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THE IMPACT OF ESG CONTROVERSIES AND ESG PERFORMANCE ON STOCK RETURN VOLATILITY

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Abstract. This study examines the impact of environmental, social and governance performance and controversies on stock return volatility. For this purpose, I considered a sample of 1095 European companies from 23 countries during 2019–2022 and it was applied panel regression. This study found a direct influence of ESG controversies on stock return volatility, but the coefficient of the dependence is close to zero. Similarly, the ESG performance has a direct impact on volatility and the coefficient of dependence is different from zero. This result shows that companies with a better performance on ESG face higher stock return volatility. The study findings enrich the academic literature and can help investors in the investment decisions making.

Keywords: ESG controversies, ESG performance, risk, stock return volatility, Europe.

JEL Classification: G32, M14.

Introduction

Nowadays, investors are paying more attention to the ESG events reflected in global media in order to incorporate the information into their investment decision making (Shakil, 2021). Additionally, investors are more concerned on environmental, social and governance issues and, by extension, on ESG controversies (Aouadi & Marsat, 2018). ESG controversies are negative events reflected in media about a company's exposure to environmental, social and governance concerns. This kind of negative news attracts the attention of investors and can have adverse effects on the share prices (Shakil, 2021).

The impact of ESG on financial risk became considerable in academic literature. However, most of the studies focus on the relationship between ESG performance and financial risk (Jo & Na, 2012; Sassen et al., 2016; Meher et al., 2020; Tasnia et al., 2020; Shakil, 2021). There is little evidence about the influence of ESG controversies on financial risk (Krüger, 2015; Shakil, 2021).

This study intends to answer two research questions to contribute to ESG and financial risk literature, as follows: (1) Is there any influence of ESG controversies on the stock return volatility? (2) Does ESG performance have any impact on the stock return volatility? In order to answer these questions, this study uses a sample of 1095 European companies from 23 countries during 2019–2022. The results of this study showed a significant and direct association between all ESG measures and stock return volatility. ESG controversies score has a direct influence on stock return volatility, but the coefficient of the dependence is close to zero. Similarly, the ESG performance has a direct impact on volatility and the coefficient of dependence is different from zero. This result shows that companies with a better performance on ESG face higher stock return volatility.

The study findings enrich the academic literature by adding further evidence about the influence of ESG performance and ESG controversies on stock return volatility in the European context. Also, these results can help investors in the investment decisions making by choosing between ESG companies according to their risk appetite.

The remainder of the paper is structured as follows. Section 1 presents the theoretical background. The methodology and data are described in Section 2. Section 3 presents and discuss the results. Finally, the last section concludes.

1. Literature review

The majority of prior literature focuses on the relationship between ESG performance and financial risk (Jo & Na, 2012; Sassen et al., 2016; Meher et al., 2020; Tasnia

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et al., 2020; Shakil, 2021) and most of the studies are on ESG and financial performance (Cai et al., 2012; Di Giuli & Kostovetsky, 2014; Gao & Zhang, 2015; Cornett et al., 2016; Ferrel et al., 2016; Buallay, 2019; Fatemi et al., 2018; Aboud & Diab, 2019; Azmi et al., 2021; Wong et al., 2021; Egorova et al., 2022). Several other studies have also found that ESG scores influence stock return (Hong & Kacperczyk, 2009; Meher et al., 2020; Bolton & Kacperczyk, 2021; Díaz et al., 2021; Ferrat et al., 2022; Luo, 2022).

Previous studies have found direct or inverse influence of ESG on financial risk. Jo and Na (2012) examined the impact of corporate social responsibility (CSR) on firm risk in controversial industry sectors (alcohol, tobacco, gambling and others) from US during 1991–2010. The authors found that CSR affected inverse firm risk. Similarly, Sassen et al. (2016) showed that social performance had a significantly inverse impact on firm risk in Europe during 2002–2014. In contrast, Tasnia et al. (2020) found a significant and direct relationship between ESG score and stock price volatility for US banks from 2013 to 2017.

