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All weather friends: How did the Russia–Ukraine war impact Indian stock markets?

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Abstract: The article examines the impact of the Russia–Ukraine war on the Indian economy. Data for 12 sectoral indices and Nifty 50 were retrieved from the official website of the National Stock Exchange of India. Using event study methodology, findings suggest that on the event day, India saw negative average abnormal returns that persisted up to the fifth-day post the event day. Second, the automobile sector witnessed a continued negative abnormal return until the tenth day of the event window. The banking sector was on second, which hurt the most. It observed a high negative abnormal return. As this study supports the negative impact of the war on markets, it implies that investors diversify their funds away from the warzone markets.

Keywords: war; sectoral indices; India; Russia–Ukraine; event study.

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1 Introduction

War and conflict have far-reaching implications that extend beyond the battlefield, wreaking havoc on human and physical capital and wreaking havoc on the economy (Omar et al., 2017). Financial markets see devastating impacts as they are integrated, and diversification benefits get impeded. During wartime, the immunity of other nations to war cannot be accepted in its entirety. Nations are roped into the war directly or indirectly. They may have direct military participation in the war or have reduced the trade or influenced the war by other measures, such as providing weapons to nations at direct war at a subsidised price. Moreover, negative political events lead to a fall in markets (Wong and Hooy, 2021). After world wars (where direct participation in the war was seen), the globe has witnessed the same event but with indirect participation on 24 Feb 2022 when Russia invaded its old territory and a sovereign nation in today's world, Ukraine, to demilitarise it (Chenoy, 2022). Unlike World Wars I and II, this war has not seen any direct participation from the military of nations other than Russia and Ukraine. Rather, Europe and the USA have supported Ukraine from the backstage to tackle Russia's aggression (The White House, 2022). During the invasion, the USA imposed sanctions on major banks in Russia to execute any international transaction in US dollars. Later, it disconnected the SWIFT (Society for Worldwide Interbank Financial Telecommunications) services to major Russian banks. Russia is the Hub of Natural

Energy and Crude Oil and gas. Europe heavily depends on Russia for almost half of its natural gas consumption (Öncü, 2022).

In the global world, apart from being the third-largest oil producer, Russia holds the second position in the top crude oil-exporting countries (U.S. Energy Information Administration (EIA), 2021). Setting aside the energy sector, Russia and Ukraine hold a big portion of the raw materials for automobiles (OEC - The Observatory of Economic Complexity, 2022). Russia produces about 40% of the world's raw palladium, which is used to clean vehicle exhaust. However, it equals the need for automobiles by importing them. In the year 2020, it was the largest wheat-exporting country. Highlighting such an important position of Russia in global trade and the imposition of US sanctions on Russia, it is obvious that the war initiated by Russia would not leave other countries to enjoy immunity. However, less but the growing trade and strengthening of bilateral relations between India and Russia may have some insights regarding war impacts. India and Russia also share a deep and old friendly relationship (Ministry of External Affairs, 2020). In such a scenario, it is implied that India favours the non-violent stand. And the same pressure was exerted from the USA and European nations. The probable repercussion of India's favouring of Russia and the US sanction in response left the Indian markets and investors in fear. But it was unclear which sector of the Indian economy would be hit more by the Russia–Ukraine war. Therefore, this study has been undertaken to fill the lacuna of the impact of war on the Indian sectors. To answer the objective, we used the event study methodology. The study's findings are twofold, first Indian market was hit negatively by the war, but the impacts persisted only for five days. Second, the automobile sector is the worst-hit sector in Indian markets. As mentioned earlier, Russia and Ukraine both hold a significant position in the global raw material of the automobile sector.

The following sections of the study are as follows; Section 2 presents the Literature review. Section 3 talks about the database and methodology used in the study. After that Section 4 depicts the analysis of the results, and in the last section 5 concludes the whole study.

2 Literature review

Scopus database was used to retrieve prestigious articles to understand the literature on stock markets and literature. The relationship between stock markets and geopolitics tussles has been studied vastly in the literature (Urquhart and Hudson, 2016). Findings from Wisniewski (2016) have emphasised the importance of geopolitics. Their study has proved that political relevant events such as war, terror attacks, coups, and revolutions have a significant influence on the stock markets. Another study by Santhosh Kumar and Sanjeev (2020) has shown that terror attacks and GDP have negative relation. By seeing through the literature, we found that the initial phase of the research on stock markets and geological conflicts took the world war as a major event (Choudhry, 1997; Fernandez, 2008; Grossman and Shore, 2006; Manela and Moreira, 2017; Moayedi and Aminfarid, 2012; Schneider and Troeger, 2006a; Urquhart and Hudson, 2016). Another section of literature has taken the regional wars under the war event (Fernandez, 2007; Kollias et al., 2010). Most of the literature has examined the stock market's reaction to terror attacks (Bash et al., 2021; Fernandez, 2008; Papakyriakou et al., 2019). In the recent past, the majority of the studies in this field have undertaken the US–China trade war in their

