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ESG and Loan Spread: Does the Country Matter?

Name Student: Adnan Aliyev

Student ID number:525709

Supervisor: Dr. Sebastian Gryglewicz

Second Assessor:

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Abstract

The rising importance of corporate sustainability has made companies try to attract more investors by pursuing this initiative. Such an initiative signals to the financial market about the company's green objectives. This study aims at finding the extent the company and country ESG scores impact the loan spread. Through controlling for the company-specific historical financial performance and lender-borrower relationship over time, it was found that an increase in one unit of ESG score of a company is associated to a 0.3 decrease in its loan spread. Additionally, it was found that by integration of interaction effect of country ESG with company ESG score, the magnitude of a unit ESG score increase is amplified by 42%, corresponding to reduction in loan spread by 0.413.

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

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1.Introduction

The world is finally on the path to become green. Even though the “going green” initiatives date as far back as the 1948 “Water Pollution” Bill, it has received a higher traction only in the last two decades. With the increasing consumer demand for sustainable products as well as environmentally friendly processes, investors gradually shift their focus to the companies that prioritize this endeavor. According to the U.S. Forum for Sustainable and Responsible Investment (2020), the US sustainable investment universe has experienced a 25-fold increase in size between 1995 and 2020.

To further stimulate this trend, financial institutions provide incentives for firms that are green or aim to be green. One such initiative is lower loan spread. Loan spread is the difference between the interest rate the lender pays to obtain the fund and the interest rate the borrower pays to get the loan from the lender. The idea behind the incentive stems from the belief that companies with strong corporate social performance (CSP) have lower credit risk; thus, are less likely to default. Rating agencies like Moody’s have already incorporated the CSP related measures into their models, emphasizing the importance of this factor in the company-risk valuation. The issue of this approach, however, can be the fact that investors might prefer companies with higher CSR score for non-financial reasons; hence, increasing the demand for loans to these companies. This creates an entanglement of these two explanations. In this article, we will assume the framework of Zhang (2021) - credit rating institutions take CSP as a parameter in their assessment; thus, credit risk channel is more likely to be the key factor than investors preferences.

This paper aims to analyze the novel field of CSP and whether corresponding ratings of the company have an impact on the cost of debt in the syndicated loan market, and whether the country of origin plays a significant role in this relationship. It will add to the existing literature by adding to and juxtaposing the existing research on the effect of CSP performance on spread as well as focus on impact of country CSP performance on magnitude of effect of company social performance on loan spread. Thus, the combination of different approaches taken by authors of various recent research papers will be applied. Similarly, it is expected to further support the investor’s view on long-term benefits of investing in “socially responsible” companies.

The mainstream way of measuring a company's CSP performance is the ESG rating system. Standing for Environmental, Social, and Governance, ESG rating helps investors assess the company's resilience to long-term environmental, social, and governance risks. As for the way of measuring the cost of debt, the loan spread is selected. This was based on the findings of Altman et al., (2004) that the loan market is more efficient in providing information compared to the bond market about loan default dates and bond default dates. Another advantage of syndicated loans is the fact that a higher degree of transparency is available to debt holders compared to bondholders, mitigating the moral hazard in such a way. Owing to these reasons, this dependent variable was selected.

2.Literature Review

This section will elaborate on the main articles that can provide an insight for the current research. The importance of ESG disclosure is widely discussed among shareholders and investors. The proponents of disclosure claim that a greater ESG transparency is associated with a lower information asymmetry between borrowing enterprises and lending institutions, which leads to a lower financial cost. A recent study by Yoo et al., (2022) supports this viewpoint, showing that media transparency on ESG is crucial for firm revenues. On the other hand, the opponents of ESG score disclosure mainly associate it with greenwashing, and personal gains of management teams. Yu et al., (2020), especially emphasize on the misalignment between a firm's ESG transparency and actual performance since the current disclosed reports are mostly comprised of unaudited ESG reports and lack a global governing body to oversee the accuracy of reports. This in turn creates doubts among lenders, increasing the borrowing cost. Given these two opposing views, the current research will rely on the most recent findings as well as methodology to investigate the topic.

