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# Geopolitical Tensions and Equity Market Reactions in Europe, the United States and Asia, 2022–2026: An Event Study and GARCH Analysis

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## Abstract

# Background

Between 2022 and 2026, equity markets absorbed an unusually dense sequence of geopolitical shocks: the Russian invasion of Ukraine, the Israel–Hamas war, the United States (US) reciprocal tariff escalation, the June 2025 Israeli strikes on Iran and the 2026 US–Israeli war on Iran with the closure of the Strait of Hormuz. Evidence on how these shocks were absorbed across European, Western and Asian markets remains fragmented across single-event studies.

# Objective

This study compares the return and volatility reactions of eight benchmark equity markets in Europe, the US and Asia to five geopolitical events and to daily geopolitical risk, and identifies which markets were more stable and which reacted more strongly.

# Methods

Daily data for the S&P 500, FTSE 100, DAX, CAC 40, Nikkei 225, Hang Seng, KOSPI and Nifty 50 from January 2021 to August 2026 (about 1,400 trading days per market) were analysed. Cumulative abnormal returns around each event were estimated with constant-mean and world market models. Generalised autoregressive conditional heteroskedasticity (GARCH(1,1)) models with event dummies and the daily Caldara–Iacoviello geopolitical risk (GPR) index in the variance equation measured volatility responses and persistence. Five indicators were combined into a composite stability ranking.

# Results

The trade shock produced a mean absolute five-day cumulative abnormal return of 10.0%, against 3.3% for the four armed-conflict events. European markets fell significantly after the Russian invasion (− 4.0% to − 4.1% on day 0), whereas the S&P 500 rose. The 2026 Iran war produced the largest single-market reaction in the sample, a five-day abnormal return of − 18.8% for the KOSPI. Event and GPR terms significantly improved the variance equation in seven of eight markets, and the half-life of volatility shocks ranged from 3.5 trading days for the FTSE 100 to 41.5 days for the KOSPI. The FTSE 100, Nifty 50 and S&P 500 were the most stable markets, and the KOSPI and DAX the least stable.

# Conclusions

Geopolitical tension affected equity markets through both abnormal returns and volatility, but the size of the effect depended on the transmission channel: trade and energy-supply shocks were far more disruptive than distant armed conflict. Short-run sensitivity did not coincide with medium-run stability.

## Introduction

Geopolitical risk has re-emerged as a first-order determinant of asset prices. Caldara and Iacoviello define geopolitical risk as the threat, realisation and escalation of adverse events associated with wars, terrorism and tensions between states, and show that higher geopolitical risk foreshadows lower investment, lower employment and larger downside risks [1]. Between 2022 and 2026, financial markets faced an unusually dense sequence of such events. Russia invaded Ukraine on 24 February 2022. Hamas attacked Israel on 7 October 2023. The US announced broad reciprocal tariffs on 2 April 2025, followed by Chinese retaliation. Israel struck Iran on 13 June 2025, and on 28 February 2026 joint US–Israeli strikes on Iran began a war that led to the closure of the Strait of Hormuz.

These events differ in nature and in their economic channels. Three are armed conflicts with a direct energy-supply dimension, one is a regional war with limited direct exposure for most economies, and one is a geoeconomic confrontation transmitted through trade and supply chains. They also differ in their distance from the world's main equity markets. This variety offers a natural setting to compare how European, Western and Asian markets respond to different types of geopolitical tension within one recent and comparable period.

The efficient market hypothesis holds that prices adjust rapidly to new public information [2, 3], and early work established that major world events move stock prices measurably [4]. Recent studies show that the Russia–Ukraine war produced negative and heterogeneous abnormal returns across countries [5–7], that the Israel–Hamas conflict had a weaker and more localised effect [8], that the 2025 tariff announcements caused one of the sharpest global sell-offs since 2020 [9], and that the 2026 Iran war triggered a large oil-price shock [10]. Most of this evidence examines one event at a time, uses different samples and windows, and focuses on mean returns. Few studies ask whether a market that appears resilient to one shock is also resilient to others, or how long the volatility created by each shock persists.

This study addresses these gaps. Its objective is to compare the return and volatility reactions of eight benchmark equity indices across Europe, the US and Asia to five major geopolitical events between 2022 and 2026, and to the daily geopolitical risk index over the whole period. It addresses four research questions:

1. How did major European, US and Asian equity markets react to each geopolitical event in abnormal returns?
2. Do reactions differ by region and by type of shock, particularly between armed conflict and trade conflict?
3. How strongly and for how long did geopolitical events and geopolitical risk raise market volatility?
4. Which markets were more stable, and which reacted more strongly, when short-run reactions and medium-run volatility behaviour are considered together?

The study contributes a consistent multi-event comparison across three regions that includes the 2026 Iran war, a joint application of event study and GARCH methods to the same sample, and a composite stability ranking that separates immediate sensitivity from medium-run resilience.

## Literature Review

# Classical foundations

The study of geopolitical events and stock prices rests on the theory of informationally efficient markets. Fama, Fisher, Jensen and Roll introduced the event study to show how prices adjust to new information [3], and Fama formalised the efficient market hypothesis [2]. Niederhoffer was among the first to show that world events, including wars and political crises, produce large price changes concentrated in the days immediately after the news [4]. MacKinlay [11] and Brown and Warner [12] standardised the event study method with daily returns, and Dimson showed how lagged market returns correct beta estimates when markets trade non-synchronously [13], a problem that is central when Asian, European and US markets are compared.

The volatility side of the problem draws on the autoregressive conditional heteroskedasticity framework of Engle [14] and its generalisation by Bollerslev [15], which capture the clustering of large price changes after shocks and allow external variables to enter the variance equation. Granger's concept of predictive causality [16] later provided a standard framework for studying how shocks are transmitted between markets. Behavioural finance explains why prices may move more than fundamentals justify: Shiller showed that stock prices are more volatile than subsequent dividends warrant [17], De Bondt and Thaler documented overreaction followed by reversal [18], and prospect theory explains why investors weight potential losses more heavily than equivalent gains [19].

A further strand links uncertainty to economic activity and asset prices. Bloom showed that uncertainty shocks depress investment and hiring [20], Baker, Bloom and Davis built a news-based index of economic policy uncertainty [21], and Pástor and Veronesi showed that political uncertainty commands a risk premium and raises stock market volatility and correlation [22]. Caldara and Iacoviello extended this approach to geopolitical risk and separated geopolitical threats from geopolitical acts [1].

## Wars, conflict and equity markets before 2022

Evidence on war and stock prices before 2022 is mixed. Rigobon and Sack found that rising war risk before the 2003 Iraq invasion lowered US equity prices and raised oil prices [23]. Schneider and Troeger found that the Iraqi invasion of Kuwait hurt major markets, while the start of Operation Desert Storm was received positively [24]. Brune, Hens, Rieger and Wang described a "war puzzle" in which the outbreak of war can lift prices once uncertainty about whether it will happen is resolved [25]. Arin, Ciferri and Spagnolo showed that terrorist attacks affect both returns and volatility, with stronger effects in emerging markets [26]. On transmission, Hamao, Masulis and Ng showed that price and volatility shocks spill over from New York to Tokyo and London [27]. Later work emphasised that apparent contagion often reflects ordinary interdependence [28], that volatility spills across markets in measurable directions [29], and that

domestic fundamentals shape how severely each market is hit [30]. Kilian showed that oil supply shocks have effects distinct from demand-driven shocks [31], and Baur and Lucey showed that gold acts as a safe haven in equity market stress [32].

