

The War between Russia and Ukraine and its Effects on the Indian Stock Market

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Abstract: *The world economies are still not over the impact of COVID 19 pandemic when Russia started war on Ukraine on February 24, 2022. The global economies sided for and against Russia, while few countries took a neutral stand like India. This study analyses the impact on the war on Indian stock market. We analyse BSE sectoral indices which includes Metals, Oil and Gas, Raw materials, Auto, Energy, FMCG, Industrial, Infrastructure Manufacturing for a short window period from the start to the partial end of the war which includes all sanctions imposed on Russia by the global economies. Using technical stock market indicators like MA, SMA and EMACD, this study finds that Indian stock market was not affected by Russia Ukraine war. The sectoral indices depicted an uptrend and the volatility index showed a downtrend. To further confirm our findings, the study analyses the abnormal returns (AR) and Cumulative Abnormal Returns (CAAR) of the sectoral indices through Event Study Analysis for 21 days around the date of declaration of war. The findings show that there was no value destruction in any of the indices during the observed period which confirm with the previous findings. The findings of this study are interesting and has implications from a practical standpoint considering that all the sectors in Indian stock market are doing well irrespective of the rising oil prices and materials shortage because of the war.*

Keywords: Indian Stock Market, Russia-Ukraine war, BSE, Global Economic

I. INTRODUCTION

The impact of events on stock market is a quite frequently researched area of study. Researchers have found that many events like pandemic, recession, economic downturn, political events, and war among countries have had significant impact on the stock price movements. With the spillover effect in place, any unforeseen event in any part of the world has an impact on almost all major global markets. This study analyses the impact of Russia-Ukraine war on the Indian stock market. With the economy just recovering from the hit of COVID 19 pandemic, the announcement of Russia-Ukraine war is a significant blow to the global markets. The study uses technical indicators of the stock markets and also adopts an event study methodology to analyze the same.

Technical analysis is the tool for forecasting future prices of particular share or market based on an investigation of the past price movement. Basically, technical analysis consists of examine current demand and supply of stocks, commodities, indices, futures, option or any tradable instruments. Technical analysis involves add stock information like price, volumes, chart, candles, support and resistance and applying various pattern and indicator in order to analyse the future price movements. Generally, there are two methods of analyzing investment opportunities market, that is fundamental and technical analysis. Technical analysis ignores the fundamental analysis and focus on the actual current price movement.

1.1 Objectives of the Study:

- To explore abnormal movement of stock prices in the period of the study.
- To analyse the reason behind the abnormal movements and capturing the impact before and after the event occurs.
- To study the relevance of Russia-Ukraine war in Indian stock market.

1.2 Scope of the Study:

This study is based on the historical prices of selected sector stocks that influenced for certain period of time. This primarily examine the impact of Russia- Ukraine war and its effect on the Indian stock market. This study will provide a view into the different types of technical analysis. The selected sector’s stock and which will help to identify the market trend. Event study analysis helps to confirm the findings of the technical analysis through analysing the AR and CAAR for the specified period.

The rest of the chapters are arranged as follows: Chapter 2 talks about a few significant literatures works in the area, Chapter 3 talks about the Methods and Materials, Chapter 4 speaks about the analysis and interpretations and finally Chapter 5 concludes with suggestions and implications.

II. LITERATURE REVIEW

Boobalan-2004 states that there is only one side to the stock market and it is not the bull side or the bear side but the right side. Technical analysis can be used, when to buy and to when to sell the stock.

Hemal Pandya-2013 states that in technical analysis price is not revealing everything, they consider both price and signal. Signal consist of whether the market is uptrend or down trend.

Krishnaprabha and Vijayakumar (2015) studied on Indian stock market to find the risk and return. They found that investors can get more return by investing for a long-term period rather than short term.

Dr.James Thomas 2021 believes that a chart and candle can give the huge amount of information. According to the author that price movement in chart can depict.

Camillo lento and Nikola gradojevic 2022 suggest that TRs may be useful for investor during market crash, TRs tools could generate positive profits in crash time.

