





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



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### ABSTRACT

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#### Keywords

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Stock markets act as barometers of economies; 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.

#### JEL Classification:

G01, G1, G4.

**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 reliefs 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. Prabu, 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
<b><i>Economic Crises</i></b>			
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: 205 days; Postdate: 205 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
<b><i>Bank Frauds</i></b>			
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 13, 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  $\ln(P1/P0)$  formula, where P1 is the price at the end and P0 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:

$$\text{LNIR} = \alpha_1 + \beta_1 \text{LNIRD}_1 + \lambda_1 \text{LNIRD}_2 + \gamma_1 \text{LNIRD}_3 + \varepsilon_1 \quad [1]$$

$$\text{LNAIR} = \alpha_2 + \beta_2 \text{LNAIRD}_1 + \lambda_2 \text{LNAIRD}_2 + \gamma_2 \text{LNAIRD}_3 + \varepsilon_2 \quad [2]$$

$$\text{LNFSIR} = \alpha_3 + \beta_3 \text{LNFSIRD}_1 + \lambda_3 \text{LNFSIRD}_2 + \gamma_3 \text{LNFSIRD}_3 + \varepsilon_3 \quad [3]$$

$$\text{LNFIR} = \alpha_4 + \beta_4 \text{LNFIRD}_1 + \lambda_4 \text{LNFIRD}_2 + \gamma_4 \text{LNFIRD}_3 + \varepsilon_4 \quad [4]$$

$$\text{LNITIR} = \alpha_5 + \beta_5 \text{LNITIRD}_1 + \lambda_5 \text{LNITIRD}_2 + \gamma_5 \text{LNITIRD}_3 + \varepsilon_5 \quad [5]$$

$$\text{LNMEDIR} = \alpha_6 + \beta_6 \text{LNMEDIRD}_1 + \lambda_6 \text{LNMEDIRD}_2 + \gamma_6 \text{LNMEDIRD}_3 + \varepsilon_6 \quad [6]$$

$$\text{LNMETIR} = \alpha_7 + \beta_7 \text{LNMETIRD}_1 + \lambda_7 \text{LNMETIRD}_2 + \gamma_7 \text{LNMETIRD}_3 + \varepsilon_7 \quad [7]$$

$$\text{LNPHIR} = \alpha_8 + \beta_8 \text{LNPHIRD}_1 + \lambda_8 \text{LNPHIRD}_2 + \gamma_8 \text{LNPHIRD}_3 + \varepsilon_8 \quad [8]$$

$$\text{LNPSUBIR} = \alpha_9 + \beta_9 \text{LNPSUBIRD}_1 + \lambda_9 \text{LNPSUBIRD}_2 + \gamma_9 \text{LNPSUBIRD}_3 + \varepsilon_9 \quad [9]$$

$$\text{LNPVTBIR} = \alpha_{10} + \beta_{10} \text{LNPVTBIRD}_1 + \lambda_{10} \text{LNPVTBIRD}_2 + \gamma_{10} \text{LNPVTBIRD}_3 + \varepsilon_{10} \quad [10]$$

$$\text{LNRIR} = \alpha_{11} + \beta_{11} \text{LNRIRD}_1 + \lambda_{11} \text{LNRIRD}_2 + \gamma_{11} \text{LNRIRD}_3 + \varepsilon_{11} \quad [11]$$

