THE IMPACT OF ECONOMIC EVENTS ON STOCK MARKET RETURNS: EVIDENCE FROM INDIA

Narayan Parab¹
Ramashanti Naik²
Y. V. Reddy³

¹Assistant Professor, Dnyanprassarak Mandal’s College and Research Centre, Assagao, Goa, India. Email: parabnarayan05@gmail.com Tel: +918413879647

²Assistant Professor, Goa Business School, Goa University, Taleigao Plateau, Goa, India. Email: nrnaik@gmail.com Tel: +918007244920

³Senior Professor, Goa Business School, Goa University, Taleigao Plateau, Goa, India. Email: yreddy@unigoa.ac.in Tel: +91942968616

(± Corresponding author)

ABSTRACT

Stock markets act as barometers of economics; thus, a nation’s stock market returns are expected to be affected by not only domestic but also global economic events. This also raises questions about the validity of the efficient market hypothesis (EMH). This study therefore examines the impact of both expected and unexpected economic events on stock market returns in India, as represented by the benchmark NIFTY 50 Index and other sectoral indices. Using dummy variable regression models to determine the effects before, on, and after the date an event occurred, the current study concludes that despite investors’ immediate positive or negative reactions to economic events, their responses are short term and the Indian stock market quickly recovers. In addition, the findings contradict the EMH in the Indian context: unexpected economic events exert a greater impact than those expected, indicating the potential for investors and traders to earn abnormal profits when such events occur.

Contribution/Originality: This study contributes to the existing body of literature on stock market efficiency. Its primary contribution is evidence of the impact of both expected and unexpected economic events on stock market returns in India.

1. INTRODUCTION

Market efficiency has been a prominent area of research for many decades. Market efficiency refers to the extent to which the stock market accurately reflects all the available information that determines equity prices, which is also influenced by the hopes and fears of stock market participants (Malkiel, 1989). While studying not only market efficiency but also earnings change and stock prices, Brown (1978) discovered market inefficiencies between 1963 and 1971. However, stock markets have experienced numerous economic events, and in an era of globalization where international trade increases significantly, individual countries are more affected by international economic events.

The economic events included in this study occurred in both India and worldwide. The demonetization in India was unexpected, as the nation was generally unaware of the government’s decision to devalue its highest
denominations—1000 and 500 rupees. In addition to the difficulty faced by the nation in replacing the old currency, a short-term negative impact on the stock market was expected. A similar negative impact was also expected from the major depreciation of the Indian rupee by the Reserve Bank of India (RBI), which monitors currency fluctuations and implements depreciation or appreciation to stabilize it. However, any major changes can damage businesses as well as whole countries, particularly as India imports and exports a large volume of goods and services to and from a range of countries.

With regard to trade, the United States (US) trades with the majority of countries and any American economic event, such as the 2008 subprime mortgage crisis, will therefore exert a global effect, including on India’s stock market. In contrast, Brexit—the United Kingdom’s (UK) exit from the European Union (EU)—was not expected to exert much effect, especially as the process involved a long period of negotiation, and was more likely to affect European than Indian stock markets. Whereas trade is stronger between European countries than with India, China is also a developing nation and an important trading partner in Asia, and thus any economic event, such as the Chinese stock market meltdown was also expected to impact India’s stock market.

Furthermore, the 2018 Union Budget of India was unlike previous budgets in terms of the stock market. In the past, the Finance Minister focused on imposing or abolishing taxes on goods and services, introducing additional or relief on income taxes, providing subsidies to companies, or announcing new schemes, to which the stock market reacted, reflected in the rise or decline in share prices according to whether companies benefited or suffered due to the budget. In 2018, though, the long-term capital gains (LTCG) tax was announced. Although short-term capital gains had previously been taxed at 15%, long-term capital gains had been exempt; however, long-term capital gains above 100,000 rupees would now be taxable at 10%. It was evident that many investors would be affected by the LTCG tax and thus expected that the stock market would react negatively. On the other hand, positive implications were expected from the goods and services tax (GST), which combined all the indirect taxes; however, as discussions lasted for many years, the impact on stock market returns when passed first by the Rajya Sabha and then the Lok Sabha, as well as when it came into effect, was expected to be weakened. Finally, when landmark legislation—the Real Estate (Regulation and Development) Act, 2016—established the Real Estate Regulatory Authority (RERA) and introduced a new era in that sector, the stock market was expected to react positively.

Public sector banks in India are renowned for mounting nonperforming assets (NPAs), which impedes potential growth, meaning that the government’s decision to recapitalize these banks was advantageous. Although the long-term impact on not only the growth in public sector banks but also on non-banking financial companies (NBFCs) and private sector banks would take time to emerge, it was expected to be positive for public sector and negative for private sector banks in the short term. Also, with reference to banks, despite the Securities and Exchange Board of India (SEBI) and RBI acting as watchdogs, financial frauds have not been eliminated. As negative events, frauds obviously affect stock markets negatively, but this study examines how India’s stock market reacted to particular bank frauds committed in recent years.

It is important to understand how economic events affect stock market returns, which sectors are severely affected, and how investors can deal with the effects. This study thus aims to examine the impact of specific key economic events on India’s stock market. The remainder of the paper is arranged as follows: Section 2 provides an insight into the existing body of literature on the subject; Section 3 describes the research methodology; Section 4 presents and discusses the results; and Section 5 provides the final conclusions.

2. LITERATURE REVIEW

There are limitations to the theory of stock market efficiency: theoretically, in terms of characterizing markets; and empirically, with regard to data quality, knowledge of price behavior, and estimation techniques (Ball, 1994). Equity prices are driven by shocks and their level and duration of persistence, and to account for this diversity, Calvet & Fisher (2007) adopted a parsimonious equilibrium model, which accommodates regime shifts in
fundamentals as well as different estimated specifications, to study stock market returns. They stated that an important role was played by two economic mechanisms: endogenous volatility feedback, increasing the variance in dividends; and investor learning, creating significant endogenous skewness. Hussain (2011) specifically investigated the impact of monetary policy announcements on stock market returns and volatility by reviewing the responses of US and European equity indices, which proved to be significant and immediate: a press conference of the European Central Bank exerted a substantial effect on the same day. Focusing solely on the US, Vortelinos, Koulakiotis, and Tsagkanos (2017) evaluated the impact of macroeconomic announcements on trading volume and stock prices in the futures market and found the response to be of a high magnitude and significance. Similarly, Jiang (2017) demonstrated that information-based trading affected stock prices positively and enhanced stock market efficiency. In addition, Smales (2012) examined the relationship between macroeconomic announcements, stock returns, and order imbalances and the Australian futures market. Nine macroeconomic announcements leading to order imbalances were identified, which, although related to earlier stock returns, also resulted contemporaneously in excessive buy/sell orders driving stock prices up/down. This finding was confirmed following an examination of order imbalance patterns prior to the announcements, which showed no evidence of information leakage beforehand. Further, Stefanescu and Dumitriu (2013) explored the variation in stock prices and volatility of foreign exchange rates on the stock market in Romania. Using GARCH models, it was found that volatility was caused by effects of global crises, inflows of foreign capital, and perceptions of the national economy.

