Are ESG female?
The Hidden Benefits of Female Presence on Sustainable Finance

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Abstract

We empirically prove that an increase in gender equality has a positive effect on a firm's financial performance and on its share of sustainable investments.

We find a negative significant correlation between a firm's 5-years probability of default and its ESG scores. Furthermore, we find that the presence of a Corporate Social Responsibility Committee, which improves ESG scores, is positively and significantly correlated to the presence of female directors. Succintly: the higher the number of female directors, the lower the risk of default.

Our results suggest to employ ESG scores, chiefly the Social (S) and Governance (G) dimensions, to monitor gender inequalities across companies and, in particular, across the EU-27's largest company, for which good quality data are available.

1 Research hypotheses

In this paper, we investigate (I) the way female presence affects a firm's financial performance and (II) the linkage between female presence and sustainable finance. By "female presence" we mean women in decision-making positions (i.e. female directors and/or executives). By investigating the previous hypotheses we contribute to the literature that study the link before gender equality and corporate governance.

For the first hypothesis, we will show that the presence of female in the Board of Directors (BoD) improves a firm' financial performance, which in turns reduces the probability of default and, therefore, the cost of debt.

A consistent body of research has proved that enhancing the role played by female directors in the value creation process has positive effects on a company's performance. Particularly, firms enhancing higher gender equality are likely to obtain a significant economic benefit and an advancement of gender equality could increase global GDP by 26% by 2025 (Mckinsey, 2015). Appointing women as directors improves the dialogue within the BoD and the quality of decision-making process, which ultimately favours the implementation of innovating and competitive business strategies (Romano et al., 2020). Finally, companies in the top quartile for gender diversity on executive teams are found to be 25% more likely to have above-average profitability compared to companies in the last quartile (Dixon et al., 2020).

For the second hypothesis, we will show that the higher the number of female directors, the higher the share of sustainable investments made by a firm.

A recent research by Velte and Stawinoga (2020) shows that the presence of Corporate Social Responsible (CSR) sustainability Committees, which are responsible for a firm's socially responsible actions and reputation, seems to be favoured by the presence of female directors. This is line with a rather innovative field of research (e.g. Azmat & Rentschler, 2017) focused on the role played women on influencing a company's performance in terms of sustainability or socially responsible behaviour. In other words: the more women there are, the higher the corporate environmental investments (Jiang & Akbar, 2018).

Concerning the link between gender equality and corporate governance, poor level of corporate governance are likely to lead to a higher probability of default, particularly for firms with high growth opportunities and greater stock liquidity. Poor corporate governance may cause information asymme-

tries between management and shareholders, which maximize moral hazard problem, with managers pursuing their self-interest and transferring corporation profits to themselves at the expense of shareholders. By contrast, better-governed firms are strongly associated with a lower level of default risk and the relationship is stronger among firms with higher growth opportunities (Ali et al., 2018).

Psychological differences between men and women have major consequences on corporate governance. Since women have a different perception of leadership role than men, they typically pay higher attention to stakeholders' interests, whereas men mostly focus on shareholders' (Adams et al., 2011). Women also tend to reduce information asymmetries among stakeholders and with the market, they are more likely to propose alternative solutions and to manage firm's social and environmental challenges (Shaukat et al., 2016). In sum, female presence in the Board of Directors seems to positively affects a firm's performance and it can be viewed as an opportunity to invest in social engagement (Arayssi et al., 2016).

Similar advantages can be referred to the social dimension. La Rosa et al. (2018) found a negative relationship between corporate social performance (CSP) and interest rates, as well as a positive relationship between corporate social performance and debt rating. They eventually concluded that performing well on the social side may positively impact on the reduction of the cost of capital. Likewise, Corporate Social Responsibility (CSR) has a strong effect on default risk reduction and this relationship is found to be remarkably high among firms with a more dynamic environment (Sun & Cui, 2014). Notably, voluntary disclosure of CSR information reduces problem asymmetric information between market agents, improving reputation and reducing the agency costs of debt (La Rosa et al., 2018).

