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Corporate Sustainability and Risk Management—The U-Shaped Relationships of Disaggregated ESG Rating Scores and Risk in the German Capital Market

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Abstract: This study addresses the relationship between the (dis)aggregated ESG rating and different types of risk (i.e., market risk, idiosyncratic risk, total risk) in the German stock market. We investigate not only the overall ESG rating and the E, S, and G pillar scores but also all the underlying category scores. Thereby, we provide in-depth insight into diverse CS operations. We cover 454 firm years (2012–2019) using ordinary least squares regression with firm and year fixed effects. Our main insights are the U-shaped relationships between CS and risk: Ecological investments first decrease systematic risk (beta), while overinvestment increases systematic risk again. Likewise, social investments initially decrease idiosyncratic risk, while overinvestment increases idiosyncratic risk again. Further findings suggest only one linkage between systematic risk and the social pillar score. In the category scores, a few more relevant linkages were identified, which indicates that disaggregation of the ESG ratings increases the explanatory power of models. In respect to findings from other capital markets, it appears that the effects of the ESG ratings on risk may depend on the existing level of sustainability in the capital market. Last, our study provides insights into the nonlinearity of the CS–risk relationships.

Keywords: sustainability disclosure; ESG rating; corporate sustainability; nonlinearity; volatility; ESG rating; Germany; total risk; market risk; idiosyncratic risk; systematic risk

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1. Introduction

The objective of this paper is to investigate the effect of corporate sustainability (CS) on firm risk. Research on CS has experienced a considerable surge since the 2000s [1,2]. In particular, the effect of CS on performance and risk management is of great interest to firms who have to make decisions regarding investment in CS [3–5]. At the same time, shareholders, such as fund managers, are increasing their focus on sustainable investments that promise lower long-term risk management and the avoidance of strict future regulation [6–8]. Institutionally managed assets strive to meet the criteria of socially responsible investment (SRI) [9], while firms focus on the implementation of CS, as it can affect the firm's value through risk management [10].

The search for significant CS effects on firms is a prevalent research topic. For instance, there is a study on CS and a firm's growth rate [11] and one on CS performance and capital restrictions [12]. The most important areas of research in sustainable firm development are the relationships between CS and credit risk or cost of equity, CS and corporate financial performance (CFP), and CS and risk. The findings from the research on CS and the credit risk or equity expense typically suggest that CS can decrease risks [13,14], and it has been shown that the SRI could mediate the impact of the corporate social performance (CSP) on the cost of capital [15]. The second area, CSP and CFP, has a large amount of empirical work that shows ambivalent effects [16]. For example, Waddock and Graves (1997) find a positive correlation [17], whereas Margolis et al. (2009) propose that each form of CSP achieves a different result and that firms should learn from early CS activities in order to be able to achieve better financial results [18]. The literature study by van Beurden and Gössling (2008) shows that a better CSP can influence the CFP positively [19]. It should be expected that CS success can minimize risk, which then affects the cost of capital through a lower interest rate. Due to these lower costs, a firm can increase their financial performance [20]. The majority of research relies on the aggregated ESG rating. ESG ratings quantify a firm's CS actions and are widely recognized for taking into account a firm's long-term performance [21]. The ESG rating takes into account the firm's reported sustainable ventures in the environmental, social, and governance domains. Sustainability refers to societal growth that does not endanger future generations' ability to meet the same needs [22,23]. A supplementary independent report on CS covers ESG concerns and offers itself as a clear stakeholder mechanism [24–26]. More recently, research has specifically focused on the effect on risk of disaggregated ESG ratings where the effects of the E, S, and G scores were independently assessed. However, this was often undertaken in settings such as South Africa, where integrated reporting is mandatory, and samples might show an adverse selection bias [27]. It is our objective to validate this stream of research in other contexts. We pose the research question: How does the (dis)aggregated ESG rating affect risk in contexts where integrated reporting is optional?

We selected the German capital market for this investigation as it is a large and efficient capital market, and the institutional setting is not opposed to the idea of CS [28]. Using time series regressions, this study examines the relationship between the ESG rating, pillar scores, and category scores and all three risk indicators. The goal is to gain a better understanding of the CS connection with risk. This study intends to provide more thorough insights into the interrelationships that can be found in Germany. Unlike Lueg et al. (2019), who used a capital market where reporting is mandatory and indicated that a higher ESG rating can reduce a firm's risk [27], this study uses a capital market where reporting is not mandatory. The findings highlight three key takeaways about the impact of CS that firms, investors, and the academic community should consider. First, our main insights are the U-shaped relationships between CS and risk: Ecological investments first decrease systematic risk (beta), while overinvestment increases systematic risk again. Likewise, social investments initially decrease idiosyncratic risk, while overinvestment increases idiosyncratic risk again. Executives must consider the proper level of CS investment and invest in the EPS only up to the point where the benefit of a greater EPS ends, as any future expenses may outweigh the benefit. Second, our findings suggest that the effects of ESG ratings on risk may depend on the existing level of sustainability in the capital market. This insight creates consensus among opposing studies, such as Sassen et al. (2016) [15] and Engström and Martinsson (2020) [29]. We argue that managers should adjust their CS actions based on the capital market's sustainability. Third, we cannot confirm the predicted *linear* relationships between CS and risk, especially their direction. This insight might motivate future research to look into reverse or bidirectional effects of CS and risk. We organize the remainder of the paper as follows: After developing the hypotheses in Section 2, we argue for our chosen methodology in Section 3. We continue by analyzing our data in Section 4 and discuss the implications in Section 5.

2. Theory and Hypotheses Development

According to the European Commission [30] (pp. 6–7), CSR describes firms that implement social and environmental measures in their business operations beyond compliance with legal requirements. Such investments in human capital, the environment, and stakeholder relations can have positive effects such as increased productivity and improved competitiveness as a result of more environmentally friendly and social business practices and new technologies [30]. Instead of a short-term shareholder value policy, CS can be seen as a sustainable management technique that takes the needs of all stakeholder groups into account. CS constitutes an investment by a firm to improve product differentiation [31].

In addition, shareholder assets enjoy insurance-like protection through CS transparency, which means enhanced risk management, improved business attractiveness for consumers, and easier access to the financial market [27,32,33]. ESG ratings are based on publicly available information and, while reporting does not improve the business model of a firm and increase cash flow, it generates valuable transparency [27]. Orlitzky and Benjamin (2001) try to give an overview of all the connections between CSP and risk, as well as their positive or negative influences [34]. They conclude that there is a reciprocal causality between CSP and financial risk and also suggest that CSP correlates more with systematic risk than with accounting risk.