mainstream research topics (Carlomagno and Albagli, 2022; Chen and Pantelous, 2022; de Nicola et al., 2020; Egger, 2020). During a conflict, changes in the financial markets have two effects: they either boost or reduce the price of shares, which makes an investor more concerned about their assets' future returns and risk. Those that do not use the right data will lose money. As a result, some events modify perceptions about an industry, a sector's, or the entire financial market's progression. Investors may interpret a rise in violence during wartime as a trend that has an impact on economic growth for as long as a battle is critical to the stock exchange of a particular market (Schneider and Tröger, 2006b). Nonetheless, wars have disastrous repercussions (Guidolin and la Ferrara, 2010; Wisniewski, 2016). They have a major impact on people and capital resources. Because war necessitates a massive expense for military equipment, weapons, and a large number of armed personnel, it is a zero-sum game (Nordhaus, 2002). War's harsh ramifications affect not just a single country but also other countries, as it disrupts the global supply chain. On the other hand, governments will spend vast sums on military ammunition, resulting in a global economic downturn (Cappelen et al., 1984; Deger and Smith, 1983). Army battles or terrorist attacks lead to a decline in the financial markets. Rigobon and Sack (2005) focused on the impact of the Baghdad war on US financial markets. They pointed out that war risk causes stock market and government treasury prices to decline. It has a positive impact on oil prices as well as the bond yield spread. Investors shift their cash away from hazardous investments and toward less risky ones. Wolfers and Zitzewitz (2009) used information from Tradesports-listed securities that promised a certain payout if Saddam Hussein was toppled. The 'Saddam contracts' pricing reflected the widespread conviction that Hussain would be ousted. Prior to military engagement, a ten-percentage-point increase in the risk of conflict generated a 1.5-percentage-point reduction in the S&P 500 index. Whereas Amihud and Wohl (2004) suggested that after the war started, the increasing chance of Saddam's demise would be viewed as a positive occurrence. It denotes the end of the conflict. As a result, throughout the war, the likelihood inferred from 'Saddam contracts' was positively connected with stock prices. Mixed results have been demonstrated by Kollias et al. (2010), who, in their study, have explored the influence of Israel's military operations on Gaza on the Tel Aviv Stock Exchange's stock and bond indices. They discovered that investors prefer to invest in bonds at the start of a dispute but that as the conflict progresses, they return to stocks. The important to remember is that, despite massive destruction, if investors see past the potential results, they can profit from the victorious nation's discounted benefits by investing in their markets. By using event study methodology, Hudson and Urquhart (2014) has pointed out that unfavourable occurrences for the British army result in negative stock returns on the next day of the conflict, while positive events result in positive stock returns. The unfavourable effects, however, outweighed the positive advantages. This is due to the loss aversion theory, which states that investors consider future loss and gain asymmetrically. Investors may behave irrationally as a result of their fear of loss, and they may withdraw from risky securities for a period of time. During any act of war, managers reduce the war by lowering dividends and maintaining a war chest; this step may tell investors to diversify their positions in the markets. On the contrary, Pyo (2021), in the context of South Korea, has demonstrated that geopolitical events have no impact on stock markets since market players are unlikely to overestimate the mere geopolitical risk of turning into a full-fledged conflict. Kollias et al. (2013) looked into how war and terrorist attacks affected the link between oil and stock markets. The consequences are more concentrated in the early stages of the battle, according to their research. It's worth

noting that, unlike previous studies, their claims that not all stock indices have been shaken by the war events. The efficient market hypothesis is the most likely explanation, as the unfolding of important events alerts investors and market agents to the dramatic repercussions on which they promptly modify their portfolios. Overall, the literature has a mixed school of thought. One argues that war escalation will reduce the price of the stocks since investors opt for less risky assets in their portfolio in uncertain times. In contrast, the other school of thought propounds that war escalation should be seen as the end of the war, and this, in turn, will reflect in the stock markets, and they will move upwards.

India has long camaraderie relations with Russia. Although in the last decade, it has been trying to build good relations with the rest of the major powers in the world. There are twofold benefits for India to have support from the global powers. First, it would boost its trade and economy. Second, it would help India counter China in any dispute on an international level. Over the past decades, India has become the top priority for foreign institutional investors, among other emerging markets, due to supply chain impediments in China (Justinek, 2021). Covid-19 has also contributed to some forces in the transfer of FII's interest in the Indian markets. The Russian invasion has provoked western countries to cut off Russia's economy from the rest of the world. The USA has imposed sanctions on some big corporate players in Russia (Justinek, 2022). Apart from governmental sanctions, giant corporations have shut down either their entire or a part of their operating units in Russia as human rights are given significant priority by business firms (Justinek, 2019; Justinek and Černič, 2022). In such a scenario, India had implied pressure from the west to condemn and stand against Russia's invasion. Such pressure of potential sanctions on India might have impacted the investors' sentiments. Therefore, this study took this opportunity to examine the impact of the Russia-Ukraine war on the sectorial indices' behaviour of Indian markets.

