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Geopolitical risk and real estate stock crash

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ABSTRACT

We investigate the effect of geopolitical risk (GPR) on real estate stock crashes while accounting for the impact of cash holdings and financial constraints in this relationship. Using a dataset from 28 countries covering the period of 2000 to 2023 from 1805 firms, we document that geopolitical risk increases real estate stock price crash risk. Our result remains consistent using an alternate proxy of geopolitical risk and even after considering endogeneity concerns using 2SLS and Entropy balanced samples. Our result shows the negative impact of GPR is stronger for firms with high cash holdings and high financial constraints.

1. Introduction

Geopolitical and military conflicts arising from the exchanges between terrorist groups and/or countries with adverse financial and economic effects are considered geopolitical risks (GRP, hereafter), according to Caldara and Iacoviello (2022). Heightened global geopolitical tensions are believed to impact global business cycles and financial markets due to increased global supply chain disruptions (Izzeldin et al., 2023), risk aversion (Baur and Smales, 2020), financial market volatility (Smales, 2021), investment strategy (Caldara and Iacoviello, 2022) and demand disruptions (Khudaykulova et al., 2022). Investigating the economic effect of international military conflicts and terrorist events, Yilmazkuday (2025;2024) and Bajra et al. (2025) find that global geopolitical risk impacts financial assets (e.g., stock prices, exchange rate, green financial assets). Overall, financial assets (e.g., stocks) can perform or underperform depending on the sector in the wake of geopolitical tensions, where an empirical investigation is required to gauge the corresponding effects.

Inspired by this background, this paper extends the literature by investigating the impact of GPRs on stock price crashes in the real estate sector, a critical sector in the global economy. This paper focuses on the real estate sector for varied reasons. First, the hybrid nature of the global real estate company market has made it a major component of both institutional and ordinary investors' investment portfolios (Su et al., 2010), offering features of both equities and real estate assets (Wong, 2018). Second, real estate firms provide investors with liquid access to the real estate market while exhibiting unique return behaviors that blend the features of both traditional stock investments and direct real estate holdings (Liow and Song, 2022; Nyachiro and Jagongo, 2017). This dual nature allows real estate firms to enhance portfolio diversification while providing potential inflation-hedging benefits (Feng et al., 2015).

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These characteristics have made real estate firms a preferred asset class for investors seeking exposure to real estate with the liquidity and pricing transparency of publicly traded securities (Riddiough et al., 2005). Our dataset comprises 29,858 firm-year observations (from 1821 unique firms) covering 2000 to 2023 across 28 countries. The findings reveal that geopolitical conflict drives real estate stock crashes, with the adverse effects being more pronounced for firms holding substantial cash reserves and those experiencing higher financial constraints.

This study shows that heightened geopolitical conflicts influence a decline in real estate stock prices from a global perspective, prompting managers to withhold negative information due to the influence of performance-based compensation (Kim et al., 2011). In particular, the bad news withheld increases the probability of a stock price crash, which arises when accumulated negative information suddenly hits the market (Hutton et al., 2009). Additionally, geopolitical risk (GPR) exacerbates market participants' overreaction to negative news by increasing information asymmetry and uncertainty. This forces investors to rely heavily on firms' disclosures when making decisions. Coën and Desfleurs (2024) documented the effect of GPRs US REITs stock returns in a related study. Also, Fiorillo et al. (2024), using a large international sample, revealed that firms with higher ESG scores are more resistant to the impact of GPR on stock price crashes.

The paper extends the literature along the following lines. First, this paper examines a sample of 1, 821 unique real estate firms across 28 countries, making it feasible to investigate the heterogeneity across countries regarding the influence of geopolitical tension on real estate stock crashes. In comparison, Coën and Desfleurs (2024) explored only US REITs returns. Second, this paper uses a long sample period between 2000 and 2024 that contains periods of geopolitical tensions such as the September 11 attacks, the Iraq War, the Russo-Ukraine War, and the Israel-Hamas War. Earlier studies such as Hossain et al. (2024) and Bossman et al. (2023) highlight the impacts of single geopolitical tensions. Third, to the best of our knowledge, this is one of the foremost studies that examines real estate stock crashes using firm-level data. Fourth, this study provides novel insights into the moderating roles of cash holdings and financial constraints in this relationship.

