DO ESG SCORES PREDICT FUTURE ESG CONTROVERSIES? EVIDENCE FROM INTERNATIONAL DATA

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Abstract
This paper is the first to examine how Environmental, social and corporate governance (ESG) rating has predicted controversies and bad social performance and precipitated negative public reactions and the mid-to-long term associated valuation effects using an extensive International dataset from Thomson Reuters Environmental, social and corporate governance (ESG) scores, the Thomson Reuters controversies score and the Environmental, social and governance pillars score for 4238 companies from 45 countries from Europe and the United States across 31 industrial sectors for 17 years from 2004 to 2021. Primary analysis shows that ESG ratings predict future controversies and negative public scandals two years ahead of the scandal. To check the sensitivity of the primary results, we further unbundle ESG ratings into the three separate Environmental pillar, social pillar and governance pillar ratings and explore the impact each of the three Environmental, social and governance ratings has in predicting future controversies and public media attention. The results show that Environmental pillar, social pillar and governance pillar ratings strongly predict future scandals two years before scandals and negative media attentions for firms in Europe and United States.
Building on this evidence, we unpack the data and conduct sample split analysis by year and growth value. Our results show Environmental pillar, social pillar and governance pillar ratings strongly predict future controversies and public scandals for firms in Europe and

United States from 2014 to 2021. The findings hold for several robustness checks such as splitting the dataset across time and growth value.

Keywords: ESG scores, ESG controversies, Environmental pillar, social pillar, governance pillar

1. Introduction

In this empirical study, we attempt to find whether Environmental, social and corporate governance (ESG) scores predict future ESG controversies and how firm performance and valuation impact on ESG ratings.

Institutions that provide information intermediation are required for proper resource allocation in any economy (Healy and Palepu, 2001). Increasing amount of resources are now being deployed to producing performance evaluations such as analyst forecasts, recommendation ratings, credit ratings and more recently environment, social and governance (ESG) ratings and ESG controversies ratings. Performance evaluations can guide financial services industries and investment managers and investors in making informed business and investment decisions. Recently, investors and financial services industries and investment managers with trillions of dollars in assets management have started to include environment, social and governance (ESG) considerations in their portfolio construction, trading, investment and business decisions.

ESG analytics provide rating from measures of companies performance in environmental, social and governance variables, which enables investors to make portfolio constructions and understand the unsystematic and idiosyncratic risks that are related to environmental (resource use, emissions, innovation), governance (management, shareholders, CSR strategy) and social responsibilities (workforce, human rights, community, product responsibility). The ESG controversies (ESGC) rating on the other hand provides a measure of specific well identified weaknesses of a company that can potentially have a significant impact on its business. Controversies are negative events about a firm that is reflected in global media and may also have short or long term consequences in terms of reputational damage, legal risks or loss of business opportunities and impact on firm value (Cai et al 2012, Carroll 1979, Aouadi and Marsat, 2016, Dorfleitner et al, 2020).

This paper is the first to examine how ESG rating has predicted controversies and bad social performance and precipitated negative public reactions and the mid-to-long term associated valuation effects. The study provides answer to the question on how do ESG scores predict future ESG controversies and what are the associated firm performance and valuation effects? The overall purpose of the study is to measure the effect of firms ESG performance on ESG controversies and the associated valuation effects after controlling for other firms attributes such as size, performance and industry and country of origin and year effects. We analyse whether ESG ratings predict future controversies and negative public scandals two years ahead of the scandal using a larger sample. We consider 16,861 ESG controversies relating to 4500 International firms from 45 countries and 31 industrial sectors during 2002 to 2021.

We find that ESG ratings predict future controversies and negative public scandals two years ahead of the scandal. To check the sensitivity of the primary results, we further unbundle ESG ratings into the three separate Environmental pillar, social pillar and governance pillar ratings and explore the impact each of the three Environmental, social and governance ratings has in predicting future controversies and public media attention. The results show that Environmental pillar, social pillar and governance pillar ratings strongly predict future scandals two years before scandals and negative media attentions. The associated valuation effect of ESG controversies is negative.
We also unpack the data to re-estimate our baseline model across industries and countries of origin. Our results show that ESG ratings predict future scandals for most of the industrial sectors especially energy and fossil fuels, Industrial goods, Mineral resources, technology, applied resources and utilities sectors. ESG ratings strongly predict future controversies and public scandals for firms in Europe and United States.
We perform robustness check on our results by partitioning the sample period into four equal length subperiods as well as dividing firms into four growth-value groups based on market-to-book -ratio (MBV). The regression results in the four subperiods and the growth-value groups regression are qualitatively the same as in the baseline regressions. Irrespective of the estimation technique, ESG ratings predicts future controversies scores and public scandals and the associated valuation effects are negative.
The remainder of the paper is organized in five parts. The next section presents the literature review, followed by the data and methodology section. The penultimate section presents the results and the robustness checks and the final section is the conclusion and policy implications.

2. Literature Review

This section provides an overview of the existing perspectives regarding causes of Corporate scandals that can guide how corporate scandals can be predicted.

Notwithstanding the growing literature on Corporate sustainability and social performance, measured by Environmental, social and governance (ESG) scores which evaluates firms performance in their environmental, social and governance pillars, studies on causes of corporate scandals and impact of bad social performance and negative public opinion on corporate firms are very scanty and based on internationalization, firm value and reputation, aspirations and prominence, future of fraud given COVID-19 pandemic (Park 2018, Vasilescu and Wisniewski 2019, Dorfleitner et al, 2020, Aouadi and Marsat, 2018, Mishina et al, 2010, Karpoff, 2021, Amiram et al, 2018).
Corporate scandals are widely publicized illegal, illegitimate, unethical actions or wrongful or criminal deception and misconducts meant to benefit a firm by potentially reducing their liabilities or cost and increasing their earnings (McKendall & Wagner, 1997). Corporate scandals includes financial reporting misconduct (in form of fraud, irregularities, misreporting and misrepresentation, manipulation of firms accounting policies, violation of the books and records and or internal controls provisions of the securities and exchange act), violation of environmental regulations through inappropriate disposal of hazardous waste, top management team engaging in illegal actions or creating an avenue for others in the firm to do so (Mishina et al, 2010, Karpoff, 2021, Amiram et al, 2018). The number of corporate scandals has been on the increase. For example, in the US, the number of

lawsuits filings that allege corporate financial misconduct has increased overtime to 428 new class action securities case in 2019 which almost doubled the 1997-2018 average in 2019. This number excludes corporate misconducts or unobserved misconducts that occur but did not attract public attention or lawsuit or escape regulatory enforcement actions (Karpoff 2021).

