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## Subcategories of ESG controversies and firm value

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### Abstract

To clarify the literature's conflicting findings on the impact of Environmental, Social, and Governance (ESG) controversies on firm value, this paper examines subcategory impacts within ESG pillars. We take advantage of a novel dataset to build cross-industry comparable quarterly subcategory scores. Aggregating them at different levels, our analysis of U.S. firms reveals significant impacts of controversies at both overall and sub-pillar levels, that are not systematically reduced by a higher initial ESG commitment. Conflicting subcategory effects within the same pillar explain the lack of significant pillar-level impact. This highlights the need to differentiate sub-pillar component effects to avoid premature conclusions.

JEL classification: C21, D22, G14, G20, M14, Q01, Q56

Keywords: Environmental Social and Governance activities, ESG controversies, Firm value

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## **Subcategories of ESG controversies and firm value**

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### **Abstract**

To clarify the literature's conflicting findings on the impact of Environmental, Social, and Governance (ESG) controversies on firm value, this paper examines subcategory impacts within ESG pillars. We take advantage of a novel dataset to build cross-industry comparable quarterly subcategory scores. Aggregating them at different levels, our analysis of U.S. firms reveals significant impacts of controversies at both overall and sub-pillar levels, that are not systematically reduced by a higher initial ESG commitment. Conflicting subcategory effects within the same pillar explain the lack of significant pillar-level impact. This highlights the need to differentiate sub-pillar component effects to avoid premature conclusions.

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## 1. Introduction

Given the environmental challenges the world is facing, Corporate, Social and Responsible (CSR) activities of firms are increasingly attracting the attention of policymakers, customers, professionals, etc. If CSR captures a company's awareness of environmental and social initiatives, Environmental, Social, and Governance (ESG) scores provide concrete measures to support these objectives. As a result of this attention, firms are increasingly exposed to ESG controversies. ESG controversies are corporate environmental, social, and governance news stories that violate ESG principles, such as a firm that has increased its carbon dioxide emissions, or a firm that has used child labor in its warehouses or a firm that has violated shareholder rights during voting. Thus, controversies may deteriorate the firm value.

The role of ESG controversies, for both non-financial and financial firms, has attracted considerable attention from researchers. The literature seems to reach conflicting conclusions. In some studies, ESG controversies are found to negatively impact firm performance (Nirino *et al.* (2021)) and specifically firm value (Bang *et al.* (2023b); Dorfleitner *et al.* (2020); Capelle-Blancard and Petit (2019); Krüger (2015)). ESG controversies are also found to increase the firm's market value (Aouadi and Marsat (2018)). More recently a positive impact of ESG controversies on firm value has been found in the case of South Korea (Bang *et al.* (2023a)) and for European banks (Agnese *et al.* (2023)).

ESG controversies encompass a very broad array of news stories categories and subcategories. Although the literature highlights the importance of disentangling the impact of each component, to our knowledge, not much has been done in this area<sup>2</sup>. Looking into each component separately is important but up to now only a few components have received attention with also conflicting results. For example, some studies find a negative relationship between carbon emissions and firm value (Matsumura *et al.* (2014); Choi and Luo (2021); Sun *et al.* (2022)) whilst others find the opposite (Hardinyasah *et al.* (2021); Lee and Cho (2021); Lee *et al.* (2021)). Hence, what to expect from a news story about carbon emissions is unclear and this is only one of the numerous subcategories of Pillar E of ESG controversies.

Using a new and very detailed database, MarketPsych, our aim is to shed light on the opposing results found in the literature to date. Specifically, we consider not only the different subcategories of the ESG score but also the different subcategories of the ESG controversies (see Appendix I) and examine the impact of each ESG subcategory on firm value. We also investigate whether firms with better ESG scores are less vulnerable to ESG news, i.e. ESG controversies, and go deeper by exploring each type of news/controversies. We find that it is important to identify the drivers of ESG controversies to better understand their impact on firm value. While environmental innovation and resource use controversies (Pillar E) and, to some extent, workforce and product controversies (Pillar S) have a negative impact on firm value, emissions controversies (Pillar E) and, to a lesser extent, community controversies (Pillar S) have a positive effect. Our findings also reveal that a higher ESG score (or a higher pillar or subcategory score) does not systematically guarantee a lower sensitivity of firm value to controversies.

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<sup>2</sup> Bang *et al.* (2023a) have built their own database covering the Korean market and consisting of three pillars (E, S and G) which are based on 9 main categories and 19 subcategories of ESG controversies. However, they examine the effect of controversies at the pillar level, not at the subcategory level. Nicolas *et al.* (2024) analyze shareholders' response to ESG-related reputational risk using social media. They distinguish ESG and non-ESG related conversation by constructing an ESG lexicon on the three main ESG topics and divide it into 10 categories inspired by MSCI reports.

The remainder of the paper is structured as follows. Section 2 describes the sample, the data and the method we use for our empirical investigation. Section 3 presents the empirical results. Section 4 concludes.

## **2. Sample, data and methodology**

### **2.1. Sample selection and data description**

Our initial sample consists of 2,224 companies and includes all U.S. companies that received an annual ESG score in 2018 in the LSEG Eikon database. This database provides ESG data on an annual basis from a variety of sources (annual reports, NGO websites, or CSR reports). The overall ESG score is composed of three pillar scores – environmental (E), social (S), and governance (G) –, which are in turn composed of subcategories scores – emissions, environmental innovation, and resource use for the Pillar E; community, human rights, workforce, and product for Pillar S; and management and shareholders for Pillar G. A higher score indicates that the company is more committed to the specific (sub-)category of the ESG issue. However, these scores are built comparing firms within a specific industry. To obtain cross-industry comparable scores, we normalize them: we subtract the industry score from the firm score. We then divide the difference by the standard deviation of the industry score.