Two main theories explain the relation between CS and risk. First, the stakeholder theory addresses the concerns that firms must adapt to their environment [35] and include the relationships between a firm and its relevant stakeholders [36]. Communication with relevant stakeholders should serve as a means to increase value, resulting in an inverse relationship of CS to risk [27]. Thus, CS is predicted to have a negative impact on firm risk or a positive impact on firm value [15,35]. McGuire et al. (1988) give the example that if a firm does not keep its promises regarding environmentally harmful actions, government authorities can impose stricter regulations that force it into socially responsible behavior [37]. Likewise, a lack of social responsibility could increase the likelihood of lawsuits and fines [37] and neglecting to invest in product safety can lead to an increase in the number of lawsuits against the firm, resulting in additional costs and risks [13]. Therefore, a higher CSP leads investors to see the firm as more protected against social crises and more prepared for upcoming regulations (e.g., environment) [38,39]. This can give shareholders confidence, which makes the share price less volatile, resulting in lower risk. Along with this, investors expect higher future cash flows as sustainable practices can build a competitive advantage for the firm [40]. Also, according to Choi and Wang (2009), poorly performing firms can recover from disadvantageous positions [41]. However, Harrison et al. (2010) describe stakeholder relationships as a resource that not every firm has, implying that not every firm can develop stakeholder relationships into a competitive advantage [42].

The second theory is the risk management theory or risk mitigation view, which expects the same connection between CS and risk [43]. The risk management theory is based on the stakeholder theory and adds that philanthropy can generate moral capital with insurance-like protection that protects shareholders' assets [44]. This means that CS is a risk management tool, which can reduce risk in a crisis and, additionally, it should also protect the firm from a crisis that could negatively affect the firm's cash flow [45]. For a stock with highly uncertain future earnings, the potential for losses of the firm value will be higher, which indicates a higher firm risk [15]. Thus, we assume that CS—and the associated high ESG rating—mitigate uncertainty and thus reduce volatility [27]. We propose:

Hypothesis 1. *The ESG rating negatively affects a firm's (H1a) total, (H1b) systematic, and (H1c) idiosyncratic risk.*

Some research looks at individual parts of CS. Benlemlih et al. (2016) examine a panel dataset of UK-listed firms from 2005–2013, where environmental and social disclosure and performance show a significant association with stock volatility and idiosyncratic risk, but systematic risk remained insignificant [46]. A previous study of UK firms from 1994 to 2006, however, found a correlation between community and environmental responsibility and systematic risk [47]. Lee and Faff (2009) show that there is a significantly lower idiosyncratic risk for firms with a strong CSP [9]. Sassen et al. (2016) split the ESG rating into sub-ratings and found that the social pillar score in particular was significant in Europe for all three risk measurements [15]. Likewise, Bouslah et al. (2011), using a US firm sample from 1991 to 2007, looked at dimensions and their correlation with risk [38]. For example, concerns about employees, governance, diversity, and human rights have a positive impact on risk, as do strengths in diversity and governance [38]. In order to find out if all or only some of the three pillar or category scores could be relevant, we propose:

Hypothesis 2. *Pillar scores negatively affect a firm's (H2a) total, (H2b) systematic, and (H2c) idiosyncratic risk.*

Hypothesis 3. *Category scores negatively affect a firm's (H3a) total, (H3b) systematic, and (H3c) idiosyncratic risk.*

Nonlinear relationships may exist as well [48–50]. Barnett and Salomon (2012) showed that firms that invest a little in CS tend to show a decline in CFP at first, until a point is reached where the investments pay off and the CFP with many CS investments then exceeds the CFP with no CS investments [48]. However, Nollet et al. (2016) illustrate that CS efforts can only pay off to a certain point [50]. In the context of this research, we would have to translate an increasing CFP with a decreasing risk and a decreasing CFP with an increasing risk, which is why the results of Nollet et al. (2016) [50] and Barnett and Salomon (2012) [48] suggest that an inverted U could be possible. However, there is also an approach that would consider the merging of CS and risk as positive, the overinvestment view [43]. According to Barnea and Rubin (2010) [51] and Nielsen et al. (2019) [52], it appears that managers tend to overinvest in CS to improve their private reputation because they bear only a small part of the costs. This would result in a U-shaped relationship where initial investments into CS would decrease risk (left side of the "U"). Above-average investments into CS among the best-in-class CS implementers would again increase risk (right side of the "U") as this would be considered overinvestment. According to both the stakeholder theory and risk management theory, risk decreases through CS, yet (over)extensive investment causes costs to rise above the benefits of CS. Thus, the firm performs worse and does not distribute its funds properly. Similarly, Harrison et al. (2010) suggest that, for competitive advantage, the benefits of investing in stakeholder relationships must exceed the costs [42]. Therefore, this paper investigates whether there is also a U-shaped or inverted U-shaped function in the relationship between CS and risk:

Hypothesis 4. *There is a nonlinear relationship between the pillar scores and a firm's (H4a) total, (H4b) systematic, and (H4c) idiosyncratic risk.*

3. Methodology

3.1. Sample Selection

We used a data sample of the German HDAX firms from 2012 to 2019. The HDAX is a large, composite stock index that is usually employed in empirical capital market research in Germany. It comprises the largest 100 German-listed firms by market capitalization. This gave 800 possible observations, of which 346 were deleted due to missing data. The data were taken from the Thomsen Reuters Asset4 and Datastream databases. Bouslah et al. (2018) show that there is a significant difference in the relationship when comparing data from the financial crisis 2008/2009 with non-crisis data [43]. Therefore, we chose the period 2012–2019. This three-year time difference ensures sufficient time for the capital markets to adjust their risk expectations for a post-crisis scenario.

3.2. Dependent Variables

Risk measures are derived from the volatility of stock prices. Three types of risk are used in this study: total risk (TR), systematic risk (beta), and idiosyncratic (unsystematic) risk (IR) [27,34].

Total risk is calculated by the standard deviation of the daily stock returns for each year. The closing price of a share was chosen for each trading day to calculate the daily share return. The fluctuations of the share can be attributed to two different factors: systematic risk and idiosyncratic risk.

