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The Linkage between ESG Performance and Credit Ratings: A Firm-Level Perspective Analysis

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Abstract

This paper investigates the effect of environmental, social, and governance (ESG) performance on credit ratings. We argue that ESG factors should be considered in the credit analysis and the creditworthiness evaluation of borrowers because they affect borrowers' cash flows and the likelihood of default on their debt obligations. Consequently, we develop our research by firstly reviewing the literature regarding ESG commitments within financial decision-making processes and then addressing the relation between ESG performance and the cost of debt financing. We reveal no unanimous results and no clear-cut boundaries on this matter yet. Secondly, to disentangle this relationship, which is not well defined by scholars, we empirically investigate the nexus between ESG performance and credit rating issues on a sample of 56 Italian and Spanish public firms for which ESG performance in 2015 was achieved. Our final sample includes 15 variables for 56 observations: 840 items are under analysis. Our findings suggest that ESG performance, especially concerning social and governance metrics, meaningfully affects credit ratings. We do not sort out significant results referring to environmental scores, so further research is needed to investigate this ever-growing matter and strengthen this considerable nexus.

Keywords: ESG performance, credit rating, debt financing, default probability, ESG sustainability

1. Introduction

During the last decade, companies have increasingly enhanced corporate sustainability with a forward-thinking view by targeting social, environmental, governance, and financial objectives (Haffar, 2017; United Nations Global Compact, 2013). Corporate sustainability has become one of the mainstream research topics from both a managerial and financial perspective. From a managerial stream of research, several studies highlight the benefits of environmental, social, and governance issues (ESG criteria) on firm value (Fatemi, Glaum, & Kaiser, 2017; Harrison & Wicks, 2013) and financial performance (Friede, Busch, & Bassen, 2015; Lins & Servaes, 2017). Despite the increasing interest in this issue, the effect of environmental, social, and governance issues on overall firm risk by jointly considering debt financing still remains an open, entangling debate (Albuquerque, Durnev, & Koskinen, 2014; Lee & Faff, 2009). From a financial perspective, scholars and practitioners call for the need to integrate ESG objectives into credit scoring evaluations and lending policies adopted by financial intermediaries (Attig, El Ghoul, & Guedhami, 2013; Birindelli, Ferretti, Intonti, & Iannuzzi, 2015; Zeidan, Boechat, & Fleury, 2015). As a matter of fact, ESG objectives do not clearly figure in the creditworthiness evaluation of credit lending practices employed by banks yet (Zeidan et al., 2015), even if financial markets and institutions have demonstrated an increasing interest in ESG criteria within investment decision-making processes (Friede et. al., 2015). In other words, banks and financial institutions exclusively rely on risk sensitivity parameters, and they are still adopting lending practices by estimating risk against the default of borrowers (Zeidan et al., 2015).

This evidence leads us to claim that this estimation does not price the potential value the company may be able to set up with social initiatives among all stakeholders and the community, even if the positive impact of the ESG factor on firm value has already been confirmed (Cellier & Chollet, 2016; Fatemi et al., 2017; Gutsche, Schulz, & Gratwohl, 2017; Lins & Servaes, 2017). ESG commitments may serve as risk mitigation on their credit rating in two ways: ESG factors affect borrowers' cash flows and companies' default probability estimation. Therefore, we acknowledge that ESG performance should positively impact on companies' credit ratings in the sense that favorable ESG performance leads to higher-level credit ratings.

Based on the aforementioned considerations, we pose a dual research objective. First, we aim at strengthening the literature regarding the relationship between ESG and debt financing that is not well defined with closed boundaries. Second, we aim at linking ESG performance and credit ratings by providing empirical evidence that clarifies this entangled relationship. Thus, we empirically examine the relation between ESG performance and credit rating on a sample of 56 Italian and Spanish public companies for which ESG metrics are available for the fiscal year of 2015.

The remainder of the paper proceeds as follows. In Section 2, we briefly frame the improvement of ESG integration in decision-making financing fostered by financial intermediaries, and then we review previous studies that investigate the relationship between ESG criteria and credit risk. In Section 3, we develop our hypothesis, which guides our empirical analysis. Section 4 reports the methodology by describing the features of our data sample and the model specification on which we base our empirical analysis. Section 5 provides discussions of findings, and then Section 6 concludes by placing the limitations of the current study and consequently suggesting future development.