This paper was inspired by the research of Zhang (2021) who analysed the effects of ESG rating on syndicated loan market spread. Through examining the impact of the ESG score announcement, company-specific financials, as well as lender-borrower fixed effects, the author found that a one standard deviation increase in a borrowing company's ESG score leads to a 6.3 basis-point decrease in its loan spread.

Furthermore, Tommaso et al., (2020) examined the effect of corporate social responsibility ratings on Credit Default Swap (CDS) spread of European firms. Analysing the announcement of the score, account issue characteristics, and the macro-economic context, they found that improvement of CSR rating reduces the CDS spreads 30 days after the rating announcement. Hence, the study finds a negative relationship between CSR ratings and CDS spreads.

Based on the papers above, the first hypothesis will be:

H1: An increase in ESG score is associated with a reduction in the syndicated loan market spread.

It is also important to note that not all companies have enough support and conditions for improvement, which can heavily depend on the company's country of origin's initiatives towards the sustainability agenda. In their research, El Khoury et al., (2021) supported this viewpoint, showing that economic, social, legal, and institutional frameworks of the country of origin play a significant role on ESG scores.

Moreover, Stellner et al., (2015) conducted research on the impact of the ESG results on zero-volatility spreads (z-spreads). The research is particularly interested in finding how country moderates abovementioned relationship. After utilizing ordered logistic regressions to examine the relation between ESG and credit ratings, authors reached to the conclusion that there is evidence that the country of origin might moderate ESG-credit risk relationship.

Likewise, Barth et al., (2022) tried to find a relationship between the country the company was based in and potential financial benefits tied to it. The results of the research indicate that there is evidence that higher ESG rating of the country is linked with the reduction of the firm risk. This supports the theory that better ESG performance serves as an indicator of higher trust of investors.

The second hypothesis is based on the articles above, and is as follows:

H2: The impact of ESG score on syndicated loan market spread has an associated increased magnitude for companies based in countries with high country level ESG score.

3. Data

3.1 Syndicated Loan

The data on syndicated loans is retrieved from Thomson Reuters' LPC DealScan. For this research, the data on loan conditions, pricing, terms, and country of origin is taken between 2010 and 2020. This was done in order to omit the effect of COVID-19 that had a significant influence on many companies and can be considered as period of shock; hence, influencing the results of the research. As DealScan has its own unique borrower ID, the linking table (Chava et al., 2008) is used. This table translates various company identifiers used in many systems to DealScan's Unique Borrower ID. Also, the option of whole spread data extraction was used, and companies were matched based on the name and country of origin. This paper will mainly try to use the same variables as Zhang (2021): spread, maturity and loan size (See Appendix Table A.1)

3.2 Financial Data

The relevant financial indicators are imported from CompuStat Annual data. As per the article of Qureshi et al., (2021), and Zhang (2021) the following financial data were selected as optimal financial control variables: company size, return on equity (ROE) and leverage ratio. As these indicators are not directly available in the data source, relevant formulas were used to obtain them (See Appendix Table A.2).

3.3 Company ESG Scores

As for company ESG scores, they are obtained through Refinitiv Asset4 database that is updated on an annual basis. Scores are on a 0 to 100 scale, where a 100 indicates highest performance. In this database, the ESG rating for more than 9000 companies is provided. In the overview per

company, the score for each of three ESG components- Environmental, Social and Governance- is provided. This report will deal with total ESG score.

3.4 Country ESG Score

As sovereign ESG score is rarely available in many of the ESG score measuring companies, it was decided to refer to existing literature of obtaining this metric manually. One of the most widely used method to manually obtain the country ESG scores is the one introduced by Capelle-Blancard et al., (2016), which uses the World Development Indicators (WDI) from World Bank of ESG data. For each of three ESG pillars, 6 main metrics were taken for the countries in this research (See Appendix Table A.3). Thereafter, the authors use the methodology by Nicoletti et al., (2000), where factor loadings of each consecutive variable are measured. Factors are the set of underlying variables which explain some part of variance in the response variable (three of the ESG pillars in this paper). Factor loading is a statistical method that establishes an association between a model variable and its corresponding factors. A low factor loading implies that the item and its corresponding latent variable have weak links, and thus the item should be deleted, whereas high factor loading hints on strong link between the variables. In the aforementioned research, each detailed indicator was weighted according to the proportion of its variance explained by the ESG pillar it was connected to. In such a way, first variables are assigned to each pillar, and composite indexes are calculated. Then, the variables with the highest factor loading are selected to the respective pillar. Lastly, the squared factor loading is calculated to determine the weight of each variable (indicates the variance explained by the component). Once the relevant information is gathered, the weights are multiplied by relevant variables extracted from WDI database, and the scores for each pillar are calculated. Next, each pillar is weighted according to its contribution to the portion of the data set's explained variance. Capelle-Blancard et al., (2016) calculated these values, and arrived to the following equation:

$$\text{Total ESG Score} = 0.44 * \text{Governance} + 0.32 * \text{Social} + 0.24 * \text{Environmental}.$$

3.5 Other Variables

The paper will focus on 820 companies for which it was possible to retrieve the unique borrower id in DealScan and for which ESG scores were present in ASSET4 data. This section will delve into elaboration of the most important variables as well as its use throughout the research.

Borrower and Lender names/ids are going to be useful for us to establish the connections of the long-term cooperation between the repeated loan takers. Controlling for repeated contracts with the same lender over time helps to avoid the issue of determining omitted variables of borrowing costs. The idea behind this is that counterparties with established cooperation can gain trust of each other, and hence, adjusting various factors of loan that depend on trust factor.

Country of loan issuance from DealScan and Country of company's origin will be added to analyse our second hypothesis. It is, also, important to observe the magnitude of the loan. Next, margin is taken in basis points from DealScan to be able to investigate the first hypothesis and the second hypothesis.

Furthermore, we are taking the data of total ESG score of each of these companies throughout the period of 2010-2020. As not all companies start to report their ESG scores in 2010, the amount of data points will be increasing with each year.

Lastly, as per Qureshi et al., (2021) and Zhang (2021) the company size, return on equity (ROE), and leverage ratio variables will be taken as financial control. These variables are added because they are widely used and useful indicators of the company performance through the years

3.6 Outliers

Once collecting all the data, a data exploration was done. Among the variables, four of them were found to have few outliers (See Figures 1.1,1.2,1.3): Spread, Leverage Ratio, and ROE, and Average Life of Deal. As can be seen from these boxplots, Spread and Average life of deal variables have high positive outliers, whereas Leverage Ratio and ROE data has outliers on both sides. Hence, a data transformation was required. The existence of such outliers may notably change the magnitude of variable coefficients, and/or change their sign. That is why using the Winsor function of STATA, the 90% at the right tail for Spread and Average Life of Deal, and

both tails at 10th and 90th percentiles for Leverage Ratio and ROE were set to the values at corresponding percentile. In such a way, the extreme values are replaced by less extreme values.

