An Event Study On Impact Of Russia-Ukraine War On Indian Banking Sector Stock

Abstract

Aim: To study the impact of the Russia-Ukraine event on the performance of banking sector stocks.
Study designs: The descriptive statistical analysis has been done for six selected banks and is based on the Russia-Ukraine war. Study employs event analysis method for analysis.
Place and Duration of Study: The secondary data has been downloaded from the NSE site, and the study duration is pre- and post-90 days from the event day and 120 days for the event window and 210 days for the estimation window has been considered.
Methodology: The event analysis method has been used in which a paired t-test has been employed. We have checked significant at a p-value of 0.10 (10% level). Significant at p-value of 0.05 (5% level) Significant at p-value of 0.01 (1% level).
Results: By examining a wide range of degrees of relationship between the two variables, we have tried to analyze how financial markets respond to changes in the warlike situation and how conditions impact asset prices. The results show the impact of the event before and after the event date. This analysis fills the gap in understanding event-specific impacts on financial institutions.
Conclusion: The study provides insights into whether market behavior remained stable (null hypothesis accepted) or displayed volatility (alternate hypothesis accepted) across 90 days for global crises like the Russia-Ukraine war. **The findings of the research have implications for the banking sector of India, policymakers, investors, and researchers. The research provides numerical and non-numerical information that other researchers can employ for cross-study analysis or for verifying theories. Lingering questions from the investors, including those in search of portfolio diversification strategies and the right time to invest. The discovery empowers the firms to have better policies inside and better relations outside, with customers and other stakeholders, such as during the change in monetary policy or in external shocks.**

Keywords: Event study, Russia-Ukraine war, Bank shares, Abnormal return, Event window

1. INTRODUCTION

The productive capability of a society's economy, which includes the commodities and services available to its citizens, ultimately determines its material affluence. Shares also allow for the dispensation of capital to enterprises, particularly those with appealing investment opportunities. The repercussions of the Russia-Ukraine war are evident in global stock and financial markets (Tank and Ospanova, 2022). Conflict led to escalated disputes, supply chain disruptions, and economic instability, all contributing to significant market volatility (Sidhu and Suri, 2022). The Russia-Ukraine War is a geopolitical conflict that significantly affects oil prices, global trade, and even inflation. This conflict has placed significant pressure on Indian banks due to factors such as inflation, exchange risks, and changes in the structure of trade financing. A study on the Russia-Ukraine war elucidates the ramifications of geopolitical events on financial markets and banking operations, particularly in emerging economies such as India. The stock market is essential in a free market economy for national growth since it attracts money from various sources and directs them towards productive investments. This section encompasses fundamental concepts of the stock market and compiles the sub-contents of the study. From a different perspective, the present study holds significance. The study aims to elucidate the research possibilities, emphasizing the potential benefits and implications of the findings. Secondly, the study delineates research goals to direct the inquiry and guarantee concentrated results. Thirdly, it facilitates a thorough assessment of the investigator's study technique, providing insights into the strategies employed for data collection and analysisWe conducted the descriptive statistical analysis for six chosen banks, focusing on the Russia-Ukraine war. We set the event date, t, at 24th February 2022, and defined the event window as 90 days, which includes 45 days before and after the event, or t-45 to t+45 days. . We have considered only trading days from 24th

December 2021 to 5th May 2022, excluding holidays. In this study, we considered an estimation window for 120 days, i.e., from t-210 to t-91. The selected six banks are ICICI, HDFC, State Bank of India, Kotak Mahindra Bank, AXIS, and Bank of Baroda. Balaji and Kumar (2017) The objective of the study is to measure the extent of variability within a certain dataset and evaluate the risk and return associated with several public and private sector banks in India. This study utilizes a quota sampling strategy to select banks from both the public and private sectors, based on secondary data. The study spans the financial years 2006-07 to 2015-16, covering a duration of ten years. We conduct data analysis by applying correlation coefficients and regression analysis. This article concludes that the performance of private sector banks is superior to that of public sector banks. Every investor aims to maximize profit and minimize risk. For instance, there is a close relationship between risk and return. Dyckman et al. (1984) An event study is a statistical technique in finance and economics employed to assess the impact of a particular event on a target variable, usually firm stock prices or the overall market. It analyzes variables including portfolio size, event-date ambiguity, and degrees of aberrant performance using portfolio simulations. The study concludes that all three models (mean-adjusted returns, market-adjusted returns, and the market model) exhibit comparable efficacy in identifying anomalous returns, with the market model demonstrating a marginal advantage. Nonetheless, this disparity, while statistically significant, is negligible.