2. Related Literature

We provide as follows a synthesis of the main analyses in which the increasing interest in the ESG integration within financial decision-making practices has been figured out. We highlight new ways of social rating evaluations, and then, we deal with previous scholarly works that address the empirical analysis of the linkage between ESG performance and companies' debt financing.

2.1 The Impact of ESG on Financial Decision-Making

Non-financial criteria in decision-making on financing obtain considerably more reconsideration because of the need to include the daily economic, environmental, and social concerns within financial decisions (Artis, 2017). Thus, ethical investments, socially responsible investing, microcredit, and social banking have rapidly developed because financial institutions and intermediaries have enhanced their financial decision-making process by incorporating ethical choices and social objectives (Editorial "Research in International Business and Finance," 2017). The initial studies concerning this issue have questioned whether the ESG integration in financial decisions and socially responsible investment performance still rewards investors and companies through the tangible financial performance achieved by companies (Friede et al., 2015; Orlitzky, Schmidt, & Rynes, 2003) and investors (Revelli, 2017; Revelli & Viviani, 2015).

Academic studies have evolved the debate around the impact of ESG integration by discussing new ways to include ESG commitments within the evaluation process, both investments (Miralles-quiro & Miralles-quiro, 2017) and credit lending practices (Zeidan et al., 2015). As a matter of fact, credit lending practices have been primarily based on credit score systems in which banks predict the following risk components: probability of default, loss given default, exposure at default, and maturity. Banks generally gather financial data and basic qualitative information to assess borrowers' creditworthiness. The estimated default probability just relies on the expected asset payment, the debt repayment, and the asset volatility of borrowers. Through this process, banks achieve the risk sensitivity measurement to the drivers of credit risk and economic loss in their own portfolio. However, banks and financial institutions have started to implement social ratings and sustainable credit scoring ways of evaluations.

Consequently, besides the traditional credit scoring evaluation process, social ratings and the impact measurement evaluation process, in general, have become a recent central issue in banks' credit lending practices (Birindelli et al., 2015). Zeidan et al. (2015) have questioned whether the default probability depends also on the future sustainability and the long-term impact on socially responsible initiatives. The literature has been advanced in terms of the construction of sustainability credit scoring; this tool ranks firms in terms of their sustainability commitment, through which the bank can assess a higher quantity of information (Zeidan et al., 2015). The study of Grunert et al. (2005) is one of the first works that demonstrates how the combination of financial and non-financial factors leads to more accuracy in the prediction of a default event. Some authors develop this stream of research by particularly investigating the influence of these CSR and socially responsible initiatives on the credit risk portfolio of banks (Attig et al., 2013; Grunert et al., 2005; Weber, Diaz, & Schwegler, 2014; Weber, Scholz, & Michalik, 2010). Weber et al. (2010) analyze which role sustainability and environmental practices play within the banks' credit risk management process. The authors examine the impacts of social rating announcements on stock prices to better understand the relationship between social responsibility and firm value, according to a shareholder's perspective. Nowadays, this stream of research is still an open debate that needs further investigation because of the relevance of a social and solidarity finance system to "build upon a support relationship that facilitates the elaboration of converging expectations" (Artis, 2017).