Beta reflects the *systematic risk* of the firm. Examples include market fluctuations, economic growth rate shocks, inflation shocks, and other shocks [11]. For systematic risk, the "5 Year beta" was taken from the Thomson Reuters Eikon database. This was calculated from each firm's stock-price volatility relative to market-price volatility for a 5-year duration using a least squares linear regression line. Monthly closing price-change values were used, requiring at least 40 monthly closing price-change values within the 5-year trading period.

The supplementary to beta is IR which is influenced by the firm itself, for example, bad news about firm-specific lawsuits. IR is thus associated with the residual risk that cannot be explained by changes in the average market [53]. Based on portfolio theory, some studies deal only with social performance and beta because the theory says that the IR is irrelevant [43]. However, there is also research that suggests otherwise (e.g., [54,55]). IR can be measured by the standard deviation of residuals from the capital asset pricing model (CAPM) based on daily stock returns [9,46] by the four-factor model [15], five-factor model [27], or the single-index model/market model [29], which we chose for this study. This model is shown below, where R_{it} = daily return for firm i on day t. R_M = return on market. ε = residuals:

$$R_{it} = \alpha + \beta R_{Mt} + \varepsilon, \quad (1)$$

3.3. Independent Variables

For our independent CS variables, we used Refinitiv's (2020) collection of over 450 ESG metrics for each firm [56]. They can be divided into the three individual pillar scores: environmental pillar score (EPS), social pillar score (SPS), and governance pillar score (GPS). These scores are derived from the categories assigned to each pillar which are: for the EPS, resource use (ERU), emissions (EES), and innovation (EEI); for the SPS, workforce (SWF), human rights (SHR), community (SCS), and product responsibility scores (SPR); and for GPS, the management (GMS), shareholders (GSS), and CS strategy scores (GCS).

3.4. Control Variables

The control variables build on previous literature [15,27,29,57]. All data for the eight control variables were taken from the Thomson Reuters Datastream database (Table 1). Firm size (SIZE) was created by the natural logarithm of the total assets. ROA stands for return on assets and was calculated by the net income/total assets. Leverage (LEV) was calculated by the long-term debt/total assets. Market-to-book ratio (MTB) was measured as the book value to common equity. Dividend payment (DIV) was scaled with the average price per share in the previous year. SDORA_5 is the volatility of return on assets from the previous five years (collected from the database). Stock liquidity (LIQ) was calculated as trading volume divided by common shares outstanding. The current ratio (CURA) was calculated as the current total assets divided by current total liabilities.

3.5. Statistical Model

Based on Hausman test results, we decided in favor of fixed effects. The Breusch–Pagan postestimation test indicated that the regressions have no heteroskedasticity problems. The ov-test tests showed *p*-values above 0.05, so regressions are not likely to have an omitted variable bias. To test whether the relationship between risk and CSR is nonlinear or U-shaped, the respective pillar scores were squared. All variables taken together, the following equation for hypothesis 1 can be derived:

$$TR_{it} = \beta_0 + \beta_1\ ESG_{it} + \beta_2\ SIZE_{it} + \beta_3\ ROA_{it} + \beta_4\ LEV_{it} + \beta_5\ MTB_{it} + \beta_6\ CURA_{it} + \beta_7\ DIV_{it} + \beta_8\ SDORA\_5_{it} + \beta_9\ LIQ_t + FE_t + FE_i + \varepsilon_{it.} \quad (2)$$

Building on this model for the panel data regressions, the dependent and independent variables were changed according to each hypothesis. To avoid endogeneity issues, values from a category score were never used together with the corresponding pillar score.

Table 1. Description of the variables.

Shortcut	Name	Description/Calculation	Thomson Reuters
Risk measures			
TR	Total Risk	Annualized standard deviation of daily returns	TR.PriceClose
BETA	Systematic Risk	Reflects the changes in the market	897E
IR	Idiosyncratic Risk	Volatility of the firm adjusted from the market	TR.TotalReturn1D
CS measures			
ESG	ESG Score	Upper summary sustainability score	
SPS	Social Pillar Score	Measurement of social activities	
EPS	Environmental Pillar Score	Measurement of environmental activities	
GPS	Governance Pillar Score	Measurement of governance activities	
SWF	Workforce	Category Score: workforce	
SHR	Human Rights	Category Score: human rights	
SCS	Community	Category Score: the community	
SPR	Product Responsibility	Category Score: product responsibility	
EES	Emission	Category Score: emissions	
ERU	Resource Use	Category Score: resource use	
EEI	Innovation	Category Score: innovations	
GMS	Management	Category Score: management	
GSS	Shareholders	Category Score: stakeholders	
GCS	CS Strategy	Category Score: strategy	
Control Variables			
SIZE	Firm Size	Logarithm of the total assets	WC02999
ROA	Return on Assets	Income/total assets	WC01651/WC02999
LEV	Leverage	Long-term debt/total assets	WC03251/WC02999
MTB	Market-to-book Ratio	Market value/book value of firm equity	WC05001/WC05476
DIV	Dividends Payment	Dividends per share/previous year average share price	WC05101/P
SDORA_5	Volatility of ROA	Standard deviation of return on assets over previous 5 years	WC01651/WC02999
LIQ	Stock Liquidity	Turnover by volume/common shares outstanding	VO/WC05301
CURA	Current Ratio	Current total assets/current total liabilities	WC02999/WC03101

4. Results

4.1. Descriptive Statistics

Table 2 shows the number of observations as well as the mean, standard deviation, lowest, and maximum values. For each year of the time period, Table 3 provides the mean of the ESG rating and the three pillar scores and reiterates the introduction's assertion that the ESG rating is becoming more meaningful for businesses. Comparing 2012 to 2019, all the scores increased in mean value. Table 4 shows the correlation between the individual variables. It is striking that there are many significant correlations between the individual pillar scores and the ESG rating. Because the pillar scores are the basis for calculating the ESG rating, a correlation was expected.