## Recent evidence, 2022–2026

The Russia–Ukraine war generated the largest recent literature. Boungou and Yatié examined 94 countries and found a negative relationship between the war and stock returns, strongest in the first two weeks and in countries bordering the conflict [5]. Boubaker, Goodell, Pandey and Kumari reported negative cumulative abnormal returns for global indices with heterogeneous effects linked to economic globalisation [6]. Yousaf, Patel and Yarovaya found significant negative reactions on and after the event day, with European and Asian regions most affected [7]. Kumari, Kumar and Pandey confirmed the vulnerability of European Union markets [33], and Umar, Polat, Choi and Teplova showed that the conflict raised connectedness between financial markets [34]. Using uncertainty indices, Boungou and Yatié later found that war-induced uncertainty lowered stock returns and raised commodity prices, with smaller shocks as the war persisted [35]. Caldara and colleagues estimated that the 2022 rise in geopolitical risk would reduce global output by about 1.7% and add about 1.3 percentage points to global inflation [36].

Evidence on the Israel–Hamas war points to smaller and more localised effects. Pandey, Kumari, Palma and Goodell studied 71 indices and found an overall negative cumulative effect, with Europe, the Middle East and Africa most vulnerable [8]. Goyal and Soni found heterogeneous responses across 47 markets, with several markets resilient [37], and Ijaz, Ali, Du and Khurram found largely insignificant abnormal returns in most global asset classes apart from oil [38].

The 2025 tariff shock and the 2026 Iran war form the most recent strands. Espinosa-Méndez and Arias estimated abnormal returns around the 2 April 2025 announcement across regions and levels of trade exposure [39]. Pinter, Smets and Üslü showed that markets fell sharply and then largely recovered, and that the shock resembled the 2019 tariff escalation in nature but was exceptional in size [9]. Early evidence on the 2026 war shows a rise of roughly 57% in oil prices between early March and early April 2026 [10]. Systematic reviews of the conflict and markets literature note that most studies examine single events with differing designs, which limits comparison across shocks and regions [40].

## Research gap and hypotheses

Three gaps follow from this review. First, recent studies rarely compare armed-conflict and trade-conflict shocks within the same sample and design. Second, most event studies measure mean returns only, and few combine them with conditional volatility models that capture how long the effect of each shock persists. Third, no comparison yet covers the 2026 Iran war alongside the earlier shocks across European, US and Asian markets. Five hypotheses are tested:

- **H1**: Major geopolitical events are associated with negative abnormal returns in European, US and Asian markets.
- **H2**: European markets react more strongly than US and Asian markets to armed conflict in Europe's neighbourhood.
- **H3**: Trade-based geopolitical shocks produce larger and more synchronised reactions across regions than armed-conflict shocks.
- **H4**: Geopolitical events and higher geopolitical risk raise conditional volatility.
- **H5**: Markets that react most strongly in the short run are not necessarily the least stable over the medium run.

## Materials and Methods

# Research design

The study adopts a quantitative, comparative design that combines two complementary techniques on the same sample. A multi-event study measures abnormal returns around five identifiable geopolitical events [3, 11, 12]. GARCH models measure volatility persistence and the volatility response to events and to daily geopolitical risk [14, 15]. The study uses only publicly available secondary data and involves no human participants.

## Sample of markets

Eight benchmark indices represent the largest and most liquid equity markets in the three regions (Table 1). The US is represented by the S&P 500 and Europe by its three largest national markets. Asia is represented by Japan, Hong Kong, South Korea and India, which together cover developed and emerging Asian markets. Mainland China's Shanghai Composite was not included because capital controls, limited foreign ownership and state-fund intervention during sell-offs make it less comparable with open markets. Chinese exposure is captured through the Hang Seng Index, which is dominated by mainland Chinese companies and is the main venue for international investment in them.

Table 1
Sample of equity market indices

| Region | Market | Index | Classification | Trading days (returns) |
|---|---|---|---|---|
| United States | United States | S&P 500 | Developed | 1,420 |
| Europe | United Kingdom | FTSE 100 | Developed | 1,427 |
| Europe | Germany | DAX (price index) | Developed | 1,442 |
| Europe | France | CAC 40 | Developed | 1,449 |
| Asia | Japan | Nikkei 225 | Developed | 1,389 |
| Asia | Hong Kong SAR | Hang Seng Index | Developed | 1,390 |
| Asia | South Korea | KOSPI | Emerging | 1,386 |
| Asia | India | Nifty 50 | Emerging | 1,397 |

## Selection of events

Events were selected from January 2022 to August 2026 using three criteria: (i) a clear and publicly observable start date; (ii) a sharp rise in measured geopolitical risk in the Caldara–Iacoviello index [1]; and (iii) relevance to global markets beyond the countries directly involved. Five events met all criteria (Table 2). Day 0 is each market's first trading session on or after the event date, so that holiday closures are respected. The 2025 tariffs were announced after the US close on 2 April, so day 0 is 3 April 2025 for every market. The 2026 war began on Saturday 28 February, and the Strait of Hormuz remained closed into August [41, 42], so day 0 is 2 March 2026, except for South Korea, which was closed for a public holiday and first traded on 3 March.

Table 2
Geopolitical events

| Code | Event | Event date | Type of shock | Day 0 |
|---|---|---|---|---|
| E1 | Russian invasion of Ukraine | 24 February 2022 | Armed conflict, Europe | 24 February 2022 |
| E2 | Hamas attack on Israel and outbreak of war | 7 October 2023 | Armed conflict, Middle East | 9 October 2023 (10 October in Japan and South Korea) |
| E3 | US reciprocal ("Liberation Day") tariffs and Chinese retaliation | 2 April 2025, after US close | Trade and geoeconomic conflict | 3 April 2025 |
| E4 | Israeli strikes on Iran | 13 June 2025 | Armed conflict, Middle East | 13 June 2025 |
| E5 | US–Israeli war on Iran and closure of the Strait of Hormuz | 28 February 2026 | Armed conflict with energy-supply disruption | 2 March 2026 (3 March in South Korea) |

# Data

Daily closing prices from 4 January 2021 to 31 August 2026 were obtained from Investing.com [43] for the eight indices and for the iShares MSCI ACWI exchange-traded fund, used as the world market benchmark. The daily Geopolitical Risk index (GPRD) and its acts and threats sub-indices were taken from Caldara and Iacoviello [44]. All index series are price indices in local currency. Weekend-dated and stale holiday rows were removed, and each market was analysed on its own trading calendar. Daily returns are continuously compounded, as defined in Eq. (1), where $P_{i,t}$ is the closing price of market i on day t. Because the GPR index is published for every calendar day, the value assigned to each trading day is the mean of the index over the calendar days since the previous trading day.

$$r_{i,t} = 100 \times \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

1

The properties of the return series were checked with the Jarque–Bera normality test [45], the augmented Dickey–Fuller unit root test [46] and the Ljung–Box test on squared returns for volatility clustering [47].