Moving from the developed to developing economies, Vithessonthi and Techarongrojwong (2013) evaluated the effect of monetary policy announcements on stock prices of individual companies in Thailand, discovering that an expected rather than unexpected change in interest rates affected stock prices. An asymmetric response was observed, with the effect of unexpected interest rates depending on the change in direction of the interest rate. It was also concluded that in general neither a company’s characteristics nor the macroeconomic conditions could explain the reaction of stock prices, while the response of companies in different industries was heterogeneous. Meanwhile, Jain, Vyas, and Roy (2013) studied the Indian capital market during the 2007–2008 global financial crisis and discovered evidence of a weak form of market efficiency. Prabhu, Bhattacharyya, and Ray (2016), using both the identification through heteroscedasticity and the event study methodologies, examined the impact of announcements about monetary policy between 2004 and 2014 on stock indices in India. Following such announcements, indices declined, albeit not statistically significant, while unexpected announcements exerted a significant but weak impact, especially in the banking sector. Moreover, very few announcements by the US Federal Reserve exerted any significant impact on stock returns in India. However, these results failed to corroborate similar studies, but this was explained by the dominant banking channel and ineffective asset price channel.

Generally, most research studies have demonstrated an impact from monetary policy announcements. Gau and Wu (2017) showed that macroeconomic announcements influence the price discovery process in a range of markets, as did Chen and Gau (2010) and Jiang, Likitapiwat, and McNish (2012). Examining changes in information shares before and after these announcements revealed that information was likely leaked beforehand, due to significant rises in price discovery. Also on a global scale, Ali, Shahzad, Raza, and Al-Yahyaee (2018) evaluated and compared the efficiency of both conventional and Islamic stock markets in 12 developed and developing economies, the results of which indicated that efficiency was greater in the former, followed by those in the BRICS countries. In contrast, Gil-Alana, Gupta, Shittu, and Yaya (2018) assessed the efficiency of the stock markets in just the Baltic region using the Baltic Benchmark Gross and the three local all-share indices. Following the identification of both bull and bear market phases, the findings revealed a weak form of market efficiency among Baltic stock markets.

With regard to the impact of national economies on the global economy, in China, Baum, Kurov, and Wolfe (2015) also examined the impact of macroeconomic announcements on both commodity futures and financial markets worldwide. It was found that announcements about Chinese manufacturing and industrial output affected not only stock markets but also industrial and energy commodities, as well as commodity currencies. However, the
response of most global stock markets were not affected by news relating to Chinese domestic consumption and an unexpected rise in output, which was believed to indicate the state of the global economy. Nevertheless, global stock markets felt the impact following the Chinese stock market crash on August 24, 2015 (Lin & Tsai, 2018), despite the fact that volatility was the norm for China in 2015 and this particular occurrence proved not to be a black swan event, while the stock market exhibited corrections and quick recovery. Such international under- and overreactions to positive and negative local events, respectively, were also shown by Al-Thaqeb (2018) in a study on the effect of local US events on stock market returns in 26 international markets.

Earlier studies have evidently focused on the impact of scheduled macroeconomic news announcements, for which the dates are usually known in advance. However, economic events can occur unexpectedly, and this study evaluates the impact of both such events on the stock market. The most recent and prominent economic crises and bank frauds are considered.

3. METHODOLOGY

The current study considers examines 13 economic crises and 5 bank frauds between 2008 and 2018, as shown in Table 1. These economic events include not only national crises and frauds in India but also three international events with a potential global impact.

### Table 1. Economic events.

| Event                                      | Date                  | Total period                  | Total no. of days |
|--------------------------------------------|-----------------------|-------------------------------|-------------------|
| Economic Crises                            |                       |                               |                   |
| US Subprime Mortgage Crisis                | January 21, 2008       | August 4, 2006–July 22, 2009 | Antedate: 365 days; Postdate: 365 days |
| Major Depreciation of Indian Rupee         | August 16, 2013        | March 2, 2012–February 11, 2015 | Antedate: 365 days; Postdate: 365 days |
| Chinese Stock Market Meltdown              | August 24, 2015        | February 26, 2014–February 15, 2017 | Antedate: 365 days; Postdate: 365 days |
| Introduction of RERA by Rajya Sabha in India | March 10, 2016         | September 14, 2014–September 1, 2017 | Antedate: 365 days; Postdate: 365 days |
| Introduction of RERA by Lok Sabha in India | March 15, 2016         | September 18, 2014–September 6, 2017 | Antedate: 365 days; Postdate: 365 days |
| RERA established in India                  | May 1, 2016            | November 7, 2014–October 18, 2017 | Antedate: 365 days; Postdate: 365 days |
| Brexit Referendum                          | June 23, 2016          | January 1, 2015–December 12, 2017 | Antedate: 365 days; Postdate: 365 days |
| Introduction of GST by Rajya Sabha in India | August 3, 2016         | February 11, 2015–January 22, 2018 | Antedate: 365 days; Postdate: 365 days |
| Introduction of GST by Lok Sabha in India | August 8, 2016         | February 16, 2015–January 25, 2018 | Antedate: 365 days; Postdate: 365 days |
| Demonetization in India                    | November 8, 2016       | May 19, 2015–April 27, 2018   | Antedate: 365 days; Postdate: 365 days |
| GST came into effect in India              | July 1, 2017           | September 1, 2016–April 30, 2018 | Antedate: 265 days; Postdate: 265 days |
| Announcement of Bank Recapitalization in India | October 24, 2017      | April 19, 2017–April 30, 2018  | Antedate: 128 days; Postdate: 128 days |
| Reintroduction of LTCG Tax in India        | February 1, 2018       | November 9, 2017–April 30, 2018 | Antedate: 58 days; Postdate: 58 days |
| Bank Frauds                                |                       |                               |                   |
| SBI Fraud                                  | May 8, 2017            | May 12, 2016–April 30, 2018   | Antedate: 244 days; Postdate: 244 days |
| Canara and Vijaya Banks Fraud              | June 13, 2017          | July 26, 2016–April 30, 2018   | Antedate: 218 days; Postdate: 218 days |
| Andhra Bank Fraud                          | January 15, 2018       | October 5, 2017–April 30, 2018 | Antedate: 70 days; Postdate: 70 days |
| PNB Fraud                                  | February 14, 2018      | December 1, 2017–April 30, 2018 | Antedate: 50 days; Postdate: 50 days |
| Bank of Maharashtra Fraud                  | July 20, 2017          | October 13, 2016–April 30, 2018 | Antedate: 192 days; Postdate: 192 days |

Note: In cases where the event occurred on a trading holiday, the next trading day is taken as the date of the event. As the demonetization in India was announced at 8:00pm on November 8, 2016, the next trading day on November 9, 2016 is given as the date of the event. PNB, Punjab National Bank; SBI, State Bank of India.
As can be seen from Table 1, all events occurred after the US subprime mortgage crisis in 2008, with the most recent government regulations and bank frauds in India being selected. With regard to the regulations, the GST and RERA were each analyzed when they were passed first by the Rajya Sabha (Council of States, the upper house, of the Parliament of India), then by the Lok Sabha (House of the People, lower house, of the Parliament of India), and at their implementation.

