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Firm value and risk: how relevant are ESG factors and ESG controversies?

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Abstract

Purpose – This study investigates the impact of ESG (Environmental, Social, and Governance) performance and ESG-related corporate misconduct on firm value and risk. In particular, it explores whether strong ESG performance can mitigate the negative consequences of adverse ESG events.

Design/methodology/approach – The analysis is based on a robust international panel dataset from LSEG, covering 10,212 companies across 42 countries from 2002–2021. Using panel regression techniques, we examine the effects of ESG scores and ESG controversies on market valuation and risk, while controlling for firm-level heterogeneity, types of controversies, and temporal, sectoral, and geographic fixed effects.

Findings – The findings reveal that ESG controversies significantly reduce firm value and increase risk levels. However, companies with high ESG scores exhibit a moderating effect: they experience less severe impacts, particularly regarding risk exposure. After controlling for heterogeneous firm value and risk levels, corporate controversies, and different geographical, industry, and period specifications, the results remain significant.

Practical implications – These findings highlight the strategic relevance of ESG engagement for risk management and value preservation. Firms that invest in ESG practices are better equipped to weather the reputational and financial fallout of adverse events and can enjoy a competitive advantage in the capital markets.

Originality/value – The paper's novelty lies in its analysis of ESG practices, controversies, and their impact on firm value and risk, highlighting direct and indirect effects across developed and emerging markets. It reconciles conflicting findings by showing that ESG's positive indirect effect applies only to high-valued firms and demonstrates its heterogeneous impact on firm value and risk. Finally, it provides novel insights into how ESG scores' moderating influence varies with controversy severity.

Keywords ESG controversies, ESG performance, Risk mitigation, Firm valuation, Sustainability

Paper type Research paper

JEL classification – G30, M14, Q56

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1. Introduction

The Paris Agreement, adopted in December 2015, aims to keep "the increase in the global average temperature to well below 2°C above pre-industrial levels" and to pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels" (United Nations, 2015). This has heightened the focus of investors and companies on climate change and social issues and driven responsible business conduct across financial and non-financial sectors (Basel Committee on Banking Supervision, 2022; Organisation for Economic Co-operation and Development, 2023). The international attention on the significance of ESG (Environmental, Social, Governance) investments for transitioning towards sustainability (EBA, 2021) has led to two primary outcomes:

(1) companies are increasing their investments to improve their ESG scores, aiming to become more resilient and responsible in managing emerging ESG-related risks;

(2) citizens are becoming more proactive in initiating ESG controversies, which foster economic and reputational costs for companies (ESMA, 2023).

Motivated by this ongoing debate, our research aims to provide a comprehensive framework that investigates the joint effects of ESG performance and ESG controversies in shaping a firm's value and risk.

Extensive literature explores how ESG factors influence firms' value and risk jointly or separately (Sassen *et al.*, 2016; Di Tommaso and Thornton, 2020; Shakil *et al.*, 2019). An emerging body of research also examines how ESG controversies affect a company's market value (Aouadi and Marsat, 2018; Anita *et al.*, 2023), condition financial portfolio performance (Dorfleitner *et al.*, 2020), and institutional investors' trading behaviors (Alda, 2022; Bang *et al.*, 2023) as well as firms' growth opportunities (Fafaliou *et al.*, 2022). Other studies focus on the determinants of controversies (Treepongkaruna *et al.*, 2022) and how firm characteristics can mitigate the adverse effects of these controversies (Shakil *et al.*, 2021; Agnese *et al.*, 2023). Both streams of literature often present contradictory and uncertain findings regarding the effects of ESG factors, ESG controversies, and the possible moderating mechanism provided by proactive ESG engagement, as differences in types of firms (financial vs non-financial), countries, and sectors may yield varied outcomes. Only high-attention firms seem to benefit from higher ESG performance when facing controversies (Aouadi and Marsat, 2018). Nirino *et al.* (2021) do not confirm that the mitigating effect of the ESG score operates. Elamer and Boulhaga (2024) found that the indirect effect of ESG score helps mitigate corporate misconduct, while the direct effect of ESG engagement is negative. Moreover, the focus is mainly on the effect of corporate misconduct on a market-based valuation measure usually identified by Tobin's Q. Yet, little is known in terms of a firm's operational and financial risk. This inconsistency highlights the absence of a comprehensive examination that integrates the direct effect of ESG performance and ESG controversies and the indirect effect generated by their interaction on a broader range of firm metrics. This study addresses this gap by focusing on the effectiveness of ESG investments and the impact of corporate environmental, social, and governance misconduct. It also introduces a novel argument by assessing the extent to which the severity of controversies influences firm performance and risk levels. Drawing on a large panel data set of 10,212 firms across different countries and industry sectors from 2002 to 2021, we provide new evidence on whether ESG performance mitigates the negative impact of controversies and whether this effect varies by the intensity of the controversy.

Our analysis reveals several key findings:

- higher ESG scores enhance the firms' market-based value and decrease idiosyncratic volatility and total risk;

- controversies lead to a downturn in market value and an increase in both idiosyncratic and total risk; and
- ESG investments mitigate the negative impact of ESG controversies, but this effect is significant mainly for risk measures and only at low and moderate levels of controversy severity.

To the best of our understanding, this research is among the initial efforts to present an extensive framework outlining theoretical and practical links between ESG controversies and metrics of firm value and risk on a global scale. It encompasses financial and non-financial companies and is not limited to developed markets. Moreover, it clarifies the current state-of-the-art discussion and research that often yield divergent results and helps understand the implications of recent ESG regulatory requirements concerning firm value and risk.

The results suggest that firms adopt ESG practices to benefit the global economic system and fulfill their strategic objectives. The potential to lessen the impact of various controversies may motivate companies to increase their ESG investments, which can reduce risk and improve market performance.

This research enhances the current stream of literature in several significant ways. First, by systematically evaluating ESG practices, controversies, and their impact on firm value and risk, we provide further evidence on the existence of a direct and indirect effect on firms' value and risk metrics in developed and emerging markets. Additionally, we reconcile past conflicting evidence on the moderating role of ESG scores applied to firm value by clarifying that this positive indirect effect exists only for high-valued firms. Thirdly, we show that the moderating effect of ESG score has a heterogeneous impact for varying levels of firm value, idiosyncratic, and total risk. Finally, by assessing the influence of controversies separately and combined with ESG scores, we provide novel evidence that the moderating influence of ESG scores varies across different levels of controversy severity.

These results make several theoretical contributions. Grounded in stakeholder theory (Freeman, 1984), the findings suggest that firms engaging in proactive ESG practices build stronger legitimacy and resilience, enhancing their ability to withstand reputational damage and market penalties. From a risk management perspective (Godfrey, 2005; Godfrey *et al.*, 2009), ESG performance operates as a strategic asset, reducing firms' exposure to non-financial shocks, but only within specific thresholds of controversy intensity.

This study also provides actionable implications for practitioners and policymakers. For corporate managers, our results underscore the importance of not only investing in ESG initiatives but also strengthening internal governance and compliance mechanisms to help prevent severe controversies (Sarre *et al.*, 2001; Jain and Zaman, 2020; Nardella *et al.*, 2020; Pollman, 2021). For policymakers and regulators, the evidence supports implementing mandatory disclosure standards for ESG controversies and their severity levels (Krueger *et al.*, 2024). For institutional investors, incorporating severity-based ESG controversy assessments into investment and risk evaluation frameworks may enhance portfolio resilience (Rook *et al.*, 2021; Bagh *et al.*, 2024; Nogueira Reis and Soares Pinto, 2024).

This research is structured as follows. Section 2 introduces the literature review and outlines the main hypotheses. We continue by detailing the data and methodology adopted in the study. Next, we present and discuss the main results, including additional analyses and robustness checks. Finally, the last section highlights the implications of our analysis and suggests future research directions.

2. Theoretical framework and hypothesis development

2.1 Theoretical framework

The debate on the economic effects of ESG practices on companies spans over five decades, beginning with theories on corporate social responsibility (CSR). Various frameworks, such as overinvestment, managerial opportunism, stakeholder theory, risk management, and legitimacy theories, have been employed to explain CSR practices.

The overinvestment theory posits that ESG investments cause firms to allocate scarce resources away from maximizing shareholder wealth, thereby reducing firm value (Alexander and Buchholz, 1978). Moreover, agency costs can arise through ESG investments when managers prioritize their reputations over shareholders' interests (Barnea and Rubin, 2010). Investors with this perspective might view companies as riskier due to the increased fixed costs of ESG investments (Drago *et al.*, 2019). Similarly, the managerial opportunism theory suggests a positive link between ESG activities and firm risk (Bouslah *et al.*, 2013), arguing that management often pursues personal objectives (Preston and O'Bannon, 1997), focusing on short-term gains. During strong financial performance, managers might reduce ESG investment to boost immediate profits, thus increasing long-term risks. Conversely, in periods of weak financial performance, managers might escalate corporate social performance spending to enhance their reputations, thereby increasing firm risk (Barnea and Rubin, 2010).

In contrast, stakeholder theory (Freeman, 1984) posits that ESG investments shift governance priorities from shareholders to stakeholders, reducing management risk and enhancing company value. Similarly, the risk management theory posits that ESG investments cultivate positive moral capital among stakeholders, acting as a form of protection for the business, similar to an insurance policy. Godfrey (2005) argues that this reputational capital, derived from favorable evaluations of corporate social performance, strengthens stakeholder loyalty and fosters positive perceptions of the business (Luo and Bhattacharya, 2006). This reduces the likelihood of punitive actions from stakeholders during crises, leading to more stable cash flows and decreased risk (Chang *et al.*, 2014).

Legitimacy theory (Dowling and Pfeffer, 1975) asserts that ESG policies help firms align with stakeholder expectations regarding ESG responsibility. Companies might adopt proactive ESG policies to anticipate or respond to regulatory, social, or economic pressures, demonstrating their commitment to sustainable practices. These policies can prevent criticism, sanctions, or reputational damage (Deegan, 2002). Legitimacy theory emphasizes that firms should consider public expectations broadly, not just investor interests. Failure to meet societal expectations can result in societal sanctions, legal restrictions, or limited resources, thereby increasing risk (Deegan and Unerman, 2011).

Based on these theories, we hypothesize that ESG policies positively influence firm value and negatively impact risk, with the opposite outcomes expected for ESG controversies.

2.2 The relationship between ESG scores and corporate value and risk

A significant body of empirical research has extensively explored the link between corporate financial performance and ESG scores, focusing mainly on non-financial companies (Shakil *et al.*, 2021) at national and international levels (Aouadi and Marsat, 2018). The results of these studies are varied and often contradictory. Some studies have found that ESG initiatives and CSR strategies can positively affect company performance, including financial outcomes, employee engagement, innovation, and corporate reputation (Sánchez-Infante Hernández *et al.*, 2020; Duque-Grisales and Aguilera-Caracuel, 2021). On the other hand, some studies indicate a negative correlation between ESG scores and financial performance (Kim *et al.*, 2018; Forgione *et al.*, 2020), while others report mixed findings (Shakil *et al.*, 2019). In the banking sector, research has mainly concentrated on how ESG

engagement influences financial performance, frequently reporting positive effects on profitability and bank value (Simpson and Kohers, 2002; Brogi and Lagasio, 2019).

Other studies investigate the indirect effects of ESG on firm value, suggesting that ESG initiatives function as a risk control mechanism, thereby improving firm value through effective risk management strategies (Harjoto and Laksmana, 2018).

More recently, Boulhaga *et al.* (2023a, 2023b) identified a positive and significant effect of ESG Score and internal control quality on firm value. However, the moderating effect of ESG Score on internal control weaknesses is negative and significant, suggesting that the positive effect of ESG on value is lower when firms report internal control weaknesses and that firms should align their ESG strategies with robust internal governance systems to benefit from sustainability initiatives fully. The moderating effect of a higher ESG Score in the presence of tax avoidance is investigated by Elamer *et al.* (2024). Their findings indicate a significant negative association between tax avoidance and firm value, while ESG performance positively relates to firm value. Notably, the interaction term between ESG and tax avoidance is negative and statistically significant, indicating that the positive effect of ESG on firm value is somewhat weakened when firms also engage in tax avoidance. Using a different research design, Boulhaga *et al.* (2023a, 2023b) show that internal control quality (IC) and CSR negatively and significantly affect conditional accounting conservatism. Firms with stronger internal controls and higher ESG performance exhibit lower levels of conditional conservatism, implying reduced information asymmetry and a lower need for accounting caution. Tahat and Hassanein (2024) provide international evidence that gender diversity on corporate boards enhances ESG reporting.