The remaining part of the study is structured as follows: Section 2 contains the methodology and data specification, with Section 3 reporting the main findings. Finally, we report the concluding remarks in Section 4.

2. Data specification and empirical model

This section outlines our methodology, including variable measurement, sample, data sources, and model specification.

2.1. Estimating stock price crash risk

In estimating firm-level stock price crash risk, we follow Ma et al. (2020) and use two key metrics based on weekly returns calculated as residuals from an extended market framework model as follows:

$$\begin{aligned} r_{i,\tau} &= \alpha_i + \beta_{1i} r_{m,\tau-2} + \beta_{2i} r_{m,\tau-1} + \beta_{3i} r_{m,\tau} + \beta_{4i} r_{m,\tau+1} + \beta_{5i} r_{m,\tau+2} \\ &\quad + \beta_{6i} r_{ind,\tau-2} + \beta_{7i} r_{ind,\tau-1} + \beta_{8i} r_{ind,\tau} \\ &\quad + \beta_{9i} r_{ind,\tau+1} + \beta_{10i} r_{ind,\tau+2+} \varepsilon_{i,\tau} \end{aligned} \tag{1}$$

here, r_m is the value-weighted market index of real estate firms for each country in a week τ. r_{ind} is value-weighted sub-sector index real estate firms of Global Industry Classification Standard industry classification of LSEG for each country in week τ and $\varepsilon_{i,\tau}$ residual for each firm and week. The residual return from a regression model that considers stock, market, and industry returns—as well as lead and lag factors to account for non-synchronous trading—plus the natural log of one is the weekly return, or $W_{i,t} = \mathrm{In}(1 + \varepsilon 1 + \varepsilon_{i,\tau})$.

The negative third moment of the company's weekly returns over one year, normalized by the standard deviation of those returns cubed using Eq. (2), is used to calculate the first measure, negative conditional return skewness (NCSKEW). This measure reflects the negatively skewed returns, with higher values indicating greater crash risk.

$$\begin{aligned} NCSKEW_{it} &= -\left[n(n-1)^{3/2} \sum W_{i\tau}{}^3\right] \Big/ \\ &\quad \left[(n-1)(n-2)\left(\sum W_{i\tau}{}^2\right)^{3/2}\right] \end{aligned} \tag{2}$$

where, $W_{i\tau}$ is the residual weekly return for firm i, at week τ and n number of days traded in the week.

Eq. (3) divides the weeks into "down" weeks (those that return below the annual mean) and "up" weeks (those that return above the annual mean) for the second statistic, down-to-up volatility (DUVOL). After determining the standard deviation of returns for every group independently, we take the natural log of the ratio of "down" weeks to "up" weeks. A higher DUVOL value indicates a greater probability of stock price crashes.

$$DUVOL_{it} = Log\left\{(n_u - 1)\sum_{down} W_{it}^2 \Big/ \left[(n_d - 1)\sum_{up} W_{it}^2\right]\right\} \tag{3}$$

where, In the t-th year, the variable n_u and n_d represents the count of days when the daily specific return of stock i exceeds (or falls below) the average return for that year. Conversely, "down" (or "up") denotes the daily return when $W_{i,t}$ is lower (or higher) than the yearly mean return.

2.2. Measuring geopolitical risk

Our measure of GPR is based on Caldara and Iacoviello's (2022) GPR index. It monitors how frequently items about terrorism, war, threats, and international tensions appear monthly in 44 countries. To provide insights into global events, the index employs an automatic text search on 10 newspapers, classifying events into eight groupings, including military buildups and war threats. By displaying notable surges during geopolitical events, the GPR index isolates itself from other uncertainties and remains stable amid economic downturns, crises, and elections. This makes it possible to precisely link particular occurrences to company rule modifications. Its broad data set dates back to 1985 and makes it easier to analyze how GPRs have changed company tactics.

We employ two robust proxies for GPR in our investigation. The first proxy determines the annual average GPR for each nation (GPR_AVG), reflecting the total level of GPR over the year. It is based on Le and Tran (2021) and Adra et al. (2023). In line with Vural-Yavaş (2021), the second proxy computes the GPR's annual standard deviation to determine the shock in GPR (GPR_SD).

