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ESG PERFORMANCE AND CORPORATE DEFAULT RISK:

DO COUNTRIES' SHAREHOLDER PROTECTION LEVELS AFFECT THIS RELATIONSHIP?

Research

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Seda BİLYAY ERDOĞAN, Kadir Has Üniversitesi, İktisadi İdari ve Sosyal Bilimler Fakültesi, Uluslararası Ticaret ve Finansman Anabilim dalında Doktor Öğretim Üyesi olarak görev yapmaktadır. Temel çalışma alanları, kurumsal finansman, sermaye yapısı, sürdürülebilirlik ve çevresel, sosyal ve kurumsal yönetişim performansı üzerinedir.

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Abstract

This paper explores the nexus between environmental, social, and governance (ESG) performance and corporate default risk. Employing a panel dataset from 1,094 non-financial companies in 21 European nations, corresponding to 9,522 firm-year observations, and using fixed effects estimations, we empirically demonstrate that corporations with higher ESG scores tend to have lower firm default risk. Among the three categories of the ESG score, both the social and the environmental categories participate in this significant association. Moreover, our study presents novel evidence that within ESGs' ten subcategories, resource use, product responsibility, emissions, human rights, workforce, and CSR strategy significantly reduce firm default risk. Furthermore, country-level shareholder protection moderates the linkage between default risk and ESG performance, such that the negative impact of ESG on default risk is lower for corporations located in nations with higher shareholder protection. Hence, if the countries' shareholder protection levels are high, stronger ESG would decrease firm default risk by less than countries with lower shareholder protection levels. Our findings are robust to alternate variable measurements and alternate methodologies, capturing endogeneity issues.

Keywords: ESG Performance, Firm Default Risk, Country-level Shareholder Protection, European Countries

JEL codes: G34, G32, G30

ÇSY PERFORMANSI VE KURUMSAL TEMERRÜT RISKI: ÜLKELERIN HISSEDAR KORUMA DÜZEYLERI BU İLIŞKIYI ETKILER MI?

Özet

Bu makale çevresel, sosyal ve kurumsal yönetişim (ÇSY) performansı ile firma temerrüt riski arasındaki ilişkiyi incelemektedir. 21 ülkede yer alan 1,094 finansal olmayan firmadan alınan 9,522 firma yılı gözlemini içeren bir panel veri setini kullanarak, daha güçlü ÇSY performansına sahip olan firmaların daha düşük firma temerrüt riskine sahi olma eğiliminde olduklarını ampirik olarak göstermekteyiz. ÇSY skorunun üç ayrı bölümünden çevresel ve sosyal skorlar bu anlamlı ilişkiye katkıda bulunmaktadır. Çalışmamız, ÇSY puanının on alt kategorisi içinde emisyonlar, kaynak kullanımı, ürün sorumluluğu, insan hakları, işgücü ve kurumsal sosyal sorumluluk stratejisinin firma temerrüt riskini önemli ölçüde azalttığına dair yeni kanıtlar sunmaktadır. Ayrıca, ülkelerin hissedarlarını koruma seviyesi, ÇSY performansı ile temerrüt riski arasındaki bağlantıda moderatör rolü üstlenir; öyle ki, ÇSY performansının temerrüt riski üzerindeki azaltıcı etkisi, daha yüksek hissedar korumasına sahip ülkelerde bulunan firmalar için daha düşüktür. Dolayısıyla, eğer ülkelerin hissedar koruma seviyeleri yüksekse, daha güçlü ÇSY performansı firma temerrüt riskini hissedar koruma seviyeleri düşük olan ülkelere göre daha az miktarda azaltacaktır. Alternatif değişken ölçümleri ve içsellik sorunlarını da yakalayan alternatif metodolojiler kullanıldığında da bulgularımızın sağlam olduğu gözlemlenmektedir.

Anahtar kelimeler: ÇSY Performansı, Firma Temerrüt Riski, Ülke Düzeyinde Yatırımcı Koruması, Avrupa Ülkeleri

JEL codes: G34, G32, G30

1. INTRODUCTION

In the last decades, environmental, social, and governance (ESG) has captured the interests of the business world, such that it has developed as a vital tool for corporations to draw potential investors' interest and connect with different stakeholders (Yang et al., 2019). Along with practitioners, ESG has also grabbed the attention of academic researchers, who have previously investigated its impact on corporate performance (Bilyay-Erdogan & Öztürkkal, 2023), cost of equity (El Ghoul et al., 2011), market value (Jo & Harjoto, 2011), information asymmetry (Dhaliwal et al., 2012) and credit ratings (Jiraporn et al., 2014). Examining ESG is still a concern in finance research due to its significant implications for policymakers, investors, and market players.

On the other hand, firm risk is described as the likelihood of losing firm value stemming from ambiguity about future events or outcomes (Chang et al., 2014). Moreover, firm default risk is described as a firm that is unsuccessful in making its contractual settlements with creditors on time (Valta, 2016), which may result in destructive results for the shareholders and related stakeholders (e.g., employees, customers, investors, etc.) (Atif & Ali, 2021). Firm default risk is a significant indicator of a company's financial health (Rego et al., 2009). During the last decades, finance researchers have tried to comprehend firm default risk (Boubaker et al., 2020). Altman (1968) is one of the first to employ market and accounting-based models to predict firm distress risk. Firm default is expected to rise when firms suffer from a reduction or volatility in their cash flows (Atif & Ali, 2021). In line with the importance of firm default risk for shareholders and related stakeholders, examining the nexus between ESG performance and firm default risk becomes very noteworthy.