It is also essential to examine the direct impacts of each E, S, and G pillar on firm risk, as increased stock market volatility can heighten financial constraints and risk exposure. ESG investments can bolster a company's reputation, implying that higher ESG scores are associated with reduced financial risks (Luo and Bhattacharya, 2006). This results in lower stock market volatility and a decreased likelihood of financial crises (Oikonomou *et al.*, 2012). Most empirical research on ESG activities and firm risk focuses on the non-financial sector, often producing contradictory results (Lin *et al.*, 2014; Chen *et al.*, 2018). Many studies reveal a negative correlation between ESG engagement and various forms of risk. For example, total risk (Benlemlih *et al.*, 2018), systematic risk (Oikonomou *et al.*, 2012; Breuer *et al.*, 2018), and idiosyncratic risk (Benlemlih *et al.*, 2018; Sassen *et al.*, 2016) are all shown to decrease with higher ESG engagement. This trend is also observed in the U.S. and international financial sectors, where ESG practices contribute to lower default and portfolio risk (Gangi *et al.*, 2019; Neitzert and Petras, 2022). As for the banking sector, some results suggest that higher ESG scores are associated with a slight reduction in risk-taking propensity (Di Tommaso and Thornton, 2020).

Despite the predominant findings, a few studies indicate either a positive or a weak negative relationship between ESG investments and risk. For example, Menz (2010) provided limited evidence that firms with strong social responsibility practices face higher risk premiums in corporate bond markets. Similarly, Goss and Roberts (2011) found that lower-quality borrowers engaging in ESG activities tend to experience higher bank loan spreads and shorter maturities.

More recent research offers a nuanced perspective by examining different ESG pillars (environmental, social, and governance). Some studies suggest that environmentally solid performance can enhance a firm's reputation and reduce financial distress risk, particularly in manufacturing (Xue *et al.*, 2020; Gangi *et al.*, 2020). Conversely, Ben Lahouel *et al.* (2022) found a nonlinear relationship between environmental corporate social responsibility and financial performance. Hamed *et al.* (2023) highlight that corporate sustainable development positively influences corporate financial performance, with a stronger effect observed during global crises. Hassanein *et al.* (2024) provide evidence that national culture significantly influences

sustainability reporting, particularly in the energy sector. Moreover, the presence of a sustainability committee enhances this relationship by aligning ESG efforts with cultural expectations in sensitive industries.

Regarding the social aspect, Bouslah *et al.* (2013) noted that the advantages of social performance are more evident in mitigating risk during challenging economic circumstances like financial crises and recessions.

Motivated by the previous theoretical and empirical considerations, we assume that the following hypotheses hold:

H1a. ESG practices have a positive impact by increasing firm value

H1b. ESG practices have a positive impact by reducing firm risk

2.3 The relationship between ESG controversies and corporate value and risk

Despite growing public interest in understanding the effects of adverse ESG events, more research is needed to fully grasp the implications of corporate controversies on firm performance and risk. These controversies, which involve disputes or scandals negatively affecting stakeholders and the environment, often lead to negative publicity and significant reputational damage. Existing literature indicates that such scandals can harm a company's reputation and adversely affect performance (Walsh *et al.*, 2009).

Research suggests that ESG controversies reduce firm value (Orlitzky, 2013). According to stakeholder theory, controversies can lead to increased skepticism and perceptions of corporate two-facedness among stakeholders (Du *et al.*, 2010), diminishing credibility and negatively impacting firm value (Godfrey *et al.*, 2009). However, strategic efforts to enhance ESG performance can improve a firm's reputation among stakeholders (Kim *et al.*, 2018).

Intense negative media coverage of ESG controversies heightens sensitivity to ESG issues, and accusations of unethical behavior can reshape corporate identity and reputation (Fafaliou *et al.*, 2022), affecting legitimacy and firm value. Studies have shown that a strong CSR reputation can protect firms from negative news and maintain organizational legitimacy (Minor and Morgan, 2011). For instance, companies might experience a decline in market share following negative CSR news coverage from the previous year (Kang and Kim, 2014). Nimer *et al.* (2022) analyze tax evasion behavior and find that public perceptions of governance quality are critical in shaping responsible corporate behavior. These governance indicators, particularly in developing countries, significantly affect ethical outcomes central to ESG controversies. Therefore, weak public governance may exacerbate reputational damage from ESG controversies. Hassanein (2022) shows that competitive pressure leads to greater disclosure of negative risk information. Still, market competition negatively affects sustainability reporting, especially for small firms in highly competitive sectors (Hassanein and Elmaghrabi, 2025). Moreover, Abdelbaky *et al.* (2025) show that real earnings management negatively affects ESG performance, reinforcing that financial manipulation can amplify ESG controversies if not counterbalanced by strategic innovation.

Furthermore, higher corporate social performance scores affect market value, particularly in highly visible firms in countries with greater press freedom and more internet search activity (Aouadi and Marsat, 2018). Negative market news can damage a firm's reputation, leading to lower market value and increased risk. Financial analysts often lower earnings forecasts following adverse ESG incidents, causing subsequent declines in stock price and market value (Derrien *et al.*, 2022).

Investors' behavior reflects this trend, as adverse ESG events often trigger significant negative market reactions (Serafeim and Yoon, 2022). Research indicates that controversies

elicit more robust responses than positive ESG news, with investors usually overreacting to adverse ESG events (Capelle-Blancard and Petit, 2019; Cui and Docherty, 2020). Institutional investors typically reduce net order flows before negative ESG events if the controversy leads to negative abnormal returns (Hoang *et al.*, 2019).

We, therefore, consider these hypotheses:

H2a. Corporate controversies have a negative impact by reducing firm value

H2b. Corporate controversies have a negative impact by increasing firm risk

2.4 The moderating influence of ESG practices

To repair reputational damage from corporate controversies, companies often implement CSR initiatives. Li *et al.* (2019) investigate how firms use symbolic and substantive CSR to mitigate the adverse effects of ESG controversies. They find that firms prefer symbolic CSR, characterized by an inverted U-shaped relationship between controversy levels and symbolic CSR efforts. This indicates that companies adopt symbolic CSR strategies to address stakeholder concerns and restore pre-controversy relationships quickly. Utz (2019) also highlights that firms increase their CSR efforts following scandals to reinforce their reputation.

Aouadi and Marsat (2018) show that only the largest and high-attention firms benefit from higher ESG engagement when facing a controversy. Nirino *et al.* (2021) analyze the influence of corporate controversies on firm performance, considering previous ESG investments. Their findings suggest that while controversies negatively affect performance, ESG practices do not significantly moderate this relationship. A different result is highlighted by Elamer and Boulhaga (2024), who find that while ESG controversies are negatively associated with firm value, measured through Tobin's Q, this adverse effect is significantly mitigated in firms characterized by strong board independence, gender-diverse boards, and well-developed ESG strategies. Thus, the past empirical evidence seems inconclusive in assessing the clear impact of ESG Scores and ESG Controversies in general models that simultaneously evaluate their direct effect and interaction.

Shakil *et al.* (2021) further reveal that ESG controversies reduce the positive impact of ESG investments on financial risk. Benameur *et al.* (2023) find that corporate governance mechanisms such as board independence and audit committee size positively influence future-oriented disclosure, strengthening firm transparency and resilience. Similarly, Elsayed and Hassanein (2024) reveal that firms with stronger governance structures are more likely to provide voluntary risk disclosures that improve investor valuation, thereby acting as a potential mitigating factor in times of ESG controversy.

DasGupta (2022) investigates whether financial performance shortcomings prompt firms to enhance ESG practices to uphold legitimacy. The study shows that financial performance deficiencies positively affect ESG performance. However, companies experiencing significant ESG controversies are less inclined to improve ESG practices, even though these can mediate the relationship between financial shortfalls and ESG performance.

Focusing on individual ESG pillars, Marsat *et al.* (2022) provide evidence that strong environmental performance helps firms recover more quickly from environmental controversies. From a natural resource-based view, firms with high environmental performance develop capabilities and reputations that enhance resilience to negative events.

Based on the insights mentioned above, we propose the following hypothesis:

H3. Higher ESG scores moderate the negative effects of ESG controversies on firm value and risk.

3. Research design

3.1 Data and sample

The research considers listed companies with ESG coverage using LSEG Data and Analytics (formerly Refinitiv). We include firms recorded in the LSEG ESG Universe in the 2002–2021 period [1]. The analysis encompasses 10,212 companies from 47 countries, resulting in 78,738 firm-year observations. The final sample consists of firms from developed and emerging markets to capture the probability that voluntary practices or mandatory country-specific ESG policies can differently affect our main findings (Singhania and Saini, 2023)[2].

Appendix 1 details the sample's distribution across industry sectors, geographical regions, countries, and years. The largest number of observations comes from the US (3,626 firms), followed by China (763 firms) and the UK (718 firms). More firms belong to developed countries than emerging ones (7,908 and 2,304, respectively). Regarding sectoral distribution, the Industrials, Technology, Consumer Cyclicals, and Financials sectors account for nearly 55% of the total sample.

3.2 Dependent variables

3.2.1 Firm value. To evaluate the firm value, we use the natural logarithm of Tobin's Q, calculated yearly, as the ratio of the market value of assets to their book value. Among different proxies of investment (and value) opportunities, Tobin's Q (or the Market-to-Book Assets ratio) is assumed to represent the best alternative (Adam and Goyal, 2008). Tobin's Q operates as a forward-looking measure of firm valuation, incorporating tangible and intangible factors reflecting investors' expectations and market confidence about future profitability. It is used to assess how effectively firms utilize their assets to generate value, thus reflecting the market's insight and the value of the firm's assets, and it is sensitive to factors such as growth opportunities, corporate governance, and investment efficiency.

3.2.2 Firm risk. Firm risk is assessed through two main variables:

- Idiosyncratic risk (IR) is measured by realized idiosyncratic volatility (Ang *et al.*, 2006; Ang *et al.*, 2009) and computed by annualizing the residuals' standard deviation from the Fama-French 5-factor model (Fama and French, 2017)[3]. The rationale for using idiosyncratic risk lies in its ability to capture firm-specific sources of uncertainty, such as management decisions, innovation, or operational performance that are not explained by broader market movements. While systematic risk reflects economy-wide factors that affect all firms, idiosyncratic risk is unique to an individual firm. In our analysis setting, the international and regionally diversified 5-factor model used in computing idiosyncratic volatility is expressed as:

$$R_{i,t} - R^r_{f,t} = a_i + b_i\left(R^r_{m,t} - R^r_{f,t}\right) + s_i SmB^r_t + h_i HmL^r_t + r_i RmW^r_t + c_i CmA^r_t + e_{i,t} \quad (1)$$

where $(R_{i,t} - R^r_{f,t})$ is the firm's i excess return, $(R^r_{m,t} - R^r_{f,t})$ is the excess return on a regional market portfolio, SmB^r_t is the return of small stocks minus big stocks, HmL^r_t is the return of stocks with high book-to-market minus stocks with low book-to-market, RmW^r_t is the return of stocks with robust profitability minus stocks with weak profitability, CmA^r_t is the return of stocks with low investment minus stocks with high investment, and $e_{i,t}$ is a zero-mean residual. The superscript r indicates that factor portfolios in the model are obtained by sorting firms using Europe, Asia-Pacific, Japan, and North America regional factors for developed markets and a unique regional factor for emerging markets [4]. For each firm i, monthly excess returns are regressed over the 5-factor model to obtain the corresponding residuals.

The procedure is replicated for each year in the sample period. The standard deviation of the residuals is then annualized using the number of trading months in year *t*.

- Total risk (TR), which encompasses both the systematic and idiosyncratic components of firm-level risk, is computed as the annualized standard deviation of daily returns for firm *i* over year *t*. This measure captures the overall volatility in a firm's equity returns, providing a comprehensive indicator of the uncertainty investors face. By accounting for market-related and firm-specific volatility sources, the argument for using total risk lies in its capacity to reflect the entire range of risks that may influence the firm's returns and value (see Table 1).

Our data set's Tobin's Q averages 1.55 and has a significant standard deviation (1.74). The average idiosyncratic risk is 0.21, with yearly figures from 0.05–0.84. The mean total risk is 0.40 (see Table 2).

3.3 Independent variables

3.3.1 ESG scores. Using data from public disclosures, third-party databases, and company engagements, the LSEG ESG score evaluates a firm's performance on environmental, social, and governance (ESG) factors. The score considers over 630 company-level ESG measures, providing a comprehensive assessment focusing on each industry's most relevant material factors. These measures are categorized into ten categories, contributing to the three primary ESG pillars: environmental, social, and corporate governance (LSEG Data and Analytics, 2023). The scores for the three pillars are combined to form the overall LSEG ESG score (see Table 1). Scores range from 0 to 100, with higher scores indicating more robust ESG performance, where 100 represents the best performance. We decided to express the ESG score on a decimal basis to highlight its effects better in the regression analyses. In our sample, the average overall ESG score is equal to 0.4257. As a robustness exercise, we use the 2010–2019 period and compare the average ESG score in this sub-sample with the one computed in the same period by Ehlers *et al.* (2024) using all data points available in the Refinitiv database. The mean ESG score in our 2010–2019 sub-sample is 0.4277 compared to 0.428 in Ehlers *et al.*'s, 2024 study.

3.3.2 ESG controversies. LSEG identifies ESG controversies by examining publicly accessible information for misconduct in environmental, social, or governance areas. LSEG's analysts monitor 23 specific indicators of such issues categorized into seven sub-groups within the three ESG pillars [5]. Each company's ESG Controversy score, as calculated by LSEG, is a percentile ranking compared to industry peers (see Table 1). In our study, for simplicity, we convert this score into a reverse decimal format, where fewer controversies result in a lower score.