2.3. Data specification

This paper utilizes three primary data sources: LSEG for financial data, the Caldara and Iacoviello (2022) GPR index, and macroeconomic data from the World Bank. We select listed real estate firms from LSEG and integrate this data with the GPR index and country-level data. After cleaning for missing values, our dataset comprises 29,858 firm-year observations (from 1821 unique firms) covering the period from 2000 to 2023 across 28 countries.[1] We address outliers by winsorizing the values at the 1 % and 99 % levels. Table S.1 to S.3 provides detailed summary statistics of the variable and sample.

2.4. Model specification

In accordance with earlier studies stock price crashes Andreou et al. (2021) and Ma et al. (2020), we use a lagged model in the manner described below:

$$\mathrm{CRASH}_{c,i,t} = \beta_0 + \beta_1 L.GPR_{c,t-1} + \sum \gamma_k Firm - level\ Controls_{c,i,t} + \sum \lambda_k Macro\ Controls_{c,t} + \varepsilon_{c,i,t} \quad (4)$$

where, $\mathrm{CRASH}_{c,i,t}$ is stock price crashes is of firm i, of country c, at year t. $L.GPR_{c,t-1}$ is one period lagged GPR of country c. $\sum \gamma_k Firm - levelControls_{c,i,t}$ is the vector of firm level controls and $\sum \lambda_k MacroControls_{c,t}$ is vector of firm level controls, and $\varepsilon_{c,i,t}$ is error term. Table A.1 in the appendix contains a description of all variables.

3. Discussion of results

In this section, we present our empirical findings and discussion. We begin with the baseline results, followed by robustness tests using alternative proxies. Next, we address endogeneity concerns. Finally, we provide additional analysis results.

3.1. Baseline regression results

The baseline model, which examines the influence of GPRs on stock price crashes across real estate firms, is shown in Table 1. At the 1 % to 5 % level, the L.GPR_SD coefficients in both models using NCSKEW and DUVOL are statistically significant and positive. This suggests a substantial relationship between GPRs and the stock price crash for real estate companies. In Model 1, the likelihood of a stock price crash increases by 0.33 units for every unit increase in GPR. This result confirms our hypothesis that GPR increases stock crashes in the real estate industry.

The uncertainty and chaos GPR bring are the fundamental causes of this outcome. Geopolitical incidents, such as conflicts or international stresses, create significant market volatility, leading to greater risks for real estate firms' stock prices. The heightened uncertainty associated with these events may cause firms to withhold bad news, increasing the possibility of sudden price crashes when that information is eventually revealed. These findings are consistent with prior literature documenting similar effects of GPR on asset volatility and market behavior. For instance, Zhang et al. (2023) and Salisu et al. (2022) found that GPR increases stock market volatility, while Smales (2021) and Hoque and Zaidi (2020) reported that geopolitical events impact stock returns.

3.2. Robustness test results

Following the methods of Adra et al. (2023) and Le and Tran (2021), which employ the annual average of the GPR index, we examine an alternate proxy for GPR to evaluate the validity of our baseline findings. Results based on the robustness test with this alternative proxy are shown in Table 2, and they show that GPR and stock price collapse risk for real estate companies are constantly positively correlated. In particular, the alternative GPR measure's coefficient is still statistically significant, supporting the idea that

[1] Our sample of real estate firms includes a diverse range of REITs, covering various sectors of the industry. These include Diversified REITs, Health Care REITs, Hotel & Resort REITs, Industrial REITs, Office REITs, and Residential REITs. Additionally, we encompass firms specializing in Real Estate Management & Development, Retail REITs, and Specialized REITs.

Table 1
Baseline regression on the effect of geopolitical risks on stock price crashes.