Girija Nandhini-2020 states that the problem occurs if we are depending upon any single indicator that might generates some false buying and selling signals, hence to remain inn safe side and to predict the movement with higher accuracy we should use a combination of technical indicators.

Tareek Pattewar-2022 states that the stock market will reflect an economy's economic condition. If an economy is growing, output will rise and most business should earn more. Since of the higher profit the company stock becomes more appealing o investor because it can pay larger dividend to shareholders

III. METHODS AND MATERIALS

3.1 Event Study Methodology

The study focuses at analysing the price movement of selected sector’s scrip. As the study reveals the impact of Russia-Ukraine war on the Indian stock market. Generally fundamental and technical analysis is used to analyse the stock trend. In this study technical analysis is used to calculate the price movement of selected sector scrip. The study also adopts event study methodology by Dan & Brawn (1985) to calculate the AR & CAAR.

This study uses a short-term event window of the estimation period -11 to +11 days around the announcement period. The CAR (Cumulative Abnormal Returns) is observed for (-1, +1), (-3, +3),(-5, +5) and (-7,+7) around the announcement. Brown and Warner (1985) presented various measures in an event study methodology to test for excess returns. They were: Mean Adjusted returns, Market adjusted returns and Ordinary Least Square market model. This study adopts the Market model for calculating the abnormal returns from Chatterji & Juenzi (2001) for its popularity in the literature.

The market model of Chatterji & Juenzi ,2001:

The market model assumes that the stock returns are determined by the following Ordinary Least Square equation:

$$NR_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_{jt} \dots\dots\dots 1$$

NR_{jt}= normal rate of return for company j on day t;

R_{mt}= rate of return for market index m on day t;

ε_{jt} = error term for company j at time t.

The coefficients α_jand β_jare the ordinary least squares parameters of the intercept and slope, respectively, for company j.

The abnormal return AR_{jt} for the company j will then be calculated as:

$$AR_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt}) \dots\dots\dots 2$$

- AR_{jt} = Abnormal return for company j on day t.
- R_{jt} = Return for company j on day t
- α_j = Estimate of OLS parameter of intercept
- β_j = Estimate of OLS parameter of slope
- R_{mt} = Rate of return of market index m on day t.

The Cumulative Abnormal Returns are calculated using:

$$CAR_{(t, T)} = \sum^T AR_t \dots\dots\dots 3$$

- AR_t = average abnormal return on day t;
- t, T = Accumulation period

Examining the CAR of a set of sample securities will be used to look at whether or not the values of the average residuals, starting from the day of cumulation and up to a specific point, are systematically different from zero (Chatterji & Juenzi (2001)).

3.2 Data

The data have been collected from Refinitiv Eikon .In this study secondary data is used for technical analysis part and daily price movement of the selected sector in both NSE and BSE were absorbed the time period of 1st January 2022 to 1st July 2022 and mainly focus at 24th February to 11st May 2022, which is Russia declared war on Ukraine and partially came to an end. The study has 176 observations. These sectors from BSE and NSE over the observed time period collates to lie a voluminous panel date.

3.3 Variables

3.3.1 Simple Moving Average

The simple moving average is a technical indicator is formed by computing the average price of time. It is calculated by adding the closing price of specified period of time and dividing it by same period.

For example: 10 day moving average is calculated by adding the closing prices for the last 10 days and dividing the total by 10

$$SMA = (A1+A2+A3+\dots\dots\dots+An)/n \text{ OR}$$

$$= A1/n+A2/n+A3/n\dots\dots+An/n$$

3.3.2 Exponential Moving Average

Exponential moving average (EMA) is similar to the SMA line except the given days. It is formed by applying weight to the recent price changes.

$$EMA = (\text{Close price} - EMA(\text{previous day}) * \text{multiplier} + EMA(\text{previous day}))$$

$$\text{Multiplier} = (2/\text{time period} + 1)$$

3.3.3 Moving Average Convergence and Divergence (MACD)

Moving average convergence and divergence is a most popular indicator of technical analysis tools and also simplest and most effective indicator. It tries to predict stock market trend by comparison of short- and long-term trends. By discover the difference between 26 days EMA to 12 days EMA.