For each subcategory of the LSEG Eikon ESG score, there is an identical subcategory score for ESG controversies. The MarketPsych ESG database provides daily scores, derived from millions of articles published daily in thousands of global media outlets and the textual analysis used by this database proposes more accurate scores than the manual method described in the literature (Bang *et al.* (2023a)). We first set the default value to 0 and use MarketPsych internal methodology to generate quarterly scores. Second, we use these quarterly subcategory scores to recombine the E, S, and G pillars of the overall ESG controversies score. A weight is assigned to each subcategory score: its value corresponds to the number of times a controversy related to the subcategory item appears in the media. MarketPsych database provides these weights with the buzz metrics associated to each subcategory of the ESG controversies. They are presented in Appendix II. Finally, we use these three pillars of controversies scores (E, S, and G) to recombine the overall ESG controversies score. A higher controversies score indicates that the company is more exposed to corporate negative news stories relative to ESG items. Thus, from the daily and absolute subcategories scores of ESG controversies available in MarketPsych database, our methodology, presented in Appendix III, allows us to generate quarterly and cross-industry comparable scores for the different scoring levels (subcategory level of the ESG controversies, pillar level of the ESG controversies, and the overall level of ESG controversies).<sup>3</sup>

Finally, to perform our investigations, we collect quarterly data on stock prices from the LSEG Eikon database. We also control for other variables that are likely to affect firm value. These variables are computed using 2019 accounting data available on LSEG Eikon. We include Tobin's Q (TobinQ) which is (the book value of assets - the book value of equity + the market value of equity) divided by book value of assets, firm's size (Size) calculated as the natural logarithm of total assets, the cash holdings over book assets (Cash), return on equity (ROE) as the net income over book equity, the advertising

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<sup>3</sup> Most papers use LSEG Eikon database to obtain data on controversies score. These are annual scores which are benchmarked (relative performance of ESG factors to the company's sector) and adjusted for a firm's size.

expenditures over book assets (Advertising) and missing values are set to zero (Albuquerque *et al.* (2020)), the historical volatility (Historical\_vol) calculated as the volatility of the logarithm of the stock's gross quarterly return during 2019, and the (Dividend per share / stock price), multiplied by 100 (Dividend). Following past literature, control variables are winsorized at the 1st and 99th percentiles. We expect that firms with high Tobin's Q, high size, high cash, lower historical volatility and lower dividends all perform better (Albuquerque *et al.* (2020)). Larger firms attract media attention and analyst coverage, which reduces information asymmetry and improves the firm value (El Ghoul *et al.* (2011)). We expect that ROE has no effect on firm value (Albuquerque *et al.* (2020); Simanullang and Edward (2021)). Advertising is expected to be negatively associated to firm value (Kim and Morris (2003)). As controversies scores and accounting data are not available for all firms, our final sample includes 1,205 U.S. companies. As during the period considered the U.S. financial market was less impacted than European financial markets by regulations that mitigate greenhouse gas emissions (e.g., the U.S. withdrawal from the Paris Agreement on 4<sup>th</sup> November 2019), we expect this sample to be more exposed to ESG controversies than a European one. For example, Christiana Figueres, the U.N. climate chief in 2015, stated that Trump's decision reduced the incentives for some U.S.-based businesses to transition to clean energy. Descriptive statistics are presented in Table 1 and correlation matrices in Tables 2.A, 2.B, 2.C and 2.D.

**[Insert Table 1, Table 2.A, Table 2.B, Table 2.C and Table 2.D here]**

## 2.2. Research design and methodology

To investigate whether unexpected and specific subcategories of ESG controversies affect the value of the firm, we employ an event study methodology and follow the methodology present in the literature (Albuquerque *et al.* (2020)) (see Appendix IV).

We use OLS regression models to examine the impact of ESG controversies, their pillars and subcategories on firm value. We also test whether the firm's performance in terms of the overall, pillar and sub-pillar ESG scores makes the firm more resilient to the relevant controversy it faces.

$$Abnormal\_Return_{i,Q1\_2020} = \alpha_0 + \alpha_1 * ESG\_controv_{i,Q1\_2020} + \alpha_2 * ESG_{i,2018} + \alpha_3 * (ESG\_controv_{i,Q1\_2020} * ESG_{i,2018}) + \alpha_4 Firm\ controls_{i,2019} + \varepsilon_i \quad (1)$$

$$Abnormal\_Return_{i,Q1\_2020} = \alpha_0 + \alpha_1 * E\_controv_{i,Q1\_2020} + \alpha_2 * S\_controv_{i,Q1\_2020} + \alpha_3 * G\_controv_{i,Q1\_2020} + \alpha_4 * E_{i,2018} + \alpha_5 * S_{i,2018} + \alpha_6 * G_{i,2018} + \alpha_7 * (E\_controv_{i,Q1\_2020} * E_{i,2018}) + \alpha_8 * (S\_controv_{i,Q1\_2020} * S_{i,2018}) + \alpha_9 * (G\_controv_{i,Q1\_2020} * G_{i,2018}) + \alpha_{10} * Firm\ controls_{i,2019} + \varepsilon_i \quad (2)$$

