 2017) and their greater presence on the board of directors (Borghesi et al., 2014, Mc Guinness et al., 2017). Other board characteristics, such as the cultural diversity of its members (Rao and

Tilt, 2015, Lau et al., 2016), the presence of independent directors (Liu et al., 2015), and the presence of a CSR committee (Spitzeck, 2009, Helfaya and Moussa, 2017), have often been individually studied and found to be positively associated with the CSR of companies.

The aim of the present study is to examine the impact of multiple characteristics of the board of directors on the ESG score of a large sample of European listed companies. It also investigates how the impact of such board characteristics might have changed after the introduction of the EU Non-Financial Reporting Directive 95/2014. The underlying idea is that, as long as companies report on sustainability and social issues on a voluntary basis, the firm's choice to excel on ESG factors could significantly be driven by board characteristics. However, when non-financial reporting on environmental, social, and governance issues is mandatory, board characteristics could lose some or all of their importance in determining a firm's ESG policies.

In fact, voluntary reporting by EU companies on environmental and social issues in their interactions with stakeholders was initially promoted on a voluntary basis in 2001 by the European Commission's "Green Paper" on Corporate Social Responsibility (CSR). However, since 2014, the EU Directive 95/2014 has mandated non-financial reporting on large EU listed and public interest companies on many typical ESG topics. The directive requires firms to make a non-financial statement reporting non-financial key performance indicators and information on their activities related to environmental, social and employee matters, respect for human rights, anti-corruption, and bribery matters. Additionally, they must describe the firm's diversity policy applied in the administrative, management, and supervisory bodies. Therefore, we expect that the 95/2014 EU directive has not only favored a significant increase in the ESG scores of EU-listed firms but also changed the importance of some board characteristics in favoring the firm's achievement of higher ESG scores.

This study uses the Refinitiv ESG score for a wide sample of 835 EU listed firms and 16,635 annual ESG scores in the period of 2002-2020 to examine the effects of board characteristics on ESG scores and how they are impacted by the new EU Non-Financial Reporting Directive. The empirical results show that gender diversity, cultural diversity, board independence, and, above all, the presence of a CSR committee have a positive and statistically significant relationship with the ESG score in the overall studied period. On

average, companies with a CSR committee achieve 11 more points in ESG score compared to other firms (with an average score of 53.49 for the entire sample).

As expected, the aforementioned directive had a significant impact on pushing companies towards higher values of their ESG scores. The average score increased from 55.85 in 2013, before the directive, to 58.28 in 2015. The directive also significantly reduced the gap between companies that were already achieving high ESG scores for having established a CSR Committee and those that improved their attention to ESG issues when forced by the directive.

The CEO duality seemed to negatively affect the ESG scores in the years before the EU directive and had no effect after the directive. This is probably because different priorities set by a powerful CEO-President became less relevant when the focus on many ESG issues became mandatory with the EU 95/2014 directive.

As far as the other board characteristics are concerned, gender diversity, cultural diversity, and the percentage of independent directors continue to play a significant role in favoring the achievement of higher ESG scores even after the EU directive.

This paper aims to contribute to the existing literature by providing empirical evidence on the determinants of ESG/CSR scores using a wide range of board characteristic variables for a large sample of European listed firms. In addition, this study analyzes the impact of the EU 95/2014 directive on mandatory non-financial reporting on the ESG score of EU firms and examines how the directive has affected the effectiveness of certain board characteristics in favoring higher ESG scores, revealing a reduced importance of having a CSR committee when reporting on many ESG issues becomes mandatory.

The paper is structured as follows: the next paragraph develops the hypotheses that link certain board characteristics to the ESG score; paragraph 3 illustrates the sample construction and analysis methodology; paragraph 4 analyzes the results, while paragraph 5 reports the conclusions.

2 Board characteristics and hypothesis development

According to Freeman (1984, 1994), a stakeholder of an organization is any group or individual who can influence or is influenced by the organization's objectives. The stakeholder theory argues that an agent's obligation is to maximize the principal's wealth

while also considering the interests of other stakeholders. In this context, the board of directors, in its function as an agent, bears a significant responsibility towards numerous stakeholders who are interested not only in the company's operations and performance (Parkinson, 1995). Companies have an obligation to be responsible not only towards their primary stakeholders, such as shareholders, customers, or workers, but also towards secondary stakeholders, such as social communities, local governments, subcontractors, and non-governmental organizations (Parmar et al., 2010).

The board of directors is a crucial component of the corporate governance system, and its role has garnered significant regulatory attention in recent years to expand its scope of direction and control and also to account for environmental and social aspects in order to best meet the needs of all stakeholders. In its 2011 Green Paper on the European Union's corporate governance framework, the European Commission concluded that only an effective and high-performing board of directors could challenge the decisions of executives. To achieve this, the board should consist of non-executive members with differentiated skills, adequate professional experience, and sufficient time to devote to the board's work.

The Green Paper also addresses the composition of the board. According to the Commission, non-executive members should be selected on the basis of specific criteria such as merit, professional qualifications, experience, personal qualities, independence, gender, and geographical origin to ensure that the board is suitable for the company's activities. In this way, the board can acquire diverse values, perspectives, competencies, and ideas that can enhance debates, prevent groupthink, and improve decision-making quality. Therefore, we develop hypotheses on how certain board characteristics can promote greater social responsibility of the company and a higher ESG rating.