The ESG Controversy score is low, averaging 0.07 (see Table 2). Social issues constitute the most significant part of these controversies at 86.28%, while governance and environmental issues represent 9.74% and 3.98%, respectively. North America, Europe, and the Asia-Pacific exhibit the highest number of controversies, reflecting the distribution of firm-year data. The sectors most affected are Technology, Consumer Cyclicals, Financials, and Industrials (see Part A, Part B, and Part C of Appendix 2).

Our data set identifies 33,556 ESG controversies involving 3,169 firms (representing 31% of the sample) across 11,942 firm-year observations from 2002 to 2021.

3.4 Moderating variables

We compute two variables to assess the moderating role of the ESG score on the effect of ESG controversies. The first variable, *Score x Controversy*, is an interaction term between the

Table 1. Variables definitions

Dependent variables	Description
Tobin's Q	Tobin's Q is computed as the natural logarithm of the Market-to-Assets ratio. The MTA ratio is obtained as (total assets - book value of equity + market capitalization on December 31st of the fiscal year) divided by total assets. *Source*: LSEG Worldscope
Total risk (TR)	Annualized standard deviation in current year *t* of daily stock returns for firm *i*. *Source*: Refinitiv LSEG datastream
Idiosyncratic risk (IR)	Annualized standard deviation of Fama-French five-factor model's residuals in current year *t* using monthly excess returns for firm *i*. *Source*: Refinitiv Datastream and Kenneth R. French Data library (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)
Independent variables	
ESG score	The overall company ESG score measures the company's performance on environmental, social and corporate governance pillars. *Source*: LSEG ESG
ESG controversy score	ESG controversies category score measures a company's exposure to environmental, social and governance controversies and negative events reflected in global media. *Source*: LSEG ESG
Controversy	Dummy variable equal to 1 if firm *i* is involved in a ESG controversy; 0 otherwise. *Source*: LSEG ESG
Moderating variables	
ESG score x controversy	Interaction between the overall company *ESG score* and the *controversy* dummy variable. *Source*: LSEG ESG
ESG Score x ESG Controversy Severity (1–5)	Interaction between the overall company ESG score and five dummy variables for quintile value of ESG Controversy Score. 1: lower severity – 5: higher severity
Control variables	
ROA	Return on assets ratio computed as the net income divided by the total assets. *Source*: LSEG worldscope
Age	Natural logarithm of the current age of firm *i* in year *t* of observation. Current age is computed as the difference between the firm's *i* year of incorporation and year *t*. *Source*: LSEG worldscope and bureau van dijk.
Size	Natural logarithm of total assets. *Source*: LSEG worldscope.
Leverage	Ratio computed as total liabilities divided by total assets. *Source*: LSEG worldscope
Capex	Ratio computed as capital expenditures divided by total assets. *Source*: LSEG worldscope
Asset growth	Ratio computed as the difference of total assets at year *t* and *t - 1* divided by total assets at year *t - 1*. *Source*: LSEG Worldscope
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010U.S. dollars. *Source*: World Bank national accounts data

Source(s): Authors' own work

overall company ESG score and a binary variable *Controversy*, which equals 1 if firm *i* experiences at least one controversy in year *t*, and 0 otherwise.

To account for the severity of controversies, we further categorize the ESG Controversy score into five levels (from 1 to 5), corresponding to quintiles ranging from low (1) to extremely severe (5). Accordingly, the second moderating variable, ESG Score x ESG Controversy Severity (1–5), consists of interaction terms between the ESG score and five

Table 2. Descriptive statistics

Variables	N	mean	median	SD	min.	max.
Dependent variables						
Tobin's Q	76469	1.5540	1.3366	1.7353	0.6126	9.9591
Idiosyncratic risk (IR)	78059	0.2143	0.1760	0.1399	0.0470	0.8402
Total risk (TR)	78738	0.4028	0.3459	0.2125	0.1353	1.3292
Independent variables						
ESG score	78738	0.4257	0.4075	0.2044	0.0040	0.9572
ESG controversy score	78705	0.0771	0.0000	0.2101	0.0000	0.9950
Control variables						
ROA	78738	0.0253	0.0342	0.1231	−0.7332	0.2989
Age	78738	25.0732	25.0006	16.1900	2.0000	134.0000
Size (million US dollars)	78738	4,229.5	4,069.0	6.3117	36.3	583,060
Leverage	78738	0.5733	0.5717	0.2379	0.0513	1.2360
Capex	78738	0.0426	0.0290	0.0468	0.0002	0.2568
Asset growth	78738	0.1212	0.0630	0.3152	−0.4219	2.1725
GDP growth	78738	0.0206	0.0224	0.0317	−0.0865	0.0913

Note(s): For a detailed definition of the variables, see Table 1
Source(s): Authors' own work

dummy variables representing the severity quintiles of the ESG Controversy Score (see Table 1).

3.5 Control variables

We include a set of control variables that could impact firm value and risk. Profitability is measured by the Return on Assets (ROA), defined as the ratio of net income to total assets (Jo and Na, 2012; Mishra and Modi, 2013; Lins *et al.*, 2017; Benlemlih *et al.*, 2018). ROA averages 2.53% annually, with a minimum of -73.32% to a maximum of 29.89%. Firm age (Age) is determined by taking the natural logarithm of the difference between the year of incorporation and the observation's year (Aouadi and Marsat, 2018; Liu and Zhang, 2021). The average firm age in our sample is 25.7 years. Firm size (Size) is measured by the natural logarithm of total assets (McWilliams and Siegel, 2000; Cai *et al.*, 2016) and ranges from 36 million USD to 583 billion USD, with a mean value of 4.2 billion USD.

Gearing (Leverage) is measured by the ratio of total liabilities to total assets (Benlemlih *et al.*, 2018; Pham and Tran, 2020) and averages 57.33%, with a standard deviation of 23.79%. Capital Expenditures (Capex), defined as the ratio of capital expenditures to total assets (Shi and Veenstra, 2021; Liu and Wang, 2021), show an average annual rate of 4.26%. Growth in total assets (Asset Growth) is the change in total assets between year *t* and *t* -1 (Song, 2016) and indicates a positive trend, with an average yearly growth rate of 12.12%. At the country level, the growth rate of gross domestic product (GDP Growth) is defined as the relative change in national GDP between years *t* and *t - 1* (La Porta *et al.*, 2002; Caglayan *et al.*, 2020; Shi and Veenstra, 2021), and ranges from -8.65% to 9.13% annually, with an average of 2.06%. We apply winsorization at the 1st and 99th percentiles on dependent and independent variables, except for binary and ESG variables. The monetary variables are expressed in US dollars (see Table 1 and Table 2) [6].

3.6 Econometric model

To evaluate our hypotheses, we implement three distinct econometric models. The model expressed by equation (2) considers the direct influence of ESG scores on market-based value and risk metrics, addressing *H1a* and *H1b*. Equation (3) investigates the potential negative relationship between the dependent variables and ESG controversies (*H2a* and *H2b*). The model shown in equation (4) explores whether and how a firm's commitment to ESG performance can mitigate the adverse effects of controversies (*H3*). These models are represented by the following equations, where y = [Tobin's Q, idiosyncratic risk, total volatility] serves as the dependent variable:

$$y_{i,t} = a_{i,t} + b_1 ESG\,Score_{i,t} + \sum_{n=1}^{7} \gamma_n Z'_{i,t} + e_{i,t} \tag{2}$$

$$y_{i,t} = a_{i,t} + b_2 Controversy_{i,t} + \sum_{n=1}^{7} \gamma_n Z'_{i,t} + e_{i,t} \tag{3}$$

$$y_{i,t} = a_{i,t} + b_1 ESG\,Score_{i,t} + b_2 Controversy_{i,t} + b_3 ESG\,Score_{i,t} \times Controversy_{i,t} + \sum_{n=1}^{7} \gamma_n Z'_{i,t} + e_{i,t} \tag{4}$$

where i refers to individual firm observations within the sample, and t denotes the period. The parameters to be estimated are indicated by b, and Z' is a set of variables that control for firm and country characteristics. Panel OLS models incorporate constant and error terms and account for firm, year, and country-level fixed effects to control unobservable heterogeneity, which may influence both the value/risk metrics and the key explanatory variables (ESG Score and Controversies). First, firm fixed effects are included to control for time-invariant unobserved heterogeneity (such as managerial quality, corporate culture, business practices, or internal governance mechanisms) across firms. Focusing on within-firm variation over time, the fixed effects model mitigates concerns of omitted variable bias arising from unobservable factors correlated with the regressors. Second, year and country fixed effects are incorporated to account for time-specific shocks (e.g., economic crises, regulatory changes) and country-specific factors (e.g., legal systems, institutional environment) that might simultaneously affect all firms in a given year or country. This ensures that the estimated coefficients capture the relationship of interest, net of broader temporal and geographical influences.

In the fixed effects models, standard errors are clustered by firm to ensure heteroskedasticity-robust statistical inference and to account for serial correlation within firms over time (Stock and Watson, 2008) [7].

We extend the baseline specification in three main directions based on equation (4). First, we re-estimate the moderating effect by performing quantile regressions to determine if the individual components of the general controversy and ESG scores have heterogeneous impacts on our dependent variables or differentially moderate the value/risk-controversy relationship. A quantile regression approach enables us to explore how the relationship between ESG score/Controversies and a firm's value/risk metrics value may vary across different points of the conditional distribution of Tobin's Q, idiosyncratic risk, and total risk, rather than focusing solely on the conditional mean. Moreover, quantile regressions are suited to capture non-linearities in the relationship between ESG explanatory variables and the firm's dependent

variables. Standard linear models would fail to detect these differences if the ESG direct and indirect effects are not constant along the distribution. Second, to assess whether the severity of adverse ESG events influences the results, we examine the moderating effect by interacting the ESG Score with the five levels of ESG Controversy Severity (ESG Controversy Severity 1–5). Finally, we analyze the models across different geographical areas, industry contexts, and periods to understand how these dimensions affect the outcomes.

4. Results and discussion

4.1 Multivariate results

Table 3 illustrates the effect of ESG scores on value and risk metrics, addressing *H1a* and *H1b*. The data indicate that higher-quality ESG investments correlate with increased market value and decreased firm risk (Models 1, 4, and 7). The results confirm that the ESG score positively affects Tobin's Q (β_1 = 0.1014; $p < 0.01$) and reduces realized idiosyncratic and total volatility (β_1 = −0.0196, $p < 0.01$ and β_1 = −0.0348, $p < 0.01$, respectively). One standard deviation increase in the ESG Score (0.2044) significantly increases Tobin's Q by 0.1014 and reduces the risk measures by -0.0196 and −0.0348.

Examining the effects of controversies, measured by a dummy variable (H2a and H2b), reveals a negative and statistically significant impact on firm value, idiosyncratic risk, and total volatility, as shown in Models 2, 5, and 8. ESG corporate misconduct negatively impacts Tobin's Q (β_2= −0.0178; $p < 0.01$). In the presence of an ESG adverse event, the value metric is lower by 4.23%. Turning to the risk measures (columns 5 and 8), idiosyncratic risk (β_2 = 0.0079; $p < 0.01$) and total risk (β_2 = 0.0096; $p < 0.01$) rise by 3.58% and 2.33%, respectively [8]. In all specifications, a direct and negative significant association is found, thus confirming *H2a* and *H2b*.

Furthermore, the interaction term (ESG Score × Controversy) supports *H3* (Models 3, 6, and 9) for idiosyncratic and total risk, while the coefficient for Tobin's is not statistically significant. Findings for models 3, 6, and 9 indicate the following:

- in the absence of controversy, a unit increase in the ESG score (direct effect) results in a positive change in Tobin's Q of 0.0996 (β_1, $p < 0.01$), and a negative change (risk reduction) of −0.0164 (β_1, $p < 0.01$) and −0.0308 (β_1, $p < 0.01$) for the risk measures;
- Controversy negatively affects market valuation (β_2 = −0.0321; $p < 0.01$) and the risk variables (idiosyncratic: β_2 = 0.0206, $p < 0.01$; total: β_2 = 0.0265, $p < 0.01$); and
- When a controversy occurs (Controversy = 1), the firm's value decreases by about 7.86%, and idiosyncratic and total risk increases by 8.90% and 6.22% (direct effect), compared to cases where no controversy is detected; iii) if a controversy takes place, the ESG score has a moderating effect (indirect effect) of 0.0260 for Tobin's Q. Even if the coefficient is of the expected sign, results indicate that the positive effect of a higher ESG score is statistically insignificant ($p > 0.10$). More robust results apply to risk metrics with negative statistically significant interaction term coefficients (β_3 = −0.0245, $p < 0.01$ and β_3 = −0.0323, $p < 0.01$) for idiosyncratic and total risk.