Data was extracted from the official website of the National Stock Exchange (NSE) of India for the NIFTY 50 Index and other sectoral indices: NIFTY Auto, NIFTY Financial Services, NIFTY FMCG (fast-moving consumer goods), NIFTY IT, NIFTY Media, NIFTY Metal, NIFTY Pharma Index, Nifty PSU (public sector undertaking) Bank Index, NIFTY Private Bank, and NIFTY Realty.

Following the creation of dummy variables, a regression analysis was performed to determine the impact of economic events on stock market returns in India. The returns for each NIFTY index were calculated using the \( \ln(P_{t}/P_{0}) \) formula, where \( P_{t} \) is the price at the end and \( P_{0} \) the price at the start of the period. Dummy variables were developed for each index that represented the effects before, on and after the date of the event, where 1 represented an effect and 0 no effect. Five consecutive days before and after the event were examined for antedate and postdate effects from the event, as it was thought that the impact would gradually diminish after five days.

Finally, the following models were developed:

- \( \text{LNIR} = \alpha_{1} + \beta_{1} \ln \text{NIRD}_{1} + \lambda_{1} \ln \text{NIRD}_{2} + \gamma_{1} \ln \text{NIRD}_{3} + \epsilon_{1} \) \[1\]
- \( \text{LNAIR} = \alpha_{2} + \beta_{2} \ln \text{NAIRD}_{1} + \lambda_{2} \ln \text{NAIRD}_{2} + \gamma_{2} \ln \text{NAIRD}_{3} + \epsilon_{2} \) \[2\]
- \( \text{LNFSIR} = \alpha_{3} + \beta_{3} \ln \text{NSIRD}_{1} + \lambda_{3} \ln \text{NSIRD}_{2} + \gamma_{3} \ln \text{NSIRD}_{3} + \epsilon_{3} \) \[3\]
- \( \text{LNFR} = \alpha_{4} + \beta_{4} \ln \text{FRD}_{1} + \lambda_{4} \ln \text{FRD}_{2} + \gamma_{4} \ln \text{FRD}_{3} + \epsilon_{4} \) \[4\]
- \( \text{LNITIR} = \alpha_{5} + \beta_{5} \ln \text{ITIRD}_{1} + \lambda_{5} \ln \text{ITIRD}_{2} + \gamma_{5} \ln \text{ITIRD}_{3} + \epsilon_{5} \) \[5\]
- \( \text{LNMEIR} = \alpha_{6} + \beta_{6} \ln \text{MEIRD}_{1} + \lambda_{6} \ln \text{MEIRD}_{2} + \gamma_{6} \ln \text{MEIRD}_{3} + \epsilon_{6} \) \[6\]
- \( \text{LNPHIR} = \alpha_{7} + \beta_{7} \ln \text{PHIRD}_{1} + \lambda_{7} \ln \text{PHIRD}_{2} + \gamma_{7} \ln \text{PHIRD}_{3} + \epsilon_{7} \) \[7\]
- \( \text{LNPSUBIR} = \alpha_{8} + \beta_{8} \ln \text{PSUBIRD}_{1} + \lambda_{8} \ln \text{PSUBIRD}_{2} + \gamma_{8} \ln \text{PSUBIRD}_{3} + \epsilon_{8} \) \[8\]
- \( \text{LPVTBIR} = \alpha_{9} + \beta_{9} \ln \text{VTBIRD}_{1} + \lambda_{9} \ln \text{VTBIRD}_{2} + \gamma_{9} \ln \text{VTBIRD}_{3} + \epsilon_{9} \) \[9\]
- \( \text{LNRIR} = \alpha_{10} + \beta_{10} \ln \text{NIRD}_{1} + \lambda_{10} \ln \text{NIRD}_{2} + \gamma_{10} \ln \text{NIRD}_{3} + \epsilon_{11} \) \[10\]

Where,

- \( \alpha_{i} - \alpha_{11} \) are the intercept terms for the respective models.
- \( \beta_{1} - \beta_{10} \) are the slope coefficients representing the effect on the date of the event.
- \( \lambda_{i} - \lambda_{10} \) are the slope coefficients representing the effect before the event.
- \( \gamma_{i} - \gamma_{10} \) are the slope coefficients representing the effect after the event.
- The log of each index accompanied by a subscript 1 (i.e., \( \ln \text{NIRD}_{1} - \ln \text{NIRD}_{1} \)) represent dummy variables for the effect on the date of the event for the respective models.
- The log of each index accompanied by a subscript 2 (i.e., \( \ln \text{NIRD}_{2} - \ln \text{NIRD}_{2} \)) represent dummy variables for the effect before the event for the respective models.
- The log of each index accompanied by a subscript 3 (i.e., \( \ln \text{NIRD}_{3} - \ln \text{NIRD}_{3} \)) represent dummy variable for the effect after the event for the respective models.
• $ε_1, ε_2, ε_3, ε_4$: symbolize disturbance terms of the respective models.

In the analysis, the NIFTY indices representing the stock market returns acted as the dependent variables, while the dummy variables representing the event date, antedate, and postdate effects acted as the independent variables (regressors). In addition, the Durbin–Watson (DW) statistic was used to test for serial correlation in the residuals. All analyses were performed using the EViews statistical software.

The starting point for the current study’s investigation is following hypothesis:

$H_o$: Economic events exert no significant impact on stock market returns.

4. RESULTS AND DISCUSSION

The results of the dummy variable regression analysis are presented in Table 2 by event, enabling a comparison of each event’s impact on the stock returns for each NIFTY index in India.

The results for the US subprime mortgage crisis indicate the rejection of $H_o$. On the actual day of January 21, 2008, all indices on—not LNPHIR, for which no data was available—reacted negatively at a 1% level of significance. Before that date, the only significant effect was seen in LNIR, while none were observed afterwards. This finding demonstrates that the NSE witnessed sharp sell-offs during the crisis period but gradually recovered from the shock. It is evident from Table 2 that the depreciation of the rupee in August 2013 affected stock returns in India, rejecting $H_o$ on August 16, a significant negative impact at a 1% level of significance was experienced in all indices other than LAIR and LPNPHIR at 5% and LNITIR at 10% levels of significance. Once more the realty sector suffered most, followed by the private banking sector. Before depreciation, significant positive effects were observed in LNAIR, LNPHIR, LNITIR, and LNRIR, while the only significant effects were seen in LNPHIR, LNITIR, and LNRIR. Therefore, after the instant negative NSE reaction, the effect was curtailed, allowing for gradually recovery, thereafter.

The Chinese stock market meltdown did impact stock returns, not only in India but also other Asian countries. The returns in all sectors experienced considerable negative impacts at a 1% level of significance on August 24, 2015, although the realty sector was again affected most severely, followed by the public banking sector; thus, $H_o$ is rejected. However, both antedate and postdate effects were only seen in LNPHIR and LNRIR, while only LPVTBIR showed an antedate effect and LNITIR a postdate effect, at any level of significance; these antedate effects were all negative, but the postdate effects were all positive. It is evident that after such an overwhelming negative reaction by the NSE on the date of the event, the stock market did gradually recovery thereafter.