Mobarek and Mollah (2016), This article examines the degree of stock market co-movement in 20 nations and five emerging benchmark countries. Investors in a fully integrated stock market will receive the same risk-adjusted expected return on equivalent financial products across national markets. International market efficiency is improving, especially in developing nations where market co-movement has expanded. However, Geweke's unidirectional feedback metrics indicate that the USA, Brazil, and Russia have a greater lead over Japan and China than the other way around. Sidhu and Suri (2022) The unforeseen conflict between Russia and Ukraine has profoundly affected the global economy. Not only has it impacted the stock markets, but it has also significantly impacted the lives of individuals worldwide. India cannot afford to be insular. Global markets continue to endeavor recovery from the abrupt collapse. This report assesses the influence of the Russia-Ukraine war on the performance of the top 20 Indian companies listed on the National Stock Exchange. We analyzed the weekly time-series data of these companies and assessed their performance throughout this five-month period. We calculated the percentage variation in the share prices of these companies and used graphs to analyze their performance trends. Tank and Ospanova (2022), Unprecedented Western sanctions have severely impacted the Russian economy, as they are reluctant to confront a nuclear adversary on the battlefield. Sanctions enacted encompass the freezing of Russian central bank assets, the targeting of affluent Russian people and certain state-owned banks, and limited access restrictions to the international financial system SWIFT and Germany's termination of its Russian gas pipeline project. Tipoy (2024) This study explores how central banks in a sample of developing nations react to currency value changes. The author focuses on economies that target inflation and a select group of commodity exporters. Later exposes them to trade shocks. The sample includes Brazil, the Czech Republic, India, Indonesia, Russia, and South Africa. This study also examines how trade language can explain business cycles. We estimate an open, regime-switching new Keynesian model for each economy using Bayesian approaches. This model allows structural shocks and policy rule parameters to vary between low and high regimes. We employ posterior simulation to show that regime switching fits the data better than a constant parameter model. Some economies react strongly to exchange rates, while others react little. Patel and Modi (2017) Most securities market theories assume rational investor decision-making. However, this is not always the case. A new field of research acknowledges demographics in financial decision-making, contradicting old models. This research examines how demographic parameters like gender, age, marital status, education, income, and family members affect investors' risk tolerance and investing preferences. The research design is descriptive. We collected primary data from 100 investors in South Gujarat through convenience sampling and structured questionnaires. These data help managers advise customers on suitable investment areas and risk levels based on demographics. The study shows that demographic considerations affect some investment decision factors but not others. The report also shows investors' views on various investing options. Risk, return, market trends, and prior performance influence investment decisions. Age, gender, and

income affect investment decisions. Pynnonen (2022), Financial economics event studies increasingly favor nonparametric rank tests over parametric testing due to the non-normal distribution of stock returns. Rank tests substitute the cumulative abnormal returns (CARs) across numerous days with cumulative ranks. This research suggests enhancements to current methodologies to more effectively address cross-sectional correlations between returns resulting from overlapping event windows in calendar time. Simulations show that the proposed rank test, well calibrated for evaluating CARs, demonstrates robustness against both fully and partially overlapping event windows. The review asserts that nonparametric tests are more dependable than parametric tests due to their lack of reliance on strict assumptions regarding data distribution. Sorokina et al. (2021) performed an analysis of the impact of macroeconomic news releases on stock markets. Additionally, several studies have examined the effect of dividend and bonus announcements on stock market values. They used a method that is resistant to outliers in existing event research to look at how US financial reform affected the stock markets of the ten biggest countries in the world. The results were very different from what the original OLS findings showed. This discovery emphasizes the significance of managing outliers in event studies. We conduct a thorough examination of the outlier population found by Cook's distance and observe that numerous outliers are situated within the event windows. All the aforementioned studies contribute to our understanding of how the war has influenced asset prices and vice versa. These studies provide valuable insights into the complex relationship between asset prices and the event. By examining a wide range of degrees of relationship between the two variables, we have tried to analyze how financial markets respond to changes in the warlike situation and how conditions impact asset prices.

1.a. OBJECTIVE, AND SCOPE

The research primarily aimed to determine the extent of the relationship with different banks and the degree of association to which the specific factors and events were involved in influencing the chosen banking sector's stocks. To study the impact of the Russia-Ukraine event on the performance of banking sector stocks.

