

REACTION OF PRECEDENTED AND UNPRECEDENTED EVENTS ON THE INDIAN STOCK RETURNS

Saima Rizvi*, Aarti Mehta Sharma**, Shraddha Mishra***

Abstract *The purpose of the research paper is to study the market dynamics of Sensex, the share index in Mumbai, India, and its performance pre-election and post-election, which are considered to be precedent events, and during natural disasters and terrorist attacks, which are unprecedented developments. This paper has measured the impact of six positive and negative events on the Bombay Stock Exchange's 30 share index Sensex. The data is collected from secondary sources focusing on time periods before the dates of the event and time periods after the event. Event study methodology was used to prove the impact of the event on the Indian indices. The study aims to ascertain whether the impact of these events on the indices were significant or not. The application of this study is in terms of clarity to retail investors in the short run, when market may be volatile in terms of prices and returns. Some of the investors may be swayed by projections of election outcomes or other unprecedented events and may try to time the market during that time period. The long-term investor may look at their financial goals and risk profile while choosing stocks for their portfolio, rather than being influenced by swings in the markets.*

Keywords: Election Day, Lognormal Model, Market Sentiment, Volatility Effects, Efficient Market Hypothesis, Event Study Methodology

INTRODUCTION

The stock market in India is impacted by macroeconomic and political events in the country and around the world. There are a number of precedent and unprecedented events that impact the economy and may, therefore, impact the equity market. The election year witnesses more volatility in the equity market depending on the uncertainty of the election outcomes – whether the present regime will continue or a new government would take over? Three parliamentary elections of the lower house have been considered, to study their impact on the stock market. The study also tries to gauge the investor's sentiments during these political developments every five years. India follows a democratic form of government in which Members of Parliament are elected to the lower house or 'Lok Sabha' every five years.

The stock markets are a barometer of the country's economy and are sensitive to new information, according to the Efficient Market Hypothesis (Fama, 1969). Fama, in his paper, highlighted that the successive price changes in individual stocks were independent and were consistent with the efficient market. The paper is seminal and examines the

adjustment of stock prices to specific kinds of information. The capital markets are impacted by both economic and political developments within and outside the country. Elections are one such event in the Indian democracy which are held once every five years. The body of knowledge has given diverse results of the impact of political economy on stock markets. Some of the studies have proposed a positive relationship, while some a negative relationship, between elections and stock market volatility.

The paper applied event study methodology, which is one of the frequently used analytical tools in financial research. The objective of this method was to evaluate whether there were any abnormal or excess returns earned due to the occurrence of any event. The goal was to examine market response for a particular event, to see a statistically significant reaction in market to any such event. The study observed the stock price changes for firms and also the composite index during that period. The objective of the study is to determine whether the Indian stock market reacts to unanticipated event such as natural disasters or whether it reacts to anticipated events such as elections. The idea is to know the effects of these reactions on a few top companies listed in the Bombay Stock Exchange (BSE).

* Professor, IILM University, Gurugram, Haryana, India. Email: saima.rizvi@iilm.edu;
ORCID: <https://orcid.org/0000-0002-4011-2969>

** Associate Professor and Director, Symbiosis Centre for Management Studies, Bengaluru, Symbiosis International (Deemed University), Pune, Maharashtra, India. Email: director@scmsbengaluru.siu.edu.in

*** Assistant Professor, IILM University, Gurugram, Haryana, India. Email: shraddhamishra29@gmail.com;
ORCID: <https://orcid.org/0000-0002-3683-8468> (Corresponding Author)

In an event study method, the selection of the event day and event window is considered the key point of the study. According to the Efficient Market Hypothesis (Fama, 1969), market reactions may come due to different reasons, such as changes in fiscal or monetary policies, inflation rate, stock splits, earning announcement, unemployment rate, and any other important public information released in that period, such as election results or other public news. An unanticipated event suddenly strikes and it results in a 'shock' for the entire market movement. However, the election and its results also carry a distinct feature, laying an unpredictable impact on the market movements. Hence, to analyse the 'shock occurring due to a natural disaster' in the stock market and 'shock occurring due to the elections' are important issues to be covered in this study.