# Event study

Abnormal returns were estimated with two benchmark models over an estimation window of 250 trading days, from day − 260 to day − 11 relative to day 0. The primary model is the constant-mean-return model. The mean return of market i in the estimation window is

$$\bar{r}_i = \frac{1}{250}\sum_{t=-260}^{-11} r_{i,t}$$

2

and the abnormal return of market i on day t is

$$\mathrm{AR}_{i,t} = r_{i,t} - \bar{r}_i$$

3

This model measures the total reaction of each market, which is the quantity of interest when a shock is global. As a robustness check, a world market model with a Dimson [13] lag adjustment was estimated by ordinary least squares over the same window:

$$r_{i,t} = a_i + b_{0,i}W_t + b_{1,i}W_{t-1} + e_{i,t}$$

4

where W is the return of the ACWI fund. The lagged term corrects for non-synchronous trading between Asian, European and US sessions. Abnormal returns from this model, which measure each market's reaction over and above the world market's reaction, are

$$\mathrm{AR}_{i,t}^{\mathrm{MM}} = r_{i,t} - \left(\hat{a}_i + \hat{b}_{0,i}W_t + \hat{b}_{1,i}W_{t-1}\right)$$

5

Abnormal returns were cumulated over the windows [0,0], [0,+1] and [0,+4], with [− 5,−1] used to check for anticipation:

$$\mathrm{CAR}_i\left[\tau_1, \tau_2\right] = \sum_{t=\tau_1}^{\tau_2} \mathrm{AR}_{i,t}$$

6

The null hypothesis of a zero cumulative abnormal return was tested with the statistic

$$t_i = \frac{\mathrm{CAR}_i\left[\tau_1, \tau_2\right]}{\hat{\sigma}_i\sqrt{L}}$$

7

where $\hat{\sigma}_i$ is the standard deviation of abnormal returns in the estimation window and L is the number of days in the event window [11].

# Volatility model

For each market, a GARCH(1,1) model was estimated with event and geopolitical risk terms in the variance equation:

$$r_t = \mu + \epsilon_t, \quad \epsilon_t = \sqrt{h_t}z_t, \quad z_t \sim \mathrm{i.i.d.}(0,1)$$

8

where z□ is an independent and identically distributed innovation with zero mean and unit variance, and the conditional variance h□ follows

$$h_t = \omega + \alpha\, \epsilon_{t-1}^2 + \beta\, h_{t-1} + \delta_A D_t^A + \delta_T D_t^T + \gamma\, \mathrm{GPR}_{t-1}^*$$

9

where D□□ equals one on days 0 to + 10 of the four armed-conflict events, D□□ equals one on days 0 to + 10 of the trade event, and GPR*□₋₁ is the standardised logarithm of the GPR index, lagged one session. Parameters were estimated by Gaussian quasi-maximum likelihood with Bollerslev–Wooldridge robust standard errors [48]. The joint contribution of the three additional terms was tested against a baseline GARCH(1,1) with the likelihood-ratio statistic

$$\mathrm{LR} = 2\,(l_{\mathrm{ext}} - l_{\mathrm{base}}) \sim \chi^2\,(3)$$

10

where ℓ denotes the maximised log-likelihood. Volatility persistence is α + β, and the half-life of a volatility shock, in trading days, is

$$\mathrm{HL} = \frac{\ln(0.5)}{\ln(\alpha + \beta)}$$

11

From the baseline model, a volatility ratio was computed for market i and event j as the mean conditional standard deviation on days 0 to + 5 divided by its mean on days − 30 to − 10:

$$\mathrm{VR}_{i,j} = \frac{\frac{1}{6}\sum_{t=0}^{5} \widehat{\sigma}_{i,t}}{\frac{1}{21}\sum_{t=-30}^{-10} \widehat{\sigma}_{i,t}}$$

12

where $\hat{\sigma}_{i,□} = \sqrt{h_{i,□}}$ is the conditional standard deviation.

# Composite stability ranking

Five indicators were ranked from 1 (most stable) to 8 (least stable): the mean absolute CAR[0,+4] across the five events, the mean volatility ratio, the GARCH half-life, the maximum drawdown over the sample, and the GARCH coefficient on geopolitical risk (γ). The composite score of market i is the equally weighted mean of its five ranks:

$$S_i = \frac{1}{5}\sum_{k=1}^{5} \mathrm{Rank}_{i,k}$$

13

where $\mathrm{Rank}_{i,□}$ is the rank of market i on indicator k. All estimation was programmed in Python 3 using NumPy, SciPy and pandas.

## Results

# Descriptive statistics

Table 3 summarises the daily return series. Annualised volatility ranged from 12.6% for the FTSE 100 to 27.9% for the KOSPI, with the Nifty 50 (14.2%) the least volatile Asian market. All series were negatively skewed and fat-tailed, with excess kurtosis between 3.9 and 13.9, and normality was rejected for every market. Augmented Dickey–Fuller statistics did not reject a unit root in log price levels (all above the 5% critical value of − 2.86) but strongly rejected it for returns. Ljung–Box tests on squared returns confirmed strong volatility clustering in every market, which supports the use of GARCH models.

Table 3
Descriptive statistics of daily log returns, January 2021 to August 2026

| Index | N | Mean (%) | SD (%) | Annual vol. (%) | Min (%) | Max (%) | Skewness | Excess kurtosis | JB p | ADF, log level | ADF, return | LB²(10) p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S&P 500 | 1420 | 0.051 | 1.044 | 16.6 | −6.16 | 9.09 | −0.01 | 6.30 | < 0.001 | −0.12 | −9.79*** | < 0.001 |
| FTSE 100 | 1427 | 0.035 | 0.795 | 12.6 | −5.08 | 3.84 | −0.65 | 4.73 | < 0.001 | −0.27 | −9.66*** | < 0.001 |
| DAX | 1442 | 0.033 | 1.050 | 16.7 | −5.08 | 7.62 | −0.08 | 3.97 | < 0.001 | −0.52 | −9.22*** | < 0.001 |
| CAC 40 | 1449 | 0.028 | 1.007 | 16.0 | −5.09 | 6.88 | −0.23 | 4.04 | < 0.001 | −2.21 | −9.36*** | < 0.001 |
| Nikkei 225 | 1389 | 0.064 | 1.428 | 22.7 | −13.23 | 9.74 | −0.41 | 9.08 | < 0.001 | 0.42 | −9.46*** | < 0.001 |
| Hang Seng | 1390 | −0.005 | 1.558 | 24.7 | −14.18 | 8.69 | −0.33 | 7.43 | < 0.001 | −1.78 | −10.86*** | < 0.001 |
| KOSPI | 1386 | 0.061 | 1.758 | 27.9 | −12.85 | 16.48 | −0.30 | 13.94 | < 0.001 | 0.48 | −8.18*** | < 0.001 |
| Nifty 50 | 1397 | 0.039 | 0.892 | 14.2 | −6.11 | 4.63 | −0.38 | 3.92 | < 0.001 | −1.53 | −12.60*** | < 0.001 |

JB: Jarque–Bera; ADF: augmented Dickey–Fuller t-statistic with five lags; LB²(10): Ljung–Box test on squared returns with 10 lags. *** p < 0.01.

