ORIGINAL RESEARCH

Assessing the Impact of Policy Uncertainty, Geopolitical Risk, and Sustainable Disclosure on Corporate Performance

Siddhartha Barman[1] **· Jitendra Mahakud**[1]

Abstract

This study explores the impact of policy uncertainty, geopolitical risk, and sustainable disclosure (ESG) on corporate performance for the period 2014–21 across 23 countries. Using the System GMM technique, it uncovers a negative link between policy uncertainty, geopolitical risk, and corporate performance. Sustainable disclosure mitigates the influence of economic uncertainty and geopolitical risk on firm performance. The results are robust across the various other econometric methods (i.e. fixed effect, random effect and feasible generalized least squares) and alternative proxy used for sustainability disclosure. These findings have implications for policymakers and managers, highlighting the importance of aligning policies with sustainable disclosure practices. This study contributes to the literature by examining these factors on a cross-country scale, potentially among the first of its kind.

1 Introduction

The research on sustainable disclosures and their relationship with firm value has gained attention in the corporate finance literature. A higher level of disclosure can attract capital and maintain confidence in the markets. In contrast, a lower level of disclosure may lead to manipulation, unethical behavior and damage of market integrity at a high cost to firms, stakeholders and the economy (OECD, 2004). In the same line, a growing number of firms are now engaged in a broad set of environmental, social and governance (ESG) disclosure activities, and this issue has

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become a topic of much attention (Ashwin Kumar et al., 2016; Gulen et al., 2016; Mirza & Ahsan, 2020; Wang & Sarkis, 2017). Several theories explain the benefits of voluntary disclosure of ESG information by the firms. First, voluntary corporate disclosures help in reduction of information asymmetry between managers and investors (Shane & Spicer, 1983), which ultimately reduces the cost of capital of the firm. Second, ESG disclosures always aim at gaining social legitimacy for social and environmental impacts caused by firms' operations (Lokuwaduge & Heenetigala, 2017). ESG disclosure is also a tool for impression management that can maintain and enhance corporate reputation (Brammer & Pavelin, 2008; Higginson et al., 2006). In the recent periods the research on two aspects i.e., impact of policy uncertainty and geopolitical risk on firm performance has also gained the importance. Economic policy uncertainty refers to the unpredictability and instability surrounding governmental regulations, trade policies, fiscal measures, and other related factors (Baker et al., 2016; Kang et al., 2014; Liu & Zhang, 2020), while Geopolitical risk, on the other hand, encompasses the potential challenges and disruptions arising from political tensions, conflicts, and economic instabilities among different nations (Caldara & Iacoviello, 2022; Demir & Ersan, 2017). The relationship between policy uncertainty, geopolitical risk, and sustainability-performance sensitivity have garnered considerable attention from researchers and practitioners over the past few years. Even though there has been increasing frequency of empirical research that investigates the impact of sustainability disclosure (ESG) and macro level uncertainty factors on firm performance, the studies are largely based on single country perspective and the effect of ESG, policy uncertainty and geopolitical risk on firm performance has been examined independently. There is a dearth of the research that investigates the intertwining relationship between ESG, economic policy uncertainty, geopolitical risk, and firm performance across the countries. We intend to fill this gap with this study using a modest sample size of 36,721 firm-year observations of 4590 firms from 23 countries for the period 2014–2021. Broadly, this study answers the broad research questions such as (1) How sustainability disclosure and macro level uncertainties viz. policy uncertainty and geopolitical risk affect the corporate performance? and (2) Does sustainable disclosure influence the corporate performance-macro uncertainty relationship? Employing system GMM estimation, the study finds that overall ESG, environmental, social and governance disclosures have a positive impact on corporate performance. The association between policy uncertainty, geopolitical risk and performance is negative and the sustainability disclosure (ESG) moderates the negative impact of policy uncertainty as well as geopolitical risk on firm performance. In this way, we formally examine how sustainable disclosure (ESG) mediates the link between economic policy uncertainty, geopolitical risk and corporate performance. Our findings are robust across the various econometric methods (i.e. fixed effect, random effect and feasible generalized least squares) and alternative proxies used for sustainability disclosure.

The rest of the paper is organized as follows: Sect. 2 deals with the literature review and hypothesis formulation. Section 3 presents the data and variables used in our study. Section 4 discusses the model specifications and estimation methods. Section 5 Empirical results and discussions. Section 6 concludes the study.

2 Literature Review and Hypotheses Development

2.1 Economic Policy Uncertainty and Corporate Performance

The early empirical studies have found a significant association between economic policy uncertainty (EPU) and corporate decisions. Most of the studies have established a negative relationship between EPU and investment decisions of the firm (Azqueta-Gavaldón, 2017; Feng et al., 2021; Kang & Ratti, 2013). Economic policy uncertainty reduces net debt issuance and also disrupts the investment financing in China (Liu & Zhang, 2020). Arouri et al. (2016) explores the influence of EPU on stock returns in the United States of America and reveals that policy uncertainty significantly reduces the capital market returns, and the effect is stronger during the period of extreme volatility. Bonaime et al (2018) have concluded that the EPU has a strong negative impact on M&A activities of the firms. Several studies have found that EPU has a negative impact on firm performance (Ahsan & Qureshi, 2021; Baker et al., 2016; Chen et al., 2019; Meinen & Röhe, 2017). Ahsan et al. (2022) have found that policy uncertainty significantly reduces the firm performance for European non-financial firms. This study also concluded that cultural dimensions moderate the relationship between EPU and firm performance. Considering the above-mentioned studies, we propose hypotheses as follows:

H1 Economic policy uncertainty will be negatively associated with corporate performance.

2.2 Economic Policy Uncertainty, Sustainable Reporting and Corporate Performance

The proponents of sustainability reporting believe that promoting sustainable development will be beneficial for both the organization and its employees. Often, the sustainable development of businesses is enhanced by measures that simultaneously contribute to financial stability, improved environmental and social sustainability, and increased internal and external decision-making transparency (Eccles et al., 2011). The empirical research linked sustainability disclosure to company performance and conclude that sustainable reporting increases company performance (Graves & Waddock, 2000; Schadewitz & Niskala, 2010; Iwata & Okada, 2011; Kim & Chang, 2022; Gupta & Gupta, 2020). Social activities like corporate social investing can boost long-term profitability (Brammer et al., 2012). Effective management practices based on sustainable indicators improve corporate performance (Halbritter & Dorfleitner, 2015). According to Xie et al. (2019) governance reporting dominates, followed by social and environmental disclosures. Bahadori et al. (2021) found that financial performance is higher with more sustainable ratings.

Hilal and Tantawy (2022) find that environmental awareness and investment boost bank performance. Ahsan et al. (2021) have found that policy uncertainty lowers company performance and the effect of policy uncertainty reduces with high sustainability disclosures. In other words, sustainability disclosures reduce the performance-policy uncertainty sensitivity.

Considering the preceding studies, we propose the following hypotheses:

H2 Sustainability disclosure (ESG) may affect the Economic policy uncertainty and the corporate performance sensitivity.

2.3 Geopolitical Risk and Corporate Performance

Geopolitical risks such as war, foreign aggression, political instability, and other geopolitical variables cause external shocks and poor company performance (Alam et al., 2023). Geopolitical risks (GPR) may affect the supply chain, overseas commerce, foreign investments, and business growth. Political instability increases the cost of capital, making it difficult for enterprises to raise money on their own. Foreign investors and stakeholders would seek a greater capital financing premium during uncertainty to compensate for risks. Such risk-and-uncertainty scenarios lower company value and performance. The theory of real options suggests that firms are more likely to delay their investment decisions during political or economic policy uncertainty so they can maximize market value after the uncertainty is resolved (Bernanke, 1983). According to Phan et al. (2021) uncertainty increases information asymmetry, making it difficult for lenders to identify good borrowers, which affects lending, investment, and economic activity. Empirical evidences support the fact that increased uncertainty causes financial market liquidity crisis (Brunnermeier & Pedersen, 2009) and geopolitical risk adversely affect the corporate finance decisions such as corporate investments, cash holding, leverage, cash flow etc. (Azzimonti, 2018; Çolak et al., 2018; Dai & Zhang, 2019; Le and Tran, 2021; Khoo & Cheung, 2022; Kothari & Maneenop, 2020; Park & Newaz, 2018). Considering these theoretical arguments and empirical findings, we propose following hypotheses:

H3 Geopolitical risk will be negatively associated with corporate performance.

2.4 Geopolitical Risk, Sustainable Reporting and Corporate Performance

In an uncertain environment, it is very much hard to anticipate an enterprise's future for institutional investors, corporate stakeholders, and firm management and at that point of time ESG reporting gives extra information about the company beyond financial statements (Boubakri et al., 2010). According to Pereira da Silva (2020), organizations that adopt environmental, social, and governance (ESG) practices demonstrate their allegiance to ESG by voluntarily disclosing non-financial information. Gelb and Strawser (2001) claim that companies that engage in socially responsible practices are more likely to exhibit increased fiscal openness, as this falls within the realm of "socially responsible behavior". Therefore, the inclusion

of supplementary ESG-related data serves to mitigate the disparity in information within the financial market, facilitating the investor's ability to evaluate the risks and issues confronted by the firm. Furthermore, it has been seen that organizations that align their environmental, social, and governance (ESG) goals with their economic goals experience enhanced brand recognition. The implementation of environmental, social, and governance (ESG) practices generates a form of ethical capital that serves as a safeguard for the organization when confronted with adverse circumstances (Godfrey et al., 2009).

Koh et al. (2014) found that corporations use sustainability investments as strategic decisions to reduce the risk of unpredictable occurrences in the country. Sustainable reporting reduces information asymmetry and acts as an ex-ante risk insurance premium. Cheng et al. (2014) argue that companies may enhance institutional investor funding by improving their brand value and reputation through social initiatives. Oanh and Hoang (2020) observed that sustainable reporting acts as risk management tool for Chinese investors during the period of crisis. Rjiba et al. (2020) found that corporate social responsibility disclosures reduce the influence of economic policy uncertainty on corporate performance. Atif and Ali (2021) indicate that companies with greater ESG disclosure tend to exhibit reduced default risk. Koh et al. (2022) have conducted a study that demonstrates the advantageous impact of environmental, social, and governance (ESG) initiatives on brand credibility, brand image, and perceived quality. In summary, the participation in environmental, social, and governance (ESG) practices is linked to increased transparency and decreased risk of economic hardship for enterprises. This is achieved by alleviating economic constraints and improving reputation among clients and investors. Consequently, high-ESG firms are expected to be less susceptible to external shocks. The empirical studies also found that substantial CSR efforts, big cash holdings, and institutional ownership reduce negative effects of uncertainty on business performance (Ozdemir et al., 2023 and Peng et al., 2023).