The data suggest that while ESG controversies negatively affect value and risk metrics, higher ESG scores can mitigate these adverse effects. The moderating effect of ESG score implies that firms with robust ESG performance can offset the negative impact of ESG controversies, functioning as an insurance mechanism (Godfrey, 2005). However, this positive moderating role is influential only for the risk measures and cannot overcome the negative effect of corporate misconduct when applied to firm value.

Table 3. ESG Scores, controversies and moderating effect on value and risk

	Tobin's Q			IR			TR		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ESG score	0.1014***		0.0996***	−0.0196***		−0.0164***	−0.0348***		−0.0308***
	(5.90)		(5.72)	(−3.73)		(−3.06)	(−4.76)		(−4.17)
Controversy		−0.0178***	−0.0321***		0.0079***	0.0206***		0.0096***	0.0265***
		(−5.40)	(−3.09)		(5.92)	(5.54)		(5.67)	(5.44)
ESG score × controversy			0.0260 (1.42)			−0.0245***			−0.0323***
						(−4.04)			(−3.94)
ROA	0.8843***	0.8858***	0.8840***	−0.1488***	−0.1480***	−0.1477***	−0.2411***	−0.2406***	−0.2400***
	(24.02)	(23.98)	(23.96)	(−15.74)	(−15.65)	(−15.61)	(−19.51)	(−19.45)	(−19.41)
Age	−0.0454***	−0.0423***	−0.0447***	−0.0047	−0.0055*	−0.0051	−0.0014	−0.0027	−0.0019
	(−3.74)	(−3.48)	(−3.68)	(−1.51)	(−1.75)	(−1.63)	(−0.31)	(−0.61)	(−0.45)
Size	−0.1477***	−0.1427***	−0.1469***	−0.0153***	−0.0164***	−0.0157***	−0.0167***	−0.0185***	−0.0171***
	(−20.73)	(−20.01)	(−20.63)	(−9.09)	(−9.74)	(−9.33)	(−6.91)	(−7.64)	(−7.12)
Leverage	0.1104***	0.1105***	0.1109***	0.0737***	0.0742***	0.0743***	0.1094***	0.1098***	0.1098***
	(4.45)	(4.44)	(4.47)	(10.36)	(10.44)	(10.45)	(11.53)	(11.58)	(11.58)
Capex	1.1634***	1.1658***	1.1607***	−0.1496***	−0.1491***	−0.1476***	−0.3003***	−0.3001***	−0.2978***
	(18.10)	(18.09)	(18.05)	(−7.51)	(−7.47)	(−7.41)	(−11.73)	(−11.71)	(−11.63)
Asset growth	0.0684***	0.0666***	0.0682***	0.0038*	0.0042**	0.0040**	0.0002 (0.07)	0.0009	0.0004
	(11.07)	(10.77)	(11.03)	(1.96)	(2.15)	(2.02)		(0.39)	(0.19)
GDP growth	1.2883***	1.2721***	1.2868***	−0.2292***	−0.2260***	−0.2276***	−0.4332***	−0.4276***	−0.4310***
	(16.94)	(16.72)	(16.91)	(−7.11)	(−7.01)	(−7.06)	(−9.64)	(−9.52)	(−9.59)
Constant	2.6242***	2.5849***	2.6129***	0.4438***	0.4529***	0.4473***	0.6413***	0.6565***	0.6466***
	(23.84)	(23.39)	(23.76)	(17.09)	(17.45)	(17.29)	(17.82)	(18.21)	(18.02)

(*continued*)

Table 3. Continued

Variables	Tobin's Q			IR			TR		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Firm-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	79,268	79,226	79,226	77,941	77,899	77,899	78,738	78,695	78,695
N. Firms	10,139	10,139	10,129	10,094	10,084	10,084	10,212	10,202	10,202
R^2	0.840	0.840	0.840	0.576	0.576	0.576	0.735	0.735	0.735
Adjusted-R^2	0.730	0.816	0.816	0.513	0.513	0.513	0.695	0.695	0.695

Note(s): The results refer to regressions for the sample of 10,212 firms. The observation period is 2002–2021. Dependent variables: in columns 1–3 Tobin's Q, in columns 4–6 Idiosyncratic Risk (IR), in columns 7–9 Total Risk (TR). Models incorporate firm, year, and country fixed effects. Robust t-statistics are in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively

Source(s): Authors' own work

Overall, this analysis concludes that strong ESG practices at the micro level effectively reduce total and idiosyncratic risk and only partially influence firm value positively.

The results for control variables align with expectations and corroborate existing literature.

The findings of this analysis have important implications for investors, regulators, and corporate managers. For investors, the results highlight the dual role of ESG performance in enhancing firm value and mitigating risk. While firms with higher ESG scores benefit from increased market valuation and reduced idiosyncratic and total risk, the moderating effect of ESG in the presence of controversies is more pronounced for risk reduction than for firm value preservation. This suggests that investors should not rely solely on ESG scores as indicators of firm resilience but should also assess how effectively companies manage ESG risks, particularly in cases of corporate misconduct. For regulators, the results reinforce the necessity of integrating ESG risk considerations into financial oversight frameworks. Since ESG controversies significantly impact firm value and risk, regulators should promote more transparent ESG disclosures and encourage firms to adopt stronger risk management practices. The evidence that ESG scores act as a partial buffer against risk escalation suggests that policies incentivizing sustainable business practices could enhance financial stability and market confidence. However, since ESG performance alone does not fully shield firms from the negative effects of controversies on valuation, regulatory frameworks should also emphasize accountability and governance mechanisms to prevent ESG-related misconduct.

Corporate managers should recognize that while strong ESG practices contribute to reducing financial risk, they do not fully offset the negative impact of ESG controversies on firm value. This underscores the need for a proactive approach to ESG strategy beyond compliance and disclosure. Integrating ESG risk assessment into decision-making processes, strengthening governance frameworks, and enhancing transparency can improve a firm's ability to manage ESG-related risks.

4.2 Additional analysis

Although the previous paragraph's results highlight that ESG scores and controversies directly impact value and risk measures, the moderating effect of higher ESG scores appears statistically significant for the idiosyncratic and total risk. Still, not for Tobin's Q. This result contrasts with past empirical evidence. At first, Aouadi and Marsat (2018) show that the moderating effect holds in a general model, including the direct effect of ESG scores and controversies. However, their results are strongly influenced by the presence of the largest firms, and, more importantly, the direct effect of controversies varies according to different model specifications. Conversely, Nirino *et al.* (2021) highlight that a direct and significant negative effect of controversies on Tobin's Q is confirmed, even if the moderating effect of higher ESG scores is not large enough to counterbalance the adverse impact of corporate misconduct. Finally, Elamer and Boulhaga's (2024) findings indicate a negative direct effect of controversies and a moderating effect of the ESG score exist. Still, the direct effect of ESG practices negatively impacts firm value. This seemingly conflicting evidence prompts us to explore further the association between ESG score, controversies, and the moderating effect on a firm's value expressed by equation (4)[9]. We adopted a quantile regression approach to study the relationship between Tobin's Q and ESG independent variables in greater detail. Quantile regressions based on the method of moments (Machado and Santos Silva, 2019) are then used to verify to what extent ESG variables impact Tobin's Q of firms with heterogeneous levels of value[10]. We also apply the quantile regression approach on the idiosyncratic and total risk to evaluate the varying impact of the same ESG variables on risk metrics. Table 4 presents the results of the estimations across the 10^{th}, 30^{th}, 50^{th}, 70^{th}, and 90^{th} quantiles of

Table 4. Quantiles regressions for moderating effect on value and risk

	Tobin's Q					IR					TR				
	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
ESG score	0.1127***	0.1062***	0.1000***	0.0930***	0.0850***	−0.0067	−0.0110**	−0.0152***	−0.0207***	−0.0279***	−0.0215***	−0.0258***	−0.0298***	−0.0351***	−0.0427***
	(6.35)	(6.30)	(5.77)	(4.82)	(3.72)	(−1.41)	(−2.41)	(−2.98)	(−3.20)	(−3.15)	(−3.28)	(−3.97)	(−4.18)	(−4.02)	(−3.59)
Controversy	−0.0106	−0.0213**	−0.0315***	−0.0430***	−0.0560***	0.0090***	0.0143***	0.0193***	0.0258***	0.0345***	0.0124***	0.0188***	0.0249***	0.0330***	0.0447***
	(−0.92)	(−2.05)	(−3.03)	(−3.69)	(−3.92)	(2.73)	(4.55)	(5.45)	(5.57)	(5.27)	(2.92)	(4.60)	(5.38)	(5.45)	(5.11)
ESG score ×	−0.0061	0.0098	0.0250 (1.37)	0.0422**	0.0617**	−0.0115**	−0.0174***	−0.0230***	−0.0304***	−0.0401***	−0.0180**	−0.0246***	−0.0308***	−0.0390***	−0.0509***
controversy	(−0.30)	(0.54)		(2.04)	(2.43)	(−2.09)	(−3.38)	(−3.99)	(−4.00)	(−3.72)	(−2.45)	(−3.50)	(−3.92)	(−3.84)	(−3.47)
ROA	0.9029***	0.8935***	0.8845***	0.8744***	0.8629***	−0.0980***	−0.1205***	−0.1419***	−0.1702***	−0.2070***	−0.1618***	−0.1977***	−0.2315***	−0.2765***	−0.3411***
	(24.75)	(25.59)	(24.13)	(20.86)	(17.01)	(−11.77)	(−14.91)	(−15.72)	(−14.76)	(−13.05)	(−14.74)	(−18.48)	(−19.51)	(−18.49)	(−16.31)
Age	0.0102 (0.85)	−0.0170	−0.0430***	−0.0724***	−0.1056***	0.0021	−0.0012	−0.0043	−0.0084**	−0.0138***	0.0022 (0.55)	0.0003 (0.08)	−0.0015	−0.0039	−0.0073
		(−1.45)	(−3.56)	(−5.49)	(−6.98)	(0.80)	(−0.44)	(−1.43)	(−2.21)	(−2.67)			(−0.35)	(−0.77)	(−1.11)
Size	−0.1062***	−0.1263***	−0.1456***	−0.1673***	−0.1920***	−0.0100***	−0.0126***	−0.0150***	−0.0182***	−0.0224***	−0.0111***	−0.0139***	−0.0165***	−0.0199***	−0.0249***
	(−14.60)	(−18.11)	(−20.53)	(−21.81)	(−21.97)	(−6.75)	(−8.68)	(−9.33)	(−9.00)	(−8.15)	(−5.20)	(−6.54)	(−7.09)	(−7.01)	(−6.46)
Leverage	0.1805***	0.1460***	0.1130***	0.0758***	0.0336 (1.02)	0.0369***	0.0539***	0.0699***	0.0911***	0.1188***	0.0680***	0.0872***	0.1052***	0.1293***	0.1639***
	(7.25)	(6.14)	(4.58)	(2.74)		(6.04)	(8.73)	(10.23)	(10.88)	(10.77)	(8.22)	(10.44)	(11.49)	(11.66)	(11.07)
Capex	0.8886***	1.0233***	1.1522***	1.2978***	1.4626***	−0.1041***	−0.1238***	−0.1425***	−0.1673***	−0.1995***	−0.2042***	−0.2472***	−0.2875***	−0.3413***	−0.4187***
	(13.01)	(16.15)	(18.00)	(18.33)	(17.37)	(−5.82)	(−7.16)	(−7.47)	(−6.95)	(−6.08)	(−8.86)	(−10.97)	(−11.65)	(−11.19)	(−9.96)
Asset growth	0.0392***	0.0535***	0.0673***	0.0828***	0.1004***	0.0029*	0.0034**	0.0038**	0.0044*	0.0052 (1.63)	−0.0012	−0.0005	0.0002 (0.11)	0.0012 (0.43)	0.0026
	(5.64)	(8.56)	(10.93)	(12.31)	(12.51)	(1.73)	(2.02)	(2.04)	(1.88)		(−0.59)	(−0.23)			(0.66)
GDP growth	1.0624***	1.1735***	1.2798***	1.3998***	1.5357***	−0.1456***	−0.1828***	−0.2180***	−0.2646***	−0.3254***	−0.3544***	−0.3896***	−0.4226***	−0.4666***	−0.5300***
	(12.58)	(15.39)	(16.88)	(16.63)	(15.05)	(−4.90)	(−6.46)	(−7.05)	(−6.82)	(−6.13)	(−8.45)	(−9.62)	(−9.71)	(−8.84)	(−7.38)
Constant	1.5663***	2.0833***	2.5784***	3.1370***	3.7698***	0.2650***	0.3481***	0.4269***	0.5312***	0.6672***	0.4568***	0.5445***	0.6269***	0.7367***	0.8946***
	(14.13)	(19.54)	(23.59)	(26.24)	(27.47)	(11.77)	(15.73)	(17.29)	(17.00)	(15.69)	(14.34)	(17.30)	(18.14)	(17.34)	(15.39)

(*continued*)

Table 4. Continued

	Tobin's Q					IR					TR				
	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Firm-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	80,652	80,652	80,652	80,652	80,652	79,208	79,208	79,208	79,208	79,208	80,097	80,097	80,097	80,097	80,097
Pseudo-R^2	0.648	0.658	0.658	0.656	0.652	0.650	0.652	0.651	0.649	0.646	0.664	0.664	0.664	0.662	0.661