$$Abnormal\_Return_{i,Q1\_2020} = \alpha_0 + \sum_j [\alpha_j * Sub-Pillars\ controv_{i,Q1\_2020}] + \sum_k [\alpha_k * Sub-Pillars\ ESG_{i,2018}] + \sum_m [\alpha_m * (Sub-Pillars\ controv_{i,Q1\_2020} * Sub-Pillars\ ESG_{i,2018})] + \alpha_{28} * Firm\ controls_{i,2019} + \varepsilon_i \quad (3)$$

with  $j \in 1, \dots, 9$ ,  $k = j+9$ , and  $m = j+18$

## 3. Results

The regression results are presented in Table 3.

First, taken together (panel A), ESG controversies have a negative and significant impact on abnormal returns. ESG controversies seem to affect the legitimacy of firms (Palazzo and Scherer (2006)), which is detrimental to their value. However, none of each pillar of ESG controversies significantly affects firms' abnormal return (panel B). Thus, the negative impact of the overall ESG controversies score cannot be understood by separately looking at the impact of the three pillars of ESG controversies. Given that each pillar score is composed of subcategories, market reactions may differ according to them. Our results (panel C) show that considering the subcategories of ESG controversies is important when analyzing the impact of ESG controversies on firm value. In particular, within pillar E, we observe that all environmental subcategories controversies have a significant impact but they have opposing effects on firm value. The latter may explain the lack of significance of Pillar E ESG controversies. On the one hand, we find that emissions controversies have a positive and significant impact on firm's abnormal returns, thus carbon emission controversies increase firm value. On the other hand, environmental innovation controversies and resource use controversies have negative and significant impacts on abnormal returns. As for Pillar S, only workforce controversies negatively and significantly impact firm value, and none of the subcategories of Pillar G affect firm value.

**[Insert Table 3 here]**

To complete our study, we analyze whether the firm's performance in terms of its ESG score (at the overall, pillar and sub-pillar level) makes the firm more resilient to the associated controversy it faces. Thus, we interact ESG\_controv with ESG\_2018 and also consider interactions at the pillar and subcategory levels and compute the average marginal effects of controversies for different values of the ESG score. When ESG controversies are taken together, the coefficients of the marginal effects for p25 and p50 are significantly negative. The value of the coefficient gradually increases and is no longer significantly different from 0 at p75 (table 4, panel A), suggesting that firms are more preserved from the negative impact of ESG controversies when their ESG score is higher. When we consider the analysis at the pillar level, only the coefficient of marginal effects associated to social controversies is negatively significant for p25 and only at the 10% level (table 4, panel B). Analyzing the resilience of firms to ESG controversies at the pillar level does not really provide information on how market participants react. Going deeper, we observe that the coefficients of the marginal effects of the three subcategories of Pillar E are significant for p25 and p50 values (table 4, panel C), but they do not have the same signs. They are positive for controversies regarding carbon emissions and negative for the rest. We again observe that the market's reaction is less pronounced when the firm has a higher ex-ante score. Such results are in line with Sabahi and Parast (2020) who find that firms with a more innovative environment are more resilient to disruptions. Regarding carbon emission, our results are in line with those of Lee *et al.* (2021) and Lee and Cho (2021). They find that for South Korean firms, the 'unfavorable' act of carbon emission indicates, among others, a smaller firm's investment in carbon reduction. These results are opposite to those found for European firms (Perdichizzi *et al.* (2024)). For firms that were committed to carbon reduction, the disclosure of carbon emissions reveals a form of greenwashing that creates a reputational risk (ESMA Report (2023)). Meeting emission objectives hence generates operating costs that are negatively perceived by the market hence decreasing firm value. In our study of U.S. firms, emissions controversies are found to increase the value of the firm. However, the higher is its ex-ante

emissions score which assesses the firm's good behavior in reducing carbon emissions, the smaller the increase. Such opposing results for European firms and U.S. as well as Korean firms suggest that environmental conscienceless needs to be taken into account. Indeed, firm value market perception and media understanding is relatively slow in terms of carbon emissions and may not carry the same meaning on different markets specifically regarding brand image (Lee and Cho (2021)). Regarding the subcategories of Pillars S and G, we find mostly no significance, except a negative impact for workforce controversies. Interestingly, the decline in value for firms exposed to workforce controversies is more pronounced for those which have a higher ex-ante workforce score. This is consistent with the conjecture that firms that commit to providing better conditions for their employees are punished more strongly by the market in case of bad news about the workforce (Kang and Selvam (2019)).

**[Insert Table 4 here]**

#### **4. Conclusion**

The literature finds opposing results concerning the impact of ESG controversies on firm value. Most studies are based on annual scores not cross industry comparable. In this paper, to better understand these conflicting findings, we consider daily and absolute scores for each subcategory of controversies. At the pillar level of ESG controversies, we find that E, S, or G controversies scores have no significant impact on firm value, whereas we find a negative and significant impact of the overall ESG controversies score. Furthermore, the opposing effects of subcategories scores within the same pillar explain the lack of significant impact of the controversies scores at the pillar-level. While within pillar E, emission controversies increase the value of the exposed firms, environmental innovation and to a lesser extent resource use controversies reduce it. Similarly, within pillar S, community controversies positively impact firm value whereas workforce as well as product controversies negatively affect it. Our results reveal that more or less media understanding of environmental issues plays a determinant role in explaining firm value reaction.