Considering the preceding considerations, we offer following hypotheses:

H4 Sustainability disclosure (ESG) may affect the geopolitical risk and the corporate performance sensitivity

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Hypotheses development

H1. Economic policy uncertainty will be negatively associated with corporate performance

H2: Sustainability disclosure (ESG) may affect the Economic policy uncertainty and the corporate performance sensitivity

H3: Geopolitical risk will be negatively associated with corporate performance

H4: Sustainability disclosure (ESG) may affect the geopolitical risk and the corporate performance sensitivity

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3 Data & Variables

This study considers cross-country data from 23 developing and emerging nations, 4590 companies, and 36,721 observations during the period 2014–2021. The sources of data are World Bank and Bloomberg data base. Bloomberg's unique ESG score evaluates a company's ESG disclosure quality to calculate its overall ESG score. Companies get 0.1 for releasing the absolute minimum of ESG data and 100 for publishing everything. In our study we have used the combined score of ESG along with its three components representing as dummy variables. Environmental disclosure score represents a dummy variable, which equals 1 if environmental score is above the median; or 0 otherwise. Similarly, social and governance disclosure score is also taken as dummy variable, which equals 1 if above the median; or 0 otherwise. The average ESG disclosure score and its sub components per year for the above mentioned sample is provided in the Fig. 1.

We use Ahir et al. (2022) global uncertainty index (WUI), as the uncertainty proxy. The World Bank's World development indicators database was mined for macroeconomic metrics including GDP growth and inflation. Caldara and Iacoviello (2022) define GPR as the threat of rapid changes in international relations owing to wars, terrorism, and state conflicts. We use Caldara & Iacoviello's GPR index for geopolitical risk. Company performance is judged using accounting- and market-based ratios such as ROA, ROE, and Tobin's Q. According to Goddard et al. (2005), Hamrouni et al. (2019), and Wong et al. (2021), ROA shows how well a company uses its assets to make money. It measures business profitability relative to total assets (Prasad et al., 2019). Return on equity measures a company's productivity and profit-making efficiency. Higher ROE means the corporation converts equity into earnings, improving its financial position (Mittal, 2019). Tobin's Q is market capitalization, total liabilities, preferred equity, and minority interest divided by total assets. We have used firm specific variables such as leverage (Lev), liquidity (Liq), asset tangibility (TAN), company size, and R&D and country-specific variables like inflation and growth rate of gross domestic product as the control variables. Table 1 shows the summary of all the variables used in this study.
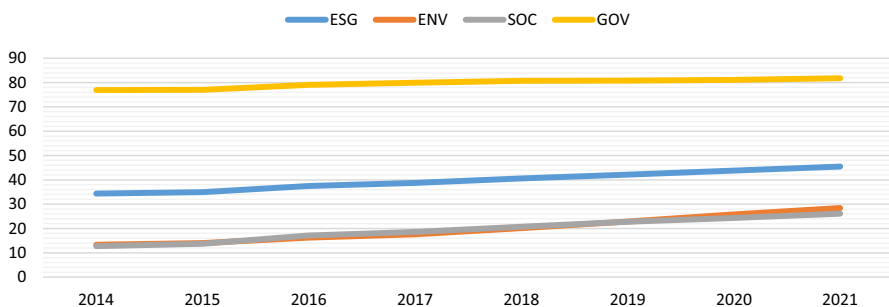

Fig. 1 Sustainable disclosure (ESG) over the years. The graph represents average ESG score per year for a cross-country data from 23 developing and emerging nations comprising of 4950 companies

Table 1 The measurement and definition of the variables

Variables	Name	Variable definition	Sources
Return on assets	ROA	Net income to total assets	Bloomberg
Return on equity	ROE	Net income to total equity	Bloomberg
Tobin's Q	TQ	The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets	Bloomberg
Policy Uncertainty	WUI	World uncertainty index by Ahir et al. (2022)	Policyuncertainty.com
Geopolitical Risk	GPR	Geopolitical risks by Caldara and Iacoviello (2022)	Policyuncertainty.com
ESG combined disclosure score	ESG	Dummy 1 for high median value of Bloomberg's proprietary score for combined ESG disclosure score, and 0 otherwise	Bloomberg
Environmental disclosure score	ENV	Dummy 1 for high median value of Bloomberg's proprietary score for environmental disclosure score, and 0 otherwise. Higher values reflect increased environmental disclosure	Bloomberg
Social disclosure score	SOC	Dummy 1 for high median value of Bloomberg's proprietary score for social disclosure score, and 0 otherwise. Higher values reflect increased social disclosure	Bloomberg
Governance disclosure score	GOV	Dummy 1 for high median value of Bloomberg's proprietary score for governance disclosure score, and 0 otherwise. Higher values reflect increased governance disclosure	Bloomberg
Leverage	LEV	Debt to equity ratio	Bloomberg
Liquidity	LIQ	Current assets to current liabilities	Bloomberg
Asset Tangibility	TAN	Net fixed assets to total assets	Bloomberg
Size	SIZE	Logarithmic value of total assets	Bloomberg
Research & development	R&D	Research and development expenditure to total assets	Bloomberg
GDP	GDP	GDP per capita growth annual (%)	World Bank
Inflation	INF	Consumer prices annual (%)	World Bank

Table 2 Descriptive statistics of all the variables

Variable	Observations	Mean	Std. Dev	Min	Max
ROA	36,721	2.029	12.213	− 62.886	28.512
ROE	36,721	10.49	18.656	− 1.228	111.041
TQ	34,202	2.36	1.674	1.022	10.892
WUI	36,721	4.396	0.116	4.250	4.609
GPR	36,721	95.301	9.935	77.294	107.377
ESG	36,721	39.735	10.099	26.909	87.154
ENV	36,721	19.865	19.44	0	92.298
SOC	36,721	19.562	12.096	0	82.164
GOV	36,721	79.674	10.185	6.261	100
LEV	36,721	0.89	2.69	0	22.454
LIQ	36,721	1.958	1.967	0	12.623
SIZE	36,561	9.954	1.243	7.515	13.442
R&D	34,202	4.251	18.779	0	166.606
TAN	36,561	0.303	0.263	0	.949
GDP	35,553	0.924	2.86	− 9.907	23.999
INF	35,553	1.724	1.652	− 1.736	19.596

This table presents the descriptive statistics of dependent and independent variables. ROA, ROE and TOBINSQ are the dependent variables, where ROA = Return on assets, ROE = Return on equity, and TOBINSQ (TQ) = The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, WUI = World uncertainty index, GPR = Geopolitical risks, ESG = Bloomberg's proprietary score based on the extent of a company's environmental, social, and governance disclosure, ENV = Bloomberg's proprietary score based on the extent of a company's environmental disclosure, SOC = Bloomberg's proprietary score based on the extent of a company's social disclosure, GOV = Bloomberg's proprietary score based on the extent of a company's governance disclosure, LEV = Leverage, LIQ = Liquidity, Size = firm size, RD = Research and Development, TAN = Asset Tangibility, GDP = GDP per capita, and INF = Inflation

Table 2 reports the descriptive statistics of all the variables. It is evident that the average ROA is 2.03%, with a standard deviation of 12.21, while ROE is 10.49%, with a standard deviation of 18.66, and average Tobin's Q is 2.36%, with a standard deviation of 1.67. The policy uncertainty index (WUI) ranges from 4.250 to 4.609 with a mean value of 4.396 and a standard deviation of 0.116, along with the geopolitical risk index (GPR) ranges from 77 to 107 with a mean value of 95 and a standard deviation of 9.9. Meanwhile, the average ESG combined score and all its three components, viz., Environmental, Social, and Governance score, are 39.74%, 19.86%, 19.56%, and 79.67%, respectively. It also shows that among different explanatory variables, the average values of the variables, viz. Leverage (LEV), Liquidity (LIQ), SIZE, R&D, Asset tangibility (TAN), GDP per capita growth (GDP), and Inflation (INF) are 0.89, 1.96, 9.95, 4.25, 0.30, 0.92, and 1.72 respectively. The level of debt (Leverage) indicates that the companies are in a good

position to meet their future financial obligations through their cash flows, as the average leverage is 0.89, which is below 1, usually considered good by the industry standards. The average liquidity ratio of the companies is 1.96, which indicates that most of the companies are in good financial condition, as a good liquidity ratio is anything greater than 1. The higher the ratio, the higher the security of the company to meet its liabilities.

The Asset tangibility has a mean of 0.30, and the standard deviation is 0.26. The average size of the companies is 9.95; it is computed as the logarithmic value of the total assets. We can also see that the values of some explanatory variables such as Leverage (LEV), Liquidity (LIQ), asset tangibility (TAN), SIZE, R&D, GDP per capita growth (GDP), and Inflation (INF) are having values of their standard deviation below their mean values by which we can refer that these variable are not volatile in nature. On the other hand, the standard deviation values of leverage and liquidity are above their respective mean values, and we can say that they are volatile in nature.

Table 3 reports the correlation matrix of the independent variables and reveals that the values of most of the correlation coefficients are small in number. The results also show that the independent variables are free from any presence of multi-collinearity between themselves. Gujarati (2003) establishes that the issue of multi-collinearity usually arises if any pair-wise correlation between two independent variables exceeds a value of 0.80. Consequently, in our study, we can state that there is no evidence of multi-collinearity in our dataset.

4 Models Specification and Estimation Methods

4.1 Models Specification

We initially estimate the following baseline regression model to examine the impact of economic policy uncertainty on firm performance along with a few firm-specific factors and country-specific factors and the model is specified as follows:

$$
\begin{aligned}
CPi,t = \alpha_0 &+ \beta_0 CP_{i,t-1} + \beta_1 WUI_{i,t} + \beta_2 LEV_{i,t} + \beta_3 LIQ_{i,t} \\
&+ \beta_4 TAN_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 RD_{i,t} + \beta_7 GDP_{i,t} + \beta_8 INF_{i,t} + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where $CP_{I,t}$ = Corporate performance indicators measured by both accounting-based and market-based measures, viz. Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q (TQ), and ε_{it} is the error term. Meanwhile, the β parameters capture the possible effect of explanatory variables on corporate performance measures.