- MACD Line: 12 days EMA-26 days EMA
- Signal Line: 9 days EMA of MACD line
- MACD histogram: MACD line-signal line

3.3.4 Relative Strength Index

It is developed by J.Welles Wilder and it is one of the widely used tools for the technical analysis. RSI fluctuates between 0 to 100. When the trend line is above 70 means overbought of stock is happening and when the trend line oscillates between 30 means then oversold process is takes place.

$$RSI = 100 - (100 / (1 + RS))$$

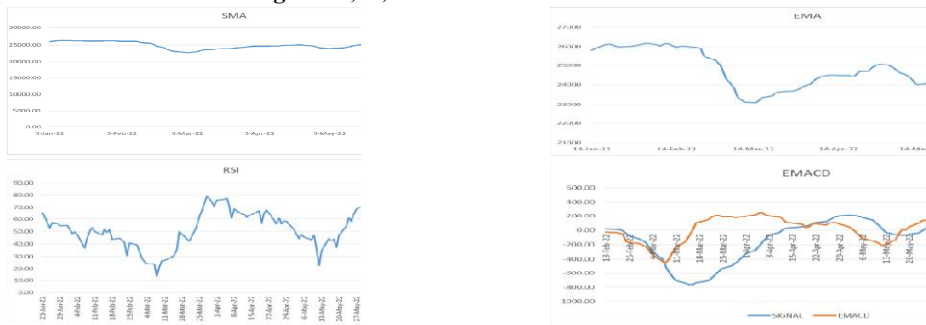
RS = Relative strength
RS = Average gain/ Average loss

IV. ANALYSIS AND INTERPRETATION

The figures below represent the computed Simple Moving Average, Exponential Moving Average, Relative Strength Index and Moving Average Convergence and Divergence for different sectors in BSE like Auto, Basic Material, Energy, Oil & Gas, Metals, Manufacturing, FMCG, Infrastructure and Industrial. The technical indicators have also been computed for India VIX and BSE Low volatile Index. From the figures it is clearly visible that the Indian stock market is not affected by Russia-Ukraine war. Though the stock market shows a slight downturn before the announcement of the war, the market goes to a bullish phase after the war had begun. This could be due to the policy and stand taken by India during the war. The results of India VIX also shows a downturn which confirms our findings that our market is doing well even during war.

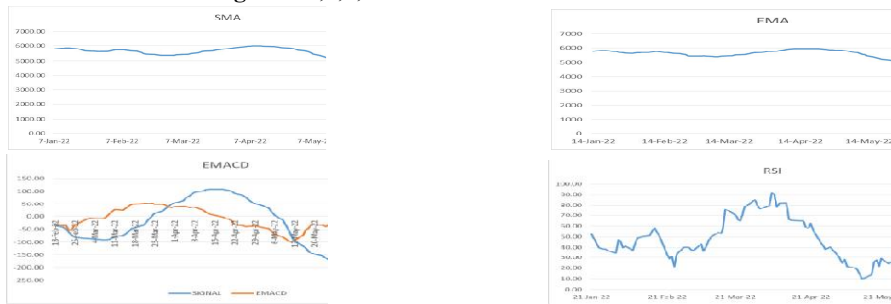
4.1 BSE Auto

Figures 1, 2 ,3 & 4: Technical Indicators of BSE Auto



4.2 BSE Basic material

Figures: 5,6,7,8: Technical Indicators of BSE Material



4.3 BSE ENERGY

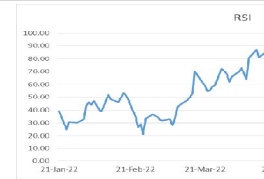
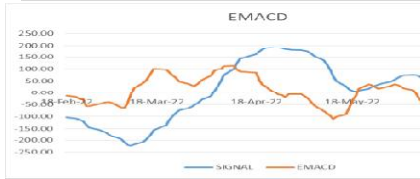
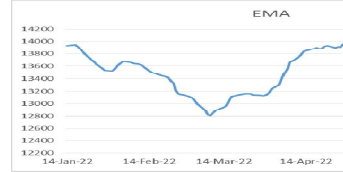
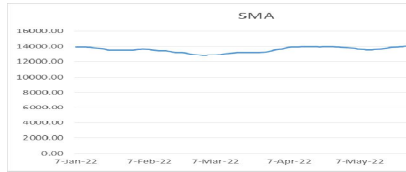
Figures 9,10,11,12: Technical Indicators of BSE Energy