2.2. ESG and Debt Financing

We provide as follows a synthesis of previous relevant studies on this issue that help us to understand the critical relation between ESG performance and debt financing. As Stelnner et al. (2015) have remarked, very few works consider the nexus between ESG and debt financing and do not have unidirectional results. Specifically, one stream of research provides a positive connection, whereas other studies present exactly the opposite results. Starting with a study that highlights a positive relationship, we firstly mention the work of Ge and Lui, (2015), which points out "a higher CSR strength score which is associated with lower yield spreads in new corporate bond issue," by suggesting, as a consequence, better credit rating evaluation. Another research with similar results is that of Cooper and Uzur (2015), which determines a negative correlation between CSR-ESG commitment and the cost of debt for banks' loans. Specifically, the increased level of ESG leads to the lower cost of debt on banks' loans. In other words, this inverse and positive relationship has indirect and beneficial effects on the credit rating through its close link with banks' debt and borrowers' debt capital repayment of borrower companies. The study of Hoepner, Oikonomou, Scholtens, and Scholtens (2016) is highly relevant to this investigation because the authors investigate the effects of corporate and national sustainability on the cost of debt, which has a consequent impact on the credit rating of companies. The authors perform a country-level analysis, taking into account each sub-dimension of environmental, social, and governance concerns, enriching the literature empirically. They acknowledge that social and environmental activities statistically impact on loan financing, and in greater detail, social issues have less cost reduction in loan financing than environmental ones. In contrast to the aforementioned studies, there is the research of Menz (2010), whose findings suggest that companies with higher ESG-CSR commitment face higher corporate bonds spreads and, hence, higher credit ratings. Specifically, Menz (2010) gathers data from sustainable asset management research and based his sample on 498 European corporate bonds over the period 2004–2007. Menz (2010) discovers a higher risk premium for companies that enhance and target ESG objectives for inclusion in their strategic decision-making process. Similar in results, but different in the objective of the study is the research of Goss and Roberts (2011), which tests the relationship between 3,996 bank loans from 1991 and 2006 CSR investments of borrowers. In line with Menz (2010), Goss and Roberts (2011) show that banks' lenders do not reward the implementation of CSR-ESG matters within the interest rate spread of loans; additionally, "firms with social responsibility concerns pay between 7 and 18 basis points more than companies which prefer no involvement in this practice" (Goss & Roberts, 2011). Finally, the research of Stellner, Klein, and Zwergel (2015) contributes to the literature by providing a scale position on these opposite results. Precisely, the authors aim at demonstrating whether higher corporate social performance (CSP) has impacted on credit risk measured through credit rating and zero-volatility spreads. Findings sort out that CSP acts as a risk mitigation factor by rewarding a company with a greater quality rating, though only for environmental concerns. Table 1 provides a literature review of previous studies that examines the indirect link between ESG sustainability criteria and credit risk through the analysis of debt financing capital structure.

Table 1. The linkage between ESG and debt financing

Study	Methodology	Data Collection	Sample	Time Period	Findings
(Anis & Utama, 2016)	Quantitative *(OLS regression and 2SLS with PLS)*	Published CSR Disclosure and Corporate Governance disclosure in annual report	Manufacturing Industry (Indonesia Stock Exchange)	2011–2014	Indirect positive effect CSR disclosure on cost of debt
(Cooper & Uzur, 2015)	Quantitative *(multi-regression model)*	KLD Stat; Bloomberg; Mergent Fixed Income Securities Database	US companies	2006–2013	Lower cost of debt
(Ge & Lui, 2015)	Quantitative *(multi-regression model)*	RiskMetrics Group; KLD STATS database; Mergent Fixed Income Securities Database; Compustat	4,260 new bond issues from 2,317 firms	1992–2009	Issue bonds at lower cost
(Goss & Roberts, 2011)	Quantitative *(simultaneous equations, instrumental variable*	KLD Research and Analytics Inc.; Dealscan	3,996 loans	1991–2006	Higher loan pricing

	regressions, Heckman selection model)				
(Hoepner et al., 2016)	Quantitative	Msci KLD Stats	470 loan agreements based in 28 different countries	2005–2012	Higher country sustainability is associated with lower costs of bank loans
(Menz, 2010)	Quantitative *(OLS—fixed and random effect model)*	Merrill Lynch index system	498 bonds	2004–2007	Higher bond spread
(Nandy & Lodh, 2012)	Quantitative *(OLS; fixed effect; Wald test to confirm)*	Kinder, Lydenberg and Domini Research & Analytics, Inc.; Compustat; Dealscan database	3,000 U.S. firms	1991–2006	Lower cost of loan negotiation
(Pavelin & Oikonomou, 2017)	Quantitative	KLD STATS and Datastream	3,240 bonds issued by 742 different firms	1991–2008	Social posture impacts on the cost of debt financing and the credit quality of its bond issues
(Zeidan et al., 2015)	Qualitative	Qualitative questionnaire from a subsidiary bank in Brazil to develop the sustainability credit scoring			Lower default probability expected

Source: Authors

3. Hypothesis Development

As revealed in the previous section, the literature is not unanimous concerning the nexus between ESG performance and debt financing; in fact, the academic work does not provide unidirectional results (Disclosure; Organization and Management; Socially Responsible Instruments; International Agreements and Certifications and Indexes)

To advance this issue and provide strong connections, we take into account credit rating issues provided by credit rating agencies. As a matter of fact, credit rating agencies express the company's opinion about the willingness and the ability to repay its debts in full and on time (Standard & Poor's, 2009). Likewise, credit rating agencies measure a company's capability to fulfill its financial obligations, and they assign judgments to short-term debts, long-term debts, securities, business loans, and preferred stock. Moreover, credit ratings are usually used as a proxy for the credit risk, which is "the risk that a counterparty to a financial transaction will fail to fulfill its obligation" (Arnold, 2008).