In relation to the introduction of the RERA, the NSE showed no significant response either on the date or after it passed the Rajya Sabha. However, significant positive antedate effects did occur in LNPHIR at the 1% level, LNIR, LNPVTBIR, and LNRIR at 5%, and LNSIR and LPVTBIR at 10%, rejecting $H_o$. No such antedate effects occurred when the RERA passed the Lok Sabha. However, on the actual date of the event, significant negative effects were observed in LPNPHIR at the 1% level, LNPHIR at 5%, and LNIR at 10%, again rejecting $H_o$. In addition, the only significant positive postdate effect occurred in LNITIR. Following its progress through the Parliament of India in March, the impact of RERA was reduced, and there were no significant effects when it was established on May 1, 2016. Nevertheless, $H_o$ was rejected.

With regard to the antedate, event date, and postdate effects on stock market returns in India from the Brexit Referendum, all the P-values are above than 0.01, 0.05, and 0.10 at the 1%, 5%, and 10% levels of significance, respectively. Thus, no evidence of any significant impact was found, rejecting $H_o$.

In India, the GST had been debated for many years, and its impact was thus minimized; however, $H_o$ was rejected. When the GST passed the Rajya Sabha on August 3, 2016, the FMCG sector (LNFIR) reacted in a significantly negative manner, whereas no such response was observed in the other sectors. Similarly, none of the sectors reacted significantly either of after that date, and as the NSE was already aware of the GST, no significant impact was observed on the NSE it passed the Lok Sabha five days later. Once more, when the GST came into effect
on July 1, 2017, the only significant impact occurred in the FMCG sector, albeit positive at this time, while no such responses were exhibited either in any other sectors on that date or by any sector before or after. As the GST reduces the cascading effect of all indirect taxes in the supply chain, the price of products was expected to decline, ultimately resulting in increased sales, which explains the positive reaction to the GST in the FMCG sector.

The Indian government’s announcement on demonetize on November 8, 2016, exerted a significant, negative, impact beforehand in LNPHIR only and none on that date, probably because the nation was unaware of the decision. However, there were significant aftereffects, rejecting $H_0$; at a 1% level of significance for LNRIR, LNAIR, LNFIR, and LNRIR; 5% level of significance for LNFSIR and LNMEDIR; and 10% level of significance for LNITIR, LNPSUBIR, and LPVTBIR. All exhibited negative impacts, the greatest in the reality sector (LNRIR), except for the public sector banks (LNPSUBIR) where the impact was positive due to the large cash deposits received. Consequently, the results reveal that although demonetization exerted no prior impact on the NSE and only a minimal effect on the day it was announced, the negative impact was highly significant thereafter. The reality sector in particular suffered severely; however, the public banking sector benefitted greatly from the huge inflow of funds. The introduction of the LTCG tax 2018 received a negative response in the main, with sharp sell-offs in many sectors; however, the market recovered fairly quickly. However, the negative impact was only significant at 5% on February 1, 2018 in LNPHIR and at 10% beforehand in LNFIR. The postdate effects, though, were significant at 1% in LNIR, LNFSIR, and LPVTBIR and again at 10% in LNFIR. This indicates how investors responded to long-term capital gains on equities becoming taxable and rejects $H_0$.

One of the major decisions concerning the banking sector in India occurred on October 24, 2017, when the Indian government recapitalized public sector banks, the response to which rejects $H_0$. On that date, there was a significant positive impact seen in LNPSUBIR, at the 5% level, but even better at the 1% level in LNMEDIR. The greatest and only significant antedate effect occurred in LPVTBIR, which indicated a negative response by private sector banks to the inflow of funds to public sector banks. In contrast, the greatest and only significant postdate effect occurred in LNPSUBIR, since the growth of public sector banks was advanced, which resulted in a generally positive reaction on the NSE. With regard to the five bank frauds considered in the current study, the following impacts on stock market returns in India were observed, as presented in Table 2. Prior to the PNB fraud, only LNITIR exhibited a significant negative effect, but when it became public on February 14, 2018, it was the public sector banks (LNPSUBIR) that reacted negatively at the same 5% level of significance. As PNB is a public sector bank, this result reveals the negative response of investors witnessed by all major public sector banks. However, the overall postdate effect was minimal. The effect of the earlier Andhra Bank fraud when it was publicized on January 13, 2018, only the financial services sector (LNFSIR) showed a significant positive reaction at a 1% level. Although there were no significant antedate effects, postdate effects were only significant, and positive, in LNITIR at and LPVTBIR at the 1% and 5% levels, respectively. However, later on July 20, 2017, $H_0$ was not completely rejected in relation to the Bank of Maharashtra fraud, since the only significant impact on stock market returns was seen in the negative antedate response in LNFIR. The hypothesis was totally rejected, though, by the analysis of the impact on stock market returns from the Canara and Vijaya Bank fraud. Finally, insufficient evidence was found for the SBI Bank fraud exerting a significant impact on stock market returns: the only significant effects were observed in LNMEDIR beforehand at the 10% level of significance and on the date it occurred in LNRIR at the 5% level, with the former being negative and the latter positive, and none after May 8, 2017.

From the results of the DW test presented in Table 2, it is evident that the residuals in each model were white noise and indicated no serial correlation.
### Table 2: Dummy variable regression analysis.