This paper investigates whether and how corporate ESG performance affects firm default risk for European corporations. Covering a dataset encompassing 1,094 publicly listed nonfinancial companies from 21 countries for the period between 2002 and 2019, and by executing fixed effects estimations, we present empirical output that corporate ESG performance reduces corporate default risk, proxied with two separate variables: Altman Z-score and earnings volatility. This finding suggests that corporations that are better in ESG activities exhibit less default risk thanks to being considered more creditworthy with higher levels of access to finance. Our findings are robust when we employ alternate proxies for the dependent and the independent variables and alternate methodologies for estimating our models, including instrumental variable approaches and alternate samples. Furthermore, we demonstrate that among the three groupings of the ESG score, social and environmental categories contribute to this association, with the impact of the governance pillar being insignificant. Moreover, within the ten subsections of the

ESG scores, workforce, human rights, emissions, resource use, CSR strategy, and product responsibility significantly reduce firm default risk. We further analyze whether shareholder protection levels in different countries moderate the ESG performance–firm default risk association. We empirically provide novel evidence that countries' shareholder protection levels moderate this link: Companies in nations with stronger shareholder protection tend to see a smaller effect from ESG performance on default risk.

Our research adds to the body of literature in a few ways. Based on the available information, this paper is the initial exploration of whether the connection between corporate default risk and ESG is shaped by shareholder protection at the national level. We present novel empirical findings that in countries where shareholders are protected more, the negative effect of ESG performance on firm default risk is lower. Hence, the findings of this cross-country analysis have significant implications, such that if the countries' shareholder protection levels are high, stronger ESG performance would decrease firm default risk by a lesser amount compared to countries with lower shareholder protection levels. Second, in prior papers, the link between corporate default and ESG risk has been analyzed in single-country settings, especially focusing on the USA (Bouslah et al., 2013; Chang et al., 2014; Jo & Harjoto, 2014;), with limited studies conducted in a cross-country setting, especially in Europe (Sassen et al., 2016). Analyzing this topic for Europe is very important since European countries are considered to be influential in ESG in contrast to firms in other countries (Ho et al., 2012). Concentrating on ESG coverage, the European Union (EU) started promoting corporate nonfinancial disclosures with several directives starting in 2014. These directives demonstrate how much value the EU exerts on this topic. Hence, Europe, with its cross-country setting, provides an excellent market for study. Finally, ESG performance is a multifaceted concept with many layers. Accordingly, our study is the first to demonstrate which exact category and subcategory within the ESG score significantly impacts firm default risk in Europe. Hence, this paper also has significant managerial suggestions, such that we guide managers on which area to concentrate on if they want to reduce their firm default risk.

Five sections comprise this paper. The literature review is presented in the second section. Then, the methodological framework is presented, including the sample, variables, and estimations. The fourth section displays and discusses the main results and a battery of robustness tests. We conclude our paper by presenting our findings and discussing their implications.

2. LITERATURE REVIEW

Default risk is considered one of the most important corporate risks that affect firms' survival. Investors and debtholders consider firm default risk when evaluating firms in the investing selection process (Atif & Ali, 2021; Campbell et al., 2008). Capital markets are the biggest resource for external financing. Hence, managers aim to maintain their default risk as low as possible to find enough financing at relevant costs (Anderson & Mansi, 2009). Besides, corporations with lower default risk are likely to have higher market confidence and lower capital costs.

Prior studies demonstrate that several aspects are directly or indirectly associated with projected cash flows, corporate performance, and default risk. These are uncertainties in cash flows (Chava & Purnanandam, 2010), customer satisfaction (Anderson & Mansi, 2009), a firm's efficiency in its production and operations (Becchetti & Sierra, 2003), brand loyalty (Rego et al., 2009) and asymmetric information (Bhojraj & Sengupta, 2003). Hence, default risk shows a firm's power and market confidence to reduce the risk related to several factors, including economic, social, and business-related indicators.

On the other hand, ESG performance demonstrates what kinds of actions companies undertake regarding environmental, social, and governance initiatives. These initiatives supply non-financial information, including various aspects such as employee welfare, human rights, product responsibility, emissions, etc. All these environmental, social, and governance initiatives help enhance society's welfare (Atif & Ali, 2021) by establishing a firm's integrity and linking with stakeholders. Accordingly, ESG performance helps companies boost their reputation and benefit from this internal power in their financial risk management.

In this context, the nexus between default risk and ESG performance may be described with the resource-based theory (RBT) (Barney, 1991). RBT conjectures companies can manage their internal dynamic resources, impacting their success and survival. Accordingly, companies with stronger dynamic resources may merge their ESG strengths with other corporate schemes to successfully take advantage of their risk management (Teece et al., 1997). A superior ESG performance may also be regarded as an indicator of better management expertise (Waddock & Graves, 1997). Even if a firm is faced with negative events, the firm will not get hurt from these negative events in terms of a reduction in cash inflows due to the moral capital among customers (Atif & Ali, 2021).

Corporate ESG performance helps companies decrease default risk in several ways. For example, stronger ESG is expected to enhance customer satisfaction and brand value and enhance the image of products among potential customers (Sassen et al., 2016), resulting in higher revenue,

consistent cash inflows, and, accordingly, higher profitability and lower financial distress (Luo & Bhattacharya, 2006). Prior studies demonstrate that the probability of default and incoming cash flows are directly associated with a steady stream of liquidity, which supports firms' operations and avoids possible outcomes of financial difficulties (Atif & Ali, 2021). As corporations with higher ESG incur more cash inflows, default risk is also likely to be reduced.

Second, companies may face volatility in cash flows stemming from infrequent income flows, which may create cash shortfalls (Chava & Purnanandam, 2010). Firms with better performance in ESG activities tend to reach stable financial performance due to enhanced reputation and corporate image and improved relationships with the financial markets and the government (Carter, 2005). Companies with upper ESG scores have more customer trust and loyalty, leading to less volatile income and profitability streams (Godfrey et al., 2009). Hence, ESG performance, which ensures stable cash flows, is like insurance for companies, keeping them away from default.

Third, stronger ESG performance and disclosure are expected to reduce asymmetric information (Bilyay-Erdogan, 2022), which mitigates regulatory, managerial, controversy, and reputational risks. When businesses reveal non-financial information to the public, investors' loyalty and trust are enhanced, resulting in cheaper funding costs and a fall in the total cost of capital (El Ghoul et al., 2011).

