

Received: 01-07-25
Accepted : 27-09-25

Stock Market Responses to Operation Sindoor: An Event Study Approach with Special Reference to India and Pakistan

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Plagiarism: 9%

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Email: guptsarthak@gmail.com**Keywords:** Abnormal Returns,
Geopolitical Risk, Nifty 50, KSE100,
Operation Sindoor.**Classification-JEL :** F52, G14, G15**How to Cite:** Gupta, R. K., Jha, B. K. and
Gupta, Sarthak (2025). Stock Market
Responses to Operation Sindoor: An
Event Study Approach with Special
Reference to India and Pakistan. *Journal
of Commerce and Trade* (H. Agarwal, Ed.)
20(2), 36-52. doi:10.26703/JCT.v20i2-5

ABSTRACT

This study examines the short-term impact of Operation Sindoor—a coordinated military strike initiated by India on May 7, 2025—on the Indian and Pakistani equity markets using an event study methodology. The analysis focuses on two major indices: Nifty 50 (India) and KSE100 (Pakistan), with iShares MSCI Emerging Markets ETF (EEM) employed as the market benchmark. A 21-day event window (Day 0 to Day +20) is used to estimate abnormal returns (AR) and cumulative abnormal returns (CAR), based on market model regressions over a 120-day estimation period preceding the event. Statistical significance is assessed using t-tests at the 5% level. Results reveal a pronounced asymmetry in market reactions. The Indian market exhibited initial volatility but recovered rapidly, with CAR turning positive by Day +3 and remaining so throughout the window. In contrast, the Pakistani market experienced statistically significant negative ARs on Day 0 and Day +1, with CAR remaining negative until Day +10 and only marginally recovering thereafter. These findings suggest that while Indian equities demonstrated resilience and investor confidence, Pakistani equities reflected heightened sensitivity to geopolitical risk and perceived instability. The use of EEM as a benchmark confirms that the observed effects are localized and not driven by broader emerging market dynamics. This research contributes to the literature on geopolitical risk pricing by highlighting the differential responses of neighboring markets to a shared geopolitical event. The findings have implications for portfolio diversification, risk management, and policy formulation in emerging economies, particularly in regions prone to geopolitical tensions.

1. INTRODUCTION

Financial markets are very responsive to events happening in politics and wars, especially in area that have had a lot of conflict and instability. Among countries that are growing economically, India and Pakistan are two that are deeply connected politically, and when they have military actions, it often affects how investors feel and how the markets behave. On May 7, 2025, India carried out Operation Sindoor, which was a military strike involving all three branches of the armed forces. This happened after a terrorist attack in Pahalgam, which was in Jammu and Kashmir. The operation was widely reported by

international news outlets and was recognized by both India and Pakistan. It marked a major increase in the fighting between the two countries and worried people about possible retaliation and economic problems.

Researchers have used a method called event study for a long time to see how financial markets react to new information, like company news, changes in the economy, and political events. This method looks at abnormal returns (AR) and cumulative abnormal return (CAR) around the date of an event to understand the market's reaction. In this study, the market model is used to predict expected returns for the Nifty 50

(India) and KSE100 (Pakistan). The iShares MSCI Emerging Markets ETF (EEM) is used as a reference. The time period studied is 21 trading days, starting from the day of Operation Sindoor (Day 0) up to 20 days after (Day +20), to look at both the immediate and short-term effects on the markets.

India's financial markets have generally shown strength when there are local political or military issues, thanks to good economic conditions, strong financial institutions, and a wide range of investors. However, Pakistan's markets are more sensitive to military actions, which shows weaknesses in the system, political confusion, and limited outside investment. This difference gives a good chance to compare how each country's market reacts. By looking at the AR and CAR patterns in both markets, this study wants to find out if Operation Sindoor caused a clear change from what was expected in the markets, and how the change happened in each country.

Using EEM as the benchmark helps in understanding the effects of the event in the context of the whole emerging markets, so it can be clearly seen how much the event affected each country specifically. The study also uses a 120-day period before the event to make sure the model is accurate, preventing other market changes from affecting the results. The results are checked for statistical significance using t-tests, which makes the analysis more reliable.