1.b. IMPACT OF THE WAR

Null Hypothesis: The war has no impact on banking stock returns.

Alternate Hypothesis: The war has impact on banking stock returns.

2. RESEARCH METHODOLOGY

We conducted a descriptive statistical analysis for six chosen banks, focusing on the Russia-Ukraine war. We set the event date, t, at 24th February 2022, and defined the event window as 90 days, which includes 45 days before and after the event, or t-45 to t+45 days. We have considered only trading days from 24th December 2021 to 5th May 2022, excluding holidays. In this study, we considered an estimation window for 120 days, i.e., from t-210 to t-91. The Indian stock market comprises numerous indices, viz., Bank Nifty, Nifty 50, Fin Nifty, Nifty Small Cap, Nifty Mid Cap, and many others. All the indices encompass several categories of industries, corporations, and banking stocks. Consequently, it is not feasible to encompass everything within a single research project. The 06 banks comprising Bank Nifty are HDFC Bank, ICICI Bank, SBI, Kotak Mahindra Bank, Axis Bank, and Bank of Baroda.

List 1: Statistical Tool

Statistical tool	
Test	Study

Paired t-test	Patel (2017), Pandey and Kumari (2020), Bhattacharjee and Chaudhuri (2020), Harwell(1988), Kaspereit (2021),

Calculation of Abnormal return and cumulative abnormal return

Calculate the daily abnormal returns for each stock by comparing the actual returns with the normal returns. Additionally, we must juxtapose actual returns with the normal return to compute the abnormal return. The equation illustrates the computation of normal return.

ERit = a + bRmt

In this context, Rit represents the rate of return on day t for stock i within the estimate window and in the regression, with the intercept designated as 'a' and the slope coefficients as 'b.' Rmt denotes the return rate on day t for the benchmark index. We calculate the "a & b" coefficients using data from t-270 to t-91, which spans a total of 180 days.

We calculate the abnormal daily return by subtracting the normal return from the actual daily return and estimating its return based on past performance. We compute the abnormal return, ARit, using the risk-adjusted return methodology and assess it over the stock price event window.

ARit = Rit – ERit

Where:

ARit is abnormal return, on stock i for day t;

Rit is actual return, for stock i.

ERit is normal return on, the stock i for day t. (Seiler, 2003)

The actual return, Rit, is calculated on MS-excel by using the following formula,

Rit = (Pit - Pit-1)/ Pit

ARit = Rit – ERit

AARt = $\frac{1}{N}\sum_{i=1}^{N} AR_{it}$

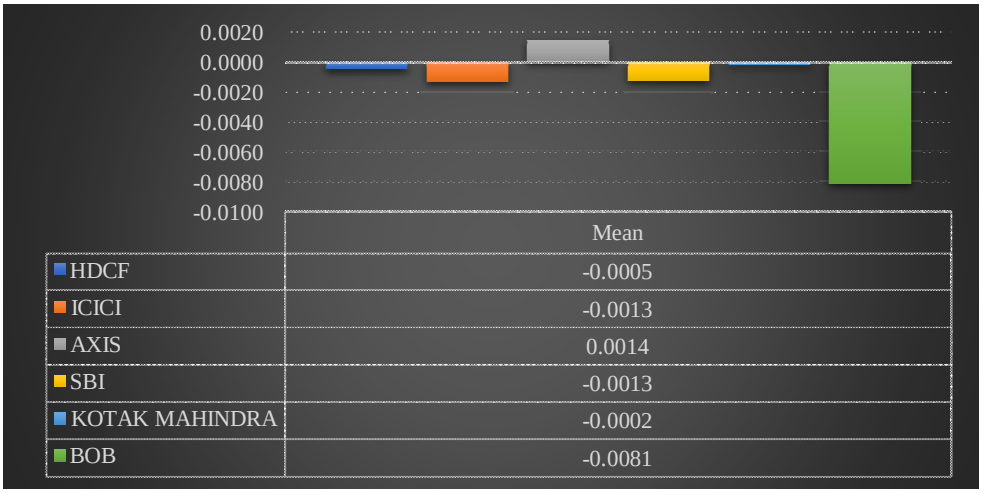
ARit denotes the abnormal return for stock i on day t, while Rit represents the true return for the same stock. ERit is the usual return on the stock for day t, Seiler (2003). We compute the actual return, Rit, in MS Excel using the following formula.