Theoretical and empirical literature have suggested that good performance are strong disincentive for firms to engage in illegal, illegitimate and unethical activities that can cause corporate scandals, because of the negative consequences of scandals which include loss of financial and nonfinancial resources, losses from regulators fines and private lawsuits, social stigma, disutility, loss of self esteem, increase in cognitive dissonance for violating ethical principles, loss of reputation capital, reputational damage to the firm and the management team (Davidson & Worrell, 1988, Karpoff et al, 2009, Karpoff 2021, Weisenfeld et al, 2008, Mishina et al, 2010). Firms reputational losses manifest in form of higher costs of capital, lower operating profit, fall in global rating, lawsuits and associated costs and possibility of winding down operations and threat to 'going concern'.

In theory, The Trust Triangle by Dupont and Karpoff, 1990 explains that at the core of most economic transactions, there are forces that promote trust building and discipline misconducts. The trust triangle include the effectiveness of the third-party enforcement of miscoducts (laws, institutions, regulations and regulators), the related party enforcement (market forces and reputation capital) and first party enforcement (personal ethics, integrity and cultural norms). The Klein-Leffler model (1991) also underscore contractual enforcement through reputational capital and the market forces part of the Trust Triangle. Managers and firms are likely to commit fraud when the expected benefits exceed the expected costs. Total expected costs include all the cost imposed by the three components of the trust triangle including costs imposed by third parties regulators and courts, first party non-pecuniary costs of community sanction and disutility from violating ethical codes. Increase in societal income facilitated by economic growth will also lead to increase in high quality goods and high-quality assurance and increase in resources devoted to securities regulation and enforcements and greater commitments to and increase in consumption of ethical behaviour and lower the likelihood of financial misconducts (Karpoff 2021). Financial technology also reduce the incidence of fraud in the financial market over the long run because of the attendant decrease in information, search and transaction costs reduce the potential gains from corporate misconducts. While blockchain technology reduce the incidence of financial misconducts because of the reduction in the opportunities and profitability of corporate miscoducts, on the other hand, crowfunding is an enabler of misconducts and fraud because it provides incentives for frausters to hide identities and funding histories.

Corporate scandals have the likelihood of being worsened by global pandemics including COVID-19 and the associated lockdowns, economic shutdowns, informational and behavioural frictions, increase in corporate mistrust and economic inequality. Theoretical and empirical evidence have shown that financially troubled firms and more likely to commit fraud because economic shutdown impose high cost and threatens going concern thereby creating a condition in which the short-term benefits of corporate misconducts exceed the long term benefits of not engaging in misconduct. COVID 19 pandemic and the attendant

economic lockdown also created a large shift in aggregate demand with friction and high cost of adjustments of supply chains and production processes and create new information asymmetries, which increase the likelihood of corporate misconduct because the short term benefits of fraud becomes attractive. In addition, as a result of pandemic, many organizational capital are destroyed, institutional knowledge and firm specific knowhow are lost when employees are laid off or leave the organisation, and firms investment in reputational capital is reduced. Many firms have less to loose from cheating on their implicit and explicit contracts with reduced reputation and organizational capital (Karpoff 2021).

Theoretically, high perfoming firms have a higher incentive to shun illegality because the negative consequences of scandals magnified through the media lenses is expected to have greater impacts on their operations (Mishina et al, 2010). Notwithstanding, corporate scandals involving high profile firms has been on the increase with the list including Arthur Andersen, Enron, World Com, Tyco, Uber and Facebook.

However, theories from social psychology and behavioural economics have provided explanation on why individual decision making process often violate rationality assumptions of traditional economics, and this has been applied to understanding the causes of corporate scandals. Prospect theory is based on the view that decision maker evaluate a choice by analysing whether it representa potential or sure gain, or a potential or sure loss and their beahvior will be risk averse to protect sure gain and risk taking to avoid sure losses (Teversky & Kahnenman, 1991). Mishina et al, 2010 analysed the causes of corporate scandals among high performing firms and found that performance above internal aspiration and external expectations increase the likelihood of corporate misconducts, while performance below social aspirations is a disincentive to corporate misconducts for prominent firms. Theoretical framework for explaining why high performing firms engage in corporate misconducts include loss aversion view (Teversky & Kahnenman, 1991), the house money effect (Thaler & Johnson, 1990) and or managerial hubris (Roll, 1986) and these effects are intensified by prominence of firm (Mishina et al, 2010).
Amiram et al, 2018 reviewed corporate financial misconducts from the legal, accounting and finance perspectives and discussed discretaionary accruals and proxies for earnngs managemnets as establied predictors of misconduct behaviour. Internal monitoring and governance and effective public enforcement through agencies such as SEC and effective private enforcement such as class-action lawsuits reduce financial misconducts.
However, studies on Environmental, social and governance (ESG) controversy otherwise ESG based scandals is very scanty (Aouadi and Marsat, 2016, Dorfleitner et al, 2020, Giese et al, 2020, Spears 2021). The occurrence of ESG scandals attracts media attention and public opinions and is immediately reflected in stock prices, the absence of these scandals are often overlooked and firms with little or no scandal 'fly under the radar' (Dorfleitner et al, 2020). Aouadi and Marsat, 2016 investigated the relationship between ESG controversies and firm valuation and found that ESG controversies are associated with higher firm valuation, but when interacted with corporate social performance (CSP) score, ESG have no direct effect on firm value. After sample split, higher CSP scores has an impact on market value of high-attention firms which are large firms that are better performer, located in countries with greater press freedom, followed more by analysts, more searched on internet and improved corporate social reputations. Dorfleitner et al, 2020 analyse the relationship between Corporate social performance (CSP) and Corporate financial performance (CFP)

using the ESG controversies scores to examine the mid-to-long term effects of scandals on CFP and conclude that a value-weighted strategy does not show any significant abnormal returns, however rank weighting portfolios is a useful tool for investors profiting from ESG ratings through investment in high-ranked firms or low-ranked firms. Their study conclude that high controversies score do not necessarily have a high ESG score. Spears 2021 examined the impact of controversies and negative public opinion on valuation and found that when firms have controversies that attract negative media publicity, the public revenue statements and valuation decline over the same period as a negative news cycle. The scanty studies on ESG controversies are inconclusive.