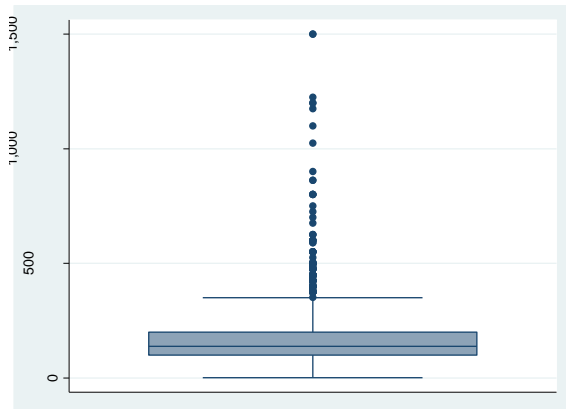


Figure 1.1 The figure shows the box plot of data distribution for Spread



Figure 1.2 The figure shows the box plot of data distribution for Leverage Ratio

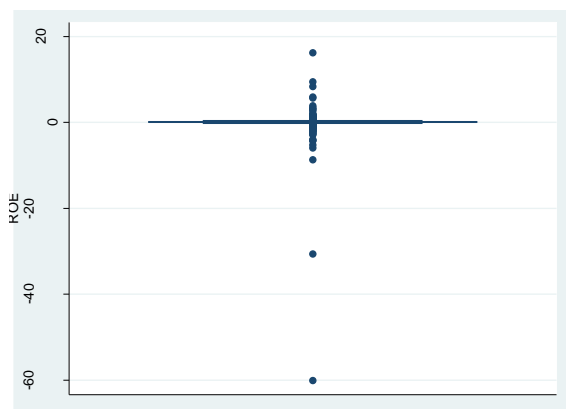


Figure 1.3 The figure shows the box plot of data distribution for ROE

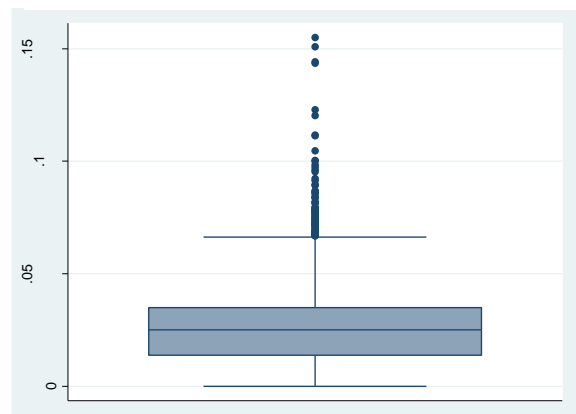


Figure 1.4 The figure shows the box plot of data distribution for Average Life of Deal

3.7 Companies

Of the 820 companies in the research, 587 (71.59%) companies were from the United States, 48 (5.85%) from the United Kingdom and the remaining 185 companies from 22 other countries that make up 22.56% of the total companies.

Country	#Companies	Share
UNITED STATES	587	71.59%
UNITED KINGDOM	48	5.85%
CHINA	33	4.02%
CANADA	28	3.41%
GERMANY	18	2.20%
AUSTRALIA	18	2.20%
FRANCE	15	1.83%
JAPAN	14	1.71%
INDIA	12	1.46%
SPAIN	6	0.73%
SWITZERLAND	6	0.73%
NETHERLANDS	5	0.61%
NORWAY	5	0.61%
CHILE	4	0.49%
SOUTH AFRICA	4	0.49%
MEXICO	3	0.37%
ISRAEL	3	0.37%
RUSSIAN FEDERATION	3	0.37%
BELGIUM	2	0.24%
SINGAPORE	2	0.24%
ITALY	2	0.24%
BRAZIL	1	0.12%
TURKEY	1	0.12%
Total	820	100%

Table 1 The table above illustrates the number of companies located in each country in this research

The final sample consists of 1272 lender-borrower pairs with an average of 1.49 loans per pair and a standard deviation of 1.27. On average, the loan size was 323,725.17 US dollars. Upon removing the observations that have missing values for any of the three main variables in the regression (Country ESG score, Company ESG score, Spread), there are a total of 1903 observations left for the regressions. From the summary table below, it is possible to

detect the wide range in the Loan Spreads with lowest margin rate at 50 basis point, the highest at 225 basis points, standard deviation of 56.77 basis points, and a mean of 143.1. The mean ESG score of the companies in this paper is 49.31, indicating the average level of the companies researched. These values tell us that the sample mainly consists of the companies with an average ESG rating and moderate Loan Spread.

Variable	Observation	Mean	Std. Dev.	Min	Max
Spread	1,902	143.10	56.77	50.00	225.00
Company ESG Score	1,902	49.31	20.74	2.34	93.76
Country ESG Score	1,902	67.95	9.23	35.63	85.88
ROE	1,902	0.11	0.10	(0.04)	0.29
Leverage Ratio	1,902	1.79	1.77	-	5.31
Size	1,902	10.00	1.07	-	13.49
Sales Size (in Millions)	1,902	0.60	3.02	-	63.41
Average Life of deal	1,902	4.56	3.27	-	60.00
Recurrence partnership	1,902	4.64	5.44	-	50.00

Table 2 The table above illustrates a summary statistic for each variable used in the regressions.

3.8 Country ESG Scores

Table 3 shows the performance of top 5 and bottom 5 ESG performing countries. While Norway retained the leading position throughout the decade with the staggering 85.88 points, the largest growth among top-performing countries was in Germany with almost 5% increase in 10 years, and annual growth of 0.5%. As for countries with the lowest scores in this research, China has performed notably well, increasing its score by 22%. In contrast, Turkey had an unfortunate decade, where its ESG score dropped by 3.09%.