To sum up, an increase in gender diversity has a positive effect on corporate outcomes (Romano et al., 2020). Though the problem of gender equality has been gaining considerable importance over the last decades, a number of related benefits are still unknown to many.

Our analysis aims at filling this gap and broadening the knowledge on the aforementioned benefits.

2 Data and summary statistics

In this section, we will present the dataset used for the statistical analysis aimed at verifying hypotheses I and II.

The credit quality of a firm is a crucial information which reflects a company's financial health and its ability to meet debt obligations. Credit quality can be expressed as a credit score, but it is most explicit when expressed as a probability of default, thereby bringing significant information on a company's credit condition across different time horizons.

In line with the possibly long time needed for gender equality to manifest its effects, we decided to use as a response variable the 5-years default probability of firms. It is a continuous variable with values between 0 and 1, calculated as the probability of insolvency of the company over the next five years, according to the Bloomberg issuer default risk model (Bloomberg, 2021). We remark that the choice of a 5-years time horizon is in line with the fact that Environmental, Social and Governance (ESG) scores, which include gender equality, are mostly used for investment decision in long-term horizons.

To measure the effect of female presence in a company, several explanatory variables can be employed. The most widely used are: the number of female employees; the existence of policies favouring inclusion or diversity; the existence of programs favouring work/life balance; achievements in gender parity, including equal pay; reports of controversies related to sexual harassment and discrimination (Morgan Stanley, 2016). The Social (S) and Governance (G) scores are calculated taking into account all the previous indicators and, therefore, can be used as proxy measurements of gender equality (see e.g. Goldman Sachs, 2020; Morgan Stanley, 2020).

In practice, the availability of (S) and (G) related data may be a problem. Given that firms face no obligations in the disclosure of information, they may share some data and retain others (Mooney, 2021; Strobel, 2020). As a result, ESG data providers may suffer from data quality issues. In our analysis, we consider the Bloomberg database as it seems, to date, one of the few providing, for a relatively large sample of companies, not only aggregate ESG scores, but also specific score for each of the three dimensions (E), (S) and (G) (Escrig-Olmedo et al., 2019).

Bloomberg database theoretically accounts for a variety of interesting indicators of gender equality at the micro-level, such as: average weeks of (paid) maternity leaves; the availability of a firm's human rights policy; the percent-

age of female employees; the percentage of female engineers; the presence of requisite of gender diversity for managers candidates; reports of sexual harassment and discrimination. However similar data tend to be available only for a limited set of companies.

Trying to balance informativeness with data quality, we opted for the following measures of gender equality, which were available for all companies included in the sample. They are: the presence of equal opportunity policies[2](binary variable); the presence of health safety policies (binary variable); the percentage of women in the Board; the number of female directors and the number of female executives; the existence of gender pay gap breakout[3]; the fairness of the remuneration policies (binary variable).

To extend the width of our analysis, we also included: the presence of a Corporate Social Responsible (CSR) sustainability committee (binary variable);the average and the total board compensation; the aggregate ESG scores along with the specific scores for the social (S) and governance (G) dimensions.

Finally, we included some control variables at the firm level, namely: (I) the market capitalization, calculated by multiplying the total number of a company's outstanding shares by the current market price of a share; (II) the return on assets (ROA), a measure of how efficiently a company's management uses assets to generate earnings; (III) the return on Equity (ROE), calculated by dividing net income by shareholders' equity, a measure of financial performance; (IV) the return on Invested Capital (ROIC), which expresses the capability of a company to extract value from its investments; (V) the weighted Average Cost of Capital (WACC), in which each category of capital is proportionately weighted; (VI) the financial leverage, given by the ratio between total assets and total equity, which assesses the ability of a company to meet its financial obligations; (VII) the ratio between Sales and Revenues and (VIII) the ratio between Return on Capital (ROIC) and WACC, which can help to assess the performance of the company and, finally, (IX) the credit rating, expressed by Bloomberg's analysts rating on a scale from 1 to 5 (1 represents the weakest value, a signal to sell firm's shares, 5 represents the strongest value, a signal to buy firm's shares);

Moving to the sample choice, we consider the most recent data (2020)