Consequently, credit ratings can be applied as an indirect measure of the company's debt financing. In other words, since the credit rating is a measure of the company's financial obligations, we investigate the relation between ESG performance and debt financing by using credit ratings as a proxy. Ratings can be downgraded or upgraded if information changes, so intuitively, we test if ESG performance leads to favorable credit rating issues. If higher ESG performance positively impacts on a higher level of credit rating, this means that companies can get beneficial conditions on the cost of debt.

We structure our analysis by developing three main hypotheses according to our main research question: Does ESG performance influence the credit rating evaluation of companies?

3.1 Environmental Performance and Credit Rating

The literature seemingly has not thoroughly investigated the relation between environmental issues and credit rating. In fact, only one study of this nature could be found (Bauer & Hann, 2010). As reported by the authors, the paper is the "first to also consider corporate activities that are directed at reducing environmental risk exposure or enhancing cash flows" because they test the relation between environmental concerns and strengths of firms on the yield spread of newly issued bonds, bond ratings, and long-term issuer ratings. Positive findings are sorted out because environmental concerns pay a premium on the cost of debt financing, and those firms have lower credit ratings assigned to them. With a different perspective, others (Sharfam & Fernando, 2008)

have investigated the impact of better environmental risk management on the cost of capital, taking into account both the cost of equity and the cost of debt.

Given these positive results, according to Bauer and Hann (2010), we pose the following hypothesis concerning environmental performance and credit ratings:

H1. Environmental performance is positively associated with credit rating; likewise, a high level of environmental performance leads to a superior rating.

3.2 Social Performance and Credit Rating

Unlike environmental concerns, the impact of social performance on credit risk has been examined from diverse perspectives. Bauer, Derwall, and Hann (2009) explore the relation between employee relations, employees as a valuable stakeholder, and credit risk. They argue that employment policies and practices establish the expected cash flow and "also mitigate the risks associated with the harmful behavior of dissatisfied employees" (Bauer et al., 2009). The authors show that firms with strong employee relations enjoy a lower cost of debt financing and firms with strong employee relations benefit from significantly higher bond ratings. Similarly, Chen et. al. (2012) study the effect of one specific category of social concern, employees' relationship in the US context with corporate debt pricing. Due to the less risky investment policies and protection of bondholders' wealth acknowledged by the bond market, a yield reduction is recognized. Oikonomou, Brooks, and Pavelin, (2014) argue that firms that behave irresponsibly have the higher probability of taking penalties and government sanctions, as well as undergo employees' layoff and strikes. As a matter of fact, researchers (Bouslah, Kryzanowski, & M'Zali, 2013) have sorted out that employee relations and the community negatively affect firm risk. Likewise, social enhancements within the firm have a positive impact on firm value by considering employees' diversity, a firm's relationship with its employees, and product quality (Jo & Harjoto, 2011).

To support these empirical studies with theoretical concepts, stakeholder theory suggests that higher social performance will decrease firm risk through reduced financial and operating risks (Bouslah et al., 2013; McGuire, Sundgren, & Schneeweis, 1988). Based on the aforementioned statements, the hypothesis for the linkage between social performance and credit rating being tested in this study is:

H2. Social performance is positively associated with credit rating; likewise, a high level of social performance leads to a superior-level rating.

3.3 Corporate Governance and Credit Rating

Several works focus on the impact of corporate governance on credit rating (Ashbaugh-skaife & Collins, 2005; Ashbaugh-Skaife, Collins, & LaFond, 2006; Bhojraj & Sengupta, 2003; Bradley, Chen, Dallas, & Snyderwine, 2007; Klock, Mansi, & Maxwell, 2005). The literature has gathered a unanimous consensus that higher-quality corporate governance leads to decreased credit risk because of information asymmetry reduction between companies and their external stakeholders (Ashbaugh-Skaife et al., 2006) and a firm value's positive association (Gutsche, Schulz, & Gratwohl, 2016). According to previous research, we expect a positive correlation between credit rating and corporate governance. Thus, we define the following hypothesis:

H3. Corporate governance is positively associated with credit rating. Likewise, better corporate governance leads to a superior-level rating.