| Event | Variables, Coefficients, and P-values | Indices |
|-------|---------------------------------------|---------|
|       | LNIR | LNAIR | LNFSIR | LNFIR | LNTITIR | LNMEDI R | LNMETI R | LNPHIR | LNPSUBI R | LPVTVBI R | LNIR |
| US Subprime Mortgage Crisis | \( \alpha_c \) | 0.067 | 0.054 | 0.099 | 0.049 | 0.012 | 0.014 | - | 0.043 | 0.090 | 0.111 | -0.281 |
| | P-value | 0.414 | 0.609 | 0.346 | 0.426 | 0.894 | 0.873 | - | 0.461 | 0.388 | 0.319 | 0.119 |
| Event Date Effect | \( \beta_c \) | -9.172 | -9.670 | -8.677 | -7.200 | -6.995 | -9.003 | - | -7.804 | -9.332 | -8.074 | -14.285 |
| | P-value | 0.000*** | 0.000*** | 0.002*** | 0.000*** | 0.003*** | 0.000*** | - | 0.000*** | 0.001*** | 0.007*** | 0.001*** |
| Antedate Effect | \( \lambda_c \) | -1.730 | -0.934 | -1.883 | -0.918 | -1.640 | -1.608 | - | -0.704 | -0.861 | -1.983 | -1.837 |
| | P-value | 0.081* | 0.250 | 0.136 | 0.213 | 0.119 | 0.133 | - | 0.319 | 0.493 | 0.319 | 0.319 |
| Postdate Effect | \( \Theta_c \) | 0.182 | 0.811 | 1.596 | -0.149 | 0.065 | -0.193 | - | -0.653 | 1.952 | 1.454 | 0.861 |
| | P-value | 0.854 | 0.318 | 0.207 | 0.840 | 0.950 | 0.857 | - | 0.355 | 0.120 | 0.277 | 0.640 |
| Autocorrelation Test | DW Statistic | 1.93 | 1.72 | 1.76 | 2.08 | 2.01 | 1.82 | - | 2.09 | 1.77 | 1.78 | 1.84 |
| Major Depreciation of Indian Rupee | \( \alpha_c \) | 0.068 | 0.100 | 0.088 | 0.104 | 0.087 | 0.088 | 0.058 | 0.124 | 0.014 | 0.114 | -0.025 |
| | P-value | 0.055 | 0.018 | 0.098 | 0.010 | 0.082 | 0.077 | 0.319 | 0.000 | 0.844 | 0.044 | 0.767 |
| Event Date Effect | \( \beta_c \) | -4.237 | -2.505 | -5.504 | -4.036 | -2.399 | -5.590 | -5.569 | -1.895 | -5.544 | -6.346 | -6.866 |
| | P-value | 0.000*** | 0.027** | 0.000*** | 0.000*** | 0.003* | 0.001*** | 0.000*** | 0.004** | 0.000*** | 0.002*** | 0.002*** |
| Antedate Effect | \( \lambda_c \) | 0.641 | 1.208 | 0.642 | 0.366 | 0.113 | 1.082 | 2.606 | 0.325 | 0.363 | 0.626 | 3.261 |
| | P-value | 0.135 | 0.017** | 0.315 | 0.448 | 0.850 | 0.071* | 0.000*** | 0.438 | 0.682 | 0.356 | 0.001*** |
| Postdate Effect | \( \Theta_c \) | -0.200 | -0.809 | -0.108 | -0.723 | 0.217 | -1.202 | 2.187 | -0.857 | -0.309 | -0.151 | -0.702 |
| | P-value | 0.641 | 0.111 | 0.866 | 0.134 | 0.717 | 0.045* | 0.002*** | 0.041** | 0.727 | 0.824 | 0.486 |
| Autocorrelation Test | DW Statistic | 1.81 | 1.75 | 1.83 | 2.01 | 1.91 | 1.87 | 1.89 | 1.81 | 1.83 | 1.79 | 1.80 |
| Chinese Stock Market Meltdown | \( \alpha_c \) | 0.057 | 0.092 | 0.093 | 0.044 | 0.009 | 0.089 | 0.051 | 0.032 | 0.071 | 0.112 | 0.043 |
| | P-value | 0.092 | 0.042 | 0.041 | 0.264 | 0.835 | 0.082 | 0.417 | 0.472 | 0.356 | 0.018 | 0.592 |
| Event Date Effect | \( \beta_c \) | -6.154 | -7.625 | -6.864 | -4.804 | -4.924 | -8.492 | -7.358 | -6.287 | -9.890 | -7.009 | -11.787 |
| | P-value | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** | 0.000*** |
| Antedate Effect | \( \lambda_c \) | -0.577 | -0.704 | -0.898 | 0.306 | -0.036 | -1.313 | -1.102 | 0.468 | -0.016 | -1.053 | -1.965 |
| | P-value | 0.154 | 0.195 | 0.102 | 0.521 | 0.944 | 0.033* | 0.149 | 0.383 | 0.987 | 0.085* | 0.041** |
| Postdate Effect | \( \Theta_c \) | 0.355 | 0.354 | 0.335 | 0.327 | 0.252 | 1.386 | 1.528 | 0.834 | 0.140 | 0.363 | 1.678 |
| | P-value | 0.380 | 0.514 | 0.542 | 0.493 | 0.618 | 0.025** | 0.045** | 0.121 | 0.881 | 0.525 | 0.081* |
| Autocorrelation Test | DW Statistic | 1.81 | 1.81 | 1.86 | 1.90 | 1.87 | 1.99 | 1.88 | 1.85 | 1.89 | 1.82 | 1.81 |

© 2020 AESS Publications. All Rights Reserved.
| Introduction of RERA by Rajya Sabha in India | Autocorrelation Test | DW Statistic | 1.88 | 1.88 | 1.92 | 1.91 | 1.90 | 2.01 | 1.98 | 1.80 | 1.95 | 1.91 | 1.94 |
| C | \( \alpha_{11} \) | 0.023 | 0.037 | 0.051 | 0.039 | -0.009 | 0.059 | 0.004 | -0.018 | -0.033 | 0.061 | 0.023 |
| | P-value | 0.483 | 0.414 | 0.241 | 0.353 | 0.814 | 0.251 | 0.951 | 0.705 | 0.655 | 0.177 | 0.760 |
| Event Date Effect | \( \beta_{11} \) | -0.631 | -0.056 | -0.042 | -0.991 | -0.900 | -0.534 | 0.756 | 0.207 | -1.643 | -0.593 | -0.952 |
| | P-value | 0.480 | 0.963 | 0.972 | 0.376 | 0.403 | 0.699 | 0.646 | 0.868 | 0.411 | 0.624 | 0.641 |
| Antedate Effect | \( \lambda_{11} \) | 0.816 | 0.742 | 1.020 | 0.053* | 0.545 | 0.080 | 1.996 | 0.553 | 2.243 | 0.987 | 2.027 |
| | P-value | 0.049** | 0.173 | 0.053* | 0.827 | 0.260 | 0.519 | 0.007*** | 0.322 | 0.012** | 0.069* | 0.027** |
| Postdate Effect | \( \Theta_{11} \) | 0.047 | -0.104 | 0.049 | 0.355 | 0.187 | -0.188 | -0.408 | -0.675 | 0.554 | 0.321 | -0.482 |
| | P-value | 0.907 | 0.849 | 0.925 | 0.480 | 0.698 | 0.762 | 0.580 | 0.227 | 0.536 | 0.554 | 0.599 |

| Introduction of RERA by Lok Sabha in India | Autocorrelation Test | DW Statistic | 1.88 | 1.88 | 1.92 | 1.91 | 1.90 | 2.01 | 1.98 | 1.80 | 1.95 | 1.91 | 1.93 |
| C | \( \alpha_{12} \) | 0.026 | 0.036 | 0.058 | 0.034 | -0.010 | 0.062 | 0.017 | -0.017 | -0.020 | 0.068 | 0.029 |
| | P-value | 0.433 | 0.420 | 0.186* | 0.411 | 0.798 | 0.227 | 0.777 | 0.713 | 0.788 | 0.131 | 0.703 |
| Event Date Effect | \( \beta_{12} \) | -1.068 | -0.889 | -0.883 | -2.096 | -1.253 | -2.726 | 0.302 | -3.399 | 1.646 | 0.105 | -0.029 |
| | P-value | 0.231 | 0.463 | 0.450 | 0.061* | 0.243 | 0.048** | 0.855 | 0.006*** | 0.410 | 0.931 | 0.989 |
| Antedate Effect | \( \lambda_{12} \) | 0.116 | 0.446 | -0.001 | 0.369 | -0.199 | 0.157 | 0.155 | 0.329 | -0.638 | -0.077 | 0.140 |
| | P-value | 0.772 | 0.411 | 0.998 | 0.462 | 0.680 | 0.799 | 0.854 | 0.554 | 0.477 | 0.887 | 0.879 |
| Postdate Effect | \( \Theta_{12} \) | 0.644 | 0.567 | 0.790 | 0.454 | 0.879 | 0.282 | 0.612 | -0.175 | 1.043 | 0.700 | 0.986 |
| | P-value | 0.108 | 0.297 | 0.132 | 0.366 | 0.068* | 0.647 | 0.408 | 0.753 | 0.245 | 0.197 | 0.283 |