3.1 Board size

Several studies on individual countries have found a substantial positive association between board size and the quantity of integrated or voluntary reporting (Akhtaruddin et al., 2009, Allegrini and Greco, 2013, Liao et al., 2018, Suttipun and Bomlai, 2019). Some studies argue that a larger board can provide a broader representation of ownership and therefore be more open in disclosing information on strategic objectives to a wider range of stakeholders (Fasan and Mio, 2017; Suttipun and Bomlai, 2019). However, larger

boards present more coordination/communication problems and are easier to be influenced and controlled by the CEO, leading to more severe agency problems (Jensen, 1993). In light of these contradicting studies, the formulate the first hypothesis in null form:

H1: There is no significant relationship between the board and the ESG score

3.2 Gender Diversity

Although there is conflicting empirical evidence regarding the percentage of women on corporate boards and company performance (Adams and Ferreira, 2009, Liu et al., 2014, Post and Byron, 2015), the presence of women on boards would have a positive effect, according to the European Commission's Green Paper, as it would contribute to expanding the pool of talent resources from which to draw for higher positions in corporate leadership. Liao et al. (2018) believe that the cognitive structure of the group and the diversity of its members are important in carrying out the various tasks required. Consequently, the quality of the board of directors is determined by the cognitive disparities that characterize the perceptions of its members. According to several studies, gender diversity on the board of directors has been found to be associated with favorable cognitive outcomes such as creativity, innovation, and the creation of new ideas (Ruigrok et al., 2007; Kang et al., 2007; Miller and del Carmen Triana, 2009). According to Carter et al. (2003), gender diversity significantly increases the quality of board decisions and the quality of information provided to stakeholders. Saphira et al. (2014) show the moderation effect of female on board on the negative CSR–CEO compensation linkage¹ and Yu (2023) finds that the fraction of female directors on the board improve corporate investments. Moreover, the female gender of the CEO is found to increase firm performance and shrink firm risk (Khan and Vieito, 2013). Some studies have found a higher ESG/CSR ranking associated with the presence of women holding the position of CEO (Borghesi et al., 2014, Cronqvist and Yu, 2017). A favorable association between a greater presence of women on the board and CSR practices of companies has been found

¹ Chakraborty et al. (2019) also show that relationship between CSR and the risk taking incentives of CEO compensation.

in numerous empirical studies, such as those by Mc Guinness et al. (2017), Boulouta (2013), Harjoto et al. (2015), Arajssi (2016), Dienes and Velte (2016), while Elmagrhi et al. (2018) have found the same positive relationship with regard to the environmental performance of Chinese companies. The inclusion of women on boards or having a female CEO have also been found to be associated with a higher quality of financial reporting in European listed firms (Cimini, 2022), an increase in corporate donations in the United States (Wang and Coffey, 1992, Williams 2003), and a greater demand for external certification of the company's CSR activities (Liao et al., 2018). For these reasons, the second hypothesis has been formulated as follows:

H2: A higher level of gender diversity in the board positively affects the ESG Score

3.3 Cultural Diversity

According to the European Commission 2011 Green Paper on Corporate Governance, the diverse geographic origin of board members, especially in relation to companies that have developed international operations, is an additional qualifying element of the board, as it allows the company to have a better understanding of the regional markets in which it operates. A more diverse board in terms of age, gender, ethnicity, vocations, and levels of education is more likely to consider multiple perspectives when making decisions (Galia & Zenou, 2012). Additionally, a more diverse board is more likely to understand and meet the needs of a diverse set of stakeholders, promoting CSR (Harjoto et al., 2015). Previous research has examined the ethnic diversity of the board, sometimes finding a positive influence between the fraction of women and ethnic minorities present on the board and the performance of the company (Carter et al., 2003), other times not finding a connection between ethnic minorities and the financial results of the company (Carter et al., 2010), or even a negative relationship between cultural diversity and the company's performance (Frijns et al., 2016). However, the link between board diversity and CSR/ESG is mostly unknown (Rao and Tilt, 2015). People of different nationalities generally have different values and ethical standards that could influence the board's work in a diversified manner (Fitzsimmons, 2013). Additionally, having board members of various nationalities is found to increase the likelihood of implementing CSR measures (Lau et al., 2016) and improve the quality of CSR, as previous international experiences

can provide useful insights in addressing the challenges of social responsibility in various markets (Katmon et al., 2017). Given the above, the following hypothesis is proposed:

H3: A higher level of cultural diversity in the board positively affects the ESG score

3.4 CEO Duality

The term "CEO Duality" refers to a situation where the CEO also holds the position of Chairman of the Board of Directors. According to some studies, CEO duality leads to a decrease in shareholder control over the CEO exercised through the board of directors and has a negative impact on the company's financial performance (Iyengar and Zampelli, 2009; Rechner and Dalton, 1991). However, empirical data are contradictory. Allegrini and Greco (2013) found a lower degree of voluntary disclosure in the presence of CEO duality in listed Italian companies, and Webb (2004) has found evidence that separation of responsibilities can increase communication costs, make decision-making processes less effective and efficient, and have a negative impact on company performance (for a review, see Krause et al., 2014). Empirical evidence on the link between CEO duality and the quality of integrated reporting is therefore overall contradictory, which is why the fourth hypothesis is formulated as follows:

H4: There is no significant relationship between the CEO Duality and the ESG Score

3.5 Independent Directors

The inclusion of independent directors within the board of directors should ensure a more careful monitoring of the actions of executive directors, favor decisions that are more attentive to the interests of minorities, and according to some research and contexts, also favor the performance of the company (Liu et al, 2015). Ibrahim and Angelidis (1995) found that independent directors are more interested than internal directors in the altruistic and philanthropic issues related to CSR. In a study by Jizi et al. (2014) on a sample of US commercial banks, it emerged that banks with a higher percentage of independent directors on the board are positively associated with greater CSR disclosure, while Webb (2004) found that more socially responsible companies are characterized by having more independent directors. Other studies have confirmed that independent directors have a

positive relationship with sustainability reporting, considering the fact that they encourage companies to adopt a proactive approach towards information disclosure to stakeholders, including voluntary disclosure (Arayssi et al., 2020 and Jizi et al., 2014). In light of the studies highlighted, the following hypothesis is proposed:

H5: The percentage of independent directors in the board positively affects the ESG score

3.6 CSR Committee

The establishment of a Corporate Social Responsibility (CSR) Committee is certainly indicative of a commitment by the board of directors to pursue sustainable development. Spitzeck (2009) found that UK companies with a corporate responsibility committee scored on average 9% higher in the BITC Corporate Responsibility Index than the general population. Based on a cross-sectional study of a sample of companies from 12 Asia-Pacific countries, Amran et al. (2014) found that having at least one CSR committee chaired by an internal leader in a company improved the quality of sustainability reporting. Helfaya and Moussa (2017) found that having a CSR committee and issuing a stand-alone CSR report are substantially and positively associated with environmental sustainability disclosure. Given the aforementioned evidence, the final hypothesis can be formulated as follows:

H6: The presence of a CSR Committee in the board positively affects the ESG score

3.7 The 95/2014 EU non-financial reporting directive the achievement of higher ESG scores

As anticipated in the introduction, the EU 95/2014 non-financial reporting directive mandated large EU firms to elaborate a non-financial statement that included a variety of non-financial information related to ESG indicators and scores, such as environmental, social, and employee matters, respect for human rights, anti-corruption and bribery matters, diversity policy in the administrative bodies, and others. What was previously a voluntary reporting became mandatory, and likely pushed firms to focus more on ESG-related issues while meeting new investors' preference for ESG investments. Therefore, we expect that the average ESG score of EU firms has significantly increased after the

introduction of the directive. We also expect that the ESG gap between firms that had set up a CSR committee and those that had not has narrowed, as the directive mandated all firms to move in the same direction. The two additional hypotheses are:

H7: The EU 95/2014 directive has had a positive effect on the ESG score of EU firms.

H8: The EU 95/2014 directive has decreased the importance of having a CSR committee in achieving higher ESG scores.

The directive may also have affected the efficacy of other board characteristics in achieving higher ESG scores. However, since we don't think there are enough clear arguments to develop additional hypotheses, we will focus on offering some interpretations of the reported results.

3 Data and research methodology

In the present study, we adopted the Refinitiv ESG score developed by Thomson Reuters Eikon Datastream, which, at the date of May 2022, is based on more than 630 standardized ESG data points collected from annual reports, company websites, NGO websites, stock exchange filings CSR reports and news sources. Out of these 630 ESG data points, 186 most important and comparable ones are selected for making the scoring process and grouped into 10 categories: resource use, emissions and innovation, for the Environment Pillar; workforce, human rights, community and product responsibility for the Social Pillar; management, shareholders and CSR strategy, for the Governance Pillar. The 10 category scores are therefore converted into the three ESG scores and a final pillar-weighted ESG score is obtained. Such a score is expressed both as a percentile rank score between 0 and 100 as well as letter grades from D- to A+. Although there are several ESG score databases available, with some divergence both in methodology and results (see Rau and Ting, 2023, for a survey), Refinitiv is one of the most comprehensive and old one, as it covers (as of May 2022) over 85% of the global market capitalization across 76 countries with history dating back to 2002.

In the present study, we used the Refinitiv ESG score to analyze the environmental, social, and governance performance of companies. As of May 2022, the Refinitiv ESG score, developed by Thomson Reuters Eikon Datastream, is based on more

than 630 standardized ESG data points collected from annual reports, company websites, NGO websites, stock exchange filings, CSR reports, and news sources. Out of these 630 ESG data points, we selected the 186 most important and comparable ones based on their relevance, materiality, and comparability. These data points were then grouped into 10 categories: resource use, emissions and innovation, for the Environment Pillar; workforce, human rights, community and product responsibility for the Social Pillar; management, shareholders and CSR strategy for the Governance Pillar. The 10 category scores were converted into three ESG scores, and a final pillar-weighted ESG score was obtained. The score is expressed both as a percentile rank score between 0 and 100 and letter grades from D- to A+, with higher scores indicating better ESG performance.

Although several ESG score databases are available, with some divergence both in methodology (e.g., weighting schemes, data sources) and results (e.g., score ranges, rankings), Refinitiv is one of the oldest and most comprehensive ESG score databases available. As of May 2022, it covers over 85% of the global market capitalization across 76 countries, with a history dating back to 2002.

Since this paper aims to cover all EU countries over the most extensive period, in order to observe the impact of the firm's board characteristic and the EU 85/2014 directive in determining the ESG score, we choose to adopt the Refinitiv ESG score, following several other previous studies (Ferrell et al., 2016; Dyck et al., 2019; Albuquerque et al., 2020, Arayssi et al., 2020). To construct the sample of companies studied, an initial sample of companies listed on the stock exchanges of the European Union that had received a Refinitiv ESG rating in 2019 and 2020 was identified. Companies that had received less than 6 ESG ratings between 2002 and 2020 and companies belonging to the financial sector were then excluded since they have different reporting and accounting obligations. The final sample consisted of 835 companies with 16,635 annual ESG score observations between 2002 and 2020. In the following graph, it is possible to appreciate the frequency in terms of the number of companies (left graph) and observations (right graph) divided among the analyzed countries.

Insert Figure 1 around here

Like the ESG score, the independent and control variables are also obtained from the Thomson Reuters Eikon Datastream database and are reported in the subsequent Table 1.