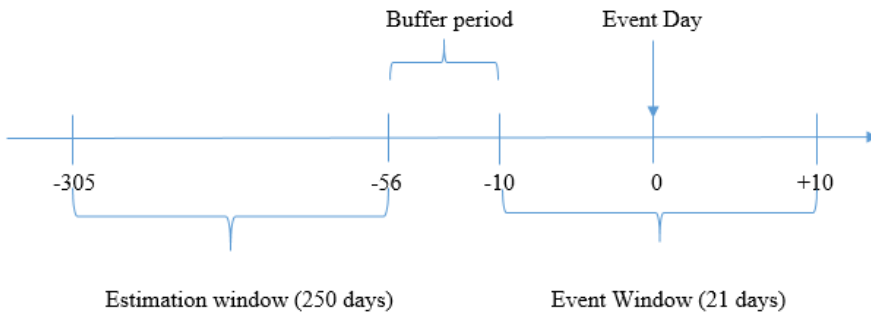
3 Database and methodology

Sectorial Indices have been identified and obtained from the indices collection of the National stock exchange (NSE). The Daily closing price of 12 sectorial indices has been taken from the NSE official website <https://www.nseindia.com/>. Nifty 50 has been taken as the market index to compute the market returns.

We adopted the event study methodology (ESM) to answer the study's objective. ESM is the widely used methodology in financial markets studies as it captures the impact of short-term events on the stock markets. It examines the impact of some specified event on the stock return of the index return. ESM can be traced back to the 1930s. The first paper using ESM was published by James Dolley in 1933 (MacKinlay, 1997), thereafter (Fama et al., 1969) and (Brown and Warner, 1980). Previous studies have used the ESM for examining corporate events (Arora et al., 2015) and war or terrorist attacks on stock markets. (Bash et al., 2021; Biktimirov and Durrani, 2017; Charles and Darné, 2014; Datta and Iskandar-Datta, 2008; Hudson and Urquhart, 2014; Kollias et al., 2010; Omar et al., 2017; Papakyriakou et al., 2019; Webb, 2008; Yang et al., 2019). This methodology is based on semi-strong market efficiency, which means, it is impossible to reap excess returns regularly because markets will immediately incorporate publicly available information.

Abnormal return and cumulative abnormal return are the two measures that help us to ferret out the whether the impact was significant or not. Abnormal return is the difference between the actual return and the estimated return. Abnormal returns can either be positive or negative. In the vast literature that employed ESM, three models have been used to fetch the abnormal returns. Namely, the mean-adjusted return model, market-adjusted return model and market model or risk-adjusted return model. The analysis of this study laid down on all these three models. To compute the abnormal returns, we first set the estimation window, event date and event window, as these are the basic premise of ESM. The Estimation window is used to calculate the normal returns or estimated returns of the index. The normal return is the return that could be the actual return if the event would not have occurred. Event day is the day on which the study-related event has happened. The event window is the period pre and post of event day. It is the event window in which we examine the degree of impact of a specified event. Generally, the appropriate estimation window for daily data is considered 250 days (Fauzi et al., 2017); therefore, we took 250 days estimation window and 21 days event window (i.e., -10 day to +10 day, where 0 is called an event day). The markets are efficient, and the information leakages before the event day cannot be ignored; therefore, to nullify the effect of information leakages on the analysis (Deane et al., 2019), we took 45 days buffer period between the estimation window and the event window. Figure 1 present the event window and estimation window timeline.

Figure 1 Analysis timeline



Source: Authors' calculation

For fetching abnormal returns, we first calculated the return series of the sectorial indices and market index with the following method:

$$R_{it} = \log \left(\frac{P_{t+1}}{P_t} \right)$$

where R_{it} is the actual return of the i -th index at time t , P_{t+1} is the closing price at day $t+1$, and P_t is the closing price at day t .

The abnormal return under the mean adjusted return model is computed as:

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

where AR_{it} is the abnormal return of the i -th index at time t , R_{it} is the actual return of the i -th index at time t , and ER_{it} is the expected return or mean return of the i -th index at time t . The calculation of the mean return is based on the estimation window.

Thereafter, the abnormal returns were calculated by the market-adjusted return model. Following is the method that was employed:

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

where AR_{it} and R_{it} are the same as mentioned in the above model. ER_{mt} is the average return of the market during the time t .

We then modelled the abnormal return based on the market model/risk-adjusted model. Equation (4) shows the method for calculating the same:

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

where AR_{it} , R_{it} and R_{mt} are the same as in the above equations. α_i and β_i are the intercept and slope, respectively, which are estimated by the ordinary least square method of regression.