We report in Figure 1 the conceptual model through which we conduct the empirical analysis presented in the next section.

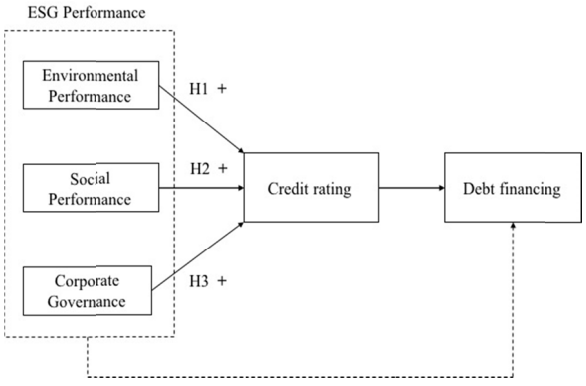

Figure 1. Conceptual model

Source: Authors

4. Empirical Analysis

4.1 Data Sample

The empirical analysis has been carried out to explore the effects of ESG performance on credit rating issued by rating agencies on Italian and Spanish public companies. Specifically, we based our empirical tests on a sample of 56 public companies in Italy and Spain by analyzing available ESG data from the fiscal year 2015. We choose Italy and Spain for further investigation because of similarities concerning both ESG practices and public companies' debt financing. Specifically, referring to the socially responsible investment (SRI) landscape, the Italian market is highly comparable to the Spanish one (Mullerat, 2010). Fund managers have considerably increased their interest in environmental, social, and governance criteria into management and financial practices, even if Spain has seen weaker improvements in comparison to the other developed countries (Mullerat, 2010). Moreover, socially responsible investments referring to the market size and its characteristics are similar in Italy and Spain, as reported by Eurosif (2014). Furthermore, the Italian and Spanish business economy is similar within the European scenario when we consider the corporate sector and bank lending dependence (European Investment Bank, 2014). In Italy and Spain, credit to firms is higher than the continental EU average, even if the Italian bond market is more developed, whereas in Spain, the stock market has a superior level of capitalization (European Investment Bank, 2014). Based on the aforementioned considerations, we focus our analysis on those Italian and Spanish companies that enhance ESG commitments. More precisely, we focus on Italian and Spanish manufacturing companies. We do not consider in our analysis those companies that belong to the financial sector because of differences in core-business results which are not comparable as the EBIT (Earnings before interest and taxes) and EBITDA (Earnings before interest, taxes, depreciations and amortizations).

The total sample of public companies sits at 412, although more than 86% of ESG performance data are not available. Consequently, we run the analysis on a sample of 56 public companies, splitting into 26 Italian and 30 Spanish companies. We report in Table 2 the summary of the Italian and the Spanish context.

Table 2. The Italian and the Spanish context

		ESG Performance	
Country Headquarters	Public Companies	Not Available Data	Available Data
Italy	259	233	26 (10.03%)
Spain	153	123	30 (19.61%)
Total	412	356	56 (13.59%)

Source: Authors

4.2 Variables' Description

We gather data on credit ratings, ESG scores, and company-specific sector variables on Thomson Reuters DataStream. Specifically, our dependent variable is the public company's credit rating obtained from Moody's and checked on DataStream. We group the Moody's scale rating into eight categories from 1, the highest level of rating (AAA), to 7, the lowest one (CCC). Our independent variables are the ESG metrics that largely come from corporate reporting (annual reports, corporate social responsibility reports, company website, etc.) data in the public domain. We focus our analysis on the following Thomson Reuters ESG scores, which measure companies' ESG performance grouped into three main pillars:

- Environmental measures include the use of resources, emissions, and environmental innovation;
- Social measures cover workforces' policies, community enhancement, and product responsibility;
- Governance measures combine the management structure, shareholders' policies, and CSR strategies.

We provide a detailed description of the variables under analysis in Appendix A. Finally, we assess company factors as control variables to fix the company size and those variables highly related to the credit rating evaluation. We set the company size including the market capitalization, total revenue, and EBITDA, whereas we cover the dependency on credit ratings by including net debt/total equity and EBIT/total revenue. Specifically, the higher a company's financial leverage is, the higher default risk the rating agency sets up. Moreover, higher profitability (EBIT/total revenue) may positively impact on credit rating because of a reduction in its default risk

(Altman & Saunders, 1997; Stellner et al., 2015).