Insert Table 1 around here

The independent variables used include: board size (*Boardsize*), the percentage of women on the board (*GenderDiv*), the percentage of board members with a cultural background different from that of the company's registered office (*CulturalDiv*), a dummy variable equal to 1 if the CEO also holds the position of board chairman, the percentage of independent board members (*Independence*), a dummy variable equal to 1 in the presence of a CSR committee (*CSRCommittee*), and a dummy variable equal to 1 for the years following the introduction of European Directive 95/2014 (*Dpost*). In line with previous literature, some control variables were also collected, such as company profitability (measured by ROA), company size (measured by total assets), and company indebtedness (measured by the ratio of debt to total assets). Higher levels of CSR in companies have been found to be associated with larger companies (Borghesi et al., 2004; Reverte, 2009), companies with higher financial profitability or growth (Borghesi et al., 2004; Arora and Dharwadkar, 2011), and companies with lower levels of indebtedness (Barnea and Rubin, 2010), while a greater voluntary disclosure has been found in larger, more profitable and less indebted firms (Barros et al, 2013). The following estimation model is adopted:

$$\begin{aligned}
 (ESG)_{i,t} = & \alpha_i + \beta_1(Dpost) + \beta_1(BoardSize)_{i,t} + \beta_2(GenderDiv)_{i,t} + \\
 & \beta_3(CulturalDiv)_{i,t} + \beta_4(CeoDuality)_{i,t} + \beta_5(Independence)_{i,t} + \\
 & + \beta_6(CSRCommittee)_{i,t} + \beta_7(LnAssets)_{i,t} + \beta_8(ROA)_{i,t} + \\
 & \beta_9(DebtAssets)_{i,t} + \varepsilon_{i,t},
 \end{aligned}$$

where α_i represents the time-invariant unobserved effects of the model for each *i-th* firm; β identifies the regression coefficients related to the nine explanatory variables used; *t* represents the reference year (from 2003 to 2020); $\varepsilon_{i,t}$ refers to the error terms in the *t-th* year and for the *i-th* firm. The fixed effects model was preferred over the random effects model to avoid the assumption of no correlation between intercepts and the regressor matrix. Such a model assists in controlling for omitted variable bias due to unobserved

heterogeneity when this heterogeneity is supposed to be constant over time. To verify this assumption, a Hausman specification test was conducted which showed the superiority of the fixed effects model over the random effects model. Finally, the specification was obtained using robust standard errors with respect to residual heteroskedasticity.

4 Empirical results

The European Union companies falling within our sample have shown a significant increase in ESG score over time, with the average value increasing from 37.06 in 2003 to 60.12 in 2020. As shown in Figure 2, which captures the ESG indicator at regular intervals over time, the improvements have been rather indiscriminate regardless of the country considered. At the same time, Portugal is the country that has made the most progress, increasing from an average of 18.7 in 2003 to 61.65 in 2020, while the Netherlands, starting from a promising situation with an average of 45.33 in 2003, shows the worst increase, reaching 62.12 in the last year surveyed (2020). While in the previous years before the regulation came into effect, the average ESG Score was relatively stable, at values around 55/56 (from 2011 to 2013: 55.19, 55.64, and 55.85), in 2014 and the following years the value increased to reach 60 in 2017 (from 2014 to 2017: 56.45, 58.28, 59.51, and 60.02)

Insert Figure 2 around here

Figure 3 shows the distribution of the average ESG score in 2020 in the different industrial sectors included in the sample and in the different countries of the European Union. As can be seen, the highest ESG scores were generally found in the energy and utilities sectors, while the lowest were in real estate and technology, highlighting a marked sectoral differentiation, as already noted by Borghesi et al. (2004).

Insert Figure 3 around here

4.1 Descriptive statistics

Table 2 shows the descriptive statistics of all the variables. The listed companies in the sample reported an average ESG score of 53.49, with a maximum of 94.69 and a minimum of 1.21. The average size of the board in our sample is about 12 directors, with

a maximum of 38 members and a minimum of one person. On average, these boards have only a 20.83% share of women, while the average share of directors with a cultural background different from that of the company's headquarters is 30.35%. In 29% of cases, the role of the chairman of the board of directors coincided with that of the CEO, while regarding the share of independent directors on the board, the average value is as high as 53.25%

4.2 *Multivariate Analysis*

The results of the multivariate panel data analysis models are reported in Table 3. In the first two models (1 and 2) we used fixed effects while in the subsequent two models (3 and 4) random effects. The second and fourth models includes interaction variables between the board characteristic variables and the post-directive dummy variable in order to test the effect of the directive on changing the importance of some board characteristics in favoring higher ESG score.

From the analysis of the results, several expected hypotheses appear to be confirmed. Over the entire period of analysis, both Model 1 and Model 3 show that a higher percentage of women on the board of directors (*GenderDiv*) is significantly associated with higher ESG scores, confirming the findings of previous studies on CSR rankings and engagement (McGuinness et al., 2017; Jizi, 2017). Another confirmed hypothesis relates to the degree of cultural diversity of the board (*CulturalDiv*), which is found to be positively associated with higher ESG scores in all models. A greater percentage of independent directors (*Independence*) is also found to be significantly associated with higher ESG scores in all models, as previously reported by Arayssi et al. (2020).

The most significant board characteristic influencing the achievement of a higher ESG score is the presence of a CSR Committee (*CSRCommittee* dummy), as firms with such committees show an average ESG score that is about 11 points higher. This result is not surprising, as firms that have set up CSR committees within their boards have clearly decided to pay greater attention to corporate and social responsibility issues (Spitzeck, 2009; Helfaya and Moussa, 2017), most of which are also included in the ESG pillars. Models 1 and 3 show that board characteristics that do not appear to have a significant

impact on a firm's ESG scores are the board size (*Boardsize*) and CEO duality (*CeoDuality*).

Regarding the control variables, higher levels of ESG scores significantly characterize larger companies (*LnAssets* variable), which can allocate more resources to these objectives and have governance practices that are usually more adherent to best practices. Additionally, ESG scores are significantly negatively associated with less profitable firms (*Roa*), which is consistent with the findings of Borghesi et al. (2014) for investments in CSR.