LITERATURE REVIEW

An extensive literature review is done to understand the background and to look at the kind of research gap that exists in the area of semi-strong form of efficiency and the stock market reaction with respect to the precedented and unprecedented events.

Raju (2019), in his article, has highlighted that elections around the world bring industries to a speculative mode in the anticipation of policy changes which a new regime might bring. This in turn impacts the stock prices and returns across the market. The investor might think whether to invest or not to invest in the market during this period. In addition, the performance of sector-specific indices, such as BSE Bankex, BSE Auto, and BSE Metals can be tracked to see the movements in different sectors during, pre- and post-election period. The study observed the stock market movements one month, three months, and six months prior to and after elections. The markets were found to show a subdued growth during and after the elections, whereas they were usually bullish before the elections. The study suggested that investors should build up a portfolio three months before the elections and hold it for three or six months after the elections. Chien et al. (2014), in their paper, examined the relationship between the political developments, such as election, on the Dow Jones Industrial Average (DJIA). This paper analysed the movement of the market between 1900 and 2008 during 27 presidential elections in the United States. The paper evaluated the relationship between market returns and economic performance of the US market. The analysis showed that after the elections market movement had been significant and it suggested the potential of the future US Presidential administration.

Santa-Clara and Valkanov (2003), in their work, stated that the difference in stock returns across political cycles

remain a puzzle for researchers. The paper highlighted that the excess returns in the stock market were higher under the democratic presidencies than republic presidencies. Although, no difference was found in terms of riskiness of presidencies, which could result in higher risk premium. In India, the risk may be high in case of a coalition government, which may fall in case the alliance partners withdraw support due to disagreement, and the party might have to prove their majority on the floor of the house. Jones and Banning (2009), in their paper, studied the monthly market returns of the US market for over 104 years, with the aim of understanding the relationship between market returns and American elections. The study found very little or no significant relationship between the stock market performance and elections or election cycles. The study pointed out that even 'second half effect', which predicts higher returns during the second half of the presidential election term, has been found to give only weak evidence. Hirsch (2013), in his article, highlighted the linkage between stock market and Presidential elections and terms. Presidential elections had a deep impact on the stock market every four years. The first half of the term witnessed bear markets and recession, and the second half usually was better, in terms of bullish stock market performance and prosperous times. Goodell (2012), in his paper, examined the relationship between political uncertainties and stock market volatility. The study found a positive relationship between election outcome and implied market volatility. The stock market volatility is measured by the Volatility Index (VIX) increases, in case the probable winner of the Presidential elections becomes less uncertain. The election results in anxiety among the investors, as they revise their expectations regarding future macroeconomic policies.

Li and Born (2006), in their work, re-emphasised the influence of political outcomes on the stock markets. According to them, if the outcome of the candidates were not very certain then both stock market volatility and stock market returns rise. Lynch (2002) and Patrick (1999), in their paper, highlighted the relationship between economic conditions and presidential elections by applying various OLS (Ordinary Least Square) regression tests and F-test to confirm the results. This was considered to be groundbreaking, as not many studies were conducted in the 19th and early 20th century in the field to test the correlation between economic stability and election results. Malley et al. (2007), in their work, highlighted the positive relationship among elections, fiscal policy, and aggregate fluctuations in the economy. Econometric analysis of US data suggested a correlation among electoral uncertainty, policy instruments, and macroeconomic outcomes. Nippani and Augustine (2005), in their work, examined the impact of the US Presidential elections' result on stock market performance in the US, Canadian, and Mexican stock markets. The authors pointed

out that the delay in the US Presidential elections not only impacted the US markets, a spillover effect was felt by other markets as well. The markets of the three North American countries were integrated and were negatively impacted due to delay in the declaration of results. Bialkowski, Jędrzej et al. (2008), in their paper, analysed 27 OECD (Organisation for Economic Co-operation and Development) countries to know whether national elections induce stock market volatility. Country-specific components of the index return may show more volatility during the week near the elections. A number of factors, such as margin of victory, lack of compulsory voting rights, and failure to get a majority, may result in volatility due to election shock.