Park, 2018 analysed ESG controversies within the context of internationalization and corporate sustainability and found that internationalization increases ESG controversies (which is a measure of sustainability concerns) as well as sustainability strengths measured by ESG scores in the global market. This finding is based on theoretical approaches of Corporate Sustainbility as a managerial manoeuver for overcoming the liability of origin (Marano, Tashman, & Kostova, 2017) and the attention-based view of firms (Ocasio, 1997). Multinational or International firms operate in multiple countries and are often confronted with the challenges of organizational legitimacy, they are expected to establish and maintain legitimacy in the eyes of global stakeholders including global media, as well as foreign audiences in host environments different to the domestic stakeholders in their home countries (Park, 2017). As the number of host countries or institutional distance between home and host countries increases, Multinational firms have a more difficult time maintaining organizational legitimacy (Park 2018). From the tension between internal and external legitimacies of Multinational firms' subsidiaries, the divergence or misalignment between the objectives of Headquarters and its foreign subunits can arise with undesired agent behaviours of subsidiary managers (Dalton, et al, 2007; Wijen, 2014). On the other hand, multinational firms because of reliance on foreign sales are motivated to adopt corporate sustainability as a global business norm.

Vasilescu and Wisniewski 2019 examine the impact of controversies on corporate reputation and found that an escalation in negative media coverage related to alleged or documented corporate misconduct (measured by ESG controversies) resulted in reputation damage which was difficult to rebuild.

This study is the first to examine the relationship between ESG controversies and ESG rating and the valuation effect. The study provides answer to the question on how do ESG scores predict future ESG controversies and what are the associated firm performance and valuation effects? The study is the first to examine whether ESG ratings predicts controversies and scandals and their associated valuation using a larger sample. We consider 14406 ESG controversies relating to 4238 firms from 45 countries and 31 industrial sectors during 2002 to 2021.

Our a priori expectation is that corporate social performance (CSP) measured by ESG scores will predict future controversies scores and public scandals. Theoretically, a firm that is doing well in CSP measured by ESG scores will have a low likelihood of having an extreme event of an ESG-based scandal. If ESG scores for a firm is high indicating good corporate social performance, then Thomson Reuter's ESG controversies score for the same firm is expected to have a high value, meaning that the higher the score value, the fewer the

scandals came to light. A ESG controversy score of 100 percent signifies that there was no ESG scandal in the firm year.
Hypothesis 1 ESG scores are positive and directly linked to ESG controversies.
Hypothesis 2 ESG scores are positive and directly linked to ESG controversies irrespective of firm size and growth value.

3. Data and Methodology

Data

Our data source is the Thomson Reuters Eikon Datastream ESG scores database which has provided reliable information on Corporate social reporting performance since 2002. We choose the Thomson Reuters Eikon Datastream because of their transparent scoring methodology and because they have the largest ESG rating database in the world.

Dependent variable

The Thomson Reuters ESG controversies score which provide a comprehensive evaluation of the firm's sustainability impact and conduct and capture negative media stories from global media sources. ESG Controversy are news that negatively impact a company with respect to Environmental, Social and Governance standards. The ESG Controversy Scores from Thomson Reuters data source is calculated from ESG Controversy News collected daily and categorized into any of the 57 controversies topics, but only 23 of controversies topics which are grouped into seven broader categories (human rights, management, product responsibility, resource use, shareholders, workforce and community) are finally used to calculate the Thomas Reuter's ESG Controversies Score.
The individual ESG controversy score for each category gauges the number of negative events or concerns captured by all media news. The aggregated controversy percentile rank across Environmental, Social and Governance pillars with an ESG controversies overlay from negative events reflected in global media, using all 23 controversy topics. The aggregated ESG controversies score is expressed as a percentage rank (out of 100%). The ESG performance score is discounted based on negative media stories to arrive at the ESG controversies score. Thomson Reuters reports their ESG controversies score on an inverted scale, meaning that the higher the score value, the fewer ESG scandals came to light, and vice versa. ESG Controversies Score ranges from 0 to 100, and a high ESG Controversies Score indicates lower Firms ESG controversies. Firms with higher controversies have lower ESG Controversies Score. Thus, a high ESG Controversies Score is good for firms, while a low one is bad for firms. Ongoing legislation disputes, lawsuits or fine may still have effect in the following two years and may still reflect in the controversy scores.

Independent variables

Independent variables include The Thomson Reuters Environmental, social and corporate governance (ESG) Scores; which are overall ESG scores, Environmental pillar score (E), Governance pillar score (G) and Social pillar score (S).
The Thomson Reuters ESG Score measures a company's Environmental, Social and Governance ESG from 178 firm level ESG measures collected from company's public reported data and based on the three (3) Environmental, Social and Governance pillars

across ten (10) categories. Each pillar has categories scores which are aggregated to arrive at the pillars score. The environment pillar (E) has resource use, emissions and innovation categories, The Governance pillar (G) has management, shareholders and CSR strategy categories and the Social pillar (S) have workforce, human right, community and product responsibility categories. Each of these categories receives a score that was calculated individually and related category weighing within its associated pillar. These result in one score for each of the three ESG pillars. The overall ESG scores are obtained by aggregating pillars scores and ESG scores is ranked by percentile and benchmarked against the industry. ESG scores take continuous numerical values in the range 0–100. The final ESG score is calculated from the 10 categories. ESG score ranges from 0 (most negative) to 100 (most positive and is calculated yearly for each firm. A high ESG Score reflects good sustainability rating.

Control variables

The study control for factors that affect ESG including firm size and growth, industry, year and country of origin effect.

All variables are defined in Table 1.