To examine the impact of sustainable disclosure on corporate performance and WUI-performance relationship we specify the following models:

$$
\begin{aligned}
CPi,t = \alpha_0 &+ \beta_0 CP_{i,t-1} + \beta_1 WUI_{i,t} + \beta_2 ENV_{i,t} + \beta_3 WUI_{i,t} \times ENV_{i,t} + \beta_4 LEV_{i,t} \\
&+ \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} + \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}
\end{aligned}
\tag{2}
$$

Table 3 Pairwise correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ROA	1							
(2) ROE	0.338	1						
(3) TQ	0.051	0.226	1					
(4) WUI	0.037	0.038	−0.039	1				
(5) GPR	−0.053	−0.035	0.069	−0.469	1			
(6) ESG	0.157	0.132	−0.097	0.191	−0.279	1		
(7) ENV	0.17	0.083	−0.151	0.118	−0.214	0.853	1	
(8) SOC	0.15	0.133	−0.078	0.197	−0.279	0.859	0.647	1
(9) GOV	−0.040	0.07	0.093	0.102	−0.083	0.288	−0.165	0.113
(10) LEV	−0.009	−0.004	−0.008	0.011	−0.003	−0.001	−0.005	−0.000
(11) LIQ	−0.115	−0.040	0.184	−0.022	0.038	−0.102	−0.100	−0.100
(12) SIZE	0.259	0.034	−0.262	0.047	−0.116	0.327	0.525	0.243
(13) R&D	−0.069	−0.010	0.037	−0.005	0.008	−0.017	−0.019	−0.019
(14) TAN	0.046	−0.183	−0.193	0.021	−0.043	0.12	0.121	0.131
(15) GDP	0.006	−0.026	0.116	−0.290	0.672	−0.220	−0.173	−0.200
(16) INF	0.038	0.053	0.059	−0.034	−0.012	0.006	−0.067	0.091
Variables	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) ROA								
(2) ROE								
(3) TQ								
(4) WUI								
(5) GPR								
(6) ESG								
(7) ENV								
(8) SOC								
(9) GOV	1							
(10) LEV	0.006	1						
(11) LIQ	0.009	−0.005	1					
(12) SIZE	−0.326	−0.004	−0.179	1				
(13) R&D	0.008	−0.000	0.071	−0.027	1			
(14) TAN	−0.031	0.007	−0.140	0.088	−0.019	1		
(15) GDP	−0.080	0.001	0.018	−0.010	0.005	−0.031	1	
(16) INF	0.036	0.002	−0.013	−0.004	−0.005	0.029	0.171	1

This table presents the pairwise correlation matrix of dependent and independent variables. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, WUI=World uncertainty index, GPR=Geopolitical risks, ESG=Bloomberg's proprietary score based on the extent of a company's environmental, social, and governance disclosure, ENV=Bloomberg's proprietary score based on the extent of a company's environmental disclosure, SOC=Bloomberg's proprietary score based on the extent of a company's social disclosure, GOV=Bloomberg's proprietary score based on the extent of a company's governance disclosure, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, and INF=Inflation

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 WUI_{i,t} + \beta_2 SOC_{i,t} + \beta_3 WUI_{i,t} \times SOC_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} \qquad (3)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 WUI_{i,t} + \beta_2 GOV_{i,t} + \beta_3 WUI_{i,t} \times GOV_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} \qquad (4)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

ENV represents the environmental disclosure score which is measured as 1 if environmental score is above the median; or 0 otherwise. SOC represents the social disclosure score which is measured as 1 if social score is above the median; or 0 otherwise. GOV represents the governance disclosure score which is measured as 1 if governance score is above the median; or 0 otherwise.

To analyze the impact of geopolitical risk on firm performance along with few firm specific factors and country specific factors following model is specified:

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 GPR_{i,t} + \beta_2 LEV_{i,t} + \beta_3 LIQ_{i,t}$$
$$+ \beta_4 TAN_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 RD_{i,t} + \beta_7 GDP_{i,t} + \beta_8 INF_{i,t} + \varepsilon_{i,t} \qquad (5)$$

We then augment the equation with an interaction term between sustainable disclosure dummies and geopolitical risk (GPR) to see how the sustainable disclosures affect the relationship between geopolitical risk and the corporate performance. The models are specified as follows:

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 GPR_{i,t} + \beta_2 ENV_{i,t} + \beta_3 GPR_{i,t} \times ENV_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} \qquad (6)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 GPR_{i,t} + \beta_2 SOC_{i,t} + \beta_3 GPR_{i,t}$$
$$\times SOC_{i,t} + \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} \qquad (7)$$
$$+ \beta_8 RD_{i,t} + \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 GPR_{i,t} + \beta_2 GOV_{i,t} + \beta_3 GPR_{i,t} \times GOV_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} \qquad (8)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

Further, we have incorporated an interaction term between a combined score of sustainable disclosure (ESG) as an alternate proxy to check the robustness of the results and following equations are estimated.

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 WUI_{i,t} + \beta_2 ESG_{i,t} + \beta_3 WUI_{i,t} \times ESG_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 RD_{i,t} \quad (9)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

$$CPi, t = \alpha_0 + \beta_0 CP_{i,t-1} + \beta_1 GPR_{i,t} + \beta_2 ESG_{i,t} + \beta_3 GPR_{i,t} \times ESG_{i,t}$$
$$+ \beta_4 LEV_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 TAN_{i,t} + \beta_7 SIZE_{i,t} + \beta_8 R\&D_{i,t} \quad (10)$$
$$+ \beta_9 GDP_{i,t} + \beta_{10} INF_{i,t} + \varepsilon_{i,t}$$

4.2 Tests for Cross-sectional Dependence

In the field of econometric research, it is frequently assumed that the error terms exhibit cross-sectional independence. Nevertheless, contemporary empirical research (Chudik & Pesaran, 2015) has provided demonstration indicating that the notion of cross-sectional independence is not applicable in panel data sets, as cross-sectional dependency is frequently observed. For instance, nations have extensive global interconnectivity. Therefore, it can be inferred that alterations in economic policies inside a particular nation have the potential to impact the economic undertakings of other nations. In the current scenario, it is crucial to take into account the existence of cross-sectional dependence while assessing the impact of policy uncertainty, geopolitical risk, and sustainable disclosure on corporate performance. Nonetheless, failure to account for cross-sectional dependence (CD) may result in the estimator's lack of efficacy and the production of inaccurate outcomes. In order to address this issue, the Cross-sectional Dependence tests proposed by Breusch and Pagan (1980) Lagrange Multiplier (LM), Pesaran (2021) Scaled LM and CD tests, and Baltagi et al. (2012)'s Bias-corrected Scaled LM tests are employed. Subsequently, it is crucial to assess the stationary behaviour of the data series, namely determining the presence or absence of a unit root. In accordance with the outcomes of the cross-sectional dependence test, individuals may opt to conduct either the first or second-generation panel unit root testing.

4.3 Estimation Methods

Our research makes use of a dynamic panel data estimation strategy in order to deal with the high level of persistence. Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) created a dynamic panel estimation model that we have applied in our research. When compared to the Fixed Effects estimator, the system generalised method of moments (GMM) estimators are superior and more effective at addressing the problems of endogeneity and simultaneity bias. According to Roodman (2009), the system GMM estimator is superior to the different GMM estimator model in terms of efficiency and robustness. Windmeijer-corrected standard errors have been disseminated once more to address heteroscedasticity and autocorrelation issues. Further to check the robustness of the results and to

Table 4 Cross-sectional dependence (CD) tests

Variable	Breusch-Pagan LM	Pesaran Scaled LM	Bias-corrected Scaled LM	Pesaran CD
ROA	8456***	456.2***	455.7***	89.49***
ROE	8901***	441.1***	440.5***	87.80***
TQ	7805***	418.8***	417.7***	77.45***
WUI	2158***	215.2***	212.5***	22.84***
GPR	5578***	278.5***	270.4***	54.89***
ESG	3201***	178.7***	177.1***	33.23***
ENV	3055***	188.5***	187.5***	31.20***
SOC	3012***	182.4***	181.4***	30.88***
GOV	3111***	198.7***	197.7***	32.55***
LEV	2955***	181.5***	180.7***	19.55***
LIQ	2678***	145.7***	142.1***	19.12***
SIZE	2457***	179.8***	177.2***	18.14***
R&D	2897***	155.4***	154.1***	17.89***
TAN	2877***	197.4***	190.1***	18.23***
GDP	1144***	110.7***	100.9***	11.87***
INF	1247***	101.6***	101.1***	15.67***

***p-value < 0.01. *Source* Authors calculation

Table 5 CIPS unit root test

Variable	I (0)	I (1)
ROA	− 2.340***	− 4.287***
ROE	− 2.221***	− 4.211***
TQ	− 2.124***	− 4.396***
WUI	− 3.210	–
GPR	− 4.111	–
ESG	− 4.219***	− 5.476***
ENV	− 4.210***	− 4.986***
SOC	− 4.201***	− 4.589***
GOV	− 4.198***	− 4.421***
LEV	− 2.076	–
LIQ	− 2.044***	–
SIZE	− 2.011***	− 5.879***
R&D	− 2.019	− 5.677***
TAN	− 2.114	− 5.147***
GDP	− 3.974***	–
INF	− 3.457***	–

***p-value < 0.01. *Source* Authors calculation

Table 6 Policy uncertainty (WUI) and corporate performance (System GMM estimation results)

Variables	ROA	ROE	TQ
	(1)	(1)	(3)
Lag Performance	0.492***(0.113)	0.566***(0.132)	0.919***(0.219)
WUI	−0.001**(0.002)	−0.010***(0.002)	−0.011***(0.001)
LEV	0.001*(0.004)	0.009**(0.004)	3.430*(6.940)
LIQ	−0.061(0.038)	−0.172**(0.070)	−0.004(0.015)
SIZE	1.774***(0.333)	0.126(0.126)	0.047(0.089)
R&D	0.009**(0.004)	0.001(0.077)	1.100*(3.406)
TAN	−0.217(0.340)	−7.758***(2.276)	0.067(0.254)
GDP	0.716**(0.430)	0.072(0.079)	0.002*(0.015)
INF	0.540***(0.198)	0.427***(0.151)	0.055**(0.024)
AR1 p value	Z= −2.52 (0.012)	Z= −4.70 (0.000)	Z= −2.34 (0.020)
AR2 p value	Z= −1.70 (0.101)	Z=1.32 (0.186)	Z=0.36 (0.719)
Hansen p value	$\chi 2$ (2)=0.64(0.726)	$\chi 2$ (1)=3.61 (0.158)	$\chi 2$ (2)=9.23 (0.170)
Total Observations	25,218	25,218	25,218

This table presents the impact of geopolitical risk on corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation and WUI=policy uncertainty

keep up the efficiency of the models, we have used various econometric methods in our study such as Fixed effect (FE), Random effects (RE) and Feasible generalized least squares (FGLS) methods.