Cumulative abnormal returns (CAR) are computed to accommodate the abnormal returns of multiple days in the event window:

$$CAR_{it} = \sum_{t=1}^N AR_{it}$$

Cumulative abnormal returns are the summation of the abnormal returns of any security or index for any given period. In the later stage, we computed the average abnormal returns and cumulative average abnormal returns to examine the persistence of the event on the returns of the indices and to discern the overall effect of the event on the markets of India. Cumulative average abnormal return is the summation of the average abnormal return of all the indices for a given period. Equations (5) and (6) show the calculation of the average abnormal return (AAR) and cumulative average abnormal return (CAAR), respectively. A t-test has been employed to check the significance of the abnormal return.

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

$$CAAR_t = \sum_{t=1}^N AAR_t$$

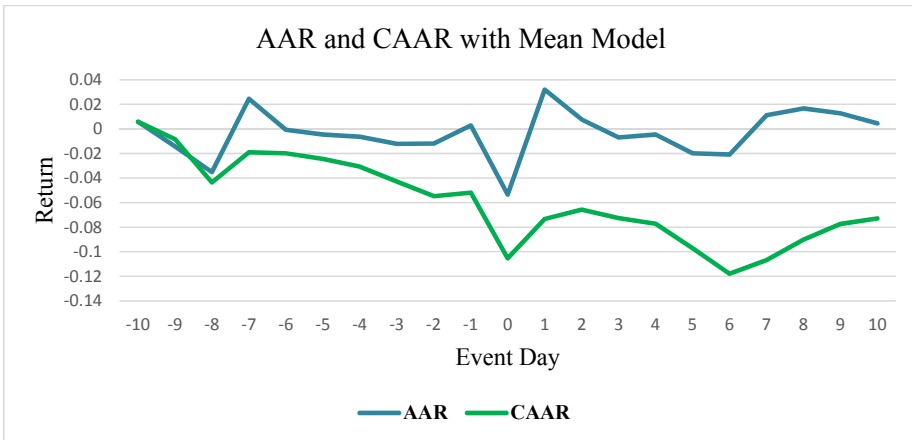
4 Empirical analysis and results

Figures 2, 3 and 4 represent the AAR and CAAR of sectoral indices of India calculated by using the mean-adjusted return model, market-adjusted return model and market model.

All three figures have a clear indication that the Indian markets have some disturbance on the event day. There is a sharp decline in abnormal returns on day 0. This abnormal return shows the persistent feature as the widened gap between the AAR and CAAR is reducing gradually. Although the buffer period was taken to overcome the information leakages, it might not be ignored completely as the gap between AAR and

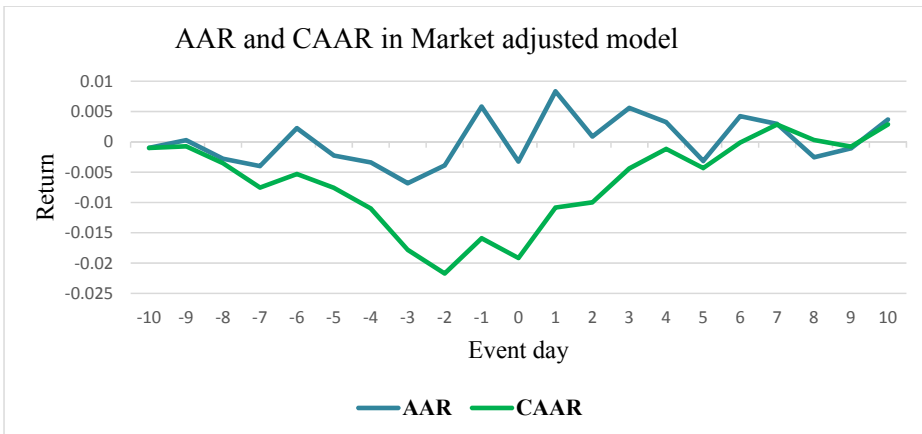
CAAR starts winding seven days prior to the event day. Except for Figure 3, the rest of the figures shows that the abnormal return persists even on day +10 and whereas as per the market-adjusted model, AR and CAAR converged on day +5, indicating that beyond day 5, markets have incorporated the event in prices fully. It is interesting to note that from day -7, there is a series of negative abnormal returns that is expanding gradually. This may indicate that before the event day (i.e., military invasion), markets have negative sentiments regarding the threats coming from the Russian dispensation. During this period, Russia announced the independence of two regions of Ukraine; one is Donetsk People’s Republic and Luhansk People’s Republic.

