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

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Article abstract

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Most research on sustainable finance and its impact on corporate governance rely only on aggregate ESG ratings for their results. Such scores are typically a black-box, with financial providers supplying little information about their methodology. Our analysis not only develops disaggregate scores for each dimension, but also provides motivation for the measurement of gender equality by means of specific indicators, such as the number of female directors, going beyond the bare (S) or (G) rating. ESG ratings and specific indicators of gender equality were retrieved from the well-known Bloomberg provider. Relying on a dataset concerning European companies, we empirically show that an increase in gender equality has a positive effect on a firm's financial performance and on its share of sustainable investments.

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

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Though gender equality has been at the centre of debate over the last decades, a number of benefits concerning the impact of female directors on corporate performance are still overlooked. Particularly, the link that seems to exist between female directors and sustainable finance has received limited attention. We investigate the impact of an enhancement in female presence, meant as women in decision-making positions, on a firm's performance both in financial and sustainability terms. The goal is to contribute to the literature streams on gender economics and on sustainable finance.

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Keywords: ESG; Sustainable Finance; Risk management; Gender Economics; Bloomberg

JEL: C12;G32;G40;J16;J78;M14

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 focus on the link between gender equality and corporate governance.

For the first hypothesis, we find that the presence of females in the Board of Directors (BoD) improves a firm's financial performance, which in turn reduces the probability of default and, therefore, the cost of debt.

A consistent body of research has proven 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: 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 bottom quartile (Dixon et al., 2020).

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

Recent research by Velte and Stawinoga (2020) shows that female directors seem to favour the presence of Corporate Social Responsibility (CSR) Committees, which manage a firm's socially responsible actions and reputation. This is line with a rather innovative field of research (e.g. Azmat & Rentschler, 2017) that focuses on the role played by women in 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, a poor level of corporate governance is 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 asymmetries between management and shareholders, which maximize the 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 roles than men, they typically pay higher attention to stakeholders' interests, whereas men mostly focus on

shareholders' interests (Adams et al., 2011). Since women are typically more risk-adverse than men, their presence on the board has been found to be effective in risk monitoring (Terzani et al.,2020). Women also tend to reduce information asymmetries among stakeholders, and with the market, they are more likely to propose alternative solutions and manage a firm's social and environmental challenges (Shaukat et al., 2016). Similarly, a high female presence in corporate governance structures is likely to improve business management behaviour, ultimately favouring a better use of a firm's financing strategies (Fenoy-Castaño et al., 2021). Furthermore, the participation of female directors on the board and audit committee is found to improve reporting discipline and increase investors' confidence in financial statements (Srinidhi et al., 2011). To sum up, a female presence on the Board of Directors is likely to improve a firm's performance and represents an opportunity to invest in social engagement (Arayssi et al., 2016).

The framework we are presenting calls for a more detailed overview of ESG.

ESG can be defined as a set of standards used to screen potential investments in a company on the basis of how the company performs according to three criteria: Environment (E), Social (S) and Governance (G). In contrast to more traditional financial indicators, ESG criteria aim at enhancing financial returns while simultaneously promoting positive social and environmental outcomes (Morgan Stanley, 2019). The incorporation of such standards in the investment decision-making process is defined as "sustainable finance" and it is supposed to increase long-term investments in sustainable economic activities and projects (Forstater & Zhang, 2016).

Despite the unstoppable growth ESG has experienced ever since the 2008's Great Recession, authorities have come up with little or no regularisation on the matter, leaving rating agencies free to decide upon their own methodology for the assessment of a corporate's sustainability performance (Escrig-Olmedo et al., 2019). In a similar context, the interpretation of ESG scores as provided by major financial platforms—such as Refinitiv or Bloomberg—becomes challenging, if not deceiving. Indeed, more and more firms engage in "greenwashing" behaviours, ultimately misleading stakeholders about their sustainable performance (e.g. Delmas & Burbano, 2011; Furlow, 2010).

Though no unique classification yet exists (Escrig-Olmedo et al., 2019), the features included in each of the three dimensions of (E) (S) (G) could be described as follows.