Our final sample includes 15 variables for 56 observations: the number of total items under analysis sets at 840 items.

4.3 Model Specification

Our empirical tests are based on the ordered logistic regression of a sample of 56 public companies in Italy and Spain. In line with Stellner et al. (2015), we adopt the ordered logistic regression that is generally used to estimate relationships between an ordinal dependent variable and a set of independent variables. As described in Subsection 3.2, our dependent variable is the credit rating issue that is ordered because it has a meaningful order for each category from AAA (equal to 1) to CCC (equal to 7). Specifically, credit rating issues decrease the quality of a credit evaluation by going from AAA, the highest level of credit rating evaluation associated with the lowest default probability estimation, to CCC, the lowest level of credit rating with a higher risk default.

The set of our independent variables are the Environmental and Social and Governance Scores which are continuous variables ranging from 0 to 100. We include in our model three variables for each category of Environmental (Resource_Use, Emissions, Env_Innov), Social (Workforce, Community, Product_Respons), and Governance (Management, Shareholder, CSR_Strategy) metrics for the fiscal year 2015.

The model is set up as follows:

$$RATING_t = B_0 + B_1*Resource\_Use_t + B_2*Emissions_t + B_3*Innov_t + B_4*Workforce_t + B_5*Community_t + B_6*Product\_Respons_t + B_7*Manag_t + B_8*Shareholder_t + B_9*CSR\_Strategy_t + B_{10}*Debt\_Equity_t + B_{11}*Ebit\_TotRev_t + B_{12}*log\_MarkCap_t + B_{13}*log\_TotRev_t + B_{14}*log\_EBITDA_t + \varepsilon_i \quad (1)$$

with $t = 2015$

We expect that for one increase of one of our dependent variables, i.e., going from 0 to 1, the odds of going from the lower category to the upper is positive, given that all the other variables in the model are held constant. Thus, this leads to a higher credit rating and consequently better credit risk evaluation.

5. Results and Discussions

5.1 Descriptive Statistics

Table 3 and Table 4 provide the descriptive summary statistics of our analysis. More precisely, the former shows the descriptive results for the dependent, independent, and control variables under investigation, whereas the latter reports the descriptive statistics for each country.

We notice that the rating scale generally sets the values of 3 and 4, which means respectively A and BBB rating issues. There is a normal distribution of the Rating_Scale, without a strong dispersion in results. Referring to our independent variables, we reveal similar results concerning both the mean and the standard deviation. In other words, Environmental, Social, and Governance sat in the central median of the distribution, with a similar standard deviation ranging from 23.61118 to 29.75429. We conduct the descriptive statistics on the Rating_Scale and the general ESG_score comparing Italy to Spain. As Table 5 shows, both Italian and Spanish public companies get a BBB credit rating issue and perform on average at 60.85 and 62.91, so our sample is equally weighted. Consequently, we can run the regression analysis without splitting ESG_scores for each country. In other words, we employ the regression by considering the whole sample of 56 observations.

Table 3. Descriptive summary statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Rating_Scale	56	3.678571	1.161616	1	7
Resource_Use	56	68.50144	24.48721	11.27451	99.6732
Emission	56	63.25052	28.02689	.3546099	99.6732
Innov	56	65.84016	25.00355	11.84211	99.38272
Workforce	56	68.76284	24.24801	6.372549	99.79839
Community	56	60.82409	26.73276	4.411765	99.01961
Product_Resp	56	74.64284	23.61118	4.166667	99.6732

Management	56	51.17187	27.09578	1.020408	96.93878
Shareholder	56	48.52396	29.75429	1.020408	98.97959
CSR_Strategy	56	48.64182	25.75871	1.020408	97.95918
Debt_Equity	56	.8494812	1.431581	-4.169061	5.095033
Ebit_TotRev	56	.1238959	.2509576	-1.418452	.5393842
Log_MarkCap	56	22.26342	1.56003	18.32991	25.41595
Log_TotRev	56	22.08165	1.329286	19.12546	24.95162
Log_Ebitda	56	20.44320	1.414434	17.11608	23.43438

Source: Authors

Table 4. Descriptive summary statistics—Italy and Spain

Country Headquarter	Rating_Scale			ESG Score	
	Median	*Median Freq.*	*St. Dev.*	*Mean*	*St. Dev*
Italy	4	12	0.90118	60.85	16.9697
Spain	4	11	1.32874	62.91	15.6605

Source: Authors

5.2 The ordered logistic regression model

Taking into account the descriptive statistics in the sample under investigation, we run the ordered logistic regression model. As shown in Table 5, our model is significant, as the p-value sits at 0.000.