VARIABLES	(1) NCSKEW	(2) DUVOL
L.GPR_SD	0.033***	0.016**
	(0.013)	(0.007)
AGE	0.023*	0.012
	(0.013)	(0.007)
SIZE	−0.008**	−0.008***
	(0.004)	(0.002)
LEV	0.037*	0.024*
	(0.021)	(0.012)
MB	0.011	0.001
	(0.007)	(0.004)
HHI	0.358***	0.158***
	(0.101)	(0.058)
CASH	−0.026	−0.019
	(0.034)	(0.020)
ROA	−0.360***	−0.224***
	(0.054)	(0.032)
SIGMA	0.754***	0.424***
	(0.090)	(0.052)
RET	−27.908***	−17.584***
	(0.352)	(0.204)
DIVIDEND	0.958***	0.392***
	(0.252)	(0.146)
GDPG	0.011***	0.006***
	(0.001)	(0.001)
FDI	−0.000	−0.000
	(0.000)	(0.000)
INF	0.003***	0.002***
	(0.001)	(0.000)
Constant	−0.011	0.047
	(0.074)	(0.043)
Observations	27,288	27,268
R-squared	0.269	0.293
Firm FF	YES	YES
Year FF	YES	YES

Note: This table encompasses results from the baseline regression. All models consider L.GPR_SD as the independent variable. All models account for time and firm fixed effects; robust standard errors are presented in brackets. *, **, and *** represent significant levels at 10 %, 5 %, and 1 %, respectively. FF denotes Fixed Effects. Table A.1 reports a description of the variables. The sample period covering 2000 to 2023 is used for estimation.

higher GPR levels increase stock price crashes. This consistent result shows that the connection between GPR and stock price crash risk is independent of the GPR proxy selection, confirming the validity of our preliminary findings.

3.3. Endogeneity concerns

While we have established a robust connection between GPRs and stock price crashes in real estate firms, endogeneity concerns must be addressed to ensure the validity of our findings. We utilize two common approaches to mitigate these concerns: two-stage least squares (2SLS) regression and entropy balancing.

First, we apply the 2SLS regression using an instrumental variable to address the endogeneity issue. This approach helps to isolate the exogenous variation in GPR that is not influenced by other factors, ensuring that our estimates reflect the actual causal effect of GPR on stock price crashes. The instrumental variable we choose is regional GPR (RGPR), by the approach of Abdullah et al. (2024). Table 3, Panel A displays the 2SLS regression findings. We confirm that RGPR is a powerful tool in the first stage by finding that it is highly related to L.GPR_SD. Furthermore, every model satisfies the instrument relevance level. In the second stage, the coefficient for the fitted L.GPR_SD remains consistently positive and statistically significant, reinforcing our initial findings. These results prove that GPR increases real estate firms' stock price crash risk.

Next, we employ entropy balancing to address endogeneity by matching treated and control groups based on observable characteristics, thus mitigating potential biases from confounding factors (Roy et al., 2024). This method ensures that the groups are balanced to the covariates. The results of the entropy-balanced sample are shown in Table 3, Panel B. Again, we observe that the coefficient for L.GPR_SD is consistently positive and significant. This further corroborates our initial findings and indicates that GPR exacerbates stock price crash risk in real estate firms.

Table 2
Robustness test results.

VARIABLES	(1) NCSKEW	(2) DUVOL
L.GPR_AVG	0.027**	0.014**
	(0.011)	(0.006)
Constant	-0.015	0.045
	(0.074)	(0.043)
Observations	27,288	27,268
R-squared	0.269	0.293
Firm FF	YES	YES
Year FF	YES	YES
Controls	YES	YES

Note: This table details results from the robustness test. All models consider L. GPR_AVG as the independent variable. All models account for time and firm fixed effects; robust standard errors are presented in brackets. *, **, and *** represent significant levels at 10 %, 5 %, and 1 %, respectively. FF denotes Fixed Effects. Table A.1 reports a description of the variables. The sample period covering 2000 to 2023 is used for estimation.

Table 3
Endogeneity concern results.