Where,

- LNIR Equation 1 represents the Log of NIFTY 50 Index Returns, LNAIR Equation 2 the Log of NIFTY Auto Index Returns, LNFSIR Equation 3 the Log of NIFTY Financial Services Index Returns, LNFIR Equation 4 the Log of NIFTY FMCG Index Returns, LNITIR Equation 5 the Log of NIFTY IT Index Returns, LNMEDIR Equation 6 the Log of NIFTY Media Index Returns, LNMETIR Equation 7 the Log of NIFTY Metal Index Returns, LNPHIR Equation 8 the Log of NIFTY Pharma Index Returns, LNPSUBIR Equation 9 the Log of NIFTY PSU Bank Index Returns, LNPVTBIR Equation 10 the Log of NIFTY Private Bank Index Returns, and LNRIR Equation 11 the Log of NIFTY Realty Index Returns.
- $\alpha_1$ – $\alpha_{11}$  are the intercept terms for the respective models.
- $\beta_1$ – $\beta_{11}$  are the slope coefficients representing the effect on the date of the event.
- $\lambda_1$ – $\lambda_{11}$  are the slope coefficients representing the effect before the event.
- $\gamma_1$ – $\gamma_{11}$  are the slope coefficients representing the effect after the event.
- The log of each index accompanied by a subscript 1 (i.e.,  $\text{LNIRD}_1$ – $\text{LNRIRD}_1$ ) 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.,  $\text{LNIRD}_2$ – $\text{LNRIRD}_2$ ) 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.,  $\text{LNIRD}_3$ – $\text{LNRIRD}_3$ ) represent dummy variable for the effect after the event for the respective models.

- $\varepsilon_1$ – $\varepsilon_{11}$  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:

$H_0$ : 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  $H_0$ . On the actual day of January 21, 2008, all indices on—other than LNMETIR, 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  $H_0$ : on August 16, a significant negative impact at a 1% level of significance was experienced in all indices other than LNAIR and LNPHIR 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, LNMEDIR, LNMETIR, and LNRIR, while the only significant effects were seen in LNMEDIR, LNMETIR, and LNPHIR. 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,  $H_0$  is rejected. However, both antedate and postdate effects were only seen in LNMEDIR and LNRIR, while only LNPVTBIR showed an antedate effect and LNMETIR 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 LNMETIR at the 1% level, LNIR, LNPSUBIR, and LNRIR at 5%, and LNFSIR and LNPVTBIR at 10%, rejecting  $H_0$ . 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 LNPHIR at the 1% level, LNMEDIR at 5%, and LNFIR at 10%, again rejecting  $H_0$ . 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,  $H_0$  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  $H_0$ .

In India, the GST had been debated for many years, and its impact was thus minimized; however,  $H_0$  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 demonetization 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 LNIR, LNAIR, LNFIR, and LNRIR; 5% level of significance for LNFSIR and LNMEDIR; and 10% level of significance for LNTIR, LNPSUBIR, and LNPVTBIR. All exhibited negative impacts, the greatest in the realty 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 realty 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 LNPVTBIR 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 LNPVTBIR, 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 LNTIR 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 LNTIR at and LNPVTBIR 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	LNITIR	LNMEDI R	LNMETI R <sup>+</sup>	LNPHIR	LNPSUBI R	LNPVTBI R	LNRR
US Subprime Mortgage Crisis	C	$\alpha_7$	0.067	0.034	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	$\beta_7$	-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	$\lambda_7$	-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	0.139	0.319
	Postdate Effect	$\Theta_7$	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	C	$\alpha_4$	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	$\beta_4$	-4.237	-2.505	-5.504	-4.036	-2.399	-4.590	-5.569	-1.895	-5.544	-6.346	-6.866
		P-value	0.000***	0.027**	0.000***	0.000***	0.073*	0.001***	0.000***	0.043**	0.005***	0.000***	0.002***
	Antedate Effect	$\lambda_4$	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	$\Theta_4$	-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	C	$\alpha_3$	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	$\beta_3$	-6.154	-7.625	-6.864	-4.804	-4.924	-8.482	-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	$\lambda_3$	-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	0.065*	0.041**
	Postdate Effect	$\Theta_3$	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	



Introduction of RERA by Rajya Sabha in India	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	-0.110	0.545	0.400	1.996	0.553	2.243	0.987	2.027
		P-value	0.042**	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	
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	
Introduction of RERA by Lok Sabha in India	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	0.834	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	
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	
RERA established in India	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	
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	
Brexit Referendum	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	-0.419	0.308	0.929	2.020	1.330	-1.212
P-value		0.374	0.397	0.354	0.430	0.973	0.758	0.849	0.462	0.360	0.260	0.539	