Figure 2 Graph of average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) with mean model



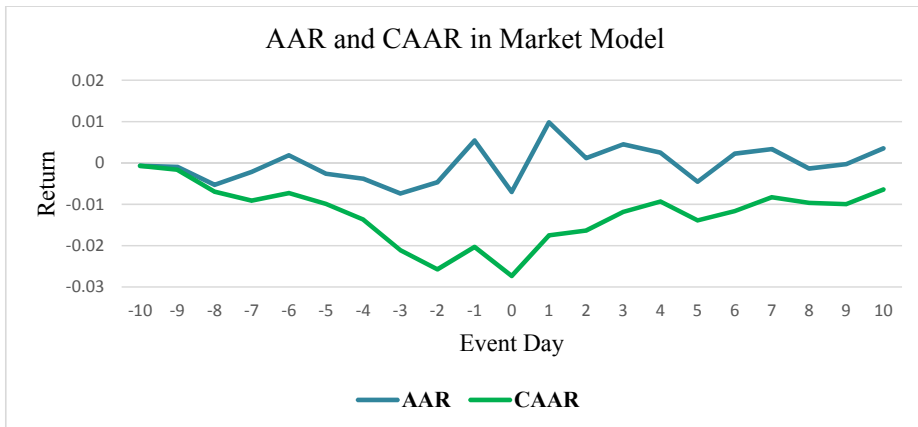
Source: Authors’ calculation

Figure 3 Graph of average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) with the market-adjusted model



Source: Authors’ calculation

Figure 4 Graph of average abnormal returns (AAR) and cumulative average abnormal returns (CAAR) with the market model



Source: Authors' calculation

Tables 1, 2 and 3 show the CAR by using the mean-adjusted return model, market-adjusted return model and market model. We calculated CAR for days (−10 to 0), (−10 to +10), (−5 to +5), (−3 to +3), (−1 to +1), (0 to +3), (0 to +5), (0 to +10). All three tables (Table 1, 2 and 3) is also indicating that prior to the event day, there are negative abnormal returns, which can be seen in the (−10 to 0) column. (−10 to +10) depicts the overall effects in sectorial indices over the event window. The results are mixed as the Mean adjusted CAR for the event window is negative for every sector. In contrast, Market adjusted CAR is positive for almost every sector except Auto, Bank, Realty and Financial Services. Results from Table 3, i.e., CAR by the Market adjusted model, have a more complex picture. It indicates the negative CAR for Auto, bank, Consumer Durables, FMCG, Media, Realty and Financial Services. The possible reason behind the negative CAR of Bank and Financial Services is the sanctions of the USA on the major banks of Russia. It might have signalled that market regarding the exposure of other countries' banking systems to the US sanctions risk. Arm conflicts anywhere in the world would hamper the global supply chain. This can be attributed to negative returns in the FMCG sector. It is interesting to note that on post-event days, CAR has positive signs. This is in line with the CAAR in Figures 1, 2 and 3. In the (−1 to +1) window, Auto, FMCG, Oil & Gas, and IT have negative CAR in Table 3. Russia holds a position in the top five oil exporter countries. This war has put negative pressure on the oil index, indicating the rising cost of rival oil exporters, which leads to a surge in the input cost of oil importers of India. The auto industry is the only one that has persistent negative returns overall event window. Banks and Consumer Durables have negative returns from the −10 day to +10 day (Table 3). The rest of the sectors have positive CAR beyond

event day till day +10. All three tables reflect almost similar results for (0 to +10) and (0 to +5), with the exception of the Financial Services sector. In both event windows, Auto, Bank and Consumer Durables have negative CAR. Only the Auto sector has persistent negative CAR in all windows and by all methods of calculation. The negative CAR of Auto is increased from -0.0032 in $(-10$ to $0)$ to -0.0808 in $(0$ to $+10)$ with 2390.54 %. The banking sector is in the second rank with the most percentage change on 10 day CAR post-event day. It witnesses a huge fall in CAR with -1931.46% . Table 1 and Table 2 have contrasting results on the percentage change in the 10-Day CAR pre- and post-event day. As per the market-adjusted model, the financial service sector has an enormous surge in negative CAR (3528.470%) after 10 days of the event. IT industry has recovered from negative CAR on $(-10$ to $0)$ to positive CAR on $(0$ to $+10$ day) with 3138.427%. But here also Auto industry cannot be ignored as its negative CAR on $(-10$ to $0)$ has worsened on $(0$ to $+10)$ with a 926.47% rise. As per the mean adjusted return model (Table 1), financial service has the least change in pre-post 10 days CAR. It has reduced by just 6.047%.

Tables 4, 5 and 6 show the AAR and CAAR and their significance as per mean adjusted return model, market-adjusted return model and market model, respectively. Results from these tables reflect the effects of the event on the overall sectors of the Indian market. All three depict the negative AAR and CAAR on the event day. If the significance is concerned, then the mean adjusted return table shows that negative cumulative average abnormal returns in Indian markets are significant at a 1 % level. Negative CAAR is significant at the 10% level in the case of the market model but not significant as per the market-adjusted model. Each table depicts the post 3 days CAAR as significant except for the -1 day CAAR in Table 5. It is noteworthy that only Table 4 (mean adjusted return model) depicts most of the CAAR as significant at various levels. The rest of the table shows that there is no significant difference in abnormal returns after the event day. This indicates mixed results regarding Indian markets. However, Table 4 and 6 agree that the event day has a significant effect on the cumulative average abnormal returns on the event day. However, the cross-sectional AAR does not show any significant change in all three tables (Tables 4, 5 and 6). Setting aside Table 4, we discern from Tables 5 and 6 that the overall CAAR does not show any significant change beyond event day. The results from the CAAR tables are consistent with the CAR tables. Both the tables indicate a contraction of the abnormal returns over a post-event window. But the results from the mean adjusted return model cannot be ignored as they are becoming significant every day after the event (Table 4). The CAAR on day 0 and day +6 is coming out significant at a 1% level and at a 5% level on days -8 , 1, 5, 7 and 8. Days -3 , -2 , -1 , 2, 3, 4, 9 and 10 have significant CAAR at a 10% level. The overall understanding is that the mean model advocates the significant effect post-event window, whereas rest two models have rejected the significance. But on the event day, the significance of CAAR is witnessed by all three models.