He, Yan et al. (2009), in their paper, elaborated on the impact of election-induced uncertainty in politically sensitive stocks and concluded that a delay in election results causes volatility in the stock market. Jayachandran (2006), in her paper, highlighted the impact of the Jeffords effect, which evaluated the impact of changes in the political landscape on market value of firms. Soft money could be a proxy for how well a particular party's policy suited a firm. The paper also mentioned the soft money donations by firm to fund elections of a political party, which in turn determine their performance during the election year. Knight (2006), in his paper, evaluated the capitalisation of policy platforms into the equity prices using a sample size of 70 firms favoured under the Bush administration. The most sensitive companies included sectors like tobacco, Microsoft competitors, and alternative energy companies. Further, analysis of the contribution to election campaigns were taken into consideration.

Gemill (1992), in his paper, examined the behaviour of the stock and options market in London during the 1987 elections. A close relationship between opinion polls and FTSE 100 index of share prices was found to exist in the study. Graham, Nikkinen and Sahlstrom (2003), in their paper, examined the effects of changes in political uncertainty on changes in implied stock market volatility during the US Presidential elections. Findings suggested that there exists a relationship between US Presidential elections and stock market volatility. Alesina and Sachs (1988), in their paper, suggested that a relationship between political and economic cycles in a two-party system exists, and during the first few years of the tenure, the incumbent tries to stimulate the economy towards the election to gain favour. Bialkoski and Gottschalk et al. (2008), in their paper, investigated 27 OECD countries to test whether national elections induce stock market volatility. It was found in their study that country-specific component of index returns was doubled during this period, because investors were surprised by the outcome of the election.

Siokis and Kapopoulos (2007), in their paper, observed that the volatility in the Athens Stock Exchange was attributed to the political development in the country. Hung and Jiang (2007), in their paper, examined the jump intensity model of the Taiwan stock market during the time period of the presidential elections. Models such as ARJI and GARCH were applied to measure the jump intensity and volatility of the Taiwanese market. It was found that volatility was high around the election period in both the markets, but was found to be higher in the stock market compared to the foreign exchange market, due to government intervention.

Chakraborty and Sarkar (2016), in their paper, examined the volatility of the Indian stock market on the introduction of derivatives, Union Budget, and elections. They also evaluated the co-integration between spot and futures market. Foroohar (2016), in his article, noted the effect of Donald Trump's win in the elections on the stock market movements, uncertainty, and economic growth. Sabuwala (2014), in her paper, emphasised the impact of exit polls and election results on stock market volatility. She also highlighted that the defensive sectors – pharmaceutical, information technology, and fast-moving consumer goods – were not much impacted by these developments and volatility in the market. Celis and Shen (2015), in their paper, examined the impact of the Malaysian political cycle on stock market returns and volatility between the period February 1982 and April 2012, covering seven general elections during this period. The presence of a political cycle in the Malaysian Stock Market volatilities were statistically found to be significant. The findings of the study were useful for investors to decide when to enter and when to exit the market.

Karmin (2004), in his article, highlighted that stock market returns declined in 2004 post election results, suggesting investors' concern towards a left leaning government which may reverse reforms. The hedge funds also continued to exit the emerging markets in the wake of volatility and uncertainty in the market. Sabuwala (2013), in her article, highlighted the impact of political rivalry between Rahul Gandhi and Narendra Modi on the stock market in the 2014 elections.

Luo (2012), in his paper, evaluated the impact of natural disasters on the global stock market by studying the impact of the Japanese 2011 earthquake on six representative stock markets of the world. The impact on some stocks in these markets were found to be significant. Overall, the impact on these stock markets were largely insignificant. Wang and Kutan (2013) highlighted in their paper the impact of natural disasters on stock markets of the US and Japan, and also the insurance sectors in these markets, to understand the wealth effect and risk effects in these markets. Tavor and Regev

(2019), in their paper, highlighted the impact of disaster and terrorism on stock market, to reveal profit opportunities. The results showed that the index was impacted for two days in the case of natural disasters and for one day in the case of artificial disasters. Siddiquee and Rahman (2017), in their paper, evaluated the contagion effect from the Australian Capital Market to Indian, New Zealand, Hong Kong, Chinese, Taiwan, and Japanese capital markets due to the Australian catastrophe. Worthington and Valadkhani (2007), in their paper, analysed the impact of natural disasters on the Australian equity market. Results indicated that some of these natural disasters, such as cyclones, bush-fires, and earthquakes, had a major impact on market returns.

