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From crisis to Stability: How CSR shielded firms during Covid-19 pandemic

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ABSTRACT

This study examines the relationship between the COVID-19 pandemic and firm risk, as well as the moderating role of corporate social responsibility (CSR) performance in this relationship. Using 22,451 firm-year observations from 62 countries between 2018 and 2021, the study finds a marked increase in firm risk due to the economic disruptions caused by the pandemic. However, firms with strong CSR performance exhibit greater resilience, highlighting CSR's critical role in crisis management and risk mitigation beyond ethical compliance. Additional analysis shows that the effects of the pandemic and the moderating role of CSR performance vary by country-level business culture and economic environment. The findings highlight the importance of integrating CSR into corporate strategy to enhance resilience and manage risk during crises. We also show that stakeholder management serves as an underlying mechanism linking the interaction between CSR performance and the COVID-19 pandemic to firm risk. The study also advocates for policy support to strengthen CSR initiatives, offering actionable insights for managers and policymakers in fostering corporate preparedness for future challenges.

1. Introduction

The COVID-19 pandemic profoundly disrupted global markets, reshaping the landscape of business risk and challenging firms' resilience in unprecedented ways (Baker et al., 2020a, 2020b; Bose et al., 2022, 2023; Carracedo et al., 2021; Cheema-Fox et al., 2021). As the pandemic brought economies to a standstill, firms across industries faced increased uncertainty; experiencing sharp fluctuations in stock prices and supply chain disruptions, as well as heightened vulnerability to financial losses (Baker et al., 2020a, 2020b). This crisis highlighted the fragility of corporate structures when confronted with external shocks, revealing that firm-specific risk—including both systematic and idiosyncratic components—can rapidly escalate under conditions of global turmoil. While prior economic disruptions, such as the 2008–2009 Global Financial Crisis (GFC), highlighted the vulnerabilities faced by firms during market-wide disturbances (Lins et al., 2017), the COVID-19 pandemic amplified these types of risk, introducing new layers of operational, financial and strategic challenges that required immediate and adaptive responses (Baker et al., 2020a; Bose et al., 2022;

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Cheema-Fox et al., 2021).

One of the significant impacts of the pandemic was an increase in systematic risk, as firms became increasingly exposed to factors beyond their control, such as market volatility, regulatory changes and economic downturns (Baker et al., 2020a; Bose et al., 2022). In addition, the pandemic led to a rise in idiosyncratic risk, as businesses had to adapt to shifting demand, workforce changes and operational disruptions (Baker et al., 2020a; Bose et al., 2022). These types of risk intensified pressure on firms to maintain stability and safeguard their financial standing amid unpredictable conditions. Studies have shown that heightened systematic risk can adversely impact firm valuation, investor confidence and market stability, while idiosyncratic risk impedes a firm's ability to adapt and respond effectively to crises (Baker et al., 2020a). Therefore, understanding the impact of the COVID-19 pandemic on firm risk is essential to identifying factors that contribute to corporate resilience in the face of global shocks. However, no studies have examined the impact of the COVID-19 pandemic on firm risk.

As firms continued to grapple with the complex challenges posed by the pandemic, the role of strategic risk management gained increasing importance. In particular, corporate social responsibility (CSR) emerged as a crucial factor in strengthening firms' resilience against such external disruptions (Albuquerque et al., 2020; Arora et al., 2022; Bose et al., 2022; Zhai et al., 2022). Emphasising stakeholder trust and accountability, CSR initiatives have proven effective in fostering long-term stability and providing a 'buffer' against crises by building goodwill among stakeholders and reinforcing a firm's corporate reputation. As highlighted in the existing literature, firms with strong CSR commitments experience reduced market volatility and demonstrate greater resilience during crises due to enhanced stakeholder trust and loyalty (Cheema-Fox et al., 2021; Lins et al., 2017). Prior studies, such as Hoang et al. (2023), have explored the link between country-level sustainability and environmental, social and governance (ESG) reporting transparency. However, our study uniquely examines how CSR performance moderates the impact of global crises, such as the COVID-19 pandemic, on firm-specific risk across varied economic and governance contexts. This contribution advances academic discourse by positioning CSR as a critical crisis mitigation tool and provides practical insights for firms seeking to enhance resilience through strategic CSR initiatives. Specifically, the study highlights the potential of CSR to mitigate risk, ensuring operational continuity and reducing the financial repercussions of market-wide shocks. Focusing on the impact of the COVID-19 pandemic on firm risk, we investigate how CSR performance moderates both systematic and idiosyncratic risk, offering valuable perspectives on managing global crises.

Using 22,451 firm-year observations from 2018 to 2021 across 62 countries, we examine the impact of the COVID-19 pandemic on firm risk. We measure firm risk using total, systematic and idiosyncratic risk. As an indicator variable, the COVID-19 pandemic is measured by taking the value of 1 for the years 2020 and 2021 (pandemic and post-pandemic years) and 0 for 2018 and 2019 (pre-pandemic years). Firm-level CSR performance is measured using social and environmental ratings by the Refinitiv ESG database. We find that the COVID-19 pandemic is positively associated with firm risk, with this suggesting that firms experienced higher levels of risk, including both systematic and idiosyncratic risk, during the COVID-19 pandemic period. In terms of economic significance, the results suggest that during the pandemic, total risk, systematic risk and idiosyncratic risk increased by approximately 8.10 %, 16.30 % and 1.6 %, respectively. We also examine the moderating role of CSR performance in the association between the COVID-19 pandemic and firm risk. Our study's findings indicate that CSR performance attenuates the negative impact of the COVID-19 pandemic on firm risk, suggesting that CSR performance plays a critical role in reducing firm risk, with this reflecting the importance of stakeholder-oriented practices in crisis management. Our findings are robust and address potential endogeneity issues arising from observable selection bias using entropy balancing and three-stage least squares (3SLS) regression analyses.

Prior studies have highlighted that country-level factors play a pivotal role in shaping the institutional framework within which firms operate (Dey et al., 2024; Dhaliwal et al., 2012, 2014). These factors significantly influence how firms respond to global crises, such as the COVID-19 pandemic, which markedly increased firm risk across financial, operational and market domains. Building on this premise, we explore the role of country-level factors in shaping the relationship between the COVID-19 pandemic and firm risk, as well as the moderating influence of CSR performance in this relationship. Specifically, our analysis focuses on two key country-level institutional factors: business culture and economic development. The results indicate that the adverse effects of the COVID-19 pandemic on firm risk and the mitigating role of CSR performance, are more pronounced in countries with shareholder-oriented business cultures and advanced economies. These findings highlight the critical role of institutional and cultural environments in enabling firms to utilise CSR as a tool for resilience during global crises, such as the COVID-19 pandemic. Furthermore, consistent with the 'insurance-like' view of CSR (Godfrey, 2005), we assess how stakeholder management mediates the relationship between CSR performance, the COVID-19 pandemic, and firm risk, highlighting CSR's broader value beyond compliance and reputation. Our findings show that stakeholder management acts as an underlying mechanism in the relationship between the interaction of CSR performance and the COVID-19 pandemic and firm risk.

The findings of this study contribute to the literature in several ways. Firstly, our study is among the first to empirically examine the impact of the COVID-19 pandemic on firm risk, providing insights into how global crises influence both systematic and idiosyncratic risk. By doing so, we respond to the lack of research addressing the effect of the COVID-19 pandemic on firm risk, with this lack highlighted by recent studies on economic disruptions (Baker et al., 2020a; Bose et al., 2022). Secondly, we contribute to the growing body of literature on CSR performance by identifying its moderating role in mitigating the adverse effects of the COVID-19 pandemic on firm risk. This extends prior research that has emphasised the role of CSR in enhancing resilience and fostering stakeholder trust during crises (Lins et al., 2017). Existing research has shown that CSR enhances firm resilience, such as Lins et al. (2017) which investigated CSR's impact during the 2008–2009 GFC and Huang and Ye (2021) which explored CSR and firm performance during the COVID-19 pandemic, with these studies largely focusing on outcomes, such as firm value or investor trust. In contrast, our study is the first to systematically examine how CSR performance moderates the relationship between the COVID-19 pandemic and disaggregated firm-level risk dimensions (namely, total risk, systematic risk and idiosyncratic risk) using a cross-country context. This risk-based perspective offers more granular insights than prior studies in the literature.

Thirdly, we expand the understanding of firm-specific risk management by showing that the pandemic increased total risk by 8.10 %; systematic risk by 16.30 %; and idiosyncratic risk by 1.60 %, while, at the same time, firms with stronger CSR performance experienced significantly attenuated risk. Fourthly, our study incorporates country-level factors, comprising business culture and economic development, to reveal how institutional environments shape the relationship between the COVID-19 pandemic, firm risk and CSR performance. We contribute an international perspective that is often overlooked. While most prior studies have been country-specific, our cross-country analysis introduces novel evidence on how institutional environments shape the CSR–risk nexus. We show that CSR's risk-mitigating effects are significantly more pronounced in countries with shareholder-oriented business cultures and those with higher economic development, thus advancing the understanding of contextual heterogeneity in CSR effectiveness.

Fifthly, we respond to the need to better understand how firms manage risk during non-financial, exogenous shocks. Unlike earlier crises such as the GFC, the COVID-19 pandemic introduced novel operational, health and social disruptions. By investigating its impact only on firm risk and examining CSR as a moderating factor, our study provides fresh insights into how socially responsible practices support resilience beyond financial indicators. Overall, our findings advance the CSR and risk management literature by demonstrating that CSR is not only beneficial for firm value but also for reducing volatility across different types of risk during systemic crises. These insights are especially valuable for firms, investors and policymakers seeking to build more resilient corporate systems in the face of global disruptions. Finally, our findings provide actionable implications for regulators, policymakers and corporate managers. By demonstrating that CSR performance serves as a critical risk mitigation tool, particularly in times of global crises, this study highlights the importance of embedding CSR into corporate strategies to enhance resilience. These results also inform global debates on crisis management, emphasising the need for robust institutional frameworks to support firms during unprecedented disruptions, such as the COVID-19 pandemic.

The remainder of the paper is structured as follows. Section 2 presents the literature review and hypotheses development, Section 3 describes the research design; Section 4 reports the empirical results; while Section 5 discusses the robustness tests and their results. Section 7 concludes the paper.

2. Literature review and hypotheses development

The COVID-19 pandemic represents an unprecedented global crisis, with far-reaching economic and financial impacts that disrupted industries and equity markets worldwide (Baker et al., 2020a; Bose et al., 2022; Carracedo et al., 2021). Stakeholder theory, which emphasises corporate value creation through fulfilling social responsibilities and maintaining strong stakeholder relationships, provides a robust framework for understanding corporate responses to such crises (Freeman, 2010; Harrison et al., 2010). By fostering transparency and trust, stakeholder-oriented practices—particularly robust CSR performance—can play a pivotal role in mitigating risk, especially during periods of heightened uncertainty.

Research has highlighted the critical importance of CSR in risk management. Strong CSR performance enhances corporate transparency; reduces information asymmetry; and fosters stakeholder trust (Bose et al., 2023; Freeman, 2010; Harjoto et al., 2015). These mechanisms are particularly vital during crises, such as the COVID-19 pandemic, when uncertainty prevails. Transparency stemming from CSR practices helps firms to mitigate firm-specific risk and to maintain stability in capital markets, offering an "insurance-like" protection against idiosyncratic risk (Godfrey, 2005; Godfrey et al., 2009). Conversely, firms with poor CSR performance are more likely to face allegations of corporate misconduct and to experience heightened idiosyncratic risk (Waddock & Graves, 1997). These dynamics accentuate the protective role of CSR in crisis contexts, in which stakeholder engagement becomes essential for resilience.

The economic impacts of infectious disease outbreaks, including COVID-19, are well documented (Khlystova et al., 2022). Prior pandemics, such as severe acute respiratory syndrome (SARS) in 2003, had significant but regionally confined effects. For example, Chen et al. (2007) documented declines in Taiwan's hotel industry and equity market, while Nippani and Washer (2004) found mixed impacts across different countries. More recently, Kim et al. (2020) highlighted the vulnerabilities of the restaurant and hospitality industries during epidemics. The COVID-19 pandemic, however, differed markedly from previous outbreaks in its unprecedented global reach and extensive economic consequences. Nearly 4.5 billion people experienced movement restrictions, triggering substantial declines in corporate revenues and liquidity challenges (Kpmg, 2020). Studies, such as Iyke (2020), showed that infection rates strongly predicted volatility in financial markets, with the pandemic's effects exceeding those of the 2008–2009 Global Financial Crisis (GFC). Sectoral impacts varied, with some industries—such as biotechnology and crude oil—showing resilience or growth (Liu et al., 2020a, 2020b), while others, including energy and private sector operations, faced significant downturns (Aifuwa et al., 2020; Fu & Shen, 2020).

Corporate performance during the COVID-19 pandemic was also shaped by public health measures, such as lockdowns and travel restrictions, which significantly disrupted supply chains, consumer behaviour and economic activity (Bose et al., 2022, 2023; Carracedo et al., 2021). The COVID-19 pandemic significantly reshaped the risk landscape for firms, exposing them to new challenges and uncertainties (Ali et al., 2020; Baker et al., 2020a; Bose et al., 2022; Carracedo et al., 2021). On one hand, systematic risk surged as firms became increasingly vulnerable to external factors beyond their control, such as heightened market volatility, shifting regulatory landscapes, and broader economic downturns (Ali et al., 2020; Baker et al., 2020a; Bose et al., 2022, 2023; Khlystova et al., 2022). On the other hand, idiosyncratic risk also escalated, driven by the need to rapidly adapt to changing consumer demands, workforce disruptions and operational challenges (Ali et al., 2020; Baker et al., 2020a; Bose et al., 2022). These pressures emphasised the difficulty of maintaining stability and safeguarding financial health in an unpredictable environment. Research has highlighted that systematic risk can undermine firm valuation, erode investor confidence and destabilise markets, while idiosyncratic risk hampers a firm's ability to adapt and respond effectively during crises (Bose et al., 2022). Despite these critical insights, the specific impacts of the

COVID-19 pandemic on firm-level risk remain underexplored. The pandemic's global scale and prolonged duration created a challenging environment, amplifying operational and financial risk for firms across sectors. Building on this context, this study proposes the following hypothesis.

H1. A positive relationship exists between the COVID-19 pandemic and firm risk.