Note(s): The results refer to quantile regressions for the sample of 10,212 firms. The observation period is 2002–2021. Dependent variables: in columns 1–5 Tobin's Q, in columns 6–10 Idiosyncratic Risk (IR), in columns 11–15 Total Risk (TR). Models incorporate firm, year, and country fixed effects. Robust z-statistics are in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively

Source(s): Authors' own work

dependent variables. Concerning the direct effect of ESG scores, firms with higher Tobin's Q exhibit a smaller positive effect of ESG scores than firms with smaller market-based performance. ESG score coefficients vary from 0.1127 in the 10^{th} to 0.0850 in the 90^{th} quantile, showing a positive and decreasing pattern. We find the same downward trend for the risk measures, but in this case, the results must be interpreted regarding risk reduction. Lower-risk firms (q_{10}) exhibit a smaller positive impact (e.g., lower reduction in risk) compared to higher-risk firms (q_{90}), suggesting that high-risk firms benefit more than low-risk firms from better ESG scores. Except for the lower tail of the distribution for idiosyncratic risk, all the quantiles of risk measures show statistically significant negative coefficients. Moving to the direct effect of negative ESG events, findings indicate that firms with higher values and higher levels of risk are more sensitive to controversies. Decrease (increase) in value (risk) is more prominent in magnitude for firms in the 90^{th} quantile compared to firms in the 10^{th} quantile (-0.0560, 0.0345, and 0.0447 for high-value, high-risk firms; -0.0106, 0.0090, and 0.0124 for low-value, low-risk firms, respectively). Only the lowest part of Tobin's Q distribution shows a statistically insignificant (but consistent in sign) coefficient. Finally, focusing on the association between the moderating effect and varying levels of a firm's value and risk, our results from quantile regressions reveal that as value and risk profiles increase, firms benefit more from higher ESG scores once a controversy occurs. The pattern is evident for the three dependent variables. However, the effect is more pronounced and robust for Tobin's Q in the latest two quantiles. Only firms in the 70^{th} and 90^{th} quantiles exhibit statistically significant coefficients. Firms in smaller value quantiles (q_{50}, q_{30}, and q_{10}) seem unable to exploit the likely advantage of better ESG practices in reducing the negative impact of corporate ESG misconduct, as their coefficients are statistically insignificant. For the two risk measures, the moderating effect follows a more regular positive trend in reducing realized idiosyncratic and total volatility. The coefficients in all quantiles are statistically significant and negative and vary across the conditional distributions. These associations are adequately represented in Figure 1, which exhibits the upward (downward) trend of the moderating effect of ESG coefficients (vertical-axis) as Tobin's, idiosyncratic risk, and total volatility vary (horizontal-axis). Shadowed areas represent confidence intervals. Overall, our results reconcile with past contradictory evidence showing that the direct effects of the ESG score and ESG adverse events are present and robust across different quantiles of Tobin's Q. Furthermore, the moderating effect of ESG scores affects market-based performance following an upward positive trend. It is mainly driven by firms in the highest quintiles (q_{70} to q_{90}) of Tobin's Q. Combined with the new evidence of the varying impact of ESG variables on risk measures, our analysis sheds further light on our knowledge of their direct and indirect impact on firm metrics.

Recent empirical evidence (Li *et al.*, 2019), limited to firm value metrics, highlights that firms facing controversies adopt various strategies and that the financial markets react asymmetrically to a firm's CSR activities in response to internal adverse events (Yang *et al.*, 2024). Therefore, we explore in Table 5 whether the primary findings from Table 3 hold across different levels of ESG controversy. We interact the overall ESG score with each dummy variable representing controversy severity levels based on quintiles of ESG Controversy Score (Controversy Severity 1–5) and examine the ESG score's moderating effect from low (1) to extremely serious (5) controversy levels.

Findings indicate that the ESG score mitigates the adverse impact of controversies mainly at low (1) and moderate (2) severity levels. As controversies become more severe, the positive moderating effect of robust ESG practices diminishes. Thus, while robust ESG practices can mitigate financial risks due to low-to-moderate-severity controversies, their effectiveness weakens in extreme cases due to credibility concerns, regulatory scrutiny, and adverse market reactions. Severe controversies often lead to heightened legal liabilities, operational disruptions,

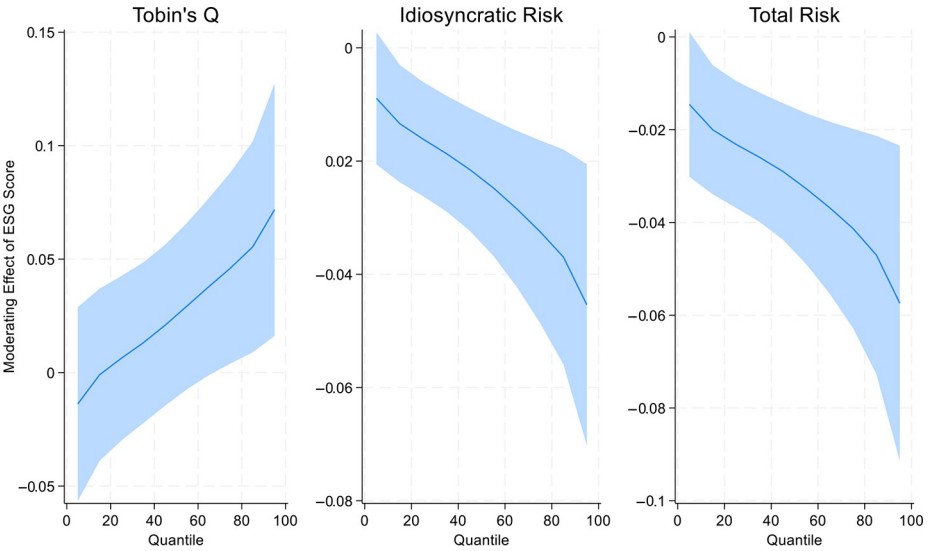

Figure 1. Moderating effect of ESG score on Tobin'Q, idiosyncratic risk, and total risk quantiles distribution

Note(s): The moderating effect of ESG score coefficients are represented on the Y-axis. Quantiles of Tobin's Q, idiosyncratic risk, and total volatility are on the X-axis. The light blue area corresponds to the confidence interval

Source: Authors' own work

and reputational damage, which ESG scores alone cannot counterbalance. Moreover, when firms with high ESG ratings face significant controversies, stakeholders may perceive their ESG commitments as superficial or inconsistent, leading to increased skepticism and reduced confidence. The financial repercussions of high-severity controversies tend to be longer-lasting and more severe, manifesting in stock price declines, credit rating downgrades, and diminished investor trust, further limiting the protective role of ESG engagement.

This result suggests that to manage high-severity controversies effectively, firms must go beyond ESG scoring and adopt a more proactive approach to governance, risk management, and crisis response. Strengthening ESG oversight structures, enhancing transparency in controversy mitigation, and integrating ESG risks into core business strategies are crucial for increasing resilience. Additionally, ESG strategies should be tailored to industry-specific risks, as the impact of controversies varies significantly across sectors. Firms must also ensure that their ESG frameworks remain dynamic and aligned with evolving regulatory requirements and stakeholder expectations rather than relying on static ESG ratings. By embedding ESG risk management into strategic decision-making and adopting forward-looking risk assessment models, firms can better safeguard their financial stability even when facing severe ESG-related controversies.

This suggests that firms focusing solely on enhancing ESG scores without addressing the risks associated with significant controversial events are not sufficiently safeguarding their financial stability, as liability and compliance risks related to ESG controversial events may be substantial. The policy implications are clear: to avoid the significant costs associated with ESG controversies, firms must invest in robust risk control instruments (EBA, 2020; Basel Committee on Banking Supervision, 2021).

Table 5. Moderating Effect on Value and Risk for Different Controversies Severity

Variables	Tobin's Q (1)	IR (2)	TR (3)
ESG score	0.1006*** (5.79)	−0.0191*** (-3.58)	−0.0346*** (-4.70)
Controversy	−0.0291*** (-3.14)	0.0124*** (3.56)	0.0151*** (3.30)
ESG Score x ESG Controversy Severity 1	0.0770*** (4.45)	−0.0198*** (-3.27)	−0.0231*** (-2.78)
ESG Score x ESG Controversy Severity 2	0.0345** (2.01)	−0.0123** (-2.00)	−0.0158* (-1.92)
ESG Score x ESG Controversy Severity 3	−0.0123 (-0.73)	0.0003 (0.05)	−0.0019 (-0.22)
ESG Score x ESG Controversy Severity 4	−0.0021 (-0.11)	−0.0094 (-1.44)	−0.0092 (-1.07)
ESG Score x ESG Controversy Severity 5	−0.0141 (-0.75)	0.0031 (0.49)	0.0060 (0.69)
Constant	0.8822*** (23.94)	0.4464*** (17.25)	0.6458*** (17.99)
(*Control variables omitted*)			
Firm-fixed effect	YES	YES	YES
Year-fixed effect	YES	YES	YES
Country-fixed effect	YES	YES	YES
Observations	79,226	77,899	78,695
N. Firms	10,129	10,084	10,202
R^2	0.840	0.577	0.735
Adjusted-R^2	0.817	0.513	0.695

Note(s): The results refer to regressions for the sample of 10,202 firms. The observation period is 2002–2021. Dependent variables: in column 1 Tobin's Q, in column 2 Idiosyncratic Risk (IR), in column 3 Total Risk (TR). Models incorporate firm, year, and country fixed effects. Robust t-statistics are in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively
Source(s): Authors' own work

Moreover, the effectiveness of such risk mitigation strategies can vary across regions and industries, influenced by the strength of regulatory frameworks. In developed markets, robust regulations and enforcement mechanisms help mitigate the adverse effects of controversies, whereas in emerging markets, weaker institutions and lower ESG disclosure standards may exacerbate risks. Similarly, sectoral differences can be pronounced, with high-risk industries facing heightened vulnerability due to increased regulatory scrutiny, environmental risks, and stakeholder pressures. To navigate these challenges, firms operating in high-risk industries should adopt proactive ESG strategies, including enhanced transparency, independent ESG audits, and stronger governance mechanisms to preempt controversies. Additionally, aligning with international sustainability standards (e.g., TCFD, GRI) can help firms in less-regulated environments build credibility and attract responsible investors.

5. Robustness checks

In Table 6, we perform further heterogeneity analyses to verify if the moderating effect of ESG score is robust across various geographical specifications (Panel A), among alternative industry definitions (Panel B), and in different sample periods (Panel C).

First, we evaluate the possibility that the general results highlighted for the moderating effect expressed by equation (4) are mainly driven by US firms as they represent more than 35% of all the firms covered in the overall sample period and could be differently affected by the adverse effects of corporate controversies, and by the positive impact of the moderating effect. We then re-estimate the model in equation (4) and focus on a sub-sample of 6,269 non-US firms from developed and emerging markets. After excluding US firms, our results remain robust [11].

Table 6. Moderating effect for different Sub-samples

Variables	Tobin's Q (1)	IR (2)	TR (3)
Part A. Moderating effect: subsample without US firms			
ESG score	0.0802*** (3.97)	−0.0153** (−2.30)	−0.0248*** (−2.79)
Controversy	−0.0342*** (−2.59)	0.0160*** (2.94)	0.0236*** (3.38)
ESG score × controversy	0.0360 (1.64)	−0.0169** (−1.98)	−0.0259** (−2.30)
(*Control variables omitted*)			
Year-fixed effect	YES	YES	YES
Country-fixed effect	YES	YES	YES
Firm × industry-fixed effect	YES	YES	YES
Observations	53,291	51,195	51,668
N. Firms	6,629	6,515	6,577
R^2	0.838	0.532	0.707
Adjusted-R^2	0.815	0.463	0.664
Part B. Moderating effect: subsample without financial firms			
ESG score	0.1083*** (5.47)	−0.0154*** (−2.76)	−0.0289*** (−3.88)
Controversy	−0.0309*** (−2.67)	0.0186*** (4.68)	0.0228*** (4.47)
ESG score × controversy	0.0226 (1.09)	−0.0230*** (−3.53)	−0.0278*** (−3.21)
(*Control variables omitted*)			
Year-fixed effect	YES	YES	YES
Industry-fixed effect	YES	YES	YES
Firm × country-fixed effect	YES	YES	YES
Observations	68,151	67,089	67,769
N. Firms	8,759	8,728	8,831
R^2	0.830	0.575	0.740
Adjusted-R^2	0.805	0.510	0.701
Part C. Moderating effect: subsample without COVID-19 years			
ESG score	0.0875*** (4.78)	−0.0218*** (−3.65)	−0.0372*** (−4.49)
Controversy	−0.0312*** (−2.98)	0.0173*** (4.54)	0.0212*** (4.26)
ESG score × controversy	0.0335* (1.79)	−0.0195*** (−3.08)	−0.0231*** (−2.72)
(*Control variables omitted*)			
Firm-fixed effect	YES	YES	YES
Year-fixed effect	YES	YES	YES
Country-fixed effect	YES	YES	YES
Observations	68,151	67,089	67,769
N. Firms	8,759	8,728	8,831
R^2	0.830	0.575	0.740
Adjusted-R^2	0.805	0.510	0.701

Notes(s): The results for Part A. refer to the regressions for non-US firms only. The observation period is 2002–2021. Models incorporate year, country and firm-industry fixed effects. The results for Part B. refer to the regressions for non-financial firms only. The observation period is 2002–2021. Models incorporate year, industry and firm-country fixed effects. The results for Part C. refer to the regressions for firms in the 2002–19 observation period. Models incorporate firm, year and country fixed effects. Dependent variables: in column 1 Tobin's Q, in column 2 Idiosyncratic Risk (IR) and in column 3 Total Risk (TR). Standard errors are clustered by firm. Robust t-statistics in parentheses. For the definitions of the variables, see Table 1. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively
Source(s): Authors' own work

We further investigate whether financial firms influence the main results [12]. It is often argued that financial firms (banks, insurance, investment services) exhibit valuation and risk profiles (idiosyncratic and total) influenced by characteristics partially different from non-financial firms (Neitzert and Petras, 2022) and that part of their risk embeds also a systemic component (Hafeez *et al.*, 2022). The general results are confirmed again for the restricted sample of non-financial firms only, showing that the moderating effect of higher ESG scores still holds.