## Event study: immediate reactions

Table 4 reports day-0 abnormal returns. The Russian invasion (E1) produced significant losses of 4.0% to 4.1% in all three European markets and significant losses in every Asian market except Japan, led by the Nifty 50 (− 5.0%). The S&P 500 rose by 1.4%. The Israel–Hamas war (E2) produced no significant negative reaction anywhere; the Nikkei 225's 2.3% gain reflects catch-up after a national holiday. On day 0 of the tariff shock (E3), the S&P 500 recorded the largest loss (− 5.0%, t = − 5.76), followed by the CAC 40 and DAX. The June 2025 strikes on Iran (E4) produced no significant reaction. The 2026 Iran war (E5) produced the largest day-0 loss in the sample, − 7.8% for the KOSPI (t = − 5.21), together with significant losses in Germany and France.

Table 4
Day-0 abnormal returns, constant-mean-return model (%)

| Index | E1 Ukraine | E2 Israel–Hamas | E3 Tariffs | E4 Israel–Iran | E5 Iran war |
|---|---|---|---|---|---|
| S&P 500 | 1.43* (1.67) | 0.57 (0.52) | −5.00*** (− 5.76) | −1.18 (− 0.95) | 0.00 (0.00) |
| FTSE 100 | −4.01*** (− 5.03) | −0.07 (− 0.09) | −1.60*** (− 2.66) | −0.41 (− 0.50) | −1.27* (− 1.68) |
| DAX | −4.07*** (− 4.27) | −0.75 (− 0.81) | −3.14*** (− 3.46) | −1.17 (− 1.04) | −2.61** (− 2.36) |
| CAC 40 | −3.99*** (− 4.24) | −0.64 (− 0.66) | −3.36*** (− 3.89) | −1.03 (− 0.96) | −2.21** (− 2.28) |
| Nikkei 225 | −1.82 (− 1.50) | 2.34** (2.30) | −2.79* (− 1.68) | −0.89 (− 0.47) | −1.51 (− 0.98) |
| Hang Seng | −3.19** (− 2.50) | 0.21 (0.12) | −1.69 (− 1.05) | −0.68 (− 0.37) | −2.27 (− 1.47) |
| KOSPI | −2.59*** (− 2.72) | −0.29 (− 0.30) | −0.77 (− 0.61) | −0.86 (− 0.64) | −7.82*** (− 5.21) |
| Nifty 50 | −4.96*** (− 5.25) | −0.77 (− 1.15) | −0.36 (− 0.41) | −0.72 (− 0.73) | −1.28* (− 1.75) |
| *US* | *1.43* | *0.57* | *−5.00* | *−1.18* | *0.00* |
| *Europe (mean)* | *−4.03* | *−0.49* | *−2.70* | *−0.87* | *−2.03* |
| *Asia (mean)* | *−3.14* | *0.37* | *−1.40* | *−0.78* | *−3.22* |

t-statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

There was evidence of anticipation before E1: the pre-event CAR[− 5,−1] was − 5.9% for the S&P 500 (t = − 3.10) and − 5.1% for the DAX (t = − 2.40), as markets priced the military build-up. No other event showed significant pre-event movement at the 5% level.

# Event study: five-day reactions

Table 5 and Fig. 1 report the five-day cumulative abnormal returns, CAR[0,+4]. The tariff shock was the only event with significant losses in all eight markets, ranging from − 4.0% for the S&P 500 to − 13.6% for the CAC 40. The smaller US figure reflects the 9.5% relief rally on 9 April 2025, when part of the tariffs was paused, which falls inside the window. Mean losses over this window were 12.9% in Europe and 9.3% in Asia. The 2026 Iran war produced the largest single five-day loss in the sample, − 18.8% for the KOSPI (t = − 5.61), significant losses of 6.3% to 7.1% in the three European markets and of 4.8% in India, and no significant reaction in the US or Hong Kong. After the Russian invasion, five-day losses remained significant for the DAX and CAC 40 at the 5% level, while the FTSE 100 recovered. Averaged across markets, the absolute five-day reaction was 10.0% for the trade shock and 3.3% for the four armed-conflict events.

Table 5
Five-day cumulative abnormal returns CAR[0,+4], constant-mean-return model (%)

| Index | E1 Ukraine | E2 Israel–Hamas | E3 Tariffs | E4 Israel–Iran | E5 Iran war |
|---|---|---|---|---|---|
| S&P 500 | 3.45* (1.81) | 0.13 (0.05) | −4.03** (− 2.08) | −1.52 (− 0.55) | −2.26 (− 0.86) |
| FTSE 100 | −1.22 (− 0.68) | 1.21 (0.72) | −11.61*** (− 8.63) | −1.16 (− 0.64) | −6.26*** (− 3.70) |
| DAX | −4.58** (− 2.15) | −0.70 (− 0.34) | −13.39*** (− 6.60) | −3.50 (− 1.39) | −7.05*** (− 2.84) |
| CAC 40 | −4.68** (− 2.23) | −1.24 (− 0.57) | −13.55*** (− 7.02) | −2.71 (− 1.12) | −7.14*** (− 3.29) |
| Nikkei 225 | −0.18 (− 0.07) | 1.82 (0.80) | −11.82*** (− 3.19) | 0.85 (0.20) | −6.41* (− 1.86) |
| Hang Seng | −5.39* (− 1.89) | 1.99 (0.51) | −12.30*** (− 3.42) | −3.78 (− 0.92) | −3.84 (− 1.12) |
| KOSPI | 1.25 (0.59) | 0.98 (0.46) | −8.84*** (− 3.16) | 2.03 (0.67) | −18.82*** (− 5.61) |
| Nifty 50 | −3.68* (− 1.74) | 0.27 (0.18) | −4.13** (− 2.07) | −0.54 (− 0.25) | −4.83*** (− 2.95) |
| *US* | *3.45* | *0.13* | *−4.03* | *−1.52* | *−2.26* |
| *Europe (mean)* | *−3.49* | *−0.24* | *−12.85* | *−2.46* | *−6.82* |
| *Asia (mean)* | *−2.00* | *1.26* | *−9.27* | *−0.36* | *−8.48* |

t-statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Author's estimates from daily closing prices (Investing.com) · CAR[0,+4] for eight indices and five events

The world market model gave a consistent picture of relative sensitivity. Relative to the world benchmark, European markets underperformed significantly after E1 (DAX − 5.2%, CAC 40 − 5.4%), E3 (− 8.9% to − 9.9%) and E5 (− 3.9% to − 4.5%), and the KOSPI underperformed by 15.7% after E5 (t = − 5.34). The Hang Seng underperformed by 11.9% after E3. The S&P 500 outperformed the world benchmark after E1 (+ 1.9%), E4 (+ 1.3%) and E5 (+ 2.1%), all significant at the 5% level. The Nikkei 225 and KOSPI fell broadly in line with the world market during E3, so their large constant-mean losses for that event reflect the global sell-off rather than local exposure.