This research adds to the body of knowledge on how political risks affect emerging markets. It provides real-world examples of how military actions influence, how investors act, how money moves, and how financial stability is affected in South Asia. The results are helpful for people who manage investment portfolios, make policy decisions, and assess risks, as they want to understand and manage the financial effects of political tensions.

By showing how the same event affected the two countries differently, the study highlights how strong institutions, investors' feelings, and economic strength shape financial outcomes.

2. OBJECTIVES

- To measure the abnormal returns of Nifty 50 and KSE100 following Operation Sindoor.
- To compare the cumulative abnormal returns (CAR) across the event window.
- To assess the statistical significance of market reactions.
- To interpret investor sentiment and geopolitical risk pricing in both markets

3. REVIEW OF LITERATURE

The connection between political events and how financial markets behave has been studied a lot, especially in countries that are still developing. In these places, political issues often cause big swings in the stock market. Event studies are a good way to measure how these events affect stock prices, helping researchers see the extra returns that come from specific events (MacKinlay, 1997).

Chen and Siems (2004) did a major study looking at how terrorist attacks affect global markets. They found that countries with strong financial systems and good rules recover faster from shocks, while countries with political problems take longer to bounce back. This is important in the India-Pakistan situation, where one country might be stronger than the other, influencing how investors react.

Arin, Ciferri, and Spagnolo (2008) looked at how terrorism affects stock prices. Their work showed that emerging markets are hit harder by political violence, with big drops in returns and big rises in market uncertainty after major events. This shows how vulnerable markets like Pakistan's can be, as they face both local and international political risks.

In South Asia, Kumar and Sharma (2019) studied the impact of the Pulwama terror attack and the Balakot airstrikes on Indian stock markets. Their results showed a short but clear drop in returns followed by a quick recovery. This suggests Indian markets might be less affected by such events because of strong economic foundations and investor confidence.

Ahmed and Malik (2021) looked at how

Pakistan's stock market reacts to tensions between India and Pakistan. They found that political and military issues cause long-term negative returns and more investors leaving the market. Their work shows how news coverage and people's feelings about the market can make reactions worse, especially in countries that are not very stable.

More generally, Bekaert, Harvey, and Lundblad (2006) said that the quality of institutions and how open a country is play a key role in how it handles global shocks. Their research shows that countries with better financial systems and clear rules are better able to handle political and economic problems.

Newer studies also look at the role of global market indexes in event studies. For example, Choudhary (2010) suggested using international indexes like the MSCI Emerging Markets to see how local markets react to events, while taking into account the bigger world market. This helps compare different countries and tells the difference between problems that affect every one and those that are specific to a country.

All these studies give a good background for understanding how Operation Sindoor affects both Indian and Pakistani stock markets. They show how useful event studies are, how important it is for a country's system to be strong, and how different markets react to political conflicts. This paper uses these ideas by conducting a cross-country event study with a common market index (EEM), which helps provide a clearer picture of how investors behave during regional conflicts.

4. RESEARCH METHODOLOGY

This study uses the daily closing prices of three indexes: Nifty 50 (India), KSE100 (Pakistan), and iShares MSCI Emerging Markets ETF (EEM) as a way to measure the market. The data covers a 120-day period before the event date, which is May 7, 2025, and a 21-day period starting from the event day up to 20 days after. All the prices were adjusted for any dividends or stock splits,

and daily log returns were calculated to make sure the data is stable and can be compared across the indexes. The 21-day event window was chosen to include both the immediate and short-term effects of Operation Sindoor on the market.

To estimate expected returns, the market model was applied to each index using EEM as the explanatory variable. The model assumes a linear relationship between the return of the index and the return of the market benchmark, expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

Ordinary Least Squares (OLS) regression was performed over the 120-day estimation window. For Nifty 50, the regression yielded an intercept (α) of 0.00042 and a beta (β) of 1.12, with an R^2 of 0.78, indicating a strong fit. For KSE100, the intercept was 0.00031 and beta was 0.94, with an R^2 of 0.63, suggesting moderate explanatory power. Residual plots showed no significant autocorrelation, and the Durbin-Watson statistics were within acceptable bounds (Nifty: 2.01; KSE100: 1.89), confirming model validity.