The review results suggest that a lot of research in various countries, as well as in India, has been conducted to understand the impact of political events on the stock market movements and various exchanges. Many studies have been found with respect to natural disasters and terrorism. There are very few studies in the Indian scenario, where the objective is to understand the difference in the stock movement reactions happening in the market due to natural disasters and assembly elections. This paper is written to bridge this gap in the literature.

RESEARCH METHODOLOGY

This paper used event study methodology to understand the impact of preceded and unpreceded events on the stock market performance in terms of overall movement of BSE Sensex, the 30-share index, and select stocks from the automobile, technology, and banking sectors.

The events included preceded events such as elections, which were planned events and were expected to impact market sentiments, and unpreceded events, which included natural disasters and terrorist attacks and were also expected to impact the markets. The data was collected for 120 days before the event and 120 days after the event. The period of study was between November 2007 and November 2019, covering the Indian Lok Sabha elections in 2004, 2009, 2014, and 2019. The unpreceded events included the Bihar floods, the Uttarakhand floods, and the Mumbai terrorist attacks in 2007, 2013, and 2008, respectively. Both market-wide data and individual stock market data had been used to analyse the impact of elections and disasters, both natural and artificial, on the performance of the stock market index BSE Sensex.

Event Selection

In a vast country like India, parliamentary elections could not be conducted in one day, and hence, they were scheduled in

different phases across different states of India. They might extend for even two months. So, the election result date, for the last four parliamentary elections, was considered to be an event, as was the 100-day time period before and after that date; other disasters were considered as unpreceded events.

Hypothesis

HA1: Preceded events such as election results have a significant impact on the stock market returns of selected stocks.

HA2: Unpreceded events such as natural disasters have a significant impact on the stock market returns of selected stocks.

HA3: Unpreceded events such as terrorist attacks have a significant impact on the stock market returns of selected stocks.

The daily adjusted closing values of BSE Sensex 30, and the select stocks from the three sectors collected from the EMIS database from 2007 to 2019, were for the series of events listed in Table 1 and 2.

Table 1: Preceded Event Description

Sr. No.	Event Date	Preceded Event Description
1.	16 May 2009	Elections held in the month of March and April, 2009
2.	16 May 2014	Elections held in the month of March and April, 2014
3.	23 May 2019	Elections held in the month of March and April, 2019

Table 2: Un-Preceded Event Description

Sr. No.	Event Date	Un-Preceded Event Description
1.	Bihar Floods	8 August 2007
2.	Mumbai Terrorist Attacks	26 November 2008
3.	Uttarakhand Floods	16 June 2013

Event Study Model

The market model of returns is as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \mu_{it}$$

Where, R_{it} is the returns during the time period t , α_i is the intercept, β_i is the slope, and R_{mt} is the returns from composite index.

The average abnormal returns is calculated as follows:

$$AARs = \sum_{i=1}^N AR_{is} / N_s$$

AR_{is} is the abnormal returns for the stock i and N_s is the number of firms in the sample.

The cumulative average abnormal returns is:

$$CAARs_{1, S2} = \sum_{s1}^{s2} AARs$$

The estimates of the average abnormal returns are summed across a time period to measure the cumulative average abnormal returns.

Patell (1976) test statistic (PATELL) is:

$$ZPATELL = \sqrt{n(L1 - 4)} L1 - 2 SCAR\tau1, \tau$$

held in the month of March and April, 2009' was coded as 21; the combination of the second company, Maruti Suzuki, with 'Elections held in the month of March and April, 2009' was coded as 22; and so on. The table for the same is presented in Annexure 1.