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[2]Referred to any form of initiative, commitment or policy that ensures non-discrimination of any type of demographic group (Bloomberg, 2021)

[3]a binary variable constructed by Bloomberg which is either a Y (yes=1) or a N (no=0) (Bloomberg, 2021)

from European Union countries which, at the moment, seem more sensible to ESG considerations (i.d. TEG, 2020). We considered only countries for which enough information is available. For instance, Luxembourg has only 3 complete observations (3 companies for which all variables were available) and, for this reason, it was dropped. Furthermore, to obtain a balanced dataset we added Norway. Though not a EU Member, Norway's historical and socio-cultural features are comparable to other EU Members, such as Sweden and Finland. Therefore, its inclusion seems consistent with the goal of measuring gender equality across European companies. The database finally obtained contains more than 15.000 observations on the year 2020 for 12 countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain and Sweden.

We are now ready to introduce the summary statistics calculated on the available data. To put their interpretation in context, we introduce a binary variable which separates Northern and Southern companies. More specifically, observations from Austria, Belgium, Finland, Germany, Ireland, the Netherlands, Norway and Sweden have been grouped under the label "North", whereas those from Italy, France, Portugal and Spain have been grouped under "South". We have used, without loss of generality, a "statistical" criteria of inclusion. For instance, France was included in the South block as it presented scores comparable to most Southern countries. Austria was included in Northern countries for similar reasons. Though Northern countries outnumber Southern ones, the number of companies for each block is comparable (329 Northern companies vs 229 Southern companies), therefore the sample is well balanced.

Table 1 contains the summary statistics for all the introduced variables, separately for Northern and Southern companies.

The five years (probability of default) PD is, on average, slightly lower for Southern companies (7 basis points of difference: 4.43 percent against 4.78 percent), while the ESG scores of Northern companies are lower than Southern ones (35 basis points of difference). Consistently, Environmental (E), Social (S) and Governance (G) scores for Northern companies are on average lower than for Southern companies. Beside the overall credit rating of companies, which reflects both ESG and financial characteristics, is, on average, higher for Southern companies (3.83 *vs*.3.63), in line with previous findings.

Looking at the summary statistics for the gender equality related indicators (**table1**), the following insights can be obtained. The number of female

	North	South
5Y PD	4.3340*10^{-2}	4.2657*10^{-2}
ESG	4.4383*10	4.7808*10
E	3.6902*10	3.9565*10
S	4.5327*10	4.7983*10
G	5.9929*10	6.3899*10
% Women Board	3.2891*10	3.6618*10
N. Female Directors	3.43	4.62
N. Female Executives	1.40	1.50
Average Board Compens.	4.7291*10^5	1.4723*10^5
Total Board Compens.	4.4938*10^6	1.5303*10^6
MARKET CAP	1.4059*10^4	1.4659*10^4
ROA	2.4377	1.3520
ROE	6.6329	1.0719
ROIC	4.4085	4.2220
ROIC/WACC	-1.7954	0.0876
WACC	6.5650	0.0810
Financial Leverage	4.8256	6.4205
Sales/Rev	2.0211*10^4	1.0995*10^4
Rating	3.6271	3.8265

Table 1: Descriptive Statistics: North *VS* South.
Source: Authors' Elaboration Based on Data Downloaded from Bloomberg, 2020

executives and the number of female directors are, on average, higher in Southern companies than in Northern ones. The same holds for the average percentage of women on Board (about 33% and 37% respectively). So far, it seems that Southern companies perform better than Northern ones in terms of gender equality, but this is not the full story yet. Both the average and the total Board compensations are much higher in the North than in the South, in line with the average higher income. Within this framework, a further analysis of Bloomberg's database reveals that a fair remuneration policy is witnessed in 16 Northern companies out of 329, whereas only 7 Southern companies out of 228 are found to comply with it. Consistently, a gender pay gap is found to exist in more than half of Southern companies (128 over 228), whereas only 70 Northern companies over 329 report it. On the other hand, a smaller gap exists in terms of health safety policies (322 over 329). The availability of health and safety policies is relevant for our research, as men and women typically work in different environments, face different working conditions and work-hazards and also differ in physical strength and biolog-

ical reproductive makeup. Acknowledging these differences and adopting a gender-sensitive approach to health and safety at work is crucial to improve prevention and allow everyone to be equally protected (UNISON, 2016).