Where:

P represents the observed price, where the subscript t denotes time; Pit signifies the current price or opening of stock i, and Pit-1 indicates the closing price from the preceding trading day. The Cumulative Abnormal Return (CAR) is the aggregate of Abnormal Returns (ARs) for each event day inside the event window. We compute the ARs and CARs to determine cross-sectional and time-series aggregation for the specified period. We compute the t-statistics for abnormal returns (ARs) by dividing the ARs by the sample standard deviation, then further dividing by the square root of the sample size. We have verified the significance at a p-value of 0.10 (10% level). We found significance at a p-value of 0.05 (5% level) and at a p-value of 0.01 (1% level).

Pictorial representation

Graph 1 Mean return for the six banks- Russia-Ukraine war



	Mean
HDCF	-0.0005
ICICI	-0.0013
AXIS	0.0014
SBI	-0.0013
KOTAK MAHINDRA	-0.0002
BOB	-0.0081

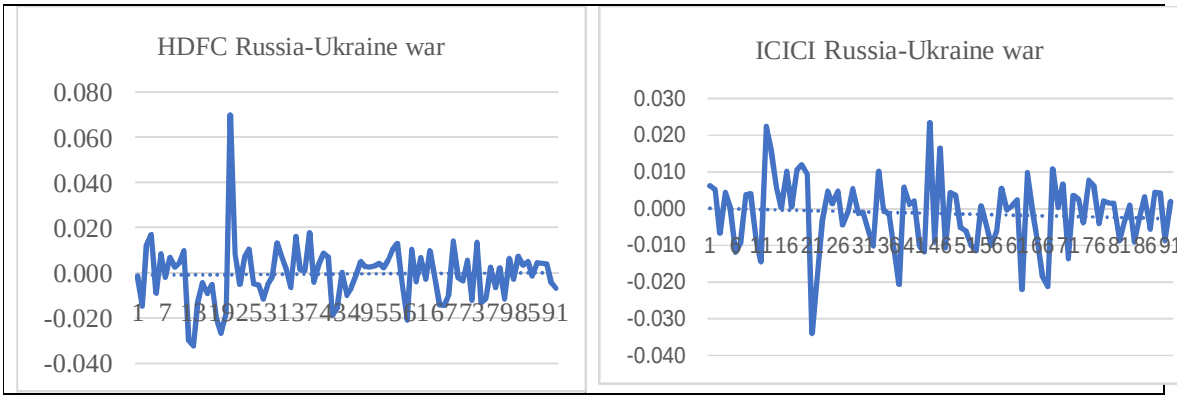
Author's own compilation

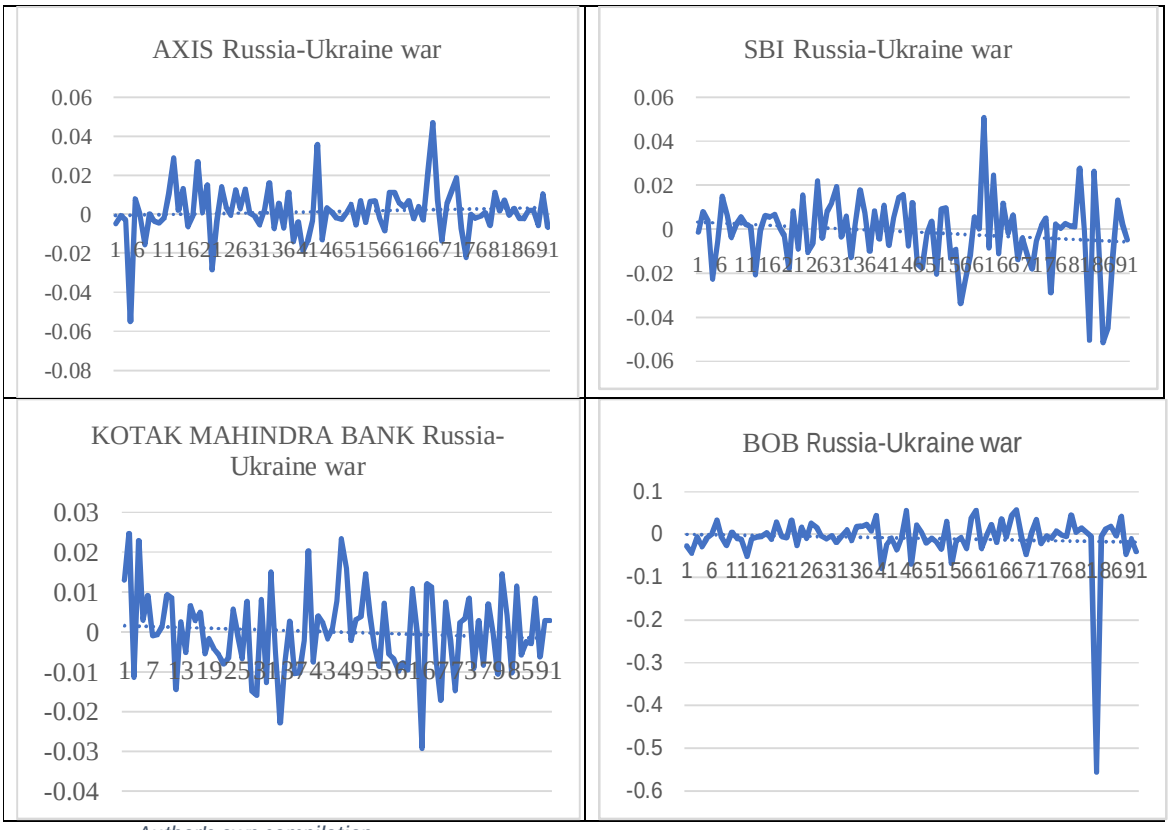
Explanation

The above histogram shows the pictorial representation of the mean value for all six banks, indicating that, out of six, only one was positive and five were negative. AXIS was the only bank with a positive mean value. On average, AXIS Bank's Positive Mean AR outperformed the expected return on a daily basis during the analyzed timeframe. Furthermore, the five banks with the lowest mean value, BOB, are ICICI and SBI, followed by HDFC and Kotak Mahindra Bank. During the analyzed period, the average Negative Mean AR experienced daily underperformance compared to the expected return.

Inferential study
Graphical representation of AR for all Six banks

Graph 2 Graphical representation of AR for six banks





Author's own compilation

1. HDFC Bank: We observed an abnormal return on the stock of HDFC Bank on the 13th and 28th day, respectively, before and after the war, with a confidence level of 90%. Additionally, an abnormal return occurred on the 27th day following the event announcement, with a confidence level of 95%. Furthermore, the data revealed