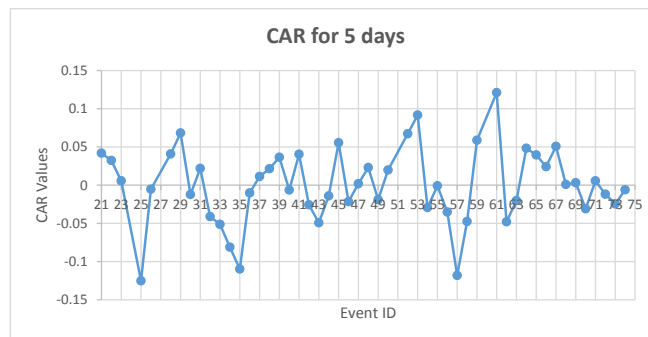


Fig. 1: Cumulative Abnormal Returns for Five-Day Events

DATA ANALYSIS AND INTERPRETATION

The market model of the event study methodology was applied in the study. Daily data was sourced from BSE Sensex for the time period 16 May 2007 to 16 June 2013. Top three companies from the automobile, technology, and banking sector (i.e., total of nine companies) were selected to calculate the abnormal returns, vis-à-vis the BSE Sensex. These listed firms were Mahindra and Mahindra, Maruti Suzuki, Hero Motor Corp., Infosys, Tata Consultancy Services, HCL, ICICI Bank, HDFC, and Kotak Mahindra Bank. Unique events were created for the combination of each event with each firm. For example, the combination of the first company, Mahindra and Mahindra, with 'Elections

Analysis of the results suggests that significant abnormal returns were present for the elections as event IDs 21, 22, 23, 29, 30, 33, 34, 35, 36, 38, and 45 were found to be significant. The stock market was affected to a much lesser extent by other events as there were abnormal returns for only three events – event 52 and 53 for the Bihar floods and event 66 for the Uttarakhand floods. For the companies, we could see that the abnormal returns were maximum for Mahindra and Mahindra, with abnormal returns in three instances, followed by ICICI, Kotak, TCS, and HCL, with abnormal returns in three instances, each. The remaining had abnormal returns in one instance, each.

Table 3: Average Abnormal Returns with Respect to Each Event

Event	AAR(-2)	AAR(-1)	AAR(0)	AAR(1)	AAR(2)	CAAR
Election 2009	-0.0209	0.027	0.0222	-0.0179	-0.0031	0.0073
N (Election 2009, AAR(i))	8	8	8	8	8	
Pos:Neg (Election 2009, AAR(i))	3:5	6:2	5:3	2:6	4:4	5:3
Patell Z	-0.843	2.1695	1.4208	-1.7819	-0.1803	0.3511
Csect T	-1.0246	1.1422	1.2971	-2.1659	-0.3024	0.3488
Std C Sect Z	-0.4699	0.9517	0.952	-2.0218	-0.1962	0.3288
Adjusted Patell Z	-0.8299	2.1358	1.3987	-1.7542	-0.1775	0.2979
Adjusted Std C Sect Z	-0.4615	0.9348	0.9351	-1.9858	-0.1927	0.3022
Election 2014	-0.0053	0.0005	-0.0039	-0.0202	0.0009	-0.0279
N (Election 2014, AAR(i))	9	9	9	9	9	
Pos:Neg (Election 2014, AAR(i))	4:5	6:3	4:5	2:7	5:4	3:6
Patell Z	-1.1566	0.1918	-0.4886	-4.2509	0.0968	-2.5078
Csect T	-1.3164	0.1353	-0.463	-2.0292	0.1246	-1.8023
Std C Sect Z	-1.28	0.2202	-0.2535	-2.1433	0.0597	-1.7914
Adjusted Patell Z	-1.1085	0.1838	-0.4683	-4.0742	0.0928	-2.9125^^