The transition from prioritising shareholder wealth maximisation, as proposed by Jensen and Meckling (1976), to a focus on stakeholder value creation marks a transformative shift in corporate governance and strategy. This approach moves beyond an exclusive emphasis on shareholders to encompass the interests of employees, customers, suppliers and the broader community. It is increasingly recognised that sustainable shareholder value is best achieved when firms balance these diverse stakeholder interests (Freeman, 2010; Smith, 2003). Firms with robust CSR practices are therefore well positioned to meet stakeholder expectations and navigate complex challenges. Strengthening informal commitments between firms and stakeholders, CSR fosters trust and cooperation, with this enhancing operational performance and stability (Gao et al., 2016; Renneboog et al., 2008).

The COVID-19 pandemic presents a critical opportunity to examine the role of CSR in mitigating different types of risk exposure. Drawing on stakeholder theory and the "insurance-like" protection hypothesis (Godfrey, 2005), we argue that CSR reduces risk by building reputational and relational capital. This manifests in several ways. Firstly, CSR fosters stronger employee and customer loyalty during crises, ensuring greater operational continuity. Secondly, CSR enhances investor trust and reduces information asymmetry, leading to less stock price volatility and narrower forecast dispersion. Thirdly, responsible firms are more likely to receive government support or leniency, due to greater perceived legitimacy. Fourthly, CSR-oriented firms are more financially prudent and maintain higher internal liquidity buffers, with these helping to absorb shocks. These mechanisms suggest that firms with strong CSR performance were less vulnerable to the shocks of COVID 19 pandemic-induced risk.

Prior research has shown that firms with strong CSR performance are better equipped to handle crises as they attract supportive stakeholders, including consumers and investors, who prioritise social responsibility (Hillman & Keim, 2001; Kapstein, 2001). During the COVID-19 pandemic, CSR has proven to be a key differentiator. For example, Edelman (2020) found that 65 % of consumers globally considered corporate pandemic responses when making future purchase decisions, with many favouring brands demonstrating ethical and innovative practices. Similarly, Just Capital (2020) highlighted how firms with strong stakeholder-focused actions gained recognition during the crisis. Albuquerque et al. (2020) found that stocks with higher environmental and social ratings achieved notably higher returns, lower return volatility and stronger operating profit margins during the first quarter of 2020. Bose et al. (2022) documented that firms with stronger sustainability performance mitigated the adverse impact of the COVID-19 pandemic on firm value. These findings underscore the role of CSR in strengthening relationships that are critical for resilience during economic and social upheavals.

Firms with higher CSR performance are also more likely to secure resources, attract top talent, identify growth opportunities and build social legitimacy (Fombrun & Shanley, 1990; Greening & Turban, 2000; Waddock & Graves, 1997). These advantages are amplified during crises, enabling these firms to adapt to shifting market conditions, overcome financial challenges and maintain operational continuity. By proactively addressing stakeholder needs, these firms mitigate risk and build stronger buffers against external shocks (Albuquerque et al., 2020; Bose et al., 2022; Gilchrist, 2020; Harrison et al., 2010). The COVID-19 pandemic, in particular, offers a unique test of how CSR-oriented strategies can shield firms from severe economic and operational consequences. Unlike past pandemics, the COVID-19 pandemic brought global disruptions to supply chains, consumer behaviour and overall economic activity, creating an environment of unprecedented risk. Yet, firms with exceptional CSR practices appeared better equipped to navigate these challenges, reinforcing the critical role of stakeholder-focused approaches in corporate resilience. Accordingly, we expect a negative coefficient for the interaction term between CSR performance and the COVID-19 pandemic, indicating that CSR performance would weaken the positive effect of the pandemic on firm risk. This context leads to our hypothesis.

H2. CSR performance negatively moderates the positive impact of the COVID-19 pandemic on corporate risk.

3. Research methodology

3.1. Sample and data

This study's sample includes all firms covered by the Refinitiv ESG database from 2018 to 2021. This period was intentionally chosen to encompass two critical phases: the pre-COVID-19 pandemic period (2018–2019) and the pandemic and post-pandemic period (2020–2021). The inclusion of these years allows our study to assess the baseline firm risk and CSR performance before the pandemic period and to capture the immediate impacts and mitigating effects of CSR during the global crisis. While extending the study period might provide additional context, focusing on this four-year window ensures that the analysis remains highly relevant to understanding the dynamics of an unprecedented global event. Moreover, prior studies (e.g., Bose et al., 2022) have demonstrated the validity of short study periods when analysing time-sensitive phenomena, such as global crises or rapid shifts in firm behaviour. The concentrated time frame ensures that external confounding factors, unrelated to the pandemic, are minimised, thereby isolating the effects of CSR performance on firm risk during a highly volatile period. We sourced financial data from the Worldscope database; CSR performance data from the Refinitiv ESG database; and stock market data from the DataStream database. Additionally, country-level data, including macroeconomic indicators, were collected from the World Bank database. After merging these data sets and excluding incomplete observations, the final sample consists of 22,451 firm-year observations spanning 62 countries. Table 1, Panel A outlines the sample selection procedure, illustrating the sampling process from the initial data set to the finalised sample.

Table 1, Panel B presents the industry-wide distribution of firms, with the financial sector accounting for the largest proportion

Table 1
Sample selection and distribution.

Panel A: Sample selection	Firm-year observations
Data coverage 2018–2021	34,312
Less: Observations dropped due to insufficient firm risk data	(5,600)
Less: Observations dropped due to insufficient control variables	(6261)
Final test sample 2018–2021	22,451

Panel B: Industry-wise distribution of firms in sample		
Name of industry	Observations	% of sample
Mining/Construction	1,506	6.71
Food	798	3.55
Textiles/Print/Publishing	585	2.61
Chemicals	705	3.14
Pharmaceuticals	889	3.96
Extractive	571	2.54
Manufacturing: Rubber/Glass/etc.	498	2.22
Manufacturing: Metal	614	2.73
Manufacturing: Machinery	748	3.33
Manufacturing: Electrical Equipment	581	2.59
Manufacturing: Transport Equipment	675	3.01
Manufacturing: Instruments	740	3.30
Manufacturing: Miscellaneous	104	0.46
Computers	2,134	9.51
Transportation	1,499	6.68
Utilities	824	3.67
Retail: Wholesale	569	2.53
Retail: Miscellaneous	974	4.34
Retail: Restaurant	175	0.78
Financial	3,616	16.11
Insurance/Real Estate	1,466	6.53
Services	1,967	8.76
Others	213	0.95
Total sample	22,451	100

Panel C: Year-wise distribution of firms in sample		
	Observations	% of sample
2018	4,576	20.38
2019	5,090	22.67
2020	7,299	32.51
2021	5,486	24.44
Total sample	22,451	100

Panel D: Country-wise distribution of firms in sample

Country	**N**	**%**	TOTRISK	SYSRISK	UNSYSRISK	CSR_PERF	GDPC in US$	STD_GDPC
Argentina	108	0.480	0.473	0.836	0.125	0.335	9,842.64	4.558
Australia	980	4.370	0.440	1.112	0.104	0.364	56,080.97	0.836
Austria	110	0.490	0.310	0.933	0.067	0.605	50,927.64	2.468
Belgium	140	0.620	0.303	0.759	0.071	0.563	47,552.47	1.995
Bahrain	37	0.160	0.185	0.611	0.060	0.159	25,188.93	2.763
Bermuda	101	0.450	0.389	1.036	0.083	0.358	112,326.30	3.349
Brazil	262	1.170	0.423	0.885	0.089	0.490	8,073.61	2.722
Canada	862	3.840	0.413	1.223	0.098	0.382	46,818.80	2.580
Chile	132	0.590	0.301	1.054	0.059	0.498	14,830.51	2.839
China	2,543	11.330	0.418	1.057	0.102	0.309	11,056.30	1.557
Colombia	68	0.300	0.280	0.701	0.060	0.569	6,185.87	2.690
Cayman Islands	11	0.050	0.413	0.958	0.092	0.263	86,049.17	2.546
Cyprus	8	0.040	0.385	0.535	0.119	0.481	29,433.18	3.594
Czech Republic	11	0.050	0.170	1.064	0.041	0.479	23,989.92	2.657
Denmark	185	0.820	0.334	0.944	0.079	0.502	62,866.01	1.630
Finland	201	0.900	0.329	0.992	0.076	0.564	50,576.23	1.867
France	498	2.220	0.328	1.013	0.070	0.650	41,118.70	2.763
Germany	664	2.960	0.390	0.919	0.082	0.489	48,103.34	1.796
Greece	70	0.310	0.398	0.954	0.083	0.469	19,014.73	3.020
Hong Kong	468	2.080	0.346	0.917	0.082	0.539	48,139.56	3.221
Hungary	15	0.070	0.302	1.158	0.071	0.526	17,009.44	3.054
Indonesia	154	0.690	0.425	1.326	0.092	0.458	4,054.22	1.806
India	334	1.490	0.348	1.062	0.082	0.508	2,112.46	4.919
Ireland	112	0.500	0.393	1.197	0.086	0.472	86,944.79	4.684

(*continued on next page*)

Table 1 (*continued*)

Panel A: Sample selection							Firm-year observations	
Israel	84	0.370	0.378	1.070	0.084	0.334	45,723.68	2.024
Italy	329	1.470	0.335	0.930	0.074	0.578	33,722.79	3.002
Japan	1,259	5.610	0.295	1.026	0.066	0.485	39,883.32	1.856
Jordan	12	0.050	0.172	0.935	0.039	0.267	4,093.55	1.314
Kuwait	35	0.160	0.228	0.663	0.055	0.279	28,283.24	3.881
Luxembourg	65	0.290	0.418	0.915	0.088	0.485	118,942.10	1.842
Malta	9	0.040	0.463	0.525	0.104	0.226	31,015.16	6.009
Malaysia	357	1.590	0.340	1.223	0.091	0.445	10,933.52	3.695
Mexico	197	0.880	0.310	0.855	0.070	0.483	9,708.66	2.932
Monaco	6	0.030	0.727	1.306	0.157	0.364	193,974.60	6.414
Morocco	12	0.050	0.433	1.385	0.098	0.685	62,406.62	6.869
Netherlands	192	0.860	0.350	1.083	0.083	0.598	53,926.10	1.812
Norway	185	0.820	0.373	0.949	0.086	0.514	77,814.94	1.082
New Zealand	154	0.690	0.265	0.937	0.062	0.342	44,215.89	1.337
Oman	25	0.110	0.219	1.097	0.047	0.098	18,837.21	2.653
Pakistan	23	0.100	0.302	1.053	0.060	0.256	1,467.76	2.206
Panama	5	0.020	0.470	1.301	0.114	0.313	14,837.91	3.313
Peru	74	0.330	0.263	0.779	0.072	0.444	6,629.44	3.433
Philippines	92	0.410	0.352	0.955	0.063	0.467	3,300.85	3.290
Poland	114	0.510	0.366	0.847	0.081	0.468	16,061.28	2.100
Puerto Rico	11	0.050	0.403	1.431	0.087	0.229	32,096.27	2.201
Portugal	36	0.160	0.282	1.050	0.068	0.672	23,141.88	2.620
Qatar	106	0.470	0.284	1.036	0.071	0.135	60,421.01	2.476
Romania	10	0.040	0.270	1.231	0.048	0.617	13,462.21	3.601
Russia	126	0.560	0.251	0.807	0.071	0.492	11,104.69	2.055
Saudi Arabia	130	0.580	0.263	1.000	0.065	0.234	21,922.27	2.291
Singapore	241	1.070	0.274	0.876	0.061	0.467	66,405.07	2.876
South Africa	331	1.470	0.402	0.831	0.093	0.513	6,659.17	2.217
South Korea	380	1.690	0.359	0.947	0.084	0.473	32,429.28	0.800
Spain	203	0.900	0.313	0.894	0.070	0.724	29,241.65	3.496
Sweden	686	3.060	0.404	1.054	0.094	0.428	55,564.75	1.870
Switzerland	529	2.360	0.321	0.922	0.074	0.436	86,919.23	1.555
Thailand	321	1.430	0.352	1.101	0.076	0.503	7,180.74	3.169
Turkey	232	1.030	0.398	0.942	0.085	0.629	9,137.03	2.936
United Arab Emirates	93	0.410	0.312	0.687	0.074	0.288	43,048.44	3.227
United Kingdom	912	4.060	0.384	1.095	0.093	0.433	43,341.16	4.242
United States of America	6,761	30.110	0.455	1.162	0.100	0.322	65,680.46	1.783
Vietnam	40	0.180	0.359	1.032	0.091	0.205	3,661.89	2.051
Total	**22,451**	**100.000**	0.394	1.061	0.090	0.406	44,798.25	2.153

Note: All variables are defined in Appendix A.

(16.11 %), followed by the computer industry (9.51 %) and the services industry (8.76 %). In contrast, the miscellaneous manufacturing industry had the smallest proportion of firms, with less than 0.46 % of the sample. Panel C shows the year-wise distribution of firms in the sample. In terms of observations by year, the highest proportion was 32.51 % in 2020, followed by 24.44 % (2021) and 22.67 % (2019), while 2018 (with 20.38 %) had the lowest proportion of observations.

Table 1, Panel D presents a summary of key statistics for our study's variables by country. Regarding total risk *(TOTRISK)*, Monaco had the highest level (mean = 0.727), followed by Argentina (mean = 0.473), while the Czech Republic had the lowest level (mean = 0.170). The highest mean scored for systematic risk *(SYSRISK)* was in Monaco (mean = 1.306), followed by Panama (mean = 1.301), while Bahrain (mean = 0.611) showed the lowest level. In terms of idiosyncratic risk *(UNSYSRISK)*, Monaco again had the highest (mean = 0.157), followed by Malta (mean = 0.104), whereas Jordan (mean = 0.039) had the lowest. For CSR performance *(CSR_PERF)*, Morocco scored the highest (mean = 0.685), followed by Portugal (mean = 0.672), whereas Oman (mean = 0.098) had the lowest mean. Gross domestic product (GDP) per capita (*GDPC*) (expressed in US$) scored the highest in Monaco (mean = US $193,974.60), followed by Luxembourg (mean = US$118,942.10), while Pakistan (mean = US$1,467.76) had the lowest GDP per capita. Regarding macroeconomic risk *(STD_GDPC)*, Morocco had the highest variability (mean = 6.869), followed by Malta (mean = 6.009), whereas South Korea (mean = 0.800) has the lowest variability. These country-specific metrics highlight the diversity in risk exposure, CSR performance and economic conditions across jurisdictions. Higher GDP per capita and higher CSR performance were found in wealthier countries, such as Monaco and Luxembourg, suggesting a potential link between economic prosperity and investment in sustainability initiatives. In contrast, countries with lower GDP per capita, such as Pakistan, had lower CSR performance, reflecting differences in priorities and resources for sustainability practices.