Environment typically refers to a company's effort in climate change mitigation and adaption (European Commission, n.d.). It may account for a company's limiting the usage of harmful pollutants and chemicals or to a company's active engagement in the reduction of greenhouse emissions (Strobel, 2020). Among the three ESG items, Environment (E) has always been the most popular one, both in terms of implementation on a firm's side and in terms of evaluation by rating agencies (Escrig-Olmedo et al., 2019).

The term "social criteria" usually refers to the policies promoted by a company on matters related to inequality, inclusiveness, labour relations and human rights (European Commission, n.d.). A company's business relationships alongside employees' health, safety and working conditions may be evaluated as well (Strobel, 2020). Governance may account for the presence of a conflict of interest in the choice of board members, the percentage of female board members or, more generally, the percentage of gender diversity in a company (Strobel, 2020).

Following this classification, the assessment of female presence by means of a number of indicators (e.g. number of female directors, percentage of women in the Board) would fall under Social (S) and Governance (G) dimensions, which is explained in more detail in the following section.

Though ESG ratings were found to suffer from instability issues, as observations extracted from two different points in time (2018 and 2020) witnessed large and systematic changes (Berg et al., 2020), we do not recognize this as problematic for our sample. The issue analysed by Berg at al. (2020) essentially concerns overall ESG scores, whereas we present cross-section data for a number of aspects concerning each of three dimensions beyond bare ESG scores. Particularly, the variables we rely on for the assessment of gender equality (e.g. percentage of women in the Board; the number of female executives; the presence of a Corporate Social Responsible (CSR) sustainability committee) are rather stable by nature, as firms are not likely to suffer from drastic and frequent changes in the composition of their boards and directive bodies.

In line with the literature, performing well on the social side is likely to positively impact the corporate level. 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 have a positive 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 problems of 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 attention over the last decades, a number of related benefits remain unknown to many observers.

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

2   Data and Summary Statistics

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

The credit quality of a firm is a crucial piece of information that 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 supplying significant information about 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-year 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-year time horizon is in line with the fact that Environmental, Social and Governance scores, which include gender equality, are mostly used for investment decision in long-term horizons.

To measure the effect of female presence within 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; and 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 (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 obligation to disclose information, they may share some data and retain others (Mooney, 2021; Strobel, 202). 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 scores for each of the three dimensions (E), (S) and (G) (Escrig-Olmedo et al., 2019).

Furthermore, the 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 percentage of female employees; the percentage of female engineers; the presence of requisite of gender diversity for managers candidates; and 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[1] (binary variable); the presence of health safety policies (binary variable); the percentage of women on the Board; the number of female directors and the number of female executives; the presence of female CEOs (binary variable); the existence of a gender pay gap breakout (binary variable)[2]; and the fairness of the remuneration policies (binary variable).

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

We created a binary variable for female-dominated (Fem_Dominated) and male-dominated (Male_Dominated) sectors with the hope of obtaining some significant insights on the matter of gender pay gap across sectors[3]. These variables eventually turned out to be significant only for one regression used as robustness checks (see tab. 7, appendix).

Finally, we included some control variables at the firm level, namely: (I) the market capitalization, as 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), as 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, while 5 represents the strongest value, a signal to buy firm's shares).

All variables and their relative descriptions are listed in tab. 4 (see appendix). We have also included, for the continuous variables, their descriptive statistics and correlation matrix (respectively fig. 1; tab. 5, see appendix).

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

[2] Variable built by Bloomberg experts assigning either a Y (yes=1) or a N (no=0) (Bloomberg, 2021)

[3] Energy, Utilities, IT & communication and Real Estate were classified as male-dominated sectors. Female-dominated sectors (health care, consumer staples and consumer discretionary) and balanced sectors (finance and materials) were grouped together for the sake of this analysis. This classification was based on EIGE's report (2019) and on NACE Rev.2 Statistical classification of economic activities in the European Community (Eurostat, 2008)

Moving to the sample choice, we consider the most recent data (2020) from European Union countries which, at the moment, seem more open to ESG considerations (see e.g. 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 an 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 cross-sectional data points from the year 2020 for 12 European countries: Austria, Belgium, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Note that the metrics included in our dataset are updated on an annual basis.

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 vs 229 Southern companies), and the sample is well balanced.