Insert Table 3 around here

To fully understand the effects of the single board characteristic variables on the ESG score, we computed the marginal effects of the individual independent variables of our fixed-effect base model, as shown in Table 3 (Model 1), and reported some individual graphs in Figure 4. As can be seen from the figure, one of the most notable effects on the ESG score is related to the presence of women on the board. For example, moving from a total absence of women to a percentage of 20 percent, i.e., one out of five members, increases the ESG score from about 56 to 60 points. On the other hand, cultural difference seems to have a smaller effect: from a total absence of foreigners on the board to one out of five members increases the ESG score from about 58.6 to 60 points. As previously noted, the presence of a CSR Committee is the most significant variable and explains about 11 points of difference in the ESG score (from 53 to 64 over the studied period).

Insert Figure 4 around here

When we look at the effect of the introduction of the EU 95/2014 Directive, the significantly positive coefficient of the dummy variable indicating the post-directive period (*Dpost*) in all models clearly indicates that the average ESG score in EU firms has significantly increased in the years following the directive. Models 3 and 4 replicate models 1 and 2, but add interaction variables between the dummy *Dpost* and the board characteristic variables to verify if some of the explanatory variables have lost or gained importance in affecting the ESG score after the directive's introduction. The most

significant interaction variable is the one related to the CSR committee, confirming our last hypothesis. The sign and size of its coefficient (equal to -4.17 and -3.47 in model 2 and 4, respectively) indicates that the higher average ESG score characterizing companies having a CSR committee decreased by about 4 points, likely because firms who were not paying attention to ESG issues (not having a CSR committee) were forced by the directive to address and report on ESG matters in the new mandatory non-financial reporting regulation. Among the other interaction variables, some also appear to be significant. The CEO duality seems to have negatively affected ESG scores in the years before the EU directive and had no effect after the directive (as the size and sign of the interaction variable totally offset its coefficient in the post-directive period). A possible interpretation could be that the CEO being also the President of the board could more easily push the board to focus on financial goals rather than ESG issues before the directive, while his priorities became less relevant when the focus on many ESG issues became mandatory with the EU 95/2014 directive. As far as the other board characteristics are concerned, gender diversity, cultural diversity, and the percentage of independent directors keep their significant role in favoring the achievement of higher ESG scores even after the EU directive. A higher presence of women on the board appears to be further associated with higher ESG scores after the directive, while the negative effect of board size on the ESG score seems to characterize only the post-directive period.

4.3 Alternative specifications

Our main econometric specifications use fixed effect models, which already control for unobservable heterogeneity among observations and the likelihood of omitted firm-related characteristics. Furthermore, the fact that the results remain substantially unchanged (in terms of the sign and significance of the coefficients) in the random effect models further validates the results of the main models.

However, one can argue that firms with high corporate governance standards are more capable of investing in social and environmental projects and consequently reporting on them. On the other hand, communicating ESG activities reflects firms' commitment to societal needs and helps fulfill their social responsibilities, leading to better stakeholder engagement and operational results (Simpson and Kohers, 2002; Jizi et al., 2014). To address a potential reverse causality problem, we follow Arayssi et al.

(2020) and rerun the regression models using the one-year lagged values of the explanatory variables. This approach ensures that any influence the variables may have on ESG disclosure in the current year cannot retroactively influence firm and board characteristics from the previous year. In model 1 of Table 4, we lag only the control variables, which are performance, leverage, and size measures, while in model 2 of Table 4, we lag all explanatory variables. The coefficients remain unchanged in terms of sign and significance.

It can also be argued that our response variable (the ESG score) includes the corporate governance pillar, which could lead to some endogeneity risk when corporate governance measures are used as explanatory variables. Therefore, we remove the corporate governance pillar and employ only the environment and social pillars in models 3, 4, and 5 of Table 4. After setting the mean between these two measures as our new response variable, we rerun model 2 of Table 3 using the base model (model 3), a model with the control variables lagged by one year (model 4), and a last model with all lagged explanatory variables (model 5). The results remain basically the same in terms of sign and significance of the coefficients, showing overall robustness of the results.

5 Conclusions

The aim of this study is to evaluate the possible relationship between the characteristics of the board of directors and the ESG score on a wide sample of 835 European listed firms during the 2002-2020 period. The empirical results indicate that gender diversity, cultural diversity, a greater presence of independent directors on the board, and most importantly, the presence of a CSR committee are significantly associated with a higher ESG score. Companies with a CSR committee, all other variables being equal, achieved an ESG score 11 points higher than other companies, which is a significant difference considering the average value of 53.49 for the entire sample during the analyzed period.

The results also indicate that the Non-Financial Reporting Directive 95/2014 had a significant impact in pushing companies towards higher values of their ESG scores and reducing the gap between companies that already had high scores due to the presence of a CSR committee and those that improved their ESG score even without it following the introduction of the European directive. The other board characteristics (gender diversity, cultural diversity, a greater presence of independent directors) continued to play a

significant role in favoring the achievement of higher ESG scores even after the EU directive.