3.2. Measurement of firm risk

Following prior studies (Cai et al., 2016; Jo & Na, 2012; Al Rabab'a et al., 2024), we estimate three measures of firm risk: total risk (*TOTR*), systematic risk (*SYSR*) and idiosyncratic risk (*UNSYSR*). Total risk, encompassing both systematic and idiosyncratic

components, is calculated as the annualised standard deviation of a firm's daily stock returns. Idiosyncratic risk *(UNSYSR)*, or firm-specific risk, is determined using the standard deviation of residuals from the capital asset pricing model (CAPM), based on daily returns from the preceding year (Al Rabab'a et al., 2024; Bouslah et al., 2013). According to modern portfolio theory, only systematic risk is relevant to asset pricing as diversification eliminates idiosyncratic risk. However, idiosyncratic risk can be significant when investors prioritise social and environmental considerations (Fama and French, 2007). Studies, such as Ang et al. (2009), have shown that firms with high idiosyncratic risk tend to have lower future returns, while Goyal and Santa-Clara (2003) found a positive association between average stock variance (idiosyncratic risk) and market returns. Systematic risk *(SYSR)* reflects a stock's sensitivity to market return changes. It is estimated by regressing a firm's excess returns against market excess returns over the prior 12 months, following the CAPM framework (Bouslah et al., 2013; Jo & Na, 2012). The CAPM is expressed as:

$$\mathrm{Ri,t} = \alpha\mathrm{i} + \beta\mathrm{i}\ \mathrm{Rm,t} + \varepsilon\mathrm{i,t} \tag{1}$$

where $R_{i,t}$ represents excess returns of firm i at time t; α_i is the intercept term; β_i is the estimated systematic risk (*SYSR*); $R_{m,t}$ is the market's excess returns at time t; and $\varepsilon_{i,t}$ is the stochastic error term.

3.3. Measurement of COVID-19 pandemic

We measure the COVID-19 pandemic *(COVID)* as an indicator variable that takes the value of 1 for the years 2020 and 2021 (pandemic years) and 0 for 2018 and 2019 (pre-pandemic years).

3.4. Measurement of CSR performance

Corporate social responsibility performance *(CSR_PERF)* is measured as the average of the environmental and social performance scores provided by the Refinitiv ESG database, in line with the approach used in prior studies (e.g., Bose et al., 2022; Bose & Yu, 2023; Dhaliwal et al., 2014). Environmental performance is calculated as the weighted average of a firm's relative ratings across three environmental categories: resource use, environmental emissions reduction and innovation (Refinitiv, 2020). Similarly, social performance is determined as the weighted average of a firm's relative ratings across four social categories: workforce, human rights, community and product responsibility (Refinitiv, 2020).

3.5. Empirical models

We estimate the following model to test the association between the COVID-19 pandemic *(COVID)* and firm risk (*FIRM_RISK*), as proposed in our first hypothesis (H1):

$$FIRM\_RISK_{i,j,t} = \beta_0 + \beta_1 COVID_t + \beta_2 SIZE_{i,j,t} + \beta_3 ROA_{i,j,t} + \beta_4 GROWTH_{i,j,t} + \beta_5 MB_{i,j,t} + \beta_6 CSR\_DISC_{i,j,t} + \beta_7 CAPEX_{i,j,t} + \beta_8 RDINT_{i,j,t} + \beta_9 TANGIBILITY_{i,j,t} + \beta_{10} FAGE_{i,j,t} + \beta_{11} LNGDPC_{j,t} + \beta_{12} STD\_GDPC_{j,t} + \sum YEAR_t + \sum INDUSTRY_k + \sum COUNTRY_j + \varepsilon_{i,j,t} \tag{2}$$

To test our second hypothesis (H2), we add the interaction between the COVID-19 pandemic *(COVID)* and CSR performance score *(CSR_PERF)* to Equation (1). The model is as follows:

$$FIRM\_RISK_{i,j,t} = \beta_0 + \beta_1 COVID_t + \beta_2 COVID_t \times CSR\_PERF_{i,j,t} + \beta_3 CSR\_PERF_{i,j,t} + \beta_4 SIZE_{i,j,t} + \beta_5 ROA_{i,j,t} + \beta_6 GROWTH_{i,j,t} + \beta_7 MB_{i,j,t} + \beta_8 CSR\_DISC_{i,j,t} + \beta_9 CAPEX_{i,j,t} + \beta_{10} RDINT_{i,j,t} + \beta_{11} TANGIBILITY_{i,j,t} + \beta_{12} FAGE_{i,j,t} + \beta_{13} LNGDPC_{j,t} + \beta_{14} STD\_GDPC_{j,t} + \sum YEAR_t + \sum INDUSTRY_k + \sum COUNTRY_j + \varepsilon_{i,j,t} \tag{3}$$

where subscript i denotes the individual firm; j denotes the country; t denotes the period; and k denotes the industry. In Equations (2) and (3), *FIRM_RISK* represents firm-level risk, measured through three dimensions: total risk *(TOTR)*, systematic risk *(SYSR)* and idiosyncratic risk *(UNSYSR)*. Corporate social responsibility performance *(CSR_PERF)* is measured using the average of the environmental and social performance scores provided by the Refinitiv ESG database. A positive coefficient for β_1 in Equation (2) and a statistically significant negative coefficient for β_2 in Equation (3) will support our study's hypotheses.

3.6. Control variables

Following prior studies (Benlemlih & Girerd-Potin, 2017; Albuquerque et al., 2019; Al Rabab'a et al., 2024; Benlemlih et al., 2018), we incorporate several control variables into Equations (2) and (3). Prior studies have suggested that larger firms are better equipped to manage risk during periods of high volatility (e.g., Benlemlih & Girerd-Potin, 2017; Benlemlih et al., 2018; Al Rabab'a et al., 2024). Consequently, firm size *(SIZE)* is included as a control variable, with an expected negative effect on firm risk (*FIRM_RISK*). Similarly, profitability, measured by return on assets *(ROA)*, is expected to have a negative impact on firm risk (*FIRM_RISK*), as more profitable firms tend to exhibit a lower level of risk (Benlemlih et al., 2018; Al Rabab'a et al., 2024). To account for growth opportunities, we use the market-to-book ratio *(MB)* and sales revenue growth *(GROWTH)*, as firms with greater growth potential are generally less vulnerable to market fluctuations (Benlemlih & Girerd-Potin, 2017; Bouslah et al., 2013), implying a negative effect on firm risk (*FIRM_RISK*). We also include CSR disclosure *(CSR_DISC)* as a control variable, as it reflects a firm's commitment to transparency in CSR activities. Firm-level research and development (R&D) expenditure intensity *(RDINT)* is included as a control variable to capture the impact on firm risk *(FIRM_RISK)* of a firm's investment in innovation. The ratio of net property, plant and equipment to total assets

(TANGIBILITY) is included to account for the tangibility of a firm's assets, as firms with a higher proportion of tangible assets are generally perceived to have lower financial risk due to their ability to provide collateral and maintain asset value during economic downturns.

Additionally, we control for firm age *(FAGE)* as older firms are typically considered less risky due to their established presence and operational resilience. We also control for capital expenditure *(CAPEX)* to account for investment opportunities, as firms with greater investment potential typically face lower risk (Benlemlih et al., 2018; Al Rabab'a et al., 2024), suggesting a negative coefficient for *CAPEX*. On the cross-country level, following prior studies (e.g., Al Rabab'a et al., 2024; Ben-Nasr & Ghouma, 2018), we control for GDP per capita (*GDPC*), expressed as the natural logarithm of GDP per capita *(LNGDPC)* in US dollars, which accounts for economic development, with higher *GDPC* values reflecting more developed economies. We also control for the standard deviation of GDPC *(STD_GDPC)* to account of macroeconomic risk (Ben-Nasr & Ghouma, 2018). Appendix A provides the definitions of all variables.

3.7. Estimation method

We employ ordinary least squares (OLS) regression techniques to estimate all our regression models. To mitigate potential issues of heteroscedasticity and serial correlation, we use robust standard errors clustered at the firm level. Additionally, we calculate variance inflation factor (VIF) values to check for multicollinearity among the independent variables. We also include industry, year and country fixed effects in all regression models to control for industry-specific, time-specific and country-specific influences. To address the potential impact of outliers, we winsorise all firm-level continuous variables at the 1st and 99th percentiles.

4. Results

4.1. Descriptive statistics

Table 2 provides the descriptive statistics of the variables used in this study. The mean (median) value of total risk *(TOTRISK)* is 0.394 (0.350), with a standard deviation of 0.209, while the interquartile range spans from 0.258 (1st quartile) to 0.475 (3rd quartile). Systematic risk *(SYSRISK)* has a mean (median) of 1.061 (1.008) and a standard deviation of 0.575, with values ranging between 0.690 (1st quartile) and 1.363 (3rd quartile). For idiosyncratic risk *(UNSYSRISK)*, the mean (median) is 0.090 (0.079), with a standard deviation of 0.047 and values between 0.060 (1st quartile) and 0.109 (3rd quartile). The average value of the *COVID* variable is 0.569, indicating that 56.90 % of firm-year observations correspond to the COVID-19 pandemic period and beyond. The mean (median) value of CSR performance *(CSR_PERF)* is 0.406 (0.382), with a standard deviation of 0.242 and an interquartile range between 0.191 and 0.601. Firm size *(SIZE)*, measured as the natural logarithm of total assets, has a mean (median) of 7.665 (7.748), suggesting an average total asset value of approximately US$2.13 million, with interquartile values ranging between 6.544 and 8.786. Profitability *(ROA)* has a mean (median) of 0.028 (0.032), indicating an average return on assets of 2.8 %, with interquartile values ranging between 0.007 and 0.073. The mean (median) value of growth opportunities *(GROWTH)* is 0.173 (0.063), with a standard deviation of 0.751 and values ranging from −0.039 (1st quartile) to 0.193 (3rd quartile). The market-to-book ratio *(MB)* has a mean (median) of 3.370 (1.800), indicating that, on average, firms' market values exceed their book values by more than threefold. Corporate social responsibility (CSR) disclosure *(CSR_DISC)* has a mean of 0.649, implying that 64.9 % of firms issue CSR reports. The mean (median) value of capital expenditure *(CAPEX)* is 0.122 (0.036), representing approximately 12.2 % of total assets on average, with interquartile values ranging between 0.016 and 0.090. Research and development intensity *(RDINT)* has an average value of 0.088, with a median value of 0.000, suggesting that many firms have no R&D expenditure. Tangibility *(TANGIBILITY)*, measured as the ratio of net property, plant and equipment to total assets, has a mean (median) of 0.271 (0.182), with an interquartile range between 0.048 and 0.426. Firm age *(FAGE)*, calculated as the natural logarithm of the number of years since the firm's first appearance in the Worldscope database, has a mean (median) of 2.941 (3.045), with interquartile values ranging between 2.639 and 3.367. The natural logarithm of GDP per capita *(LNGDPC)* has a mean (median) of 10.445 (10.786), indicating variation in economic development levels, with interquartile values ranging between 9.880 and 11.059. The standard deviation of GDP per capita *(STD_GDPC)* has a mean (median) of 2.153 (2.239), with interquartile values ranging between 0.588 and 3.133.

4.2. Correlation matrix

Table 3 presents Pearson's correlation matrix for the variables used in our research models. As shown in Table 3, firm-level CSR performance is negatively correlated with total risk *(TOTRISK)*, systematic risk *(SYSRISK)* and idiosyncratic risk *(UNSYSRISK)*, consistent with our expectations. The COVID-19 pandemic *(COVID)* is positively correlated with all three risk measures, reflecting heightened uncertainty during the pandemic period. Furthermore, the correlation matrix reveals no significant high correlations between the independent variables, except between *TOTRISK, SYSRISK* and *UNSYSRISK*. As these risk measures are not included together in the same regression model, concerns regarding multicollinearity are mitigated. To ensure robustness, we further examine multicollinearity using variance inflation factor (VIF) values. A VIF value above 10 is typically considered indicative of multicollinearity concerns. In our regression models, the mean VIF value is 1.56, with the lowest at 1.04 and the highest at 3.49, suggesting that multicollinearity is not a significant issue in our analysis.

Table 2
Descriptive statistics.

	N	Mean	Std. Dev.	Median	1st quartile	3rd quartile
TOTRISK	22,451	0.394	0.209	0.350	0.258	0.475
SYSRISK	22,451	1.061	0.575	1.008	0.690	1.363
UNSYSRISK	22,451	0.090	0.047	0.079	0.060	0.109
COVID	22,451	0.569	0.495	1.000	0.000	1.000
CSR_PERF	22,451	0.406	0.242	0.382	0.191	0.601
SIZE	22,451	7.665	1.670	7.748	6.544	8.786
ROA	22,451	0.028	0.119	0.032	0.007	0.073
GROWTH	22,451	0.173	0.751	0.063	−0.039	0.193
MB	22,451	3.370	5.294	1.800	1.024	3.660
CSR_DISC	22,451	0.649	0.477	1.000	0.000	1.000
CAPEX	22,451	0.122	0.309	0.036	0.016	0.090
RDINT	22,451	0.088	0.524	0.000	0.000	0.018
TANGIBILITY	22,451	0.271	0.266	0.182	0.048	0.426
FAGE	22,451	2.941	0.565	3.045	2.639	3.367
LNGDPC	22,451	10.445	0.863	10.786	9.880	11.059
STD_GDPC	22,451	2.153	1.603	2.239	0.588	3.133

Notes: Std. Dev. = standard deviation. All variables are defined in Appendix A.

4.3. Multivariate regression results

4.3.1. Impact of COVID-19 pandemic on firm risk

Our first hypothesis (H1) predicts that the COVID-19 pandemic *(COVID)* is positively associated with firm risk *(FIRM_RISK)*. We employ three proxies for firm risk: total risk *(TOTRISK)*, systematic risk *(SYSRISK)* and idiosyncratic (unsystematic) risk *(UNSYSRISK)*. Table 4 presents the results of the first hypothesis (H1) test. Models (1)–(3) show the regression results. The coefficients of *COVID* are positive and statistically significant ($\beta = 0.081$, p-value<0.05 in Model [1]; $\beta = 0.163$, p-value<0.01 in Model [2]; and $\beta = 0.016$, p-value<0.01 in Model [3]) across Models (1)–(3), suggesting that firms experienced higher levels of risk including both systematic and idiosyncratic risk during the COVID-19 pandemic period. In terms of economic significance, the coefficient estimates for Models (1)–(3) indicate that during the pandemic, total risk, systematic risk and idiosyncratic risk increased by approximately 8.10 %, 16.30 % and 1.60 %, respectively.