Table 1 CAR – mean adjusted model

Sector	(-10 to 0)	(-10 to +10)	(-5 to +5)	(-3 to +3)	(-1 to +1)	(0 to +3)	(0 to +5)	(0 to +10)
Auto	-0.0382*	-0.1715***	-0.1584***	-0.0887***	-0.0423**	-0.0124*	-0.0729***	-0.0680*
Bank	-0.0408*	-0.1295**	-0.1077***	-0.0671**	-0.0281*	0.0015*	-0.0279*	-0.0282*
Consumer Durables	-0.0367*	-0.0862*	-0.0742**	-0.0184*	-0.0051*	0.0307*	-0.0174*	-0.0099*
FMCG	-0.0315*	-0.0473*	-0.0584*	-0.0359*	-0.0184*	0.0161*	-0.0062*	0.0188*
Healthcare	-0.0486*	-0.0219*	-0.0649*	-0.0366*	-0.0067*	0.0205*	0.0081*	0.0669***
IT	-0.0435*	-0.0281*	-0.0382*	-0.0352*	-0.0248*	0.0299*	0.0397*	0.0642*
Media	-0.0931*	-0.0713*	-0.1115**	-0.0656*	-0.0236*	0.0664**	0.0380*	0.0954*
Metal	-0.0884*	-0.0157*	0.0076*	0.0437*	-0.0030*	0.1369***	0.1114***	0.1291**
Oil & Gas	-0.0448*	-0.0320*	-0.0405*	-0.0363*	-0.0404**	0.0514***	0.0532**	0.0673*
Pharma	-0.0484*	-0.0203*	-0.0674*	-0.0426*	-0.0053*	0.0140*	0.0062*	0.0658*
Realty	-0.0750*	-0.1315*	-0.1162**	-0.0568*	0.0016*	0.0392*	-0.0004*	0.0203*
Financial Services	-0.0339*	-0.1196**	-0.0976**	-0.0638**	-0.0280*	-0.0016*	-0.0324*	-0.0319*

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5%, and 1% level respectively.

Table 2 CAR – market adjusted model

Sector	(-10 to 0)	(-10 to +10)	(-5 to +5)	(-3 to +3)	(-1 to +1)	(0 to +3)	(0 to +5)	(0 to +10)
Auto	-0.0082*	-0.1084*	-0.0868**	-0.0444*	-0.0146*	-0.0322*	-0.0694**	-0.0845**
Bank	-0.0089*	-0.0623*	-0.0339*	-0.0215*	0.0002*	-0.0177*	-0.0234*	-0.0428*
Consumer Durables	0.0048*	0.0010*	0.0101*	0.0340*	0.0260*	0.0144*	-0.0082*	-0.0150*
FMCG	-0.0021*	0.0147*	0.0126*	0.0080*	0.0092*	-0.0038*	-0.0029*	0.0017*
Healthcare	-0.0189*	0.0407*	0.0064*	0.0075*	0.0210*	0.0007*	0.0115*	0.0502*
IT	-0.0020*	0.0593*	0.0461*	0.0172*	0.0064*	0.0136*	0.0490*	0.0593*
Media	-0.0543*	0.0104*	-0.0302*	-0.0151*	0.0068*	0.0493*	0.0460*	0.0877*
Metal	-0.0417*	0.0826*	0.0977*	0.0997**	0.0298*	0.1222***	0.1233***	0.1294**
Oil & Gas	-0.0086*	0.0442*	0.0380*	0.0124*	-0.0108*	0.0335*	0.0598**	0.0570*
Pharma	-0.0216*	0.0362*	0.0008*	-0.0005*	0.0215*	-0.0068*	0.0081*	0.0462*
Realty	-0.0283*	-0.0332*	-0.0261*	-0.0008*	0.0344*	0.0245*	0.0115*	0.0206*
Financial Services	-0.0013*	-0.0508*	-0.0230*	-0.0176*	0.0006*	-0.0206*	-0.0275*	-0.0457*

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5%, and 1% level respectively.