# Volatility responses

Table 6 reports the GARCH estimates. All ARCH and GARCH coefficients were significant. Volatility persistence ranged from 0.819 for the FTSE 100 to 0.983 for the KOSPI, so the half-life of a volatility shock ranged from 3.5 trading days in London to 41.5 days in Seoul. European markets and Japan absorbed volatility shocks within one to two weeks, while the S&P 500 (17.8 days), Hang Seng (23.3), Nifty 50 (27.3) and KOSPI (41.5) showed much slower decay. Adding the event and GPR terms significantly improved the variance equation in seven of eight markets (likelihood-ratio statistics from 13.5 to 58.5, p < 0.01); the exception was the Nifty 50. The trade-event coefficient was positive in every market and largest for the Hang Seng and Nikkei 225, but individually imprecise under robust standard errors because the event window is short. The lagged GPR term was positive and significant for the KOSPI (p < 0.05) and Nikkei 225 (p < 0.10).

Table 6
GARCH(1,1) estimates with event and geopolitical risk terms

| Index | α | β | α + β | Half-life (days) | δ armed conflict | δ trade conflict | γ GPR | LR $\chi^2(3)$ | $LB^2(10)$ p |
|---|---|---|---|---|---|---|---|---|---|
| S&P 500 | 0.102*** | 0.859*** | 0.962 | 17.8 | −0.007 (−0.19) | 2.603 (1.43) | 0.009 (1.00) | 19.34*** | 0.29 |
| FTSE 100 | 0.169*** | 0.651*** | 0.819 | 3.5 | 0.609 (1.20) | 1.718 (1.34) | −0.020 (−1.55) | 41.59*** | 0.72 |
| DAX | 0.169*** | 0.741*** | 0.910 | 7.3 | 0.513 (1.25) | 2.019 (1.57) | 0.017 (0.93) | 16.31*** | 0.92 |
| CAC 40 | 0.153*** | 0.737*** | 0.890 | 6.0 | 0.464 (0.99) | 1.864 (1.36) | 0.009 (0.39) | 15.33*** | 0.79 |
| Nikkei 225 | 0.181*** | 0.678*** | 0.859 | 4.5 | 0.265 (0.86) | 3.994 (1.38) | 0.056* (1.73) | 15.90*** | 0.42 |
| Hang Seng | 0.072*** | 0.899*** | 0.971 | 23.3 | 0.078 (0.52) | 5.465 (1.04) | 0.010 (0.44) | 58.51*** | 1.00 |
| KOSPI | 0.157*** | 0.827*** | 0.983 | 41.5 | 0.047 (0.37) | 0.697 (0.75) | 0.036** (1.98) | 13.54*** | 0.11 |
| Nifty 50 | 0.105** | 0.870*** | 0.975 | 27.3 | 0.005 (0.19) | 0.343 (0.95) | 0.004 (0.57) | 5.60 | 0.03 |

α, β, persistence and half-life from the baseline GARCH(1,1); δ and γ from the extended model, with Bollerslev–Wooldridge robust t-statistics in parentheses. LR: likelihood-ratio test of the three additional terms. $LB^2(10)$: Ljung–Box p-value for squared standardised residuals. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7 shows how much conditional volatility rose after each event relative to its pre-event level. The tariff shock raised volatility in every market, by 1.5 to 2.6 times, with the largest increase in the FTSE 100. The Russian invasion raised volatility by 1.6 to 1.8 times in Europe and India but left it almost unchanged in Japan and South Korea. The 2026 Iran war produced the largest single increase in the sample, 2.8 times for the KOSPI, whose annualised conditional volatility peaked at 105% in the event window, against peaks of 58% for the S&P 500 and 77% for the Nikkei 225 during the tariff shock. The June 2025 strikes coincided with falling volatility in most markets.

Table 7
Volatility ratio: mean conditional volatility on days 0 to + 5 relative to days − 30 to − 10

| Index | E1 | E2 | E3 | E4 | E5 | Mean |
|---|---|---|---|---|---|---|
| S&P 500 | 1.24 | 1.03 | 2.14 | 0.62 | 1.00 | 1.21 |
| FTSE 100 | 1.83 | 1.09 | 2.61 | 0.92 | 1.61 | 1.61 |
| DAX | 1.63 | 1.27 | 1.59 | 0.94 | 1.65 | 1.42 |
| CAC 40 | 1.59 | 1.15 | 2.25 | 0.87 | 1.65 | 1.50 |
| Nikkei 225 | 0.98 | 1.27 | 2.35 | 0.98 | 1.19 | 1.36 |
| Hang Seng | 1.13 | 1.06 | 1.67 | 0.70 | 1.18 | 1.15 |
| KOSPI | 1.01 | 1.39 | 1.68 | 1.14 | 2.78 | 1.60 |
| Nifty 50 | 1.76 | 1.17 | 1.51 | 0.68 | 1.30 | 1.28 |

# Medium-run performance and composite stability

Table 8 reports calendar-year returns and maximum drawdowns. Only the FTSE 100 and Nifty 50 avoided a loss in 2022. The Hang Seng suffered the deepest drawdown (− 52.8%) and two consecutive negative years, while the KOSPI combined a 24.9% loss in 2022 with gains of 75.6% in 2025 and 61.8% in 2026 to date.

Table 8
Calendar-year price returns and maximum drawdown (%)

| Index | 2022 | 2023 | 2024 | 2025 | 2026 (to 31 August) | Maximum drawdown |
|---|---|---|---|---|---|---|
| S&P 500 | −19.4 | 24.2 | 23.3 | 16.4 | 12.3 | −25.4 |
| FTSE 100 | 0.9 | 3.8 | 5.7 | 21.5 | 9.0 | −13.4 |
| DAX | −15.2 | 16.5 | 15.4 | 20.0 | 4.5 | −28.7 |
| CAC 40 | −9.5 | 16.5 | −2.2 | 10.4 | 2.3 | −23.0 |
| Nikkei 225 | −9.4 | 28.2 | 19.2 | 26.2 | 31.7 | −26.3 |
| Hang Seng | −15.5 | −13.8 | 17.7 | 27.8 | −0.2 | −52.8 |
| KOSPI | −24.9 | 18.7 | −9.6 | 75.6 | 61.8 | −38.6 |
| Nifty 50 | 4.3 | 20.0 | 8.8 | 10.5 | −7.8 | −17.2 |

Price index returns from closing values; maximum drawdown over January 2021 to August 2026.

Table 9 combines the five stability indicators. The FTSE 100 ranked as the most stable market overall, followed jointly by the Nifty 50 and S&P 500. The KOSPI ranked last, and the DAX was the least stable European market. The rankings on individual indicators diverged. The S&P 500 had the smallest event reactions but slow volatility decay; the FTSE 100 had the fastest decay, the smallest drawdown and the weakest link between geopolitical risk and volatility, but the largest average volatility jump; and the Hang Seng had the smallest volatility jumps but the deepest drawdown.