Overall, corporate ESG performance creates significant initiatives regarding enhanced corporate image and brand loyalty, which increases cash flows and reduces volatility. Firms with stronger ESG performance become more appealing to lenders. Hence, these firms benefit from lower costs of debt and have better credit ratings. These actions are expected to ease the availability of funds at low cost, reducing default risk. Consequently, the primary hypothesis is constructed as follows:

H_1: Firms with higher ESG scores are likely to have lower default risk.

On the other hand, La Porta et al. (1998) argue that the separation of control and ownership lets controlling investors obtain benefits from the firm at the expense of external investors, with the magnitude of these advantages depending on the extent of stockholder protection, which is expected to protect the outside investors that ultimately affects firm value. Besides firm value, the level of investor protection in different countries also affects asset returns, welfare costs, corporate investments, as well as firm risk (Albuquerque & Wang, 2008). Accordingly, Albuquerue & Wang (2008) show that in countries with weaker investor protection; higher risk, and larger volatility are observed. When shareholder protection is low in a country, conflicts of interest are

born between the controlling and outside shareholders. Moreover, the controlling investors value the benefits they will obtain from the firm more (Jensen, 1986). Hence, the controlling investors are more likely to invest when there is weaker stockholder protection. Nonetheless, a higher level of investment leads to higher volatility, taking into consideration the shocks to the investment's marginal efficiency (Albuquerque & Wang, 2008). Hence, firms in countries with stronger shareholder protection are likely to be less volatile, i.e., have less firm default risk. Based on the prediction that ESG and firm risk have a negative association, shareholder protection and firm default risk are also negatively related, we hypothesize country-level shareholder protection to moderate the ESG–firm default risk link. Since the corporations in countries with more shareholder protection are already protected in terms of having less firm default risk, we expect the additional impact of ESG performance to be trivial for corporations in countries with stronger shareholder protection. Thus, the second hypothesis is constructed as follows:

H2. Country-level shareholder protection has a moderating impact on the association between corporate ESG performance and firm default risk.

3. METHODOLOGICAL FRAMEWORK

3.1 Data

In this paper, we use a sample that covers 21 countries from Europe for the years between 2002 and 2019. We employ several sources to extract our data. Primarily, the accounting and financial variables are downloaded from Thomson Reuters Datastream. Second, we extract the environmental, social, and governance variables from the Refinitiv Eikon Database. We download the country-level control variables from the World Bank. Finally, we obtain anti-director-rights-index (ADRI) and ADRI revised index data from La Porta et al. (1998) and Spamann (2010), respectively. In this study, the pivotal variable is the ESG score, extracted from Refinitiv, which started to publish ESG scores beginning in 2002. Therefore, the sample employed in this analysis also starts with 2002. On the other hand, evidence shows that the pandemic crises increase firm default risk (Ho et al., 2023). As the main purpose of this study is to investigate the impact of ESG performance on firm default risk, we exclude the years in which the pandemic occurred. Accordingly, our sample period ends in 2019.

In our sample, we only include the manufacturing and service sector companies, excluding the financial firms, i.e., corporations with "standard industrial classification (SIC) codes" between 6,000 and 6,999. Moreover, only the corporations with ESG scores are incorporated in our sample,

excluding companies without ESG scores. Our sample contains 9,522 firm-year observations extracted from 1,094 corporations. Please refer to Table 1 – Panels A and B for the allocation of companies in the sample across the 21 countries and eight sectors. As can be depicted from Table 1 – Panel I, the largest number of company-year observations comes from the UK (28.2%). Moreover, Table 1 – Panel B displays that the manufacturing sector has the biggest portion, corresponding to 43.8% of the sample as a whole.

Table 1. Dissemination of the Sample

Panel I. Dissemination of the Sample Across Nations		
Countries	Number of Obs.	%
Austria	176	1.9%
Belgium	235	2.5%
Czech	25	0.3%
Denmark	314	3.3%
Finland	319	3.4%
France	1018	10.7%
Germany	972	10.2%
Greece	121	1.3%
Hungary	35	0.4%
Ireland	118	1.2%
Italy	405	4.3%
Netherlands	331	3.5%
Norway	367	3.9%
Poland	143	1.5%
Portugal	120	1.3%
Russia	316	3.3%
Spain	459	4.8%
Sweden	576	6.1%
Switzerland	593	6.2%
Turkey	193	2.0%
UK	2686	28.2%
TOTAL	9,522	100.0%
Panel II. Dissemination of the Sample Across Sectors		
Sectors	Number of Obs.	%
Agriculture, Forestry & Fishing	12	0.13%
Construction	588	6.18%
Manufacturing	4172	43.81%
Mining	671	7.05%
Retails Trade	838	8.80%
Service	1062	11.15%
Public Utilities & Transportation	1888	19.83%
Wholesale Trade	291	3.06%
TOTAL	9,522	100.00%

Table 1 – Panels I and II display the number of observations and their percentage across nations and sectors, respectively.

3.2 Variables

This paper analyses how corporate ESG performance affects firm default risk. Accordingly, our dependent variable is firm default risk. We employ two separate proxies for this variable: Altman Z Score and ROA volatility. Scholars frequently utilize ROA volatility and Z-score to gauge corporate default risk (Boubaker et al., 2020; Hu et al., 2020; Maquieira et al., 2024).

The primary independent variable is ESG combined scores extracted from Refitiniv. The effect of the three categories of ESG, i.e., environmental, social, and governance categories, on firm default risk is also examined to comprehend which exact category has a significant impact. Furthermore, we examine the effect of the ten sub-categories on firm default risk. The ten subcategories are community, resource use, human rights, workforce, environment product innovativeness, emission, shareholders, corporate social responsibility, management scores, and product responsibility.

Moreover, how countries' shareholder protection levels moderate the nexus between firm default risk and ESG performance is also analyzed. The "anti-director-rights-index" (ADRI) and ADRI revised index are two different proxies for country-level shareholder protection. The initial developers of ADRI were La Porta et al. (1998). ADRI utilizes six items to evaluate "the ease with which investors can exercise their rights in response to opportunistic behavior." ADRI scales from 0 to 6, where 6 means minority shareholders are protected legally at the highest level, and 0 indicates at the lowest level. On the other hand, Spamann (2010) has re-examined the legal data for shareholder protection, creating a revised index. This revised index captures corrections for 33 of the 45 countries analyzed. As robustness tests, we also employ the revised ADRI to observe whether our findings remain the same.