	Antedate Effect	$\lambda_2$	-0.035	0.162	-0.145	-0.108	0.364	-0.272	0.357	-0.145	0.013	-0.466	0.860
		P-value	0.929	0.760	0.776	0.825	0.430	0.655	0.623	0.798	0.990	0.378	0.331
	Postdate Effect	$\Theta_2$	0.014	-0.055	0.108	0.476	-0.652	0.489	0.090	0.666	0.312	0.023	0.706
		P-value	0.972	0.917	0.832	0.332	0.158	0.423	0.902	0.240	0.752	0.966	0.425
Autocorrelation Test	DW Statistic		1.87	1.85	1.88	1.91	1.95	1.98	1.94	1.84	1.91	1.89	1.96
Introduction of GST by Rajya Sabha in India	C	$\alpha_8$	0.035	0.041	0.054	0.039	0.004	0.056	0.064	-0.018	-0.001	0.059	0.060
		P-value	0.281	0.348	0.189	0.331	0.909	0.260	0.289	0.707	0.987	0.166	0.408
	Event Date Effect	$\beta_8$	-0.944	-1.829	-1.096	-2.518	0.017	-1.201	-0.070	-0.109	-0.724	-0.628	-1.510
		P-value	0.273	0.117	0.318	0.020**	0.987	0.372	0.965	0.931	0.741	0.585	0.441
	Antedate Effect	$\lambda_8$	0.040	0.417	-0.224	0.479	0.542	0.727	-0.296	-0.194	-0.139	-0.281	-0.182
		P-value	0.917	0.426	0.649	0.321	0.239	0.228	0.682	0.731	0.887	0.587	0.836
	Postdate Effect	$\Theta_8$	0.037	0.506	0.044	-0.271	-0.014	0.301	0.614	-0.316	0.379	-0.025	0.830
		P-value	0.924	0.334	0.929	0.574	0.975	0.618	0.395	0.576	0.699	0.961	0.344
Autocorrelation Test	DW Statistic		1.88	1.87	1.89	1.87	1.96	1.99	1.94	1.84	1.93	1.89	1.95
Introduction of GST by Lok Sabha in India	C	$\alpha_9$	0.032	0.037	0.049	0.033	0.006	0.056	0.060	-0.023	-0.011	0.056	0.060
		P-value	0.322	0.400	0.226	0.405	0.874	0.260	0.321	0.618	0.893	0.194	0.409
	Event Date Effect	$\beta_9$	0.293	0.566	0.409	0.185	0.533	0.364	0.503	0.141	-0.317	0.054	0.786
		P-value	0.734	0.628	0.710	0.864	0.604	0.787	0.756	0.911	0.885	0.963	0.688
	Antedate Effect	$\lambda_9$	0.071	0.521	-0.233	-0.103	0.400	0.021	0.708	-0.008	0.371	-0.170	0.360
		P-value	0.853	0.320	0.636	0.832	0.385	0.972	0.329	0.989	0.706	0.742	0.682
	Postdate Effect	$\Theta_9$	-0.190	-0.530	0.027	0.142	-0.373	-0.227	0.085	-0.449	0.548	-0.015	-0.625
		P-value	0.622	0.311	0.956	0.769	0.418	0.707	0.907	0.427	0.577	0.977	0.477
Autocorrelation Test	DW Statistic		1.89	1.87	1.89	1.88	1.96	1.98	1.95	1.85	1.92	1.89	1.95
Demonetization in India	C	$\alpha_1$	0.042	0.058	0.055	0.056	0.034	0.080	0.062	-0.032	-0.043	0.059	0.104
		P-value	0.171	0.170	0.163	0.143	0.377	0.107	0.305	0.479	0.603	0.149	0.138
	Event Date Effect	$\beta_1$	0.503	1.816	0.712	-0.118	0.350	-0.048	0.336	-1.392	-0.034	0.825	-0.306
		P-value	0.546	0.109	0.501	0.908	0.736	0.971	0.836	0.254	0.988	0.454	0.871
	Antedate Effect	$\lambda_1$	-0.343	-0.371	-0.288	0.345	-0.259	-0.739	0.287	-1.424	-0.584	-0.215	-1.325
		P-value	0.358	0.466	0.544	0.453	0.579	0.214	0.694	0.009***	0.554	0.664	0.117
	Postdate Effect	$\Theta_1$	-1.080	-2.505	-0.938	-1.748	-0.782	-1.218	-0.757	-0.169	1.902	-0.965	-4.625
		P-value	0.004***	0.000***	0.049**	0.000***	0.094*	0.041**	0.300	0.758	0.054*	0.051*	0.000***