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**Table 1. Descriptive statistics**

Summary statistics are computed at the aggregate level by considering all tested firms. N is the number of observations. Mean is the average. Sd is the standard deviation. Min is the minimum while max is the maximum. P50 is the median value. Abnormal\_Return is the measure of the quarterly abnormal return of the firm on Q1- 2020. ESG\_controv, E\_controv, S\_controv, and G\_controv are respectively a quarterly measure of the overall ESG controversies, Environmental controversies, Social controversies and Governance controversies scores on Q1-2020. E\_emissions\_controv, E\_envir\_innov\_controv, E\_resource\_use\_controv, S\_community\_controv, S\_human\_rights\_controv, S\_workforce\_controv, S\_product\_controv, G\_management\_controv, and G\_shareholder\_controv are quarterly measures of subcategories scores of ESG controversies on Q1-2020. They are presented in detail in Appendix I. ESG\_2018, E\_2018, S\_2018 and G\_2018 are respectively an annual measure of the overall ESG performance, Environmental performance, Social performance, and Governance performance in 2018. E\_emissions\_2018, E\_envir\_innov\_2018, E\_resource\_use\_2018, S\_community\_2018, S\_human\_rights\_2018, S\_workforce\_2018, S\_product\_2018, G\_management\_2018, and G\_shareholder\_2018 are annual measures of subcategories of ESG performance in 2018. Controls are measured in U.S. dollar in 2019. Following past literature, they are winsorized at the 1st and 99th percentiles. TobinQ is the company Tobin's Q, Size is the firm's size, Cash is the cash holdings over book assets, ROE is the return on equity, Advertising is the advertising expenditures over book assets, Historical\_vol is the historical volatility of the stock, Dividend is the Dividend per share over stock price, multiplied by 100.

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	(6) median
Abnormal_Return	1,205	-5.47	40.95	-205.88	156.53	-3.14
ESG_controv	1,205	0.23	0.16	-0.00	0.85	0.20
E_controv	1,205	0.11	0.20	-0.33	1.00	0.01
E_emissions_controv	1,205	0.11	0.24	-0.33	1.00	0.00
E_envir_innov_controv	1,205	0.09	0.20	-0.33	1.00	0.00
E_resource_use_controv	1,205	0.03	0.13	-0.33	1.00	0.00
S_controv	1,205	0.22	0.18	-0.02	0.86	0.18
S_community_controv	1,205	0.25	0.20	-0.04	0.90	0.20
S_human_rights_controv	1,205	0.04	0.16	-1.00	1.00	0.00
S_workforce_controv	1,205	0.15	0.23	-1.00	1.00	0.03
S_product_controv	1,205	0.08	0.16	-0.25	1.00	0.02
G_controv	1,205	0.41	0.26	-0.36	1.00	0.39
G_management_controv	1,205	0.05	0.10	-0.50	0.77	0.00
G_shareholder_controv	1,205	0.78	0.30	-1.00	1.00	0.90
ESG_2018	1,205	0.35	1.03	-1.76	3.49	0.25
E_2018	1,205	0.33	1.10	-1.45	4.51	0.05
E_emissions_2018	1,205	0.32	1.11	-1.77	3.64	-0.05
E_envir_innov_2018	1,205	0.19	1.13	-1.41	4.93	-0.32
E_resource_use_2018	1,205	0.33	1.10	-1.28	3.75	-0.01
S_2018	1,205	0.35	1.01	-1.97	3.53	0.27
S_community_2018	1,205	0.31	0.92	-2.52	2.22	0.31
S_human_right_2018	1,205	0.27	1.12	-1.03	4.75	-0.32
S_workforce_2018	1,205	0.33	1.02	-1.56	3.10	0.27
S_product_2018	1,205	0.21	1.01	-2.31	2.68	-0.05
G_2018	1,205	0.21	0.99	-2.34	2.55	0.34
G_management_2018	1,205	0.18	0.97	-2.07	2.06	0.31
G_shareholder_2018	1,205	0.03	0.99	-2.19	1.88	0.08
TobinQ	1,205	2.28	1.68	0.75	9.09	1.62
Size	1,205	22.44	1.57	17.58	26.55	22.36
Cash	1,205	0.13	0.17	0.00	0.90	0.06
ROE	1,205	0.13	0.40	-1.96	1.49	0.14
advertising	1,205	0.01	0.03	0.00	0.16	0.00
Historical_vol	1,205	2.03	1.02	0.85	8.32	1.76
Dividend	1,205	1.88	2.38	0.00	12.01	1.21

Table 2. Correlation matrices

In Table 2.A, we present a matrix of correlations which contains the overall ESG scores and the ESG pillar scores. We then consider each pillar and the associated subcategories scores in Table 2.B., Table 2.C., and Table 2.D.