Panel A: 2SLS results

VARIABLES	(1) L.GPR_SD	(2) NCSKEW	(3) DUVOL
RGPR	0.921***		
	(0.004)		
Fitted L.GPR_SD		0.263***	0.116***
		(0.085)	(0.043)
Observations	27,302	27,302	27,282
R-squared		0.191	0.223
Firm FF	YES	YES	YES
Year FF	YES	YES	YES
Controls	YES	YES	YES
Anderson canon. corr. LM statistic		1444.061	7158.387
Cragg-Donald Wald F statistic		1522.640	9691.613
Stock-Yogo weak ID		16.380	16.380

Panel B: Entropy-balanced sample results

VARIABLES	(1) NCSKEW	(2) DUVOL
L.GPR_SD	0.030**	0.013*
	(0.013)	(0.007)
Constant	-0.186**	-0.042
	(0.075)	(0.043)
Observations	27,288	27,268
R-squared	0.273	0.299
Firm FF	YES	YES
Year FF	YES	YES
Controls	YES	YES

Note: The table reports endogeneity test results. Panel A shows the result for 2SLS regression with an instrumental variable, where RGPR is used as the instrumental variable. Panel B shows results for entropy-balanced sample results. All models consider L.GPR_SD as the independent variable. All models account for time and firm fixed effects, and robust standard errors are presented in brackets. *, **, and *** represent significant levels at 10 %, 5 %, and 1 %, respectively. FF denotes Fixed Effects. Table A.1 reports a description of the variables. The sample period covering 2000 to 2023 is used for estimation.

3.4. Additional analysis results

We investigate potential mechanisms by which GPR influences the stock price crashes of real estate companies, paying special attention to the functions of cash holdings and financial limitations, to understand our baseline findings better. While higher GPR exacerbates financial limitations, prior research by Roy et al. (2024), Wang et al. (2021), and Lee and Wang (2021) indicate that businesses store extra cash as a safeguard during uncertainty. This leads us to hypothesize that enterprises with more extensive cash holdings and more financial constraints are more vulnerable to the effect of GPRs on stock price crashes.

Our hypothesis is supported by the findings of our channel study, which are displayed in Table 4. According to our analysis, both L.

Table 4
Channel analysis results.

VARIABLES	(1) NCSKEW	(2) DUVOL	(3) NCSKEW	(4) DUVOL
L.GPR_SD	-0.029*	-0.017*	0.008	0.003
	(0.017)	(0.010)	(0.018)	(0.010)
High cash holdings	0.022***	0.012***		
	(0.007)	(0.004)		
L.GPR_SD × High cash holdings	0.061***	0.033***		
	(0.020)	(0.011)		
High KZ			-0.004	0.001
			(0.009)	(0.005)
L.GPR_SD × High financial constraints			0.041*	0.023*
			(0.021)	(0.012)
Constant	-0.105***	-0.051***	0.007	0.054
	(0.022)	(0.013)	(0.075)	(0.044)
Observations	27,302	27,282	26,992	26,972
R-squared	0.195	0.226	0.269	0.294
Firm FF	YES	YES	YES	YES
Year FF	YES	YES	YES	YES
Controls	YES	YES	YES	YES

Note: This table shows the results of channel analysis. High Cash Holdings are a dummy variable for higher cash holding, and High financial constraints are a dummy variable for higher financial constraints. All models account for time and firm fixed effects, and robust standard errors are presented in brackets. *, **, and *** represent significant levels at 10 %, 5 %, and 1 %, respectively. FF denotes Fixed Effects. Table A.1 reports a description of the variables. The sample period covering 2000 to 2023 is used for estimation.

GPR_SD × High Cash Holdings and L.GPR_SD × High Financial Constraints are positive and statistically significant. These results demonstrate that under increasing GPR, the danger of a stock market crash increases more for companies with larger cash holdings and more financial limitations. Businesses with large financial reserves could hide bad news to prevent panic, which could cause a sudden collapse when it is eventually made public. Similarly, companies with limited resources find it difficult to obtain funding during geopolitical unrest, increasing the probability of stock price crashes.

We further examine cross-sectional analysis to investigate how certain country-level factors, precisely control of corruption and national peace, influence the connection between GPR and stock price crash risk for real estate firms. The results in Tables S.4 and S.5 show a significant impact of GPR and these country-level variables. Specifically, the impact of GPR on stock price crash risk is more noticeable in countries with lower control of corruption and weaker peace. This finding suggests that weaker institutions and higher political instability make firms more vulnerable to geopolitical events. Similarly, in countries with lower peace, social unrest or conflict increases business unpredictability, amplifying the negative impact of GPR.