In addition, previous studies have identified diverse factors that explain the stock price volatility, namely market to book ratio (Jo & Na, 2012; Sassen et al., 2016; Tasnia et al., 2020; Shakil, 2021), leverage (Jo & Na, 2012; Tasnia et al., 2020; Shakil, 2021), dividend yield (Tasnia et al., 2020; Shakil, 2021), firm size (Jo & Na, 2012; Sassen et al., 2016; Tasnia et al., 2020; Shakil, 2021) and ROA (Jo & Na, 2012; Sassen et al., 2016; Tasnia et al., 2020).

ESG controversies are undesirable ESG news about companies, such as doubtful activities and product-harm scandals (Shakil, 2021). Previous studies found significant evidence of ESG controversies influence on financial risk (Krüger, 2015; Shakil, 2021), financial performance (Nirino et al., 2021), market value (Aouadi & Marsat, 2018; Melinda & Wardhani, 2020; Nirino et al., 2021) and cost of equity (La Rosa & Bernini, 2022).

Shakil (2021) examined the impact of ESG performance and ESG controversies on financial risk for 70 oil and gas firms worldwide during 2010–2018. To measure financial risk, the author used stock price volatility as a proxy of total risk and market beta as a proxy for systematic risk. The results showed a significant adverse effect of ESG performance on total risk, but an insignificant effect of ESG on systematic risk. Also, the study found a moderating effect of ESG controversies on the relationship between ESG performance and total risk. A previous event study by Krüger (2015) found similar results regarding the negative reaction of investors at negative CSR news, particularly for communities and environment news.

Nirino et al. (2021) explored the impact of ESG controversies on financial performance, measured by ROA, ROE and Tobin's Q. Using a sample of 356 European listed companies, the authors found an inverse and significant relationship between ESG controversies and financial performance.

Aouadi and Marsat (2018) considered 4312 firms from 58 countries over a ten year period (2002–2011) to analyze the relationship between ESG controversies and firm market value. To measure firm value, the authors used Tobin's Q and Market-to-book ratio. Furthermore, the authors used some rates of return: Operating income on assets, Operating income on sales and Return on equity. First, ESG controversies are associated with greater firm value. However, the authors introduced an interaction term between controversies and the corporate social performance score and the direct effect of ESG controversies disappears but the interaction term is direct related to market value.

Furthermore, Melinda and Wardhani (2020) concluded that ESG score and controversy score affect directly the value of Asian companies, measured by Tobin's Q, in the period 2014–2018. A recent study by La Rosa and Bernini (2022) analyzed the effect of ESG controversies on the cost of equity in the case of the European listed companies. The results showed that ESG controversies increases the cost of equity.

Based on the prior literature, the following conclusions may be drawn. First, the results regarding the impact of ESG performance on firm risk are not conclusive. Second, the influence of ESG controversies on stock return volatility is not sufficiently analyzed in the literature.

2. Data and methodology

2.1. Data

The sample is made of ESG ratings and financial data from European companies during 2019–2022. The data are obtained from Thomson Reuters database. Of the all the European listed companies, I retained 1095 companies from 23 countries (Austria, Belgium, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Switzerland) for which I have identified a reasonable level of data. I had to remove Bulgaria, Slovakia, Ukraine, Iceland, Lithuania, Estonia, Serbia, Montenegro, Macedonia and Croatia from the database because the companies from these countries did not have ESG ratings available in the Thomson Reuters.

Table 1 details the sample construction. Germany is the country with the most companies included in the database, followed by France, Switzerland and Sweden. In contrast, only one company from Slovenia and two companies each from Romania and Cyprus were included in the database.