| RERA established in India | Autocorrelation Test | DW Statistic | 1.88 | 1.88 | 1.91 | 1.91 | 1.90 | 2.00 | 1.96 | 1.79 | 1.94 | 1.91 | 1.93 |
| C | \( \alpha_{13} \) | 0.029 | 0.045 | 0.049 | 0.039 | -0.003 | 0.037 | 0.046 | -0.018 | -0.027 | 0.059 | 0.040 |
| | P-value | 0.383 | 0.316 | 0.253 | 0.350 | 0.945 | 0.464 | 0.444 | 0.705 | 0.716 | 0.181 | 0.587 |
| Event Date Effect | \( \beta_{13} \) | -0.590 | 0.077 | -0.774 | -0.086 | -0.701 | 0.222 | 0.905 | -0.172 | -1.650 | -1.504 | -0.614 |
| | P-value | 0.505 | 0.948 | 0.501 | 0.939 | 0.501 | 0.871 | 0.579 | 0.891 | 0.404 | 0.207 | 0.758 |
| Antedate Effect | \( \lambda_{13} \) | -0.154 | -0.314 | -0.217 | -0.179 | -0.189 | 0.340 | -0.204 | 0.029 | -0.927 | 0.148 | 0.706 |
| | P-value | 0.697 | 0.557 | 0.673 | 0.721 | 0.686 | 0.579 | 0.780 | 0.959 | 0.296 | 0.782 | 0.429 |
| Postdate Effect | \( \Theta_{13} \) | 0.125 | -0.004 | 0.478 | -0.014 | -0.226 | 0.045 | -0.943 | -0.140 | 0.102 | 0.079 | 0.080 |
| | P-value | 0.753 | 0.994 | 0.354 | 0.977 | 0.629 | 0.942 | 0.197 | 0.802 | 0.908 | 0.883 | 0.928 |

| Brexit Referendum | Autocorrelation Test | DW Statistic | 1.87 | 1.86 | 1.91 | 1.91 | 1.94 | 2.01 | 1.95 | 1.81 | 1.94 | 1.90 | 1.97 |
| C | \( \alpha_{2} \) | 0.028 | 0.041 | 0.043 | 0.033 | 0.003 | 0.044 | 0.039 | -0.030 | -0.021 | 0.050 | 0.052 |
| | P-value | 0.392 | 0.354 | 0.312 | 0.415 | 0.944 | 0.387 | 0.522 | 0.526 | 0.799 | 0.253 | 0.478 |
| Event Date Effect | \( \beta_{2} \) | 0.782 | 1.002 | 1.055 | 0.863 | -0.035 | 0.308 | 0.929 | 2.020 | 1.330 | -1.212 |
| | P-value | 0.374 | 0.397 | 0.354 | 0.480 | 0.973 | 0.758 | 0.849 | 0.462 | 0.360 | 0.260 | 0.539 |
| Antedate | \( \lambda_{2} \) | -0.035 | 0.162 | -0.145 | -0.108 | 0.364 | -0.272 | 0.357 | -0.145 | 0.013 | -0.466 | 0.860 |
| Effect | P-value | α_1 | 0.042 | 0.058 | 0.055 | 0.056 | 0.034 | 0.080 | 0.062 | -0.032 | -0.043 | 0.059 | 0.104 |
|--------|---------|-----|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|
| Postdate Effect | Θ_1 | 0.004*** | 0.000*** | 0.049** | 0.000*** | 0.094* | 0.041** | 0.300 | 0.758 | 0.054* | 0.051* | 0.000*** | 0.281 |
| Autocorrelation Test | DW Statistic | 1.90 | 1.94 | 1.88 | 1.95 | 1.95 | 1.99 | 1.94 | 1.84 | 1.91 | 1.89 | 1.89 | 1.95 |

© 2020 AESS Publications. All Rights Reserved.
| GST came into effect | Event Date Effect | Antedate Effect | Postdate Effect | Autocorrelation Test
|---------------------|------------------|-----------------|-----------------|---------------------|
| $\alpha_{10}$      | 0.047            | 0.041           | 0.070           | 0.048              | 0.067              | 0.035              | 0.078              | -0.070             | -0.018             | 0.068              | 0.100              |
| P-value             | 0.175            | 0.426           | 0.108           | 0.314              | 0.180              | 0.561              | 0.291              | 0.246              | 0.870              | 0.136              | 0.275              |
| $\beta_{10}$       | 0.937            | 1.285           | 0.219           | 3.748              | 0.275              | 0.483              | 1.742              | 0.173              | 0.546              | 0.132              | 1.276              |
| P-value             | 0.173            | 0.211           | 0.801           | 0.000***           | 0.782              | 0.689              | 0.242              | 0.886              | 0.802              | 0.884              | 0.486              |
| $\lambda_{10}$     | -0.274           | -0.566          | -0.543          | 0.378              | -0.154             | -0.700             | 0.455              | 0.353              | -1.227             | -0.340             | -0.427             |
| P-value             | 0.374            | 0.221           | 0.166           | 0.381              | 0.750              | 0.198              | 0.496              | 0.516              | 0.212              | 0.405              | 0.604              |
| $\Theta_{10}$      | 0.275            | 0.172           | 0.164           | -0.275             | 0.265              | 0.235              | 0.463              | 0.620              | 0.930              | 0.204              | 0.950              |
| P-value             | 0.372            | 0.710           | 0.676           | 0.524              | 0.554              | 0.665              | 0.488              | 0.254              | 0.343              | 0.617              | 0.289              |

| Announcements of Bank Recapitalization in India | Event Date Effect | Antedate Effect | Postdate Effect | Autocorrelation Test
|--------------------------|------------------|-----------------|-----------------|---------------------|
| $\alpha_c$               | 0.060            | 0.058           | 0.076           | 0.080              | 0.140              | 0.009              | 0.097              | -0.063             | -0.174             | 0.086              | 0.093              |
| P-value                  | 0.137            | 0.288           | 0.136           | 0.199              | 0.022              | 0.895              | 0.277              | 0.429              | 0.241              | 0.099              | 0.363              |
| $\beta_{c}$              | 0.164            | -0.328          | 0.417           | 0.249              | -1.174             | 3.536              | 0.295              | -0.485             | 3.895              | 0.077              | 0.475              |
| P-value                  | 0.798            | 0.704           | 0.601           | 0.800              | 0.219              | 0.001***           | 0.854              | 0.699              | 0.095*             | 0.925              | 0.767              |
| $\lambda_{c}$            | -0.026           | -0.001          | -0.545          | -0.093             | -0.006             | -0.410             | 0.210              | 0.056              | -0.259             | -0.714             | 0.424              |
| P-value                  | 0.927            | 0.997           | 0.130           | 0.834              | 0.989              | 0.386              | 0.740              | 0.921              | 0.805              | 0.053*             | 0.557              |
| $\Theta_{c}$             | 0.188            | 0.458           | 0.434           | 0.064              | -0.227             | 0.602              | -0.003             | 0.616              | 4.205              | 0.238              | 0.773              |
| P-value                  | 0.513            | 0.239           | 0.228           | 0.885              | 0.599              | 0.204              | 0.996              | 0.277              | 0.000***            | 0.519              | 0.285              |