Finally, several firm-specific and country-specific control variables are included to ensure our findings are unbiased. Following the relevant literature, we include firm size, leverage, and market-to-book ratio (MTB) as our firm-specific control variables, following relevant literature (Maquieira et al., 2024; Sassen et al., 2016). Finally, we include inflation and GDP per capita growth as the country-specific control variables. Table 2 presents the variables and their descriptions.

3.3 Methodological Framework

To investigate the effect of ESG performance on firm default risk, the following specification is employed:

$$Firm\ default\ risk_{i,t} = \alpha_0 + \beta_1\ ESG\ perf_{i,t-1} + \beta_2\ X_{i,t-1} + \beta_3\ Y_{i,t-1} + \eta_i + \eta_c + \eta_t + \nu_{it} \quad (1)$$

where the Altman Z-score and earnings (ROA) volatility are used to represent firm default risk. Our primary indicator of how well corporations perform on ESG is the ESG combined score. ν_{it} represents the error term and $\alpha_0$is the intercept. The subscripts i and t indicate firm i and year t. In addition, we replace the independent variable with the environmental, social, and governance pillars. Furthermore, we incorporate firm size, leverage, and MTB ratios as firm-specific control variables and GDP as country-specific control variables. $X_{i,t-1}$ represents the firm-level control variables, whereas $Y_{i,t-1}$ represents the country-level control variables. We winsorize all continuous variables at a 1% level to alleviate potential outliers' impact on the results.

Next, to explore the impact of country-level shareholder protection on the link between ESG performance and firm default risk, we employ Model 2, stated below:

$$Firm\ default\ risk_{i,t} = \alpha_0 + \beta_1\ ESG\ perf_{i,t-1} + + \beta_2\ ADRI_{c,t-1} + \beta_3\ ESG\ x\ ADRI_{i,t-1} + \beta_4\ X_{i,t-1} + \beta_5\ Y_{i,t-1} + \eta_j + \eta_c + \eta_t + \nu_{it} \quad (2)$$

Utilizing panel data analysis with fixed effects supported by Hausman tests, we estimate both models using the ordinary least squares estimation methodology. The sectoral, country and time-fixed effects are denoted by η_j, and η_c, η_t. We add sectoral fixed effects to capture the sector-specific features, which are constant over time but may also impact firm default risk. To incorporate omitted country-level variables, we incorporate country-fixed effects. Finally, we add years-fixed effects to address the effect of the shifting macro-level events. To adjust for heteroscedasticity, the robust standard errors are clustered at the firm level (Petersen, 2009).

3.4 Descriptive Statistics

The summary statistics for the variables included in the analysis are displayed in Table 2. The mean ESG combined score for firms in our sample is 47.6. As can be seen from Table 2, the social pillar takes the highest score (51.582), with the environmental pillar possessing the lowest score for this sample (46.417).

We report the Pearson correlation coefficients for all the variables in Table 3. The findings in Table 3 demonstrate that multicollinearity problems do not exist within the variables.

Table 2. Definitions and Summary Statistics of Variables

	Description	Obs.	Mean	min	p25	Median	p75	max	Std. Dev.
Independent variables									
ESG Combined score	Varying from 0 to 100, extracted from Refinitiv	9522	47.614	8.26	33.12	47.88	61.98	86.38	19.049
Environmental Pillar	Shows firms' environmental performance varying from 0 to 100, and extracted from Refinitiv	9514	46.417	0	23.97	47.64	70.19	95.17	27.899
Social Pillar	Shows firms' social performance, varying from 0 to 100, extracted from Refinitiv	9514	51.582	4.31	31.64	51.66	72.2	95.39	24.386
Governance Pillar	Shows firms' governance performance, varying from 0 to 100, extracted from Refinitiv	9520	50.462	6.1	32.555	50.84	68.64	92.93	22.307
Dependent variables									
Altman Z-Score	"Z-Score= 0.012*Y1 + 0.014*´Y2 + 0.033*´Y3 + 0.006*´Y4 + 0.999*´Y5" "where´Y1: working capital / total assets,´Y2: retained earnings / total assets,´Y3: earnings before interest and taxes / total assets,´Y4: market value of equity/book value of total debt,´Y5: sales / total assets."	9045	1.659	-1.334	.533	1.583	1.160	4.756	.99
ROA volatility	The standard deviation of ROA	9432	.0506	.002	.0195	.035	.0629	.301	.050
Firm-level controls									
Firm Size	Ln (Total assets)	9503	15.6	7.428	14.273	15.515	16.872	19.289	1.834
Leverage	Total liabilities over total assets	9501	.585	.012	.4586	.589	.707	1.954	.207
MTB	The market value of equity over the book value of equity	9328	.003	-.004	.00125	.002	.0034	.023	.003
Country level controls									
Inflation	Annual consumer price index	9522	2.061	-5.21	.9479	1.774	2.284	24.46	2.518
GDP per capita growth	Annual growth of Gross Domestic Product per capita	9522	1.089	-10.02	.6412	1.325	1.832	23.99	2.143
Moderating variables									
Anti directors Rights Index (ADRI)	Ranging from zero to six, ADRI uses six items to assess "the ease with which investors can exercise their rights in response to opportunistic behavior" (La Porta et al., 98)	9522	3.818	2	3.5	3.5	5	5	.973
ADRI Revised	ADRI Index altered by Spamann (2010)	9003	4.382	2	4	4	5	6	.808

Table 2 exhibits the definitions of the variables and the summary statistics.