Table 3 CAR – market model

Sector	(-10 to 0)	(-10 to +10)	(-5 to +5)	(-3 to +3)	(-1 to +1)	(0 to +3)	(0 to +5)	(0 to +10)
Auto	-0.0032*	-0.0980*	-0.0803**	-0.0403*	-0.0126*	-0.0314*	-0.0672**	-0.0808**
Bank	0.0024*	-0.0386*	-0.0111*	-0.0073*	0.0086*	-0.0221*	-0.0209*	-0.0441*
Consumer Durables	-0.0092*	-0.0285*	-0.0128*	0.0196*	0.0182*	0.0157*	-0.0130*	-0.0200*
FMCG	-0.0137*	-0.0099*	-0.0187*	-0.0113*	-0.0033*	0.0064*	-0.0033*	0.0122*
Healthcare	-0.0312*	0.0148*	-0.0259*	-0.0124*	0.0082*	0.0110*	0.0109*	0.0605*
IT	-0.0171*	0.0275*	0.0208*	0.0014*	-0.0023*	0.0155*	0.0440*	0.0546*
Media	-0.0602*	-0.0021*	-0.0379*	-0.0200*	0.0044*	0.0485*	0.0434*	0.0833*
Metal	-0.0445*	0.0768*	0.1059**	0.1046**	0.0344*	0.1130***	0.1186***	0.1130**
Oil & Gas	-0.0136*	0.0335*	0.0291*	0.0069*	-0.0139*	0.0344*	0.0582**	0.0559*
Pharma	-0.0302*	0.0179*	-0.0268*	-0.0175*	0.0101*	0.0041*	0.0091*	0.0592*
Realty	-0.0308*	-0.0383*	-0.0172*	0.0045*	0.0393*	0.0151*	0.0068*	0.0041*
Financial Services	-0.0308*	-0.0383*	-0.0172*	0.0045*	0.0393*	0.0151*	0.0068*	0.0041*

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5%, and 1% level respectively.

Table 4 Mean adjusted returns

<i>Event Day</i>	<i>AAR</i>	<i>t-value</i>	<i>CAAR</i>	<i>t-value</i>
-10	0.3375	0.3525	0.0058	0.5693
-9	-0.5301	-0.5537	-0.0084	-0.5818
-8	-0.7423	-0.7753	-0.0436	-2.4644**
-7	0.7371	0.7699	-0.0191	-0.9335
-6	-0.0388	-0.0406	-0.0198	-0.8691
-5	-0.2640	-0.2757	-0.0244	-0.9759
-4	-0.3748	-0.3914	-0.0307	-1.1375
-3	-0.3715	-0.3880	-0.0429	-1.4850*
-2	-0.3186	-0.3328	-0.0547	-1.7872*
-1	0.0938	0.0979	-0.0519	-1.6076*
0	-1.1062	-1.1554	-0.1054	-3.1124***
1	0.7756	0.8101	-0.0734	-2.0756**
2	0.1470	0.1535	-0.0657	-1.7853*
3	-0.1015	-0.1060	-0.0727	-1.9023*
4	-0.1155	-0.1206	-0.0772	-1.9533*
5	-0.4386	-0.4581	-0.0971	-2.3782**
6	-0.2547	-0.2661	-0.1180	-2.8031***
7	0.2172	0.2269	-0.1069	-2.4677**
8	0.4330	0.4522	-0.0902	-2.0268**
9	0.3589	0.3749	-0.0774	-1.6957*
10	0.1335	0.1394	-0.0729	-1.5582*

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5% and 1% level respectively.

Table 5 Market adjusted returns

<i>Event Day</i>	<i>AAR</i>	<i>t-value</i>	<i>CAAR</i>	<i>t-value</i>
-10	-0.0010	-0.0555	-0.0010	-0.2208
-9	0.0003	0.0109	-0.0007	-0.1129
-8	-0.0028	-0.0606	-0.0035	-0.4463
-7	-0.0040	-0.1184	-0.0075	-0.8252
-6	0.0022	0.1108	-0.0053	-0.5187
-5	-0.0023	-0.1304	-0.0076	-0.6761
-4	-0.0034	-0.2090	-0.0110	-0.9072
-3	-0.0068	-0.2143	-0.0178	-1.3772*
-2	-0.0039	-0.1089	-0.0217	-1.5829*
-1	0.0058	0.1839	-0.0159	-1.1000
0	-0.0032	-0.0687	-0.0192	-1.2629
1	0.0083	0.1945	-0.0108	-0.6844

Table 5 Market adjusted returns (continued)

<i>Event Day</i>	<i>AAR</i>	<i>t-value</i>	<i>CAAR</i>	<i>t-value</i>
2	0.0009	0.0161	-0.0100	-0.6050
3	0.0056	0.0798	-0.0044	-0.2568
4	0.0032	0.0795	-0.0012	-0.0657
5	-0.0032	-0.0717	-0.0043	-0.2369
6	0.0042	0.0512	-0.0001	-0.0064
7	0.0030	0.0582	0.0028	0.1460
8	-0.0025	-0.0668	0.0003	0.0144
9	-0.0011	-0.0306	-0.0008	-0.0396
10	0.0037	0.1115	0.0029	0.1361

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5% and 1% level respectively.

