

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

Abstract

Aim: To study the impact of Russia-Ukraine event on the performance of Banking sector stocks.

Study designs: The descriptive statistical analysis has been done for selected six 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 NSE site and study duration is pre and post 90 days from the event day and 120 days for event window and 210 days for estimation window has been considered.

Methodology: Event analysis method has been used in which paired t-test has been employed. We have checked Significant at 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 degree of relationship between the two variables, we have tried to analyse financial markets respond to changes in the war like 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 behaviour remained stable (null hypothesis accepted) or displayed volatility (alternate hypothesis accepted) across 90 days for global crises like the Russia-Ukraine war.

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 having a large impact on oil prices, global trade, and even inflation. This put a round of pressure on Indian banks because of inflation, exchange risks, and changing 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 analysis. The following descriptive statistical analysis has been done for selected six banks and is based on the Russia-Ukraine war with event date, t as 24th February 2022, and Event window is of 90 days i.e. 45 days pre and post the event i.e. $t-45$ to $t+45$ days. The event window lies from 24th December 2021 to 05th May 2022 only trading days has been considered hence holidays are excluded. In this study we have considered 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. Data analysis is conducted by the application of 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, risk and return are closely related. 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 analyses 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 unidirectional feedback metrics show that the USA, Brazil, and Russia lead Japan and China more than vice versa. Sidhu and Suri (2022) The unforeseen conflict between Russia and Ukraine has profoundly affected the global economy. It has not only affected the stock markets but also the lives of individuals around. India cannot afford to be insular. Global markets continue to endeavour 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 analysed the weekly time-series data of these companies and assessed their performance throughout this five-month period. We have computed the percentage variation in the share prices of these companies and analysed the trend of their performance using graphs. Tank and Ospanova (2022), The Russian economy have been severely impacted by unprecedented Western sanctions, 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 uses inflation-target economies and few 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 a regime-switching open 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. Primary data was acquired from 100 South Gujarat investors using 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. Investment decisions are influenced by risk, return, market trends, and prior performance. Age, gender, and income affect investment decisions. Pynnönen (2022), Owing to the non-normal distribution of stock returns, nonparametric rank tests are increasingly favoured over parametric testing in financial economics event studies. In rank tests, the cumulative abnormal returns (CARs) across numerous days are substituted by cumulative ranks. This research suggests enhancements to current methodologies to more effectively address cross-sectional correlation of returns resulting from overlapping event windows in calendar time. Simulations indicate that the proposed rank test is well calibrated for evaluating CARs and 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),

They have performed an analysis on 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 employed a methodology resilient to outliers in existing event research examining the impact of US financial reform on the stock markets of the ten largest global nations, yielding results that significantly diverge from the original OLS findings. 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 aforesaid mentioned 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 degree of relationship between the two variables, we have tried to analyse financial markets respond to changes in the war like situation and how conditions impact asset prices.

1.a. OBJECTIVE, AND SCOPE

The research primarily aimed to determine extent of relationship with different banks and degree of association to which the specific factors and event was involved to influence chosen banking sector's Stocks. To study the impact of 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

The following descriptive statistical analysis has been done for selected six banks and is based on the Russia-Ukraine war with event date, t as 24th February 2022, and Event window is of 90 days i.e. 45 days pre and post the event i.e. t-45 to t+45 days. The event window lies from 24th December 2021 to 05th May 2022 only trading days has been considered hence holidays are excluded. In this study we have considered estimation window for 120 days i.e. from t-210 to t-91. The Indian stock market comprises of numerous indices viz: Banknifty, 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 single research. The 06 banks comprising Bank Nifty are HDFC Bank, ICICI Bank, SBI, Kotak Mahindra Bank, Axis Bank, and Bank of Baroda.

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

List 1- Paired t-test conducted in accordance with the other studies

Calculation of Abnormal return and cumulative abnormal return

The daily returns of the twelve stocks must be computed to determine the daily abnormal returns for each stock. Additionally, to compute abnormal return, actual returns must be juxtaposed with normal return. Equation illustrates the computation of normal return.

$$ER_{it} = a + bR_{mt}$$

In this context, R_{it} represents the rate of return on day t for stock i within the estimate window in the regression, with the intercept designated as 'a' and the slope coefficients as 'b'. R_{mt} denotes the return rate on day t for the benchmark index. The "a & b" coefficients are calculated utilizing data from $t-270$ to $t-91$, encompassing a total of 180 days.