Since only 37% of women is currently employed in managerial positions across the EU-27 (Eurostat, 2020), focusing only on female representation at top-level positions (e.g. number of women on Board, number of female executives) may provide a partial and even deceiving view on the matter of gender equality. By contrast, the fairness of the remuneration policy and the gender pay gap at firm-level can conceive significant information.

A fair remuneration policy is supposed to comply with four aspects: minimum wage, fair wage, equal pay and gender pay gap (DSM, 2020). In a company, the less fair the remuneration policy, the larger the pay gap between top-level and low-level employees (UNRISD, 2020). As most women in the EU are typically employed in part-time, low-level positions (EIGE, 2019), low level of income equality at firm-level will inevitably cause the gender pay gap to widen. In line with this intuition, larger gender pay gaps are associated with relatively unfair remuneration policies in Southern companies, while narrower gender pay gap correspond to fairer policies in Northern companies. This in line with common expectations, as Northern companies are on average embedded in a more egalitarian environment than Southern ones (World Economic Forum, 2021) and, therefore, they are more likely to implement policies favouring gender income equality.

On this note, a typical measure of income equality within a company is the pay ratio between employees at the bottom (or near the bottom) of the income pyramid and employees at the top (i.e., CEOs) (UNRISD, 2020). In theory, Bloomberg accounts for this indicator, yet it was hardly ever available. For this reason, we eventually opted for the "Average Board Compensation" or "Total Board Compensation" as mere indicators of income level across firms. As the cost of living for North countries typically exceeds the level in South countries (Eurostat, 2018), the average or total Board Compensation is consistently higher for Northern companies than Southern.

We also point out that Corporate Social Responsibility (CSR) Committees, which are responsible for a firm's socially responsible actions and reputation (Velte & Stawinoga, 2020), are more present among Southern companies than among Northern ones. More in details, such Committees are found in 141 Southern companies out of 229, whereas only 50 Northern companies report their presence. Since these Committees are part of the Board (Velte & Stawinoga, 2020), a potential explanation of the large difference may lie in

the percentage of women on Board, which is higher for Southern companies. In other words, the presence of women on Boards might favour the presence of CSR sustainability Committees. This link will be further analysed in the following section.

In summary, it is quite hard to tell whether North or South companies perform better in terms of gender equality. While Southern companies perform slightly better in terms of higher ESG scores, they have a lower fairness of their remuneration policies together with a wider gender pay gap.

In the next section, we introduce a more advanced regression model to test the validity of our research hypotheses.

3   Regression models

To establish whether our hypotheses are supported by empirical data, we have implemented regression model selections.

Table 2 yields the results from the first regression, based on a stepwise model selection algorithm carried out by the software R. In the selected regression model, Bloomberg's 5 years default probability is used as a response variable, while the Country (North/South), the market capitalisation (Mkt_Cap), ROE, ROIC, the ratio between ROC and WACC (ROC/WACC), the financial leverage (Fin_Lvrg), the analyst rating (Rating), the percentage of women on Board (Pct_Wom_BoD), the presence of CSR Sustainability Committee (CSR_Sust_Commitee), the total Board Compensation (Tot_BoD_), the ESG scores and the scores for Social (S) and Governances (G) are all used as explanatory variables.

From **Table 2** note that there is positive correlation between the 5-years default probability and the binary variable country (which assigns 1 to Northern countries and 2 to Southern countries), in line with the summary statistics. A weak positive correlation (with significance level of 10%) is found between the total ESG scores and the 5-years default probability, whereas Social (S) and Governance (G) significantly impact on the 5-year probability (with significance levels of 5% and 1% respectively).