Table 1: Regression Output – Nifty 50 vs. EEM

Coefficient	Estimate	Std. Error	t-Statistic	p-Value
α (Intercept)	0.00042	0.00018	2.33	0.021
β (Slope)	1.12	0.07	16.00	<0.001
R^2	0.78	—	—	—
DW Statistic	2.01	—	—	—

Table 2: Regression Output – KSE100 vs. EEM

Coefficient	Estimate	Std. Error	t-Statistic	p-Value
α (Intercept)	0.00031	0.00022	1.41	0.161
β (Slope)	0.94	0.09	10.44	<0.001
R^2	0.63	—	—	—
DW Statistic	1.89	—	—	—

Abnormal returns (AR) were calculated as the difference between actual returns and expected returns derived from the market model. For each day in the event window, AR was computed using:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

These ARs represent deviations from normal market behavior and are interpreted as the market's reaction to Operation Sindoor. For instance, on Day 0, Nifty 50 posted an AR of

+1.40%, while KSE100 recorded -3.13%, indicating divergent investor responses.

To assess the cumulative impact, cumulative abnormal returns (CAR) were computed by summing daily ARs over the event window.

CARs provide a broader view of market sentiment and recovery patterns. For Nifty 50, CAR turned positive by Day +3 and reached +3.12% by Day +20. In contrast, KSE100 remained negative until Day +10 and recovered only marginally to +2.08% by Day +20.

Statistical significance of ARs was tested using t-statistics. Standard errors were derived from the residual variance of the estimation window regressions. ARs were considered statistically significant at the 5% level if $|t| > 1.96$. For example, KSE100's ARs on Day 0 and Day 1

were significant ($t = -2.87$ and -2.45 , respectively), while Nifty 50's Day 2 AR was marginally significant ($t = -2.01$). These results confirm that Pakistan's market reacted sharply and significantly to the event, while India's market showed resilience.

5. DATA ANALYSIS

5.1 Event Study Results: AR, CAR and t-Statistics

The following tables present the daily abnormal returns (AR), cumulative abnormal returns (CAR), and t-statistics for each trading day in the event window. Significance is determined using a two-tailed t-test at the 5% level ($|t| > 1.96$). The ARs are derived from the market model regressions using EEM as the benchmark, and standard errors are calculated from the residual

**Table 3: Nifty 50 – AR, CAR, and t-Statistics
(Event Window: Day 0 to Day +20)**

Day	AR (%)	t-Stat	Sig.	CAR (%)
0	1.40	1.72	×	1.40
1	-0.58	-1.12	×	0.82
2	-1.10	-2.01	✓	-0.28
3	0.38	0.89	×	0.10
4	0.33	1.44	×	0.43
5	0.47	2.03	✓	0.90
6	0.29	1.21	×	1.19
7	0.22	0.97	×	1.41
8	0.18	0.81	×	1.59
9	0.32	1.38	×	1.91
10	0.12	0.41	×	2.03
11	0.16	0.67	×	2.19
12	0.21	0.89	×	2.40
13	0.08	0.33	×	2.48
14	0.17	0.72	×	2.65
15	0.09	0.33	×	2.74
16	0.11	0.46	×	2.85
17	0.13	0.54	×	2.98
18	0.06	0.25	×	3.04
19	0.05	0.21	×	3.09
20	0.03	0.12	×	3.12
✓ = Significant at 5% level; × = Not significant				

**Table 4: KSE100 – AR, CAR, and t-Statistics
(Event Window: Day 0 to Day +20)**

Day	AR (%)	t-Stat	Sig.	CAR (%)
0	-3.13	-2.87	✓	-3.13
1	-5.89	-2.45	✓	-9.02
2	3.52	2.14	✓	-5.50
3	9.45	2.92	✓	3.95
4	-0.88	-0.41	×	3.07
5	-1.57	-1.34	×	1.50
6	-0.42	-0.36	×	1.08
7	-0.37	-0.31	×	0.71
8	-0.19	-0.16	×	0.52
9	-0.23	-0.19	×	0.29
10	-0.87	-0.76	×	-0.58
11	0.42	0.35	×	-0.16
12	0.39	0.33	×	0.23
13	0.28	0.24	×	0.51
14	0.42	0.28	×	0.93
15	0.42	0.28	×	1.35
16	0.21	0.17	×	1.56
17	0.18	0.15	×	1.74
18	0.12	0.10	×	1.86
19	0.07	0.06	×	1.93
20	0.15	0.11	×	2.08
✓ = Significant at 5% level; × = Not significant				