| Reintroduction of LTCG Tax in India | Event Date Effect | Antedate Effect | Postdate Effect | Autocorrelation Test
|--------------------------|------------------|-----------------|-----------------|---------------------|
| $\alpha_c$               | 0.083            | 0.062           | 0.075           | 0.139              | 0.240              | 0.093              | 0.040              | 0.006              | -0.182             | 0.099              | 0.129              |
| P-value                  | 0.218            | 0.486           | 0.387           | 0.053              | 0.028              | 0.366              | 0.787              | 0.955              | 0.334              | 0.258              | 0.386              |
| $\beta_{c}$              | -0.181           | 0.639           | -0.345          | 0.686              | -0.408             | -0.656             | 0.096              | -2.444             | -2.144             | -0.321             | -0.944             |
| P-value                  | 0.795            | 0.487           | 0.699           | 0.351              | 0.714              | 0.555              | 0.950              | 0.024**            | 0.271              | 0.723              | 0.537              |
| $\lambda_{c}$            | -0.185           | -0.257          | 0.045           | -0.601             | -0.336             | -0.438             | -0.541             | -0.805             | -0.618             | -0.131             | -0.790             |
| P-value                  | 0.561            | 0.539           | 0.913           | 0.074*             | 0.509              | 0.364              | 0.439              | 0.100              | 0.486              | 0.750              | 0.258              |
| $\Theta_{c}$             | -0.899           | -0.669          | -1.126          | -0.556             | -0.829             | -0.428             | -0.714             | 0.219              | -0.292             | -1.161             | -1.029             |
| P-value                  | 0.005***         | 0.112           | 0.007***        | 0.098*             | 0.104              | 0.375              | 0.307              | 0.653              | 0.793              | 0.000***            | 0.142              |

| SBI Fraud | Event Date Effect | Antedate Effect | Postdate Effect | Autocorrelation Test
|--------------------------|------------------|-----------------|-----------------|---------------------|
| $\alpha_{a}$             | 0.063            | 0.067           | 0.087           | 0.079              | 0.044              | 0.061              | 0.135              | -0.047             | 0.027              | 0.085              | 0.117              |
| P-value                  | 0.047            | 0.156           | 0.032           | 0.078              | 0.332              | 0.254              | 0.042              | 0.374              | 0.783              | 0.043              | 0.148              |

© 2020 AESS Publications. All Rights Reserved.
### Canara and Vijaya Banks Fraud

| Event Date Effect | $\beta_{13}$ | $\lambda_{13}$ | $\Theta_{13}$ |
|-------------------|----------------|----------------|---------------|
| $\beta_{13}$      | 0.246          | -0.185         | 0.217         |
| $\lambda_{13}$    | -0.724         | 0.554          | 0.489         |
| $\Theta_{13}$     | 0.516          | 0.673          | 0.242         |

| Autocorrelation Test | DW Statistic |
|----------------------|--------------|
| C                    | 1.87         |
| Event Date Effect    | 0.516        |
| $\beta_{13}$         | 0.246        |
| $\lambda_{13}$       | -0.185       |
| $\Theta_{13}$        | 0.217        |

### Andhra Bank Fraud

| Event Date Effect | $\beta_{13}$ | $\lambda_{13}$ | $\Theta_{13}$ |
|-------------------|----------------|----------------|---------------|
| $\beta_{13}$      | 0.246          | -0.185         | 0.217         |
| $\lambda_{13}$    | -0.724         | 0.554          | 0.489         |
| $\Theta_{13}$     | 0.516          | 0.673          | 0.242         |

| Autocorrelation Test | DW Statistic |
|----------------------|--------------|
| C                    | 1.87         |
| Event Date Effect    | 0.516        |
| $\beta_{13}$         | 0.246        |
| $\lambda_{13}$       | -0.185       |
| $\Theta_{13}$        | 0.217        |

### PNB Fraud

| Event Date Effect | $\beta_{13}$ | $\lambda_{13}$ | $\Theta_{13}$ |
|-------------------|----------------|----------------|---------------|
| $\beta_{13}$      | 0.246          | -0.185         | 0.217         |
| $\lambda_{13}$    | -0.724         | 0.554          | 0.489         |
| $\Theta_{13}$     | 0.516          | 0.673          | 0.242         |

| Autocorrelation Test | DW Statistic |
|----------------------|--------------|
| C                    | 1.87         |
| Event Date Effect    | 0.516        |
| $\beta_{13}$         | 0.246        |
| $\lambda_{13}$       | -0.185       |
| $\Theta_{13}$        | 0.217        |
| Event Date Effect | β_{16} | -0.317 | -0.499 | 0.358 | -0.682 | -0.957 | 0.599 | -1.006 | -0.855 | -1.128 | 0.267 | 0.154 |
|------------------|--------|--------|--------|-------|--------|--------|-------|--------|--------|--------|-------|-------|
| P-value           | 0.642  | 0.551  | 0.655  | 0.074 | 0.138  | 0.807  | 0.306 | 0.290  | 0.756  | 0.143  | 0.227 |
| DW Statistic c    | 1.79   | 1.96   | 1.86   | 1.77   | 2.03   | 1.89   | 2.05  | 1.81   | 2.17   | 1.89   | 1.79  |
| Antedate Effect   | λ_{16} | 0.119  | 0.166  | 0.311 | 1.223  | 0.270  | 0.623 | 0.549  | 0.898  | 0.447  | 0.352 | 0.149 |
| P-value           | 0.698  | 0.715  | 0.422  | 0.006  | 0.550  | 0.235  | 0.409 | 0.101  | 0.652  | 0.381  | 0.854 |
| Postdate Effect   | Θ_{16} | 0.246  | -0.107 | 0.530 | 0.070  | 0.153  | -0.179 | 0.257  | -0.454 | 0.373  | 0.486 | -0.123 |
| P-value           | 0.423  | 0.813  | 0.172  | 0.873  | 0.736  | 0.733  | 0.700 | 0.407  | 0.707  | 0.227  | 0.879 |
| Autocorrelation Test DW Statistic c | 1.89 | 1.90 | 1.90 | 1.95 | 1.96 | 1.82 | 2.00 | 1.80 | 1.95 | 1.92 | 1.94 |

**Notes:** *, The NIFTY Metal Index was not constructed during the US Subprime Mortgage Crisis; hence the data were unavailable. C, Constant.
***Significant at 1% level, **Significant at 5% Level, *Significant at 10% level.
5. CONCLUSIONS

This study examined the impact of 13 economic crises and 5 bank frauds on stock market returns. The crises included not only events in India—demonetization, rupee depreciation, LTCG taxation and GST, bank recapitalization, and implementation of the RERA—but also international events—Brexit Referendum, Chinese stock market meltdown, and US subprime mortgage crisis. All the frauds were associated Indian public sector banks. Dummy variables were developed to represent 11 NIFTY indices and regression analysis was performed to determine the impact of each event on stock market returns in a range of sectors.