More precisely, an increase by 10% in either Social (S) or Governance (G) scores leads to a decrease of the default probability by about 0.5 and 0.9 percent, respectively. These effects are counterbalanced by the opposite effect of the total ESG score, whose 10% increase leads to an increase of the default probability of about 0.7 percent. However, by summing up the

Residuals:				
Min	**1Q**	**Median**	**3Q**	**Max**
-0.185160	-0.021554	-0.008315	0.009157	0.263324

Coefficient	**Estimate**	**Std. Error**	**t value**	**Pr (>| t |)**
(Intercept)	$1.162*10^{-1}$	$1.856*10^{-2}$	6.262	$9.16*10^{-10}$ ***
Country	$1.195*10^{-2}$	$5.304*10^{-3}$	2.253	0.024773 *
Mkt_Cap	$-2.667*10^{-7}$	$9.895*10^{-8}$	-2.705	0.007091 **
ROE	$-1.160*10^{-4}$	$4.298*10^{-5}$	-2.698	0.007243 **
ROIC	$-7.490*10^{-4}$	$1.836*10^{-4}$	-4.079	$5.39*1^{-5}$ * **
ROC/WACC	$-6.608*10^{-4}$	$9.005*10^{-5}$	-7.338	$1.09*10^{-12}$ * **
Fin_Lvrg	$1.008*10^{-3}$	$2.793*10^{-4}$	3.608	0.000344 ***
Rating	$-1.062*10^{-2}$	$2.887*10^{-3}$	-3.678	0.000265 ***
Pct_Wom_BoD	$-3.028*10^{-4}$	$1.888*10^{-4}$	-1.604	0.109504
CSR_Comm	$7.919*10^{-3}$	$5.040*10^{-3}$	1.571	0.116872
Tot_BoD_Comp	$1.310*10^{-9}$	$5.894*10^{-10}$	2.222	0.026808 *
ESG	$7.087*10^{-4}$	$3.821*10^{-4}$	1.854	0.064350 .
Social	$-5.523*10^{-4}$	$2.590*10^{-4}$	-2.132	0.033544 *
Governance	$-7.988*10^{-4}$	$2.753*10^{-4}$	-2.901	0.003906 **

Table 2: Linear regression of the probability of default on the explanatory variables. Source: Authors' Elaboration Based On Data Downloaded from Bloomberg, 2020. Note: the significance codes are: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1. The Multiple R-Squared is equal to 0.4188, with an F-Statistic equal to 23.94 on 13 and 432 DF and a p-value which is less than $2.2*10^{-16}$.

three linear coefficients, we obtain that the overall effects is negative, with a decrease in the default probability of about 0.7 percent, when all of ESG, G and S increase by 10%. If we compare the decrease in PD with the average PD of about 4.30, as seen in the previous section, we roughly obtain a 16% decrease of the PD, implied by ESG factors. This result demonstrates that by enhancing the share of ESG investment in Social (S) and Governance(G), firms can reduce the probability of default. Similar results are also evidenced by similar studies (e.g. Ali et al., 2018; La Rosa et al., 2018).

Table 2 shows another important result. The percentage of women on BoD is negatively correlated with the default probability, thus the more women there are on the Board, the lower the risk of default. This is consistent with what found in the previous section. More women in the Board increase dialogue among board members, improve the quality of decision-making process and favours the implementation of innovating and competitive business strategies, with a positive effect on corporate outcomes (Romano et al., 2020).

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The obtained empirical evidence supports the validity of our research assumption I: a higher presence of women in the board and, more generally, higher Social and Governance scores, decrease the probability of default of a firm, improving its financial performance.

The table yields, however, other interesting results. An apparently counter intuitive correlation is found for the presence of CSR Committee, which seems to be positively related to a higher probability of default. This result can be explained as it follows. CSR committees are designed to fight corruption, protect stakeholders, create shared value and reduce a company's exposure to failures in contexts where management becomes more complicated (Gennari & Salvioni, 2019). Thus, companies are more likely to set up CSR Committees when they face financial difficulties (as implied by a high probability of default), as a way of conquering or maintaining investors' trust. This explains the negative correlations between the presence of a CSR committee and the probability of default.