Table 1 contains the summary statistics for all the above-mentioned variables and are listed separately for Northern and Southern companies.

The five years PD (probability of default) 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 those recorded for Southern companies. In addition, 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).

Looking at the summary statistics for the gender equality related indicators (**tab. 1**), the following insights can be obtained. The number of female 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 the 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. 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 out of 329 report it. On the other hand, a smaller gap exists in terms of health safety policies (322 out of 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 biological reproductive makeup. Acknowledging these differences and adopting a gender-sensitive approach to health and safety at work is crucial to improving prevention and allowing everyone to be equally protected (UNISON, 2016).

Since only 37% of women are 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 the 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 convey significant information.

Table 1. Descriptive Statistics, North vs South

	NORTH	SOUTH
5Y DEFAULT	$4.3340*10^{-2}$	$4.2657*10^{-2}$
RATING	3.6271	3.8265
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.	$4.7291*10^5$	$1.4723*10^5$
TOT. BRD 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
ROC/WACC	-1.7954	0.0876
WACC	6.5650	0.0810
FINANCIAL LEVERAGE	4.8256	6.4205
SALES/REV	$2.0211*10^4$	$1.0995*10^4$

Source: Authors' Calculations Based on Data Downloaded from Bloomberg, 2020.

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 is 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 rarely 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 Northern countries typically exceeds the level in Southern countries (Eurostat, 2018), the average or total Board Compensation is consistently higher for Northern companies than for Southern ones.

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. Furthermore, 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 is 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 a regression model selection.

Table 2 yields the results from the first regression, based on a stepwise model selection algorithm carried out by the software R. We have adopted a stepwise model selection (command "step" in R) which allows us to subsequently compare alternative model specifications, from the most complex to the simplest, in terms of F-statistics and/or likelihood-based scoring values, such as AIC or BIC.

In the selected regression model, Bloomberg's 5 year 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 the board (Pct_Wom_BoD), the presence of CSR Sustainability Committee (CSR_Sust_Commitee), the total board Compensation (Tot_BoD_), the ESG scores and individual score for Social (S) and Governance (G) are all used as explanatory variables.

Table 2 reveals that there is positive correlation between the 5-year 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-year 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, where a 10% increase leads to an increase of the default probability of about 0.7 percent. However, by summing up the three linear coefficients, we obtain that the overall effects are negative, with a decrease in the default probability of about 0.7 percent, when all of ESG, (S) and (G), 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 a 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 on the board increases dialogue among board members, improves 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).

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

Table 2. Linear regression of the probability of default on the explanatory variables.

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	$5.39*10^{-5}$ ***
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 **

Significance : '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 Residual standard error: 0.04387 on 432 degrees of freedom Multiple R-Squared: 0.4188.   Adjusted R-Squared: 0.4013 F-Statistic: 23.94 on 13 and 432 DF, p-value: $< 2.2*10^{-16}$

Source: Authors' Calculations Based on Data Downloaded from Bloomberg, 2020.

The table yields, however, other interesting results. An apparently counterintuitive correlation is found for the presence of CSR committees, which seems to be positively related to a higher probability of default. This result can be explained as 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 6 (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) that analyses the correlation between the number of female directors and the level of corporate environmental investments. They found that more women leads to higher 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 Committee binary variable as response variable. We have opted for a probit regression model (command "glm"in R[4]), as it specifically designed to deal with dichotomous or binary outcome variables. In this model, the inverse standard normal distribution of the probability is given as a linear combination of the predictors (UCLA: Statistical Consulting Group, 2021).

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 existence 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,

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[4] Further specification in R: family = binomial(link = "probit")

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. Similarly, the number of female executives shows a positive correlation.

In addition, 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' rather than shareholders' interests (Adams et al., 2011), which in turn may trigger lower earnings for the Board.

Tab. 3. Probit regression of the presence of a CSR committee on the explanatory variables

Residuals:				
Min	**1Q**	**Median**	**3Q**	**Max**
-2.1295	-0.8103	-0.5186	0.9311	2.4112
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 *

Significance: '***' 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.

Source: Authors' Calculations Based On Data Downloaded from Bloomberg, 2020.

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 consistent with the results in Table 2, the default probability is positively 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 7 (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.