Table 9
Composite stability ranking

| Rank | Index | Region | Mean absolute CAR[0,+4] (%) | Mean volatility ratio | GARCH half-life (days) | Maximum drawdown (%) | GARCH GPR coefficient γ | Composite score |
|---|---|---|---|---|---|---|---|---|
| 1 | FTSE 100 | Europe | 4.29 (4) | 1.61 (8) | 3.5 (1) | 13.4 (1) | −0.0197 (1) | 3.0 |
| 2= | Nifty 50 | Asia | 2.69 (2) | 1.28 (3) | 27.3 (7) | 17.2 (2) | 0.0035 (2) | 3.2 |
| 2= | S&P 500 | US | 2.28 (1) | 1.21 (2) | 17.8 (5) | 25.4 (4) | 0.0088 (4) | 3.2 |
| 4= | Nikkei 225 | Asia | 4.22 (3) | 1.36 (4) | 4.5 (2) | 26.3 (5) | 0.0563 (8) | 4.4 |
| 4= | CAC 40 | Europe | 5.86 (7) | 1.50 (6) | 6.0 (3) | 23.0 (3) | 0.0087 (3) | 4.4 |
| 6 | Hang Seng | Asia | 5.46 (5) | 1.15 (1) | 23.3 (6) | 52.8 (8) | 0.0098 (5) | 5.0 |
| 7 | DAX | Europe | 5.85 (6) | 1.42 (5) | 7.3 (4) | 28.7 (6) | 0.0172 (6) | 5.4 |
| 8 | KOSPI | Asia | 6.38 (8) | 1.60 (7) | 41.5 (8) | 38.6 (7) | 0.0358 (7) | 7.4 |

Ranks on each indicator in parentheses (1 = most stable). γ is the coefficient on lagged standardised log GPR in the GARCH variance equation (Table 6). Composite score = mean of the five ranks; = denotes a tie.

# Summary of hypothesis tests

- **H1 (negative abnormal returns): partly supported.** Significant losses followed E1, E3 and E5 in most markets, but not E2 or E4, and the S&P 500 rose after E1.
- **H2 (stronger European reaction to nearby armed conflict): supported.** European day-0 losses after E1 averaged 4.0%, against 3.1% in Asia and a 1.4% gain in the US.
- **H3 (larger and more synchronised trade-shock reactions): supported.** E3 was the only event with significant five-day losses in all eight markets, and its mean absolute reaction was three times that of the armed-conflict events.

- **H4 (geopolitical events and risk raise volatility): largely supported.** Event and GPR terms jointly improved the variance equation in seven of eight markets and volatility rose after the trade shock in every market, but individual event coefficients were imprecise and the GPR term was significant only for the KOSPI and Nikkei 225.
- **H5 (short-run reaction differs from medium-run stability): supported.** Rankings on reaction size, volatility decay and drawdown diverged, most clearly for the S&P 500, FTSE 100 and Hang Seng.

## Discussion

This study compared eight equity markets in Europe, the US and Asia across five geopolitical events between 2022 and 2026, combining event study and GARCH evidence. Three findings stand out. The economic channel of a shock mattered more than its human or political scale. Geopolitical events and geopolitical risk left a clear mark on volatility, whose persistence differed sharply between regions. And a market's immediate sensitivity did not determine its medium-run stability.

## Type of shock and transmission channel

The 2025 tariff escalation was the only event that produced significant losses in all eight markets and large volatility increases everywhere. Geopolitical events affect prices through expected cash flows and discount rates [1, 22]. A broad tariff shock changes the expected revenues, input costs and supply chains of a large share of listed firms at once and raises policy uncertainty in the world's largest economy [21, 22]. The S&P 500 recorded the largest day-0 loss because the shock originated in US policy, and its smaller five-day loss reflects the partial reversal on 9 April, consistent with the sharp fall and rapid recovery documented by Pinter, Smets and Üslü [9] and with classical evidence of overreaction followed by reversal [17, 18].

Among the armed conflicts, the energy-supply channel separated large reactions from small ones. The Russian invasion hit Europe hardest, in line with Europe's dependence on Russian energy and its proximity to the war, and consistent with evidence that European and neighbouring markets were most affected [5, 7, 33]. India, a large net oil importer, recorded the largest day-0 loss among all markets. The 2026 Iran war, which disrupted shipping through the Strait of Hormuz and raised oil prices sharply [10, 41], produced the largest single-market loss in the sample for South Korea and significant losses in Europe, Japan and India, all of which depend heavily on imported energy. By contrast, the Israel–Hamas war and the June 2025 strikes, which did not disrupt supply, produced no significant reactions, consistent with studies reporting small or insignificant effects outside the region [8, 37, 38] and with the distinction between supply-driven and demand-driven oil shocks [31].

The S&P 500 rose after the Russian invasion and outperformed the world benchmark after both Iran events. This pattern is consistent with the US position as an energy exporter, with the safe-haven role of US assets, and with the "war puzzle" in which the outbreak of war resolves uncertainty that markets had already priced [20, 25]. The significant pre-event decline in the S&P 500 and DAX before 24 February 2022 supports this interpretation.

# Volatility responses and persistence

The GARCH results show that geopolitical shocks affected markets through volatility as well as through returns. Event and GPR terms jointly improved the variance equation in seven of eight markets, the trade shock raised conditional volatility everywhere, and the 2026 war nearly tripled volatility in South Korea. This is consistent with the theory that political uncertainty raises volatility and correlations [22] and with evidence that terrorism and conflict affect volatility as well as returns [26]. The individual event coefficients were imprecise, which reflects the short duration of the volatility spikes: in Europe and Japan, volatility shocks lost half their effect within three to eight trading days, so the extra variance was concentrated in a few sessions. The lagged GPR index raised conditional variance significantly only in South Korea and Japan, the two markets most exposed to the trade and Middle East energy shocks of 2025 and 2026, and had a small negative coefficient for the FTSE 100, whose energy and defensive sectors tend to benefit from geopolitical tension.

# Regional patterns

European markets were the most consistently negative across events and absorbed volatility shocks fastest, with half-lives of 3.5 to 7.3 days. Asian markets were the most heterogeneous. Japan reacted strongly to the trade shock but absorbed volatility quickly. Hong Kong suffered the deepest medium-run drawdown, reflecting its exposure to mainland Chinese companies and US–China tensions.

South Korea combined the slowest volatility decay, a significant link between geopolitical risk and volatility, and the largest reaction to the 2026 war, consistent with a market that is concentrated in a few large technology exporters and highly exposed to imported energy. The US showed the smallest abnormal returns and outperformed the world benchmark during the energy-related events, but its volatility shocks persisted longer than those in Europe. This suggests that its relative resilience reflects the direction of the shocks rather than lower sensitivity to market stress, in line with evidence that shocks spread through interdependence between markets [27–30].

## Reaction versus stability

The composite ranking shows that immediate sensitivity and medium-run stability are distinct properties. The FTSE 100 ranked most stable despite the largest average volatility jumps, because those jumps decayed fastest, its drawdown was the smallest and its volatility did not rise with geopolitical risk. This pattern is consistent with an index weighted towards energy, commodity and defensive sectors whose earnings benefit from the same shocks that hurt other markets. The Nifty 50 ranked jointly second despite a large reaction to the Russian invasion and slow volatility decay, because its event reactions were otherwise modest, its drawdown was small and its volatility was unrelated to geopolitical risk. The S&P 500 showed the smallest event reactions but slow volatility decay, partly because its largest drawdown in 2022 was driven by monetary tightening rather than geopolitics. These cases support the view that crisis outcomes depend on domestic fundamentals and market structure as much as on the shock itself [26, 30].