Tables and Figures

Figure 1. Distribution of firms and observations per country

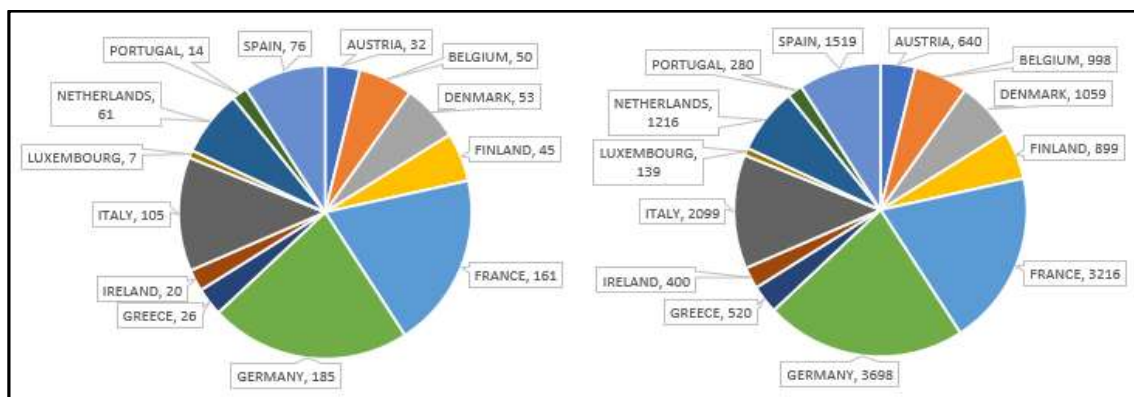


Table 1. Definitions of variables

Variable	Definition
<i>ESG</i>	ESG Score from Thomson Reuters Eikon Datastream
<i>BoardSize</i>	Board size measured as total number of board members
<i>GenderDiv</i>	Gender diversity measured as percentage of women in the board
<i>CulturalDiv</i>	Cultural diversity: percentage of board members with a cultural background different from the country where the company headquarter is located
<i>CeoDuality</i>	Dummy variable equal to 1 if the CEO is also the president of the board, 0 otherwise
<i>Independence</i>	Percentage of independent members in the board
<i>CSRCommittee</i>	Dummy variable equal to 1 if there is a CSR Committee, 0 otherwise
<i>Dpost</i>	Dummy variable equal to 1 in the years following the European Directive 95/2014, equal to 0 otherwise
<i>Roa</i>	Firm's Return on Assets (as a measure of profitability)
<i>Assets</i>	Firm's Total Assets (as a measure of size)
<i>Debt/Assets</i>	Firm's Total Debt/Total Assets (as a measure of leverage)