Another controversial result concerns the total Board of Directors compensation: when the total BoD compensation increases, so does the probability of default. This may be the result of an increase in agency problems and conflict of interest. For example, equity-based compensation for external directors affects shareholder-bondholder conflicts, increasing the likelihood of risk-shifting, which could hurt bondholders (Ertugrul & Hegde, 2008).

In **table 4** (see appendix), we test the robustness of our analysis. Rating scores (from 1 to 5) were transformed into a binary variable taking value 1 if results are strong (ratings going from 4 to 5) and 0 otherwise (ratings going from 1 to 3). Hypothesis I is confirmed. The variable "Female CEO" makes its appearance and it shows a negative correlation.

We now move to our second research hypotheses: does female presence increase sustainable finance?

In the extant literature, there is evidence of a positive and significant correlation between the number of female directors and the presence of CSR committees. This is in line with a rather innovative field of research (e.g. Azmat & Rentschler, 2017; Li et al., 2017) which enquires the correlation between the number of female directors and the level of corporate environmental investments. They found that the more the women, the higher the corporate environmental investments (Jiang & Akbar, 2018).

To check the validity of this result in our sample, and extend it, we performed a Probit regression with the software R, using the CSR Sustainability

Coefficient	Estimate	Std. Error	t value	Pr ($>$| t |)
(Intercept)	-1.622	3.897×10^{-1}	-4.161	3.16×10^{-5} ***
Mkt_Cap	8.845×10^{-6}	3.152×10^{-6}	2.806	0.005021 **
Wacc	-8.692×10^{-2}	1.743×10^{-2}	-4.988	6.11×10^{-7} ***
Fin_Lvrg	-2.079×10^{-2}	1.071×10^{-2}	-1.940	0.052367 .
BB_default_prob	5.241	1.454	3.605	0.000312 ***
Rating	2.176×10^{-1}	8.654×10^{-2}	2.514	0.011937 *
N_Fem_Executives	7.470×10^{-2}	4.017×10^{-2}	1.860	0.062937 .
N_Fem_Directors	1.467×10^{-1}	3.500×10^{-2}	4.192	2.77×10^{-5} ***
Tot_BoD_Compens	-5.467×10^{-8}	1.966×10^{-8}	-2.781	0.005422 **

Table 3:

Probit regression of the presence of a CSR committee on the explanatory variables. Source: Authors' Elaboration Based on Data Downloaded from Bloomberg, 2020. Significance Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1. Null Deviance 716.24 on 556 degrees of freedom; Residual Deviance: 583.96 on 548 degrees of freedom; Akaike Information Criterion: 601.96.

Committee binary variable as response variable.

Table 3 yields the results from the selected probit regression, based on a stepwise model selection algorithm carried out by the software R. In the selected regression model, the existance of a CSR committee is used as a response variable, while the market capitalisation (Mkt-Cap), the WACC, the financial leverage (Fin_Lvrg), the Bloomberg default probability, the analyst rating (Rating), the number of women executives, the number of women directors and the total Board Compensation (Tot_BoD_) are all used as explanatory variables.

The results from **table 3** are in line with Jiang and Akbar (2018): a higher number of female directors increases the likelihood of having a CSR committee.

The results support our hypotheses II: a higher number of female directors favours the presence of a CSR Committee, which is likely to boost the share of sustainable investments made by a company. A higher number of female executives similarly shows a positive correlation.

In addition, the total Board compensation is negatively and significantly correlated to the presence of CSR Committees. A potential explanation can be found in women's tendency to care more about stakeholders' interest rather than shareholders' (Adams et al., 2011), which in turn may trigger lower earnings for the Board.

The market cap shows a positive and strong correlation: the larger the firm, the more likely a CSR committee. The WACC is instead negatively and strongly correlated to the dependent variable: the higher the cost of capital, the less likely the CSR.

Finally and consistently with the results in **Table 2**, the default probability is negatively correlated with the presence of a CSR Committee. On the other hand, a better analysts' rating is correlated with a higher likelihood of a CSR Committee.

Table 5 (see appendix) tests the robustness of our analysis. We opted for a step-wise logistic regression using the number of female directors as dependent variable. The CSR sustainability Committee is reassuringly positively and significantly correlated to the number of female directors. Our hypothesis II holds.