Table 2.A: Matrix of correlations with the overall ESG scores

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Abnormal_Return	1.00									
(2) ESG_controv	-0.06	1.00								
(3) E_controv	-0.06	0.36	1.00							
(4) S_controv	-0.04	0.92	0.25	1.00						
(5) G_controv	-0.04	0.39	0.06	0.19	1.00					
(6) ESG_2018	0.07	0.04	-0.01	0.10	-0.03	1.00				
(7) E_2018	0.06	0.02	-0.02	0.09	-0.05	0.87	1.00			
(8) S_2018	0.07	0.05	-0.00	0.11	-0.04	0.87	0.76	1.00		
(9) G_2018	-0.00	0.02	0.01	0.04	0.00	0.67	0.38	0.34	1.00	
(10) ICB_code	0.20	-0.12	-0.12	-0.10	-0.01	0.00	-0.00	-0.00	0.02	1.00

Table 2.B: Matrix of correlations with E-pillar scores

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Abnormal_Return	1.00									
(2) E_controv	-0.06	1.00								
(3) E_emissions_controv	0.06	0.47	1.00							
(4) E_envir_innov_controv	-0.09	0.85	0.17	1.00						
(5) E_resource_use_controv	-0.05	0.26	0.14	0.11	1.00					
(6) E_2018	0.06	-0.02	0.03	0.02	0.02	1.00				
(7) E_emissions_2018	0.05	0.01	0.05	0.04	0.05	0.91	1.00			
(8) E_envir_innov_2018	0.06	-0.06	0.01	-0.04	-0.01	0.71	0.48	1.00		
(9) E_resource_use_2018	0.06	0.01	0.04	0.05	0.03	0.92	0.85	0.52	1.00	
(10) ICB_code	0.20	-0.12	0.02	-0.15	-0.05	-0.00	-0.00	0.03	-0.01	1.00

Table 2.C: Matrix of correlations with S-pillar scores

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Abnormal_Return	1.00											
(2) S_controv	-0.04	1.00										
(3) S_community_controv	0.00	0.97	1.00									
(4) S_human_rights_controv	-0.00	0.21	0.20	1.00								
(5) S_workforce_controv	-0.09	0.31	0.22	0.07	1.00							
(6) S_product_controv	-0.04	0.31	0.23	0.02	0.08	1.00						
(7) S_2018	0.07	0.11	0.14	0.10	0.11	0.02	1.00					
(8) S_community_2018	0.05	0.10	0.12	0.06	0.10	0.05	0.78	1.00				
(9) S_human_right_2018	0.03	0.11	0.13	0.13	0.06	0.01	0.76	0.49	1.00			
(10) S_workforce_2018	0.07	0.11	0.13	0.08	0.12	0.04	0.85	0.67	0.57	1.00		
(11) S_product_2018	0.09	0.03	0.05	0.03	0.07	0.01	0.66	0.37	0.36	0.43	1.00	
(12) ICB_code	0.20	-0.10	-0.07	-0.06	-0.13	-0.06	-0.00	0.01	-0.01	0.00	-0.01	1.00

Table 2.D: Matrix of correlations with G-pillar scores

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Abnormal_Return	1.00							
(2) G_controv	-0.04	1.00						
(3) G_management_controv	-0.02	0.17	1.00					
(4) G_shareholder_controv	0.09	0.58	0.06	1.00				
(5) G_2018	-0.00	0.00	0.05	0.06	1.00			
(6) G_management_2018	0.00	0.02	0.04	0.05	0.93	1.00		
(7) G_shareholder_2018	-0.05	-0.00	0.04	-0.00	0.49	0.25	1.00	
(8) ICB_code	0.20	-0.01	-0.09	0.05	0.02	0.02	0.02	1.00

**Table 3: Abnormal Returns, Controversies and ESG scores**

This table reports the baseline regression findings for the impact of ESG controversies, their pillars and subcategories on firm value. We complete our study by analyzing whether the firm's performance in terms of the overall, pillar and sub-pillar ESG score makes the firm more resilient to the controversy. We use a sample of 1,205 U.S. firms. A positive coefficient indicates that an increase of the value of that variable increases the value of the company. Standard errors are robust to heteroscedasticity. The numbers in parentheses are robust p-values (\*\*\*) p<0.01, \*\* p<0.05, \* p<0.10).