TOP 5	Highest	Min	Average	Change since 2010 in %	Average Annual Change in %
Norway	85.88	83.41	84.86	2.73%	0.27%
Switzerland	80.70	77.66	79.53	3.21%	0.32%
Canada	80.37	77.99	79.10	1.15%	0.12%
Netherlands	75.68	73.46	74.93	2.87%	0.29%
Germany	76.60	72.30	74.80	4.93%	0.49%
Bottom 5					
South Africa	49.44	46.16	49.44	7.11%	0.70%
Mexico	47.32	45.39	47.32	3.65%	0.36%
Russian Federation	49.03	44.01	49.03	9.86%	0.95%
Turkey	44.28	40.97	44.28	-3.09%	-0.30%
China	46.71	38.29	42.18	22.00%	2.02%

Table 3 The table above shows the best and the worst performing country in terms of ESG score. Also, the graph provides information on the relevant metrics such as Growth during the decade, annual growth, average, minimal and maximum scores per country.

4. Methodology

4.1 Data Preprocessing

As some companies start to report ESG score later than 2010 and/or have some gaps in their reporting, missing data points are excluded from the evaluation, as assigning 0 to these values would distort the results, and extrapolation cannot be performed with the limited number of data points for each company.

The last step prior to inputting the data to the statistical software (STATA) is normalization. The purpose of normalization is to convert the values of numeric columns in a dataset to a similar scale without distorting disparities in value ranges. It was done as some variables in this research are in millions, while others in the scale between 0 and 100. Hence, all the variables are rescaled and brought to the scale from 0 to 1 by means of Python Normalization command.

4.2 Model

The model this paper will use to assess the first hypothesis is the model introduced by Zhang (2021) to check whether results found by her paper hold.

$$\text{Spread}_{ijt} = \text{CompanyESGscore}_{it} + \text{LoanChar}_{ijlt} + \text{FinChar}_{it} + y_{jt} + k_{it} + e_{ijlt} \quad (1)$$

Spread is the spread borrower i pays over the floating base rate in particular year t adding any additional costs of transactions paid to lender j to the spread. CompanyESGscore variable is the ESG score of company i for year t . LoanChar variable is specific attributes of the deal such as loan size, maturity, average life of deal. FinChar is the firm-specific annual financial data for the company size, ROE, and Leverage Ratio. y_{jt} takes into account all the unobserved variations for lender-year pairs. k_{it} is the time-invariant borrower fixed effect, e_{ijlt} is the residual corresponding to borrower i , lender j , loan l and year t . Standard errors are clustered at the borrower level.

For the second hypothesis of observing the effect of interaction effect between country ESG score and company ESG score on Spread the following model will be used:

$$\text{Spread}_{ijt} = \text{CompanyESGscore}_{it} + \text{CountryESGscore}_{cjt} + \text{CountryESGscore}_{cjt} * \text{CompanyESGscore}_{ijt} + \text{LoanChar}_{ijlt} + \text{FinChar}_{it} + y_{jt} + k_{it} + e_{ijt} \quad (2)$$

Two terms added to this regression are ESG score country for year t and interaction effect between ESG score of company and ESG score of the country.

5. Results

5.1 First Regression: First Hypothesis

After regressing the selected variables on Loan Spread, it can be seen from Table 4 that all the variables apart from the Sales Size are significant at 1% significance level. The R-squared of this regression shows that this set of variables explains an 85% variation in the loan spread. From the table it can be seen that the addition of the Financial Characteristics of the company adds almost 10% of explained variance to the model consisting of ESG score. Furthermore, adding Loan related variables helps to increase the R-square by 0.05%. As per a detailed analysis of each variable, a unit increase in ESG score is associated with a decrease in spread by 0.291 basis points which supports the first hypothesis. Similarly, the size of the company, return on equity, average life of the deal and recurrence of the relationship between the lender, and borrower are correlated with a reduction in Loan Spread. In contrast, leverage ratio seems to have a positive impact on loan spread. Results are below in Table 4:

VARIABLES	(1) Spread	(2) Spread	(3) Spread
Company ESG Score	-0.458*** (0.00603)	-0.290*** (0.00691)	-0.291*** (0.00699)
ROE		-13.38*** (1.863)	-13.12*** (1.854)
Leverage Ratio		0.301*** (0.117)	0.329*** (0.116)
Size		-1.650*** (0.0531)	-1.535*** (0.0567)
Sales Size			0.00239 (0.0455)
Average Life of deal			-0.290*** (0.0723)
Recurrence partnership			-0.130*** (0.0283)
Constant	0.977*** (0.00216)	1.033*** (0.00248)	1.037*** (0.00261)
Observations	1,902	1,902	1,902
R-squared	0.752	0.846	0.850

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Regression results for the relationship between Loan Spread and Company ESG score, controlling for Financial Characteristics and Borrower-Lender relation

5.2 Second Regression: Second Hypothesis

The second regression has interaction effect of country ESG score added to check for the effect of country of the company on the Loan Spread. Generally, it can be interpreted from the Table 5 that the ESG country score is statistically significant at 1% significance level. Also, R-square of

the model has increased to 92.2%, but this is to be expected as a new explanatory variable is added. Moreover, by controlling for the country ESG score of the country of the company is located in, the magnitude of associated effect of ESG score on Loan Spread seem to increase by 42%. In such a way, a unit increase in ESG score is associated with reduction of the Loan spread by 0.41 basis points. With this addition, also the Sales Size becomes significant which can imply the potential correlation between Country ESG and Sales Size. Contrary to this, the Size of the company and Average life of the deal became insignificant, which also hints on correlation between these variables as well. Hence, the correlogram for these variables was run. While there is a small correlation between the Sales Size and Country ESG, the correlation between the size of the company as well as deal length is above 0.35 (See Appendix Table A.5). An argument from economics point of view would be the fact that large companies are predominantly located in the developed countries which have a greater stability and give a greater freedom to companies. Likewise, investors tend to provide longer time to repay the contracts to companies' from more sustainable and stable countries that are more resistant to external shocks in market. Nevertheless, to remove the multicollinearity from the model, another regression is run without these two variables. Upon removal of these two variables, a new regression is performed to observe any potential changes this has action led to. As can be seen from the regression 4 in Table 5, none of the variables underwent drastic changes in the coefficients, and R-squared is equal to the exactly the same value as in the regression 3 in Table 5.

VARIABLES	(1)	(2)	(3)	(4)
	Spread	Spread	Spread	Spread
Company ESG Score	-0.458*** (0.00603)	-0.422*** (0.0116)	-0.410*** (0.0123)	-0.413*** (0.0116)
Country ESG Score		-0.418*** (0.00833)	-0.405*** (0.0108)	-0.411*** (0.00844)
Country ESG Score* Company ESG Score		0.296*** (0.0236)	0.290*** (0.0239)	0.292*** (0.0233)
ROE			-4.569*** (1.356)	-4.554*** (1.351)
Leverage Ratio			0.212** (0.0838)	0.206** (0.0836)
Size			-0.0668 (0.0541)	
Sales Size			-0.116*** (0.0330)	-0.120*** (0.0327)
Average Life of deal			0.0398 (0.0532)	
Recurrence partnership			-0.0624*** (0.0205)	-0.0631*** (0.0205)
Constant	0.977*** (0.00216)	1.095*** (0.00313)	1.093*** (0.00314)	1.094*** (0.00313)
Observations	1,902	1,902	1,902	1,902
R-squared	0.752	0.883	0.922	0.922

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression results for the relationship between Loan Spread, Company ESG score, and an interaction effect between Country and Company ESG scores, controlling for Financial Characteristics and Borrower-Lender relation

The results in this section coincide with Zhang (2021) findings of significance of ESG score on Spread where an increase in one unit of ESG score correspond with a decrease in spread by 0.3, controlling for loan characteristics and the financials of company. Likewise, the results support the views of El Khoury et al., (2021), Stellner et al., (2015), and Barth et al., (2022) that control for country is an important variable that further expands the effect of ESG score. The significance of each factor added has also a resemblance to the research by the core papers.

6 Model Robustness

6.1 Robust to Outliers

This section is dedicated to test the robustness of the model. The tool used for this will be STATA's RREG function that performs Huber's regression where data is mixed with outliers or influential observations to check whether they are significantly affecting the results of the regression. As we can see from the Table 6, none of the variables lost their significance and their coefficients have not changed by noteworthy amounts. Hence, we can conclude that the models used in this paper are robust to the outliers.