Table 1. Sample construction (source: authors' own research)

Country	Nr. of companies
Austria	32
Belgium	45
Cyprus	2
Czech Republic	3
Denmark	42
Finland	33

End of Table 1

Country	Nr. of companies
France	134
Germany	157
Greece	25
Hungary	5
Ireland	45
Italy	78
Luxembourg	23
Malta	4
Netherlands	67
Norway	44
Poland	36
Portugal	13
Romania	2
Slovenia	1
Spain	65
Sweden	116
Switzerland	123
Total	1095

2.2. Methodology

Following prior literature, the volatility is measured by the annual standard deviation of daily stock returns (Jo & Na, 2012; Shakil, 2021). The independent variables of interest in this study are ESG controversies score and ESG score, along with ESG combined score. I chose to introduce the ESG combined score in regressions to determine whether the two combined scores influence the volatility.

Other company-specific variables, for instance, dividend yield, return on assets, leverage, size and market to book value of equity, are selected according to prior studies (Jo & Na, 2012; Sassen et al., 2016; Tasnia et al., 2020; Shakil, 2021). All variables used in the study are defined in Table 2, with symbols and description.

In order to achieve the objective of the paper, it was applied panel regression as in Jo and Na (2012), Tasnia et al. (2020) and Shakil (2021). These authors applied ordinary least square (OLS) and fixed effects panel regression. The regression models are as follows:

$$VOL_{it} = \alpha + \beta_1 \times DY_{it} + \beta_2 \times ROA_{it} + \beta_3 \times LEV_{it} + \beta_4 \times SIZE_{it} + \beta_5 \times MTB_{it} + \varepsilon_{it}, \quad (1)$$

where: *VOL* – volatility, *DY* – dividend yield, *ROA* – return on assets, *LEV* – leverage, *SIZE* – size, *MTB* – market to book value of equity, α – the intercept, β_j – the regression coefficients (*j* – factor), *i* – the company, *t* – the year index, ε – the error term.

Model 1 tests the impact of the control variables identified in the previous literature (dividend yield, return on assets, leverage, size and market to book value of equity) on stock return volatility.

Table 2. Variables used in the study (source: authors' own research)

Variable	Symbol	Description
Dependent variables		
Volatility	VOL	Annual standard deviation of daily stock returns
Independent variables		
ESG controversies score	ESGCON	As provided by Thomson Reuters, measures a company's exposure to environmental, social and governance controversies and negative events reflected in media. ESG controversy score is measured based on 33 topics
ESG combined score	ESGCOMB	As provided by Thomson Reuters, is an overall company score based on the reported information in the environmental, social and governance pillars (ESG Score) with an ESG Controversies overlay
ESG score	ESG	As provided by Thomson Reuters, is an overall company score based on the self-reported information in the environmental, social and governance pillars
Dividend yield	DY	Dividend per share divided by price per share
Return on assets	ROA	Income after taxes divided by total assets
Leverage	LEV	Long-term debt divided by total assets
Size	SIZE	Natural logarithm of total assets
Market to book value of equity	MTB	Market value of equity over book value of equity

$$VOL_{it} = \alpha + \beta_1 \times ESGCON_{it} + \beta_2 \times DY_{it} + \beta_3 \times ROA_{it} + \beta_4 \times LEV_{it} + \beta_5 \times SIZE_{it} + \beta_6 \times MTB_{it} + \varepsilon_{it}, \quad (2)$$

where: *VOL* – volatility, *ESGCON* – ESG controversies score, *DY* – dividend yield, *ROA* – return on assets, *LEV* – leverage, *SIZE* – size, *MTB* – market to book value of equity, α – the intercept, β_j – the regression coefficients (*j* – factor), *i* – the company, *t* – the year index, ε – the error term.