Event	AAR(-2)	AAR(-1)	AAR(0)	AAR(1)	AAR(2)	CAAR
Adjusted Std CSect Z	-1.22	0.2099	-0.2416	-2.0428	0.0569	-2.0304[^]
Election 2019	-0.0085	0.0007	0.0059	0.0043	-0.0004	0.0019
N (Election 2019, AAR(i))	9	9	9	9	9	
Pos:Neg (Election 2019, AAR(i))	0:9	5:4	6:3	5:4	4:5	4:5
Patell Z	-1.8829	0.0413	0.6121	1.0386	0.1807	-0.0046
Csect T	-4.489	0.2554	1.1147	0.7895	-0.1554	0.1657
Std C Sect Z	-5.0723	0.071	0.3914	0.8786	0.2714	-0.0059
Adjusted Patell Z	-1.8691	0.041	0.6076	1.0309	0.1794	-0.0054
Adjusted Std CSect Z	-5.0305	0.0704	0.3881	0.8713	0.2691	-0.3086
Bihar Floods	0.0065	0.0012	0.0038	0.0054	-0.0023	0.0147
N (Bihar Floods, AAR(i))	8	8	8	8	8	
Pos:Neg (Bihar Floods, AAR(i))	6:2	5:3	3:5	6:2	2:6	4:4
Patell Z	1.0224	0.0575	0.4816	1.1486	-0.3683	1.0474
Csect T	1.366	0.3138	0.5601	1.0947	-0.3054	0.9093
Std C Sect Z	1.1358	0.0814	0.4313	1.3312	-0.321	0.8519
Adjusted Patell Z	1.033	0.0581	0.4867	1.1606	-0.3721	0.9694
Adjusted Std CSect Z	1.1493	0.0824	0.4364	1.347	-0.3248	0.7009
Mumbai Attack	0.0063	0.0005	0.0014	0.0111	-0.0152	0.0042
N (Mumbai Attack, AAR(i))	8	8	8	8	8	
Pos:Neg (Mumbai Attack, AAR(i))	5:3	5:3	5:3	6:2	3:5	4:4
Patell Z	0.5249	0.4045	0.4805	1.1346	-1.6881	0.3829
Csect T	0.5292	0.0386	0.1104	1.0211	-1.1884	0.1542
Std C Sect Z	0.4274	0.3404	0.3848	1.1226	-1.245	0.3332
Adjusted Patell Z	0.5129	0.3952	0.4695	1.1086	-1.6495	0.3555
Adjusted Std CSect Z	0.4162	0.3315	0.3747	1.0932	-1.2124	0.4608
Uttarakhand Floods	-0.0011	0.0044	0.0046	-0.0034	-0.0032	0.0013
N (Uttarakhand Floods, AAR(i))	9	9	9	9	9	
Pos:Neg (Uttarakhand Floods, AAR(i))	4:5	5:4	5:4	3:6	3:6	5:4
Patell Z	-0.1992	0.728	0.7032	-0.6448	-0.9292	-0.1529
Csect T	-0.3079	0.9326	1.5692	-1.3078	-0.9005	0.1531
Std C Sect Z	-0.2939	0.6578	1.0604	-0.9767	-1.1441	-0.2155
Adjusted Patell Z	-0.195	0.7126	0.6884	-0.6312	-0.9096	-0.1804
Adjusted Std CSect Z	-0.287	0.6422	1.0352	-0.9536	-1.1169	-0.6558

* t-test 5% and df 8 2.306

** t-test 10% and df 8 1.860

*** t-test 5% and df 7 2.365

**** t-test 10% and df 7 1.895

^^^ Z-test significant at 10% 1.645

^ Z-test significant at 5% 1.96

^^ Z-test significant at 1% 2.58

Here, it was evident that the event of elections had a major impact on the stock market, compared to the other events (tragedies) that befell the country. The average abnormal returns (AAR) were found significant for

the three elections, whereas the cumulative average abnormal returns (CAAR) were not found significant. The results for the same are reflected in Annexure 3.

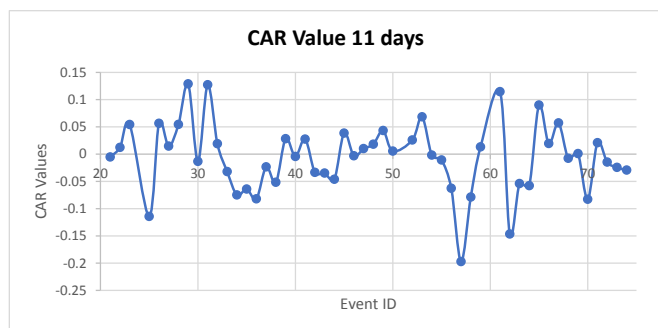


Fig. 2: Cumulative Abnormal Returns for 11 Days

The t-test was significant for three events; those were event 31 (abnormal returns for Maruti Suzuki when elections held in the month of March and April, 2014), 36 (abnormal

returns for ICICI when elections held in the month of March and April, 2014), and 70 (abnormal returns for TCS when Uttarakhand was flooded). While examining the individual abnormal returns, it was noted that there were significant differences in 31 values from the expected values. These had been marked with asterisks. These individual returns might or might not culminate in a significant CAR value. For example, the first event, which was event 21, had three significant abnormal returns; however, the overall CAR t-test was not significant. Like this, there were 31 significant ARs – with the maximum significant deviations from the expected being in AR(0), with seven deviations, and with AR(-1) also having seven deviations. While examining the significant abnormal returns company-wise, it was noted that the maximum deviations had been found in ICICI (five), TCS (four), Kotak (four), M&M (four), and HCL (four).