In summary, demonetization exerted a significant negative impact on stock market returns, particularly in the realty sector, except for the positive reaction from the public sector banks after the event. A similar significant negative impact from the rupee depreciation occurred, albeit on the actual date of the event, again most affecting the realty sector, followed by the private banking sector. The LTCG taxation also resulted in a significant negative response from investors due to long-term capital gains on equities becoming taxable for the first time. In contrast, stock market returns remained unaffected by the GST, when it passed through both houses of the Parliament of India and when it came into effect. The only significant impact occurred in the FMCG sector, which moved from negative on the date the GST passed the Rajya Sabha to positive on the date it came into effect almost a year later, probably in anticipation of increased sales. The final event in India to be investigated was the RERA, to which stock market returns displayed no significant reaction when it was established, having already been introduced when the related legislation passed through both houses of the Parliament of India. In terms of international events, although no evidence found any significant impact from the Brexit Referendum to the NSE, stock returns were significantly and negatively affected at the actual times of the Chinese stock market meltdown and US subprime mortgage crisis; the realty sector and public banks in India was severely affected by the crash in China. However, the insignificant postdate effects in both cases that the NSE gradually recovered after these shocks. Furthermore, the impact of bank fraud on stock market returns was minimal. The only significant effect of the PNB fraud was the negative reaction in the public banking sector on the date it became public, whereas the Andhra Bank fraud resulted in significant positive event date and postdate effects in the financial services and private banking sectors, respectively. In relation to the other bank frauds, there was insufficient evidence for a significant impact on stock market returns.

Based on these findings, it can be concluded that despite investors’ instantaneous positive or negative reactions to economic events, their responses are short term, and the NSE quickly recovers. Moreover, the evidence found that unexpected more than expected events led to dramatic effects suggests that opportunities exist for investors and traders to earn sort-term abnormal profits. In the context of India, therefore, this contradicts the theory of stock market efficiency: when asset price reflect all available information, then abnormal profits become virtually impossible (Fama, 1970).

There are limitations to this study: only specific economic events were reviewed and the volatility of stock prices during those events was not analyzed. The current study could thus be enhanced by incorporating volatility analysis using such models as GARCH or EGARCH. Nevertheless, it is clear that the NSE is excellent at recovering from substantial declines, enabling investors and traders to develop suitable strategies: investors can seize the opportunity during economic events to accumulate shares of those companies in which they intend to invest long term, following appropriate fundamental analysis. Moreover, market regulators and policy-makers are recommended to evaluate the impact of economic events so that safeguards for the interests of realty investors can be implemented.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgement: All authors contributed equally to the conception and design of the study.
REFERENCES

Al-Thaqeb, S. A. (2018). Do international markets overreact? Event study: International market reaction to US local news events. *Research in International Business and Finance, 44*, 369-385. Available at: https://doi.org/10.1016/j.ribaf.2017.07.106.

Ali, S., Shahzad, S. J. H., Raza, N., & Al-Yahyaee, K. H. (2018). Stock market efficiency: A comparative analysis of Islamic and conventional stock markets. *Physica A: Statistical Mechanics and Its Applications, 503*, 139-153.

Ball, R. (1994). The development, accomplishments and limitations of the theory of stock market efficiency. *Managerial Finance, 20*(2), 3-48. Available at: https://doi.org/10.1108/eb018462.

Baum, C. F., Kurov, A., & Wolfe, M. H. (2015). What do Chinese macro announcements tell us about the world economy? *Journal of International Money and Finance, 59*, 100-122. Available at: https://doi.org/10.1016/j.jimonfin.2015.07.002.

Brown, S. L. (1978). Earnings changes, stock prices, and market efficiency. *The Journal of Finance, 33*(1), 17-28. Available at: https://doi.org/10.1111/j.1540-6261.1978.tb03386.x.

Calvet, L. E., & Fisher, A. J. (2007). Multifrequency news and stock returns. *Journal of Financial Economics, 86*(1), 178-212. Available at: https://doi.org/10.1016/j.jfineco.2006.09.001.

Chen, Y.-L., & Gau, Y.-F. (2010). News announcements and price discovery in foreign exchange spot and futures markets. *Journal of Banking & Finance, 34*(7), 1628-1636. Available at: https://doi.org/10.1016/j.jbankfin.2010.03.009.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417. Available at: https://doi.org/10.2307/2325486.

Gau, Y.-F., & Wu, Z.-X. (2017). Macroeconomic announcements and price discovery in the foreign exchange market. *Journal of International Money and Finance, 79*, 232-254. Available at: https://doi.org/10.1016/j.jimonfin.2017.08.006.

Gil-Alana, L. A., Gupta, R., Shittu, O. I., & Yaya, O. S. (2018). Market efficiency of Baltic stock markets: A fractional integration approach. *Physica A: Statistical Mechanics and Its Applications, 511*, 251-262. Available at: https://doi.org/10.1016/j.physa.2018.07.029.

Hussain, S. M. (2011). Simultaneous monetary policy announcements and international stock markets response: An intraday analysis. *Journal of Banking & Finance, 35*(3), 752-764. Available at: https://doi.org/10.1016/j.jbankfin.2010.09.002.

Jain, P., Vyas, V., & Roy, A. (2013). A study on weak form of market efficiency during the period of global financial crisis in the form of random walk on Indian capital market. *Journal of Advances in Management Research, 10*(1), 122-138. Available at: https://doi.org/10.1108/09727981311327802.

Jiang, C. X., Likitapiwat, T., & McInish, T. H. (2012). Information content of earnings announcements: evidence from afterhours trading. *Journal of Financial and Quantitative Analysis, 47*(6), 1303-1330. Available at: https://doi.org/10.1017/s002210901200049x.

Jiang, J. (2017). Cross-sectional variation of market efficiency. *Review of Accounting and Finance, 16*(1), 67-85. Available at: https://doi.org/10.1108/raf-02-2016-0018.

Lin, W., & Tsai, I. (2018). Black swan events in China’s stock markets: Intraday price behaviors on days of volatility. *International Review of Economics and Finance, 59*(700), 395-411. Available at: https://doi.org/10.1016/j.iref.2018.10.005.

Malkiel, B. G. (1989). Is the stock market efficient? *Science, 243*(4896), 1313-1318. Available at: https://doi.org/10.1126/science.243.4896.1313.

Prabu, E., Bhattacharyya, I., & Ray, P. (2016). Is the stock market impervious to monetary policy announcements: Evidence from emerging India. *International Review of Economics & Finance, 46*, 166-179. Available at: https://doi.org/10.1016/j.iref.2016.09.007.

Smales, L. A. (2012). Order imbalance, market returns and macroeconomic news: Evidence from the Australian interest rate futures market. *Research in International Business and Finance, 26*(3), 410-427.

Stefanescu, R., & Dumitriu, R. (2013). Impact of the foreign exchange rates fluctuations on returns and volatility of the Bucharest stock exchange. MPRA Paper No. 47229.
Vithessonthi, C., & Techarongrojwong, Y. (2013). Do monetary policy announcements affect stock prices in emerging market countries? The case of Thailand. *Journal of Multinational Financial Management, 23*(5), 446-469. Available at: https://doi.org/10.1016/j.mulfin.2013.10.001.

Vortelinos, D. I., Koulakiotis, A., & Tsagkanos, A. (2017). Intraday analysis of macroeconomic news surprises and asymmetries in mini-futures markets. *Research in International Business and Finance, 39*, 150-168. Available at: https://doi.org/10.1016/j.ribaf.2016.07.002.

*Views and opinions expressed in this article are the views and opinions of the author(s), Asian Economic and Financial Review shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.*