Figure 2. Average ESG score distribution in UE countries

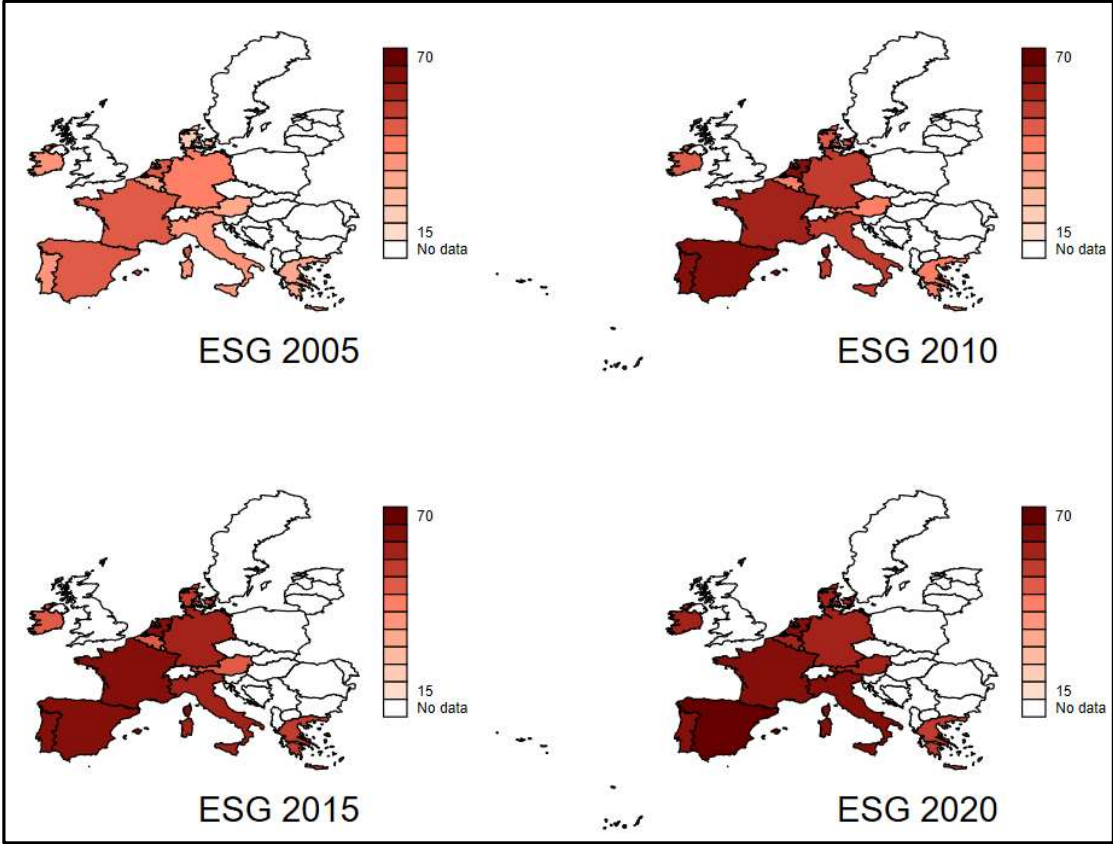


Figure 3. Average ESG Score in 2020 in different industries and countries

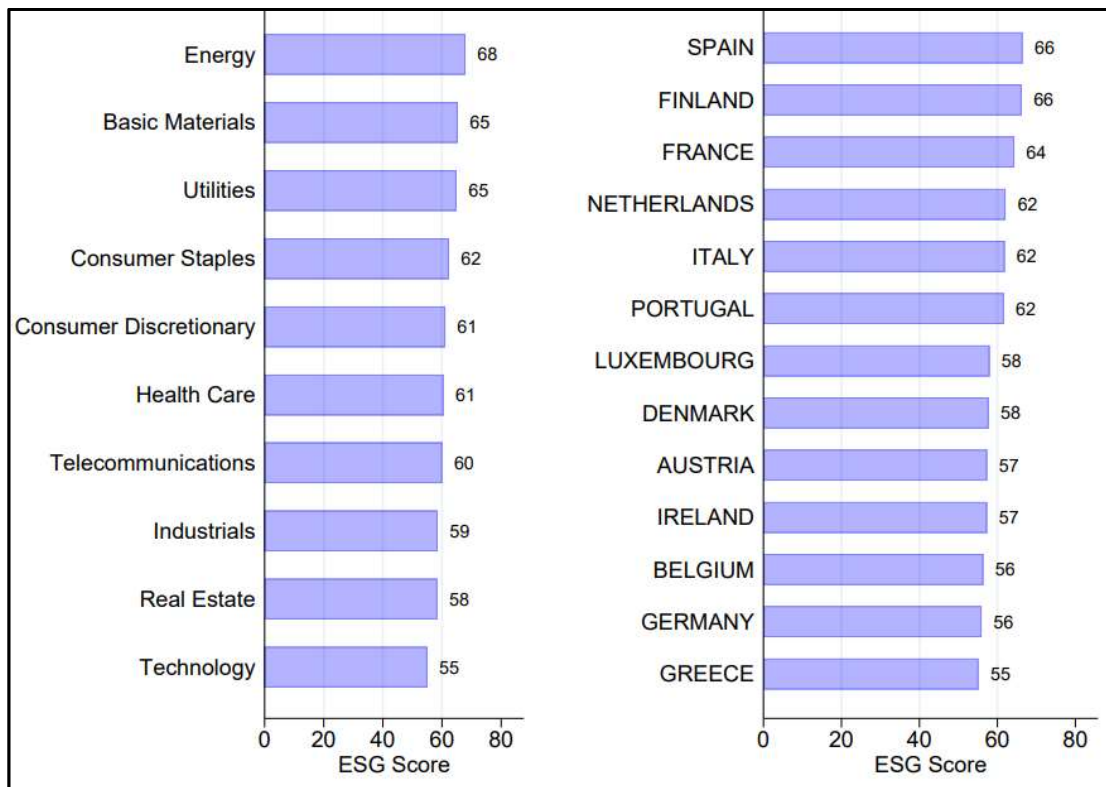


Table 2. Descriptive statistics

Variable	Min	Mean	Median	Std Dev	Max
ESG	1.21	53.49	55.39	21.10	94.69
BoardSize	1.00	11.93	12.00	4.64	38.00
GenderDiv	0.00	20.83	20.00	15.17	80.00
CulturalDiv	0.00	30.35	23.53	23.84	100.00
CeoDuality	0.00	0.29	0.00	0.45	1.00
Independents	0.00	53.25	52.63	28.02	100.00
Roa	-5.21	4.95	4.47	5.12	16.57
CSRCommittee	0.00	0.59	1.00	0.49	1.00
Assets	7,00	45,85	3,06	262,62	6,397,94
Debt/Assets	0.00	26.65	25.39	18.91	279.31

Table 3. Multivariate analysis. In models 1 and 2, panel regressions with Fixed Effects are reported, while in models 3 and 4, Random Effects of the dependent variable ESG score are reported on the dummy variable indicating the post-EU Directive 95/2014 period, on explanatory variables related to the board, and on control variables. In models 3 and 4, slope shifters are used to identify the effects of EU Directive 95/2014 on the explanatory variables.

	(1)	(2)	(3)	(4)
	fe	fe	re	re
	ESG	ESG	ESG	ESG
BoardSize	-0.18 (0.13)	0.02 (0.15)	0.00 (0.12)	0.19 (0.14)
GenderDiv	0.19*** (0.03)	0.14*** (0.03)	0.18*** (0.02)	0.13*** (0.03)
CulturalDiv	0.07*** (0.02)	0.06*** (0.02)	0.06*** (0.02)	0.05*** (0.02)
CeoDuality	-1.08 (0.82)	-2.36*** (0.88)	-0.48 (0.76)	-1.65* (0.87)
Independence	0.10*** (0.02)	0.12*** (0.02)	0.10*** (0.02)	0.11*** (0.02)
CSRCommittee	10.82*** (0.87)	12.17*** (0.98)	11.57*** (0.84)	12.80*** (0.96)
Dpost	3.80*** (0.63)	11.36*** (2.58)	3.60*** (0.59)	8.63*** (2.42)
Dpost x BoardSize		-0.60*** (0.13)		-0.47*** (0.12)
Dpost x GenderDiv		0.10*** (0.04)		0.10*** (0.04)
Dpost x CulturalDiv		0.00 (0.02)		0.00 (0.02)
Dpost x CeoDuality		2.31** (0.99)		2.11** (0.96)
Dpost x Independence		0.00 (0.02)		0.01 (0.02)
Dpost x CSRCommittee		-4.17*** (1.16)		-3.47*** (1.13)
Roa	-0.12** (0.05)	-0.12*** (0.04)	-0.08* (0.05)	-0.08* (0.04)
DebtAssets	-0.03 (0.03)	-0.03 (0.03)	-0.02 (0.02)	-0.02 (0.02)
LnAssets	4.05*** (0.83)	3.91*** (0.76)	3.94*** (0.35)	4.05*** (0.34)
Constant	-24.10* (13.07)	-24.93** (12.06)	-26.61*** (5.13)	-30.97*** (5.30)
R^2 (R^2 -within)	0.48	0.50	(0.50)	(0.49)
N(ID)	835	835	835	835

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

Figure 4. Effects of (statistically significant) variables on ESG score based on the results of the first fixed effect model in Table 3.