To fit this model, we estimate the odds ratio that explains our ordinal variables as predictors. In other words, our odds ratio predicts the probability of our credit ratings increasing. We go further by understanding the meaningful significance of our estimated predictors. In Table 6, we provide the predictors and the robust standard errors through which we conduct our analysis.

In the output below, the results are displayed as proportional odds ratios. Results show that the Community_score and the Shareholder_score have a significant (p-value < 0.001) and positive effect on credit rating issues. More precisely, for the Community_score that is sitting at 1.028545, we suggest that for a one-unit increase in community policies, i.e., going from 0 to 1, the odds of going from the lower category to the upper is 1.0285 greater, given that all of the other variables in the model are held constant. In other words, that means increasing one unit of the Community_score, the probability of a higher credit rating increases of 2.85%. Similarly, the Shareholder_score has a positive effect on the credit rating. For a one-unit increase of shareholder strategies, the odds of the high category of the rating from the lowest is 1.019666 times greater, given that the other variables in the model are held constant. Likewise, the CSR_Strategy is significant at a p-value < 0.005 with a positive impact on credit ratings. The CSR_Strategy odds ratio is 1.020991, so the increase, 1.02991 times, is found between low rating and the high rating category. Negative results sort out for Product_Resp_Sc and Env_Innov_Sc because the odds ratios are less than 1, even if they are significant with a p-value of 0.05. Further research is needed to explore this nexus.

Overall, these results are in line with the study of Stellner et al. (2015). Thus, ESG performance leads to better credit ratings. We discover a meaningful significance for social and governance issues, whereas with reference to environmental matters, the influence on credit ratings is weaker, rejecting the null hypothesis at a 90% confidential level. Finally, our control variables confirm what has been well defined in the literature in the studies of Altman (2000); Altman and Saunders (1998); and Merton (1974).

Even if we do not reveal strong evidence, our research opens up several avenues for deeper investigations discussed in Section 6. Moreover, this work has strong implications, both theoretically and practically. From a theoretical perspective, it opens avenues for enhancing and strengthening ESG disclosure and performance matters. From a managerial perspective, banks and financial intermediaries may include ESG with the creditworthiness evaluation of their borrowers as the reduction in the default probability estimation, through which both counterparts take an advantage. Specifically, ESG disclosure leads to information asymmetry reduction because of more and better information gathering. On one side, banks can price borrowers at a lower

interest rate if they demonstrate the valuable enhancement and sustainability of ESG commitments. On the other side, borrowers can access credit at an affordable rate, and their ESG activities are financially repaid.

Table 5. The ordered logistic regression model

Model Specifications	Results
Number of Obs.	56
Wald chi2(14)	118.93
Prob > chi2	0.000

Source: Authors

Table 6. Ordered logistic regression

Rating_Scale	Odds Ratio	Robust Std. Err.	|z|	P > |z|
Independent Variables				
Resource_Use_Sc	1.005901	.0088853	0.67	0.505
Emission_Sc	1.008491	.0076765	1.11	0.267
Env_Innov_Sc	.0966009	.0057443	2.32	0.021
Workforce_Sc	.9918119	.0091022	0.90	0.370
Community_Sc	1.028545***	.0081582	3.55	0.00
Product_Resp_Sc	.9876669	.0058635	2.09	0.037
Manag_Sc	.9913486	.005251	1.64	0.101
Shareholder_Sc	1.019666***	.0055161	3.60	0.000
CSR_Strategy_Sc	1.020991**	.0088952	2.38	0.017
Control Variables				
NetDebt_TotEquity	1.383981***	.1196773	3.76	0.000
EBIT_TotRev	.0246309	.0513087	1.78	0.075
Market_Cap	1.2211444***	.0585293	5.70	0.000
Total_Revenue	.7367603	.3282173	0.69	0.493
Ebitda	3.626352***	1.415007	3.30	0.001

Note. *, **, and *** denote significance at $p< 0.10$, $p<0.05$, and $p<0.01$, respectively.