Future robustness checks call for the addition of a 1-year response variable with lagged regressors. However, a current lack of data—with companies providing metrics for one year, but not for the previous one—does not yet allow the development of such a line of research.

4   Conclusions

Both our research hypotheses 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. Moreover, (II) the higher the number of female directors, the higher the share of sustainable investments. This is proven 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 demonstrate 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, affirm the need for further research and the introduction of policy actions.

On the one hand, the growing implementation of ESG calls for their standardisation. Despite their rise in importance, the lack of data may become frustrating, if not penalizing for the development of new lines of research. Consistently, a common methodology for their definition and computation needs to be created.

On the other hand, authorities should introduce new tools to monitor gender equality (European Parliament, 2020). 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 and ultimately to the improvement of policy decisions on the matter. Of course, this is not the ultimate solution for

such a complex issue like gender equality, yet the value of our results lies in the possibility of broadening the usage of ESG criteria to monitor gender equality.

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APPENDIX

Table 4: Variables Description and Source. Number of observations for each metric: 55

| Variable Name	Type	Source
Equal Opportunity Policy	Dummy	Bloomberg (2020)
Health Safety policy	Dummy	Bloomberg (2020)
% Women on Board	Continuous	Bloomberg (2020)
Number Female Directors	Discrete	Bloomberg (2020)
Number Female Executives	Discrete	Bloomberg (2020)
Presence of Female CEOs	Dummy	Bloomberg (2020)
Gender Pay Gap	Dummy	Bloomberg (2020)
Fairness Remuneration Policy	Dummy	Bloomberg (2020)
CSR Sustainability Committee	Dummy	Bloomberg (2020)
Male/Female-Dominated sectors	Dummy	NACE Classification from Eurostat \& European Commission (2008).
ESG	Continuous	Bloomberg (2020)
Environmental	Continuous	Bloomberg (2020)
Social	Continuous	Bloomberg (2020)
Governance	Continuous	Bloomberg (2020)
Market Cap	Continuous	Bloomberg (2020)
ROA	Continuous	Bloomberg (2020)
ROE	Continuous	Bloomberg (2020)
ROIC	Continuous	Bloomberg (2020)
WACC	Continuous	Bloomberg (2020)
ROIC/WACC	Continuous	Bloomberg (2020)
Sales/Revenues	Continuous	Bloomberg (2020)
Financial Leverage	Continuous	Bloomberg (2020)
Credit Rating	Continuous	Bloomberg (2020)
5Y Probability Default	Continuous	Bloomberg (2020)
Average Board Compensation	Continuous	Bloomberg (2020)
Total Board Compensation	Continuous	Bloomberg (2020)

Table 5: Descriptive Statistics for Continuous Variables

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max
Financial Leverage	1.009	2.139	2.949	5.467	5.130	106.000
Sales/Revenues	0	1540	4362	16380	16207	338446
Prob. Of Default (5Y)	0.0005387	0.0190024	0.0204848	0.0471537	0.0482004	0.5287155
Credit Rating	1.000	3.316	3.810	3.810	4.238	5.000
Num. of female executives	0.00	0.00	1.00	1.44	2.00	8.00
Num. of female directors	0.000	3.000	4.000	3.916	5.000	10.000
Pct. Women board	0.00	28.57	33.33	34.42	41.67	66.67
Market Cap	0.73	1883.48	5598.87	14304.54	15217.35	257880.52
ROA	-91.8903	0.0009	1.9068	1.9933	4.7744	97.3212
ROE	-198.659	-1.388	6.582	4.357	12.552	1059.735
ROIC	-93.9227	0.7392	4.8764	4.3321	8.9766	173.9932
ROC/WACC	-530.9332	0.0250	0.6653	-1.0246	1.2902	13.3096
WACC	-0.5676	0.0514	2.9563	3.9109	7.5280	23.2359
Average Board Compensation	8753	55651	91350	339596	146092	104398400
Total Board Compensation	67806	939200	1769628	3280752	3958448	35869654
ESG	6.198	39.256	47.368	45.785	54.545	73.554
Environment	1.55	28.12	40.31	37.99	48.84	77.52
Social	14.04	36.84	47.37	46.41	56.14	85.96
Governance	3.571	55.357	62.500	61.554	67.857	99.308