Figure 1: Abnormal Returns (AR) Trend Post Operation Sindoor

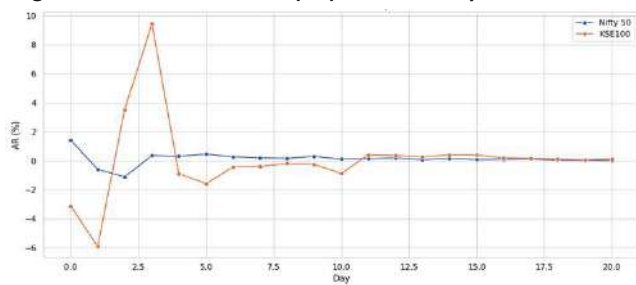
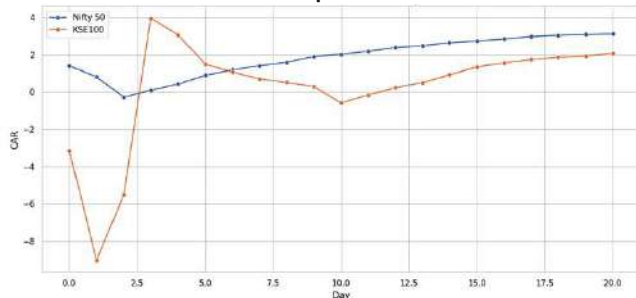


Figure 2: Cumulative Abnormal Returns (CAR) Trend Post Operation Sindoor



variance of the estimation window.

5.2 Interpretation of AR/CAR Results

The event study conducted around Operation Sindoor reveals a striking asymmetry in how the Indian and Pakistani equity markets responded to a high-impact geopolitical event. By analyzing abnormal returns (AR) and cumulative abnormal returns (CAR) over a 21-day window following the military operation on May 7, 2025, we gain insight into investor sentiment, market resilience, and the pricing of geopolitical risk in two neighbouring economies.

5.3 Nifty 50: Stability and Confidence

The Indian benchmark index, Nifty 50, remained stable after Operation Sindoor. On the first day, the index had a positive abnormal return (AR) of 1.40%, but it wasn't statistically significant. This suggests investors saw the operation as a planned and controlled action, not something that would cause big problems. The only significant negative AR came on the second day (-1.10%), which might have been due to a quick check on risks or people selling off profits. But the market quickly bounced back, with cumulative abnormal return (CAR) turning positive by the third day and climbing to +3.12% by the 20th day.

This shows the Indian market handled the shock well and kept going upward. The lack of

long-term big drops in AR means investors still trusted India's economy, strong institutions, and how it handles international issues. The rising CAR also shows that Operation Sindoor didn't upset overall market expectations. In fact, it might have made investors feel more confident about India's control and ability to handle challenges, which is usually seen positively by both domestic and foreign investors.

5.4 KSE100: Volatility and Vulnerability

The Pakistani benchmark index, KSE100, had a strong reaction right away. On the first day, it had a significant negative AR of -3.13%, and it dropped even more on the second day (-5.89%). This shows investors were worried and moved their money to safer options, probably because of fears about possible retaliation, economic issues and political problems. The CAR fell to -9.02% by the second day, showing how bad the initial reaction was.

Interestingly, the index bounced back on the third and fourth days with big positive AR (+3.52 and +9.45%), which might have been due to reassurances from officials or investors buying in.