VARIABLES	(1) Spread	(2) Spread
Company ESG Score	-0.275*** (0.00634)	-0.446*** (0.0116)
Country ESG Score		-0.443*** (0.00843)
Country ESG Score* Company ESG Score		0.350*** (0.0232)
Leverage Ratio	0.354*** (0.105)	0.148* (0.0835)
ROE	-12.42*** (1.682)	-4.903*** (1.350)
Size	-1.959*** (0.0514)	
Recurrence of partnership	-0.133*** (0.0257)	-0.0788*** (0.0205)
Sales Size	-0.0435 (0.0413)	-0.120*** (0.0327)
Average Life of deal	-0.282*** (0.0656)	
Constant	1.054*** (0.00237)	1.112*** (0.00313)
Observations	1,902	1,902
R-squared	0.888	0.927

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Huber's Robust Regression results for the relationship between Loan Spread, Company ESG score, and an interaction effect between Country and Company ESG scores, controlling for Financial Characteristics and Borrower-Lender relation. The model 1 presents the Huber's regression corresponding to regression in Table 4, and the model 2 is corresponding to the model 8.

6.2 Robust Standard Errors

Robust standard errors technique is used to be confident that no significant differences in standard errors appear because of the presence of heteroskedasticity. Hence, if the model is homoscedastic, the values of standard errors in a simple regression and regression with robust standard errors are not significantly different. Using the model in STATA that makes use of White-Huber standard errors estimation methodology, the Table 7 was obtained. When

comparing Model 1 and Model 2 with their corresponding regressions in Table 7, Table 4 and Table 5, it can be seen that no significant variation in standard errors exist. Thus, it can be inferred that the models used in this paper are robust to standard errors.

VARIABLES	(1) Spread	(2) Spread
Company ESG Score	-0.275*** (0.00634)	-0.446*** (0.0116)
Country ESG Score		-0.443*** (0.00843)
Country ESG Score* Company ESG Score		0.350*** (0.0232)
ROE	-12.72*** (1.682)	-4.803*** (1.350)
Leverage Ratio	0.354*** (0.105)	0.178* (0.0835)
Size	-1.859*** (0.0514)	
Sales Size	-0.00435 (0.0413)	-0.120*** (0.0327)
Average Life of deal	-0.282*** (0.0656)	
Recurrence of partnership	-0.133*** (0.0257)	-0.0788*** (0.0205)
Constant	1.054*** (0.00237)	1.112*** (0.00313)
Observations	1,902	1,902
R-squared	0.888	0.927

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression with the robust standard errors for the regression between Loan Spread, Company ESG score, and an interaction effect between Country and Company ESG scores, controlling for Financial Characteristics and Borrower-Lender relation. The model 1 presents the White-Huber standard errors regression corresponding to regression in Table 4, Model 3, and the model 2 is corresponding to the Table 5, Model 4.

7 Limitations & Potential Improvements

7.1 Limitations of the research

While research adds to the existing literature by incorporating country ESG score to analyzing the effects of company ESG performance on Loan Spread, a better data quality is required. Mainly, countries outside of North America have an inconsistent way of reporting the ESG performance even though results have improved in the recent years. Similarly, better and more transparent ways of calculating the country ESG scores are required. Also, despite Capelle-Blancard provide a good scientific backing for their model, the flows like inconsistency in the World Bank Data reporting, as well lack of data in some parts of the world create a significant hindrance to accurate results. Likewise, the way this research obtained the Loan spread scores is inefficient and open to flows. This stems from the fact that no open translation between the well-known, unique company identifiers and Deal Scan IDs exist. Therefore, it was not possible to collect Loan Spread data for all companies for whom ASSET4 ESG info was provided.

7.2 Potential Improvements

For the future research, the key element to improve the findings in this paper would be enlarging the dataset. Especially, it would be useful to increase the number of companies outside of North America that makes up almost 66% of the companies. Furthermore, as discussed in the section above, enhancing the data quality as well as building on country ESG data would be of particular importance.

8 Conclusion

This paper aimed to research the trending topic of Corporate Social Responsibility, and what is the value added of including ESG performance in Loan Spread. Also, this paper controls for the ability of country ESG ratings to enhance the relationship between ESG performance and Spread.