5 Empirical Results and Discussion

Table 4 presents the results of cross-sectional dependence tests. All the tests propose the null hypothesis that all the variables are cross sectionally independent. The test statistics are statistically significant across the four tests and hence reject the null hypothesis, which concludes that all the variables are cross sectionally dependent. This evidence refers to a typical economic phenomenon impacting the variables across the 23 developed and emerging nations. For example, a geopolitical conflict in one country or region can affect the geopolitical position of other countries and regions. In a globalized and interconnected world, such results are expected.

Therefore, the existence of cross-sectional dependence has significant ramifications, necessitating the utilization of second-generation unit root tests, such as the CIPS panel unit root test, and long-run models. Table 5 presents the outcomes of the CIPS panel unit root test. The statistical properties of the CIPS test are evaluated by comparing them to the key values at various levels of relevance. This is done under the assumption that the data series exhibits a unit root, indicating integration of order one. It is determined that the variables exhibit a combination

Table 7 Sustainable disclosure (ESG), policy uncertainty (WUI) and corporate performance (System GMM estimation results)

Variables	ROA (1)	ROA (2)	ROA (3)	ROE (4)	ROE (5)	ROE (6)	TQ (7)	TQ (8)	TQ (9)
Lag Performance	0.642***(0.183)	0.571***(0.164)	0.228(0.139)	0.559***(0.164)	0.572***(0.132)	0.495***(0.145)	0.104(0.078)	0.088(0.081)	−0.106(0.098)
WUI	−0.001***(0.023)	−.001***(0.012)	0.001***(0.033)	−0.001(0.001)	−0.002*(0.001)	−0.011***(0.001)	−0.010*(0.010)	−0.001(0.001)	−0.001***(0.230)
ENV	−26.297***(5.223)			−35.243**(15.906)			−0.530(0.392)		
ENV×WUI	0.001***(0.120)			0.001*(0.001)			0.001*(0.023)		
SOC		−52.254***(8.809)			−56.007***(20.076)			0.514(0.778)	
SOC×WUI		0.002***(0.010)			0.002***(0.001)			0.001(0.011)	
GOV			19.415***(3.331)			12.623**(6.406)			−1.752***(0.382)
GOV×WUI			0.001***(0.002)			0.001***(0.022)			0.001***(0.050)
LEV	0.011(0.010)	0.050(0.011)	0.032(0.001)	0.019*(0.009)	0.002*(0.012)	0.003*(0.001)	0.008(0.001)	0.001*(0.001)	0.004**(0.045)
LIQ	0.001(0.053)	0.013(0.057)	−0.108*(0.064)	−0.162*(0.084)	−0.105(0.085)	−0.199*(0.085)	0.051***(0.019)	0.048***(0.017)	0.050***(0.016)
SIZE	−0.011(0.936)	0.571(0.579)	1.662***(0.325)	−0.390(1.150)	−0.854(0.694)	−0.194(0.206)	−0.339***(0.082)	−.242*(.053)	−0.407***(0.062)
R&D	0.001(0.65)	0.004(0.110)	0.002(0.101)	0.002*(0.001)	0.001*(0.001)	0.002(0.002)	0.001(0.001)	0.002(0.018)	0.011(0.019)
TAN	−1.146*(0.581)	−1.417**(0.618)	0.302(0.445)	−8.338***(2.445)	−9.287***(2.177)	−8.830***(2.470)	−0.792***(0.091)	−0.764***(0.106)	−1.145***(0.144)
GDP	0.145***(0.050)	0.203***(0.068)	0.033(0.024)	0.046(0.140)	0.210(0.172)	0.036(0.101)	0.048***(0.005)	0.041***(0.006)	0.028***(0.004)
INF	0.252***(0.075)	−.027(.153)	0.182*(0.098)	0.583***(0.153)	0.186(0.313)	0.449**(0.220)	0.042***(0.013)	0.038*(0.022)	0.109***(0.020)
AR1 p value	Z=−3.47 (0.001)	Z=−3.59 (0.000)	Z=−2.60 (0.009)	Z=−4.46 (0.010)	Z=−4.25 (0.001)	Z=−4.95 (0.001)	Z=−1.99 (0.046)	Z=−1.76 (0.078)	Z=−1.26 (0.208)
AR2 p value	Z=−1.12 (0.263)	Z=−2.44 (0.115)	Z=−1.42 (0.156)	Z=1.35 (0.176)	Z=0.95 (0.343)	Z=0.50 (0.614)	Z=−0.24 (0.808)	Z=−0.48 (0.628)	Z=−1.24 (0.215)
Hansen test	$\chi^2(2)=40.05(0.270)$	$\chi^2(9)=7.26(0.611)$	$\chi^2(9)=16.90$ (0.105)	$\chi^2(4)=18.23$ (0.133)	$\chi^2(4)=9.96(0.141)$	$\chi^2(4)=5.64$ (0.228)	$\chi^2(9)=49.76$ (0.126)	$\chi^2(9)=56.16$ (0.128)	$\chi^2(4)=26.05$ (0.200)
	25.218	25.218	25.218	25.218	25.218	25.218	25.218	25.218	25.218

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, preferred equity and minority interest divided by total assets, ENV=dummy variable for high median value of Bloomberg's proprietary score for environmental disclosure, SOC=dummy variable for high median value of Bloomberg's proprietary score for social disclosure, GOV=dummy variable for high median value of Bloomberg's proprietary score for governance disclosure, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation and WUI=policy uncertainty

of integrated order (i.e., I (1) or I (0)), making them appropriate for long-term panel econometric investigations.

Table 6 displays the estimation outcomes of Eq. (1). Policy uncertainty (WUI_{it}) is found to have a negative relationship with ROA, ROE, and Tobin's Q. This suggests that a decline in business performance occurs when policy uncertainty increases. It could be due to the fact that economic policy uncertainty may lower firm performance by increasing cost of capital, which in turn acts as a constraint on the market for financing and investment possibilities. It is also assumed that in the period of high uncertainty, the availability of alternative sources of funds decline and therefore, it will be difficult for the firms to raise the financial capital for investment activities, which ultimately adversely affect the financial performance of the company. Other argument is that lesser investment opportunities in the uncertain conditions also reduces the profit and other financial performance of the firms. The results support our hypothesis *H1 (Economic policy uncertainty (WUI) will be negatively associated with corporate performance)*. Our results are consistent with the findings of Kang et al. (2014); Iqbal et al. (2020); Feng X et al. (2021).

Furthermore, the significance level of the lagged terms of the performance measures make it clear that all performance measures are observed to display significant persistence. The results also reveal that other control variables such as leverage, size, R&D expenses, GDP and inflation have significant positive impact on organizations' financial and market success. On the other hand, liquidity, and asset tangibility, have significant negative relationship with company performance. The findings indicate

Table 8 Geopolitical risk (GPR) and corporate performance (System GMM estimation results)

Variables	ROA	ROE	TQ
	(1)	(2)	(3)
Lag Performance	0.670**(0.549)	0.918***(0.321)	0.249**(0.209)
GPR	−0.117**(0.057)	−0.011(0.017)	−0.014***(0.003)
LEV	0.004*(0.001)	0.001(0.001)	0.001***(0.001)
LIQ	−0.236** (0.130)	−0.071(0.105)	0.052***(0.016)
SIZE	4.566***(1.451)	−0.078(0.205)	−0.525***(0.115)
R&D	0.001**(0.001)	0.001(0.012)	0.002(0.01)
TAN	1.458(0.917)	−1.860(5.375)	−1.471***(0.305)
GDP	0.191**(0.084)	0.179(0.162)	0.098***(0.016)
INF	0.516***(0.183)	0.109(0.315)	0.040**(0.017)
AR1 p value	Z=0.07 (0.010)	Z=−3.32 (0.001)	Z=−0.43 (0.069)
AR2 p value	Z=−1.60 (0.110)	Z=2.17 (0.130)	Z=−0.83 (0.405)
Hansen p value	χ2 (2)=3.70 (0.157)	χ2 (1)=0.04(0.845)	χ2 (1)=2.19 (0.139)
Total observations	25,218	25,218	25,218

This table presents the impact of geopolitical risk on corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation and GPR=Geopolitical risk

that a higher proportion of debt financing, greater company maturity, and increased investment in R&D all contribute to better financial outcomes for businesses.