Sample

Our dataset is an unbalanced panel of International data set from Thomson Reuters Eikon database for 7500 firms from 2002 to 2021 for Environmental, social and corporate governance (ESG) rating and ESG Controversies Scores (Table 2). The initial sample was a total of 135176 firm year study. In order to determine our data universe, we consider the companies for which the ESG controversies and ESG scores are available. As a result, we obtain annual dataset with 31352 ESG scores and ESG controversies relating to 7500 international firms in Europe and the United States over the period 2002 to 2021 across 31 industries and 45 countries. We excluded countries with less than 10 firms from the analysis and firms with missing observations and zero values for any of the three Environmental, Social and Governance pillar scores and firms with missing or insufficient financial information to estimate size and growth (Total assets, Market capitalization and market-to-book value). As a result, the size of our sample dropped substantially by about half from 7500 firms to 4238 firms with 14406 ESG scores and ESG controversies.

The general form for the regression is:

$$ESGC_{it} = a + b(ESG_{it}) + c(F_{it}) + d(Ind_{it}) + e(Y_{it}) + f(countryoi_{it}) + \varepsilon_{it} \quad (1)$$

where: Dependent variable is Environmental, Social and corporate governance Controversies ($ESGC_{it}$) Scores.

Independent variables include Environmental, social and corporate governance (ESG_{it}) Scores; which are overall ESG scores (ESG_{it}), Environmental pillar score (E_{it}), Governance pillar score (G_{it}) and Social pillar score (S_{it}). The ESG Scores from Thomson Reuters data

source measures a company's performance in Environmental, social and governance variables based on annual reported data by companies. The 3 ESG pillars have 10 categories namely; Environmental (resource use, emissions, innovation), governance (management, shareholders, CSR strategy) and social (workforce, human rights, community, product responsibility). The final ESG score is calculated from the 10 categories. ESG score ranges from 0 (most negative) to 100 (most positive and is calculated yearly for each firm.
Firm specific control group (F_{it}) are Standard variables used to control for firm specific characteristics including Firm Size measured as the logarithm of Total assets (ln(Size). Market capitalisation (ln(MarketCap)) which served as a proxy for size and demand for the companies product is the value of a company that is traded on the stock market, calculated by multiplying the total number of shares by the present share price. Market to book value (MBV) is a measure of growth, defined as the market value of common equity divided by the book value.
Industry control (Ind_{it}) capture industry fixed effects, Year controls (Y_{it}) are the dummy variables that capture year fixed effects, Area or country of incorporation control ($countryoi_{it}$) capture countries fixed effects and εit is the idiosyncratic error term. The independent variables are lagged values at t-2. We winsorized the values of each variable at 1 percent to adjust for outliers without losing any observation by carefully analyzing the extreme values to avoid their influence on our key results.

The data is analysed using ordinary least square method and Ordered logit models (ologit). The selection of ologit is motivated by the categorical nature of the independent variable.

Descriptive Statistics
The final sample is made up of firms from 31 industrial sectors and 4238 firms from 45 countries with 43 countries across Europe, The United kingdom (UK) and the United states of America. The dependent variable ESGControversiesScore (ESGC) is a dummy variable D(ESGC) is defined as D(ESGC) = 1 if ESGControversiesScore<100 and D(ESGC) = 0 if ESGControversiesScore=100. ESG scores, Environmental Pillars Score, Social Pillars Score and Governance Pillars Scores are at 2 years lag. Market capitalisation ln(MarketCap)) is natural logarithm of Market capitalization.

Table 3 presents the descriptive statistics of all the variables. The mean of ESGScore is 45 with a standard deviation of approximately 21. The mean of Environmental pillar score is about 42 which is lower than the mean value of Governance Pillar Score (53) and Social Pillar Score (approximately 53).

Table 3 Descriptive Statistics for 14406 firm years observations from 2002-2021

	mean	SD	Min	Max
Number of Companies	2187	1200.58	1	4238
Year	2015	4.08	2004	2021
Number of Industries	16	8.15	1	31
Number of Countries	33	15.01	1	45

D(ESGC)	0.23	0.42	0	1
ESGScore(t-2)	45	20.87	0.47	95
E (t-2)	42	29.82	0	99
S (t-2)	53	22.91	0.43	99
G (t-2)	53	22.16	0.45	99
Ln(MarketCap)	21	2.21	12	29
MarketCap(US$millions)	23,900	29,700	0.014	10800000
TotalAssets (US$millions)	22,300	142,000	0.013	4110000
MBV	208	3123.31	0.00002	85350

Table 4 presents the correlation coefficients of the variables. The correlation between ESG controversies score and ESG score is negative (-0.2826). This implies that a firm with high ESG score is likely to have a low controversies score. Firms that have high ESG scores are greatly impacted by controversies because the damage from a fall from a great height is greater than falling from a lower height. The correlation between the three (3) pillar scores; environmental pillar score, social pillar score and governance pillar scores, are positive.

Table 4 Correlation Coefficients

	ESGC	ESGScore	ESGControversy	E	S	G	ln(MarketCap)
ESGC	1						
ESGScore	0,29	1,00					
ESGControversy	-0,83	-0,27	1,00				
E	0,26	0,83	-0,24	1,00			
S	0,26	0,89	-0,24	0,70	1,00		
G	0,18	0,67	-0,17	0,34	0,38	1,00	
ln(MarketCap)	0,02	0,07	-0,02	0,05	0,05	0,05	1,00

4. Results and Discussions

The first question we investigate is whether ESG scores predict future ESG controversies and the associated firm performance and valuation effects. We control for other firms attributes such as size, performance and industry and country of origin and year effects in our baseline model. To check the sensitivity of the primary results, we further unbundle ESG ratings into the three separate Environmental pillar, social pillar and governance pillar ratings and explore the impact of each of the three Environmental, social and governance ratings in predicting future controversies and public media attention. We also unpack the data to re-estimate our baseline model across industries and countries of origin (country). For robustness checks, we split the dataset across time and growth value. Data was analysed using logit regression. Table 5 presents the regression results with the dummy of ESG controversies scores D(ESGC) as the dependent variable and the ESG scores and the three Pillar Scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores and size measured by Market capitalization (ln(MarketCap) as independent variables. The data was analysed using logit regression since the dependent variable is a categorical

variable. The ESG scores and the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores are lagged by two years and Market capitalization (ln(MarketCap) is at level.