4. Conclusion

This study examines at how GPR affects real estate companies' stock price crashes. Findings from our paper confirm that a higher GPR considerably raises the level of stock price crashes for real estate companies. For businesses with larger cash holdings and those with more financial constraints, this effect is most noticeable. We also show how crucial national and institutional factors—like levels of peace and corruption control—are in limiting the effect of GPR on the likelihood of stock market crashes. Our findings hold up well when using a variety of GPR proxies and approaches, such as entropy balancing and instrumental variable regression.

Our results offer significant implications for policymakers and practitioners. First, emerging economies with underdeveloped real estate sector need to address and monitory closely geopolitical issues that can trigger geopolitical conflicts to curtail the corresponding effects on real estate sector stocks. Given that geopolitical acts and threats impact real estate stock crashes, policymakers should prioritize policies and strategies that help reduce actions (such as corruption) that could trigger geopolitical events. This is critical since the impact of geopolitical events risks on real estate stock prices could help forecast the possibility of future geopolitical events. Policymakers may enact policies to de-escalate tension through diplomatic engagement and the development of vigorous financial safety nets to support countries during geopolitical tensions to aid economic diversification. Also, policymakers should prioritize stabilizing fiscal and monetary policies and market conditions to help mitigate the adverse effects of geopolitical risks. Government should provide a clear communication pathway during geopolitical events to help reduce panic-selling and volatility, thus stabilizing asset prices.

Future studies may consider the effect of policy intervention during geopolitical conflicts on real estate stock crashes. Also, examining the extent of connectedness among the countries examined can provide additional understanding on the complex association between geopolitical risks and real estate stock crashes.

CRediT authorship contribution statement

Emmanuel Joel Aikins Abakah: Writing – review & editing, Writing – original draft, Supervision, Conceptualization. **Mohammad Abdullah:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Omokolade**

Akinsomi: Writing – review & editing, Visualization, Supervision, Conceptualization. **Aviral Kumar Tiwari:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Conceptualization.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2025.107333.

Appendix A

Variable	Description	Data source
NCSKEW	Negative conditional skewness, denoted as NCSKEW, is calculated as the negative third moment of real estate firms' weekly returns, scaled by the standard deviation of cubic returns. These returns are estimated using a 52-week rolling window based on an expanded index model.	Authors' calculation from LSEG Data
DUVOL	Down-to-up volatility (DUVOL) is the natural log of the ratio between the volatilities of negative and positive firm-specific weekly returns. These returns are also estimated using a 52-week rolling window from the expanded index model.	Authors' calculation from LSEG Data
GPR_SD	Yearly standard deviation of the GPR Index	Caldara and Iacoviello (2022)
GPR_AVG	Yearly average of GPR Index	Caldara and Iacoviello (2022)
AGE	Natural logarithm of firm age	LSEG
SIZE	Natural logarithm of total assets	LSEG
LEV	Total debt scaled by total assets	LSEG
MB	Market value to book value	LSEG
HHI	Herfindahl-Hirschman Index of sales	LSEG
CASH	Cash and cash equivalents scaled by total assets	LSEG
ROA	Return on assets	LSEG
SIGMA	Yearly standard deviation of weekly stock returns	LSEG
RET	Yearly average of weekly stock returns	LSEG
DIVIDEND	Cash dividend scaled by total assets	LSEG
GDPG	Annual GDP growth rate	The World Bank
FDI	Foreign direct investment, net inflows (% of GDP)	The World Bank
INF	Inflation, consumer prices (annual %)	The World Bank
RGPR	Regional average GPR Index	Caldara and Iacoviello (2022)
High Cash Holdings	The dummy variable for high cash holdings, where the value is one if the ratio of cash and cash equivalents to total assets is higher than the median value; otherwise, the value is 0.	LSEG
High Financial Constraints	Dummy variable for financial constraints, where the value is one if the KZ index is higher than the median value; otherwise, the value is 0. The KZ index is measured following the methodology by Baker et al. (2003).	LSEG
CC	Control of Corruption	The World Bank
GPI	Global peace index	Institute for Economics & Peace
ICRG	International Country Risk Guide Political risk index	PRS Group

Data availability

The authors do not have permission to share data.

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