Table 2. Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Risk measures					
TR	454	0.992	0.954	0.040	9.796
BETA	454	0.862	0.360	0.106	2.165
IR	454	1.424	0.531	0.553	3.818
ESG measures					
ESG	454	63.790	19.854	7.277	94.522
SPS	454	69.338	22.385	2.098	98.162
SWF	454	81.685	19.002	6.071	99.765
SHR	454	60.984	35.293	0.000	98.913
SCS	454	62.347	30.796	0.000	99.490
SPR	454	69.904	28.585	0.000	99.865
EPS	454	59.704	27.231	0.000	98.261
EES	454	63.449	31.431	0.000	99.693
ERU	454	67.820	31.025	0.000	99.786
EEI	454	46.341	33.271	0.000	99.667
GPS	454	57.763	21.289	9.249	95.311
GMS	454	58.698	27.670	0.549	99.722
GSS	454	55.843	28.012	0.532	99.708
GCS	454	55.971	30.294	0.000	94.969
Control variables					
SIZE	454	16.149	1.663	11.735	19.979
ROA	454	0.048	0.056	−0.262	0.264
LEV	454	0.178	0.121	0.000	0.544
MTB	454	3.427	3.036	−12.407	19.619
DIV	454	0.025	0.024	0.000	0.371
SDORA_5	454	0.024	0.029	0.001	0.269
LIQ	454	0.823	0.561	0.001	3.286
CURA	454	4.184	2.332	1.426	16.644

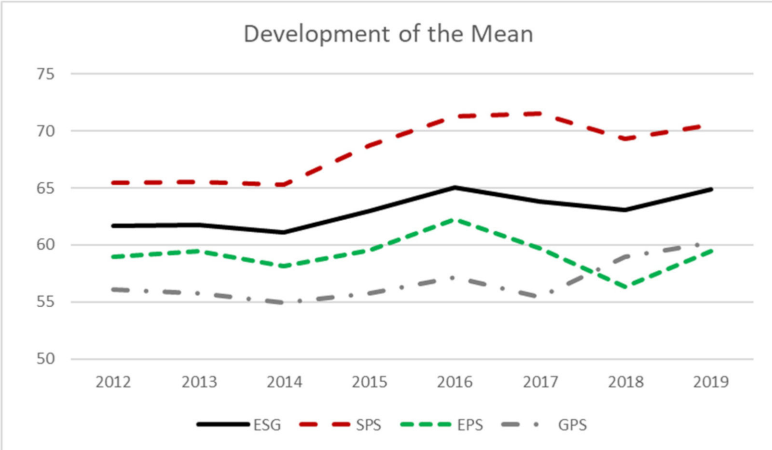
TR: total risk; BETA: systematic risk; IR: idiosyncratic risk; ESG: ESG score; SPS: social pillar score; EPS: environmental pillar score; GPS: governance pillar score; SIZE: firm size (logarithm of the total assets); ROA: return on assets (income/total assets); LEV: leverage (long-term debt/total assets); MTB: market-to-book ratio (market value/book value of firm equity); DIV: dividends payment (dividends per share/previous year average share price); SDORA_5: volatility of ROA (standard deviation of return on assets over previous 5 years); LIQ: stock liquidity (turnover by volume/common shares outstanding); CURA: current ratio (current total assets/current total liabilities).

The results of the variance inflation factor (VIF) tests always show a value below 10, which means that the model does not suffer from multicollinearity (not tabulated). The results of the Breusch–Pagan postestimation test show a p-value less than 0.05 for each hypothesis. This shows that the regressions have no problem with heteroskedasticity. The final control test, the ov-test, shows that an omitted variable bias can occur in all the regressions with the total risk and idiosyncratic risk. The beta, however, always has a value above 5%. However, because this is also a fixed-effects model as in Sassen et al. (2016) [15], this should not be problematic.

4.2. Regression Results

Table 5 shows the regression analysis results for Hypotheses 1, 2, and 4. There is a positive but non-significant coefficient between the ESG rating and firm total risk. Thus, H1a should be rejected. Similarly, the H1b and H1c regressions using the beta and IR, respectively, reveal positive but non-significant coefficients and should be rejected as well.

Table 3. Average of the ESG ratings of the HDAX.



Year	ESG	SPS	EPS	GPS
2012	61.67	65.49	58.97	56.07
2013	61.72	65.53	59.44	55.80
2014	61.10	65.32	58.14	54.98
2015	63.00	68.73	59.51	55.79
2016	65.05	71.26	62.28	57.19
2017	63.84	71.51	59.70	55.43
2018	63.11	69.28	56.35	58.95
2019	64.84	70.56	59.43	60.23

Table 4. Correlation analysis.

	TR	IR	BETA	ESG	SPS	EPS	GPS	SIZE	ROA	LEV	MTB	DIV	SDORA_5	LIQ	CURA
TR	1														
IR	0.063	1													
BETA	0.023	0.014	1												
ESG	0.093	−0.309	0.182	1											
SPS	0.092	−0.298	0.123	0.923	1										
EPS	0.073	−0.324	0.222	0.866	0.751	1									
GPS	0.043	−0.180	0.097	0.696	0.496	0.397	1								
SIZE	−0.047	−0.509	0.347	0.656	0.544	0.723	0.371	1							
ROA	0.290	−0.212	−0.120	−0.105	−0.010	−0.144	−0.115	−0.174	1						
LEV	−0.150	−0.284	0.063	0.102	0.105	0.081	0.029	0.313	−0.079	1					
MTB	0.338	0.076	−0.164	−0.275	−0.190	−0.297	−0.251	−0.392	0.383	−0.006	1				
DIV	−0.108	−0.238	0.255	−0.022	−0.049	0.009	−0.019	0.238	0.131	0.184	−0.128	1			
SDORA_5	−0.106	0.451	0.215	−0.204	−0.217	−0.212	−0.062	−0.276	−0.257	−0.280	0.074	−0.038	1		
LIQ	−0.181	0.408	0.282	0.052	−0.023	0.008	0.156	−0.013	−0.255	−0.040	−0.275	−0.004	0.335	1	
CURA	−0.039	0.043	−0.224	−0.071	−0.034	−0.181	0.007	−0.220	−0.085	0.249	−0.048	−0.119	0.038	−0.028	1

TR: total risk; BETA: systematic risk; IR: idiosyncratic risk; ESG: ESG score; SPS: social pillar score; EPS: environmental pillar score; GPS: governance pillar score; SIZE: firm size (logarithm of the total assets); ROA: return on assets (income/total assets); LEV: leverage (long-term debt/total assets); MTB: market-to-book ratio (market value/book value of firm equity); DIV: dividends payment (dividends per share/previous year average share price); SDORA_5: volatility of ROA (standard deviation of return on assets over previous 5 years); LIQ: stock liquidity (turnover by volume/common shares outstanding); CURA: current ratio (current total assets/current total liabilities).