Table 3. Correlation Table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ESG Combined Scores	1.000											
(2) Env. Pillars	0.813*	1.000										
(3) Soc. Pillars	0.846*	0.741*	1.000									
(4) Gov. Pillars	0.606*	0.372*	0.397*	1.000								
(5) Altman Z-Score	-0.068*	-0.085*	-0.085*	-0.055*	1.000							
(6) ROA volatility	-0.174*	-0.189*	-0.172*	-0.059*	-0.151*	1.000						
(7) Firm Size	0.380*	0.473*	0.389*	0.284*	-0.184*	-0.179*	1.000					
(8) Lev	0.122*	0.140*	0.135*	0.056*	-0.275*	-0.075*	0.084*	1.000				
(9) MTB	-0.075*	-0.119*	-0.069*	-0.053*	0.241*	0.071*	-0.245*	0.055*	1.000			
(10) GDP per Capita growth	-0.035*	-0.067*	-0.032*	0.003	0.067*	-0.019	0.018	-0.055*	0.053*	1.000		
(11) Inflation	-0.117*	-0.113*	-0.151*	0.000	0.048*	0.029*	0.209*	-0.073*	0.004	0.200*	1.000	
(12) ADRI	-0.041*	-0.049*	-0.054*	0.056*	0.103*	0.111*	-0.217*	-0.014	0.100*	-0.009	0.042*	1.000

Table 3 exhibits the correlation coefficients between the main variables.

4. Results and Discussion

4.1 Baseline Results: The Relationship Between ESG Performance and Default Risk

The main goal of this study is to determine whether and how firm default risk is impacted by ESG performance. Two separate variables are used to measure firm default risk: Altman Z-score and ROA volatility, for which we present our findings in Table 4 and Table 5, respectively.

Table 4. Corporate ESG Performance and Firm Default Risk (Z-Score)

	(1) Z Score	(2) Z Score	(3) Z Score	(4) Z Score
ESG Combined Score (t-1)	0.004***			
	(6.85)			
Env. Pillar (t-1)		0.004***		
		(8.883)		
Social Pillar (t-1)			0.004***	
			(7.292)	
Government Pillar (t-1)				0.0002
				(0.473)
Firm Size (t-1)	-0.065***	-0.081***	-0.07***	-.041***
	(-7.032)	(-8.393)	(-7.466)	(-4.48)
Leverage (t-1)	-1.074***	-1.079***	-1.077***	-1.066***
	(-14.961)	(-15.048)	(-15.01)	(-14.788)
MTB (t-1)	57.077***	56.377***	56.662***	58.013***
	(12.791)	(12.662)	(12.682)	(12.922)
GDP p.c. growth	0.005	0.004	0.005	0.005
	(0.764)	(0.721)	(0.805)	(0.854)
Inflation	-0.004	-0.004	-0.004	-0.004
	(-0.829)	(-0.85)	(-0.86)	(-0.833)
Constant	2.936***	3.198***	3.044***	2.74***
	(21.533)	(22.494)	(21.649)	(19.906)
Observations	8014	8013	8013	8014
R-squared	0.311	0.314	0.312	0.308

This table exhibits the outcomes of the regressions estimating the effect of ESG performance on the Altman Z-score. Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Column 1 in Table 4 shows that ESG performance has a significantly positive impact on the Altman Z-score. Since higher Z-scores denote less default risk, this finding suggests that companies with better ESG scores tend to encounter lower firm default risk, in line with our prediction in Hypothesis 1. This result implies that corporations with more effective ESG initiatives tend to be more creditworthy, reach better access to finance, and accordingly encounter less default risk. Our results support the findings of Sassen et al. (2016), Boubaker et al. (2020), and Atif & Ali (2021).

Next, we re-estimate the same model while including one ESG pillar at a time. The effects of social and environmental categories are significantly positive (columns 2 and 3), with the effect of the governance pillar being insignificant (column 4). These findings imply that corporations with more robust social and environmental performance tend to possess lower default risk. Our findings align with the findings of Maquieira et al. (2024).

Then, we explore the influence of the control variables on firm default risk. Firm size and leverage negatively and significantly affect the Z-score in all four estimations. This suggests that larger firms and firms with higher leverage are likely to have higher firm default risk. On the other hand, MTB has a positive and significant impact on the Z-score, implying that companies possessing higher MTB ratios are likely to have lower default rates. Neither the GDP per capita growth nor inflation has a significant influence on the Z score.

Next, we employ ROA volatility as our second proxy for firm default risk. We present the findings in Table 5. ESG performance negatively impacts ROA volatility (column 1), indicating that superior ESG companies tend to possess lower volatility in ROA, i.e., lower default risk, supporting Hypothesis 1. Like our findings with the Z-score, within the three pillars, both the environmental and social scores significantly and negatively impact ROA volatility. These findings suggest that firms that invest in their environmental and social activities and hence reach stronger levels in these areas are likely also to have lower volatility in ROA. These findings align with the findings of Maquieira et al. (2024). Finally, the impact of the governance pillar on ROA volatility is significantly positive.

Table 5. Corporate ESG Performance and Firm Default Risk (ROA-Volatility)

	(1) ROA-Volatility	(2) ROA-Volatility	(3) ROA-Volatility	(4) ROA-Volatility
ESG Combined Score (t-1)	-0.0001*** (-2.759)			
Environmental Pillar(t-1)		-0.0001** (-2.2)		
Social Pillar(t-1)			-0.0001** (-2.232)	
Government Pillar(t-1)				0.0001** (2.258)
Firm Size(t-1)	-0.008*** (-15.492)	-0.008*** (-14.273)	-0.008*** (-14.903)	-0.008*** (-17.142)
Leverage(t-1)	0.005 (1.339)	0.006 (1.504)	0.006 (1.508)	0.005 (1.286)
MTB(t-1)	-0.007 (-0.037)	-0.015 (-0.077)	-0.012 (-0.063)	-0.043 (-0.215)
GDP p.c. growth	-0.0003 (-0.868)	-0.0003 (-0.784)	-0.0003 (-0.81)	-0.0003 (-0.931)
Inflation	-0.0002 (-0.527)	-0.0002 (-0.533)	-0.0002 (-0.536)	-0.0002 (-0.54)
Constant	0.171*** (22.767)	0.169*** (20.952)	0.17*** (21.978)	0.178*** (23.524)
Obs.	8250	8247	8247	8250
R-squared	0.21	0.211	0.211	0.209

This table exhibits the regressions' outcomes estimating corporate ESG performance's effect on ROA volatility. Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Within the firm-level control variables, firm size significantly and negatively impacts ROA volatility, implying that as firms get larger, the volatility in ROA is reduced. Hence, larger firms are likely to have more stable earnings, i.e., less default risk. As opposed to this finding, leverage significantly and positively influences ROA volatility, signifying that companies possessing higher leverage tend to have more volatility earnings, i.e., more default risk. The impact of MTB on ROA volatility is insignificant. Neither GDP per capita growth nor inflation significantly impacts earnings volatility.