VARIABLES	Panel A – Overall scores		Panel B – Pillars scores		Panel C – Subcategories scores	
	Abnormal Return	p-value	Abnormal Return	p-value	Abnormal Return	p-value
ESG_controv	-20.653***	(0.005)				
ESG_2018	-0.433	(0.800)				
ESG_2018 *ESG_controv	12.045**	(0.048)				
E_controv			-7.289	(0.229)		
S_controv			-11.170	(0.126)		
G_controv			-4.478	(0.271)		
E_2018			2.608*	(0.074)		
S_2018			-2.287	(0.222)		
G_2018			0.052	(0.977)		
E_controv*E_2018			-2.839	(0.623)		
S_controv*S_2018			12.587**	(0.034)		
G_controv*G_2018			-1.630	(0.667)		
E_emissions_controv					9.309**	(0.034)
E_envir_innov_controv					-11.641**	(0.047)
E_resource_use_controv					-14.102*	(0.063)
S_community_controv					-1.558	(0.824)
S_human_rights_controv					8.149	(0.359)
S_workforce_controv					-12.254**	(0.038)
S_product_controv					-6.462	(0.354)
G_management_controv					-4.824	(0.702)
G_shareholder_controv					3.314	(0.307)
E_emissions_2018					0.198	(0.919)
E_envir_innov_2018					0.830	(0.414)
E_resource_use_2018					3.123	(0.111)
S_community_2018					-4.378**	(0.026)
S_human_rights_2018					-1.293	(0.293)
S_workforce_2018					0.474	(0.792)
S_product_2018					3.523***	(0.002)
G_management_2018					1.316	(0.283)
G_shareholder_2018					-2.063	(0.450)
E_emissions_controv*E_emissions_2018					-7.507**	(0.045)
E_envir_innov_controv*E_envir_innov_2018					6.039	(0.229)
E_resource_use_controv*E_resource_use_2018					3.488	(0.629)
S_community_controv*S_community_2018					14.782**	(0.015)
S_human_rights_controv*S_human_rights_2018					-0.691	(0.914)
S_workforce_controv*S_workforce_2018					-6.366	(0.229)
S_product_controv*S_product_2018					-9.970	(0.126)
G_management_controv*G_management_2018					-8.368	(0.483)
G_shareholder_controv*G_shareholder_2018					-0.269	(0.932)
TobinQ	4.211***	(0.000)	4.320***	(0.000)	3.920***	(0.000)
Size	2.110**	(0.023)	1.824*	(0.065)	1.903*	(0.056)
Cash	54.573***	(0.000)	55.119***	(0.000)	51.979***	(0.000)
ROE	4.847	(0.172)	4.665	(0.191)	5.049	(0.161)
advertising	-131.836***	(0.009)	-139.176***	(0.006)	-129.648***	(0.009)
Historical_vol	0.747	(0.731)	0.607	(0.783)	0.822	(0.711)
Dividend	-4.275***	(0.000)	-4.305***	(0.000)	-4.303***	(0.000)
Constant	-58.180***	(0.010)	-51.287**	(0.050)	-57.075**	(0.017)
Observations	1,205		1,205		1,205	
R-squared	0.225		0.226		0.249	

Table 4: Marginal effects of controversies scores on different levels of ESG scores

In panel A, we report the results of the regression of the first quarter 2020 abnormal returns on ESG\_controv (equation 1) when ESG\_2018 is equal to its p25, p50 and p75 value. ESG scores are normalized. In panel B, we report the results of the regression of the first quarter 2020 abnormal returns on the different pillars of ESG controversies (equation 2) when the relevant pillar of ESG score is equal to its p25, p50 and p75 value. Pillars ESG scores are normalized. In panel C, we report the results of the regression of the first quarter 2020 abnormal returns on the different subcategories of ESG controversies (equation 3) when the relevant subcategory of ESG score is equal to its p25, p50 and p75 value. Subcategories of ESG scores are normalized. In the estimations, control variables are winsorised at the 1% level in each tail. Standard errors are robust to heteroscedasticity. The numbers in parentheses are robust p-values (\*\*p<0.01, \*\*p<0.05, \*p<0.10).

Panel A – Overall Scores		
Marginal effects of	ESG_controv	
At : ESG_2018 =		p-value
1. -0.454 (p25)	-26.116***	(0.003)
2. 0.246 (p50)	-17.687***	(0.010)
3. 1.107 (p75)	-7.326	(0.356)
Observations	1,205	

Panel B – Pillar scores						
Marginal effects of	E_controv		S_controv		G_controv	
At : `pillar`_ESG_2018 =		p_value		p_value		p_value
1. p25	-5.716	(0.441)	-16.945*	(0.052)	-3.645	(0.448)
2. p50	-7.419	(0.217)	-7.797	(0.255)	-5.031	(0.213)
3. p75	-10.551	(0.188)	2.373	(0.755)	-6.108	(0.226)
Observations	1,205		1,205		1,205	

E\_2018 = -0.554 (p25), 0.046 (p50), 1.149 (p75)

S\_2018 = -0.459 (p25), 0.268 (p50), 1.076 (p75)

G\_2018 = -0.511 (p25), 0.340 (p50), 1.000 (p75)

Panel C – Pillar E subcategories scores						
Marginal Effects of	E_emissions_controv		E_envir_innov_controv		E_resource_use_controv	
At : E_`category`_2018'		p_value		p_value		p_value
1. p25	13.724**	(0.013)	-14.922**	(0.024)	-16.345*	(0.096)
2. p50	9.709**	(0.030)	-13.598**	(0.028)	-14.121*	(0.063)
3. p75	0.599	(0.906)	-6.868	(0.316)	-9.770	(0.339)
Observations	1,205		1,205		1,205	

E\_emissions\_2018 = -0.588 (p25), -0.053 (p50), 1.160 (p75)

E\_envir\_innov\_2018 = -0.543 (p25), -0.324 (p50), 0.790 (p75)

E\_resource\_use\_2018 = -0.643 (p25), -0.006 (p50), 1.242 (p75)

Panel C – Pillar S subcategories scores								
Marginal Effects of	S_community_controv		S_human_rights_controv		S_workforce_controv		S_product_controv	
At : S_`category`_2018'		p_value		p_value		p_value		p_value
1. p25	-8.735	(0.296)	8.549	(0.462)	-8.961	(0.236)	-2.087	(0.790)
2. p50	3.073	(0.646)	8.367	(0.416)	-13.944**	(0.010)	-5.915	(0.400)
3. p75	14.579*	(0.073)	7.457	(0.279)	-19.216***	(0.002)	-16.294*	(0.068)
Observations	1,205		1,205		1,205		1,205	

S\_community\_2018 = -0.486 (p25), 0.313 (p50), 1.092 (p75)

S\_human\_right\_2018 = -0.580 (p25), -0.315 (p50), 1.001 (p75)

S\_workforce\_2018 = -0.517 (p25), 0.266 (p50), 1.094 (p75)