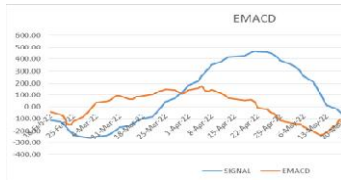
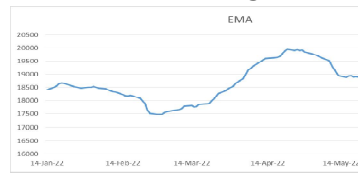
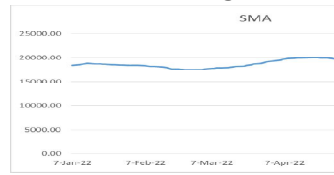
4.4 BSE FMCG

Figures 13,14,15,16: Technical Indicators of BSE FMCG



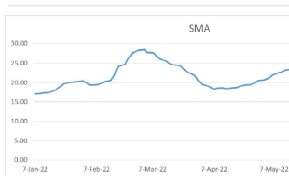
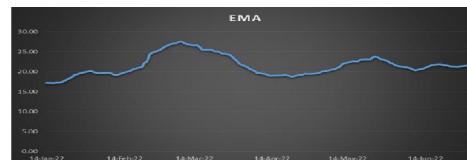
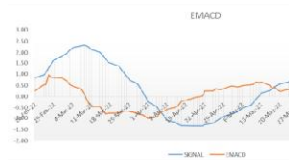
4.5 BSE Oil and Gas