Finally, we explore the possibility that the partial (and not significant) results for the moderating effect related to the firm valuation metric can be driven by the inclusion of the 2020–2021 period, which was severely affected, at the global level, by the COVID-19 pandemic. It is plausible to assume that, at the outbreak's peak, individuals' and firms' limitations and restrictions have exacerbated the insurgence of Social controversies between firms and stakeholders. In a sub-sample that excludes the COVID-19 years, we find that the direct effect of ESG misconduct on value and risk metrics is lower, and the moderating effects for Tobin's Q become statistically significant (β_3 = 0.0335, $p < 0.10$). Control variables are omitted from the tables to enhance readability, as their estimated coefficients are coherent with past empirical literature.

We also adopt alternative definitions of the value/risk metrics in equation (4) and evaluate the correctness of our findings. First, we use the Market-to-Book ratio (M/B) instead of Tobin's Q to proxy the firm's market-based performance. In line with our measurement of Tobin's Q, we take the natural logarithm of the firm's equity market value over the book value of equity to measure the Market-to-Book ratio. Idiosyncratic risk is estimated using two different approaches. We use a regionally diversified four-factor model in equation (5) by adding a regional momentum factor (Carhart, 1997) to the traditional version of the regional three-factor model (Fama and French, 1993). We also consider a globally diversified five-factor model in equation (6) by aggregating the firms in a general portfolio of developed and emerging markets without further regional specifications. Finally, consistent with the empirical evidence that firms with higher ESG scores tend to have lower financial distress risk (Boubaker *et al.*, 2022), we proxy the firm's risk by computing its Altman's Z-score (Altman, 1968). Increasing score values in equation (7) denote a decreasing probability of financial distress or default. The alternative measures of value/risk metrics are obtained as follows:

$$R_{i,t} - R^r_{f,t} = a_i + b_i\left(R^r_{m,t} - R^r_{f,t}\right) + s_i SmB^r_t + h_i HmL^r_t + r_i WmL^r_t + e_{i,t} \tag{5}$$

$$R_{i,t} - R^g_{f,t} = a_i + b_i\left(R^g_{m,t} - R^g_{f,t}\right) + s_i SmB^g_t + h_i HmL^g_t + r_i RmW^g_t + c_i CmA^g_t + e_{i,t} \tag{6}$$

$$\text{Altman's Z-score} = 1.2 \times \frac{\text{Working Capital}}{\text{Total Assets}} + 1.4 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} + 3.3 \times \frac{\text{EBIT}}{\text{Total Assets}} + 0.999 \times \frac{\text{Sales}}{\text{Total Assets}} + 0.6 \times \frac{\text{Market Capitalization}}{\text{Total Liabilities}} \tag{7}$$

where WmL^r_t Is the return on a portfolio of winners' stocks minus the return of losers' stocks, and the superscripts *r* and *g* denote regionally or globally diversified factors and portfolios.

We assume that the same positive direct and indirect effects of ESG scores and the negative impact of ESG adverse events highlighted in Table 3 should also be confirmed for our different market value and risk measures. Table 7 confirms this expectation.

We conclude this paragraph by considering some endogeneity issues. While panel OLS with fixed effects models helps address endogeneity resulting from unobserved heterogeneity, they do not fully resolve concerns related to reverse causality or time-varying omitted variables. Moreover, quantile regressions via methods of moments that include fixed effects allow us to account for distributional heterogeneity in the relationships between dependent variables and ESG explanatory variables and offer robustness to individual-specific unobserved effects and outliers, but do not inherently correct for endogeneity. We, therefore, adopt an instrumental variable regression approach to consider residual endogeneity. We instrumented the ESG Score at time t with its lagged value at time t - *1*. The implicit assumption to consider the ESG Score as an endogenous variable is twofold. Firstly, while higher ESG engagement may influence a firm's value, firms with higher market valuation may likely enhance ESG performance because they have greater financial flexibility to adopt more ambitious ESG policies, implying that Tobin's Q may influence ESG performance. Similarly, firms experiencing elevated idiosyncratic/total risk might increase their ESG investments to reduce perceived risk and attract socially responsible investors, improving their reputation and signalling stability to investors and other stakeholders.

Secondly, unobservable factors (managerial quality, long-term corporate strategy, institutional and regulatory pressure) could also exist that may simultaneously affect both the ESG Score and the firm's value and risk metrics.

Moreover, to justify the lagged ESG Score as an appropriate instrument, it is reasonable to assume that ESG performance measures typically exhibit high persistence over time, making the lagged value strongly correlated with the current level of ESG Score and that past ESG Score is not directly influenced by current firm value, idiosyncratic or total risk, especially when controlling for firm, year, and country fixed effects. Table 8 shows the results of the Instrumental Variable (IV) regressions performed with a 2-step GMM robust estimator that replicates models (3), (6), and (9) in Table 3. The direct and statistically significant effect of ESG Controversies is confirmed for Tobin's Q ($\beta_2 = -0.0245$, $p < 0.01$) and measures of risk ($\beta_2 = 0.0219$, $p < 0.01$ and $\beta_2 = 0.0290$, $p < 0.01$, respectively). The interaction term (ESG Score × Controversy) supports again the existence of a moderating effect provided by higher ESG Score for idiosyncratic and total risk ($\beta_3 = -0.0276$, $p < 0.01$, and $\beta_3 = 0.0372$, $p < 0.01$, respectively). At the same time, the coefficient for Tobin's Q is still not statistically significant. Finally, the direct effect of higher ESG is persistent for Tobin's Q ($\beta_1 = 0.1117$, $p < 0.01$) and somewhat weaker but consistent in sign for the risk metrics ($\beta_1 = -0.0098$, $p > 0.10$ and $\beta_1 = -0.0157$, $p < 0.10$, respectively). Overall, the evidence does not substantially alter our basic findings that the ESG Controversies significantly impact the firm's value and risk measures and that pro-active ESG engagement helps mitigate their adverse effect.

6. Conclusions

This paper presents a comprehensive framework that explores the relationship between ESG controversies and a firm's value and risk, emphasizing the direct and indirect moderating roles of ESG scores. Effective ESG practices can mitigate the negative impacts of controversies, enhancing a firm's resilience and adaptability. Based on their severity, analyzing the moderating effects of ESG practices on different types of controversies could encourage more significant investment in ESG initiatives to improve risk management and boost market performance.

Table 7. Moderating effect for different measures of value and risk

Variables	Market-to-Book (1)	Idiosyncratic risk (Regional four-factor Model) (2)	Idiosyncratic risk (Global five-factor Model) (3)	Altman's Z-Score (4)
ESG score	0.1775*** (5.86)	−0.0194*** (-3.40)	−0.0142*** (-2.60)	0.7276*** (2.90)
Controversy	−0.0574*** (-3.15)	0.0200*** (5.09)	0.0216*** (5.76)	−0.2952** (-2.10)
ESG score × controversy	0.0382 (1.15)	−0.0218*** (-3.39)	−0.0238*** (-3.86)	0.4818** (2.04)
ROA	1.4360*** (26.71)	−0.1487*** (-15.00)	−0.1415*** (-14.59)	8.0766*** (15.76)
Age	−0.0633*** (-2.87)	−0.0067** (-2.00)	−0.0046 (-1.44)	−0.5637*** (-3.70)
Size	−0.2294*** (-20.33)	−0.0158*** (-8.88)	−0.0157*** (-9.36)	−0.8158*** (-6.41)
Leverage	1.5498*** (35.53)	0.0795*** (10.53)	0.0785*** (11.05)	−12.4831*** (-27.95)
Capex	1.7118*** (16.41)	−0.1445*** (-6.70)	−0.1491*** (-7.22)	1.1493 (1.14)
Asset growth	0.1158*** (12.89)	0.0040** (1.98)	0.0035* (1.84)	1.3094*** (9.66)
GDP growth	2.8072*** (21.14)	−0.2482*** (-7.31)	−0.3030*** (-9.42)	4.8398*** (4.42)
Constant	3.3115*** (19.18)	0.4734*** (17.21)	0.4499*** (17.34)	24.2228*** (12.38)
Firm-fixed effect	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES
Observations	79,228	78,066	77,899	63,387
N. Firms	10,129	10,108	10,084	8,094
R^2	0.811	0.590	0.571	0.772
Adjusted-R^2	0.783	0.529	0.506	0.738

Note(s): The results refer to regressions for the sample of 10,212 firms. The observation period is 2002–2021. Dependent variables: in column 1 Market-to-Book, in columns 2 Idiosyncratic Risk (IR) based on a Regional four-factor model, in column 3 Idiosyncratic Risk (IR) based on a Global five-factor model, in column 4 Total Risk (TR) based on the Altman's z-score. Models incorporate firm, year, and country fixed effects. Robust t-statistics are in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively
Source(s): Authors' own work

Table 8. Moderating effect estimates with IV-2 step GMM addressing endogeneity

Variables	Tobin's Q (1)	IR (2)	TR (3)
ESG score	0.1117*** (6.34)	−0.0098 (−1.39)	−0.0157* (−1.79)
Controversy	−0.0245*** (−3.00)	0.0219*** (6.16)	0.0290*** (6.64)
ESG score × controversy	0.0146 (1.03)	−0.0276*** (−4.63)	−0.0372*** (−5.00)
ROA	0.8869*** (35.78)	−0.1469*** (−17.35)	−0.2304*** (−21.81)
Age	−0.0468*** (−7.42)	−0.0038 (−1.58)	−0.0010 (−0.33)
Size	−0.1388*** (−35.40)	−0.0142*** (−10.37)	−0.0175*** (−10.49)
Leverage	0.1094*** (7.30)	0.0753*** (13.74)	0.1178*** (17.62)
Capex	1.2247*** (26.10)	−0.1437*** (−8.20)	−0.3075*** (−14.47)
Asset growth	0.0527*** (11.09)	0.0014 (0.79)	−0.0029 (−1.39)
GDP growth	1.2414*** (18.85)	−0.2119*** (−7.09)	−0.4047*** (−10.61)
Constant	−0.0005 (−0.55)	0.0002 (0.67)	0.0003 (0.62)
Firm-fixed effect	YES	YES	YES
Year-fixed effect	YES	YES	YES
Country-fixed effect	YES	YES	YES
Observations	69,672	68,607	69,160
N. Firms	9,842	9,598	9,644
Centered R^2	0.131	0.031	0.053
Uncentered R^2	0.131	0.031	0.053

Note(s): The results refer to the Instrumental Variable (IV) regressions for the sample of 10,212 firms. The observation period is 2002–2021. Dependent variables: in column 1 Tobin's Q, in column 2 Idiosyncratic Risk (IR), in column 3 Total Risk (TR). Models incorporate firm, year and country fixed effects. Robust t-statistics in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively
Source(s): Authors' own work

Our empirical analysis uncovered several key findings. First, we found a significant positive relationship between ESG scores, firm value, idiosyncratic and total risk: higher ESG scores increase Tobin's Q and reduce risk metrics (H1a and H1b). Second, we identified a strong negative correlation between corporate controversies and the value/risk dependent variables: market-based value decreases and risk measures increase (H2a and *H2* b) when a controversy occurs. However, this relationship is not rigid and is moderated by ESG practices, with the ESG score as an essential mediator in ESG controversies (*H3*). While the moderating effect is significant and robust for idiosyncratic and total risk, only firms with the highest Tobin's Q seem to benefit from its positive impact. Increased focus on ESG issues may heighten stakeholder sensitivity to controversies, resulting in a nonlinear relationship between ESG scores, controversies, the moderating effect, and value/risk measures. This assumption is corroborated by the different and heterogeneous effects of ESG variables highlighted in quantile regression analysis. Moreover, the effectiveness of ESG practices is more pronounced when the severity of the controversy is low. Our findings suggest that robust internal ESG frameworks can convert controversies into advantages, boosting company growth and reputation depending on the severity of the controversy.