an abnormal return on the 25th, 33rd, and 34th days, with a confidence level of 99%. Therefore, we rejected the null hypothesis on these days, indicating an impact of the event on the HDFC Bank stock's performance, and accepted the alternate hypothesis on the day of the event itself. On all other days, the null hypothesis received acceptance.
2. ICICI Bank: We found an abnormal return on ICICI Bank's stock on the 25th day post-war, with a 95% confidence level. Therefore, we rejected the null hypothesis on these days, indicating an impact of the event on the ICICI Bank stock's performance, and accepted the alternate hypothesis on the day of the event itself. On all other days, the null hypothesis received acceptance.
3. Axis Bank: We found an abnormal return on AXIS Bank's stock on three days post-war, specifically the 25th, 28th, and 33rd days, with a 95% confidence level. Furthermore, we observed an abnormal return on the 3rd and 42nd days, post-war, for the confidence level at 99%, and an abnormal return on the 21st day, the day before the war. Thus, the null hypothesis was rejected on these days, showing there was an impact of the event on the performance of the AXIS Bank stock, and the alternate hypothesis was accepted on the event day. On all other days, the null hypothesis received acceptance.
4. SBI: The return on SBI bank's stock was found to have an abnormal return on two days post to the war, i.e., on the 20th day and 42nd day for the confidence level at 90%. Prior to the war, we observed an abnormal return on the 11th and 17th days. Additionally, there were abnormal returns on the 29th, 35th, and 38th days prior to the event announcement day, resulting in a 95% confidence level. Furthermore, we found an abnormal return on the 10th, 15th, 37th, 40th, and 41st days for the confidence level at 99%, prior to the warning. Consequently, we rejected the null hypothesis on these days, indicating that the event had an impact on the performance of the SBI bank stock, and accepted the

alternate hypothesis on the day of the event. On all other days, the null hypothesis received acceptance.