Model 2 tests the impact of ESG controversies on stock return volatility, considering the control variables identified in the previous literature (dividend yield, return on assets, leverage, size and market to book value of equity).

$$VOL_{it} = \alpha + \beta_1 \times ESGCOMB_{it} + \beta_2 \times DY_{it} + \beta_3 \times ROA_{it} + \beta_4 \times LEV_{it} + \beta_5 \times SIZE_{it} + \beta_6 \times MTB_{it} + \varepsilon_{it}, \quad (3)$$

where: *VOL* – volatility, *ESGCOMB* – ESG combined score, *DY* – dividend yield, *ROA* – return on assets, *LEV* – leverage, *SIZE* – size, *MTB* – market to book value of equity, α – the intercept, β_j – the regression coefficients (*j* – factor), *i* – the company, *t* – the year index, ε – the error term.

Model 3 tests the impact of ESG combined score on stock return volatility, taking into account the control variables identified in the previous literature (dividend yield, return on assets, leverage, size and market to book value of equity).

$$VOL_{it} = \alpha + \beta_1 \times ESG_{it} + \beta_2 \times DY_{it} + \beta_3 \times ROA_{it} + \beta_4 \times LEV_{it} + \beta_5 \times SIZE_{it} + \beta_6 \times MTB_{it} + \varepsilon_{it}, \quad (4)$$

where: *VOL* – volatility, *ESG* – ESG score, *DY* – dividend yield, *ROA* – return on assets, *LEV* – leverage, *SIZE* – size, *MTB* – market to book value of equity, α – the intercept, β_j – the regression coefficients (*j* – factor), *i* – the company, *t* – the year index, ε – the error term.

Model 4 tests the impact of ESG performance on stock return volatility, considering the control variables identified in the previous literature (dividend yield, return on assets, leverage, size and market to book value of equity).

3. Results and discussions

Table 3 presents the descriptive statistics of the sample. There are 4380 company-year observations from 1095 companies during the period 2019–2022. The average volatility is 33.2%, while the minimum is 6.9% (see Figure 1 for histogram). In terms of ESG, the average ESG controversies score is 90.672 and varies between a minimum of 0.439 and a maximum of 100 (see Figure 2 for histogram). The average ESG combined score is 56.144. The maximum ESG combined score is 94.157 and the minimum is 1.417. The average ESG score is 58.597. The highest ESG score is 95.422 where the lowest ESG score is 1.417 (see Figure 3 for histogram).

Regarding the control variables, the average dividend yield is 2.3%, while the minimum is 0%. The average ROA is 3.1% and the average leverage is 20.9%. Size and market to book value of equity mean values are approximately 5.2 billion USD and 3.139, respectively.

Table 3. Descriptive statistics (source: authors' own research, using Stata)

Variable	Obs.	Mean	Std. Dev.	Min	Max
VOL	4380	.332	.171	.069	4.135
ESGCON	4380	90.672	22.810	.439	100
ESGCOMB	4380	56.144	18.326	1.417	94.157
ESG	4380	58.597	19.378	1.417	95.422
DY	4380	.023	.041	0	2
ROA	4380	.031	.122	–2.942	1.718
LEV	4380	.209	.158	0	1.125
SIZE	4380	22.37	1.963	.007	28.743
MTB	4380	3.142	3.881	.001	47.106