The estimation results of Eqs. (2) to (4) are presented in Table 7. The coefficient of WUI*ENV is positive and statistically significant. This implies that increased environmental reporting reduces the influence of policy uncertainty on firm performance. We also find the similar results for WUI * SOC and WUI * GOV. The outcome suggests that a higher level of investments in environmental, social and governance activities reduce the effect of policy uncertainty on firm performance. This can be attributed to the facts that business units can mitigate the information asymmetry by engaging in environmental and social activities, that may enhance the firm's credibility and acceptability in the market and reduce the adverse effects of uncertainty on firm performance. Enhanced transparency regarding the environmental, social, and governance aspects, supported by a well-established sustainability framework, enhances the management framework and oversight the resources across the value chain. This approach also assists in preventing risks through strategic connections and specialized knowledge, while fostering efficient management in times of uncertainty. As a result, reducing information asymmetry caused by policy interventions contributes to improved firm performance. Additionally, it is indicated that the implementation of regulatory measures and a sound governance model enhances the adaptability and responsiveness of the firm, thereby minimizing the impact of economic volatility on the financial performance of companies. These results are consistent with our hypothesis *H2 (Sustainability disclosure (ESG) may affect the Economic policy uncertainty and the corporate performance sensitivity).*

Table 8 shows the estimation results of Eq. (5). Models 1, 2, and 3 include the geopolitical risk index (GPR_{it}) along with firm-level and country-specific variables to investigate the impact of geopolitical risk on the performance of the firm. The results reveal that the geopolitical risk (GPR_{it}) is negatively associated with corporate performance measures. This implies that a higher level of geopolitical risk reduces the growth opportunity in the presence of unstable situations arising due to various geopolitical scenarios, which eventually leads to a decrease the corporate performance (Adra et al., 2023; Jiang et al., 2022). Our results are consistent with the real options theory, which explains that firms have the ability to make decisions regarding whether to wait for deferent options or to make immediate investments in order to get timely returns on investment, particularly in the context of uncertain or risky environments. Typically, firms tend to opt for the deferred option due to their belief that instantaneous investments may not yield favorable returns in uncertain conditions. Consequently, they exhibit a greater inclination to wait for more promising investment prospects in the future. This preference for delay ultimately leads to a decrease in investment and a decline in firm performance (Shen et al., 2021).

Based on prior empirical studies, it can be asserted that geopolitical uncertainty exerts diverse effects on financial performance across multiple dimensions. The heightened geopolitical risk (GPR) can have macroeconomic implications, leading to an aggregate rise in the cost of capital for debt as well as equity financing. According to Pástor and Veronesi (2013), shareholders require a risk premium in order to offset the increased risks associated with political uncertainty. Simultaneously, enterprises encounter increased challenges in acquiring outside financing

Table 9 Sustainable disclosure (ESG), geopolitical risk (GPR) and corporate performance (System GMM estimation results)

Variables	ROA (1)	ROA (2)	ROA (3)	ROE (4)	ROE (5)	ROE (6)	TQ (7)	TQ (8)	TQ (9)
Lag Performance	0.644***(0.110)	0.648***(0.110)	0.683***(0.109)	1.172**(0.530)	0.607(0.383)	0.808**(0.391)	0.924***(0.220)	0.491**(0.234)	1.139***(0.298)
GPR	−0.095**(0.044)	−0.062**(0.038)	−0.041*(0.024)	−5.407***(2.285)	−3.416**(1.399)	−3.620***(1.112)	−0.322***(0.132)	−0.360***(0.113)	−0.187***(0.062)
ENV	−16.937***(6.486)			−86.049**(37.825)			−20.866*(10.827)		
ENV×GPR	0.184***(0.068)			9.265***(3.903)			0.217*(0.113)		
SOC		−13.847**(6.167)			−61.933**(25.965)			−26.443***(9.576)	
SOC×GPR		0.153**(0.065)			6.462**(2.614)			0.272***(0.099)	
GOV			−10.879***(4.184)			−71.73***(21.06)			−6.770**(3.075)
GOV×GPR			0.115***(0.044)			7.458***(2.290)			0.073**(0.033)
LEV	0.001(0.012)	0.001(0.009)	0.002(0.011)	0.010*(0.112)	0.011*(0.114)	0.012*(0.119)	0.001**(0.101)	0.001**(0.111)	0.002**(0.124)
LIQ	−0.011(0.043)	−0.011(0.039)	−0.024(0.039)	0.040(0.176)	−0.180(0.115)	−0.186(0.138)	0.007(0.017)	0.021(0.017)	−0.002(0.018)
SIZE	0.591***(0.182)	0.690***(0.178)	0.665***(0.172)	−3.857***(1.495)	−1.186***(0.458)	−2.160***(0.829)	−0.125(0.132)	−0.329***(0.140)	0.096(0.132)
R&D	0.001(0.110)	0.009(0.009)	0.008(0.011)	0.010(0.002)	0.011(0.004)	0.012*(0.009)	0.001**(0.181)	0.001**(0.182)	0.002**(0.184)
TAN	−0.303(0.361)	−0.390(0.352)	−0.311(0.342)	4.860(9.902)	−7.519(6.601)	−4.663(6.500)	0.273(0.428)	−0.391(0.356)	0.532(0.416)
GDP	0.051*(0.031)	0.004(0.036)	0.030(0.031)	−0.016(0.207)	−1.961*(0.763)	−0.906***(0.332)	0.485***(0.154)	0.467***(0.123)	0.377***(0.101)
INF	0.089*(0.053)	0.091*(0.048)	0.074(0.051)	−2.640*(1.499)	−0.217(0.446)	−2.096**(0.913)	−0.160*(0.095)	−0.134*(0.068)	−0.091*(0.052)
AR1 p value	Z=−3.40 (0.001)	Z=−3.38 (0.001)	Z=−3.35(0.001)	Z=−2.68 (0.007)	Z=−2.51 (0.012)	Z=−2.49 (0.013)	Z=−2.18 (0.029)	Z=−2.79 (0.005)	Z=−1.9(0.076)
AR2 p value	Z=−0.53 (0.593)	Z=−0.54 (0.591)	Z=−0.52 (0.602)	Z=2.10 (0.056)	Z=1.60 (0.109)	Z=0.74 (0.458)	Z=−0.52 (0.604)	Z=−0.19(0.850)	Z=−0.29 (0.773)
Hansen test	χ2 (10)=119.48(0.177)	χ2 (10)=479.85 (0.174)	χ2 (10)=118.61 (0.178)	χ2 (1)=1.73 (0.188)	χ2 (1)=2.65(0.103)	χ2 (1)=0.29 (0.592)	χ2 (1)=0.29 (0.589)	χ2 (1)=0.01 (0.903)	χ2 (1)=4.38 (0.336)
	25,218	25,218	25,218	25,218	25,218	25,218	25,218	25,218	25,218

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, ENV=dummy variable for high median value of Bloomberg's proprietary score for environmental disclosure, SOC=dummy variable for high median value of Bloomberg's proprietary score for social disclosure, GOV=dummy variable for high median value of Bloomberg's proprietary score for governance disclosure, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation and GPR=Geopolitical risks

under favorable conditions. Furthermore, the presence of geopolitical volatility contributes to an elevation in the perceived risk associated with cash flow control. According to Dai and Zhang (2019), there is a notable increase in the likelihood of enterprises experiencing budgetary shortfalls during periods marked by heightened political risk. Furthermore, the real option theory pertaining to investment irreversibility posits that firms are inclined to postpone investment decisions when the potential benefits of waiting for future policy uncertainty to be resolved outweigh the immediate advantages (Bernanke, 1983). This finding supports our hypothesis *H3, (i.e., geopolitical risk is negatively related to corporate performance).* Our results are also consistent with the findings of Phan et al. (2022); Agoraki et al., (2022): Maneenop et al., 2023).

Table 9 shows the estimation result of Eqs. (6) to (8). The results reveal that the geopolitical risk is negatively associated with the corporate performance. The coefficient of GPR * ENV is positive and statistically significant, here the findings suggest that the higher environmental disclosure reduces the impact of geopolitical risk on firm performance. We also find the similar results for GPR * SOC and GPR * GOV. Our findings are consistent with the perspective that when corporations engage in environmental and social initiatives, they generate positive effects that extend beyond the company itself, benefiting the community at large. This, in turn, improves the company's credibility among shareholders and other participants, and serves as a form of protection against unforeseen external disruptions. (Godfrey et al., 2009). Another perspective is that environmental, social, and governance (ESG) practices may assist businesses in enhancing their capacity to effectively manage the repercussions of these external disturbances raised due to geopolitical risk across the countries. These findings support our hypothesis *H4 (i.e., Sustainability disclosure (ESG) may affect the geopolitical risk and the corporate performance sensitivity).*

5.1 Robustness Check

Further to check the robustness and to strengthen our results by means of increasing the reliability and consistency of the findings, we have used various econometric methods such as Fixed effect, Random effect and FGLS methods. We also carry out the second set of robustness analysis by using an alternative proxy for sustainable disclosure, i.e., combined ESG score. Consistent with our primary findings, we find a positive and statistically significant coefficient for the interaction terms WUI*it* * ESG*it* and GPR*it* * ESG*it* (Table 10). These findings also imply that sustainability disclosures reduce the impact of economic uncertainty and geopolitical risk on financial performance of the company.

Further, we have estimated all the models using the other econometric methods such as fixed effects, random effects and FGLS. All the results are reported in the Tables 11, 12, 13, 14, 15 and 16. The results are almost consistent with the system GMM estimation results. The findings remain similar to those reported in the previous Tables from 6 to 11. The results of FE, RE and FGLS estimation show that the relationship nature and significance level for all variables are more or less

Table 10 Combined ESG score, policy uncertainty, geopolitical risk, and corporate performance (System GMM estimation results)

Variables	ROA (1)	ROE (2)	TQ (3)	ROA (4)	ROE (5)	TQ (6)
Lag Performance	0.707***(0.214)	0.561***(0.155)	0.083(0.081)	0.656***(0.104)	0.919**(0.420)	0.816***(0.193)
WUI	−0.001***(0.002)	−0.001*(0.001)	0.001**(0.011)	–	–	–
ESG	−32.946***(7.982)	−51.749***(21.626)	−0.878*(0.486)	–	–	–
GPR	–	–	–	−0.068**(0.033)	−4.529***(1.417)	−0.259***(0.097)
ESG×WUI	0.001***(0.001)	0.002**(0.001)	0.002*(0.012)	–	–	–
ESG×GPR	–	–	–	0.145***(0.050)	7.776***(2.411)	0.136**(0.065)
LEV	−0.001(0.004)	−0.001**(0.004)	0.101(0.011)	0.001(0.011)	0.001(0.010)	0.004(0.001)
LIQ	0.014(0.058)	−0.149(0.091)	0.053***(0.019)	−0.010(0.040)	−0.082(0.134)	0.009(0.015)
SIZE	0.548(0.698)	−0.027(0.457)	−0.270***(0.038)	0.654***(0.167)	−1.689***(0.523)	−0.099(0.121)
R&D	−0.009(0.004)	−0.001*(0.077)	1.100(3.406)	0.002(0.010)	0.001(0.001)	0.019(0.011)
TAN	−0.840*(0.504)	−8.185***(2.428)	−0.782***(0.094)	−0.330(0.349)	−0.816(7.465)	0.101(0.358)
GDP	0.126**(0.057)	−0.010(0.130)	0.047***(0.006)	0.025(0.032)	−1.521***(0.481)	0.423***(0.125)
INF	0.249***(0.111)	0.715***(0.173)	0.035**(0.016)	0.083*(0.049)	−1.831**(0.864)	−0.117(0.075)
AR1 p value	Z=−2.52 (0.012)	Z=−4.70 (0.000)	Z=−2.34 (0.020)	Z=−3.39 (0.001)	Z=−3.14 (0.002)	Z=−2.18 (0.029)
AR2 p value	Z=−1.70 (0.166)	Z=1.32 (0.157)	Z=0.36 (0.219)	Z=−0.54 (0.588)	Z=1.79 (0.0173)	Z=−0.53 (0.595)
Hansen p value	$\chi2$ (9)=0.24 (0.145)	$\chi2$ (4)=2.61 (0.189)	$\chi2$ (9)=2.23 (0.119)	$\chi2$(10)=11.66(0.102)	$\chi2$ (1)=0.24 (0.625)	$\chi2$ (1)=0.36 (0.549)
Total observations	25,218	25,218	25,218	25,218	25,218	25,218