	Autocorrelation Test	DW Statistic	1.90	1.94	1.88	1.95	1.95	1.99	1.94	1.90	1.92	1.91	2.01
GST came into effect	C	$\alpha_{10}$	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
	Event Date Effect	$\beta_{10}$	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
	Antedate Effect	$\lambda_{10}$	-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	0.730	0.198	0.496	0.516	0.212	0.405	0.604
	Postdate Effect	$\Theta_{10}$	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	0.249
	Autocorrelation Test	DW Statistic	1.91	1.90	1.90	1.89	1.97	1.94	2.01	1.82	1.99	1.92	1.99
Announcement of Bank Recapitalization in India	C	$\alpha_6$	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
	Event Date Effect	$\beta_6$	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***	0.834	0.699	0.095*	0.925	0.767
	Antedate Effect	$\lambda_6$	-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
	Postdate Effect	$\Theta_6$	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
	Autocorrelation Test	DW Statistic	1.76	1.78	1.83	1.86	2.02	1.73	1.98	1.68	2.10	1.87	1.82
Reintroduction of LTCG Tax in India	C	$\alpha_5$	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
	Event Date Effect	$\beta_5$	-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	0.535	0.950	0.024**	0.271	0.723	0.537
	Antedate Effect	$\lambda_5$	-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
	Postdate Effect	$\Theta_5$	-0.899	-0.669	-1.126	-0.556	-0.829	-0.428	-0.714	0.219	-0.232	-1.161	-1.029
		P-value	0.005***	0.112	0.007***	0.098*	0.104	0.375	0.307	0.653	0.793	0.006***	0.142
	Autocorrelation Test	DW Statistic	1.88	1.85	1.99	1.83	2.07	1.85	1.97	1.91	2.11	2.02	1.71
SBI Fraud	C	$\alpha_{18}$	0.063	0.067	0.087	0.079	0.044	0.061	0.135	-0.047	0.027	0.085	0.117