From a policy perspective, firms should invest in comprehensive risk controls and develop strategies to assess the severity of controversies to avoid irreversible negative impacts on value. The comparison between different regions, industries, and periods introduced a geographical and regulatory perspective to our results, highlighting the influence of distinct contexts and regulatory frameworks on the relationship between ESG

controversies and firm performance. This also implies that an institutional regulatory framework with mandatory national codes may be essential to achieving ESG objectives on a global scale.

This paper makes several contributions. First, it enriches the academic dialogue on ESG scores and controversies and their impacts on firm performance and risk by providing empirical data that extends the understanding of these relationships internationally for both financial and non-financial firms. We examined the moderating role of ESG scores when controversies negatively affect firm value and increase risk. Second, the findings suggest that effective ESG strategies can enhance financial firm performance and reduce risk. ESG practices mitigate the negative effects of controversies and create new opportunities for sustainable business growth. On a macro level, sustainable goals are better addressed by institutional regulatory frameworks. Policymakers should encourage firms to internalize ESG culture to reduce the negative effects of their activities, resulting in higher firm value and reduced risk. A well-coordinated macro policy is also desirable to reduce systematic risk, which is not significantly impacted by micro ESG strategies at the firm level. Third, we provide evidence of nuanced results for different levels of severity of ESG controversy, as well as various geographical, industry, and temporal settings. These results offer policymakers insights into enhancing policies that address differentiated needs in the evolving landscape of ESG practices and controversies.

These findings carry several practical implications. For investors, ESG performance emerges as a meaningful signal of value creation and risk management. Including ESG criteria in investment decisions can help identify firms that are more resilient in the face of adverse events and more likely to deliver stable, long-term returns. For regulators, the study highlights the importance of promoting consistent and enforceable ESG standards. Our evidence suggests that institutional frameworks play a critical role in shaping the effectiveness of ESG practices. When the regulatory environment sets common standards and expectations, ESG efforts become more credible and comparable, helping to build trust across markets. For corporate managers, the findings point to the strategic value of ESG integration beyond simple compliance. Considering ESG as a core component of enterprise risk management and long-term value creation can offer protection in times of crisis and opportunities for competitive advantage. This study has limitations, and further research is needed. First, we rely on a single ESG data provider (LSEG), which may introduce measurement inconsistencies, as different providers (e.g., MSCI, Sustainalytics) often use distinct methodologies to assess ESG performance. Future research could address this issue by incorporating multiple ESG data sources or using direct measures of ESG/CSR activities to enhance robustness. Second, our sample is limited to listed firms, which typically have higher ESG disclosure requirements and stronger investor scrutiny. This may not fully capture the ESG dynamics in privately held companies, where disclosure incentives and regulatory pressures differ. Including non-listed firms in future research could provide a more comprehensive regulatory and market perspective. Third, although our study spans twenty years, ESG practices and regulatory frameworks rapidly evolve. What was considered best practice in ESG a decade ago may no longer be effective today. Future studies should consider updating and re-evaluating the impact of ESG scores and controversies in light of new regulations, emerging ESG trends, and evolving stakeholder expectations. A longer-term perspective with rolling updates would allow researchers to assess how ESG effectiveness adapts over time. Fourth, endogeneity concerns may arise due to the bidirectional relationship between ESG performance and corporate controversies. Firms with high ESG scores may be more transparent and, therefore, more exposed to scrutiny, increasing the likelihood of reported controversies. Conversely, firms facing

ESG-related controversies may attempt to offset reputational damage by increasing ESG investments. To address this, future research could apply difference-in-differences models or propensity score matching techniques to isolate causal effects better. Fifth, while our study considers an aggregated ESG score, analyzing the individual effects of Environmental (E), Social (S), and Governance (G) factors could provide deeper insights into their distinct impacts on firm value and risk. For instance, environmental risks may be more relevant for energy-intensive industries, whereas governance factors could play a stronger role in financial stability. Future research could disaggregate ESG components and assess their relative influence across different industries and risk dimensions. In addition to addressing these limitations, further avenues for research can explore broader aspects of ESG dynamics. One key direction is a sector-specific analysis of ESG impacts. Different industries face distinct ESG challenges and regulatory requirements, which could influence how ESG practices mitigate risks and enhance firm value. Exploring sectoral variations could provide deeper insights into ESG effectiveness across industries with varying environmental and social footprints.

Additionally, incorporating real-time ESG controversy data could refine the analysis by capturing the immediate market reactions and risk dynamics associated with ESG events. Unlike retrospective ESG scores, real-time data could reveal how markets adjust to controversies as they unfold, offering a more nuanced understanding of ESG risk mitigation.

Finally, future research could explore national-level ESG policies and regulatory frameworks, as institutional settings vary significantly across countries. Investigating how different regulatory environments shape ESG risk management strategies would contribute to the broader discussion on ESG governance and financial stability.

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Notes

[1.] de Villiers *et al.* (2022) extensively review past empirical research that used LSEG ESG data (formerly known as Thomson Reuters ASSET 4).

[2.] Appendix 1 details the sample's distribution across industry sectors, geographical regions, countries, and years.

[3.] Idiosyncratic volatility can also be computed using local or international versions of the Fama-French 3-factor model (Fama and French, 1993; Fama and French, 2012), the Fama-French-Carhart 4-factor model, or hybrid 5-factor models obtained by adding, notably, a 1-year prior returns factor (Carhart, 1997) and a liquidity factor (Amihud, 2002) to the traditional Fama-French 3-factor model.

[4.] Data for stocks' market prices are from LSEG Datastream. Firm's *i* return between time *t* and *t*-1 are obtained as = $\ln(P_{i,t}/P_{i,t-1})$. Regionally diversified SmB_t, HmL_t, RmW_t, and CmA_t factors for developed and emerging countries, market risk premiums, and risk-free rates are available from Kenneth French's website: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[5.] Part C of Appendix 2 file highlights the composition by pillar of the different types of controversies and their temporal distribution across the sample period. Even though the ESG

Controversy Score incorporates adverse events relative to 23 specific issues, Table B.3 doesn't consider controversies related to strikes or industrial disputes, as LSEG records them as a YES/NO qualitative variable.

[6.] Part A of Appendix 3 presents the matrix of correlation coefficients. Dependent and explanatory variables appear significantly correlated, mainly at the 1 percent level. We also observe statistical significance between the five and ten percent levels. In only residual cases is there no statistically significant correlation found. VIF for independent variables is, on average, equal to 1.20, with a maximum of 1.69 for the Size control variable, denoting no concern for multicollinearity.

[7.] In untabulated results we perform a preliminary specification Durbin–Wu–Hausman test (Hausman, 1978) that suggests using a fixed-effect model rather than a random-effect one (Chi^2 statistic = 2445.84, *p*-value = 0.000).

[8.] Post-estimation Stata command *margins* are also applied to evaluate the marginal mean values of our dependent variables when an ESG controversy occurs, and no adverse ESG event is recorded. In models (2), (5), and (8), the margin values for Tobin's Q, idiosyncratic risk, and total risk in the two alternative scenarios are 0.4208 and 0.4386, 0.2207 and 0.2128, 0.4108 and 0.4012, respectively.

[9.] Eq. (2) and Eq. (3) quantile regression results are available in Part B and Part C of Appendix 3.

[10.] We use the Stata-written module *mmqreg* (Rios-Avila, 2020), allowing multiple fixed effects and clustered standard errors to perform moments quantile regression. *Pseudo-*R^2 is computed as the square root of the correlation between the fitted values and the dependent variable.

[11.] In un-tabulated results, we estimate the moderating effect for the sub-sample of firms from Developed countries, excluding US firms, and the results remain unchanged.

[12.] Financial firms are identified according to the Refinitiv Business Classification (TRBC) Economic Sector code (55).

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Appendix 1

Table A1. Distribution of observations

Part A. Number of observations by country

Country	Market classification	Number of firms	Percentage of Total firms (%)	Number of Firm-Year observations	Percentage of Total Firm-Year observations (%)	Average Firm-Year observations
Argentina	Emerging	53	0.52	266	0.34	5.02
Australia	Developed	479	4.69	3,689	4.69	7.70
Austria	Developed	38	0.37	349	0.44	9.18
Belgium	Developed	53	0.52	558	0.71	10.53
Brazil	Emerging	134	1.31	1,099	1.40	8.20
Canada	Developed	499	4.89	3,960	5.03	7.94
Chile	Emerging	43	0.42	392	0.50	9.12
China	Emerging	763	7.47	3,281	4.17	4.30
Colombia	Emerging	24	0.24	182	0.23	7.58
Czech Republic	Emerging	5	0.05	57	0.07	11.40
Denmark	Developed	62	0.61	530	0.67	8.55
Egypt	Emerging	18	0.18	137	0.17	7.61
Finland	Developed	86	0.84	598	0.76	6.95
France	Developed	197	1.93	1,972	2.50	10.01
Germany	Developed	294	2.88	1,943	2.47	6.61
Greece	Emerging	33	0.32	348	0.44	10.55
Hong Kong	Developed	263	2.58	2,283	2.90	8.68
Hungary	Emerging	6	0.06	57	0.07	9.50
India	Emerging	165	1.62	1,269	1.61	7.69
Indonesia	Emerging	49	0.48	434	0.55	8.86
Ireland	Developed	27	0.26	273	0.35	10.11
Italy	Developed	145	1.42	1,004	1.28	6.92
Japan	Developed	501	4.91	6,511	8.27	13.00
Malaysia	Emerging	72	0.71	626	0.80	8.69
Mexico	Emerging	54	0.53	408	0.52	7.56
Netherlands	Developed	68	0.67	651	0.83	9.57
New Zealand	Developed	55	0.54	388	0.49	7.05
Norway	Developed	100	0.98	611	0.78	6.11
Pakistan	Emerging	6	0.06	27	0.03	4.50
Peru	Emerging	29	0.28	173	0.22	5.97
Philippines	Emerging	30	0.29	269	0.34	8.97
Poland	Emerging	46	0.45	415	0.53	9.02
Portugal	Developed	18	0.18	205	0.26	11.39
Qatar	Emerging	41	0.40	179	0.23	4.37
Saudi Arabia	Emerging	45	0.44	240	0.30	5.33
Singapore	Developed	77	0.75	734	0.93	9.53
South Africa	Emerging	146	1.43	1,366	1.73	9.36
South Korea	Emerging	162	1.59	1,362	1.73	8.41
Spain	Developed	92	0.90	899	1.14	9.77
Sweden	Developed	298	2.92	1,556	1.98	5.22
Switzerland	Developed	179	1.75	1,341	1.70	7.49
Taiwan	Emerging	171	1.67	1,543	1.96	9.02
Thailand	Emerging	126	1.23	597	0.76	4.74
Turkey	Emerging	84	0.82	500	0.64	5.95
United Arab Emirates	Emerging	32	0.31	159	0.20	4.97
United Kingdom	Developed	718	7.03	6,264	7.96	8.72
United States	Developed	3,626	35.51	27,033	34.33	7.46
Total		10,212	100.00	78,738	100.00	7.71

(*continued*)

Table A1. Continued

Part B. Number of observations by geographical region

Geographical region	Number of firms	Percentage of Total firms (%)	Number of Firm-Year observations	Percentage of Total Firm-Year observations (%)	Average Firm-Year observations
North America	4,124	40.38	30,981	39.35	7.51
Asia-Pacific	2,920	28.59	23,025	29.24	7.89
Europe	2,465	24.14	19,631	24.93	7.96
Central/South America	337	3.30	2,520	3.20	7.48
Middle East	204	2.00	1,091	1.39	5.35
Africa	162	1.59	1,490	1.89	9.20
Developed markets	*7,908*	*77.44%*	*63,700*	*80.90%*	*8.06*
Emerging markets	*2,304*	*22.56%*	*15,038*	*19.10%*	*6.53*
Total	10,212	100.00	78,738	100.00	7.71

Part C. Number of observations by industry classification

TRBC economic sector classification	Number of firms	Percentage of Total firms (%)	Number of Firm-Year observations	Percentage of Total Firm-Year observations (%)	Average Firm-Year observations
Industrials	1,499	14.68	12,116	15.39	8.08
Technology	1,444	14.14	10,193	12.95	7.06
Consumer cyclicals	1,377	13.48	11,302	14.35	8.21
Financials	1,373	13.44	10,934	13.89	7.96
Healthcare	1,136	11.12	6,823	8.67	6.01
Basic materials	988	9.67	8,067	10.25	8.16
Consumer Non-Cyclicals	689	6.75	5,873	7.46	8.52
Energy	592	5.80	4,789	6.08	8.09
Real estate	592	5.80	4,515	5.73	7.63
Utilities	358	3.51	3,363	4.27	9.39
Other	164	1.61	763	0.97	4.65
Total	10,212	100.00	78,738	100.00	7.71

(*continued*)