In table 5 panel A, the coefficients of ESG Scores and the E,S & G pillars scores are all positive and statistically significant. The coefficients of size measured by log of Market capitalisation at level is also positive and statistically significant.

Table 5 Regression Results of ESG Controversies, ESG Scores, E, S and G & Market Capitalisation for International Firms from 43 countries across Europe, The United kingdom (UK) and the United states of America.
Dependent variable is dummy of ESG Controversies score D(ESGC)

	(1) ESGC	(2) ESGC	(3) ESGC	(4) ESGC	(5) ESGC
ESGScore(t-2)	0.039***				
	(35.04)				
ln(MarketCap)	0.045***	0.046***	0.051***	0.052***	0.045***
	(4.48)	(4.66)	(5.17)	(5.42)	(4.55)
E (t-2)		0.024***			0.011***
		(31.76)			(9.64)
S (t-2)			0.033***		0.019***
			(32.67)		(12.90)
G (t-2)				0.022***	0.010***
				(23.18)	(8.91)
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Constant	-3.073***	-2.355***	-2.982***	-2.972***	-3.078***
	(-6.89)	(-5.35)	(-6.73)	(-6.80)	(-6.88)
Observations	14295	14295	14295	14295	14295
Adjusted R^2					

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 presents the logit regression results for only firms with their country of incorporation as United States of America (USA). The dependent variable is the dummy of ESG controversies scores D(ESGC) and the independent variables are ESG scores and the three Pillar Scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores and size measured by Market capitalization.

The coefficients of ESG Scores, Environmental Pillar Scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for all USA firms. The coefficients of Market capitalization are also positive statistically significant in all the models.

Table 6 Regression Results of ESG Controversies, ESG Scores, E, S and G & Market Capitalization for USA
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) ESGC	(2) ESGC	(3) ESGC	(4) ESGC	(5) ESGC
ESGScore(t-2)	0.042***				
	(20.92)				
ln(MarketCap)	0.083***	0.081***	0.082***	0.086***	0.081***
	(4.53)	(4.48)	(4.55)	(4.90)	(4.43)
E (t-2)		0.026***			0.013***
		(19.54)			(6.48)
S (t-2)			0.034***		0.017***
			(19.36)		(6.56)
G (t-2)				0.025***	0.011***
				(14.26)	(5.45)
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Constant	-3.068***	-2.377***	-2.811***	-2.943***	-2.987***
	(-5.17)	(-4.08)	(-4.80)	(-5.10)	(-5.02)
Observations	4666	4666	4666	4666	4666
Adjusted R^2					

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 presents the logit regression results for only firms with their country of incorporation in Europe. The dependent variable is the dummy of ESG controversies scores D(ESGC) and the independent variables are ESG scores and the three Pillar Scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores and size measured by Market capitalization.

The coefficients of ESG Scores, Environmental Pillar Scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for all the European firms. The coefficients of Market capitalization is positive for all firms but only statistically

significant in models 3 and 4, the regression equations with the social and governance pillar scores.

Table 7 Regression Results of ESG Controversies, ESG Scores, E, S and G & Market Capitalization for European firms
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) ESGC	(2) ESGC	(3) ESGC	(4) ESGC	(5) ESGC
ESGScore(t-2)	0.039***				
	(28.93)				
ln(MarketCap)	0.014	0.013	0.021*	0.024**	0.015
	(1.15)	(1.14)	(1.82)	(2.07)	(1.25)
E (t-2)		0.023***			0.010***
		(25.82)			(7.28)
S (t-2)			0.032***		0.020***
			(27.21)		(11.63)
G (t-2)				0.022***	0.009***
				(18.73)	(7.16)
Industry	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Constant	-1.770**	-0.806	-1.656**	-1.050	-1.817**
	(-2.42)	(-1.13)	(-2.32)	(-1.49)	(-2.49)
Observations	9960	9960	9960	9960	9960
Adjusted R^2					

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In table 8 below, US Firms are partitioned into quartiles; four classes based on their total assets. Companies with total assets less than or equal to 215 million USD are classified as smaller. Firms with total assets greater than 215 million USD but less than or equal to 1,07 billion USD are classified as medium size. Firms with total assets greater than 1,07 billion USD but less than or equal to 5,71 billion USD are classified as large and Firms with total assets greater than 5,71 billion USD are classified as larger. The dependent variable is the ESG controversies scores and the independent variables are the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores and Size measured by Market Capitalisation. The coefficients of Environmental pillar scores and Social

pillar scores are all positive and statistically significant for small, medium and larger US firms. The parameter estimates of Governance pillar scores are positive but statistically insignificant for small and medium sized firms. The coefficients of Market capitalisation are positive and statistically significant for small and large firms, but positive and not statistically significant for medium and the largest firms.

Table 8 Regression Results of ESG Controversies and ESG Scores for USA Firms
Firms are partitioned by quartile of Total Assets (size) into 4 groups
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) Small	(2) Medium	(3) Large	(4) Larger
ln(MarketCap)	0.085**	0.058	0.132***	0.041
	(2.01)	(1.40)	(2.80)	(1.17)
E (t-2)	0.011***	0.017***	0.007	0.014***
	(2.66)	(3.99)	(1.53)	(3.20)
S (t-2)	0.025***	0.010*	0.026***	0.018***
	(4.54)	(1.86)	(4.42)	(3.08)
G (t-2)	0.007	0.005	0.019***	0.010**
	(1.63)	(1.13)	(4.33)	(2.36)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Constant	-5.573***	-0.643	-3.992**	-2.267*
	(-3.79)	(-0.41)	(-2.47)	(-1.82)
Observations	1159	1157	1080	1148
Adjusted R^2				

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In table 9 below, European Firms are partitioned into four classes based on their total assets. The dependent variable is the ESG controversies and independent variable are the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores and Size measured by Market Capitalisation. The coefficients of Environmental Pillar Scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for all firms, whether small, medium, large or larger firms. The coefficients of Market capitalisation are positive and statistically significant for small, medium and large firms, except for larger firms that have negative coefficient and statistically insignificant parameter estimate.