Regarding control variables, we find that the coefficients for *SIZE, ROA* and *FAGE* are negatively and statistically significant with firm risk *(FIRM_RISK)* in at least one model from Models (1)–(3). This indicates that larger firms, firms with higher profitability and older firms tend to have a lower level of firm risk. Specifically, larger firms benefit from economies of scale and diversification, while profitable firms and those with greater market experience are better equipped to effectively manage risk. Conversely, the coefficients for *GROWTH, RDINT* and *MB* are positively and statistically significant in at least one model, suggesting that firms with greater growth opportunities, those with higher R&D intensity and those with higher valuation multiples tend to have a higher level of firm risk. These findings align with prior literature, reflecting the uncertainties associated with growth prospects, innovation and market valuation. The coefficient for *CAPEX* is negatively and statistically significant with systematic risk *(SYSRISK)*, suggesting that firms with higher capital expenditure face lower market-related risk. However, *CAPEX* is insignificant in the models explaining total risk and idiosyncratic risk. Additionally, *TANGIBILITY* shows a positive association with total risk, implying that firms with higher tangible asset ratios might have elevated levels of risk, potentially due to the inability to quickly reallocate resources during economic downturns.

Regarding macroeconomic variables, the coefficient for *LNGDPC* is negatively significant in the model explaining total risk, indicating that firms in more economically developed countries face lower total risk. However, *STD_GDPC* is not statistically significant in any model, suggesting the limited influence of GDP variability on firm risk. The findings are consistent with prior studies (e.g., Al Rabab'a et al., 2024; Benlemlih & Girerd-Potin, 2017; Benlemlih et al., 2018), except for the nuanced role of *CAPEX* and *TANGIBILITY*. Overall, the results highlight that firms experienced higher levels of risk, including both systematic and idiosyncratic risk during the COVID-19 pandemic period.

4.3.2. Impact of COVID-19 pandemic on firm risk: role of CSR performance

Our second hypothesis (H2) predicts that CSR performance (*CSR_PERF)* negatively moderates the positive impact of the COVID-19 (*COVID)* pandemic on firm risk *(FIRM_RISK*). To test this hypothesis, the key variable of interest is the interaction term *COVID×CSR_PERF* in Equation (2). As shown in Table 5, the coefficients of *COVID×CSR_PERF* suggest a difference in the effects of CSR performance on firm risk between the pre- and post-COVID-19 pandemic period. As we measure the COVID-19 pandemic (*COVID*) with an indicator variable, the coefficient of *CSR_PERF* captures the effect of the pre-COVID-19 pandemic period on firm risk, with the coefficient of *COVID* indicating the expected effect of the COVID-19 pandemic (conditional on CSR performance) on firm risk. We find that the coefficients of *COVID×CSR_PERF* are negative and statistically significant across all models from Models (1)–(3), indicating that, when controlling for other factors, the average decrease in firm risk *(TOTRISK, SYSRISK* and *UNSYSRISK)* led by CSR performance is larger for the post-COVID-19 pandemic period than for the pre-COVID-19 pandemic period. The coefficients for the interaction term *COVID×CSR_PERF*, for example, are $\beta = -0.158$, p-value<0.01 in Model (1); $\beta = -0.217$, p-value< 0.01 in Model (2); and $\beta = -0.031$, p-value<0.01 in Model (3). These results demonstrate that CSR performance played a critical role in reducing firm risk

Table 3
Correlation matrix.

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
TOTRISK	[1]	1.000															
SYSRISK	[2]	0.423***	1.000														
UNSYSRISK	[3]	0.738***	0.362***	1.000													
COVID	[4]	0.457***	0.212***	0.304***	1.000												
CSR_PERF	[5]	−0.244***	−0.021***	−0.319***	−0.028***	1.000											
SIZE	[6]	−0.362***	−0.096***	−0.446***	−0.168***	0.512***	1.000										
ROA	[7]	−0.403***	−0.208***	−0.405***	−0.152***	0.156***	0.260***	1.000									
GROWTH	[8]	0.083***	−0.024***	0.175***	0.050***	−0.072***	−0.078***	−0.021***	1.000								
MB	[9]	0.097***	−0.012*	0.129***	0.083***	−0.033***	0.136***	0.088***	0.049***	1.000							
CSR_DISC	[10]	−0.222***	−0.033***	−0.268***	0.023***	0.668***	0.374***	0.179***	−0.074***	−0.048***	1.000						
CAPEX	[11]	0.034***	−0.054***	0.055***	0.020***	−0.039***	−0.059***	−0.131***	0.048***	−0.035***	−0.032***	1.000					
RDINT	[12]	0.250***	0.078***	0.325***	0.095***	−0.098***	−0.116***	−0.449***	0.109***	0.076***	−0.152***	0.170***	1.000				
TANGIBILITY	[13]	−0.034***	−0.023***	−0.050***	−0.018***	0.112***	0.005	0.026***	−0.021***	−0.102***	0.148***	0.423***	−0.104***	1.000			
FAGE	[14]	−0.239***	−0.032***	−0.333***	−0.088***	0.287***	0.189***	0.154***	−0.122***	−0.165***	0.180***	−0.123***	−0.150***	0.035***	1.000		
LNGDPC	[15]	0.059***	0.057***	0.040***	0.001	−0.067***	−0.113***	−0.138***	−0.039***	0.010	−0.231***	0.055***	0.095***	−0.021***	0.061***	1.000	
STD_GDPC	[16]	0.223***	0.126***	0.150***	0.671***	0.098***	−0.119***	−0.053***	0.067***	0.019***	0.136***	−0.014**	0.026***	0.018***	−0.004	−0.155***	1.000

Notes: Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. All variables are defined in Appendix A.

Table 4
Regression results between COVID-19 pandemic and firm risk.

	DV = *TOTRISK*	DV=*SYSRISK*	DV=*UNSYSRISK*
	Model (1)	Model (2)	Model (3)
COVID	0.081**	0.163***	0.016***
	(2.160)	(3.098)	(5.008)
SIZE	−0.027***	−0.008	−0.009***
	(-15.438)	(-1.039)	(-22.876)
ROA	−0.403***	−0.841***	−0.088***
	(-18.037)	(-9.131)	(-13.084)
GROWTH	0.011**	−0.021***	0.005**
	(2.009)	(-2.916)	(2.616)
MB	0.002**	−0.002	0.001***
	(2.297)	(-1.364)	(3.232)
CSR_DISC	−0.012***	0.060***	−0.004***
	(-3.582)	(3.428)	(-3.729)
CAPEX	−0.011	−0.145***	−0.001
	(-1.184)	(-5.997)	(-0.416)
RDINT	0.015***	−0.010	0.008***
	(4.480)	(-0.720)	(8.434)
TANGIBILITY	0.019**	0.015	0.000
	(2.053)	(0.382)	(0.001)
FAGE	−0.036***	−0.016	−0.012***
	(-6.482)	(-1.004)	(-6.825)
LNGDPC	−0.241*	−0.038	0.024
	(-1.788)	(-0.111)	(1.344)
STD_GDPC	0.001	0.009	0.000
	(0.141)	(0.655)	(0.030)
Intercept	3.118**	0.874	−0.078
	(2.183)	(0.236)	(-0.409)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Observations	22,451	22,451	22,451
R-squared (R^2)	0.543	0.176	0.526
Adjusted R^2	0.541	0.173	0.524

Notes: This table shows the regression results of the association between the COVID-19 pandemic and firm risk. Model (1) shows the regression results of the association between the COVID-19 pandemic and total risk. Model (2) shows regression results of the association between the COVID-19 pandemic and systematic risk. Model (3) shows the regression results of the association between the COVID-19 pandemic and idiosyncratic risk. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

during the pandemic, reflecting the importance of stakeholder-oriented practices in crisis management. In economic terms, an increase of one standard deviation in *CSR_PERF* results in a 1.05 %, 2.81 % and 0.21 % reduction in total, systematic and idiosyncratic risk, respectively, for firms during and after the COVID-19 pandemic period.

4.4. Endogeneity analysis

4.4.1. Entropy-balancing analysis

Endogeneity arises when the variable of interest is correlated with the error term, often due to systematic differences in firm characteristics across time periods. In our study's context, this bias may stem from observable heterogeneity between pre- and post-COVID-19 pandemic firm-year observations, potentially compromising the validity of the study's causal inferences. To address this concern, we apply the entropy-balancing technique which corrects for imbalances in observable covariates across treatment and control groups, while improving internal validity. Entropy balancing offers several advantages over the commonly used propensity score matching (PSM) which has been criticised both for its sensitivity to model specification and its susceptibility to researcher-induced bias (King & Nielsen, 2019). Unlike PSM, entropy balancing does not require estimation of a propensity score model and instead assigns continuous weights to control observations to achieve exact balance on the first three moments—means, variances and skewness—of the covariate distributions (Hainmueller & Xu, 2013). This method reduces researcher discretion and retains the full sample, avoiding the sample attrition often associated with matching techniques (McMullin & Schonberger, 2020).

In implementing this approach, we classify firm-year observations into treatment and control groups based on the COVID-19 pandemic period: *COVID* is allocated 1 for post-COVID pandemic observations, while *COVID* is allocated 0 for pre-COVID pandemic observations. We apply entropy balancing to reweight the pre-COVID pandemic group's firm-year observations to align their covariate distributions with those of the post-COVID pandemic group. Specifically, the entropy-balancing method increases the weights of underrepresented firm-year observations and decreases the weights of overrepresented ones, generating a reweighted 'pseudo' control group that is statistically comparable to the treatment group. This balancing procedure allows our study to isolate the effect of the

Table 5
Regression results of moderating role of CSR performance in association between COVID-19 pandemic and firm risk.

	DV = *TOTRISK*	DV=*SYSRISK*	DV=*UNSYSRISK*
	Model (1)	Model (2)	Model (3)
COVID	0.143***	0.241***	0.028***
	(3.099)	(3.679)	(5.566)
COVID×CSR_PERF	−0.158***	−0.217***	−0.031***
	(-3.134)	(-3.410)	(-4.273)
CSR_PERF	0.095***	0.281***	0.018***
	(4.508)	(4.785)	(5.423)
SIZE	−0.027***	−0.017**	−0.009***
	(-11.979)	(-2.018)	(-21.973)
ROA	−0.388***	−0.810***	−0.085***
	(-18.111)	(-9.011)	(-12.949)
GROWTH	0.010*	−0.022***	0.005**
	(1.941)	(-2.960)	(2.581)
MB	0.002**	−0.002	0.001***
	(2.295)	(-1.185)	(3.247)
CSR_DISC	−0.016***	0.019	−0.005***
	(-2.672)	(1.086)	(-3.259)
CAPEX	−0.011	−0.142***	−0.001
	(-1.285)	(-6.099)	(-0.457)
RDINT	0.014***	−0.012	0.008***
	(4.439)	(-0.886)	(8.471)
TANGIBILITY	0.018**	0.010	−0.000
	(2.023)	(0.279)	(-0.079)
FAGE	−0.036***	−0.021	−0.012***
	(-6.506)	(-1.357)	(-6.737)
LNGDPC	−0.290**	−0.104	0.015
	(-2.183)	(-0.297)	(0.848)
STD_GDPC	0.004	0.013	0.001
	(0.455)	(1.013)	(0.827)
Intercept	3.587**	1.582	0.013
	(2.574)	(0.420)	(0.068)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Observations	22,451	22,451	22,451
R-squared (R^2)	0.551	0.180	0.532
Adjusted R^2	0.549	0.176	0.530

Notes: This table shows the regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and firm risk. Model (1) shows the regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and total risk. Model (2) shows regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and systematic risk. Model (3) shows the regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and idiosyncratic risk. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

COVID-19 pandemic shock on firm risk, ensuring that any observed differences are not driven by pre-existing firm-level differences. The balanced covariates and resulting regression estimates are reported in Table 6.

Building on this balanced sample, Table 6, Panel B presents the regression results that examine the impact of the COVID-19 pandemic on firm risk and the moderating role of CSR performance in this relationship. Across Models (1)–(6), *COVID* is significantly positively associated with total risk (*TOTRISK*), systematic risk (*SYSRISK*) and idiosyncratic risk (*UNSYSRISK*), confirming the disruptive effect of the pandemic on firm stability. Importantly, the interaction term *COVID×CSR_PERF* is consistently negative and statistically significant, thus indicating that firms with higher CSR performance experienced significantly lower increases in firm risk during the pandemic. This finding highlights the mitigating role of CSR in crisis contexts, indicating that strong stakeholder engagement can attenuate the adverse impact of external shocks on firm risk. The robustness of these findings, validated using an entropy-balanced sample, strengthens the causal interpretation of CSR performance's moderating effect on the COVID-19 pandemic–firm risk relationship.

4.4.2. Simultaneous equation analysis

As our main variable of interest, *COVID*, is measured as an external shock, we consider it unlikely to be affected by endogeneity concerns while, at the same time, we recognise that our moderator variable, CSR performance *(CSR_PERF)*, could be endogenous. To address potential endogeneity concerns, we follow the approach of Lee and Bose (2021) by employing a simultaneous equation analysis using the three-stage least squares (3SLS) technique. This approach effectively mitigates endogeneity issues and ensures the robustness of our findings. Our model consists of two equations: the first stage estimates CSR performance, while the second stage

Table 6
Entropy-balancing analysis results between COVID-19 pandemic and firm risk: Role of CSR performance.