Table A1. Continued

Part D. Number of observations by year		
Sample year	Number of Firm-Year observations	Percentage of Total Firm-Year observations
2002	777	0.99
2003	806	1.02
2004	1437	1.83
2005	1766	2.24
2006	1824	2.32
2007	1980	2.51
2008	2422	3.08
2009	2771	3.52
2010	3252	4.13
2011	3383	4.30
2012	3522	4.47
2013	3631	4.61
2014	3742	4.75
2015	4404	5.59
2016	5233	6.65
2017	6088	7.73
2018	6814	8.65
2019	7726	9.81
2020	8729	11.09
2021	8431	10.71
Total	78,738	100.00

Source(s): Authors' own work based on Refinitiv Business Classification (TRBC)

Appendix 2

Table A2. Distribution of ESG Controversies

Part A. Number of ESG controversies by type and geographical region

Geographical region	ESG controversies			
	Environmental pillar (E)	Social pillar (S)	Governance pillar (G)	Total
North America	554	14,286	2,006	16,846
Europe	439	8,765	769	9,973
Asia-Pacific	250	4,894	397	5,541
Africa	6	391	41	438
Central/South America	85	534	51	670
Middle East	2	83	3	88
Developed markets	*1,121*	*25,913*	*3,055*	*30,089*
Emerging markets	*215*	*3,040*	*212*	*3,467*
Total	1,336	28,953	3,267	33,556

Part B. Number of ESG controversies by type and industry classification

TRBC economic sector classification	ESG controversies			
	Environmental pillar (E)	Social pillar (S)	Governance pillar (G)	Total
Technology	48	5,462	557	6,067
Consumer cyclicals	237	4,671	414	5,322
Financials	19	4,451	642	5,112
Industrials	45	3,402	295	3,742
Healthcare	75	2,996	649	3,720
Consumer Non-Cyclicals	61	3,259	246	3,566
Basic materials	324	1,976	146	2,446
Energy	377	1,619	171	2,167
Utilities	148	864	60	1,072
Real estate	2	133	52	187
Other	0	120	35	155
Total	1,336	28,953	3,267	33,556

(*continued*)

Table A2. Continued

Part C. Distribution of ESG controversies by type, category and year

Controversy type	Category	Pillar	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Environmental	Resource use	(E) environmental	0	0	0	0	0	0	0	8	68	33	10	36	52	60	245	97	134	205	223	165	1,336
Anti-Competition	Comunity	(S) social	52	54	72	76	107	105	171	193	268	223	212	292	367	182	502	479	494	702	648	577	5,776
Business ethics	Comunity	(S) social	46	45	85	115	168	90	224	322	467	409	313	462	407	186	580	623	528	525	287	163	6,045
Intellectual property	Comunity	(S) social	63	62	86	74	84	82	204	244	382	182	111	92	60	12	40	71	118	150	113	84	2,314
Critical countries	Comunity	(S) social	0	1	4	3	3	19	40	22	38	4	4	6	6	5	4	2	8	12	11	36	228
Public health	Comunity	(S) social	14	22	16	34	52	34	56	26	73	57	48	79	51	17	35	16	32	55	33	43	793
Tax fraud	Comunity	(S) social	8	9	19	26	18	15	12	36	40	39	23	51	24	30	37	38	112	166	108	63	874
Child labor	Human rights	(S) social	0	1	3	1	9	14	8	6	14	11	9	6	12	5	1	0	2	3	2	6	113
Human rights	Human rights	(S) social	11	12	24	20	32	26	45	39	50	22	12	26	19	5	8	3	10	6	19	21	410
Consumer complaints	Product responsability	(S) social	32	29	41	55	52	53	131	99	172	129	89	102	162	69	77	77	155	138	176	167	2,005
Customer health and safety	Product responsability	(S) social	13	13	21	40	52	62	89	120	172	133	92	139	192	59	246	173	104	188	96	203	2,207
Privacy	Product responsability	(S) social	3	3	7	9	17	20	20	26	33	64	50	56	99	57	114	149	252	244	153	185	1,561
Product access	Product responsability	(S) social	4	3	2	3	0	3	2	3	12	8	8	15	23	9	3	2	6	13	2	9	130
Responsible marketing	Product responsability	(S) social	8	4	8	11	15	13	72	92	180	185	177	190	190	35	29	44	102	112	86	65	1,618
Responsible R&D	Product responsability	(S) social	0	1	0	1	0	2	7	7	9	9	11	6	5	2	2	2	5	2	0	1	72
Diversity and opportunity	Workforce	(S) social	22	23	25	49	42	69	77	74	81	78	85	65	63	45	29	55	70	66	37	54	1,109
Employees health and safety	Workforce	(S) social	26	22	29	39	68	40	110	105	208	190	156	157	169	37	48	19	51	35	93	57	1,659
Wages working condition	Workforce	(S) social	0	0	0	0	13	21	77	137	236	195	162	195	180	109	114	106	88	162	145	99	2,039

(*continued*)

Table A2. Continued

Part C. Distribution of ESG controversies by type, category and year																						
Controversy type	Category	Pillar	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Management compensation	Management	(G) corporate governance	22	32	23	23	56	18	17	42	33	27	20	18	22	7	14	14	14	36	16	18	472
Accounting	Shareholders	(G) corporate governance	21	12	20	22	28	38	41	52	17	17	7	15	17	11	16	16	42	57	45	26	520
Insider dealings	Shareholders	(G) corporate governance	28	28	24	30	38	34	15	21	20	18	22	26	17	12	19	13	28	14	17	17	441
Shareholder rights	Shareholders	(G) corporate governance	0	0	0	0	0	1	0	27	103	110	87	101	67	52	34	27	109	180	196	740	1,834
			373	376	509	631	854	759	1,418	1,701	2,676	2,143	1,708	2,135	2,204	1,006	2,197	2,026	2,464	3,071	2,506	2,799	**33,556**

Source(s): Authors' own work based on Refinitiv Business Classification (TRBC)

Appendix 3

Table A3. Additional analyses

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Part A. Correlation matrix of the main variables														
(1) Tobin's Q	1.0000													
(2) Idiosyncratic risk (IR)	0.0009 (0.792)	1.0000												
(3) Total risk (TR)	−0.0383*** (0.000)	0.7890*** (0.000)	1.0000											
(4) ESG Score	−0.0696*** (0.000)	−0.1930*** (0.000)	−0.1670*** (0.000)	1.0000										
(5) ESG Controversy Score	−0.0382*** (0.000)	−0.0430*** (0.000)	−0.0260*** (0.000)	0.2440*** (0.000)	1.0000									
(6) Controversy	−0.0252*** (0.000)	−0.0810*** (0.000)	−0.0660*** (0.000)	0.2730*** (0.000)	0.8190*** (0.000)	1.0000								
(7) ESG Score × Controversy	−0.0332*** (0.000)	−0.1060*** (0.000)	−0.0870*** (0.000)	0.3920*** (0.000)	0.7700*** (0.000)	0.9300*** (0.000)	1.0000							
(8) ROA	0.1785*** (0.000)	−0.3740*** (0.000)	−0.4160*** (0.000)	0.1540*** (0.000)	0.0120*** (0.000)	0.0390*** (0.000)	0.0500*** (0.000)	1.0000						
(9) Age	−0.1095*** (0.000)	−0.1700*** (0.000)	−0.1790*** (0.000)	0.2250*** (0.000)	0.0640*** (0.000)	0.0800*** (0.000)	0.1100*** (0.000)	0.1550*** (0.000)	1.0000					
(10) Size	−0.3630*** (0.000)	−0.3550*** (0.000)	−0.3230*** (0.000)	0.4540*** (0.000)	0.2800*** (0.000)	0.3240*** (0.000)	0.3640*** (0.000)	0.2230*** (0.000)	0.2020*** (0.000)	1.0000				
(11) Leverage	−0.2902*** (0.000)	−0.0680*** (0.000)	−0.0440*** (0.000)	0.1580*** (0.000)	0.1120*** (0.000)	0.1140*** (0.000)	0.1210*** (0.000)	−0.0960*** (0.000)	0.0450*** (0.000)	0.4240*** (0.000)	1.0000			
(12) Capex	0.0655*** (0.000)	0.0330*** (0.000)	0.0220*** (0.000)	−0.0550*** (0.000)	0.0060* (0.069)	0.0080** (0.010)	0.0030 (0.277)	0.0600*** (0.000)	−0.0590*** (0.000)	−0.1020*** (0.000)	−0.1590*** (0.000)	1.0000		
(13) Asset Growth	0.1921*** (0.000)	0.0510*** (0.000)	0.0470*** (0.000)	−0.1220*** (0.000)	−0.0540*** (0.000)	−0.0510*** (0.000)	−0.0560*** (0.000)	0.0440*** (0.000)	−0.1400*** (0.000)	−0.0840*** (0.000)	−0.0990*** (0.000)	0.0580*** (0.000)	1.0000	
(14) GDP Growth	0.0589*** (0.000)	−0.0820*** (0.000)	−0.2230*** (0.000)	−0.0530*** (0.000)	−0.0280*** (0.000)	−0.0270*** (0.000)	−0.0380*** (0.000)	0.0760*** (0.000)	−0.0350*** (0.000)	−0.0030 (0.347)	−0.0400*** (0.000)	0.0280*** (0.000)	0.0660*** (0.000)	1.0000

(*continued*)

Table A3. Continued

Part B. Quantiles regressions for ESG score					
	Tobin's Q quantiles				
Variables	q_{10} (1)	q_{30} (2)	q_{50} (3)	q_{70} (4)	q_{90} (5)
ESG score	0.1095*** (6.27)	0.1055*** (6.35)	0.1016*** (5.94)	0.0973*** (5.10)	0.0924*** (4.09)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	80,759	80,759	80,759	80,759	80,759
Pseudo-R^2	0.6500	0.659	0.660	0.657	0.653
	Idiosyncratic risk quantiles				
Variables	q_{10} (1)	q_{30} (2)	q_{50} (3)	q_{70} (4)	q_{90} (5)
ESG score	−0.0083* (−1.81)	−0.0134*** (−2.99)	−0.0183*** (−3.65)	−0.0247*** (−3.87)	−0.0330*** (−3.79)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	79,315	79,315	79,315	79,315	79,315
Pseudo-R^2	0.649	0.652	0.650	0.648	0.645
	Total risk quantiles				
Variables	q_{10} (1)	q_{30} (2)	q_{50} (3)	q_{70} (4)	q_{90} (5)
ESG score	−0.0242*** (−3.75)	−0.0291*** (−4.55)	−0.0336*** (−4.78)	−0.0396*** (−4.57)	−0.0483*** (−4.07)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	80,207	80,207	80,207	80,207	80,207
Pseudo-R^2	0.663	0.663	0.662	0.661	0.660

(*continued*)

Table A3. Continued

Part C. Quantiles regressions for ESG controversies					
			Tobin's Q quantiles		
	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}
Variables	(1)	(2)	(3)	(4)	(5)
Controversy	−0.0125*** (−3.36)	−0.0151*** (−4.58)	−0.0176*** (−5.37)	−0.0205*** (−5.52)	−0.0237*** (−5.14)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	80,652	80,652	80,652	80,652	80,652
Pseudo-R^2	0.641	0.651	0.653	0.659	0.648
			Idiosyncratic risk quantiles		
Variables	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}
	(1)	(2)	(3)	(4)	(5)
Controversy	0.0030*** (2.63)	0.0052*** (4.79)	0.0073*** (5.82)	0.0101*** (5.98)	0.0137*** (5.70)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	79,208	79,208	79,208	79,208	79,208
Pseudo-R^2	0.650	0.652	0.651	0.649	0.646
			Total risk quantiles		
Variables	q_{10}	q_{30}	q_{50}	q_{70}	q_{90}
	(1)	(2)	(3)	(4)	(5)
Controversy	0.0031** (2.09)	0.0061*** (4.30)	0.0089*** (5.52)	0.0127*** (5.94)	0.0181*** (5.83)
(*Control variables omitted*)					
Firm-fixed effect	YES	YES	YES	YES	YES

(*continued*)

Table A3. Continued

Part C. Quantiles regressions for ESG controversies					
	Tobin's Q quantiles				
Variables	q_{10} (1)	q_{30} (2)	q_{50} (3)	q_{70} (4)	q_{90} (5)
Year-fixed effect	YES	YES	YES	YES	YES
Country-fixed effect	YES	YES	YES	YES	YES
Observations	80,097	80,097	80,097	80,097	80,097
Pseudo-R^2	0.665	0.667	0.664	0.663	0.661

Notes(s): ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels. *p*-values are in parentheses below the correlation coefficient; The results refer to the regressions for the sample of 10,212 firms. The observation period is 2002–2021. For each dependent variable, Columns 1–5 refer to the 10^{th}, 30^{th}, 50^{th}, 70^{th}, and 90^{th} quantiles. Models incorporate firm, year, and country fixed effects. Robust *z*-statistics are in parentheses. Standard errors are clustered by firm. For the definitions of the variables, see Table 1. ***, **, and *indicate statistical significance at the 1, 5, and 10% levels, respectively
Source(s): Authors' own work