5. Kotak Bank: The stock of Kotak Mahindra Bank experienced an abnormal return on the 44th day post-war, with a confidence level of 90%. Additionally, the stock experienced an abnormal return on the 18th day prior to the event announcement, resulting in a confidence level of 95%. On these days, we rejected the null hypothesis, indicating that the event had an impact on the Kotak Mahindra Bank stock's performance, and we accepted the alternate hypothesis on the event day. On all other days, the null hypothesis received acceptance.
6. Bank of Baroda: We found an abnormal return on Bank of Baroda's stock on the 24th, 39th, and 44th days post-war, with a confidence level of 90%. Prior to the war, the stock showed abnormal returns on the 6th, 7th, 11th, 14th, 18th, and 25th. Additionally, there were abnormal returns on the 3rd, 7th, and 44th day after the war, as well as on the 12th, 20th, 23rd, 32nd, 42nd, 43rd, and 45th day prior to the event announcement day, resulting in a confidence level of 95%. Furthermore, the data revealed an abnormal return on the 1st, 6th, and 33rd days, with a confidence level of 99%, as well as on the 8th, 13th, 21st, and 37th days post-war and prior to the war. On the day of the event, there was also an abnormal return at a confidence level of 99%, with a t-cal value of -3.8049. Thus, the null hypothesis was rejected on these days, showing there was an impact of the event on the performance of the SBI bank stock, and the alternate hypothesis was accepted on the event day. On all other days, the null hypothesis received acceptance.

3. RESULTS AND DISCUSSION

Table 1: Hypothesis

Bank	Prior to event Hypothesis Rejected/Accepted	Post to event Hypothesis Rejected/Accepted
HDFC	Null hypothesis accepted on all days except 13th day pre to the event. So alternate hypothesis was accepted.	Null hypothesis was accepted on all days except 25th, 27th 28th, 33rd and 34th day post the event. So, in these two days alternate hypothesis was accepted.
ICICI	Null hypothesis was accepted on all days thereby rejecting the alternate hypothesis prior to the event announcement day.	Null hypothesis was accepted on all days except 25th day post the event. So, this day alternate hypothesis was accepted.
AXIS	Null hypothesis was accepted on all days except on 21st day prior to the event thereby rejecting the alternate hypothesis.	Null hypothesis was accepted on all days except 3rd, 25th, 33rd, and 42nd day post the event. So in these days alternate hypothesis was accepted.
SBI	Null hypothesis accepted on all days except on 10th, 11th, 15th, 17th,29th, 35th,37th, 38th, 40th, and 41st day pre to the event. So, in these days alternate hypothesis was accepted.	Null hypothesis accepted on all days except event day and on 20th and 42nd day post the event. So, in these days alternate hypothesis was accepted.
KMB	Null hypothesis accepted on all days except 18th day prior to the event. So, on this day alternate hypothesis was accepted.	Null hypothesis accepted on all days except event day and on 44th day post the event. So, in these seven days alternate hypothesis was accepted.

BOB	Null hypothesis accepted on all days except on 6th, 7th, 8th,11th, 12th, 13rd, 14th, 18th, 20th, 21st, 23rd, 25th, 32nd, 37th, 42nd, 43rd and 45th day pre to the event. So, in these days alternate hypothesis was accepted.	Null hypothesis accepted on all days except 1st,3rd, 6th, 7th, 24th, 33rd, 39th, and 44th day post the event. So, on this day alternate hypothesis was accepted. Also, on event day alternate hypothesis was accepted.

Author's own compilation

4. CONCLUSION

- We have individually analyzed each bank's performance, taking into account multiple events and timelines. This granular analysis fills the gap in understanding event-specific impacts on financial institutions.
- The study provides insights into whether market behavior remained stable (null hypothesis accepted) or displayed volatility (alternate hypothesis accepted) across 90 days for global crises like the Russia-Ukraine war.
- The study highlights variations and significant deviations (acceptance of the alternate hypothesis) that occurred across banks in response to similar events, providing insights into differences in resilience and risk exposure. In this case, we note deviations on certain pre-event and post-event days, indicating the partial impact of the event on stock performance.

5. LIMITATIONS

The research appears to focus on the short-term impact of events (e.g., a 90-day period around the event), therefore possibly excluding the long-term consequences on stock performance. Extended observation times could expose more complex tendencies.

The study is limited to the banking industry. As such, the results may not be applicable to other industries, thereby limiting the scope of the conclusions to the banking sector.

Changes in stock market policies and banking laws during the study period might effect the results obtained. In recent years, SEBI and NSE have initiated many critical regulatory changes that aspire to enhance market credibility, reduce guessing, and manage risks, particularly in the derivatives market.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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