Table 9 Regression Results of ESG Controversies and ESG Scores of European Firms
Firms are partitioned by quartile of Total Assets (size) into 4 groups
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) Small	(2) Medium	(3) Large	(4) Larger
ln(MarketCap)	0.077***	0.031	0.077***	-0.034
	(2.65)	(1.19)	(2.97)	(-1.16)
E (t-2)	0.006*	0.010***	0.010***	0.014***
	(1.92)	(3.52)	(3.58)	(4.46)
S (t-2)	0.021***	0.017***	0.019***	0.024***
	(5.27)	(4.60)	(5.30)	(6.39)
G (t-2)	0.013***	0.010***	0.004	0.008***
	(4.41)	(3.72)	(1.45)	(2.79)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Constant	-2.798*	-2.687**	-1.280	-3.115***
	(-1.93)	(-2.06)	(-0.83)	(-2.64)
Observations	2384	2362	2288	2404
Adjusted R^2				

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5. Robustness Test

Data split across time

We split the dataset across time for robustness checks into data from 2004-2008; 2009-2013; 2014-2017 and 2018-2021 respectively and re-estimate the baseline model with logit regression model. As a first step we re-estimated the baseline model for all the firms in our combined data set of US and European firms. As a second step, we re-estimated the baseline model separately for US firms and European firms.

Table 10 presents the logit regression results of Data split across time from 2004 to 2008

first for all firms in the data set and secondly separate regression results for US and European firms. The dependent variable is the ESG controversies and independent variable are the ESG scores and the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores. Table 10 columns one (1) and two (2) present the regression results of the combined dataset of US and European firms from 2004 to 2008. In column one (1) of table 10, the coefficients of ESG scores is positive and statistically significant, while coefficient of market capitalization is positive but not significant. In column two (2) of Table 10, the coefficients of Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for the pooled data of all firms (both US and European firms) from 2004 to 2008.

Table 10 columns 3 and 4 present the regression results using the US dataset from 2004 to 2008. In Table 10 column 3, the coefficients of ESG scores is positive and statistically significant, while coefficient of market capitalization is positive but not significant. In Table 10 column 4, the coefficients of Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant, while the coefficient of Environmental Pillar Scores is negative and statistically insignificant for US firms.

Table 10 columns 5 and 6 present the regression results using the European dataset from 2004 to 2008. In Table 10 column 5, the coefficients of ESG scores is positive and statistically significant, while coefficient of market capitalization is positive but not significant. In Table 10 column 6, the coefficients of Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant, while the coefficient of Environmental Pillar Scores is negative and statistically insignificant for European firms from 2004-2008.

Table 10 Regression results of ESG Controversies and ESG Scores of International Firms (US & Europe) for 2004-2008

Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) All	(2) All	(3) US	(4) US	(5) EU	(6) EU
ESGScore(t-2)	0.037***		0.040***		0.034***	
	(7.94)		(4.81)		(5.68)	
ln(MarketCap)	0.053	0.056	0.082	0.066	0.008	0.013
	(1.47)	(1.55)	(1.27)	(1.02)	(0.16)	(0.26)
E (t-2)		0.006		-0.002		0.007
		(1.46)		(-0.28)		(1.40)
S (t-2)		0.020***		0.029***		0.019***
		(4.00)		(3.05)		(2.79)
G (t-2)		0.012***		0.014**		0.012**
		(3.07)		(1.99)		(2.26)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.340	-2.569	-2.912	-3.037	-3.119**	-3.350***
	(-1.45)	(-1.58)	(-1.43)	(-1.49)	(-2.56)	(-2.67)
Observations	979	979	289	289	661	661
Adjusted R^2						

t statistics in parentheses

Note:

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11 presents the logit regression results for data from 2009-2013. The regression results in table 11 are similar to results for ESG data from 2004-2008 presented in table 10 above. The dependent variable is the ESG controversies and independent variable are the ESG scores and the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores. The coefficients of Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for the combined dataset of all firms (both US and European firms) from 2009 to 2013. The coefficients of Environmental Pillar Scores are negative and statistically insignificant for the combined dataset of US and European firms in columns 1 and 2, as well as for the separate estimation of US firms in columns 3 and 4, and European firms in columns 5 and 6. The coefficients of Market capitalisation are positive and statistically significant for the combined dataset of all firms (US and European firms combined) in column 1 and 2 and also with the estimation made with US firms in column 3 and 4, but statistically insignificant for the separate estimation with European firms from 2009-2013 in columns 5 and 6.

Table 11 Regression Results of ESG Controversies and ESG Scores of International Firms (US & Europe) for 2009-2013

Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) All	(2) All	(3) US	(4) US	(5) EU	(6) EU
ESGScore(t-2)	0.037***		0.042***		0.036***	
	(15.55)		(9.28)		(11.93)	
ln(MarketCap)	0.054**	0.056***	0.137***	0.134***	-0.001	0.008
	(2.57)	(2.65)	(3.36)	(3.23)	(-0.02)	(0.30)
E (t-2)		-0.001		-0.003		-0.003
		(-0.55)		(-0.61)		(-0.86)
S (t-2)		0.026***		0.036***		0.026***
		(8.48)		(5.91)		(6.86)
G (t-2)		0.017***		0.015***		0.017***
		(7.02)		(3.40)		(5.59)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.911**	-4.503***	-4.578***	-5.273***	-3.531**	-4.029***
	(-2.35)	(-2.68)	(-3.18)	(-3.61)	(-2.49)	(-2.81)
Observations	2665	2665	864	864	1764	1764
Adjusted R^2						

t statistics in parentheses

Note:

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12 presents the logit regression results for data from 2014-2017. The dependent variable is the ESG controversies and independent variable are the ESG scores and the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores. The coefficients of ESG scores and all the Environmental pillar scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for the combined dataset from 2014 to 2017. The coefficients of Market capitalisation are positive and statistically significant for the combined datasets of US and European firms from 2014-

2017. The results are similar when the dataset is split into two and the baseline model was re-estimated separately for US and European firms.