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation ESG=dummy variable for high median value of Bloomberg's proprietary score for combined sustainable disclosure, WUI=Policy uncertainty, GPR=Geopolitical risk

Table 11 Sustainable disclosure (ESG), policy uncertainty (WUI) and corporate performance (FE & RE estimation results)

	Fixed effects (FE)								
	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
WUI	−1.588*	−1.283*	−1.249*	−1.100	−0.676	−1.548	−0.699***	−0.188	−0.075
	(1.634)	(1.304)	(1.067)	(2.841)	(2.269)	(1.856)	(0.184)	(0.147)	(0.120)
ENV	−4.592			−27.617*			−3.640***		
	(8.381)			(14.570)			(0.942)		
ENV×WUI	0.808			5.731*			0.888***		
	(1.898)			(3.300)			(0.213)		
SOC		−8.260			−28.929**			−0.532	
		(7.784)			(13.536)			(0.875)	
SOC×WUI		1.747			6.545**			0.175	
		(1.763)			(3.066)			(0.198)	
GOV			−12.499			−25.227*			−0.291
			(8.174)			(14.214)			(0.922)
GOV×WUI			2.803			5.493*			0.076
			(1.852)			(3.220)			(0.209)
LEV	−1.631***	−1.634***	−1.636***	−1.011***	−1.018***	−1.012***	−0.117***	−0.118***	−0.121***
	(0.145)	(0.145)	(0.146)	(0.252)	(0.252)	(0.253)	(0.016)	(0.016)	(0.016)
LIQ	1.014***	1.012**	1.012***	−0.320*	−0.318*	−0.332*	−0.033***	−0.030***	−0.030**
	(0.105)	(0.105)	(0.105)	(0.182)	(0.182)	(0.182)	(0.012)	(0.012)	(0.012)
SIZE	11.327***	11.393***	11.057***	1.491	0.836	0.983	−1.824***	−1.935***	−1.84***
	(1.004)	(1.008)	(1.007)	(1.745)	(1.753)	(1.752)	(0.113)	(0.113)	(0.114)
R&D	−2.376***	−2.370***	−2.375***	−1.142***	−1.133***	−1.147***	−0.071***	−0.073***	−0.701***
	(0.219)	(0.219)	(0.219)	(0.380)	(0.380)	(0.380)	(0.025)	(0.025)	(0.025)
TAN	−10.399***	−10.480***	−10.58***	−20.52***	−21.130***	−20.76***	−0.707**	−0.748**	−0.716**
	(2.893)	(2.892)	(2.896)	(5.029)	(5.029)	(5.035)	(0.325)	(0.325)	(0.326)

Table 11 (continued)

	Fixed effects (FE)								
	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GDP	0.135***	0.141***	0.149***	−0.174**	−0.141**	−0.155**	0.018***	0.018***	0.015***
	(0.041)	(0.041)	(0.041)	(0.072)	(0.072)	(0.072)	(0.005)	(0.005)	(0.005)
INF	0.178*	0.140	0.168*	0.131	0.039	0.126	−0.027**	−0.023**	−0.02***
	(0.093)	(0.095)	(0.094)	(0.162)	(0.166)	(0.164)	(0.011)	(0.011)	(0.011)
Constant	−11.493***	−11.165***	−19.776***	12.911	16.569	5.342	25.093***	24.064***	22.712***
	(11.242)	(10.875)	(10.978)	(19.543)	(18.912)	(19.089)	(1.264)	(1.223)	(1.238)
Observation	8732	8732	8732	8732	8732	8732	8732	8732	8732
	Random effects (RE)								
	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
WUI	−2.806*	−2.602**	−2.0344**	−4.256*	−0.975	−0.803	−0.861***	−0.357**	−0.223*
	(1.532)	(1.234)	(1.033)	(2.509)	(2.037)	(1.735)	(0.175)	(0.141)	(0.118)
ENV	−2.259			−42.64***			−4.171***		
	(8.028)			(13.328)			(0.914)		
ENV×WUI	0.616			9.867***			0.967***		
	(1.817)			(3.014)			(0.207)		
SOC		−2.253			−16.885			−0.811	
		(7.524)			(12.611)			(0.857)	
SOC×WUI		0.710			4.568			0.228	
		(1.705)			(2.856)			(0.194)	
GOV			−7.069			−11.842			−0.668
			(8.043)			(13.723)			(0.918)

Table 11 (continued)

	Random effects (RE)								
	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GOV×WUI			1.756			3.015			0.153
			(1.821)			(3.102)			(0.208)
LEV	−1.388***	−1.392***	−1.423***	−0.304**	−0.336**	−0.39**	−0.169***	−0.172***	−0.173***
	(0.116)	(0.116)	(0.117)	(0.151)	(0.150)	(0.152)	(0.013)	(0.013)	(0.013)
LIQ	0.564***	0.563***	0.57***	−0.841***	−0.822***	−0.853***	−0.008	−0.007	−0.008
	(0.09)	(0.09)	(0.09)	(0.126)	(0.125)	(0.125)	(0.010)	(0.010)	(0.011)
SIZE	4.072***	4.054***	4.221***	1.325***	1.148***	1.618***	−0.522***	−0.531***	−0.500**
	(0.292)	(0.274)	(0.272)	(0.301)	(0.266)	(0.267)	(0.034)	(0.032)	(0.032)
R&D	−2.872***	−2.870***	−2.893***	−0.807***	−0.790***	−0.862***	0.065***	0.064***	0.062***
	(0.144)	(0.143)	(0.144)	(0.167)	(0.166)	(0.167)	(0.017)	(0.017)	(0.017)
TAN	−7.534***	−7.479***	−7.322***	−22.92***	−22.73***	−22.43***	−0.468**	−0.45**	−0.445**
	(1.714)	(1.697)	(1.702)	(1.865)	(1.845)	(1.86)	(0.197)	(0.197)	(0.197)
GDP	0.079**	0.091**	0.092**	−0.092	−0.029	−0.061	0.028***	0.031***	0.027***
	(0.039)	(0.039)	(0.039)	(0.064)	(0.065)	(0.065)	(0.004)	(0.004)	(0.004)
INF	0.176**	0.180**	0.152*	0.577***	0.518***	0.519***	0.001	−0.001	−0.002
	(0.086)	(0.087)	(0.087)	(0.128)	(0.128)	(0.128)	(0.010)	(0.010)	(0.010))
Constant	−45.417***	−44.47***	−44.766***	24.212**	10.709	−0.740	12.326***	10.171***	9.394***
	(7.211)	(6.049)	(5.198)	(11.337)	(9.415)	(7.987)	(0.824)	(0.692)	(0.597)
Observation	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation, ENV=environmental disclosure, SOC=social disclosure, GOV=governance disclosure, WUI=Policy uncertainty

Table 12 Sustainable disclosure (ESG), policy uncertainty (WUI) and corporate performance (FGLS estimation results)

Cross-sectional time-series FGLS regression

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
WUI	−0.153*	−1.862***	−2.897***	−8.780***	−0.395	−1.327***	−0.480***	−0.119***	−0.080***
	(0.411)	(0.331)	(0.193)	(0.447)	(0.448)	(0.427)	(0.056)	(0.033)	(0.027)
ENV	−18.690***			−66.927***			−3.097***		
	(2.108)			(2.904)			(0.297)		
ENV×WUI	4.881***			15.633***			0.653***		
	(0.476)			(0.656)			(0.068)		
SOC		−7.426***			−16.386***			2.220***	
		(1.967)			(3.281)			(0.277)	
SOC×WUI		2.377***			4.958***			−0.439***	
		(0.447)			(0.741)			(0.063)	
GOV			26.161***			39.718***			−2.454***
			(2.280)			(3.647)			(0.355)
GOV×WUI			5.322***			7.841***			0.614***
			(0.516)			(0.829)			(0.080)
LEV	−1.164***	−1.237***	−1.272***	−0.179***	−0.337***	−0.196***	−0.219***	−0.211***	−0.226***
	(0.024)	(0.023)	(0.016)	(0.031)	(0.022)	(0.034)	(0.003)	(0.001)	(0.002)
LIQ	−0.390***	−0.427***	−.4670***	−1.171***	−1.311***	−1.165***	0.053***	0.071***	0.063***
	(0.021)	(0.027)	(0.021)	(0.027)	(0.028)	(0.030)	(0.002)	(0.001)	(0.002)
SIZE	1.340***	1.446***	2.271***	0.707***	0.692***	1.492***	−0.265***	−0.327***	−0.292***
	(0.033)	(0.033)	(0.024)	(0.049)	(0.039)	(0.037)	(0.004)	(0.003)	(0.003)
R&D	−1.725***	−1.656***	−1.818***	−0.359***	−0.389***	−0.671***	0.159***	0.148***	0.140***
	(0.024)	(0.025)	(0.024)	(0.025)	(0.017)	(0.019)	(0.002)	(0.002)	(0.001)
TAN	−4.894***	−4.679***	−3.184***	−22.475***	−23.79***	−21.859***	−0.459***	−0.353***	−0.359***
	(.173)	(0.198)	(0.163)	(0.301)	(0.255)	(0.277)	(0.019)	(0.019)	(0.019)