Source: Bloomberg, 2020

Figure 1. Correlation Plot.
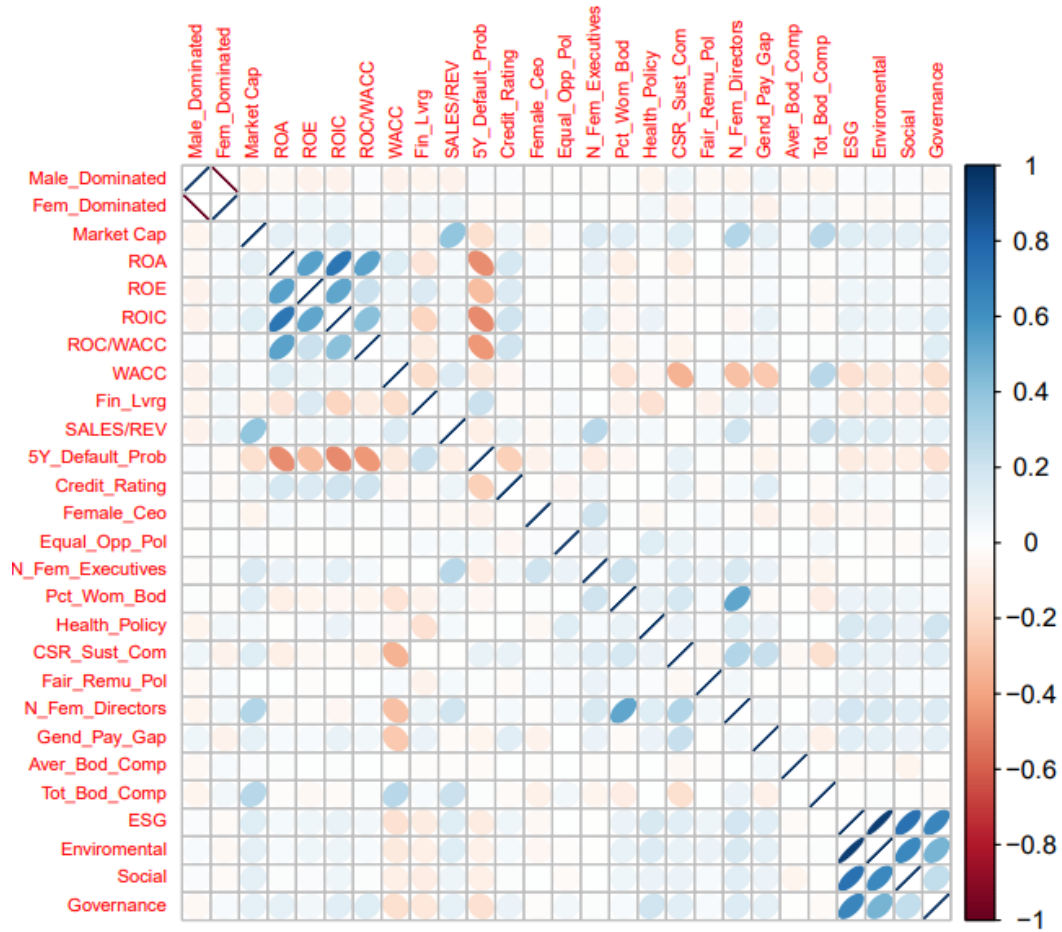
Source: Authors' Calculations.

Table 6. Regression of the rating on the explanatory variables

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

Coefficient	Estimate	Std. Error	t value	Pr (> | t |)	
(Intercept)	$5.292*10^{-2}$	$2.285*10^{-2}$	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	$-6.855*10^{-4}$	$9.552*10^{-5}$	-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	

Significance: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1; Residual standard error: 0.04716 on 431 degrees of freedom; Multiple R-Squared: 0.3557; Adjusted R-Squared: 0.3347; F-Statistic: 16.99 on 14 and 431 DF, p-value: $< 2.2*10{-16}$

Source: Authors' Calculations Based on Data Downloaded from Bloomberg,

Table 7. Regression of female directors on the explanatory variables.

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 *

Significance: 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

Source: Authors' Calculations Based on Data Downloaded from Bloomberg.