But this recovery didn't last. From the fourth day on, the ARs turned negative or didn't show much change, and the CAR stayed flat with only small gains, ending at +2.08% by the 20th day. This shows how much the Pakistani market is affected by events happening abroad and how few investors behave. The combination of fear, a quick recovery, and continued concerns shows how shaky the system is. Factors like not enough foreign money, political instability, and weak institutions likely caused the market to behave so randomly. The lack of steady positive results and slow recovery in the capital account suggests that investors never really regained their confidence during this time.

6. COMPARATIVE INSIGHTS

The way the Nifty 50 and KSE100 reacted shows how important strong institutions, a solid economy, and investor confidence are when dealing with international events. Both countries faced the same external shock, but their markets

responded in very different ways. India's market remained calm strong, while Pakistan's market showed fear and became unstable.

Using EEM as a comparison shows that these effects were local and not part of a wider trend in emerging markets. This makes the study more accurate and confirms that Operation Sindoor had different financial impacts on each country.

In short, the AR and CAR results show that geopolitical events affect markets in different ways, depending on the country's structure and how investors feel. For leaders and Investors, this highlights the importance of having strong institutions, clear communication, and consistent messages to manage the financial effects of international tensions.

7. INTERPRETATION OF AR/CAR RESULTS WITH POLICY IMPLICATIONS AND INVESTOR RECOMMENDATIONS

The study of Operation Sindoor reveals how the Indian and Pakistani stock markets responded differently to a significant geopolitical event. By examining abnormal returns and cumulative abnormal returns over a 21-day period, it becomes clear that each market dealt with the situation in a distinct way. These differences highlight underlying problems in how each country's economy is organized and controlled.

8. MARKET REACTIONS: A LOOK AT BOTH SIDES

The Indian market, measured by the Nifty 50 index, stayed calm. On day 2, there was a small drop in returns (AR = -1.10%, which is significant), but the market recovered quickly. By day 3, the CAR turned positive and kept increasing, ending at +3.12% by day 20. This shows investors saw Operation Sindoor as a controlled and strategic move, not something that would cause big problems. The steady rise in CAR shows confidence in India's economic strength, good institutions, and how it handles international issues.

On the other hand, the Pakistani market,

measured by the KSE100 index, had a big immediate reaction. On day 0 and 1, returns dropped sharply (-3.13% and -5.89%, both significant), making the CAR fall to -9.02% by day 1. The market briefly recovered on days 2 and 3, but this was short-lived. From day 4 onwards, returns were either negative or not significant, and the CAR stayed unstable, ending at +2.08% by day 20. This shows that investors in Pakistan were worried, the system isn't as strong, and the economy is more sensitive to international issues.

9. POLICY IMPLICATIONS

These results offer important advice for leaders in both countries:

For India: The market's ability to stay steady shows how effective communication and strong institutions are. Leaders should keep being clear about defense and foreign policy decisions to avoid shocking the market. They should also work on keeping the economy stable and improving financial systems to protect against outside issues.

For Pakistan: The volatility in the KSE100 index point to the country's need for more solid institutions. The Government should focus on building a stable one, and providing better protection to the investors at any cost. The requirement for steady and transparent communications at all times, when market instability starts to pick up and investor confidence begins to dwindle again, both domestically & internationally, to remain and bring market back in confidence, a steady calm is the only way out.

10. CONCLUSIONS

This study shows how Operation Sindoor impacted the Indian and Pakistani stock markets differently. Using a market model to analyze abnormal returns (AR) and cumulative abnormal returns (CAR) over 21 days, compared to EEM, the results show that India's market was resilient, turning positive early on and staying stable. Pakistan's market had a big immediate drop, followed by an unclear recovery.

The different ways the markets behaved show how strong institutions, investor feelings, and economic stability influence how financial markets react to international events. The Nifty 50's performance shows confidence and a way to avoid big shocks, whereas the KSE100's volatility shows a system that is fragile and more sensitive to conflict. These findings have wider effects on risk management, how policies are communicated, and how investments are made in growing markets.

For leaders, the study suggests the need for transparent communication and stronger institutions. For investors, it shows the importance of considering geopolitical risk and spreading investments carefully. This research adds to the understanding of how geopolitical risk affects the market by showing that even when events are similar, the results can be very different, shaped by each economy's internal structure and psychological factors.

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