Table 5. CS and risk relation with ESG rating and pillar scores (Hypotheses 1, 2, and 4).

	MODELS								
	H1a	**H2a**	**H4a**	**H1b**	**H2b**	**H4b**	**H1c**	**H2c**	**H4c**
	(Rejected)	**(Rejected)**	**(Rejected)**	**(Rejected)**	**(Rejected)**	**(Accepted; U-Shaped)**	**(Rejected)**	**(Rejected)**	**(Accepted; U-Shaped)**
Dep. Var.	**TR**	**TR**	**TR**	**Beta**	**Beta**	**Beta**	**IR**	**IR**	**IR**
Independent variables									
ESG	0.003			0.001			0.000		
SPS		−0.001	0.003		0.004 *	0.015		0.003	0.014 **
SPS2			0.000			0.000			−0.00010 *
EPS		0.003	−0.003		−0.002	−0.015 ***		−0.004	−0.008
EPS2			0.000			0.00013 ***			0.000
GPS		0.000	−0.002		−0.002	0.004		0.000	0.004
GPS2			0.000			0.000			0.000
Control variables									
SIZE	0.666 ***	0.652 ***	0.651 ***	0.272 ***	0.306 ***	0.299 ***	−0.012	0.018	0.014
ROA	0.823	0.860	0.966	−0.658	−0.741	−0.516	0.001	−0.060	0.024
LEV	−0.960 ***	−0.967 ***	−0.929 ***	0.385 *	0.373	0.486 *	−0.093	−0.084	0.016
MTB	0.069 **	0.070 **	0.067 **	0.022 **	0.021 **	0.015 *	−0.020 ***	−0.022 ***	−0.024 ***
DIV	−0.541	−0.477	−0.802	2.178 ***	1.926 ***	1.463 **	0.077	−0.073	−0.122
SDORA_5	1.074	1.256	1.421	3.365 ***	3.128 ***	3.422 ***	−0.140	−0.479	−0.318
LIQ	−0.070	−0.076	−0.081	−0.033	−0.019	−0.010	0.401 ***	0.415 ***	0.415 ***
CURA	−0.006	−0.006	−0.004	−0.021 *	−0.021 *	−0.022 *	−0.005	−0.006	−0.011
_cons	−10.052 ***	−9.832 ***	−9.788 ***	−3.627 ***	−4.168 ***	−4.260 ***	1.419	0.987	0.752
Observations	454	454	454	454	454	454	454	454	454
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R−squared	0.366	0.368	0.370	0.315	0.279	0.320	0.597	0.354	0.363
vif	1.88	2.04	9.08	1.88	2.04	9.08	1.88	2.04	9.08
ovtest	0.00	0.00	0.00	0.21	0.07	0.13	0.00	0.00	0.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. VIFs in the c-regressions are naturally high but still below 10, as we add the EPS, SPS, and GPS to the regression together with their own squared values EPS2, SPS2, and GPS2. TR: total risk; BETA: systematic risk; IR: idiosyncratic risk; ESG: ESG score; SPS: social pillar score; EPS: environmental pillar score; GPS: governance pillar score; SIZE: firm size (logarithm of the total assets); ROA: return on assets (income/total assets); LEV: leverage (long-term debt/total assets); MTB: market-to-book ratio (market value/book value of firm equity); DIV: dividends payment (dividends per share/previous year average share price); SDORA_5: volatility of ROA (standard deviation of return on assets over previous 5 years); LIQ: stock liquidity (turnover by volume/common shares outstanding); CURA: current ratio (current total assets/current total liabilities).

The second hypothesis deconstructs the aggregated ESG rating into the EPS, SPS, and GPS. Both H2a and H2c show two positive and one negative coefficients for the TR and IR, respectively, but they are all insignificant. Consequently, H2a and H2c are rejected. Model H2b exhibits a significant link between the SPS and beta. Yet, the coefficient is rather small and positive (we predicted negative), so H2b must also be ruled out. Hypotheses 4a to 4c test for nonlinear relationships. For the TR (H4a), this must be rejected as none of the coefficients are significant. Model H4b, on the other hand, exhibits a nonlinear relationship between the beta and both the EPS and EPS2. This link is statistically significant at the 1% level. Due to the negative sign of the EPS and the positive sign of the EPS2, there is a U-shaped connection, which means that although the first environmental investments reduce the risk, the value added decreases with further investments. For H4c, we find a significant nonlinear connection for the SPS and SPS2 (social investments), which is why this hypothesis can also be accepted. Thus, while the IR increases as the SPS increases, it increases more weakly as more is invested in the SPS. It is noteworthy that, in the regression, the squared value always carries the opposite sign of the pillar score, causing the increase in risk to lessen or the decrease in risk to diminish with each additional unit. The coefficients of the squared pillar scores, however, are always quite small.

Table 6 shows the regression analysis results for Hypothesis 3. H3a must be rejected because the results of the regression on the category scores and the TR reveal no significant connection. H2b can only be partially accepted because the ERU and beta have a significant negative relationship. The EEI and SHR, two other category scores, reveal significant relationships as well. The scores in the remaining four categories are all insignificant. When the category scores and the IR are regressed, two variables emerge as significant. These, however, are all positive, implying that hypothesis H3c must be rejected as well.

Table 6. CS and risk relation with category scores (Hypothesis 3).

	MODELS		
	H3a	**H3b**	**H3c**
	(Rejected)	**(Accepted)**	**(Rejected)**
Variable	**TR**	**BETA**	**IR**
EES	0.002	−0.001	−0.001
ERU	0.000	−0.005 **	−0.001
EEI	0.000	0.002 *	−0.001
SWF	0.000	0.001	0.003
SHR	−0.001	0.003 ***	−0.001
SCS	0.002	0.001	0.003 **
SPR	−0.003	−0.002	0.000
GMS	0.000	−0.001	−0.001
GSS	−0.002	0.000	0.001 *
GCS	0.004	0.001	0.001
Control variables			
SIZE	0.607 ***	0.299 ***	0.036
ROA	0.655	−1.051 **	−0.256
LEV	−0.891 ***	0.334	−0.169
MTB	0.070 **	0.025 ***	−0.018 ***
DIV	−0.251	1.946 ***	0.283
SDORA_5	1.321	2.513 ***	−0.374
LIQ	−0.103	−0.021	0.385 ***
CURA	0.000	−0.008	0.000
_cons	−9.087 ***	−3.950 ***	0.495