Figures 17,18,19,20: Technical Indicators of BSE oil & gas



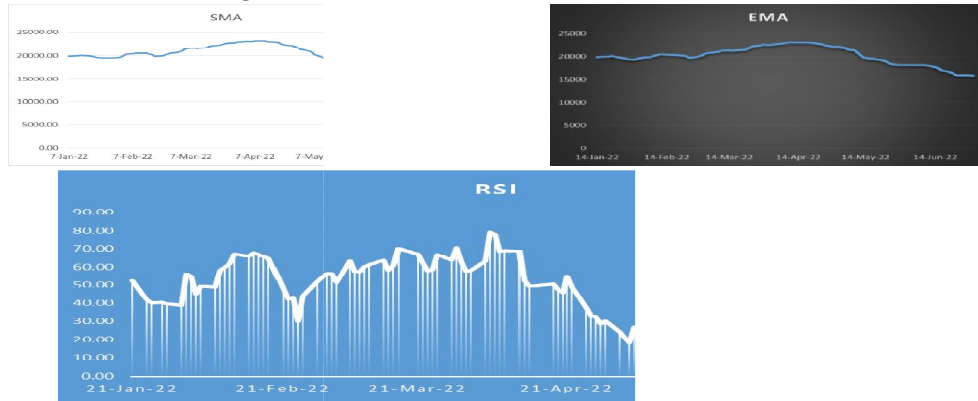
4.6 NSE India VIX

Figures 21, 22, 23, 24: Technical Indicators of NSE India VIX



4.7 BSE Metal

Figures 25,26,27: Technical Indicators of BSE Metal



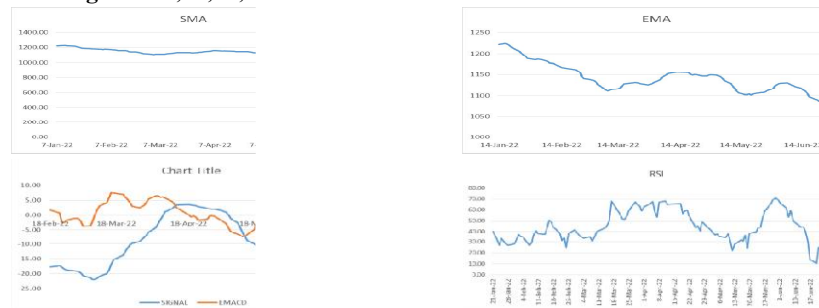
4.8 BSE Manufacturing

Figures 28,29,30,31: Technical Indicators of BSE manufacturing



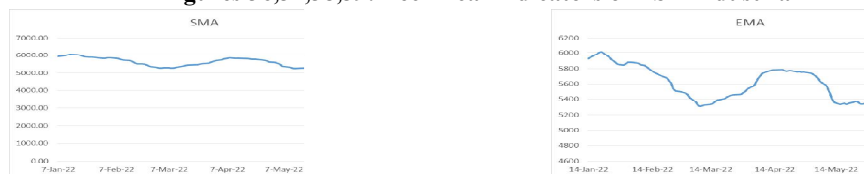
4.9 BSE Low Volatile Index

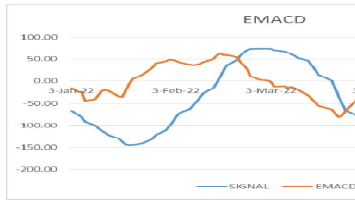
Figures 32,33,34,35: Technical Indicators of BSE Low Volatile Index



4.10 BSE Industrial

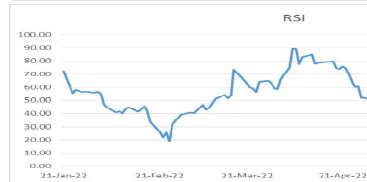
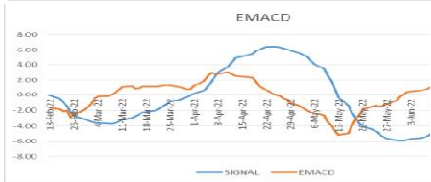
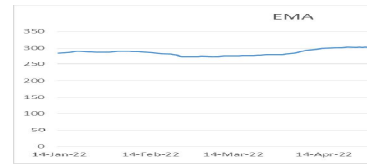
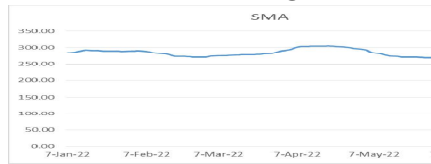
Figures 36,37,38,39: Technical Indicators of BSE Industrial





4.11 BSE Infrastructure

Figures 40,41,42,43: Technical Indicators of BSE Infrastructure



4.12 Abnormal return

Table 1 shows the AR of sectoral indices of BSE. The results show that the AR is almost positive for all sectors. The AR for BSE Low volatile index is significant at 95% confidence interval.

Table 1: AR for different sectoral indices of BSE
One-Sample Test

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
AR_Auto	-1.629	40	.111	-.54752	-1.1133	.0183
AR_Basic Material	-.706	40	.484	-.21145	-.7156	.2927
AR_Energy	-.560	40	.579	-.15806	-.6336	.3175
AR_FMCG	-1.573	40	.124	-.37402	-.7745	.0265
AR_Industrial	-1.504	40	.140	-.45241	-.9588	.0540
AR_Infrastructure	-1.343	40	.187	-.35733	-.8052	.0905
AR_Low Volatile Index	-2.025	40	.050	-.45182	-.8274	-.0762
AR_Manufacturing	-1.235	40	.224	-.32622	-.7712	.1187
AR_Metal	.406	40	.687	.15622	-.4918	.8042
AR_Oil and Gas	-.925	40	.360	-.23563	-.6644	.1932

The Table 2 below shows AR for 21 days around the event day. The AR for days -10, -9, -8, -7, -4, -3, -2, 2, 5, 6, 9 days are significant at 99% confidence interval. The AR for event day is significant at 100% confidence interval.