Table 12 Regression Results of ESG Controversies and ESG Scores of International Firms (US & Europe) for 2014-2017
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) All	(2) All	(3) US	(4) US	(5) EU	(6) EU
ESGScore(t-2)	0.036***		0.035***		0.037***	
	(15.97)		(9.05)		(12.92)	
ln(MarketCap)	0.050**	0.049**	0.061*	0.061*	0.042*	0.041*
	(2.56)	(2.53)	(1.69)	(1.69)	(1.78)	(1.73)
E (t-2)		0.012***		0.010**		0.013***
		(5.22)		(2.38)		(4.40)
S (t-2)		0.015***		0.019***		0.014***
		(5.32)		(3.61)		(4.11)
G (t-2)		0.007***		0.004		0.008***
		(3.29)		(0.95)		(3.06)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.481	-2.284	-1.512	-1.379	-4.636***	-4.529***
	(-1.52)	(-1.40)	(-1.06)	(-0.97)	(-3.85)	(-3.76)
Observations	3800	3800	1248	1248	2542	2542
Adjusted R^2						

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 presents the logit regression results for data from 2018-2021. The regression results in table 13 are similar to results for ESG data from 2014-2017 presented in table 12 above. The dependent variable is the ESG controversies and independent variable are the ESG scores and the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores. In Table 13 columns 1 and 2, the coefficients of ESG scores and all the Environmental pillar scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for the combined dataset from 2018 to 2021. The coefficients of Market capitalisation are also positive and statistically significant for the combined dataset from 2018-2021.

Table 13 Regression Results of ESG Controversies and ESG Scores of International Firms (US & Europe) for 2018-2021
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) All	(2) All	(3) US	(4) US	(5) EU	(6) EU
ESGScore(t-2)	0.044***		0.050***		0.042***	
	(25.59)		(15.89)		(19.86)	
ln(MarketCap)	0.032**	0.033**	0.065**	0.067**	0.021	0.023
	(2.01)	(2.04)	(2.25)	(2.29)	(1.07)	(1.18)
E (t-2)		0.017***		0.026***		0.014***
		(10.09)		(8.18)		(6.67)
S (t-2)		0.016***		0.006		0.020***
		(6.97)		(1.54)		(7.11)
G (t-2)		0.007***		0.013***		0.005**
		(4.20)		(4.09)		(2.28)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-4.340***	-4.143***	-4.984***	-4.656***	-2.836**	-2.734**
	(-8.19)	(-7.75)	(-6.55)	(-6.07)	(-2.19)	(-2.10)
Observations	6732	6732	2174	2174	4548	4548
Adjusted R^2						

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 columns 3 and 4 present the regression results using the US dataset from 2018 to 2021. In Table 13 column 3, the coefficients of ESG scores and market capitalization are positive and statistically significant. In Table 13 column 4, the coefficients of Environmental Pillar Scores and Governance Pillar Scores are all positive and statistically significant, while the coefficient of Social Pillar Scores is positive but no statistically significant for US firms. Table 13 columns 5 and 6 present the regression results using the European dataset from 2018 to 2021. In Table 13 column 5, the coefficients of ESG scores is positive and statistically significant, while coefficient of market capitalization is positive but not significant. In Table 13 column 6, the coefficients of Environmental Pillar Scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant, while coefficient of market capitalization is positive but not significant for European firms from 2018 to 2021.

Data split by Growth value

We partitioned the US and European datasets into four (4) quartiles based on growth value using market-to-book-ratio (MBV). The dependent variable is the ESG controversies $D(ESGC)$ and independent variable are the ESG scores and the three pillars scores; the Environmental Pillar Scores, Social Pillar Scores and the Governance Pillar Scores.

Table 14 presents the regression results of the baseline model estimated with data from US partitioned into four groups based on market-to-book -ratio. The coefficients of ESG scores and the Environmental pillar scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for all the US firms with the exception of environmental pillar score for small firms for larger US firms from 2002 to 2021. The coefficients of Market capitalisation are positive and statistically significant for medium firms.

Table 14 Regression Results of ESG Controversies and ESG Scores of US Firms
Firms are partitioned by quartile of growth-value groups based on market-to-book -ratio
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) Small	(2) Medium	(3) Large	(4) Larger
ln(MarketCap)	-0.039	0.155**	0.048	0.045
	(-0.62)	(2.42)	(1.02)	(1.10)
E (t-2)	0.004	0.019***	0.016***	0.012***
	(0.74)	(3.87)	(4.20)	(3.13)
S (t-2)	0.022***	0.021***	0.016***	0.016***
	(3.20)	(3.30)	(3.25)	(3.12)
G (t-2)	0.013***	0.017***	0.002	0.020***
	(2.59)	(3.41)	(0.64)	(5.01)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes
Constant	1.455	-5.197***	-2.090	-0.863
	(0.72)	(-3.00)	(-1.63)	(-0.69)
Observations	960	1029	1342	1243
Adjusted R^2				

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15 presents the regression results of the baseline model estimated with data from European firms partitioned into four groups based on market-to-book -ratio. The coefficients of ESG scores and all the Environmental pillar scores, Social Pillar Scores and Governance Pillar Scores are all positive and statistically significant for all the European firms from 2002 to 2021. The coefficients of Market capitalization are positive and statistically significant for larger European firms.

Table 15 ESG Controversies and ESG Scores of European Firms
Firms are partitioned by quartile of growth-value groups based on market-to-book -ratio
Dependent variable is dummy of ESG Controversies D(ESGC)

	(1) Small	(2) Medium	(3) Large	(4) Larger
ln(MarketCap)	0.044	-0.022	0.013	0.110***
	(1.44)	(-0.62)	(0.34)	(3.56)
E (t-2)	0.010***	0.006**	0.019***	0.010***
	(3.37)	(2.27)	(5.66)	(3.45)
S (t-2)	0.020***	0.021***	0.019***	0.018***
	(5.61)	(5.85)	(4.42)	(4.57)
G (t-2)	0.008***	0.010***	0.016***	0.007**
	(2.94)	(3.50)	(5.02)	(2.25)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes

Constant	-4.117***	-3.102**	-2.111*	-5.258***
	(-3.97)	(-2.43)	(-1.71)	(-3.06)
Observations	2543	2471	2204	2286
Adjusted R^2				

t statistics in parentheses
Note:
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6. Summary and Conclusions

In this study, we examine how Environmental, social and corporate governance (ESG) rating has predicted controversies and bad social performance and precipitated negative public reactions and the mid-to-long term associated valuation effects using an extensive International dataset from Thomson Reuters Environmental, social and corporate governance (ESG) scores, the Thomson Reuters controversies score and the Environmental, social and governance pillars score for 4238 companies from 45 countries from Europe and the United States across 31 industrial sectors for 17 years from 2004 to 2021. Primary analysis shows that ESG ratings predict future controversies and negative public scandals two years ahead of the scandal. To check the sensitivity of the primary results, we further unbundle ESG ratings into the three separate Environmental pillar, social pillar and governance pillar ratings and explore the impact each of the three Environmental, social and governance ratings has in predicting future controversies and public media attention. The results show that Environmental pillar, social pillar and governance pillar ratings strongly predict future scandals two years before scandals and negative media attentions for firms in Europe and United States.