S\_product\_2018 = -0.439 (p25), -0.055 (p50), 0.986 (p75)

Panel C – Pillar G subcategories scores				
Marginal Effects of	G_management_controv		G_shareholder_controv	
At : G_`category`_2018'		p_value		p_value
1. p25	-0.290	(0.986)	3.525	(0.378)
2. p50	-7.419	(0.529)	3.292	(0.313)
3. p75	-13.170	(0.342)	3.080	(0.477)
Observations	1,205		1,205	

G\_management\_2018 = -0.542 (p25), 0.310 (p50), 0.997 (p75)

G\_shareholder\_2018 = -0.781 (p25), 0.083 (p50), 0.869 (p75)

Appendix I. Category scores from Refinitiv MarketPsych ESG Analytics (RMA)

<b>Pillar Controv</b>	<b>Sub-Pillar Controv</b>	<b>Definition</b> The controversies refer to:
<b>Environmental controversies</b> (E_controv)	<b>Emission controversies</b> (E_emissions_controv)	carbon emissions, carbon dioxide releases, airborne emissions (gas leaks and flare-offs), radiation, industrial accidents (fuel transport spills, mining accidents, and radiation leaks), growing waste and pollution burden
	<b>Environmental Innovation controversies</b> (E_envir_innov_controv)	the lack of creation of new market opportunities through new green technologies and design (e.g., socially unsustainable business activities including gambling, firearms manufacturing, alcoholic beverage distribution, and tobacco production)
	<b>Resource Use controversies</b> (E_resource_use_controv)	a company's energy inefficiency and a supply chain instability
<b>Social controversies</b> (S_controv)	<b>Community controversies</b> (S_community_controv)	anger towards a company, its management, and its products or services; monopolistic or anti-competitive practices; a class action lawsuit against a company; involvement in corrupt activities and practices; criminal activity involving a company or its management; patent infringement, intellectual property violations, and patent trolling activities; lawsuits; lobbying activities and initiatives; products or services damaging public health
	<b>Human Rights controversies</b> (S_human_rights_controv)	child or underage labor use; business dealings in violation of sanctions; use of prisoner labor, forced labor, or labor exploitation
	<b>Workforce controversies</b> (S_workforce_controv)	disruption, elimination, or erosion of benefits; workplace discrimination and obstacles to advancement due to race, ethnicity, sexual orientation, and gender; disagreement and discord between labor, labor unions, and management; layoffs, furloughs, and staffing cuts; unfair wage issues, payment delays, and wage controversies; workplace abuse, exploitation, and safety violations
	<b>Product Responsibility controversies</b> (S_product_controv)	misleading advertising; violations of customer privacy; product flaws, recalls, and injuries; research and development controversies
<b>Governance controversies</b> (G_controv)	<b>Management controversies</b> (G_management_controv)	inappropriate or rule-breaking management behavior
	<b>Shareholders controversies</b> (G_shareholder_controv)	irregular accounting; engagement by activist investors and hostile takeover activity; increased risk of default or business failure; declining earnings, lowered guidance, and negative earnings surprises; market manipulation, insider sales, and insider dealings; earnings warnings; proxy battles and hostile bids to take control of a company; decreasing dividends, secondary offerings, share sales, and securities fraud; controversies surrounding shareholder rights issues; reports of tax regulation noncompliance, tax dodging, or tax fraud

## Appendix II. The Buzz scores during the Q1-2020 period

Buzz metrics is a proxy for media attention, and it delivers the number of ESG-relevant references to a given company in the media. They are used as weights to compute the pillars and sub-pillars controversies scores.

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	(6) median
E_emissionsBuzz_quarterly	1,205	103.22	926.28	0.00	27,967.50	2.00
E_envinnovationBuzz_quarterly	1,205	148.60	1,160.94	0.00	34,715.50	12.50
E_resourceuseBuzz_quarterly	1,205	24.66	171.57	0.00	3,531.00	1.00
S_communityBuzz_quarterly	1,205	919.38	5,618.70	0.00	121,553.50	157.50
S_humanrightsBuzz_quarterly	1,205	14.20	102.29	0.00	2,824.50	0.00
S_productBuzz_quarterly	1,205	177.31	1,000.02	0.00	17,101.00	27.50
S_workforceBuzz_quarterly	1,205	101.62	703.57	0.00	20,706.50	10.00
G_managementBuzz_quarterly	1,205	83.02	398.86	0.00	7,838.50	15.00
G_shareholderBuzz_quarterly	1,205	59.84	329.00	0.00	7,738.00	12.00

## Appendix III

Internal methodology of Refinitiv MarketPsych ESG Analytics (RMA)

### Step 1: Transforming the daily subcategories scores of ESG controversies into quarterly subcategories scores of ESG controversies

We obtain daily subcategories scores of ESG controversies from the MarketPsych ESG database. The range is from -1 to 1. In practice, most scores will be between 0 and 1. We transform them into quarterly (Q) scores. A higher controversies score indicates that the company is more exposed to corporate negative news stories relative to the specific subcategory of ESG controversies.