Table 12 (continued)

Cross-sectional time-series FGLS regression

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GDP	0.140***	0.096***	0.132***	−0.007	0.152***	0.081***	0.033***	0.045***	0.043***
	(0.010)	(0.011)	(0.010)	(0.016)	(0.019)	(0.018)	(0.002)	(0.002)	(0.001)
INF	0.242***	0.153***	0.257***	0.941***	0.778***	0.699***	0.079***	0.088***	0.077***
	(0.020)	(0.019)	(0.018)	(0.031)	(0.031)	(0.037)	(0.003)	(0.003)	(0.003)
Constant	−5.459***	−14.321***	−27.259***	48.227***	12.013***	−3.942**	7.917***	5.514***	6.182***
	(1.823)	(1.511)	(0.916)	(1.986)	(2.009)	(1.897)	(0.244)	(0.144)	(0.128)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA = Return on assets, ROE = Return on equity, and TQ = The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV = Leverage, LIQ = Liquidity, SIZE = firm size, R&D = Research and Development, TAN = Asset Tangibility, GDP = GDP per capita, INF = Inflation, ENV = environmental disclosure, SOC = social disclosure, GOV = governance disclosure, WUI = Policy uncertainty

Table 13 Sustainable disclosure (ESG), geopolitical risk (GPR) and corporate performance (FE & RE estimation results)

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
FIXED EFFECTS (FE)									
GPR	−0.060**	−0.039*	−0.054***	−0.012	−0.018	−0.002	−0.006*	−0.008***	−0.012***
	(0.029)	(0.023)	(0.021)	(0.051)	(0.039)	(0.036)	(0.003)	(0.003)	(0.002)
ENV	1.615			−0.333			−0.947***		
	(2.652)			(4.612)			(0.298)		
ENV×GPR	−0.026			−0.021			−0.008***		
	(0.027)			(0.048)			(0.003)		
SOC		−0.122			−8.149**			−0.838***	
		(2.327)			(4.047)			(0.261)	
SOC×GPR		−0.001*			−0.087**			−0.007**	
		(0.024)			(0.043)			(0.003)	
GOV			3.392			10.993***			0.621**
			(2.396)			(4.165)			(0.269)
GOV×GPR			0.033*			0.127***			0.007**
			(0.025)			(0.044)			(0.003)
LEV	−1.616***	−1.625***	−1.635***	−1.038***	−1.040***	−1.041***	−0.123***	−0.122***	−0.125***
	(0.145)	(0.145)	(0.146)	(0.253)	(0.253)	(0.253)	(0.016)	(0.016)	(0.016)
LIQ	0.993***	0.997***	1.004***	−0.332*	−0.332*	−0.349*	−0.031***	−0.029**	−0.030**
	(0.105)	(0.104)	(0.105)	(0.182)	(0.182)	(0.182)	(0.012)	(0.012)	(0.012)
SIZE	12.455***	12.183***	11.873***	1.307	0.678	0.727	−2.054***	−2.103***	−2.046***
	(1.033)	(1.021)	(1.031)	(1.797)	(1.776)	(1.793)	(0.116)	(0.115)	(0.116)
R&D	−2.343***	−2.340***	−2.334***	−1.142***	−1.126***	−1.124***	−0.078***	−0.078***	−0.078***
	(0.219)	(0.219)	(0.219)	(0.381)	(0.381)	(0.381)	(0.025)	(0.025)	(0.025)
TAN	−10.158***	−10.360***	−10.741***	−21.293***	−21.977***	−22.662***	−0.826**	−0.871***	−0.901***
	(2.900)	(2.899)	(2.909)	(5.043)	(5.042)	(5.057)	(0.325)	(0.325)	(0.327)

Table 13 (continued)

FIXED EFFECTS (FE)

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GDP	0.019	0.031	0.038	−0.138	−0.093	−0.051	0.046***	0.046***	0.051***
	(0.061)	(0.062)	(0.063)	(0.106)	(0.108)	(0.109)	(0.007)	(0.007)	(0.007)
INF	0.150	0.125	0.117	0.115	0.088	0.099	−0.018*	−0.017	−0.020*
	(0.095)	(0.094)	(0.094)	(0.165)	(0.163)	(0.164)	(0.011)	(0.010)	(0.011)
Constant	−13.889***	−19.412***	−17.676***	11.419	13.665	15.469	25.021***	25.727***	25.669***
	(11.902)	(11.304)	(11.303)	(20.699)	(19.657)	(19.649)	(1.336)	(1.268)	(1.27)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

RANDOM EFFECTS (RE)

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GPR	−0.060**	−0.004	−0.001	0.043	−0.059**	−0.018	−0.002	−0.003	−0.007***
	(0.029)	(0.020)	(0.019)	(0.040)	(0.032)	(0.028)	(0.003)	(0.002)	(0.002)
ENV	1.615			8.476**			0.820***		
	(2.652)			(3.870)			(0.279)		
ENV×GPR	−0.026			−0.081**			−0.008***		
	(0.027)			(0.041)			(0.003)		
SOC		−0.877			−9.249**			−0.760***	
		(2.239)			(3.660)			(0.255)	
SOC×GPR		0.001			−0.062			−0.007**	
		(0.024)			(0.039)			(0.003)	
GOV			3.559			8.615**			0.613**
			(2.306)			(3.841)			(0.263)
GOV×GPR			0.029			0.076*			0.007**
			(0.024)			(0.041)			(0.003)

Table 13 (continued)

	RANDOM EFFECTS (RE)								
	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
LEV	−1.616***	−1.385***	−1.426***	−0.316**	−0.330**	−0.389**	−0.175***	−0.176***	−0.175***
	(0.145)	(0.116)	(0.117)	(0.151)	(0.150)	(0.152)	(0.013)	(0.013)	(0.013)
LIQ	0.993***	0.552***	0.560***	−0.849***	−0.827***	−0.856***	−0.008	−0.006	−0.008
	(0.105)	(0.090)	(0.090)	(0.126)	(0.125)	(0.125)	(0.010)	(0.010)	(0.010)
SIZE	12.455***	4.071***	4.262***	1.321***	1.157***	1.637***	−0.533***	−0.537***	−0.052***
	(1.033)	(0.274)	(0.273)	(0.302)	(0.266)	(0.267)	(.034)	(0.032)	(0.032)
R&D	−2.343***	−2.858***	−2.888***	−0.806***	−0.785***	−0.866***	0.062***	0.062***	0.061***
	(0.219)	(0.143)	(0.144)	(0.167)	(0.166)	(0.167)	(0.017)	(0.014)	(0.017)
TAN	−10.158***	−7.682***	−7.566***	−22.976***	−22.725***	−22.507***	0.474**	0.466**	0.502**
	(2.900)	(1.699)	(1.705)	(1.870)	(1.847)	(1.866)	(0.197)	(0.196)	(0.197)
GDP	0.019	0.070	0.094	−0.090	−0.100	−0.040	0.048***	0.049***	0.053***
	(0.061)	(0.058)	(0.059)	(0.090)	(0.091)	(0.092)	(0.007)	(0.007)	(0.007)
INF	0.105	0.169**	0.128	0.592***	0.553***	0.506***	0.005	0.002	0.001
	(0.095)	(0.086)	(0.086)	(0.129)	(0.127)	(.129)	(0.001)	(0.010)	(0.010)
Constant	−12.889***	−32.769***	−34.867***	1.431	0.641	0.946	8.788***	8.914***	9.227***
	(11.902)	(3.535)	(3.506)	(5.027)	(4.199)	(4.098)	(.462)	(.41)	(.406)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation, ENV=environmental disclosure, SOC=social disclosure, GOV=governance disclosure, GPR=Geopolitical risks

Table 14 Sustainable disclosure (ESG), geopolitical risk (GPR) and corporate performance (FGLS estimation results)

Cross-sectional time-series FGLS regression

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GPR	−0.028***	−0.008**	−0.051***	−0.027***	−0.030***	−0.021***	−0.019***	−0.012***	−0.012***
	(0.005)	(0.004)	(0.002)	(0.005)	(0.007)	(0.004)	(0.001)	(.001)	(0.010)
ENV	7.394***			6.828***			−0.436***		
	(0.510)			(0.650)			(0.068)		
ENV×GPR	0.048***			0.047***			0.002***		
	(0.006)			(0.007)			(0.001)		
SOC		2.667***			6.045***			1.420***	
		(0.426)			(0.892)			(0.072)	
SOC×GPR		0.011**			−0.009			−0.012***	
		(0.005)			(0.010)			(0.001)	
GOV			−7.637***			1.243			0.971***
			(0.499)			(0.943)			(0.106)
GOV×GPR			0.109***			0.031***			0.008***
			(0.006)			(0.010)			(0.001)
LEV	−1.149***	−1.310***	−1.229***	−0.170***	−0.351***	−0.215***	−0.193***	−0.207***	−0.207***
	(0.020)	(0.021)	(0.014)	(0.027)	(0.022)	(0.034)	(0.004)	(0.004)	(0.002)
LIQ	−0.364***	−0.294***	−0.509***	−1.039***	−1.028***	−1.176***	0.067***	0.082***	0.074***
	(0.020)	(0.025)	(0.016)	(0.031)	(0.029)	(0.031)	(0.003)	(0.003)	(0.002)
SIZE	1.298***	1.613***	2.176***	0.949***	0.825***	1.428***	−0.259***	−0.319***	−0.286***
	(0.031)	(0.027)	(0.024)	(0.046)	(0.042)	(0.035)	(0.004)	(0.004)	(0.003)
R&D	−1.769***	−1.758***	−1.619***	−0.547***	−0.631***	−0.700***	0.169***	0.151***	0.146***
	(0.024)	(0.023)	(0.026)	(0.026)	(0.023)	(0.018)	(0.002)	(0.002)	(0.001)
TAN	−5.256***	−3.614***	−4.429***	−22.140***	−21.673***	−22.633***	−0.388***	−0.473***	−0.488***
	(0.164)	(0.186)	(0.179)	(0.279)	(0.247)	(0.195)	(0.022)	(0.023)	(0.018)

Table 14 (continued)