Table 6. *Cont.*

	MODELS		
	H3a	**H3b**	**H3c**
	(Rejected)	**(Accepted)**	**(Rejected)**
Variable	**TR**	**BETA**	**IR**
Observations	454	454	455
Firm Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
R-squared	0.386	0.373	0.374
vif	2.17	2.17	2.17
ovtest	0.00	0.61	0.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. TR: total risk; BETA: systematic risk; IR: idiosyncratic risk; EES: emission; ERU: resource use; EEI: innovation; SWF: workforce; SHR: human rights; SCS: community; SPR: product responsibility; GMS: management; GSS: shareholders; GCS: CS strategy; SIZE: firm size (logarithm of the total assets); ROA: return on assets (income/total assets); LEV: leverage (long-term debt/total assets); MTB: market-to-book ratio (market value/book value of firm equity); DIV: dividends payment (dividends per share/previous year average share price); SDORA_5: volatility of ROA (standard deviation of return on assets over previous 5 years); LIQ: stock liquidity (turnover by volume/common shares outstanding); CURA: current ratio (current total assets/current total liabilities).

The R-squared test results are always acceptable and give a higher value in the squared regressions than the linear regressions, except for H1c. The values of the R-squared with the category scores have higher values than with the nonlinear regressions. This shows that the nonlinear model explains the relationship between CS and risk better. The highest results, however, are those arising from each individual category score.

5. Discussion

5.1. Contributions to Theory and Practice

This study addressed the research question how does the (dis)aggregated ESG rating affect risk in contexts where integrated reporting is optional. It makes three major contributions. First, our main insights are the *U-shaped* relationships between CS and risk: Ecological investments first decrease systematic risk (beta), while overinvestment increases systematic risk again. Likewise, social investments initially decrease idiosyncratic risk, while overinvestment increases idiosyncratic risk again. This is also in line with the findings of Nollet et al. (2015), who looked into the link between the ESG ratings and the CFP [50] (see also Lueg and Pesheva, 2021 [49]). As a result, the ESG rating appears to have an impact not only on risk but also on the CFP. This means that a firm's executives must consider the proper level of CS investment and invest in the EPS only up to the point where the benefit of a greater EPS ends, as any future expenses may outweigh the benefit.

Second, our findings suggest that the effects of ESG ratings on risk may depend on the existing level of sustainability in the capital market. Thereby, we can synthesize opposing findings in the previous literature: the U-shaped relationship between CS and risk indicates that firms can only reduce risk to a certain point by increasing CS. Sassen et al.'s (2016) study in the European region suggests that CS lowers risk [15]. For Swedish firms, however, Engström and Martinsson (2020) show positive relationships [29]. The U-shaped relationship in our study synthesizes these opposing findings based on the arguments of the RobecoSAM (2019) ranking [58]: Sweden is significantly ahead of Germany in terms of sustainability, while the European average lags behind the two countries. When a firm's CS reaches a certain level, its importance appears to diminish and follows a U-shaped curve. This would imply that investing in CS management is—generally in less sustainable countries—advantageous as it reduces risk. In more sustainable countries, however, this relationship may not reliably exist as firms have already explored many opportunities. An excessive investment in CS may then even be harmful. As a result, firms lose their competitive advantage from their CS if all other firms also act sustainably.

Third, we cannot confirm the predicted *linear* relationships between CS and risk. We only find that social investments (SPS) are significantly and—against our prediction—positively related to systematic risk (beta). This offers a link to the study of Lueg et al.'s (2019). The authors show that South African firms tend to increase their SPS when systematic risk increases or is high [27]. Therefore, a significant and bidirectional relationship can be found there. Future research should, therefore, reconsider the direction of the hypotheses and investigate the (bidirectional) effects of risk on CS. Moreover, results suggest that the subordinate ESG scores have little to no significance. Furthermore, the TR revealed no significant relationships. This supports future studies by excluding these variables from their models.

5.2. Limitations

Our study has limitations as it builds only on one data source, the ESG rating data from Thomsen Reuters. Most prior studies have also just used one data source but may be useful examples of alternative sources for ESG ratings, such as the Kinder, Lydenberg, and Domini (KLD) database [43,59,60]. Because of the differing calculation methodologies, this could lead to discrepancies in research outcomes. While ESG ratings are widely accepted, it is difficult to analyze a firm's ESG performance. Another limitation of this study is that our methodology cannot be directly compared to those utilized by Sassen et al. (2016) [15] and Engström and Martinsson (2020) [29] as the studies feature different control variables and risk assessments. Finally, instead of using the ESG rating, the ESG Controversial Score (ESGC) could be considered. Unlike the ESG rating, the ESGC also takes into account any scandals affecting a firm, which are then reflected in a lowered ESGC score: these effects can still be seen in the following year in ongoing media reports [61] (p. 7).

5.3. Conclusions and Future Research

In conclusion, we find only moderate evidence that risk is inversely related to CS in the German setting. When this is the case, we find U-shaped relationships, and single, highly specialized category scores add a lot of the overall explanatory value. Our findings could now be investigated further. Because nonlinear correlations have been discovered not only in this study but also in studies on CS and CFP [49,50], future research should focus more on diverse reporting requirement regions and their differences in terms of the CS–risk link and the capital market's sustainability ranking. This will allow for a more exact definition of stakeholders' interests for each capital market. Considering Bouslah et al.'s (2018) study, where the results indicate a significant difference between the crisis and pre-crisis periods [43], this subdivision may also be applied in European studies. Especially with the background of risk management theory, this could lead to new insights. For example, it could be that the ESG rating is only significant in crisis periods, which could explain the differences between this study and that of Sassen et al. (2016) [15]. Thus, in future research, a breakdown of crisis periods, such as the dotcom bubble, global economic crisis, and COVID-19 pandemic, could be investigated to gain a deeper understanding of the relationship between CS and risk. This could then also clarify the question of whether CS is more of a crisis tool, only brings competitive advantages, or, perhaps, fulfils both purposes.