Source: Authors

6. Conclusions and avenues for further studies

The current research investigates how ESG performance influences credit ratings of Italian and Spanish public companies in the fiscal year 2015. We study how the individual dimension of each category of ESG performance influences the credit rating.

We discover that ESG performance is positively associated with higher credit ratings. Particularly Community_Score and Shareholder_Score are significantly and positively related to credit ratings. Precisely, these scores are statistically significant at a 0.001 level. Results show that CSR_Strategy_Score has a weak relation to credit ratings. We do not achieve considerable and meaningful results concerning the environmental metrics (Environmental_Innovation_Score, Emission_Score and Resource_Use_Score), so further research is needed to strengthen this relationship. The study explores the linkage between ESG performance and credit ratings by providing implications both academically and practically. Firstly, the work reveals from the literature no clear-cut boundaries on the relationship between ESG criteria and default probability. Thus, this tie needs to be disentangled. If this linkage is empirically significant, increasing sustainable practices leads to a decrease in the default probability. Secondly, this negative relationship can consequently have noteworthy implications in practice. The enhancement of ESG commitments acts as a risk mitigation factor that indirectly reduces the overall risk of companies and consequently has practical implications on credit ratings and default probability. As a consequence, ESG commitments may be included in credit lending policies and thus advance the evaluation of sustainable credit lending practices. ESG criteria may serve for the estimation of their risk sensitivity, referring in particular to the default probability.

We acknowledge several extensions of this analyses. Firstly, our findings are limited to the ESG performance of Italian and Spanish public companies without focusing on the whole European context. We suggest extending the sample under analysis by considering the whole sample of European public companies in compliance with the mandatory disclosure in the European Union (Directive 2013/34/EU). Secondly, this research can be classified as a cross-sectional study because it takes into account only one fiscal year. Thus, our next investigation will certainly employ the same model within panel data by considering the fixed effects on a broader range of years. Therefore, further investigations are necessarily required in terms of ESG disclosure and ESG information, considering the concrete facts of ESG results and going beyond the sole companies' declarations of intent.

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Appendix A: Overview of variables descriptions

	Definition	Database Source
RATING	Agency-equivalent credit rating implied by the current estimated forward 1-year default probability from the Star Mine Combined Credit Risk Model	Datastream/ Moody's
ESG_SCORE	The Thomson Reuters ESG Score is an overall company score based on the self-reported information in the environmental social and corporate governance pillars	Datastream
Resource_Score	The resource use category score reflects a company's performance and capacity to reduce the use of materials, energy, or water and to find more eco-efficient solutions by improving supply chain management	Datastream
Emission_Score	The Emission Category Score measures a company's commitment and effectiveness in reducing environmental emission in production and operational processes	Datastream
Env_Innov_Score	The Environmental Innovation Score reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes or eco-designed products	Datastream
Workforce_Score	The Workforce Score measures a company's effectiveness regarding job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities, and development opportunities for its workforce	Datastream
Community_Score	The Community Score measures a company's commitment to being a good citizen, protecting public health, and respecting business ethics	Datastream
Product_Resp_Score	The Product Responsibility Category Score reflects company capacity to produce quality goods and services integrating customers' health, safety, integrity, and data privacy.	Datastream
Management_Score	The Management Category Score measures a company's commitment to and effectiveness in following best-practice corporate governance principles.	Datastream
Shareholder_Score	The Shareholder Category Score measures a company's effectiveness in the equal treatment of shareholders and the use of anti-takeover devices	Datastream
CSR_Strategy_Score	The CSR Strategy Score reflects a company's practices in communicating that it integrates the economic (financial) social and environmental dimensions into its day-to-day decision-making process.	Datastream
Net Debt_Tot_Equity	The ratio is calculated as the net debt divided by total equity. Net debt represents the sum of total debt, minority interest, redeemable and non-redeemable preferred stock less cash, cash and equivalents, and	Datastream

	short-term investments.	
Ebit_Tot_Rev	The ratio represents the EBIT divided by the Total Revenue of the same period.	Datastream
LogMarkCap	The log of market capitalization, which is the sum of market value for all relevant issue level share types. The issue level market value is calculated by multiplying the requested shares type by the latest close price.	
Log_Tot_Rev	The log of total revenues, which are revenues from all of a company's operating activities after deducting any sales adjustments and their equivalents.	Datastream

Source: DataStream.