4.2 The Moderation Effect of Country-Level Shareholder Protection

Next, we investigate how shareholder protection in different countries moderates the nexus between firm default risk and corporate ESG performance. Two proxies are employed to measure countries' respective shareholder protection levels: ADRI (La Porta et al., 1998) and revised ADRI (Spamann, 2010). We display the findings in Table 6. Columns 1 and 2 present the findings with Z-score as our dependent variable, while columns 3 and 4 present the findings with ROA volatility as our dependent variable. As seen in Columns 1 and 2, ESG performance, ADRI, and revised ADRI significantly and positively affect the Z-score. This finding suggests that corporations domiciled in nations with higher shareholder protection tend to have higher Z-scores, i.e., lower default risk. Moreover, the interaction between ADRI and ESG (Column 1) and between revised ADRI and ESG (Column 2) significantly and negatively impacts the Z-score. These findings suggest that the positive effect of ESG performance on Z-score tends to be less for corporations in countries with superior ADRI. We observe the same pattern in Columns 3 and 4, where both ADRI and revised ADRI positively and significantly moderate the negative linkage between ESG and ROA volatility. These findings support our predictions stated in Hypothesis 2.

4.3 Additional Analysis

ESG score comprises three categories, i.e., environmental, social, and governance. Moreover, among these categories, the ESG score is constructed from ten sub-categories. In further analysis, we investigate which exact sub-category impacts firm default risk. This analysis is crucial to consider the probability that our findings are determined by more than one of the categories or by more than one of the sub-categories. We present the findings in Tables 7 and 8, with Z-score and ROA volatility as the dependent variables, respectively. As can be depicted from Table 7, all ten subcategories, except for shareholders and management score, positively and significantly impact the Z-score. This finding suggests that within the three sub-categories, the subcategories that belong to the environmental (emissions, environmental product innovation, and resource use) and to the

social pillars (human rights, workforce, and community) have a more robust impact on Z-score than governance sub-categories (shareholders and management scores). As opposed to these findings, Table 8 shows that community and environment product innovation scores do not significantly impact ROA volatility within the ten subcategories. These findings suggest that product responsibility, emission, resource use, CSR strategy, workforce, and human rights significantly reduce firm default risk for both proxies.

Table 6. Corporate ESG Performance and Firm Default Risk (Z-Score & ROA Volatility): The Moderating Effect of Shareholder Protection

	(1) Z Score	(2) Z Score	(3) ROA-Volatility	(4) ROA-Volatility
ESG Combined Score (t-1)	0.012***	0.022***	-0.001***	-0.001***
	(5.781)	(6.621)	(-5.8)	(-4.753)
ADRI(t-1)	0.164***		-0.003*	
	(5.223)		(-1.732)	
ESG Combined Score(t-1) x ADRI	-0.003***		0.0001***	
	(-5.348)		(3.564)	
Spamann ADRI(t-1)		0.114***		-0.008***
		(2.629)		(-3.794)
ESG Comb. Score(t-1) x Spamann ADRI		-0.004***		0.0001***
		(-5.932)		(3.686)
Firm Size(t-1)	-0.033***	-0.062***	-0.004***	-0.005***
	(-4.567)	(-7.677)	(-10.651)	(-11.89)
Leverage(t-1)	-1.228***	-1.155***	-0.005	-0.011**
	(-17.562)	(-15.478)	(-1.1)	(-2.397)
MTB(t-1)	60.974***	59.245***	0.65***	0.752***
	(13.641)	(13.101)	(3.287)	(3.784)
GDP p.c. growth	0.025***	0.034***	-0.001**	-0.001**
	(3.952)	(4.895)	(-2.382)	(-2.519)
Inflation	0.02***	0.015***	0.001***	0.0003
	(5.311)	(2.736)	(2.797)	(0.858)
Constant	1.958***	2.429***	0.141***	0.175***
	(10.227)	(9.496)	(13.525)	(13.928)
Obs.	8014	7579	8250	7800
R-squared	0.264	0.273	0.148	0.148

This table exhibits the outcomes from the regressions estimating the effects of corporate ESG performance on firm default risk and analyzing the moderating effect of countries' shareholder protection levels. Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Table 7. Additional Tests: Impact of 10 Subcategories of the ESG Score on Altman Z Score

	(1) Z Score	(2) Z Score	(3) Z Score	(4) Z Score	(5) Z Score	(6) Z Score	(7) Z Score	(8) Z Score	(9) Z Score	(10) Z Score
Env. Product Innovation(t-1)	0.002***									
	(6.031)									
Emission(t-1)		0.004***								
		(11.311)								
Resources Use(t-1)			0.003***							
			(8.308)							
Products Responsibility(t-1)				0.0004						
				(1.17)						
Human Rights(t-1)					0.003***					
					(9.35)					
Workforce(t-1)						0.004***				
						(9.079)				
Community(t-1)							0.002***			
							(4.237)			
CSR Strategy(t-1)								0.003***		
								(7.92)		
Shareholders(t-1)									0.00002	
									(.05)	
Management(t-1)										-0.0001
										(-.309)
Constant	2.872***	3.248***	3.092***	2.748***	3.094***	2.912***	2.865***	3.115***	2.722***	2.717***
	(21.138)	(23.07)	(22.555)	(20.711)	(21.918)	(21.737)	(20.809)	(21.138)	(20.514)	(19.957)
Firm and Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	7980	7980	7980	7980	7980	7980	7980	7981	7981	7981
R-squared	0.31	0.318	0.313	0.307	0.314	0.314	0.309	0.312	0.307	0.307