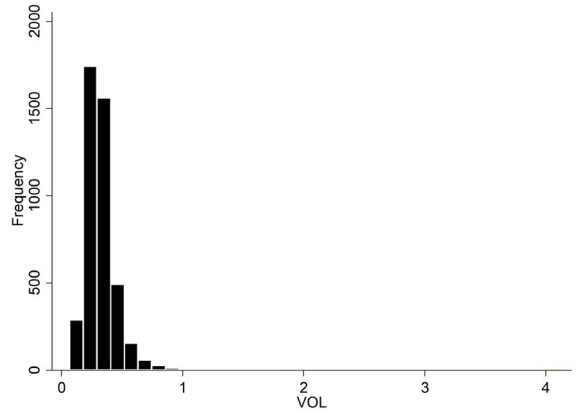

Figure 1. Histogram for volatility

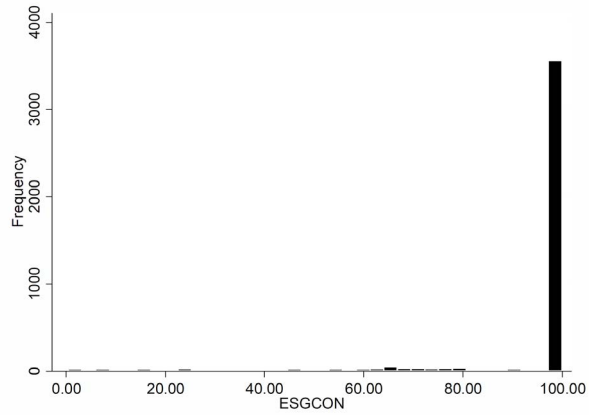

Figure 2. Histogram for ESG controversies score

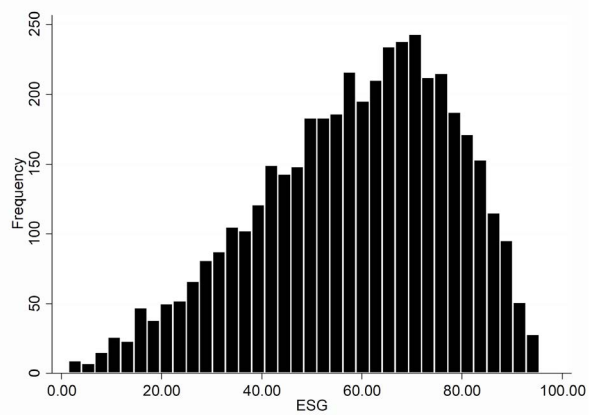

Figure 3. Histogram for ESG score

Table 4. Matrix of correlations (source: authors' own research, using Stata)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	1								
(2)	0.01	1							
(3)	–0.11*	0.07*	1						
(4)	–0.11*	–0.30*	0.92*	1					
(5)	–0.12*	–0.03*	0.05*	0.06*	1				
(6)	–0.32*	0.05*	0.09*	0.06*	0.10*	1			
(7)	0.06*	–0.02	0.10*	0.10*	–0.05*	–0.0*	1		
(8)	–0.19*	–0.42*	0.37*	0.52*	0.12*	0.06*	0.02	1	
(9)	–0.04*	0.09*	0.00	–0.03	–0.10*	0.17*	–0.04*	–0.26*	1

Note: * p < 0.1; (1) – volatility, (2) – ESG controversies, (3) – ESG combined score, (4) – ESG score, (5) – dividend yield, (6) – return on assets, (7) – leverage, (8) – size, (9) – market to book value of equity.

Table 4 reports the matrix of correlation. It shows an insignificant correlation between ESG controversies and volatility. However, the correlation between the two other ESG measures and volatility is significant and inverse. Besides, the correlation between other variables does not indicate serious problem of multicollinearity.

In order to select the suitable panel regresion model (fixed effect model or random effect model), I ran Hausman test (see Table 5). The results of the Hausman test showed a probability (p-value) equal to zero for each model which is less than 0.01, so that fixed effect models are more suitable to show the relationship between ESG and volatility.

Table 5. Hausman (1978) specification test (source: authors' own research, using Stata)

	(1)	(2)	(3)	(4)
Chi-square test value	300.64	339.313	331.842	330.863
P-value	0	0	0	0

Table 6 estimates the results from models 1, 2, 3 and 4. The first model tests the impact of control variables in the absence of ESG factors. Then, the 3 models with ESG factors are tested to see if the predictive capacity of the models is improved after introducing the ESG scores. As shown in Table 6, the three models with ESG factors have R-squared greater than the model without ESG factors showing that more variability of volatility is explained by these three models.