Table 4: Abnormal Returns and Cumulative Abnormal Returns for 11 Days Event

Grouping Variable/N	AAR(-5)	AAR(-4)	AAR(-3)	AAR(-2)	AAR(-1)	AAR(0)	AAR(1)	AAR(2)	AAR(3)	AAR(4)	AAR(5)	CAAR
Election 2009	-0.0079	0.0172	0.0011	-0.0209	0.027	0.0222	-0.0179	-0.0031	0.0068	-0.0041	0.0049	0.0252
N(e, AAR(i))	8	8	8	8	8	8	8	8	8	8	8	8
Pos:Neg(e, AAR(i))	2:6	7:1	4:4	3:5	6:2	5:3	2:6	4:4	4:4	4:4	4:4	6:2
Patell Z	-0.7933	1.5836	0.1955	-0.843	2.1695	1.4208	-1.7819	-0.1803	0.6322	-0.2225	0.5145	0.8126
Csect T	-1.5642	2.925	0.169	-1.0246	1.1422	1.2971	-2.1659	-0.3024	0.8096	-0.5712	0.67	1.0198
StdCSect Z	-1.715	3.2662	0.3152	-0.4699	0.9517	0.952	-2.0218	-0.1962	0.8452	-0.3203	0.84	1.0716
Adjusted Patell Z	-0.781	1.5589	0.1925	-0.8299	2.1358	1.3987	-1.7542	-0.1775	0.6224	-0.219	0.5065	0.6895
Adjusted StdC-Sect Z	-1.6845	3.2081	0.3096	-0.4615	0.9348	0.9351	-1.9858	-0.1927	0.8301	-0.3146	0.8251	0.9711
Election 2014	0.0074	-0.0009	0.0042	-0.0053	0.0005	-0.0039	-0.0202	0.0009	0.0033	-0.0033	-0.0045	-0.0217
N(el, AAR(i))	9	9	9	9	9	9	9	9	9	9	9	9
Pos:Neg(el, AAR(i))	8:1	6:3	5:4	4:5	6:3	4:5	2:7	5:4	4:5	3:6	5:4	2:7
Patell Z	1.7291	-0.3147	0.5478	-1.1566	0.1918	-0.4886	-4.2509	0.0968	0.6424	-1.1109	-1.6868	-1.749
Csect T	2.0533	-0.1292	0.5309	-1.3164	0.1353	-0.463	-2.0292	0.1246	0.9613	-0.5247	-0.5878	-1.0115
StdCSect Z	2.244	-0.1916	0.2964	-1.28	0.2202	-0.2535	-2.1433	0.0597	0.9022	-0.9151	-0.9726	-1.3749
Adjusted Patell Z	1.6572	-0.3016	0.525	-1.1085	0.1838	-0.4683	-4.0742	0.0928	0.6156	-1.0647	-1.6167	-2.0312
Adjusted StdC-Sect Z	2.1388	-0.1826	0.2825	-1.22	0.2099	-0.2416	-2.0428	0.0569	0.8599	-0.8722	-0.9269	-2.094
Election 2019	0.0013	0.0026	-0.0049	-0.0085	0.0007	0.0059	0.0043	-0.0004	-0.0012	0.0028	-0.0045	-0.0019
N(elec, AAR(i))	9	9	9	9	9	9	9	9	9	9	9	9
Pos:Neg(elec, AAR(i))	6:3	6:3	2:7	0:9	5:4	6:3	5:4	4:5	4:5	6:3	4:5	4:5
Patell Z	0.4029	0.6299	-0.9649	-1.8829	0.0413	0.6121	1.0386	0.1807	-0.13	0.6466	-0.8551	-0.0847
Csect T	0.4608	0.3961	-0.9876	-4.489	0.2554	1.1147	0.7895	-0.1554	-0.2631	0.64	-1.2707	-0.1859