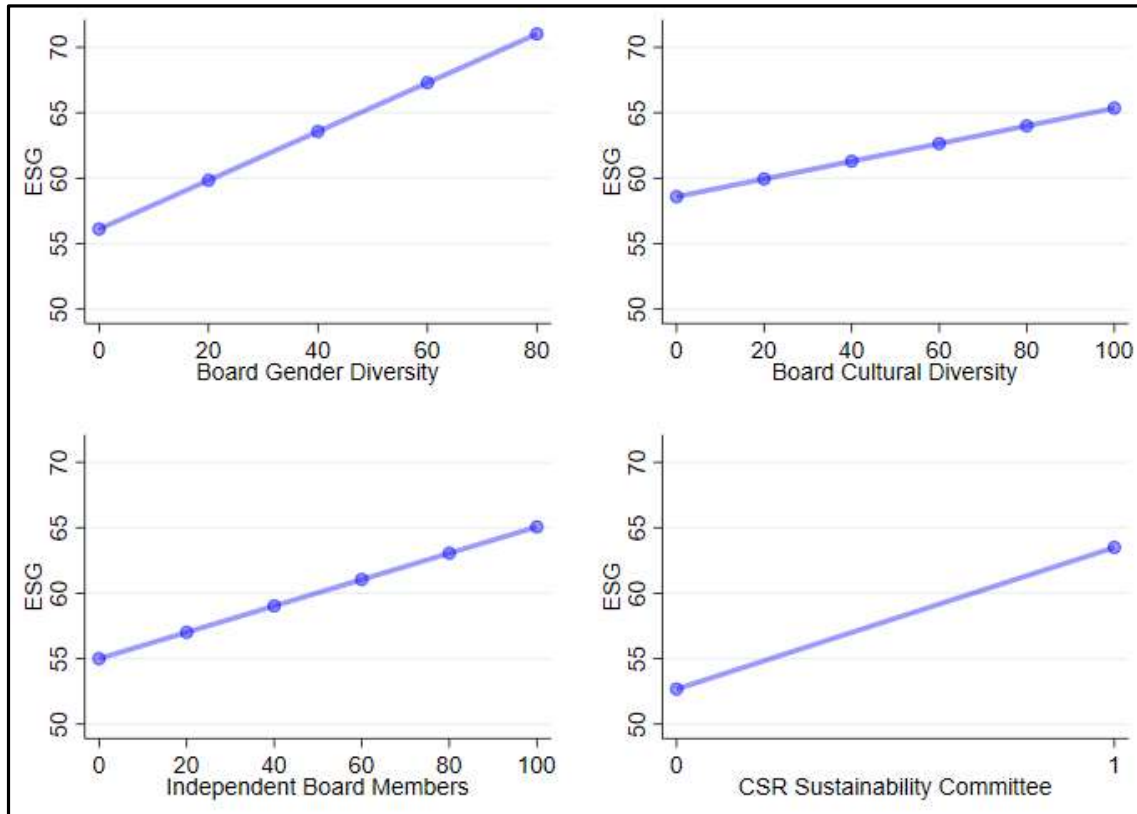


Table 4. Alternative specifications. All models use the specifications of model 2 of Table 3 (fixed effect models), using as response variables ESG (models 1 and 2) and ES (models 3, 4, and 5), respectively. In models 1 and 4, the control variables are lagged by one year. In models 2 and 5, both the control and the governance variables are lagged by one year.

Variables Lagged	(1)	(2)	(3)	(4)	(5)
	ESG	ESG	ES	ES	ES
	Control	Control & Governance		Control	Control & Governance
BoardSize	0.03 (0.15)	0.14 (0.14)	0.40** (0.17)	0.41** (0.18)	0.40** (0.16)
GenderDiv	0.13*** (0.03)	0.12*** (0.03)	0.16*** (0.04)	0.16*** (0.04)	0.12*** (0.04)
CulturalDiv	0.07*** (0.02)	0.05** (0.02)	0.05* (0.03)	0.05* (0.03)	0.04* (0.02)
CeoDuality	-2.33*** (0.89)	-1.76** (0.89)	-1.74* (0.98)	-1.58* (0.97)	-1.53* (0.99)
Independence	0.12*** (0.02)	0.10*** (0.02)	0.08*** (0.02)	0.08*** (0.02)	0.06** (0.03)
CSRCommittee	12.16*** (1.00)	9.38*** (0.94)	16.79*** (1.19)	16.51*** (1.23)	13.05*** (1.13)
Dpost	10.97*** (2.57)	12.60*** (2.58)	19.47*** (2.85)	19.07*** (2.83)	18.86*** (2.80)
Dpost x BoardSize	-0.57*** (0.13)	-0.57*** (0.13)	-0.70*** (0.14)	-0.68*** (0.14)	-0.65*** (0.14)
Dpost x GenderDiv	0.10*** (0.04)	0.09** (0.04)	0.05* (0.03)	0.05* (0.03)	0.07* (0.03)
Dpost x CulturalDiv	0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.00 (0.02)	-0.01 (0.02)
Dpost x CeoDuality	2.31** (0.99)	1.67* (0.96)	2.18** (1.08)	2.11* (1.09)	1.23* (1.04)
Dpost x Independence	0.00 (0.02)	0.00 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.00 (0.03)
Dpost x CSRCommittee	-4.14*** (1.18)	-4.57*** (1.14)	-7.63*** (1.32)	-7.46*** (1.34)	-7.89*** (1.32)
Roa	0.01 (0.05)	0.00 (0.05)	-0.11* (0.06)	0.01 (0.06)	0.02 (0.06)
DebtAssets	-0.04* (0.02)	-0.04* (0.02)	-0.04 (0.03)	-0.03 (0.03)	-0.02 (0.03)
LnAssets	4.09*** (0.81)	4.83*** (0.76)	4.84*** (0.94)	4.91*** (0.96)	5.45*** (0.93)
Constant	-28.24** (12.95)	-36.66*** (11.64)	-46.73*** (15.15)	-48.27*** (15.62)	-51.01*** (14.47)
R ²	0.49	0.43	0.52	0.51	0.46
N(ID)	530	517	531	530	517

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

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