4 Conclusions and policy suggestions

Both our research hypothesis have been confirmed by the available data.

(I) The presence of female directors improves a firm's financial performance. More specifically, a higher number of female directors has been found to be negatively correlated with the cost of debt and positively correlated with the credit rating.

Beside, (II) the higher the number of female directors, the higher the share of sustainable investments. This is proved by the strong and positive correlation between the presence of CSR sustainability Committee and the number of female directors. In other words, sustainable finance seems to be enhanced by the presence of female directors.

Our conclusions are that a higher level of female presence is likely to improve a firm's performance both in financial and sustainable terms. In addition, we have shown that Environment (E), Social (S) and Governance (G) indicators can be used to assess the level of female presence and its relative effects on a firm's performance.

Our encouraging results, along with the limited availability of data, advocate for further research and the introduction of policy actions. In line with the European Parliament's suggestion (2020) that the range of tools used to monitor gender equality at EU level needs to be enlarged, a monitoring model of gender equality based on ESG criteria could be introduced.

Since the Social (S) and Governance (G) dimensions of ESG account

for a number of informative indicators on the matter of gender equality, their periodical collection could lead to the construction of a comprehensive database on the matter. A monitor model would ultimately favour a deep understanding of the problem of gender equality across the EU-27's firms and help to improve policy decisions.

The correct implementation of a similar scheme calls for the development of a Common framework for rating agencies regarding their evaluation methodologies. Indeed, the lack of common evaluation criteria have led to a lack of transparency, with ESG rating agencies hardly providing complete and public information about the evaluation criteria they use, which in turn could lead to a trade-off among criteria, as low scores in one dimension may be offset by higher scores in another (Escrig-Olmedo et al., 2019).

According to some experts (Escrig-Olmedo et al., 2019), ESG rating agencies need to integrate sustainability in their evaluation criteria, which could happen only if (I) the three dimensions (E,S,G) were weighted similarly and (II) if future or current needs and specific risks considering both the short and long term were explicitly considered in the evaluation process.

Alongside a standardisation of methodology, European authorities ought to develop a disclosure of ESG indicators to provide clear and unique information to the monitored firms. Something similar has been already done by the "Technical Expert Group on sustainable finance" (TEG), which was set up in 2018 by the European Commission with the aim of developing a disclosure of ESG factors and the so called "EU taxonomy", which is a classification system determining whether an economic activity is environmentally sustainable or not (TEG, 2020). The framework developed by the TEG is indeed one of the most significant achievement in the field of sustainable finance (TEG, 2020), albeit it essentially concerns Environment (E).

Following this example, European authorities could favour a disclosure of ESG factors on the matter of gender equality and a new "EU taxonomy" for gender equality.

To some extent, the measures proposed in our analysis could be regarded as rough guidelines for the development of Common standards, in the sense that gender equality needs to be assessed beyond women's representation at firm level, also accounting for organizational services, policies and programs promoting gender diversity and inclusion (BNY Mellon & UN Foundations, 2018).

Since data collected by means of ESG only provide information at firm-level, some could question their usefulness. From our point of view, this is

a strength of the approach, as the gender pay gap in the EU is larger in the private sector than in the public one (Eurostat, 2021) and work-family polices are more likely to be enforced in the public sector than the private one (Nielsen et al., 2004). In other words, the need for monitoring gender equality progress is likely to be higher in the private sector than in the public sector

Were the EU to develop a Common monitoring model, a huge amount of informative data could be obtained and used to improve policy decisions on the matter. Innovative tools such as the Social (S) and Governance (G) dimensions of ESG could be sharpened, as advocated for by EU authorities (i.d. European Parliament, 2020).

A number of financial servers devoted to the collection of similar information exist (e.g. Bloomberg). Though sometimes the lack of available data may be frustrating, the adoption of a Common European framework could urge companies to full disclosure of all relevant information.

Of course, this is not the ultimate solution for such a complex problem like the assessment of gender equality, yet the value of our results lies in the possibility of broadening the usage of ESG criteria to monitor gender equality at the firm's level.