Panel A: Matching of covariates

	Descriptive statistics after entropy balancing					
	Post-COVID			Pre-COVID		
	Mean	Variance	Skewness	Mean	Variance	Skewness
SIZE	7.421	3.102	−0.069	7.420	3.102	−0.069
ROA	0.013	0.020	−2.127	0.013	0.020	−2.127
GROWTH	0.205	0.820	5.737	0.205	0.820	5.737
MB	3.752	34.690	3.026	3.753	34.700	3.026
CSR_DISC	0.659	0.225	−0.669	0.659	0.225	−0.669
CAPEX	2.898	0.342	−0.679	2.898	0.342	−0.679
RDINT	0.128	0.111	5.456	0.128	0.111	5.456
TANGIBILITY	0.131	0.441	6.901	0.131	0.441	6.901
FAGE	0.267	0.069	1.031	0.267	0.069	1.031
LNGDPC	10.450	0.757	−1.139	10.450	0.757	−1.140
STD_GDPC	3.088	1.755	1.211	3.087	1.757	1.208

Panel B: Second-stage regression results between COVID-19 pandemic and firm risk and moderating role of CSR performance in this association

	DV=*TOTRISK*	**DV=*SYSRISK***	**DV=*UNSYSRISK***	**DV=*TOTRISK***	**DV=*SYSRISK***	**DV=*UNSYSRISK***
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
COVID	0.037***	0.103**	0.016***	0.118***	0.154***	0.029***
	(4.499)	(2.405)	(3.287)	(5.314)	(2.811)	(5.978)
COVID×CSR_PERF				−0.229***	−0.151*	−0.032***
				(-5.577)	(-1.985)	(-4.824)
CSR_PERF				−0.004	0.282***	0.014**
				(-0.100)	(3.703)	(2.316)
SIZE	0.003**	−0.020***	−0.010***	0.004	−0.030***	−0.010***
	(2.564)	(-2.781)	(-11.363)	(0.556)	(-3.440)	(-10.778)
ROA	−0.409***	−0.656***	−0.063***	−0.289***	−0.644***	−0.064***
	(-26.943)	(-7.458)	(-5.515)	(-5.866)	(-7.493)	(-5.794)
GROWTH	0.009***	−0.029***	0.002	0.002	−0.030***	0.002
	(4.217)	(-4.461)	(0.921)	(0.371)	(-4.977)	(0.877)
MB	0.001***	−0.004	0.001***	0.001	−0.004	0.001***
	(4.709)	(-1.445)	(3.831)	(0.996)	(-1.516)	(3.532)
CSR_DISC	−0.030***	0.062**	−0.003*	0.001	0.011	−0.003
	(-7.435)	(2.305)	(-1.976)	(0.112)	(0.346)	(-1.369)
CAPEX	−0.007	−0.115***	−0.000	−0.025	−0.112***	−0.000
	(-1.198)	(-3.078)	(-0.084)	(-1.156)	(-2.985)	(-0.103)
RDINT	0.017***	−0.015	0.005	−0.003	−0.017	0.005
	(4.892)	(-0.847)	(1.615)	(-0.212)	(-0.953)	(1.583)
TANGIBILITY	0.011	−0.022	−0.001	0.015	−0.017	−0.001
	(1.290)	(-0.280)	(-0.249)	(0.792)	(-0.225)	(-0.131)
FAGE	−0.032***	−0.028	−0.011***	−0.016	−0.036	−0.011***
	(-10.620)	(-1.311)	(-4.133)	(-1.451)	(-1.570)	(-4.118)
LNGDPC	−0.119***	0.067	0.027	−0.070	0.059	0.027
	(-3.281)	(0.284)	(1.509)	(-0.521)	(0.247)	(1.488)
STD_GDPC	−0.004**	0.032	0.002	0.000	0.032	0.002
	(-2.075)	(1.420)	(1.187)	(0.055)	(1.441)	(1.249)
Intercept	1.813***	0.104	−0.109	1.243	0.241	−0.120
	(4.686)	(0.041)	(-0.595)	(0.849)	(0.094)	(-0.637)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,451	22,451	22,451	22,451	22,451	22,451
R-squared (R^2)	0.206	0.215	0.531	0.246	0.218	0.536
Adjusted R^2	0.203	0.211	0.529	0.243	0.215	0.534

Notes: This table shows the entropy-balancing analysis results. Panel A shows the descriptive statistics of the variables before and after entropy balancing. Panel B shows the regression results of the association between the COVID-19 pandemic and the moderating role of CSR performance in this association. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

examines the impact of the COVID-19 pandemic on firm risk (i.e., total risk, systematic risk and idiosyncratic risk), while incorporating the moderating role of CSR performance.

Following prior research (Cheng et al., 2014; Dal Maso et al., 2020), we employ the peer firms' country–industry average CSR performance score *(PEER_CSR_IND_LOC)* and the country–year average CSR performance score *(PEER_CSR_LOC_YEAR)* as instrumental variables for CSR performance.[1] Firm-level CSR performance is likely to be correlated with that of industry peers due to shared industry requirements and practices. However, from the firm's perspective, peer-level CSR performance is largely exogenous, as highlighted by Lang and Stice-Lawrence (2015). By leveraging the CSR performance of peer firms within the same country–industry and country–-year, we aim to address potential endogeneity concerns and effectively identify the outcomes associated with CSR performance. We believe that these two variables serve as valid instrumental variables in our analysis, ensuring the robustness and reliability of our findings.

Table 7 reports the results of the 3SLS regressions. The first-stage results (Models [1], [3] and [5]) demonstrate that CSR performance *(CSR_PERF)* is significantly associated with the two instrumental variables (*PEER_CSR_LOC_IND* and *PEER_CSR_LOC_YEAR*).[2] The second-stage results (Models [2], [4] and [6]) reveal that the COVID-19 pandemic *(COVID)* is positively and significantly associated with total risk *(TOTRISK)*, systematic risk *(SYSRISK)* and idiosyncratic risk *(UNSYSRISK)*. Importantly, we find that CSR performance moderates the relationship between the COVID-19 pandemic and firm risk. The interaction term (*COVID*×*CSR_PERF*) is negative and statistically significant across all models, indicating that higher CSR performance reduces the adverse impact of the pandemic on firm risk. These results suggest that CSR performance plays a critical role in mitigating both systematic and idiosyncratic risk during periods of global disruption.

4.5. Role of country-level institutional factors and industry contexts

4.5.1. Role of country-level business culture

In this study, we also examine the role of country-level business culture in the relationship between the COVID-19 pandemic and firm risk, as well as how CSR performance affects this relationship. Firms in countries with a shareholder-oriented business culture tend to focus on short-term financial results and dividend payouts. This can undermine investment in long-term resilience measures, such as stakeholder relationship management, the promotion of social responsibility and the use of sustainable practices. Due to this narrow focus, during a global crisis, such as the COVID-19 pandemic, these firms are more vulnerable, to disruptions in operations, supply chains and market stability, amplifying their firm-level risk. The lack of a comprehensive stakeholder approach further exacerbates challenges related to employee welfare, customer trust and community support, resulting in increased financial instability, operational inefficiencies and reputational risk. Thus, the adverse impacts of the COVID-19 pandemic are expected to be exaggerated in a shareholder-oriented business culture when compared to a stakeholder-oriented business culture. Moreover, the moderating role of CSR performance on the relationship between the COVID-19 pandemic and firm risk is posited to be more significant in shareholder-oriented business cultures. In these environments, CSR initiatives serve as a compensatory mechanism, offsetting the limitations of governance models focused predominantly on shareholder returns. Strong CSR performance signals a firm's commitment to proactive risk management and alignment with stakeholder expectations, even in contexts where stakeholder engagement is not structurally embedded in corporate practices. Corporate social responsibility (CSR) practices foster trust, enhance reputational capital and strengthen relationships with employees, customers and suppliers, thereby mitigating the heightened level of firm risk associated with crises like the COVID-19 pandemic. Firms with a higher level of CSR practices in shareholder-oriented cultures are better equipped to navigate economic and social upheavals by leveraging the "insurance-like" protection that these practices provide against idiosyncratic risk.

The interaction between business culture and CSR performance highlights the crucial role of governance systems in determining the effectiveness of crisis response strategies. Shareholder-oriented business cultures, with their focus on short-term financial gains, exacerbate firm vulnerability during systemic shocks, such as the COVID-19 pandemic. However, CSR performance acts as a critical moderating variable, enabling firms to reduce the adverse impacts of the crisis on firm risk. These dynamics underscore the importance of integrating CSR into corporate strategies, particularly in shareholder-oriented contexts, to enhance resilience and ensure long-term sustainability during periods of uncertainty. Therefore, we conjecture that the relationship between the COVID-19 pandemic and firm risk is more pronounced in shareholder-oriented business cultures due to the inherent emphasis on maximising shareholder wealth, often at the expense of broader stakeholder engagement. Following prior studies (Bose et al., 2024; Simnett et al., 2009), we measure shareholder-oriented business culture *(SHARE)* as an indicator variable that takes the value of 1 if a firm is domiciled in a common law

[1] To calculate peer firms' country–industry average CSR performance *(PEER_CSR_IND_LOC)* and country–year average CSR performance *(PEER_CSR_LOC_YEAR)*, we exclude the focal firm's CSR performance to ensure that the calculations are not influenced by the focal firm itself. This exclusion ensures that the instrumental variables reflect the average CSR performance of the focal firm's peers within the same country–industry and country–year. By doing so, we maintain the exogeneity of the instrumental variables and eliminate any potential bias arising from the focal firm's contribution to the peer averages.

[2] Although the 3SLS technique does not directly report standard first-stage diagnostic tests, we conduct auxiliary first-stage regressions using the two-stage least squares (2SLS) framework to assess instrument strength. The results confirm that the instruments—peer CSR at the country–industry level *(PEER_CSR_LOC_IND)* and at the country–year level (*PEER_CSR_LOC_YEAR)*—are strongly correlated with firm-level CSR performance *(CSR_PERF)*. The *F*-statistic for instrument relevance ($F = 951.42$) far exceeds the conventional threshold of 10, consistent with the criterion proposed by Staiger and Stock (1997), thereby affirming the validity of our instruments.

Table 7
Three-stage least squares (3SLS) regression results between COVID-19 pandemic and firm risk.

	First-stage	Second-stage	First-stage	Second-stage	First-stage	Second-stage
	DV=*CSR_PERF*	DV = *TOTRISK*	DV=*CSR_PERF*	DV=*SYSRISK*	DV=*CSR_PERF*	DV=*UNSYSRISK*
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
COVID		0.172***		0.299***		0.034***
		(20.444)		(9.624)		(17.686)
COVID×CSR_PERF		−0.243***		−0.386***		−0.049***
		(-12.957)		(-5.574)		(-11.444)
CSR_PERF		0.243***		0.577***		0.050***
		(7.908)		(5.091)		(7.163)
SIZE	−0.084***	−0.033***	−0.020	−0.028***	−0.179***	−0.010***
	(-8.377)	(-23.727)	(-0.709)	(-5.430)	(-10.063)	(-32.756)
ROA	−2.029***	−0.374***	−6.297***	−0.781***	−2.260***	−0.082***
	(-14.459)	(-37.150)	(-3.287)	(-21.029)	(-13.120)	(-35.736)
GROWTH	0.056***	0.010***	−0.152**	−0.023***	0.135***	0.005***
	(6.883)	(7.361)	(-2.505)	(-4.417)	(10.440)	(16.274)
MB	0.009***	0.002***	−0.015**	−0.001*	0.016***	0.001***
	(7.155)	(11.500)	(-2.307)	(-1.687)	(9.148)	(16.213)
CSR_DISC	0.158***	−0.041***	0.632***	−0.032	0.114***	−0.010***
	(11.282)	(-6.955)	(4.529)	(-1.458)	(6.592)	(-7.609)
CAPEX	−0.067***	−0.010***	−1.083***	−0.139***	−0.033	−0.000
	(-3.483)	(-2.602)	(-3.184)	(-10.139)	(-1.506)	(-0.557)
RDINT	0.076***	0.012***	−0.074	−0.015*	0.204***	0.008***
	(6.270)	(5.674)	(-1.213)	(-1.845)	(10.477)	(15.056)
TANGIBILITY	0.116***	0.016***	0.136	0.006	0.023	−0.001
	(4.168)	(3.003)	(0.965)	(0.296)	(0.745)	(-0.552)
FAGE	−0.145***	−0.039***	−0.091	−0.027***	−0.279***	−0.013***
	(-9.420)	(-19.310)	(-1.462)	(-3.661)	(-10.894)	(-28.319)
LNGDPC	−1.212***	−0.315***	−0.359	−0.155*	0.561***	0.009*
	(-8.492)	(-13.375)	(-0.597)	(-1.784)	(3.992)	(1.657)
STD_GDPC	0.005	0.006***	0.068*	0.017***	−0.001	0.001***
	(0.773)	(4.360)	(1.747)	(3.386)	(-0.123)	(3.037)
RISK	−4.884***		−7.433***		−24.916***	
	(-14.991)		(-3.278)		(-13.494)	
PEER_CSR_LOC_IND	0.849***		2.086***		0.877***	
	(13.653)		(3.181)		(12.013)	
PEER_CSR_LOC_YEAR	0.691***		1.306		0.694***	
	(3.575)		(1.485)		(5.475)	
Intercept	14.806***	3.879***	6.151	2.166**	−2.364	0.076
	(9.245)	(15.372)	(0.918)	(2.325)	(-1.643)	(1.322)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,451	22,451	22,451	22,451	22,451	22,451

Notes: This table shows the three-stage least squares (3SLS) regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and firm risk. Models (1), (3) and (5) show the first-stage regression results. Models (2), (4) and (6) show the second-stage regression results of the moderating role of CSR performance in the association between the COVID-19 pandemic and idiosyncratic risk. Coefficient values are shown with robust standard errors, while *z*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

country, and 0 otherwise.

Table 8, Panel A presents the regression results examining the relationship between the COVID-19 pandemic and firm risk, as well as the moderating role of CSR performance, within both shareholder-oriented and stakeholder-oriented business cultures. The results highlight the significant impact of the COVID-19 pandemic on all dimensions of firm risk, particularly in shareholder-oriented countries. Models (1), (3) and (5) show positive and statistically significant coefficients for *COVID*, indicating that the adverse effects of the pandemic on firm risk are more pronounced in shareholder-oriented business cultures. This finding aligns with the notion that firms in countries with a shareholder-oriented business culture, with its prioritisation of short-term financial performance, were less equipped to mitigate the uncertainties and disruptions caused by the COVID-19 pandemic.

Overall, our study's results suggest that the adverse impact of the COVID-19 pandemic on firm risk is more pronounced in countries with a shareholder-oriented business culture, where firms are less equipped to address systemic crises due to their governance system's focus. However, CSR performance plays a crucial role in mitigating these types of risk, with its moderating effects being particularly significant in shareholder-oriented business cultures. These findings emphasise the importance of integrating CSR practices into corporate strategies, particularly in governance systems in which shareholder interests are prioritised, to enhance resilience and reduce firm risk during crises.

Table 8
Regression results between COVID-19 pandemic and firm risk and moderating role of CSR performance: Role of country-level institutional factors.