The abnormal daily return is calculated by deducting the normal return from the actual daily return and its anticipated return based on previous performance. The abnormal return, AR_{it} , is computed using the risk-adjusted return methodology and assessed over the event window concerning stock prices.

$$AR_{it} = R_{it} - ER_{it}$$

Where:

AR_{it} is abnormal return, on stock i for day t ;

R_{it} is actual return, for stock i .

ER_{it} is normal return on, the stock i for day t . (Seiler, 2003)

The actual return, R_{it} , is calculated on MS-excel by using the following formula,

$$R_{it} = (P_{it} - P_{it-1}) / P_{it}$$

$$AR_{it} = R_{it} - ER_{it}$$

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

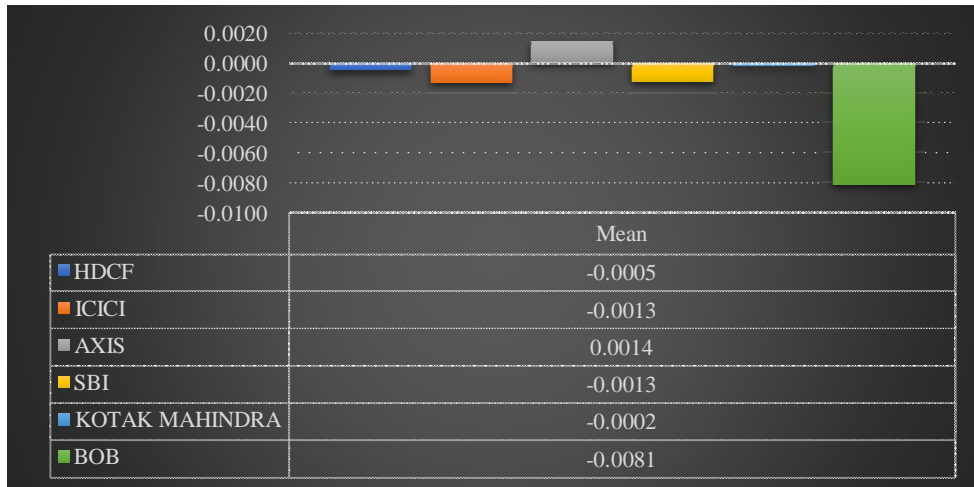
AR_{it} represents the abnormal return for stock i on day t ; R_{it} is the true return for stock i . ER_{it} is the usual return on the stock for day t , Seiler (2003). The actual return, R_{it} , is computed in MS Excel using the following formula.

Where:

P represents the observed price, where the subscript t denotes time; P_{it} signifies the current price or opening of stock i , and P_{it-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. The ARs and CARs are computed to determine cross-sectional and time-series aggregation for the specified period. The t-statistics for abnormal returns (ARs) are computed by dividing the ARs by the standard deviation of the sample, which is further divided by the square root of the sample size. We have checked Significant at 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).