For example:

$$\begin{aligned} \text{emissionsControversies}(Q) &= [\text{emissionsBuzz}(\text{day1}) * \text{emissionsControversies}(\text{day1}) \\ &+ \dots + \text{emissionsBuzz}(\text{day90}) * \text{emissionsControversies}(\text{day90})] \\ &/ [\text{emissionsBuzz}(\text{day1}) + \dots + \text{emissionsBuzz}(\text{day90})] \end{aligned}$$

### Step 2: Computing the pillars scores of ESG controversies

We compute pillars scores (E, S, and G) of ESG controversies using the full list of subcategories scores of ESG controversies. Technically, the range will be from -1 to 1, just like its components. In practice, most scores will be between 0 and 1. A higher controversies score indicates that the company is more exposed to corporate negative news stories relative to the specific Pillar category of ESG controversies.

For example, to create the environmental pillar score of ESG controversies:

$$\begin{aligned} E\_controversies(Q) &= [\text{emissionsBuzz}(Q) * \text{emissionsControversies}(Q) \\ &+ \text{environmental\_innovBuzz}(Q) * \text{environmental\_innovControversies}(Q) \\ &+ \text{resource\_useBuzz}(Q) * \text{resource\_useControversies}(Q)] \\ &/ [\text{emissionsBuzz}(Q) + \text{environmental\_innovBuzz}(Q) + \text{resource\_useBuzz}(Q)] \end{aligned}$$

When doing so, it is recommended to weight each of those 3 subcategories according to their level of buzz. Buzz is a count of relevant references, positive or negative, concerning the category. For example, emissionsBuzz is the count of references to emissions for a company.

$$\begin{aligned} \text{emissionsBuzz}(Q) &= \text{emissionsBuzz}(\text{day1}) + \dots + \text{emissionsBuzz}(\text{day90}) \\ \text{environmental\_innovBuzz}(Q) &= \text{environmental\_innovBuzz}(\text{day1}) + \dots + \text{environmental\_innovBuzz}(\text{day90}) \\ \text{resource\_useBuzz}(Q) &= \text{resource\_useBuzz}(\text{day1}) + \dots + \text{resource\_useBuzz}(\text{day90}) \end{aligned}$$

### Step 3: Computing the overall ESG controversies scores

We compute the overall ESG controversies scores. The range will be from -1 to 1, just like its components, and a higher controversies score indicates that the company is more exposed to corporate ESG negative news stories.

$$\text{ESG\_controversies}(Q) = [\text{E\_Buzz}(Q) * E\_controversies(Q) + \text{S\_Buzz}(Q) * S\_controversies(Q) + \text{G\_Buzz}(Q) * G\_controversies(Q)] / [\text{E\_Buzz}(Q) + \text{S\_Buzz}(Q) + \text{G\_Buzz}(Q)]$$

with,

$$E\_Buzz(Q) = \text{emissionsBuzz}(Q) + \text{environmental\_innovBuzz}(Q) + \text{resource\_useBuzz}(Q)$$

$$S\_Buzz(Q) = \text{communityBuzz}(Q) + \text{human\_rightsBuzz}(Q) + \text{workforceBuzz}(Q) + \text{product\_Buzz}(Q)$$

$$G\_Buzz(Q) = \text{managementBuzz}(Q) + \text{shareholderBuzz}(Q)$$

Appendix I. Event study methodology to calculate abnormal returns (Albuquerque *et al.* (2020)).

First, we compute firm-quarterly return observations:  $Ret_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$ ,  $Ret_{NYSE,t} = \ln\left(\frac{P_{NYSE,t}}{P_{NYSE,t-1}}\right)$

where  $i$  identifies firms listed on the NYSE.  $P_{i,t}$  is the average price of firm  $i$  at quarter  $t$  and  $P_{NYSE,t}$  is the average value of the NYSE composite index at quarter  $t$ .  $Ret_{i,t}$  is the average return of stock  $i$  at quarter  $t$  and,  $Ret_{NYSE,t}$  is the average value of the NYSE composite index at quarter  $t$ .

To capture the market reaction to the company's exposure to a given category of ESG controversies, we compute the abnormal stock price returns of our sample of firms over the first quarter of 2020 ("event window"). We consider the COVID-19 period as our event for two reasons. Firstly, it is a non-financial shock that affects all three concerns in the ESG acronym. Secondly, this period is part of a growing trend in the amount of media contents about companies. This can exacerbate the firm's reputational damage caused by an exposure to ESG controversies. The abnormal return is the difference between the observed (actual) return  $R_{i,t}$  and an expected (normal) return  $\hat{R}_{i,t}$ . The latter is the return that would be expected if the event did not take place. To estimate it, we use a single-factor market model over the 2017-2019 period, where the market index is the NYSE Composite Index.

$$Ret_{i,t} = \hat{\alpha}_i + \hat{\beta}_i * Ret_{NYSE,t} \quad (a)$$

$t$  ranges from Q1-2017 to Q4-2019, and  $\hat{\alpha}$  and  $\hat{\beta}$  are respectively the Ordinary Least Squares estimates of  $\alpha_i$  and  $\beta_i$ .

The quarterly abnormal return of company  $i$  on the first quarter of 2020 is given by the difference of the actual returns of firms  $i$  and the expected return of firm  $i$  in the conjecture the event would have not happened. We use the  $\hat{\alpha}$  and  $\hat{\beta}$  of equation (a), to compute:

$$Abnormal\_Return_{i, Q1\_2020} = Ret_{i, Q1\_2020} - \hat{R}_{i, Q1\_2020} = Ret_{i, Q1\_2020} - (\hat{\alpha}_i + \hat{\beta}_i * Ret_{NYSE, Q1\_2020}) \quad (b)$$