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References

1. Lueg, R.; Radlach, R. Managing sustainable development with management control systems: A literature review. *Eur. Manag. J.* **2016**, *34*, 158–171. [CrossRef]
2. Hsu, F.J.; Chen, Y.-C. Is a firm's financial risk associated with corporate social responsibility? *Manag. Decis.* **2015**, *53*, 2175–2199. [CrossRef]
3. Bouzzine, Y.D.; Lueg, R. The reputation costs of executive misconduct accusations: Evidence from the #MeToo movement. *Scand. J. Manag.* **2022**, *38*, 101196. [CrossRef]
4. Bouzzine, Y.D.; Lueg, R. The shareholder value effect of system overloads: An analysis of investor responses to the 2003 blackout in the US. *IJEEP* **2021**, *11*, 538–543. [CrossRef]
5. Bouzzine, Y.D.; Lueg, R. The contagion effect of environmental violations: The case of Dieselgate in Germany. *Bus. Strat. Environ.* **2020**, *29*, 3187–3202. [CrossRef]
6. Profitlich, M.; Bouzzine, Y.D.; Lueg, R. The Relationship between CFO Compensation and Corporate Sustainability: An Empirical Examination of German Listed Firms. *Sustainability* **2021**, *13*, 12299. [CrossRef]
7. Nielsen, J.G.; Lueg, R.; van Liempd, D. Challenges and boundaries in implementing social return on investment: An inquiry into its situational appropriateness. *Nonprofit Manag. Leadersh.* **2021**, *31*, 413–435. [CrossRef]
8. Kutzschbach, J.; Tanikulova, P.; Lueg, R. The Role of Top Managers in Implementing Corporate Sustainability—A Systematic Literature Review on Small and Medium-Sized Enterprises. *Adm. Sci.* **2021**, *11*, 44. [CrossRef]
9. Lee, D.D.; Faff, R.W. Corporate Sustainability Performance and Idiosyncratic Risk: A Global Perspective. *Financ. Rev.* **2009**, *44*, 213–237. [CrossRef]
10. Capelle-Blancard, G.; Petit, A. Every Little Helps? ESG News and Stock Market Reaction. *J. Bus. Ethics* **2019**, *157*, 543–565. [CrossRef]
11. Gregory, A.P.R.; Tharyan, R.; Whittaker, J. Corporate Social Responsibility and Firm Value: Disaggregating the Effects on Cash Flow, Risk and Growth. *J. Bus. Ethics* **2014**, *124*, 633–657. [CrossRef]
12. Cheng, B.; Ioannou, I.; Serafeim, G. Corporate social responsibility and access to finance. *Strat. Mgmt. J.* **2014**, *35*, 1–23. [CrossRef]
13. El Ghoul, S.; Guedhami, O.; Kwok, C.C.Y.; Mishra, D.R. Does corporate social responsibility affect the cost of capital? *J. Bank Financ.* **2011**, *35*, 2388–2406. [CrossRef]
14. Bauer, R.; Derwall, J.; Hann, D. Employee Relations and Credit Risk. *SSRN Electron. J.* **2009**. [CrossRef]
15. Sassen, R.; Hinze, A.-K.; Hardeck, I. Impact of ESG factors on firm risk in Europe. *J. Bus. Econ.* **2016**, *86*, 867–904. [CrossRef]
16. Kopel, M.; Brand, B. Socially responsible firms and endogenous choice of strategic incentives. *Econ. Model.* **2012**, *29*, 982–989. [CrossRef]
17. Waddock, S.A.; Graves, S.B. The corporate social performance–financial performance link. *Strat. Mgmt. J.* **1997**, *18*, 303–319. [CrossRef]
18. Margolis, J.D.; Elfenbein, H.A.; Walsh, J.P. Does it Pay to Be Good ... And Does it Matter? A Meta-Analysis of the Relationship between Corporate Social and Financial Performance. *SSRN Electron. J.* **2009**. [CrossRef]
19. Van Beurden, P.; Gössling, T. The Worth of Values—A Literature Review on the Relation Between Corporate Social and Financial Performance. *J. Bus. Ethics* **2008**, *82*, 407–424. [CrossRef]
20. Bassen, A.; Meyer, K.; Schlange, J. The Influence of Corporate Responsibility on the Cost of Capital. *SSRN Electron. J.* **2006**. [CrossRef]
21. Rajesh, R.; Rajendran, C. Relating Environmental, Social, and Governance scores and sustainability performances of firms: An empirical analysis. *Bus. Strat. Environ.* **2020**, *29*, 1247–1267. [CrossRef]
22. Ali, S.M.; Arafin, A.; Moktadir, M.A.; Rahman, T.; Zahan, N. Barriers to Reverse Logistics in the Computer Supply Chain Using Interpretive Structural Model. *Glob. J. Flex. Syst. Manag.* **2018**, *19*, 53–68. [CrossRef]
23. Carter, C.R.; Rogers, D.S. A framework of sustainable supply chain management: Moving toward new theory. *Int. Jnl. Phys. Dist. Log. Manag.* **2008**, *38*, 360–387. [CrossRef]
24. Lueg, K.; Lueg, R. Deconstructing corporate sustainability narratives: A taxonomy for critical assessment of integrated reporting types. *Corp. Soc. Responsib. Environ.* **2021**, *28*, 1785–1800. [CrossRef]
25. Lueg, K.; Lueg, R.; Andersen, K.; Dancianu, V. Integrated reporting with CSR practices. *Corp. Commun. Int. J.* **2016**, *21*, 20–35. [CrossRef]
26. Muheki, M.; Lueg, K.; Lueg, R.; Schmaltz, C. How business reporting changed during the financial crisis: A comparative case study of two large U.S. banks. *Probl. Perspect. Manag.* **2014**, *12*, 191–208.
27. Lueg, K.; Krastev, B.; Lueg, R. Bidirectional effects between organizational sustainability disclosure and risk. *J. Clean. Prod.* **2019**, *229*, 268–277. [CrossRef]
28. Burkert, M.; Lueg, R. Differences in the sophistication of Value-based Management—The role of top executives. *Manag. Account. Res.* **2013**, *24*, 3–22. [CrossRef]