Building on this evidence, we unpack the data and conduct sample split analysis by year and growth value. Our results show Environmental pillar, social pillar and governance pillar ratings strongly predict future controversies and public scandals for firms in Europe and United States from 2014 to 2021. The findings hold for several robustness checks such as splitting the dataset across time and growth value.

Overall, the regression results reveal that ESG controversies are predicted by the ESG scores and the Environmental, Social and Governance pillars scores two years ahead of the controversies.

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Appendix

Table 1: Description of Variables

Variable	Definition	Variable description
Dependent variables		
ESGC	ESG Controversies	As provided by Thomson Reuters Eikon dataset. ESGC score ranges from 0 to 100. If there are no controversies, score is 100 and if there are controversies, ESGC scores are rated based on the size adjusted number of controversies.
D(ESGC)	ESG Controversies dummy	Equals 1 if the firm ESG controversy score is 100, 0 otherwise
Independent variables		
ESGScores	ESG Scores	As provided by Thomson Reuters Eikon dataset. ESG Scores measure a company's relative ESG performance, commitment and effectiveness across 10 main themes based on company-reported information. ESCG score ranges from 0 (most negative) to 100 (most positive).

E	Environmental Pillar Scores	As provided by Thomson Reuters Eikon dataset. This comprise of the resource use, emissions and innovation scores.
S	Social Pillar Scores	As provided by Thomson Reuters Eikon dataset. This comprise of workforce, human rights, community and product responsibility scores.
G	Governance Pillar Scores	As provided by Thomson Reuters Eikon dataset. This comprise of management, shareholders and CSR Strategy scores.
Control variables		
Size	Size proxy	log of book value of Total assets In(size)
MBV	Market-to-book value	Market capitalisation divided by book value of Total assets
Year	Year controls	Year fixed effects (2002-2020)
Industry	Industry fixed effects	Eikon Industry classification
Country	Countries of origin	Country of incorporation

Table 2: Sample Selection & Data Loss

This table shows our sample selection and data loss. The initial dataset was an unbalanced panel of International data for 7500 Top firms from Europe, UK & USA from Thomson Reuters Eikon database from 2002 to 2021 with Environmental, social and corporate governance (ESG) rating and ESG Controversies Scores. The initial sample was a total of 135176 firm year study. In order to determine our data universe, we consider companies for which both the ESG controversies and ESG scores are available. As a result, we obtain annual dataset with 31352 ESG scores and ESG controversies relating to 7500 international firms in Europe, UK and the United States over the period 2002 to 2021 across 31 industries and 45 countries. We excluded countries with less than 10 firms from the analysis and firms with missing observations and zero values for any of the three Environmental, Social and Governance pillar scores and firms with missing or insufficient financial information to estimate size and growth (Total assets, Market capitalization and market-to-book value) and also used two years lagged values. As a result, the size of our sample dropped to 4238 firms with 14406 firm year observations with both ESG scores and ESG controversies.

Number	Countries	Number of Firms	Firm-year observations available	Data loss Firm-year without ESG controversies & Scores	Firm year with ESG controversies & Scores	Firm year observation for analysis
1	Austria	54	1031	820	211	211
2	Belgium	99	1766	1420	346	346
3	Bosnia and Herze	9	161	135	26	26
4	Bulgaria	25	351	271	80	80
5	Croatia	30	567	431	136	136
6	Cyprus	29	491	353	138	138

7	Czech Republic	8	144	95	49	49
8	Denmark	92	1665	1351	314	314
9	Estonia	13	221	205	16	16
10	Faroe Islands	2	40	2	38	38
11	Finland	124	2235	1720	515	515
12	France	393	7116	5401	1715	1715
13	Germany	427	7875	6199	1676	1676
14	Gilbratar	1	20	18	2	0
15	Greece	53	988	787	201	201
16	Guernsey	89	1655	1280	375	375
17	Hungary	15	264	211	53	53
18	Iceland	23	463	335	128	128
19	Ireland	67	1118	874	244	244
20	Isle of Man	9	183	168	15	15
21	Italy	220	4020	2946	1074	1074
22	Jersey	58	1097	879	218	218
23	Latvia	4	81	78	3	0
24	Liechtenstein	3	60	27	33	33
25	Lithuania	13	255	185	70	70
26	luxembourg	70	1242	913	329	329
27	Malta	22	442	339	103	103
28	Monaco	2	21	15	6	0
29	Montenegro	3	61	56	5	0
30	Netherlands	151	2599	1895	704	704
31	North Macedonia	9	181	134	47	47
32	Norway	197	3795	2852	943	943
33	Poland	141	2538	1939	599	599
34	Portugal	22	444	348	96	96
35	Romania	30	490	382	108	108
36	Russia	139	2583	1966	617	617
37	Serbia	9	142	112	30	30
38	Slovakia	4	80	70	10	10
39	Slovenia	14	242	183	59	59
40	Spain	156	2777	2175	602	602
41	Sweden	418	7729	6012	1717	1717
42	Switzerland	226	4216	3297	919	919
43	Ukraine	9	162	102	60	60
	SUB-TOTAL Europe	**3482**	**63611**	**48981**	**14630**	**14614**
44	**United Kingdom**	**987**	**17771**	**13692**	**4079**	**4079**
45	**United States**	**3031**	**53794**	**41371**	**12423**	**12423**
	TOTAL	**7500**	**135176**	**104044**	**31132**	**31116**
	Number of firms	**4238**				**14406**

after 2 years lag