Table 6 Market model returns

<i>Event Day</i>	<i>AAR</i>	<i>t-value</i>	<i>CAAR</i>	<i>t-value</i>
-10	-0.0007	-0.0471	-0.0007	-0.1573
-9	-0.0009	-0.0322	-0.0016	-0.2574
-8	-0.0053	-0.2126	-0.0069	-0.8857
-7	-0.0022	-0.0733	-0.0091	-1.0074
-6	0.0018	0.0954	-0.0073	-0.7186
-5	-0.0026	-0.1540	-0.0099	-0.8924
-4	-0.0038	-0.2171	-0.0137	-1.1437
-3	-0.0074	-0.2213	-0.0211	-1.6487*
-2	-0.0047	-0.1326	-0.0257	-1.8976*
-1	0.0054	0.1737	-0.0203	-1.4215*
0	-0.0070	-0.2031	-0.0273	-1.8222*
1	0.0098	0.2847	-0.0175	-1.1181
2	0.0012	0.0224	-0.0163	-1.0028
3	0.0045	0.0631	-0.0118	-0.6998
4	0.0025	0.0625	-0.0093	-0.5337
5	-0.0045	-0.1208	-0.0139	-0.7680
6	0.0022	0.0295	-0.0116	-0.6245
7	0.0033	0.0615	-0.0083	-0.4323
8	-0.0014	-0.0326	-0.0097	-0.4901
9	-0.0003	-0.0090	-0.0100	-0.4924
10	0.0035	0.1025	-0.0064	-0.3097

Source: Authors' calculation

Note: *, **, *** Significant at 10%, 5% and 1% level respectively.

5 Concluding remarks

India is the fastest-growing market among all other emerging markets in the world. Recently, it was also on the top of high GDP nations in upcoming years, projected by the International Monetary Fund (IMF). It has very deep and amicable relations with Russia, and in recent years it strengthened its ties with the USA. From the geopolitical perspective, USA and Russia have shared weak relations for the past decades. In the aftermath of the demolition of the USSR, the USA emerged as a global power. Today the world is multipolar. The invasion of Ukraine by Russia has changed the global world order. In this situation, the expectations of all countries lie on the close friend of Russia, i.e., India. India bears much pressure from the western part to counter Russia's stand on invasion. Such a situation brings India into a very tough arena. It needs Russia as an old friend but cannot leave the USA for future growth. This motivated us to examine the impact of the Russia-Ukraine war on the Indian sectoral indices. For that, the event study methodology was applied. The findings of this study are as follows; first, it observed that the effect of the Russian invasion had a negative impact on the Indian markets, but it persisted only for five days. This might be because India has taken a strategic stance; it remained neutral on the Russians' invasion and provided help, and showed sympathy towards Ukraine. This way, it has not ignored the west's interest and has not stood against Russia. This might create positive sentiments in Indian investors and a sense of immunisation from US sanctions. Second, this study observed that the automobile industry is the worst hit in India. The negative abnormal returns persist for even the tenth day of the event window. Rising oil prices will lead to a low sale of fuel-based cars in future might be the cause of negative sentiment. The other reason might be possible that Russia holds a major position in automobile engine production capacity, and Ukraine also contributes significantly to exports of technology, electronic control units and engine management systems. Moreover, the global supply chain has been hampered devastatingly, which not only reduced the supply of semiconductors but also impeded the food supply chain, which may be reflected in the negative FMCG sector index. After the automobile, the banking sector got a huge hit. During the Russian invasion, the US sanctioned major banks of Russia for executing any transactions in the dollar and later on, it even froze some assets of the well-known personalities of Russia. In the initial days, Indian markets feared expansions of these sanctions India. Therefore, the banking sector shows negative returns. The study's overall findings indicate that the Indian market got a negative hit only on the event day. Gradually, the negative effects on the first day contracted in the post days of the event. This study has implications for the investors that war events impact the stock markets. Considering the proximity and the trade relations of an economy, the degree of the impact may vary across sectors and markets. Hence, diversifying the funds from the warzone markets to other safe heaven markets may be an appropriate strategy for investors. The implication for policymakers is that the nation needs to reap the resource advantage of all geographies for future growth and self-sufficiency. Although the aggression of Russia cannot be ignored but being a hub of natural gas in today's world, policymakers need to re-evaluate the bilateral agreements with a focus on future sustainable goals. Managers need to have long-term plans rather than rely on short-sightedness. Warfare hampers the global supply chain; managers must ensure efficient alternatives to tackle wartime.

Analysis has been conducted with keen care. However, like any other study, this study also faces some limitations. First, the significance of results is based on t-statistic only. The scope of other tests and the non-parametric test are still present. Second, data might have some outliers; outliers generally impact the results, though the estimation window was taken with a good range. Future researchers may opt for MM – estimators to tackle the outliers. Third, the study has been conducted from the Indian perspective; other studies may take the group of countries and the regional economic groups to determine the war's impact on stock markets.

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