The results show a significant and direct relationship between all ESG measures and stock return volatility. The ESG controversies score has a direct influence on stock return volatility, but the coefficient of the dependence is close to zero. This result is contrary to Shakil (2021); the author found an insignificant effect of ESG controversies on volatility.

Similarly, the ESG performance has a direct impact on volatility and the coefficient of dependence is different from zero. This result shows that companies with a better performance on ESG face higher stock return volatility. However, these findings are not in line with previous studies (Jo & Na, 2012; Sassen et al., 2016; Shakil, 2021).

This result is in line with Tasnia et al. (2021); the authors explain this results in terms of the fact that investors may not prefer excess concentration on ESG because of the additional costs. Therefore, the results obtained for this sample indicate that European investors do not prefer companies highly involved in ESG. An over-investment in ESG by companies may not be preferred by investors because the resources could be used for other projects. In the short-term, engaging in ESG activities affects the company's profit and short-term investors who are interested in the company's dividends may affect the share price by moving to a more profitable company. Also, excess financing for ESG project can affect the performance of companies in relation to the main competitors, which can generate additional risks for investors.

Moreover, the combination of ESG performance score and ESG controversies score, namely the ESG combined score, has a direct influence on stock return volatility.

Return on assets, leverage and market to book ratio have a significant and inverse impact on volatility. A higher ROA means a profitable company which is associated with lower volatility (Jo & Na, 2012). Leverage has an inverse effect on volatility, as in Tasnia et al.

Table 6. Regression results (source: authors' own research, using Stata)

	(1)	(2)	(3)	(4)
	VOL	VOL	VOL	VOL
ESGCON		.000**		
		(0)		
ESGCOMB			.001***	
			(0)	
ESG				.002***
				(0)
DY	.187***	.187***	.191***	.191***
	(.056)	(.056)	(.056)	(.056)
ROA	–.176***	–.177***	–.176***	–.174***
	(.026)	(.026)	(.026)	(.026)
LEV	–.203***	–.2***	–.211***	–.218***
	(.031)	(.031)	(.031)	(.031)
SIZE	.009**	.009**	.009**	.008**
	(.004)	(.004)	(.004)	(.004)
MTB	–.003**	–.003**	–.002*	–.002
	(.001)	(.001)	(.001)	(.001)
_cons	.183**	.148*	.125	.112
	(.086)	(.087)	(.086)	(.086)
Observations	4380	4380	4380	4380
R-squared	.033	.035	.041	.042

Note: Standard errors are in parentheses. *** p < .01, ** p < .05, * p < .1

(2021). Companies with a higher market to book ratio have high market growth and are associated with lower volatility (Shakil, 2021; Tasnia et al., 2021). However, dividend yield has a significant and direct effect on stock return volatility, contrary to Shakil (2021) and Tasnia et al. (2021). Also, company size has a direct impact on volatility, contrary to Jo and Na (2012) and Shakil (2021).

Conclusions

This study analyzed the impact of environmental, social and governance performance and controversies on stock return volatility. For this purpose, I considered a sample of 1095 European companies from 23 countries during 2019–2022.

The results of this study showed a significant and direct association between all ESG measures and stock return volatility. ESG controversies score has a direct influence on stock return volatility, but the coefficient of the dependence is close to zero. Similarly, the ESG performance has a direct impact on volatility and the coefficients of dependence is different from zero. This result shows that companies with a better performance on ESG face higher stock return volatility.

These findings contribute to the academic literature by adding further evidence abouth the influence of ESG performance and ESG controversies on stock return volatility in the European context. Moreover, the results help investors in the investment decisions making by choosing between ESG companies according to their risk appetite.

This research exhibits a number of limitations with reference to a small time horizon. Future study may consider a longer time horizon. Moreover, a future research may examine the difference between the impact of ESG scores on volatility in the context of developed and emerging countries.

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Author contributions

The research is the result of the author's empirical work.

Disclosure statement

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