Acnowledgements

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Appendix

Residuals:

Min	1Q	Median	3Q	Max
-0.177023	-0.024683	-0.010200	0.006455	0.260636

Coefficient	Estimate	Std. Error	t value	Pr $(>\mid$ t $\mid)$
(Intercept)	$5.292*10^{-2}$	$2.285*10\text{-}2$	2.316	0.02104 *
Country	$9.441*10^{-3}$	$5.725*10^{-3}$	1.649	0.09989 .
Mkt_Cap	$-2.705*10^{-7}$	$9.317*10^{-8}$	-2.904	0.00388 **
ROE	$-9.452*10^{-5}$	$4.734*10^{-5}$	-1.997	0.04648 *
ROIC	$-8.269*10^{-4}$	$1.945*10^{-4}$	-4.252	$2.60*10^{-5} ***$
ROC/WACC	$-6.855*10^{-4}$	$9.552*10\text{-}5$	-7.177	$3.15*10^{-12} ***$
Fin_Lvrg	$8.271*10^{-4}$	$3.054*10^{-4}$	2.708	0.00704 **
Rating	$-8.075*10^{-3}$	$4.600*10^{-3}$	-1.755	0.07900 .
Female_CEO	$-1.466*10^{-2}$	$1.043*10^{-2}$	-1.406	0.16054
Pct_Wom_BoD	$-3.169*10^{-4}$	$2.081*10^{-4}$	-1.523	0.12857
Health_safety_pol	$2.750*10^{-2}$	$1.878*10.2$	1.464	0.14391
CSR_Comm	$9.412*10^{-3}$	$5.672*10^{-3}$	1.659	0.09775 .
Tot_BoD_Comp	$9.457*10^{-10}$	$5.829*10^{-10}$	1.622	0.10544
Social	$-2.699*10^{-4}$	$1.651*10^{-4}$	-1.635	0.10281
Governance	$-3.486*10^{-4}$	$2.167*10^{-4}$	-1.608	0.10848

Table 4: Regression of the rating on the explanatory variables. Source: Authors' Elaboration Based On Data Downloaded from Bloomberg, 2020. Note: the significance codes are: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1. The Multiple R-Squared is equal to 0.3557, with an F-Statistic equal to 16.99 on 14 and 412 DF and a p-value which is less than $2.2*10^{-16}$.

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.1168	-0.9047	-0.0939	0.9352	4.5594

Coefficient	Estimate	Std. Error	t value	Pr (>| t |)
(Intercept)	$-8.421*10^{-1}$	$5.414*10^{-1}$	-1.555	0.12060
Country	$6.751*10^{-1}$	$2.355*10^{-1}$	2.867	0.00434 **
Male_dominated	$-2.768*10^{-1}$	$1.517*10^{-1}$	-1.825	0.06871 .
Mkt_Cap	$1.483*10^{-5}$	$3.258*10^{-6}$	4.553	$6.88*10^{-6}***$
Wacc	$-5.425*10^{-2}$	$2.522*10^{-2}$	-2.151	0.03203 *
Fin_Lvrg	$1.594*10^{-2}$	$8.575*10^{-3}$	1.859	0.06368 .
Pct_Women_BoD	$7.816*10^{-2}$	$6.230*10^{-3}$	12.546	$<2*10^{-16}***$
CSR_Comm	$4.056*10^{-1}$	$1.662*10^{-1}$	2.440	0.01509 *
Tot_BoD_Compens	$9.420*10^{-8}$	$1.939*10^{-8}$	4.857	$1.66*10^{-6}***$
ESG	$1.416*10^{-2}$	$5.865*10^{-3}$	2.414	0.01618 *

Table 5: Regression of female directors on the explanatory variables. Source: Authors' Elaboration Based on Data Downloaded from Bloomberg, 2020. Note Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1. (Dispersion parameter for gaussian family taken to be 2.115519). Null deviance: 1643.62 on 445 degrees of freedom. Residual deviance: 922.37 on 436 degrees of freedom. AIC: 1611.8; Number of Fisher Scoring iterations: 2; Pseudo R-Squared: 0.4461273.