Panel A: Country-level business culture

	DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*		DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*	
	SHARE = 1	*SHARE* = 0	*SHARE* = 1	*SHARE* = 0	*SHARE* = 1	*SHARE* = 0	*SHARE* = 1	*SHARE* = 0	*SHARE* = 1	*SHARE* = 0	*SHARE* = 1	*SHARE* = 0
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
COVID	0.278***	0.031	0.326***	0.129***	0.024***	0.014***	0.346***	0.047	0.421***	0.106**	0.037***	0.020***
	(4.591)	(1.417)	(4.056)	(3.652)	(6.718)	(5.651)	(6.007)	(1.457)	(4.257)	(2.222)	(11.864)	(4.369)
COVID×CSR_PERF							−0.190***	−0.032	−0.289***	0.026	−0.035***	−0.011**
							(-9.688)	(-1.230)	(-3.451)	(0.635)	(-15.793)	(-2.325)
CSR_PERF							0.070***	0.012	0.313***	0.213***	0.015***	0.006*
							(5.677)	(0.912)	(6.485)	(3.409)	(4.529)	(1.890)
Intercept	7.935***	2.136**	4.434	−0.637	0.024	0.319***	8.160***	2.102**	4.706*	−0.818	0.065	0.308***
	(3.685)	(2.212)	(1.636)	(-0.723)	(0.128)	(5.135)	(4.034)	(2.135)	(1.813)	(-0.811)	(0.383)	(4.726)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,335	9,701	18,319	9,908	18,300	9,959	17,335	9,701	18,319	9,908	18,300	9,959
R-squared (R^2)	0.631	0.499	0.185	0.190	0.550	0.467	0.640	0.500	0.189	0.195	0.556	0.468
Adjusted R^2	0.630	0.496	0.182	0.184	0.549	0.463	0.638	0.496	0.187	0.190	0.555	0.465

Panel B: Country-level economic development

	DV=*TOTRISK*		**DV=*SYSRISK***		**DV=*UNSYSRISK***		**DV=*TOTRISK***		**DV=*SYSRISK***		**DV=*UNSYSRISK***	
	***HIGH_DEV*=1**	***HIGH_DEV*=0**	***HIGH_DEV*=1**	***HIGH_DEV*=0**	***HIGH_DEV*=1**	***HIGH_DEV*=0**	***HIGH_DEV*=1**	***HIGH_DEV*=0**	***HIGH_DEV*=1**	***HIGH_DEV*=0**	***HIGH_DEV*=1**	***HIGH_DEV*=0**
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**	**Model (7)**	**Model (8)**	**Model (9)**	**Model (10)**	**Model (11)**	**Model (12)**
COVID	0.142*	0.072**	0.244***	0.077	0.012***	0.013***	0.217***	0.093***	0.344***	0.111	0.026***	0.018***
	(1.974)	(2.494)	(3.559)	(0.955)	(3.072)	(4.238)	(2.842)	(2.828)	(3.919)	(1.072)	(5.304)	(4.636)
COVID×CSR_PERF							−0.182***	−0.051**	−0.260***	−0.094	−0.034***	−0.012***
							(-11.715)	(-2.098)	(-3.704)	(-1.354)	(-12.003)	(-3.080)
CSR_PERF							0.071***	0.047**	0.347***	0.199***	0.014***	0.011***
							(4.971)	(2.130)	(5.750)	(2.939)	(3.912)	(3.644)
Intercept	4.857	1.886	1.306	2.709	−0.099	0.205***	4.661	2.005	1.159	2.908	−0.128	0.232***
	(1.458)	(1.481)	(0.601)	(1.287)	(-0.810)	(4.067)	(1.372)	(1.586)	(0.492)	(1.303)	(-1.007)	(4.243)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15392	15757	16279	16143	16136	16302	15392	15757	16279	16143	16136	16302
R-squared (R^2)	0.634	0.468	0.168	0.182	0.558	0.463	0.642	0.470	0.174	0.185	0.564	0.465
Adjusted R^2	0.632	0.465	0.165	0.177	0.557	0.460	0.641	0.467	0.170	0.180	0.563	0.462

Notes: This table shows the roles of country-level institutional factors in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association. Panel A shows the regression results of the role of country-level business culture in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association. Panel B shows the regression results of the role of country-level economic development in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association. Coefficient values are shown with robust standard errors, while z-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

4.5.2. Role of country-level economic development

This study also examines the role of country-level economic development in the relationship between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this relationship. The COVID-19 pandemic–firm risk relationship is likely to be more pronounced in economically developed countries due to several structural and contextual factors inherent in their economies. Countries with developed economies are characterised by higher levels of market efficiency and financial integration (Bose & Khan, 2022); these enhance the speed and extent to which global shocks, such as a pandemic, are transmitted across sectors and firms. The interconnectedness of industries, reliance on global supply chains and intricate nature of advanced financial systems amplify the exposure of firms in developed economies to external disruptions, elevating their risk profiles. These dynamics make firms in developed markets more sensitive to uncertainties caused by crises, such as the COVID-19 pandemic, resulting in greater increases in both systematic and idiosyncratic risk. Additionally, firms in developed countries are subject to heightened stakeholder scrutiny, with greater expectations for transparency, accountability and adherence to corporate governance norms (Aguilera et al., 2006; Bose & Khan, 2022). During crises, such as the COVID-19 pandemic, these expectations pressure firms to effectively navigate disruptions. Failure to meet stakeholder expectations can exacerbate operational, reputational and financial risk. Thus, the complex regulatory environments and heightened demands for performance in developed economies further intensify the adverse impacts of global crises on corporate risk.

However, CSR performance is found to have played a pivotal moderating role in mitigating the COVID-19 pandemic–firm risk relationship, particularly in economically developed countries. Firms with improved CSR practices are better equipped to address stakeholder concerns, maintain trust and manage operational challenges, thereby reducing their vulnerability to crisis-induced types

Table 9
Regression results between COVID-19 pandemic and firm risk and moderating role of CSR performance: Role of environmentally sensitive industries.

Panel A: Regression results between COVID-19 pandemic and firm risk: Role of environmentally sensitive industries

	DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*	
	ESI = 1	ESI = 0	ESI = 1	ESI = 0	ESI = 1	ESI = 0
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
COVID	0.067**	0.083**	0.122*	0.177***	0.014***	0.015***
	(2.312)	(2.036)	(1.875)	(2.849)	(3.557)	(4.485)
Intercept	1.659	3.501**	−0.850	1.346	−0.110	−0.073
	(0.831)	(2.537)	(-0.214)	(0.360)	(-0.620)	(-0.366)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,040	18,411	4,040	18,411	4,040	18,411
R-squared (R^2)	0.638	0.524	0.324	0.150	0.631	0.514
Adjusted R^2	0.632	0.522	0.311	0.146	0.624	0.512

Panel B: Regression results of moderating role of CSR performance in association between COVID-19 pandemic and firm risk: Role of environmentally sensitive industries

	DV=*TOTRISK*		**DV=*SYSRISK***		**DV=*UNSYSRISK***	
	ESI=1	**ESI=0**	**ESI=1**	**ESI=0**	**ESI=1**	**ESI=0**
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
COVID	0.147***	0.141***	0.307***	0.236***	0.034***	0.026***
	(4.690)	(2.779)	(3.422)	(3.098)	(5.112)	(4.933)
COVID×CSR_PERF	−0.172***	−0.154***	−0.406***	−0.177***	−0.042***	−0.028***
	(-3.361)	(-2.930)	(-3.487)	(-2.842)	(-4.100)	(-3.882)
CSR_PERF	0.090***	0.095***	0.251*	0.295***	0.016**	0.018***
	(2.726)	(4.483)	(1.758)	(5.484)	(2.187)	(5.239)
Intercept	2.404	3.898***	0.929	1.885	0.067	−0.000
	(1.293)	(2.846)	(0.228)	(0.492)	(0.374)	(-0.002)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,040	18,411	4,040	18,411	4,040	18,411
R-squared (R^2)	0.645	0.532	0.328	0.154	0.639	0.519
Adjusted R^2	0.639	0.530	0.316	0.150	0.632	0.517

Notes: This table shows the regression results of the role of environmentally sensitive industries (ESIs) in the association between the COVID-19 pandemic and firm risk, as well as the moderating role of CSR performance in this association. Panel A shows the regression results of the role of environmentally sensitive industries (ESIs) in the association between the COVID-19 pandemic and firm risk. Panel B shows the regression results of the role of environmentally sensitive industries (ESIs) in the moderating role of CSR performance in the association between the COVID-19 pandemic and firm risk. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

of risk (Bose et al., 2023; Godfrey et al., 2009; Ioannou & Serafeim, 2012). In developed countries, where CSR expectations are institutionalised and deeply embedded in business practices, the benefits of CSR performance become even more pronounced. Stakeholder theory posits that firms demonstrating strong CSR performance are better positioned to align their strategies with stakeholder priorities, reducing potential conflicts and enhancing resilience (Donaldson & Preston, 1995; Freeman, 2010). By fostering stronger stakeholder relationships, enhancing reputational capital and building organisational resilience, firms with a high level of CSR performance mitigate the impact of heightened levels of risk, particularly in developed economies where stakeholder expectations are higher and enforcement mechanisms are stronger. The dual role of economic development and CSR performance in shaping firm risk during the COVID-19 pandemic underscores the critical importance of institutional and organisational factors in determining corporate resilience. Specifically, we measure *HIGH_DEV* as an indicator variable that takes the value of 1 if country-level GDP is greater than the sample's median value of GDP, and 0 otherwise.

Table 8, Panel B highlights how the impact of the COVID-19 pandemic on firm risk differs based on country-level economic development and reveals the moderating role of CSR performance. The results show that firms in highly developed countries experienced a stronger increase in total and systematic risk during the pandemic ($\beta = 0.142$ and $\beta = 0.244$, respectively) compared to those in less developed countries ($\beta = 0.072$ and $\beta = 0.077$, respectively). This suggests that the more globally integrated firms in advanced economies were more exposed to systematic disruptions caused by the COVID-19 pandemic.

Importantly, CSR performance is found to significantly mitigate the adverse effects of the COVID-19 pandemic on firm risk, particularly in highly developed countries. The interaction term *COVID×CSR_PERF* is negative and significant for total risk (β = -0.182) and idiosyncratic risk (β = -0.034), indicating that firms with a stronger CSR commitment demonstrated greater resilience by reducing both systematic and firm-specific risk. In less developed countries, while CSR performance also reduces risk, the effect is smaller in magnitude and less consistent, with this likely to reflect weaker institutional environments and less stakeholder engagement. These findings highlight the critical role of economic development in amplifying the benefits of CSR performance. Firms in highly developed countries derive greater risk mitigation advantages from CSR practices due to stronger governance, institutional frameworks and stakeholder pressures. In less developed countries, enhancing institutional quality and promoting CSR adoption could strengthen the ability of firms to manage risk during global crises.

4.5.3. Role of environmentally sensitive industries (ESIs)

The environmental sensitivity of industries is found to play a crucial role in shaping the COVID-19 pandemic–firm risk relationship, particularly given the heightened scrutiny and operational challenges faced by firms in these industries. Industries, such as energy, manufacturing and mining, are more vulnerable to disruptions caused by global crises, such as the COVID-19 pandemic, due to their dependence on natural resources, complex supply chains and stringent regulatory environments. These vulnerabilities amplify their firm risk during crises, as firms in ESIs often encounter greater operational inefficiencies, reputational risk and stakeholder pressures. However, CSR performance can serve as a critical mitigating factor, especially in these industries. Firms with a strong CSR commitment are better positioned to manage environmental and social challenges, enhancing their ability to maintain stakeholder trust and operational resilience during crises. Therefore, we conduct a subsample analysis among environmentally sensitive industries (ESIs) of the COVID-19 pandemic–firm risk relationship and the moderating role of CSR performance. Following prior studies (Cho & Patten, 2007; Clarkson et al., 2008), we define environmentally sensitive industries (ESIs) as an indicator variable that takes a value of 1 if firms operate in an environmentally sensitive industry, and 0 otherwise.

Table 9 shows the regression results. Our findings reveal that the adverse impact of the COVID-19 pandemic on firm risk is more pronounced in non-ESIs, but the mitigating effect of CSR performance is stronger in environmentally-sensitive industries (ESIs). This highlights the dual importance of industry-level environmental sensitivity and firm-level CSR initiatives in moderating the impact of global disruptions on firm risk.

5. Robustness checks

5.1. Country-level analysis

Our sample is predominantly composed of firms from the United States (US), the United Kingdom (UK), Japan and China. To account for potential variations in firm behaviour across these major economies, we analyse these groups separately. Table 10 presents the regression results, providing insights into the impact of the COVID-19 pandemic on firm risk and the moderating role of CSR performance across these country-specific subsamples. This approach allows our study to explore the heterogeneity in the relationship between CSR performance and firm risk during the pandemic, while considering differences in business cultures and institutional contexts.

Table 10, Panel A presents the regression results for firms separated into two groups: US firms and non-US firms. The results for US firms indicate a significant and pronounced increase in firm risk (*TOTRISK* = 0.279, *SYSRISK* = 0.449, *UNSYSRISK* = 0.0.017, with all significant at 1 %) during the COVID-19 pandemic, reflecting heightened sensitivity to market disruptions in a shareholder-oriented business culture. This risk is effectively mitigated by CSR performance, as evidenced by the significant negative interaction term (*COVID×CSR_PERF* = -0.181 for *TOTRISK*; −0.267 for *SYSRISK*; and −0.039 for *UNSYSRISK*, with all significant at 1 %). Non-US firms, in contrast, experience a smaller increase in total, systematic and idiosyncratic risk (*TOTRISK* = 0.053, *SYSRISK* = 0.143, *UNSYSRISK* = 0.012), highlighting the relative resilience of non-US firms. Corporate social responsibility (CSR) performance also plays a moderating role on firm risk in non-US firms, but the magnitude of its impact is smaller compared to US firms, suggesting a more uniform risk management approach in non-US contexts.

Table 10
Country-effect analysis.