Cross-sectional time-series FGLS regression

	ROA	ROA	ROA	ROE	ROE	ROE	TQ	TQ	TQ
GDP	0.252***	0.150***	0.158***	−0.028**	−0.004	−0.032*	0.071***	0.088***	0.080***
	(0.010)	(0.011)	(0.011)	(0.014)	(0.023)	(0.018)	(0.002)	(0.002)	(0.002)
INF	0.202***	0.125***	0.232***	0.797***	0.694***	0.643***	0.085***	0.070***	0.073***
	(0.019)	(0.018)	(0.019)	(0.025)	(0.032)	(0.036)	(0.003)	(0.004)	(0.003)
Constant	−2.899***	−7.590***	−8.612***	3.839***	4.898***	1.184*	7.308***	7.048***	6.807***
	(0.578)	(0.413)	(0.259)	(0.780)	(0.822)	(0.686)	(0.084)	(0.064)	(0.058)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA = Return on assets, ROE = Return on equity, and TQ = The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV = Leverage, LIQ = Liquidity, SIZE = firm size, R&D = Research and Development, TAN = Asset Tangibility, GDP = GDP per capita, INF = Inflation, ESG = dummy variable for high median value of Bloomberg's proprietary score for combined sustainable disclosure, GPR = Geopolitical risks

Table 15 ROBUSTNESS CHECK—IMPACT OF ESG ON WUI & CORPORTE PERFORMANCE (FE, RE, AND FGLS estimation results)

	FIXED EFFECT			RANDOM EFFECT			FGLS		
	ROA	ROE	TQ	ROA	ROE	TQ	ROA	ROE	TQ
WUI	−0.770	−0.892	−0.345**	−1.809	−2.157	−0.493***	−0.101	−1.282***	−0.432***
	(1.433)	(2.493)	(0.161)	(1.347)	(2.203)	(0.153)	(0.245)	(0.495)	(0.034)
ESG	−12.057	−29.544**	−1.654*	−9.045	−28.631**	−1.880**	−13.357***	−24.002***	−1.897***
	(7.972)	(13.868)	(0.897)	(7.677)	(12.778)	(0.873)	(1.529)	(3.549)	(0.201)
ESG×WUI	2.498*	6.454***	0.423***	2.171*	6.961**	0.461**	3.882***	6.138***	0.390***
	(1.810)	(3.149)	(0.204)	(1.743)	(2.897)	(0.198)	(0.351)	(0.803)	(0.045)
LEV	−1.629***	−1.021***	−0.119***	−1.390***	−0.339**	−0.173***	−1.314***	−0.291***	−0.198***
	(0.145)	(0.252)	(0.016)	(0.116)	(0.151)	(0.013)	(0.012)	(0.025)	(0.003)
LIQ	1.013***	−0.317*	−0.031***	0.559***	−0.833***	−0.008	−0.545***	−1.035***	0.083***
	(0.105)	(0.182)	(0.012)	(0.090)	(0.125)	(0.010)	(0.020)	(0.033)	(0.002)
SIZE	11.725***	1.430	−1.897***	4.084***	1.200***	−0.530***	1.560***	0.954***	−0.323***
	(1.006)	(1.751)	(0.113)	(0.276)	(0.272)	(0.032)	(0.027)	(0.049)	(0.003)
R&D	−2.367***	−1.133***	−0.073***	−2.875***	−0.829***	0.062***	−2.045***	−0.578***	0.141***
	(0.219)	(0.380)	(0.025)	(0.143)	(0.166)	(0.017)	(0.019)	(0.028)	(0.002)
TAN	−10.484***	−20.848***	−0.687**	−7.428***	−22.717***	−0.436**	−4.660***	−20.951***	−0.377***
	(2.890)	(5.027)	(0.325)	(1.695)	(1.853)	(0.197)	(0.154)	(0.305)	(0.017)
GDP	0.133***	−0.158**	0.019***	0.089**	−0.043	0.031***	0.084***	0.062***	0.047***
	(0.042)	(0.072)	(0.005)	(0.039)	(0.065)	(0.004)	(0.011)	(0.019)	(0.001)
INF	0.130	0.040	−0.025**	0.172**	0.545***	−0.002	0.230***	0.834***	0.071***
	(0.094)	(0.164)	(0.011)	(0.087)	(0.128)	(0.010)	(0.018)	(0.032)	(0.003)
Constant	−11.058***	11.865	24.352***	−41.14***	15.821	10.774***	−7.011***	11.743***	4.075***
	(11.023)	(19.177)	(1.241)	(6.493)	(10.094)	(.743)	(1.132)	(2.333)	(.162)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA=Return on assets, ROE=Return on equity, and TQ=The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV=Leverage, LIQ=Liquidity, SIZE=firm size, R&D=Research and Development, TAN=Asset Tangibility, GDP=GDP per capita, INF=Inflation, ESG=dummy variable for high median value of Bloomberg's proprietary score for combined sustainable disclosure, WUI=Policy uncertainty

Table 16 ROBUSTNESS CHECK—IMPACT OF ESG ON GPR & CORPORATE PERFORMANCE (FE, RE, AND FGLS estimation results)

	FIXED EFFECT			RANDOM EFFECT			FGLS		
	ROA	ROE	TQ	ROA	ROE	TQ	ROA	ROE	TQ
GPR	−7.703*	−4.138*	−1.351**	−1.442	7.222	−0.426	−8.588***	−2.056*	−3.057***
	(5.431)	(9.448)	(0.610)	(4.807)	(7.280)	(0.548)	(1.053)	(1.233)	(0.135)
ESG	5.358	15.813	3.129***	3.888	23.156	3.242***	−7.978***	7.758*	−0.896***
	(10.514)	(18.29)	(1.180)	(10.005)	(16.191)	(1.138)	(2.456)	(3.999)	(0.331)
ESG×GPR	−3.136	−8.646	−1.508**	−1.672	−10.665	−1.591***	5.972***	2.315	0.516***
	(5.317)	(9.248)	(0.597)	(5.068)	(8.218)	(0.576)	(1.244)	(2.045)	(0.169)
LEV	−1.624***	−1.051***	−0.124***	−1.390***	−0.342**	−0.176***	−1.561***	−0.315***	−0.184***
	(0.145)	(0.253)	(0.016)	(0.116)	(0.151)	(0.013)	(0.019)	(0.025)	(0.003)
LIQ	0.997***	−0.333*	−0.030**	0.546***	−0.841***	−0.007	−0.736***	−0.966***	0.072***
	(0.104)	(0.182)	(0.012)	(0.090)	(0.125)	(0.010)	(0.027)	(0.033)	(0.004)
SIZE	12.368***	1.094	−2.058***	4.094***	1.195***	−0.534***	1.443***	0.946***	−0.311***
	(1.021)	(1.776)	(0.115)	(0.276)	(0.272)	(0.032)	(0.031)	(0.050)	(0.004)
R&D	−2.343***	−1.136***	−0.079***	−2.867***	−0.830***	0.060***	−1.921***	−0.673***	0.142***
	(0.219)	(0.381)	(0.025)	(0.143)	(0.166)	(0.017)	(0.025)	(0.023)	(0.002)
TAN	−10.519***	−21.933***	−0.816***	−7.690***	−22.748***	−0.461***	−4.061***	−21.675***	−0.400***
	(2.898)	(5.042)	(0.325)	(1.697)	(1.857)	(0.197)	(0.190)	(0.266)	(0.019)
GDP	0.046	−0.082	0.046***	0.087	−0.073	0.050***	0.132***	0.052***	0.072***
	(0.064)	(0.111)	(0.007)	(0.059)	(0.092)	(0.007)	(0.014)	(0.019)	(0.002)
INF	0.118	0.079	−0.015	0.168*	0.578***	0.004	0.175***	0.798***	0.071***
	0(0.094)	(0.163)	(0.011)	(0.086)	(0.128)	(0.010)	(0.020)	(0.027)	(0.003)
Constant	−13.487***	19.914	27.186***	−30.342***	−7.886	9.475***	11.745***	10.486***	11.840***
	(16.912)	(29.419)	(1.899)	(10.044)	(14.709)	(1.15)	(2.086)	(2.429)	(0.253)
Observations	8732	8732	8732	8732	8732	8732	8732	8732	8732

This table presents the moderating impact of sustainable disclosure on geopolitical risk and corporate performance. ROA, ROE and TOBINSQ are the dependent variables, where ROA = Return on assets, ROE = Return on equity, and TQ = The sum of market capitalization, total liabilities, preferred equity and minority interest divided by total assets, LEV = Leverage, LIQ = Liquidity, SIZE = firm size, R&D = Research and Development, TAN = Asset Tangibility, GDP = GDP per capita, INF = Inflation, ESG = dummy variable for high median value of Bloomberg's proprietary score for combined sustainable disclosure, GPR = Geopolitical risks

consistent with the results of System GMM estimation. This implies that the impact of the sustainable disclosure on policy uncertainty, geopolitical risk and corporate performance is robust across the estimation methods.

6 Conclusions and Policy Implications

Our study contributes to the literature by examining the nexus between economic policy uncertainty, geopolitical risk, sustainable disclosure, and corporate performance through cross-country analysis. This study found that sustainability disclosure (ESG) and its three components, viz. environmental, social and governance scores are positively associated with the accounting based as well as market based performance measures, viz. ROA, ROE and Tobins Q. This implies that a higher level of ESG disclosure is associated with higher levels of corporate performance. The results are consistent with the studies by Yu et al. (2018); Qureshi et al. (2020); Zhou et al. (2022). This study also reveals that policy uncertainty and geopolitical risks decrease the financial performance of the companies. The positive and statistically significant coefficients of sustainability disclosure variables confirm that companies having higher sustainability disclosures perform better. This implies that effective higher environmental, social and governance disclosure reports based on robust strategic mechanisms, helps to achieve control and monitor resources by a firm through reducing risk and provides strong linkages and expertise. It also affirms that sustainable disclosure plays a vital role in development and growth of companies depending on the degree of voluntary sustainable activities prevailing in a country. We also found that the sustainability disclosures reduce the impact of policy uncertainty and geopolitical risk on firm performance. Our results have the implications for policy makers as well as for the corporate managers of companies to frame their policies in such manner to derive maximum benefits from this government regulation. Therefore, we can say that sustainability disclosures by firms' are a noble initiative towards the reducing the information asymmetry between the management and the stakeholders, which will eventually maximize the financial performance of the firms'.

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