Pictorial representation

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



Author's own compilation

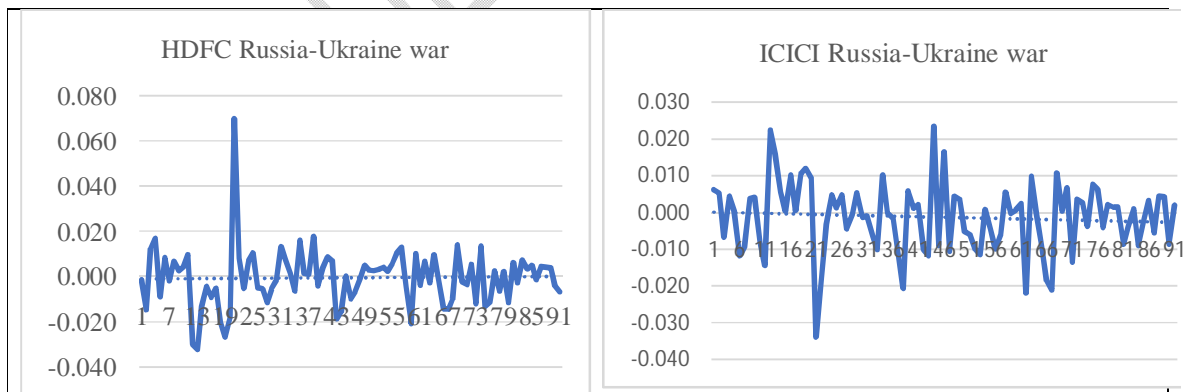
Explanation

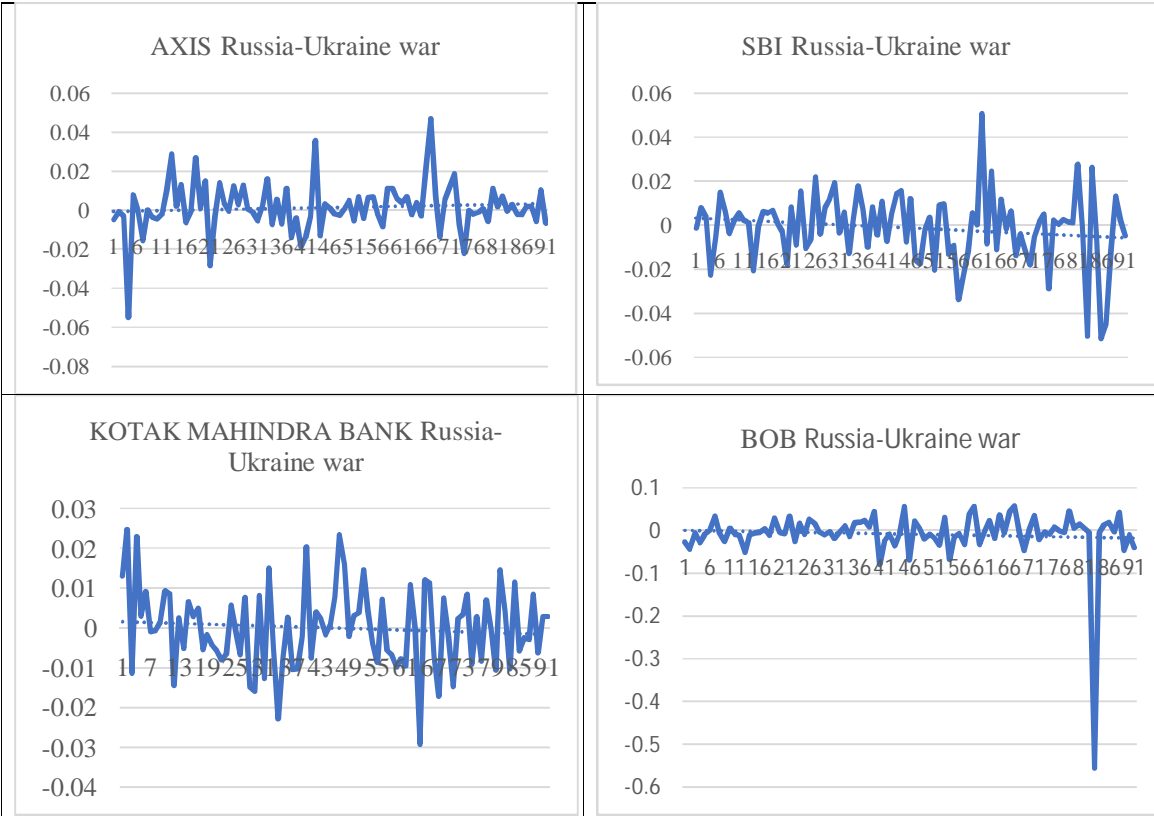
The above histogram shows the pictorial representation of the mean value for all the six banks, indicating that, out of six only one was positive and five were negative. The banks which were having positive mean value are AXIS. Positive Mean AR of AXIS bank, on average, experienced daily outperformance compared to the expected return during the analysed timeframe. Further, the five banks with negative mean value BOB have the lowest mean value, after which is ICICI and SBI, followed by HDFC and then Kotak Mahindra Bank. Negative Mean AR, on average, experienced daily underperformance compared to the expected return during the analysed period.

Inferential study

Graphical representation of AR for all Six banks

Graph 2 Graphical representation of AR for six banks





Author's own compilation

- HDFC Bank:** The return on HDFC bank's stock was found to have abnormal return on one day each prior and post to the war i.e. on 13th day and 28th day for the confidence level at 90%. Also, it had abnormal return on 27th day post to the event announcement day for the confidence level to be at 95%. Further it was found to with abnormal return on 25th day, 33rd day and 34th day for the confidence level at 99%. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the HDFC bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.
- ICICI Bank:** The return on ICICI bank's stock was found to have abnormal return on one day post to the war i.e. on 25th day for the confidence level at 95%. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the ICICI bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.
- Axis Bank:** The return on AXIS bank's stock was found to have abnormal return on three days post to the war i.e. on 25th day, 28th day and 33rd day for the confidence level at 95%. Further it was found to be with abnormal return on 3rd and 42nd day for the confidence level at 99%, post the war and had abnormal return on one day pre to the war i.e. on 21st day. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the AXIS bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.
- SBI:** The return on SBI bank's stock was found to have abnormal return on two days post to the war i.e. on 20th day and 42nd day for the confidence level at 90%. And pre to the war even it was found to have abnormal return on 11th day and 17th day. Also, it had abnormal return on 29th day, 35th and 38th day pre to the event announcement day for the confidence level to be at 95%. Further it was found to with abnormal return on 10th, 15th, 37th, 40th and 41st day for the confidence level at 99%, prior to the warn. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the SBI bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.