This table exhibits the outcomes of the estimations analyzing the impact of the ten sub-categories on firm default risk. The independent variables are the ten sub-dimensions. The dependent variable is firm default risk, proxied with Altman Z-score. Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

Table 8. Additional Estimations: Effect of 10 Sub-categories of the ESG Score on ROA Volatility

	(1) ROA-Volatility	(2) ROA-Volatility	(3) ROA-Volatility	(4) ROA-Volatility	(5) ROA-Volatility	(6) ROA-Volatility	(7) ROA-Volatility	(8) ROA-Volatility	(9) ROA-Volatility	(10) ROA-Volatility
Env. Product Innovation(t-1)	-0.00003									
	(-1.6)									
Emissions(t-1)		-0.0001**								
		(-2.302)								
Resource Use(t-1)			-0.0001***							
			(-3.178)							
Product Responsibility(t-1)				-0.00004**						
				(-2.21)						
Human Rights(t-1)					-0.00003*					
					(-1.692)					
Workforce(t-1)						-0.0001***				
						(-4.07)				
Community(t-1)							0.00002			
							(.782)			
CSR_Strategy(t-1)								-0.00004**		
								(-1.995)		
Shareholder(t-1)									0.00005***	
									(2.853)	
Management(t-1)										0.00004**
										(2.344)
Constant	0.175***	0.171***	0.17***	0.175***	0.174***	0.173***	0.179***	0.172***	0.177***	0.18***
	(22.642)	(21.534)	(21.647)	(23.48)	(21.878)	(23.525)	(23.275)	(20.95)	(23.721)	(23.732)
Firm and Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	8113	8113	8113	8113	8113	8113	8113	8116	8116	8116
R-squared	0.212	0.212	0.212	0.212	0.212	0.213	0.212	0.21	0.211	0.21

This table exhibits the results from estimating the effect of the ten subcategories on firm default risk. The independent variables are the ten sub-dimensions. The dependent variable is firm default risk, proxied with ROA volatility. Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

4.4 Robustness Analysis

We perform several robustness checks to ensure our conclusions are robust when changing certain parameters. Table 9 displays all the robustness tests. First, we employ an alternate proxy for firm default risk: LOSS 2, defined as a dummy variable that gets the value one if the firm makes a loss at the net income level for two consecutive periods and 0 otherwise. Column 1 in Table 9 shows the estimation of Model 1 when we use LOSS 2 as our dependent variable. The effect of ESG combined on LOSS2 is negative, indicating that firms with superior performance in ESG are likely to enjoy less firm default risk.

Second, we utilize an alternate proxy for ESG performance. In the main regressions, the combined ESG score is used, calculated by Refitiniv by summing up the scores the firm gets from environmental, social, and governance categories and then by reducing it by the ESG controversies score. To observe how the baseline result changes in case the ESG controversies score is excluded, the overall ESG score is employed, composed of environmental, social, and governance scores, but does not include the ESG controversy score. Column 2 displays the findings. Overall ESG score positively and significantly influences the Z-score, implying that corporations with upper overall ESG scores tend to possess less firm default risk.

Third, we use an alternate sample. As can be depicted from Table 1 – Panel A, the UK occupies 28% of the total sample. To ensure that our findings are not biased due to the UK Sample, we exclude the UK and re-estimate our main model. Column 3 in Table 9 confirms our baseline findings. In addition to excluding the UK from our sample, we exclude France and Germany, which occupy 10.7% and 10.2% of the sample, respectively. The findings in Column 4 in Table 9 confirm our baseline findings.

Fifth, we use additional control variables to ensure our results do not result from the control variables employed in the main mode. Hence, alternate firm-level control variables are added, including tangibility ("the ratio of net property plant and equipment by total assets"), dividend payout ratio ("the ratio of dividends by net sales"), and RD to assets ("the ratio of research and development expenses to total assets"), following Boubaker et al. (2020). Next, we add different control variables, which could potentially impact ESG performance and default risk, including the free cash flow ratio (free cash flow to net sales), Tobin's Q (Market value of common equity + preferred stock + book value of total liabilities) / Book value of total assets), and institutional ownership. The findings in Columns 5 and 6 show that ESG performance positively affects the Z-score, which aligns with our baseline findings.

Finally, instrumental variable methodology should be employed to address potential endogeneity issues, which could be born from omitted variables, reverse causality, or simultaneities. Accordingly, we implement a two-stage least squares methodology. We employ two instruments: the ESG-Initial and ESG-Industry variables, following Bilyay-Erdoğan et al. (2024). ESG initial is the ESG score the firm gets initially. ESG Industry is the mean of the sector-year ESG score. Both instruments are exogenous to the ESG score, a requirement for estimating 2SLS. First, ESG scores are regressed on the two instruments.

The year, country, and industry fixed effects, as well as the control variables, are included in the regression. Second, the predicted values of ESG are the independent variable, with Z-score being the dependent variable. The findings in Column 5 show that ESG performance reduces firm default risk, even when we consider potential endogeneity issues. All of the robustness tests demonstrate the robustness of our main findings.