	Event Date Effect	P-value	0.047	0.156	0.032	0.078	0.332	0.254	0.042	0.374	0.783	0.043	0.148
		$\beta_{18}$	0.246	0.516	0.088	-0.878	1.166	-0.030	-0.217	0.908	1.036	0.668	3.995
	Antedate Effect	P-value	0.724	0.617	0.921	0.368	0.243	0.979	0.881	0.435	0.632	0.467	0.024**
		$\lambda_{18}$	-0.185	-0.195	0.040	-0.445	0.103	-0.949	-0.641	-0.282	1.141	0.148	-0.171
	Postdate Effect	P-value	0.554	0.673	0.920	0.310	0.819	0.071*	0.324	0.589	0.240	0.719	0.828
		$\Theta_{18}$	0.217	0.542	0.192	0.491	0.210	0.651	0.717	0.505	-0.233	-0.052	0.323
Autocorrelation Test	DW Statistic	1.87	1.86	1.86	1.95	1.94	1.94	1.98	1.81	1.97	1.91	1.96	
Canara and Vijaya Banks Fraud	C	$\alpha_{17}$	0.052	0.052	0.069	0.065	0.067	0.052	0.096	-0.070	0.000	0.070	0.089
		P-value	0.120	0.302	0.102	0.171	0.159	0.374	0.180	0.225	0.998	0.110	0.309
	Event Date Effect	$\beta_{17}$	-0.151	-0.542	0.230	0.234	-1.334	-0.102	-0.872	0.156	-0.103	-0.081	0.642
		P-value	0.826	0.602	0.792	0.811	0.178	0.932	0.554	0.895	0.962	0.929	0.721
	Antedate Effect	$\lambda_{17}$	-0.173	-0.059	0.089	-0.498	-0.426	-0.292	0.454	0.823	-0.464	-0.076	0.152
		P-value	0.574	0.899	0.821	0.257	0.338	0.589	0.493	0.124	0.634	0.851	0.851
Postdate Effect	$\Theta_{17}$	0.045	-0.069	0.029	0.022	-0.163	-0.006	0.071	-0.161	0.218	0.126	0.638	
	P-value	0.884	0.882	0.940	0.960	0.715	0.991	0.914	0.762	0.823	0.757	0.430	
Autocorrelation Test	DW Statistic	1.89	1.87	1.87	1.92	1.96	1.93	2.01	1.82	1.98	1.91	1.98	
Andhra Bank Fraud	C	$\alpha_{15}$	0.032	0.062	0.006	0.085	0.138	0.083	0.063	-0.022	-0.044	0.004	0.106
		P-value	0.590	0.423	0.937	0.179	0.122	0.376	0.629	0.826	0.866	0.960	0.418
	Event Date Effect	$\beta_{15}$	0.531	-1.027	2.378	-0.178	-1.022	1.316	0.087	-0.824	0.228	1.313	-0.079
		P-value	0.440	0.248	0.007***	0.806	0.317	0.220	0.953	0.480	0.939	0.141	0.958
	Antedate Effect	$\lambda_{15}$	0.198	-0.098	0.105	0.123	0.646	0.268	0.222	0.106	-0.259	0.183	0.987
		P-value	0.526	0.808	0.790	0.708	0.164	0.581	0.742	0.841	0.849	0.649	0.147
Postdate Effect	$\Theta_{15}$	0.382	-0.238	0.556	0.233	1.312	-0.550	-0.987	0.012	0.261	0.799	-0.825	
	P-value	0.222	0.554	0.159	0.479	0.005***	0.259	0.144	0.982	0.848	0.049**	0.225	
Autocorrelation Test	DW Statistic	1.77	1.90	1.80	1.92	2.00	1.83	1.96	1.87	1.90	1.87	1.76	
PNB Fraud	C	$\alpha_{14}$	0.083	0.076	0.067	0.146	0.279	0.026	0.033	0.006	-0.217	0.094	-0.009
		P-value	0.286	0.453	0.504	0.071	0.022	0.819	0.843	0.955	0.286	0.354	0.956
	Event Date Effect	$\beta_{14}$	-0.452	-0.333	-0.673	-0.659	-0.301	-0.442	-0.137	-0.983	-4.681	-1.257	0.353
		P-value	0.541	0.732	0.479	0.389	0.794	0.678	0.931	0.370	0.017**	0.195	0.821
Antedate	$\lambda_{14}$	-0.322	-0.115	-0.298	-0.449	-1.091	0.396	0.482	0.581	-0.011	-0.370	0.879	

	Effect	P-value	0.341	0.796	0.492	0.200	0.040**	0.417	0.506	0.246	0.990	0.402	0.219	
	Postdate Effect	$\Theta_{14}$	-0.281	-0.783	-0.244	-0.201	0.104	-0.562	-0.601	-0.904	-0.625	-0.343	-0.974	
		P-value	0.406	0.080*	0.575	0.565	0.844	0.250	0.408	0.073*	0.480	0.438	0.174	
Autocorrelation Test	DW Statistic		1.79	1.96	1.86	1.77	2.03	1.89	2.05	1.81	2.17	1.89	1.79	
Bank of Maharashtra Fraud	C	$\alpha_{16}$	0.051	0.031	0.063	0.090	0.077	0.015	0.078	-0.067	-0.035	0.068	0.112	
		P-value	0.152	0.551	0.155	0.074	0.138	0.807	0.306	0.290	0.756	0.143	0.227	
	Event Date Effect	$\beta_{16}$	-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	0.621	0.678	0.485	0.342	0.608	0.496	0.482	0.609	0.765	0.932	
	Antedate Effect	$\lambda_{16}$	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	$\Theta_{16}$	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		1.89	1.90	1.89	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 short-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 investment 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.

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