## Theoretical implications

The results support semi-strong market efficiency, in that most price reactions occurred on day 0 or within the five-day window [2, 3, 11]. They also show that markets discriminate between geopolitical shocks according to their economic channel rather than reacting uniformly to geopolitical news. Because the volatility created by these shocks persisted for weeks in some markets but only days in others, event studies that measure mean returns alone understate differences in how markets absorb geopolitical risk, which supports combining them with conditional volatility models [14, 15].

#### Limitations

This study has limitations. First, event windows may contain other news, including the partial tariff pause in April 2025, monetary policy decisions and, in 2022, the global tightening cycle. Second, the analysis covers five events, which limits statistical generalisation, and the event dummies in the variance equation cover short windows, so individual coefficients are imprecise. Third, the world benchmark is an exchange-traded fund traded in US hours, which only partly aligns with Asian and European sessions. Fourth, returns are price returns in local currency and exclude dividends and exchange-rate effects. Fifth, the daily GPR index is constructed from English-language newspapers and may weight events of interest to Western readers more heavily, and its coefficient in the variance equation is expressed in units of each market's own variance. Sixth, the composite ranking applies equal weights to its indicators. Finally, mainland China is excluded, the 2026 return covers only eight months, and the Iran conflict was still ongoing at the end of the sample.

## Conclusions

Geopolitical tensions between 2022 and 2026 affected European, US and Asian equity markets in ways that depended on the channel through which each shock was transmitted. The 2025 trade escalation produced the most synchronised losses, with significant five-day abnormal returns in all eight markets and a mean absolute reaction three times that of the armed conflicts. Among armed conflicts, only those that threatened energy supply, the Russian invasion of Ukraine and the 2026 Iran war, produced significant losses; Europe was most exposed to the former and South Korea to the latter, while the US was largely insulated. Event and geopolitical risk terms significantly raised conditional volatility in most markets, but volatility shocks decayed within days in Europe and Japan and persisted for weeks in Hong Kong, India and South Korea. Combining short-run reactions with medium-run behaviour, the FTSE 100, Nifty 50 and S&P 500 were the most stable markets, and the KOSPI and DAX the least stable. Short-run sensitivity to geopolitical events and medium-run market stability are therefore distinct dimensions of market resilience.

## Declarations

# Disclosures

**Human subjects**: Not applicable. This study used publicly available market data only.

**Animal subjects**

Not applicable.

**Conflicts of interest:**

The author declares no conflicts of interest.

**Financial relationships**

The author declares no financial relationships with any organisation that may have an interest in the submitted work.

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# Author Contribution

Uzair Bhatti: conceptualisation, methodology, software, formal analysis, writing (original draft), supervision and project administration. Sadaat Umar: data curation, investigation (literature review), validation, visualisation, and writing (review and editing). Both authors read and approved the final manuscript

# Data availability:

Index and exchange-traded fund prices are available from Investing.com, and the daily Geopolitical Risk index is available from the authors' website. The merged dataset and estimation code are available from the corresponding author on reasonable request.

## Additional Information

## References

1. Caldara D, Iacoviello M (2022) Measuring geopolitical risk. Am Econ Rev 112:1194–1225. 10.1257/aer.20191823
2. Fama EF (1970) Efficient capital markets: a review of theory and empirical work. J Finance 25:383–417. 10.2307/2325486
3. Fama EF, Fisher L, Jensen MC, Roll R (1969) The adjustment of stock prices to new information. Int Econ Rev 10:1–21. 10.2307/2525569
4. Niederhoffer V (1971) The analysis of world events and stock prices. J Bus 44:193–219. 10.1086/295352
5. Boungou W, Yatié A (2022) The impact of the Ukraine–Russia war on world stock market returns. Econ Lett 215:110516. 10.1016/j.econlet.2022.110516
6. Boubaker S, Goodell JW, Pandey DK, Kumari V (2022) Heterogeneous impacts of wars on global equity markets: evidence from the invasion of Ukraine. Finance Res Lett 48:102934. 10.1016/j.frl.2022.102934
7. Yousaf I, Patel R, Yarovaya L (2022) The reaction of G20 + stock markets to the Russia–Ukraine conflict black-swan event: evidence from event study approach. J Behav Exp Finance 35:100723. 10.1016/j.jbef.2022.100723
8. Pandey DK, Kumari V, Palma A, Goodell JW (2024) Are markets in happier countries less affected by tragic events? Evidence from market reaction to the Israel–Hamas conflict. Finance Res Lett 60:104893. 10.1016/j.frl.2023.104893
9. Pinter G, Smets F, Üslü S (2025) Market whiplash after the 2025 tariff shock: an event-targeted VAR approach. BIS Working Papers No. 1282. Bank for International Settlements, Basel; https://www.bis.org/publ/work1282.pdf
10. Kachalia MA, Audi M, Ali A (2026) Geopolitical conflict and financial market reactions: evidence from the 2026 US–Israel–Iran crisis. MPRA Paper No. 129143. University Library of Munich, Munich. https://ideas.repec.org/p/pra/mprapa/129143.html
11. MacKinlay AC (1997) Event studies in economics and finance. J Econ Lit 35:13–39
12. Brown SJ, Warner JB (1985) Using daily stock returns: the case of event studies. J Financ Econ 14:3–31. 10.1016/0304-405X(85)90042-X