Panel A: US firms versus non-US firms												
	DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*		DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*	
	US	Non-US	US	Non-US	US	Non-US	US	Non-US	US	Non-US	US	Non-US
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
COVID	0.279***	0.053**	0.449***	0.143**	0.017***	0.012***	0.345***	0.085***	0.543***	0.189**	0.031***	0.020***
	(13.948)	(2.033)	(4.912)	(2.334)	(2.921)	(4.804)	(17.112)	(2.991)	(5.754)	(2.219)	(5.308)	(4.416)
COVID×CSR_PERF							−0.181***	−0.077***	−0.267***	−0.129	−0.039***	−0.019***
							(-13.363)	(-3.182)	(-4.557)	(-1.651)	(-11.560)	(-3.362)
CSR_PERF							0.081***	0.058***	0.300***	0.247***	0.020***	0.013***
							(5.001)	(2.812)	(3.918)	(3.091)	(4.225)	(3.896)
Intercept	31.567***	3.854**	2.638	2.444	−0.194	0.110	30.898***	4.051**	1.325	2.865	−0.342	0.158
	(28.087)	(2.295)	(0.585)	(0.712)	(-0.680)	(1.214)	(27.657)	(2.512)	(0.294)	(0.804)	(-1.214)	(1.434)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	6,761	15,690	6,761	15,690	6,761	15,690	6,761	15,690	6,761	15,690	6,761	15,690
R-squared (R^2)	0.691	0.485	0.192	0.176	0.611	0.480	0.696	0.488	0.195	0.179	0.617	0.483
Adjusted R^2	0.689	0.482	0.187	0.170	0.609	0.476	0.695	0.485	0.190	0.174	0.614	0.480
Panel B: UK firms versus non-UK firms												
	DV=*TOTRISK*		**DV=*SYSRISK***		**DV=*UNSYSRISK***		**DV=*TOTRISK***		**DV=*SYSRISK***		**DV=*UNSYSRISK***	
	UK	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**	**UK**	**Non-UK**
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**	**Model (7)**	**Model (8)**	**Model (9)**	**Model (10)**	**Model (11)**	**Model (12)**
COVID	0.109***	0.064*	0.387***	0.191***	0.019**	0.014***	0.155***	0.126***	0.435**	0.268***	0.029***	0.026***
	(3.495)	(1.756)	(2.623)	(3.709)	(2.409)	(5.287)	(3.753)	(2.855)	(2.432)	(4.184)	(2.953)	(5.879)
COVID×CSR_PERF							−0.077*	−0.162***	−0.180	−0.216***	−0.022**	−0.031***
							(-1.795)	(-3.188)	(-0.949)	(-3.181)	(-2.392)	(-4.243)
CSR_PERF							−0.038	0.098***	0.333	0.279***	0.012	0.018***
							(-0.874)	(5.047)	(1.638)	(4.607)	(1.229)	(5.454)
Intercept	17.484***	2.464*	−6.786	1.485	0.455	−0.099	17.508***	2.943**	−6.396	2.189	0.480*	−0.007
	(14.997)	(1.915)	(-1.271)	(0.396)	(1.616)	(-0.483)	(14.933)	(2.326)	(-1.200)	(0.574)	(1.687)	(-0.037)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	912	21539	912	21539	912	21539	912	21539	912	21539	912	21539
R-squared (R^2)	0.567	0.548	0.302	0.175	0.511	0.530	0.572	0.556	0.304	0.178	0.514	0.536
Adjusted R^2	0.549	0.546	0.273	0.171	0.491	0.528	0.553	0.554	0.274	0.175	0.493	0.534
Panel C: Japanese firms versus non-Japanese firms												
	DV=*TOTRISK*		**DV=*SYSRISK***		**DV=*UNSYSRISK***		**DV=*TOTRISK***		**DV=*SYSRISK***		**DV=*UNSYSRISK***	
	Japan	**Non-Japan**	**Japan**	**Non-Japan**	**Japan**	**Non-Japan**	**Japan**	**Non-Japan**	**Japan**	**Non-Japan**	**Japan**	**Non-Japan**
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**	**Model (7)**	**Model (8)**	**Model (9)**	**Model (10)**	**Model (11)**	**Model (12)**
COVID	−0.079***	0.106***	0.016	0.192***	0.013***	0.017***	−0.088***	0.161***	−0.010	0.267***	0.013***	0.029***

(*continued on next page*)

Table 10 (*continued*)

Panel A: US firms versus non-US firms												
	DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*		DV = *TOTRISK*		DV=*SYSRISK*		DV=*UNSYSRISK*	
	US	Non-US	US	Non-US	US	Non-US	US	Non-US	US	Non-US	US	Non-US
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)	Model (12)
	(-4.434)	(3.270)	(0.170)	(4.012)	(2.935)	(5.287)	(-4.444)	(3.598)	(-0.106)	(4.312)	(2.826)	(5.691)
COVID×CSR_PERF							0.015	−0.146***	−0.019	−0.213***	−0.002	−0.031***
							(1.065)	(-2.940)	(-0.318)	(-3.357)	(-0.654)	(-4.291)
CSR_PERF							0.020	0.090***	0.491***	0.260***	0.005	0.018***
							(1.165)	(4.339)	(5.571)	(4.218)	(1.153)	(5.220)
Intercept	−15.317**	3.147**	−11.127	1.158	−1.369**	−0.079	−15.255**	3.574**	−11.553	1.832	−1.380**	0.011
	(-2.580)	(2.268)	(-0.907)	(0.303)	(-2.197)	(-0.409)	(-2.545)	(2.596)	(-0.918)	(0.473)	(-2.200)	(0.059)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1259	21192	1259	21192	1259	21192	1259	21192	1259	21192	1259	21192
R-squared (R^2)	0.427	0.556	0.419	0.176	0.415	0.524	0.429	0.563	0.451	0.179	0.416	0.530
Adjusted R^2	0.410	0.554	0.402	0.172	0.398	0.522	0.411	0.561	0.434	0.175	0.398	0.528
Panel D: Chinese firms versus non-Chinese firms												
	DV=*TOTRISK*		**DV=*SYSRISK***		**DV=*UNSYSRISK***		**DV=*TOTRISK***		**DV=*SYSRISK***		**DV=*UNSYSRISK***	
	China	**Non-China**	**China**	**Non-China**	**China**	**Non-China**	**China**	**Non-China**	**China**	**Non-China**	**China**	**Non-China**
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**	**Model (7)**	**Model (8)**	**Model (9)**	**Model (10)**	**Model (11)**	**Model (12)**
COVID	−0.305**	0.077*	0.630*	0.169***	−0.029	0.016***	−0.279*	0.150***	0.638*	0.264***	−0.027	0.030***
	(-2.216)	(1.870)	(1.861)	(3.381)	(-1.240)	(5.445)	(-1.929)	(3.041)	(1.883)	(4.555)	(-1.080)	(8.043)
COVID×CSR_PERF							−0.036*	−0.182***	−0.012	−0.261***	−0.004	−0.035***
							(-1.826)	(-3.855)	(-0.140)	(-6.266)	(-0.696)	(-7.039)
CSR_PERF							0.125***	0.090***	0.040	0.331***	0.015**	0.017***
							(5.275)	(3.405)	(0.435)	(7.856)	(2.235)	(4.669)
Intercept	−9.163	4.452***	15.756***	−4.088***	−1.819	−0.266	−8.878	4.803***	15.849***	−3.565**	−1.784	−0.199
	(-1.453)	(2.952)	(2.595)	(-2.775)	(-1.622)	(-1.414)	(-1.394)	(3.319)	(2.616)	(-2.440)	(-1.581)	(-1.366)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2543	19908	2543	19908	2543	19908	2543	19908	2543	19908	2543	19908
R-squared (R^2)	0.438	0.570	0.058	0.198	0.440	0.544	0.447	0.580	0.058	0.203	0.442	0.551
Adjusted R^2	0.429	0.568	0.044	0.194	0.432	0.541	0.438	0.578	0.044	0.199	0.434	0.549

Notes: This table shows the regression results in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association based on country effects. Panel A shows the regression results of the role of country-level business culture in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association using US versus non-US firms. Panel B shows the regression results of the role of country-level business culture in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association using UK versus non-UK firms. Panel C shows the regression results of the role of country-level business culture in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association using Japanese versus non-Japanese firms. Panel A shows the regression results of the role of country-level business culture in the association between the COVID-19 pandemic and firm risk and the moderating role of CSR performance in this association using Chinese versus non-Chinese firms. Coefficient values are shown with robust standard errors, while *z*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

Table 10, Panel B shows the regression results for firms separated into two groups: UK firms and non-UK firms. For UK firms, the COVID-19 pandemic moderately increases firm risk (*TOTRISK* = 0.109, *SYSRISK* = 0.387, *UNSYSRISK* = 0.019), with CSR performance showing a relatively weaker moderating effect (*COVID*×*CSR_PERF* = -0.077 for *TOTRISK* and −0.022 for *UNSYSRISK*, with both significant at least at 10 %). This aligns with the UK's shareholder-oriented business culture, where CSR performance may not be central to corporate risk management. In contrast, non-UK firms show a higher sensitivity to the COVID-19 pandemic's impact on systematic and unsystematic risk (*SYSRISK* = 0.191, *UNSYSRISK* = 0.014, with both significant), with CSR performance demonstrating a stronger mitigating role (*COVID*×*CSR_PERF* = -0.162 for *TOTRISK*, significant at 1 %). This underscores the importance of CSR performance in non-UK firms for managing firm risk during crises.

As shown in Table 10, Panel C, Japanese firms exhibit an unexpected reduction in total risk during the pandemic (*TOTRISK* = -0.079, significant at 1 %), which may reflect the effectiveness of crisis management and strong government interventions. The interaction term (*COVID*×*CSR_PERF*) is insignificant, indicating that CSR performance does not significantly influence risk mitigation for Japanese firms, with this likely to be due to the existing stability of their business environment. Conversely, non-Japanese firms experience increased levels of risk (*TOTRISK* = 0.106, *SYSRISK* = 0.192, with both significant at 1 %), with CSR performance playing a critical moderating role in reducing firm risk (*COVID*×*CSR_PERF* = -0.146 for *TOTRISK*, significant at 1 %). These results highlight the

Table 11
Regression results of moderating role of CSR performance in association between COVID-19 pandemic and firm risk.

	DV = *TOTRISK*	DV=*SYSRISK*	DV=*UNSYSRISK*	DV = *TOTRISK*	DV=*SYSRISK*	DV=*UNSYSRISK*
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
COVID	0.079**	0.221***	0.025***	0.082***	0.223***	0.027***
	(2.072)	(3.993)	(7.285)	(8.477)	(3.031)	(4.482)
COVID×*ENV_PERF*	−0.112**	−0.192***	−0.029***			
	(-2.084)	(-5.172)	(-6.155)			
ENV_PERF	−0.121***	0.231***	0.014***			
	(-5.827)	(5.697)	(6.010)			
COVID×*SOC_PERF*				−0.092***	−0.147*	−0.026***
				(-8.251)	(-1.832)	(-3.092)
SOC_PERF				−0.111***	0.201***	0.011***
				(-9.850)	(2.820)	(3.311)
SIZE	0.015***	−0.015*	−0.009***	0.013***	−0.014**	−0.009***
	(4.737)	(-1.722)	(-21.506)	(9.248)	(-2.003)	(-22.310)
ROA	−0.409***	−0.812***	−0.085***	−0.401***	−0.828***	−0.086***
	(-17.894)	(-8.822)	(-12.951)	(-24.903)	(-9.223)	(-13.563)
GROWTH	0.008	−0.022***	0.005**	0.009***	−0.022***	0.005**
	(1.595)	(-2.970)	(2.585)	(3.791)	(-2.940)	(2.609)
MB	0.001	−0.002	0.001***	0.001***	−0.002	0.001***
	(0.960)	(-1.213)	(3.282)	(3.729)	(-1.247)	(3.246)
CSR_DISC	0.016***	0.025	−0.004***	0.002	0.035**	−0.004***
	(2.663)	(1.279)	(-2.950)	(0.345)	(2.311)	(-2.718)
CAPEX	−0.010	−0.142***	−0.001	−0.010	−0.143***	−0.001
	(-0.913)	(-6.008)	(-0.427)	(-1.486)	(-6.030)	(-0.493)
RDINT	0.015***	−0.012	0.008***	0.019***	−0.012	0.008***
	(3.713)	(-0.864)	(8.410)	(5.386)	(-0.858)	(8.784)
TANGIBILITY	0.020	0.007	0.000	0.009	0.015	−0.000
	(1.408)	(0.182)	(0.001)	(1.067)	(0.389)	(-0.066)
FAGE	−0.023***	−0.021	−0.012***	−0.027***	−0.019	−0.012***
	(-3.559)	(-1.378)	(-6.786)	(-9.032)	(-1.179)	(-6.618)
LNGDPC	−0.139	−0.091	0.017	−0.153***	−0.081	0.016
	(-1.403)	(-0.265)	(1.060)	(-4.270)	(-0.232)	(0.885)
STD_GDPC	−0.002	0.012	0.000	−0.003	0.012	0.000
	(-0.435)	(0.933)	(0.722)	(-1.578)	(0.897)	(0.648)
Intercept	1.841*	1.485	−0.013	2.030***	1.361	−0.002
	(1.763)	(0.405)	(-0.075)	(5.332)	(0.362)	(-0.012)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,451	22,451	22,451	22,451	22,451	22,451
R-squared (R^2)	0.227	0.180	0.534	0.221	0.178	0.531
Adjusted R^2	0.224	0.176	0.532	0.217	0.175	0.529

Notes: This table shows the regression results of the moderating role of environmental and social performance in the association between the COVID-19 pandemic and firm risk using. Models (1) and (3) show the regression results of the moderating role of environmental and social performance in the association between the COVID-19 pandemic and total risk, respectively. Models (2) and (4) show the regression results of the moderating role of environmental and social performance in the association between the COVID-19 pandemic and systematic risk, respectively. Models (3) and (4) show the regression results of the moderating role of environmental and social performance in the association between the COVID-19 pandemic and idiosyncratic risk, respectively. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

contrasting reliance on CSR between Japanese and non-Japanese firms during the COVID-19 pandemic.

Chinese firms exhibit a unique reduction in total risk during the COVID-19 pandemic (*TOTRISK* = -0.305, significant at 5 %), potentially due to strict governmental controls and crisis management measures. The moderating role of CSR performance is limited, as reflected by the smaller and less significant interaction term coefficients, suggesting that other institutional mechanisms may have contributed to risk reduction. For non-Chinese firms, the COVID-19 pandemic significantly increases total and systematic risk (*TOTRISK* = 0.077, *SYSRISK* = 0.169, with both significant), with CSR performance playing a substantial mitigating role (*COVID*×*CSR_PERF* = -0.182 for *TOTRISK*, significant at 1 %). This emphasises the critical role of CSR performance in managing risk in non-Chinese firms.

5.2. Country sensitivity analysis

To address the potential issue of uneven sample distribution across countries, we conduct additional robustness checks. Firstly, we exclude countries with fewer than 10, 20, 30, 50 or 100 observations, respectively. The unreported results from each analysis remain

Table 12
Mediating role of stakeholder management of interaction of CSR performance in the association between COVID-19 pandemic and firm risk.