**Table 2: AR for -10 to +10 days
One-Sample Test**

Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
-10	3.733	9	.005	.50291	.2560	.7499
-9	-7.642	9	.000	-1.25018	-1.5501	-.9503
-8	-13.325	9	.000	-4.20229	-4.7804	-3.6242
-7	13.785	9	.000	3.12834	2.7123	3.5443
-6	-1.043	9	.324	-.12446	-.3433	.0944
-5	.469	9	.650	.07371	-.2145	.3619
-4	-6.234	9	.000	-.70367	-.9106	-.4968
-3	-8.757	9	.000	-1.53878	-1.8609	-1.2167
-2	-11.075	9	.000	-1.17523	-1.3698	-.9807
-1	.165	9	.873	.01668	-.1691	.2025
0	-27.133	9	.000	-6.35315	-6.7824	-5.9239
1	1.454	9	.180	.63992	-.1669	1.4467
2	2.740	9	.023	1.43500	.4751	2.3949
3	-.290	9	.779	-.17940	-1.3148	.9560
4	-1.820	9	.102	-.75402	-1.5136	.0055
5	-9.667	9	.000	-2.62736	-3.1256	-2.1291
6	-3.384	9	.008	-2.14661	-3.3094	-.9838
7	-.946	9	.369	-.30186	-.8869	.2832
8	2.803	9	.021	1.13229	.3918	1.8727
9	8.995	9	.000	1.34333	1.0696	1.6171
10	-.693	9	.506	-.08500	-.3098	.1398

4.13 Cumulative Abnormal Returns

Table 3 below shows the CAR for four window period around the event. The CAR for all four window periods is significant at 100% confidence interval.

Table 3: CAR for (-1,1), (-3,3), (-5,5), (-7,7)

One-Sample Test
Test Value = 0

	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
(-1,+1)	-20.399	9	.000	-13.20824	-14.3952	-12.0213
(-3,+3)	-7.167	9	.000	-14.83418	-18.6284	-11.0400
(-5,+5)	-6.130	9	.000	-19.82970	-25.7600	-13.8995
(-7,+7)	-6.657	9	.000	-25.12222	-32.0396	-18.2049

Table 4 shows the CAR for sectoral indices. Except for BSE Metal, All CAR shows the high significance at 95% confidence intervals.

Table 4: CAR of sectoral indices

One-Sample Test

	t	df	Sig. (2-tailed)	Mean Difference	90% Confidence Interval of the Difference	
					Lower	Upper
CAR_Auto	-4.460	3	.021	-32.03568	-48.9381	-15.1333
CAR_Basic material	-5.963	3	.009	-17.95029	-25.0340	-10.8665
CAR_Energy	-11.568	3	.001	-18.14500	-21.8364	-14.4536
CAR_FMCG	-5.394	3	.012	-18.57494	-26.6789	-10.4710
CAR_Industries	-5.190	3	.014	-23.39507	-34.0035	-12.7866
CAR_Infrastructure	-8.750	3	.003	-15.08342	-19.1402	-11.0266
CAR_Low volatility	-5.797	3	.010	-17.84117	-25.0838	-10.5985
CAR_Manufacturing	-5.786	3	.010	-21.68487	-30.5052	-12.8645
CAR_Metal	-1.010	3	.387	-2.68360	-8.9338	3.5667
CAR_Oil and Gas	-23.497	3	.000	-15.09182	-16.6034	-13.5803

V. CONCLUSION

The study tests the sensitivity of Indian stock market to Russia Ukraine war. The study had implied technical indicators like SMA, EMA, MACD, RSI to analyse the movement of stock prices of various sectoral indices in BSE around the time of the war. The results show that the stock market has taken a downturn before the war and moves to the bullish phase after the announcement of the war. The shift to the bullish phase may be due to the neutral phase that India took during the war. The analyses of the NSE India VIX shows a downturn after the war confirming our findings. The study also analyses the AR and CAR around the war which also shows positive AR and CAR with high significance confirming our previous findings. These findings show the significance of the policy and decisions the government takes during an uncertain situation.

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