13. Dimson E (1979) Risk measurement when shares are subject to infrequent trading. J Financ Econ 7:197–226. 10.1016/0304-405X(79)90013-8
14. Engle RF (1982) Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica 50:987–1007. 10.2307/1912773
15. Bollerslev T (1986) Generalized autoregressive conditional heteroskedasticity. J Econom 31:307–327 10.1016/0304–4076(86)90063-1
16. Granger CWJ (1969) Investigating causal relations by econometric models and cross-spectral methods. Econometrica 37:424–438. 10.2307/1912791
17. Shiller RJ (1981) Do stock prices move too much to be justified by subsequent changes in dividends? Am Econ Rev 71:421–436
18. De Bondt WFM, Thaler R (1985) Does the stock market overreact? J Finance 40:793–805. 10.1111/j.1540-6261.1985.tb05004.x
19. Kahneman D, Tversky A (1979) Prospect theory: an analysis of decision under risk. Econometrica 47:263–291. 10.2307/1914185
20. Bloom N (2009) The impact of uncertainty shocks. Econometrica 77:623–685 10.3982/ECTA6248
21. Baker SR, Bloom N, Davis SJ (2016) Measuring economic policy uncertainty. Q J Econ 131:1593–1636. 10.1093/qje/qjw024
22. Pástor Ľ, Veronesi P (2013) Political uncertainty and risk premia. J Financ Econ 110:520–545. 10.1016/j.jfineco.2013.08.007
23. Rigobon R, Sack B (2005) The effects of war risk on US financial markets. J Bank Finance 29:1769–1789. 10.1016/j.jbankfin.2004.06.040
24. Schneider G, Troeger VE (2006) War and the world economy: stock market reactions to international conflicts. J Confl Resolut 50:623–645. 10.1177/0022002706290430
25. Brune A, Hens T, Rieger MO, Wang M (2015) The war puzzle: contradictory effects of international conflicts on stock markets. Int Rev Econ 62:1–21. 10.1007/s12232-014-0217-6
26. Arin KP, Ciferri D, Spagnolo N (2008) The price of terror: the effects of terrorism on stock market returns and volatility. Econ Lett 101:164–167. 10.1016/j.econlet.2008.07.007
27. Hamao Y, Masulis RW, Ng V (1990) Correlations in price changes and volatility across international stock markets. Rev Financ Stud 3:281–307. 10.1093/rfs/3.2.281
28. Forbes KJ, Rigobon R (2002) No contagion, only interdependence: measuring stock market comovements. J Finance 57:2223–2261. 10.1111/0022-1082.00494
29. Diebold FX, Yilmaz K (2012) Better to give than to receive: predictive directional measurement of volatility spillovers. Int J Forecast 28:57–66. 10.1016/j.ijforecast.2011.02.006
30. Bekaert G, Ehrmann M, Fratzscher M, Mehl A (2014) The global crisis and equity market contagion. J Finance 69:2597–2649. 10.1111/jofi.12203
31. Kilian L (2009) Not all oil price shocks are alike: disentangling demand and supply shocks in the crude oil market. Am Econ Rev 99:1053–1069. 10.1257/aer.99.3.1053
32. Baur DG, Lucey BM (2010) Is gold a hedge or a safe haven? An analysis of stocks, bonds and gold. Financ Rev 45:217–229. 10.1111/j.1540-6288.2010.00244.x
33. Kumari V, Kumar G, Pandey DK (2023) Are the European Union stock markets vulnerable to the Russia–Ukraine war? J Behav Exp Finance 37:100793. 10.1016/j.jbef.2023.100793
34. Umar Z, Polat O, Choi SY, Teplova T (2022) The impact of the Russia-Ukraine conflict on the connectedness of financial markets. Finance Res Lett 48:102976. 10.1016/j.frl.2022.102976
35. Boungou W, Yatié A (2024) Uncertainty, stock and commodity prices during the Ukraine-Russia war. Policy Stud. https://hal.science/hal-04746052
36. Caldara D, Conlisk S, Iacoviello M, Penn M (2022) The effect of the war in Ukraine on global activity and inflation. FEDS Notes. Board of Governors of the Federal Reserve System, Washington, DC; https://www.federalreserve.gov/econres/notes/feds-notes/the-effect-of-the-war-in-ukraine-on-global-activity-and-inflation-20220527.html
37. Goyal P, Soni P (2024) Beyond borders: investigating the impact of the 2023 Israeli–Palestinian conflict on global equity markets. J Econ Stud 51:1714–1731. 10.1108/JES-12-2023-0729
38. Ijaz MS, Ali S, Du AM, Khurram M (2025) Analyzing financial market reactions to the Palestine-Israel conflict: an event study perspective. Int Rev Econ Finance 98:103864. 10.1016/j.iref.2025.103864

39. Espinosa-Méndez C, Arias J (2025) Effect of President Trump's Liberation Day announcements on world stock markets: an event study approach. Appl Econ Lett. 10.1080/13504851.2025.2607652
40. Pandey DK, Lucey BM, Kumar S (2023) Border disputes, conflicts, war, and financial markets research: a systematic review. Res Int Bus Finance 65:101972. 10.1016/j.ribaf.2023.101972
41. Economic impact of the 2026 Iran war. Wikipedia (2026) Accessed: November 12, 2026: https://en.wikipedia.org/wiki/Economic_impact_of_the_2026_Iran_war
42. U.S. stocks fall after Iran says Strait of Hormuz will remain shut. Fortune (2026) Accessed: November 12, 2026: https://fortune.com/2026/08/11/u-s-stocks-fall-after-iran-says-strait-of-hormuz-will-remain-shut/
43. Investing.com: Historical data for stock indices, exchange-traded funds and the Cboe Volatility Index (2026) Accessed: November 12, 2026: https://www.investing.com
44. Caldara D, Iacoviello M (2026) Geopolitical Risk (GPR) Index, daily data. Accessed: November 11, 2026: https://www.matteoiacoviello.com/gpr.htm
45. Jarque CM, Bera AK (1980) Efficient tests for normality, homoscedasticity and serial independence of regression residuals. Econ Lett 6:255–259. 10.1016/0165-1765(80)90024-5
46. Dickey DA, Fuller WA (1979) Distribution of the estimators for autoregressive time series with a unit root. J Am Stat Assoc 74:427–431. 10.1080/01621459.1979.10482531
47. Ljung GM, Box GEP (1978) On a measure of lack of fit in time series models. Biometrika 65:297–303. 10.1093/biomet/65.2.297
48. Bollerslev T, Wooldridge JM (1992) Quasi-maximum likelihood estimation and inference in dynamic models with time-varying covariances. Econom Rev 11:143–172. 10.1080/07474939208800229

## Figures

t-statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

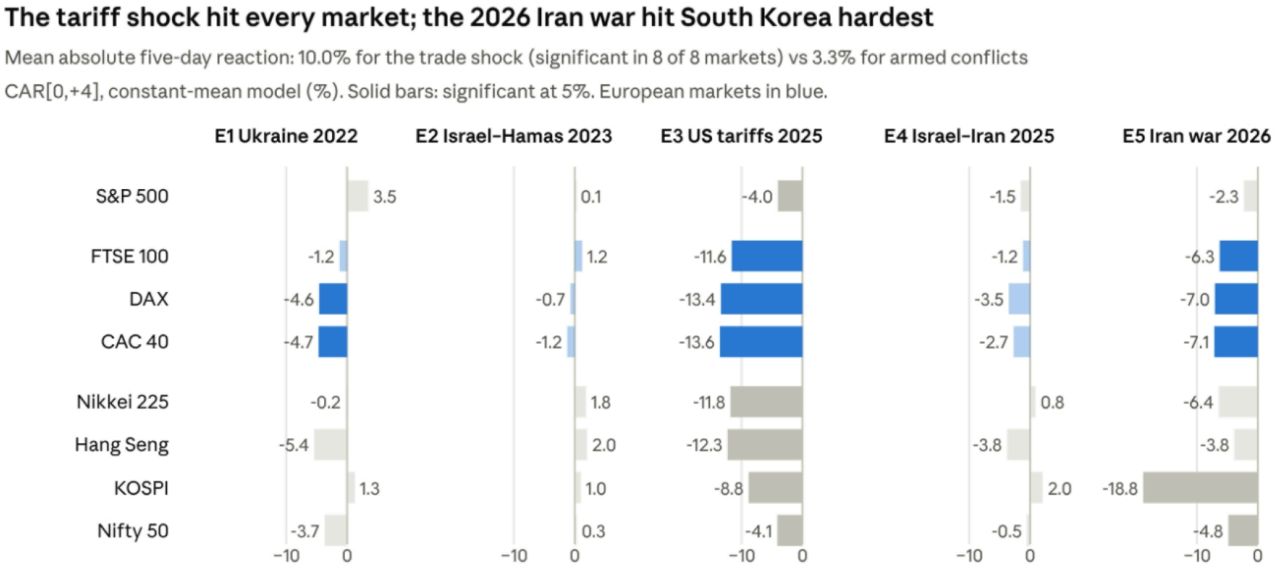



**Figure 1**

**Five-day cumulative abnormal returns by market and event (%)**