Table 9. Robustness Analysis

	(1) Alternate proxy for Firm Default Risk	(2) Alternate proxy for ESG Performance:	(3) Alternate Sample (Exclude UK)	(4) Alternate Sample (Exclude UK, France & Germany)	(5) Additional Control Variables I	(6) Additional Control Variables II	(7) Alternate Estimation Methodology (2SLS)
	LOSS2	Overall ESG Score	Z-Score	Z-Score	Z-Score	Z-Score	Z-Score
ESG Combined Score(t-1)	-0.001***		0.003***	.004***	0.004***	.004***	0.003**
	(-4.728)		(5.461)	(5.185)	(5.069)	(7.781)	(2.57)
Overall ESG Score		0.004***					
		(7.621)					
Firm Size(t-1)	-0.018***	-0.077***	-0.023**	.022	-0.057***	-.085***	-0.061***
	(-6.467)	(-7.534)	(-1.965)	(1.385)	(-5.606)	(-11.138)	(-5.255)
Leverage(t-1)	0.091***	-1.074***	-1.227***	-1.373***	-1.337***	.279***	-0.95***
	(4.728)	(-14.93)	(-13.041)	(-15.236)	(-14.944)	(3.38)	(-12.355)
MTB(t-1)	-5.054***	56.493***	58.107***	60.202***	43.906***	44.221***	53.69***
	(-4.709)	(12.618)	(9.558)	(9.694)	(7.765)	(12.905)	(12.232)
GDP p.c. Growth	0.0002	0.004	0.007	.005	-0.005	-.0003	
	(0.088)	(0.702)	(1.092)	(.676)	(-0.713)	(-.062)	
Inflation	-0.003	-0.004	-0.005	-.009	0.006	-.006	
	(-1.51)	(-0.848)	(-0.895)	(-1.578)	(0.775)	(-1.34)	
Tangibility					0.047		
					(0.62)		
Dividend Payout					0.063***		
					(4.945)		
RD / Assets					-2.745***		
					(-5.87)		
Free cash flow ratio						3.927***	
						(9.765)	
Tobin's Q						-2.116***	
						(-26.118)	
Institutional Ownership						-.003***	
						(-5.842)	
Constant	0.349***	3.097***	2.331***	1.694***	3.038***	3.078***	2.494***
	(8.943)	(21.1)	(13.194)	(6.726)	(19.602)	(27.033)	(14.254)
Observation	7613	7980	5683	4041	4220	7906	8014
R-squared	0.061	0.312	0.352	.367	0.325	.466	0.392

Sectoral, year, and country fixed effects are incorporated. In the brackets, we provide robust t-statistics. Statistical significance at 1%, 5%, and 10% is denoted by ***, **, and *, respectively.

5. CONCLUSION

Corporate ESG performance has developed as a significant factor for assessing significant corporate decisions. On the other hand, with its severe consequences, firm default risk is one of the significant indicators for demonstrating firms' financial health. This study aims to analyze the relationship between corporate ESG performance and firm default risk and investigate whether country-level shareholder protection has a moderating role in this relationship. Our study utilizes a European panel dataset of 9,522 firm-year observations from 21 countries between 2002 and 2019. We use two proxies to measure firm default risk: Altman Z-score and earnings volatility. Our findings indicate that corporations with superior ESG tend to encounter lower default risk. Our findings remain unchanged when we run a battery of robustness checks. Our findings suggest that a stronger ESG performance will likely make companies more creditworthy, giving them better access to financing and, thus, less default risk. Overall, we provide evidence that corporations with higher ESG scores enjoy lower default risk, implying that better ESG implementations are rewarded with fewer financial defaults.

Within the three pillars of ESG performance, we demonstrate that while environmental and social performance significantly contribute to reducing firm default risk, firms' governance performance does not have a significant impact. Our deeper analysis of the sub-categories of ESG performance presents new evidence that the significant effect of ESG on default risk is mainly determined by resource use, human rights, emissions, workforce, and CSR strategy for both proxies (i.e., Altman Z-score and earnings volatility). Furthermore, we present novel evidence that country-level shareholder protection moderates the relation between default risk and ESG, such that the influence of ESG performance on default risk is less for corporations in nations where shareholders are more protected.

Our study has several contributions to the literature. Primarily, we extend the literature examining the ESG performance–default risk by presenting robust evidence of the essential role ESG performance plays for nonfinancial firms in the European context. Analyzing the European market for this topic is very important since European countries are considered to be influential in ESG in contrast to corporations in other countries (Ho et al., 2012). Moreover, concentrating on ESG disclosures, the European Union (EU) started promoting several directives in 2014, demonstrating how much value is being exerted on this topic. Hence, Europe, with its cross-country setting, provides an excellent market to study. Moreover, to our knowledge, our study is the first to examine the moderating effect of country-level shareholder protection. Thus, we present robust novel proof that in countries where investor protection is higher, the negative effect of ESG performance on firm default risk tends to be lower. Hence, if the countries' shareholder protection levels are high, stronger ESG would decrease firm default risk by less than countries with lower shareholder protection levels. Furthermore, ESG performance is a multifaceted concept with many layers. Accordingly, to our knowledge, our study is the first one to demonstrate which exact pillar and subcategory within the ESG score significantly impacts firm default risk in a cross-country setting.

Our findings have significant managerial and policy implications. Our results imply that integrating ESG initiatives into companies' corporate strategies decreases firm default risk. Environmental and social performance, in general, emissions, resource use, human rights, workforce, and CSR strategy, to be specific, are the significant factors contributing to reducing firm default risk. Hence, this study also has significant managerial implications, such that we guide managers on which areas to concentrate on if they want to reduce their firm default risk. Moreover, adopting ESG initiatives and, specifically, the areas mentioned above within ESG are likely to bring less default risk, resulting in a more desirable corporate environment, enhanced financial stability, and consequently more robust economies. Hence, policymakers should continue encouraging firms to adopt ESG initiatives.

The findings of this study also present insights to debtholders and shareholders in terms of giving attention to corporate non-financial disclosure on ESG performance before initiating an investment. Moreover, managers should consider the value-enhancing impact of ESG activities in terms of integrating them into their organizational structure. Hence, firms benefit economically from adopting these ESG initiatives and their societal benefits. Moreover, firms should also be aware that the influence of ESG performance on default risk is higher for nations where shareholders are less protected. This result implies that if a firm is located in a country with lower shareholder protection, firms are likely to get an advantage from improving their ESG initiatives in terms of greater risk reduction. On the other hand, policymakers could surge regulatory requirements through mandatory ESG disclosure, which could inspire companies to incorporate ESG initiatives into their operations and strategies and hence contribute to reducing their firm default risk.

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