- **Kotak Bank:** The return on Kotak Mahindra bank's stock was found to have abnormal return on one day post to the war i.e. on 44th day for the confidence level at 90 %. Also, it had abnormal return on 18th day prior to the event announcement day for the confidence level to be at 95 %. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the Kotak Mahindra bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.
- **Bank of Baroda:** The return on Bank of Baroda's stock was found to have abnormal return on two days post to the war i.e. on 24th day, 39th and 44th day for the confidence level at 90%. And pre to the war even it was found to have abnormal return on 6th, 7th, 11th, 14th, 18th and 25th day. Also, it had abnormal return on 3rd, 7th and 44th day post the war and on 12th, 20th, 23th day, 32nd, 42nd, 43rd and 45th day pre to the event announcement day for the confidence level to be at 95 %. Further it was found to with abnormal return on 1th, 6th, 33rd day for the confidence level at 99%, post to the war and prior to the war on 8th, 13th, 21st and 37th day. On the event day also, it was having abnormal return at confidence level of 99% with t-cal to be - 3.8049. Thus, the null hypothesis was rejected on these days, showing there was impact of the event on the performance of the SBI bank stock and the alternate hypothesis was accepted on the event day. Also, Null hypothesis was accepted on all the other days.

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	<p>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.</p>	<p>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.</p>
------------	---	--

Author's own compilation

4. CONCLUSION

- Each bank's performance has been analyzed individually, considering 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 deviation (acceptance of the alternate hypothesis) occurred across banks in response to similar events, which provides insights into differences in resilience and risk exposure. For example, in this case, deviations are noted on certain pre-event and post-event days, indicating the event's partial impact on stock performance.

4.a. 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 just covers the banking industry. As so, the results might not apply to other industries, therefore restricting the range of the conclusions to the banking sector.
- Changes in stock market policies and banking laws during the study period might have an effect on 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.

COMPETING INTERESTS DISCLAIMER:

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.

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.

REFERENCES

1. Balaji, C., & Kumar, D. G. P. (2017). An assessment of stock performance of selected public and private sector banks in India. *Gitam Journal of Management*, 15(2).

2. Dyckman, T., Philbrick, D., & Stephan, J. (1984). A comparison of event study methodologies using daily stock returns: A simulation approach. *Journal of accounting research*, 1-30.
3. Mobarek, A., & Mollah, S. (2016). Market Integration in Developed and Emerging Markets. *Global Stock Market Integration*, 73–97. https://doi.org/10.1057/9781137367549_3
4. Sidhu, K. S., & Suri, P. (2022). The Impact Of Russia-Ukraine War On Indian Stock Market– An Empirical Study. *NeuroQuantology*, 20(13), 420.
5. Tank, A., & Ospanova, A. (2022). Economic impact of Russia–Ukraine war. *International Journal of Innovative Research in Science Engineering and Technology*, 11(4).
6. Tipoy, C. K. (2024). Do Central Banks Respond to Exchange Rate Movements? A Structural Analysis of Selected Inflation Targeters Emerging Economies.
7. Patel, B., & Modi, V. (2017). Impact of demographic factors on investment decision: an empirical study from South Gujarat Region. *International Journal of Latest Engineering and Management Research*, 2(12), 31-38.
8. Pynnonen, S. (2022). Non-parametric statistic for testing cumulative abnormal stock returns. *Journal of Risk and Financial Management*, 15(4), 149.
9. Sorokina, N., Booth, D. E., & Thornton, J. H. (2021). Robust Methods in Event Studies: Empirical Evidence and Theoretical Implications. *Journal of Data Science*, 11(3), 575–606. [https://doi.org/10.6339/jds.2013.11\(3\).1166](https://doi.org/10.6339/jds.2013.11(3).1166)

Webliography

1. www.nseindia.com