To circumvent the lack of country ESG data, the sovereign ESG performance for each country manually constructed. The advantage of this method is the fact that all the data has a clear methodology and the scientific backing by pre-existing papers.

All the variables in the research were normalized as many variables were from different scales. Next, each of the variables was analysed on the outliers and relevant variables were transformed by means of Winsor function in order to limit the effect of outliers. Finally, the variables were regressed.

The results suggest that there is a 0.29 basis points reduction in Loan Spread for a unit increase in company ESG score. This supports the first hypothesis of this research as well as findings of Zhang (2021). Additionally, the interaction effect of Country ESG scores seems to intensify the effect of ESG score by almost 14%, agreeing with the second hypothesis of the paper.

The results support both of the hypothesis and generally agree with the existing literature. Nevertheless, the results can be improved by the addition of a more clear and widely controlled way of ESG score validation.

Generally, Social Corporate Responsibility topic is an emerging, ubiquitous topic that is becoming more relevant in every aspect of economics. Thereafter, it is a vital element that needs to be taken into account during decision making of business.

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Appendix

Table A.1

Maturity	Number of Months Loan is Active
Loan Size	Log of Amount by the lender(s)
Lender(s) Name	Names of the Lenders
Spread	Measured in Basis Points and indicated the variance in interest rate borrower and lender pay to acquire funds

Table A.2

Return on Equity	$\frac{(Net\ income)}{(Shareholder's\ Equity)}$
Leverage Ratio	$(Total\ Debt)/EBITDA$
Size	$\text{Log} (Total\ Assets*1,000,000)$

Table A.3

Table A.1.2: Items used to assess ESG performance.

Dimension	Measuring items	Code	Source
Environmental			
Air Quality	Air pollution	Air	WDI
Water and sanitation	Waste water treatment	Waste	WDI
Forests	Forest area (% of land area)	Forest	WDI
Biodiversity	Terrestrial protected areas (% of total land area)	Terrest	WDI
Climate and Energy	Renewable electricity output(% of total)	Electricity	WDI
	Renewable energy consumption(% of total)	Energy	WDI
Social			
Human capital	Gross national income per capita growth rate	Gnicapita	WDI
	Human development index	IDH	WDI
Demography	Life expectancy	Life	WDI
Health	Health per capita	Healthpercapita	WDI
Gender equality	Female to male labour force participation rate	Femaletomale	WDI
Technology and R&D	Internet users	Internetusers	WDI
Governance			
Democratic-institution	Control of Corruption	Corruption	WGI
	Rule of Law	rule	WGI
	Voice and Accountability	voice	WGI
Safety policy	Country Effectiveness	E ectiveness	WGI
	Political Stability	Stability	WGI
	Regulatory Quality	Regulatory	WGI

Table A.1 was extracted from Capelle-Blancard et al.,(2016) research. The table above indicates the variables taken for the assessment of ESG data.

Table A.4

Table A.1.6: The construction of the ESG index.

Variables	Component 1	Component 2	Component 3
Air	0.00	0.00	0.29 ^b
Water	0.00	0.00	0.01
Forest	0.00	0.00	0.23
Terrest	0.00	0.00	0.02
Electricity	0.00	0.00	0.19
Energy	0.00	0.00	0.27
Gnicapita	0.00	0.21	0.00
IDH	0.00	0.22	0.00
Lifexpectancy	0.00	0.17	0.00
Heathpercapita	0.00	0.12	0.00
Femaletomale	0.00	0.05	0.00
Interenetusers	0.00	0.23	0.00
Effectiveness	0.18	0.00	0.00
Stability	0.11	0.00	0.00
Regulatory	0.17	0.00	0.00
Corruption	0.18	0.00	0.00
Rule	0.18	0.00	0.00
Voice	0.18	0.00	0.00

Table A.4 was extracted from Capelle-Blancard et al.,(2016) research. The table above shows the weights of each variable in the final calculation of each ESG pillar

	Country ESG Score	Sales Size	Average Life of deal	Size
Country ESG Score	1			
Sales Size	0.1112	1		
Average Life of deal	0.3464	-0.0575	1	
Size	0.8337	0.1774	0.3931	1

Table A.5 illustrates the correlation diagram between Sales Size and Country ESG scores.