29. Engström, F.; Martinsson, S. Environmental, Social and Governance-Ratings and Risk in Sweden 2020. Available online: https://www.diva-portal.org/smash/record.jsf?pid=diva2:1442117 (accessed on 23 March 2020).
30. European Commission. Promoting a European Framework for Corporate Social Responsibility. Green Paper. Available online: https://www.europarl.europa.eu/portal/de/meetdocs (accessed on 22 November 2021).
31. Lueg, K.; Lueg, R. Detecting Green-Washing or Substantial Organizational Communication: A Model for Testing Two-Way Interaction Between Risk and Sustainability Reporting. *Sustainability* **2020**, *12*, 2520. [CrossRef]
32. Schmaltz, C.; Lueg, R.; Agerholm, J.; Wittrup, K. Value-based management in banking: The effects on shareholder returns. *Int. J. Bus. Sci. Appl. Manag.* **2019**, *14*, 35–50.
33. Toft, J.S.; Lueg, R. A screening model for corporate bond picking. *Int. J. Financ.* **2015**, *27*, 437–453.
34. Orlitzky, M.; Benjamin, J.D. Corporate Social Performance and Firm Risk: A Meta-Analytic Review. *Bus. Soc.* **2001**, *40*, 369–396. [CrossRef]
35. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Cambridge University Press: Cambridge, UK, 2010.
36. Parmar, B.L.; Freeman, R.E.; Harrison, J.S.; Wicks, A.C.; Purnell, L.; Colle, S.D. Stakeholder Theory: The State of the Art. *ANNALS* **2010**, *4*, 403–445. [CrossRef]
37. McGuire, J.B.; Sundgren, A.; Schneeweis, T. Corporate Social Responsibility and Firm Financial Performance. *AMJ* **1988**, *31*, 854–872. [CrossRef]
38. Bouslah, K.; Kryzanowski, L.; M'Zali, B. The impact of the dimensions of social performance on firm risk. *J. Bank. Financ.* **2011**, *37*, 1258–1273. [CrossRef]
39. Lueg, R.; Pedersen, M.M.; Clemmensen, S.N. The Role of Corporate Sustainability in a Low-Cost Business Model—A Case Study in the Scandinavian Fashion Industry. *Bus. Strat. Environ.* **2015**, *24*, 344–359. [CrossRef]
40. Qiu, Y.; Shaukat, A.; Tharyan, R. Environmental and social disclosures: Link with corporate financial performance. *Br. Account. Rev.* **2016**, *48*, 102–116. [CrossRef]
41. Choi, J.; Wang, H. Stakeholder relations and the persistence of corporate financial performance. *Strat. Mgmt. J.* **2009**, *30*, 895–907. [CrossRef]
42. Harrison, J.S.; Bosse, D.A.; Phillips, R.A. Managing for stakeholders, stakeholder utility functions, and competitive advantage. *Strat. Mgmt. J.* **2010**, *31*, 58–74. [CrossRef]
43. Bouslah, K.; Kryzanowski, L.; M'Zali, B. Social Performance and Firm Risk: Impact of the Financial Crisis. *J. Bus. Ethics* **2018**, *149*, 643–669. [CrossRef]
44. Godfrey, P.C. The Relationship Between Corporate Philanthropy And Shareholder Wealth: A Risk Management Perspective. *AMR* **2005**, *30*, 777–798. [CrossRef]
45. Sharfman, M.P.; Fernando, C.S. Environmental risk management and the cost of capital. *Strat. Mgmt. J.* **2008**, *29*, 569–592. [CrossRef]
46. Benlemlih, M.; Shaukat, A.; Qiu, Y.; Trojanowski, G. Environmental and Social Disclosures and Firm Risk. *J. Bus. Ethics* **2018**, *152*, 613–626. [CrossRef]
47. Salama, A.; Anderson, K.; Toms, J.S. Does community and environmental responsibility affect firm risk? Evidence from UK panel data 1994–2006. *Bus. Ethics A Eur. Rev.* **2011**, *20*, 192–204. [CrossRef]
48. Barnett, M.L.; Salomon, R.M. Does it pay to be really good? addressing the shape of the relationship between social and financial performance. *Strat. Mgmt. J.* **2012**, *33*, 1304–1320. [CrossRef]
49. Lueg, R.; Pesheva, R. Corporate sustainability in the Nordic countries—The curvilinear effects on shareholder returns. *J. Clean. Prod.* **2021**, *315*, 127962. [CrossRef]
50. Nollet, J.; Filis, G.; Mitrokostas, E. Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Econ. Model.* **2016**, *52*, 400–407. [CrossRef]
51. Barnea, A.; Rubin, A. Corporate Social Responsibility as a Conflict Between Shareholders. *J. Bus. Ethics* **2010**, *97*, 71–86. [CrossRef]
52. Nielsen, J.G.; Lueg, R.; van Liempd, D. Managing Multiple Logics: The Role of Performance Measurement Systems in Social Enterprises. *Sustainability* **2019**, *11*, 2327. [CrossRef]
53. Luo, X.; Bhattacharya, C.B. The Debate over Doing Good: Corporate Social Performance, Strategic Marketing Levers, and Firm-Idiosyncratic Risk. *J. Mark.* **2009**, *73*, 198–213. [CrossRef]
54. Goyal, A.; Santa-Clara, P. Idiosyncratic Risk Matters! *J. Financ.* **2003**, *58*, 975–1007. [CrossRef]
55. Fu, F. Idiosyncratic risk and the cross-section of expected stock returns. *J. Financ. Econ.* **2009**, *91*, 24–37. [CrossRef]
56. Refinitiv. Environmental, Social and Governance (ESG) Scores from Refinitiv. Available online: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf (accessed on 23 March 2022).
57. Läger, F.; Bouzzine, Y.D.; Lueg, R. The relationship between firm complexity and corporate social responsibility: International evidence from 2010–2019. *Corp. Soc. Responsib. Environ.* **2022**, *29*, 549–560. [CrossRef]
58. RobecoSAM. Country ESG Ranking Update—December 2019. Available online: https://www.robecosam.com/en/insights/2019/norway-the-worlds-most-sustainable-country.html (accessed on 21 February 2021).
59. Oikonomou, I.; Brooks, C.; Pavelin, S. The Impact of Corporate Social Performance on Financial Risk and Utility: A Longitudinal Analysis. *Financ. Manag.* **2012**, *41*, 483–515. [CrossRef]

60. Jo, H.; Na, H. Does CSR Reduce Firm Risk? Evidence from Controversial Industry Sectors. *J. Bus. Ethics* **2012**, *110*, 441–456. [CrossRef]
61. Thomson Reuters Eikon. Thomson Reuters ESG Rating. Available online: https://www.esade.edu/itemsweb/biblioteca/bbdd/inbbdd/archivos/Thomson_Reuters_ESG_Scores.pdf (accessed on 1 December 2021).