	DV = *TOTRISK*	DV=*STAKE_MANAGE*	DV = *TOTRISK*
	Model (1)	Model (2)	Model (3)
CSR_PERF×*COVID*	−0.127*	0.155***	−0.106
	(-1.740)	(3.640)	(-1.476)
STAKE_MANAGE			−0.138***
			(-10.012)
CSR_PERF	−0.192***	−0.985***	−0.327***
	(-4.490)	(-15.680)	(-7.816)
COVID	0.195***	−0.006	0.194**
	(2.720)	(-0.150)	(2.586)
SIZE	0.020***	0.086***	0.031***
	(6.040)	(5.510)	(7.899)
ROA	−0.422***	0.116**	−0.406***
	(-18.580)	(2.190)	(-19.227)
GROWTH	0.005	−0.002	0.005
	(1.080)	(-0.450)	(0.984)
MB	0.001	0.001	0.001
	(0.970)	(1.060)	(1.055)
CSR_DISC	0.028***	0.151***	0.048***
	(3.460)	(4.960)	(5.087)
CAPEX	−0.013	−0.033	−0.017*
	(-1.180)	(-1.510)	(-1.693)
RDINT	0.017***	−0.006	0.016***
	(4.200)	(-1.010)	(4.474)
TANGIBILITY	0.015	0.045**	0.021
	(1.100)	(2.400)	(1.572)
FAGE	−0.024***	−0.019	−0.026***
	(-3.380)	(-1.090)	(-3.574)
LNGDPC	−0.539***	−0.349***	−0.587***
	(-2.720)	(-3.930)	(-2.907)
STD_GDPC	−0.110	−0.003	−0.011
	(-1.330)	(-0.250)	(-1.347)
Intercept	5.573***	3.999***	6.124***
	(2.960)	(4.810)	(3.208)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes
Observations	22,451	22,451	22,451
R-squared (R^2)	0.222	0.173	0.276
Mediating effects			
Indirect effect: *CSR_PERF*×*COVID*×*STAKE_MANAGE*		−0.021***	
z-statistic for indirect effect: *CSR_PERF*×*COVID*×*STAKE_MANAGE*		(-3.418)	
Direct effect		−0.106***	
Total effect		−0.127***	
% of total mediated effect		16.80 %	

Notes: This table shows the mediation analysis results. Model (1) shows the regression results of the interaction of CSR performance in the association between the COVID-19 pandemic and firm risk. Column (2) shows regression results of the interaction of CSR performance in the association between the COVID-19 pandemic and stakeholder management. Column (3) shows the regression results of the interaction of CSR performance with the associations between the COVID-19 pandemic, stakeholder management and firm risk. Coefficient values are shown with robust standard errors, while *t*-statistics are reported in parentheses. Superscript ***, ** and * indicate statistical significance at 1 %, 5 % and 10 % levels, respectively. DV = dependent variable. All variables are defined in Appendix A.

qualitatively consistent with our main findings. Secondly, we estimate our baseline regression models using weighted least squares, applying weights inversely proportional to the total number of firm-year observations per country. The un-tabulated results also align closely with those presented in Table 4. These robustness checks confirm that our findings are not driven by uneven sample distribution and remain reliable across various scenarios.

5.3. Alternative proxies for CSR performance

In our main analyses, CSR performance *(CSR_PERF)* is measured as the average of environmental and social performance pillar scores developed by the Refinitiv ESG database. To explore which components primarily drive the observed results, we decompose the overall CSR performance measure into its two dimensions—environmental and social—and re-run the analysis using each component separately. Table 11 reports the regression results. The results remain consistent with our main findings, indicating that both dimensions contribute significantly to the observed effect, with no single component solely accounting for the relationship. These findings reinforce the robustness of our conclusions and suggest that the moderating effect of CSR performance on the COVID-19 pandemic–firm risk relationship is best understood as the outcome of a comprehensive CSR strategy, rather than the result of any one isolated dimension.

6. Channel analysis

A growing body of literature has highlighted that CSR performance can serve as a strategic resource that protects firms during periods of crisis by fostering stakeholder trust and loyalty (Godfrey et al., 2009; Lins et al., 2017). However, the mechanism through which CSR performance moderates the adverse effects of systemic shocks, such as the COVID-19 pandemic, remains underexplored. We argue that stakeholder management is a critical transmission channel for this relationship. Drawing on stakeholder theory (Freeman, 2010; Harrison et al., 2010), we posit that firms with strong CSR performance are more likely to have institutionalised systems of stakeholder engagement—such as transparent communication, inclusive decision making and responsive feedback loops—which enhance resilience and reduce exposure to firm-specific and market-wide risk (Bose et al., 2022). During the COVID-19 pandemic, these firms were better equipped to maintain stakeholder relationships, adjust to operational disruptions and uphold reputational capital, thereby mitigating firm risk (Bose et al., 2022). This perspective aligns with the "insurance-like" view of CSR performance (Godfrey, 2005), suggesting that the value of CSR performance extends beyond compliance and reputation to include robust stakeholder governance mechanisms. Accordingly, we assess the mediating role of stakeholder management in the relationship between CSR performance, the COVID-19 pandemic and firm risk. Following established approaches in the accounting and finance literature (e.g., Bose & Hossain, 2024; Cook et al., 2019; Lang et al., 2012), we implement a mediation analysis based on the following set of regression equations:

$$FIRM\_RISK_{i,j,t} = \beta_0 + \beta_1 CSR\_PERF_{i,j,t} \times COVID_t + \sum CONTROLS_{i,j,t} + \sum YEAR_t + \sum INDUSTRY_k + \sum COUNTRY_j + \varepsilon_{i,j,t} \quad (4.1)$$

$$\text{STAKE\_MANAGE}_{i,j,t} = \gamma_0 + \gamma_1 \text{CSR\_PERF}_{i,j,t} \times \text{COVID}_t + \sum \text{CONTROLS}_{i,j,t} + \sum \text{YEAR}_t + \sum \text{INDUSTRY}_k + \sum \text{COUNTRY}_j + \varepsilon_{i,j,t} \quad (4.2)$$

$$\text{FIRM\_RISK}_{i,j,t} = \omega_0 + \omega_1 \text{CSR\_PERF}_{i,j,t} \times \text{COVID}_t + \omega_2 \text{STAKE\_MANAGE}_{i,j,t} + \sum \text{CONTROLS}_{i,j,t} + \sum \text{YEAR}_t + \sum \text{INDUSTRY}_k + \sum \text{COUNTRY}_j + \varepsilon_{i,j,t} \quad (4.3)$$

where *FIRM_RISK* is the firm's total risk and *CSR_PERF* is the firm-level CSR performance. *STAKE_MANAGE* captures the firm's broader stakeholder management framework. This includes formal policies, processes and engagement activities aimed at aligning corporate actions with stakeholder expectations. Specific practices, such as transparent communication, responsiveness to stakeholder concerns and collaborative initiatives, contribute to building stakeholder trust and legitimacy. We measure stakeholder management using the stakeholder engagement score from the Refinitiv ESG database which evaluates how effectively a firm interacts with its various stakeholder groups. The score reflects stakeholder involvement in corporate decision making and the presence of mechanisms for two-way communication and accountability (Bose & Hossain, 2024). This mediating channel highlights the role of effective stakeholder engagement in amplifying the risk-mitigating benefits of strong CSR performance. All definitions of variables are provided in Appendix A.

Table 12 reports the results of the mediation analysis.[3] In Model (1), the interaction term *CSR_PERF×COVID* is negatively associated with total firm risk ($\beta = -0.127$, p-value<0.10), indicating that firms with higher CSR performance experienced lower firm risk during the pandemic. In Model (2), we find a significant and positive association between *CSR_PERF×COVID* and stakeholder management ($\beta = 0.155$, p-value<0.01), suggesting that CSR activities during the pandemic enhanced stakeholder engagement and responsiveness. In Model (3), when both the interaction term and stakeholder management are included as predictors of firm risk, the coefficient of *CSR_PERF×COVID* decreases in magnitude and loses statistical significance ($\beta = -0.106$, p-value>0.10), while stakeholder management remains strongly significant ($\beta = -0.138$, p-value<0.01). The formal mediation test confirms the significance of the indirect pathway through stakeholder management. The indirect effect of *CSR_PERF×COVID* on firm risk via stakeholder management is -0.021 ($z = -3.418$, p-value<0.01), accounting for 16.80 % of the total effect. These results provide robust evidence that

[3] For reasons of brevity, we only report the results using firms' total risk. However, the unreported results using both systematic and unsystematic risk yield similar findings.

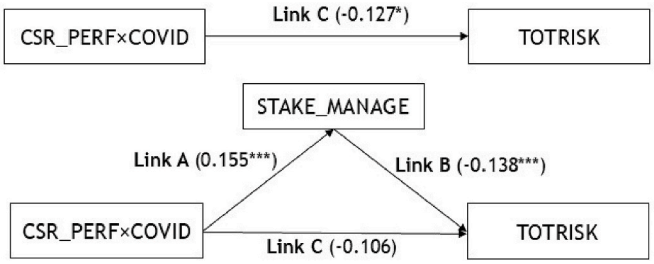

Fig. 1. Mediation analysis.

stakeholder management partially mediates the relationship between CSR performance and firm risk in the context of the COVID-19 pandemic. Fig. 1 shows the mediation results graphically.

Overall, our findings suggest that CSR performance enables firms to build stakeholder trust and responsiveness which, in turn, reduces firm vulnerabilities during periods of external shock. The strategic importance of stakeholder-oriented CSR practices is emphasised as enhancing corporate resilience and risk mitigation.

7. Conclusion

This study examines the impact of the COVID-19 pandemic on firm risk and the moderating role of CSR performance, providing critical insights into how global disruptions shape firm-level vulnerabilities. Our findings reveal that the pandemic significantly increased all types of firm risk—total risk, systematic risk and idiosyncratic risk—underscoring its role in amplifying market-wide uncertainties. These results align with earlier studies on global economic turmoil during crises (Baker et al., 2020a; Bose et al., 2022). Importantly, our analysis highlights that CSR performance mitigates these types of risk, affirming the argument by Lins et al. (2017) that pre-crisis CSR investment builds trust and resilience, enabling firms to perform better during crises. Serving as a buffer, high CSR performance reduces uncertainty and promotes operational stability amidst global disruptions.

The implications of this study are both timely and actionable. Policymakers should view CSR performance as a cornerstone of economic stability, especially during global crises. By incentivising CSR practices through policies and frameworks, governments can enhance the private sector's resilience, ultimately safeguarding broader economic stability. For corporate managers, the findings underscore the importance of integrating CSR into core business strategies. Firms that proactively invest in CSR initiatives are better positioned to navigate crises, maintain stakeholder trust and minimise financial shocks. Corporate social responsibility (CSR) should not be treated as an auxiliary activity but as a critical component of comprehensive risk management and business continuity planning.

The study also provides valuable guidance for investors. Firms with strong CSR performance can demonstrate greater stability during crises, making them more attractive to long-term investors. This reinforces the growing alignment between sustainability performance and financial outcomes, further validating the integration of ESG metrics into investment decision making. The findings of this study advance the literature by highlighting the nuanced role of CSR performance in mitigating different types of risk—total, systematic and idiosyncratic—during global crises. By employing both firm-level and country-level analyses, this study bridges a gap in the literature, offering insights into the complex dynamics between firm characteristics, governance structures and the broader economic environment.

While the study makes significant contributions, it is not without limitations. The reliance on quantitative metrics for CSR performance and firm risk may not fully capture the nuanced impacts of CSR initiatives, such as their qualitative contributions to stakeholder relationships and organisational culture. Additionally, the focus on the COVID-19 pandemic limits the generalisability of findings to other crises or long-term contexts. Future research should explore the qualitative dimensions of CSR performance, such as stakeholder perceptions, and investigate its role across diverse crises, including financial, environmental and geopolitical disruptions. Moreover, a deeper analysis of specific CSR activities and their differential effects on firm risk could provide more granular insights, enabling tailored strategies for firms and policymakers.

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Appendix A: Definitions of variables

Notation	Variable Name	Definition
TOTRISK	Total risk	Total risk measured as the annualised standard deviation of daily stock returns for the current year.
SYSRISK	Systematic risk	Systematic risk estimated by regressing the firm's excess return on the market's excess return, based on daily stock returns over the previous year from the capital asset pricing model (CAPM).
UNSYSRISK	Unsystematic risk/idiosyncratic risk	Idiosyncratic risk (unsystematic risk) measured as the standard deviation of residuals from the capital asset pricing model (CAPM) based on daily stock returns over one year.
COVID	COVID-19 pandemic	An indicator variable that takes a value of 1 if the year falls from 2020 to 2021, and 0 if the year falls from 2018 to 2019.
CSR_PERF	Corporate social responsibility (CSR) performance	Firm-level CSR performance measured by the average of the social and environmental pillar scores developed by the Refinitiv ESG database.
SIZE	Firm size	The natural logarithm of market capitalisation.
ROA	Profitability	The ratio of net income divided by total assets.
GROWTH	Revenue growth	The percentage change in annual revenue.
MB	Growth opportunities	The ratio of market value of equity to book value of equity.
CSR_DISC	CSR disclosure	An indicator variable that takes a value of 1 if a firm issues a CSR or sustainability report, and 0 otherwise.
CAPEX	Capital expenditure	Capital expenditure scaled by total assets.
RDINT	Research and development (R&D) intensity	The amount of research and development (R&D) expenditure scaled by sales revenue.
TANGIBILITY	Tangibility	The ratio of net property, plant and equipment to total assets.
FAGE	Firm age	The natural logarithm of the total number of years since the firm first appears in the Worldscope database.
LNGDP	Gross domestic product (GDP)	The natural logarithm of the gross domestic product (GDP) per capita in US$.
STD_GDPC	Macroeconomic risk	The five-year rolling standard deviation of gross domestic product (GDP) per capita.
PEER_CSR_LOC_IND	Instrumental variable	The average level of CSR performance for firms in the same country–industry, excluding the focal firm.
PEER_CSR_LOC_YEAR	Instrumental variable	The average level of CSR performance for firms in the same country–year, excluding the focal firm.
STAKE_MANAGE	Stakeholder management	Stakeholder management measured using the stakeholder engagement score from the Refinitiv ESG database, with this score evaluating how effectively a firm interacts with its various stakeholder groups. The score reflects stakeholder involvement in corporate decision making and the presence of mechanisms for two-way communication and accountability.

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