Grouping Variable/N	AAR(-5)	AAR(-4)	AAR(-3)	AAR(-2)	AAR(-1)	AAR(0)	AAR(1)	AAR(2)	AAR(3)	AAR(4)	AAR(5)	CAAR
StdCSect Z	0.625	0.4655	-0.9868	-5.0723	0.071	0.3914	0.8786	0.2714	-0.1393	0.6743	-1.1124	0.9549
Adjusted Patell Z	0.3999	0.6253	-0.9579	-1.8691	0.041	0.6076	1.0309	0.1794	-0.129	0.6418	-0.8488	0.565
Adjusted StdC-Sect Z	0.6198	0.4616	-0.9786	-5.0305	0.0704	0.3881	0.8713	0.2691	-0.1382	0.6687	-1.1032	1.0186
Bihar floods	0.0048	-0.0001	-0.0039	0.0065	0.0012	0.0038	0.0054	-0.0023	-0.0057	-0.0024	0.0034	0.0107
N(bf, AAR(i))	8	8	8	8	8	8	8	8	8	8	8	8
Pos:Neg(bf, AAR(i))	5:3	3:5	3:5	6:2	5:3	3:5	6:2	2:6	2:6	3:5	6:2	5:3
Patell Z	0.9171	-0.1488	-0.5775	1.0224	0.0575	0.4816	1.1486	-0.3683	-0.7765	-0.3912	0.6594	0.6104
Csect T	1.2097	-0.0088	-1.2218	1.366	0.3138	0.5601	1.0947	-0.3054	-0.959	-0.7131	0.6587	0.7767
StdCSect Z	1.4047	-0.0831	-1.0729	1.1358	0.0814	0.4313	1.3312	-0.321	-0.7712	-0.6988	0.8344	-0.1684
Adjusted Patell Z	0.9267	-0.1503	-0.5835	1.033	0.0581	0.4867	1.1606	-0.3721	-0.7846	-0.3953	0.6662	-0.099
Adjusted StdC-Sect Z	1.4214	-0.0841	-1.0856	1.1493	0.0824	0.4364	1.347	-0.3248	-0.7803	-0.7071	0.8443	-0.1577
Mumbai attack	0.0087	-0.002	-0.0087	0.0063	0.0005	0.0014	0.0111	-0.0152	-0.0215	-0.0023	-0.0178	-0.0395
N(m, AAR(i))	8	8	8	8	8	8	8	8	8	8	8	8
Pos:Neg(m, AAR(i))	5:3	4:4	3:5	5:3	5:3	5:3	6:2	3:5	3:5	4:4	1:7	3:5
Patell Z	0.8632	-0.6526	-0.9119	0.5249	0.4045	0.4805	1.1346	-1.6881	-1.9287	-0.04	-1.7623	-1.0782
Csect T	1.1154	-0.1517	-1.0455	0.5292	0.0386	0.1104	1.0211	-1.1884	-1.4965	-0.2052	-3.1171	-1.0354
StdCSect Z	1.0581	-0.5042	-1.0531	0.4274	0.3404	0.3848	1.1226	-1.245	-1.5071	-0.0359	-3.364	-1.0574
Adjusted Patell Z	0.8435	-0.6377	-0.8911	0.5129	0.3952	0.4695	1.1086	-1.6495	-1.8845	-0.0391	-1.7219	-1.0011
Adjusted StdC-Sect Z	1.0304	-0.491	-1.0255	0.4162	0.3315	0.3747	1.0932	-1.2124	-1.4676	-0.0349	-3.2759	-0.984
Uttarakhand floods	-0.001	-0.0022	-0.0039	-0.0011	0.0044	0.0046	-0.0034	-0.0032	0.0031	-0.0036	-0.0004	-0.0067
N(u, AAR(i))	9	9	9	9	9	9	9	9	9	9	9	9
Pos:Neg(u, AAR(i))	4:5	4:5	3:6	4:5	5:4	5:4	3:6	3:6	4:5	3:6	3:6	4:5
Patell Z	-0.483	-0.2384	-0.7695	-0.1992	0.728	0.7032	-0.6448	-0.9292	0.2409	-0.9074	0.1555	-0.7067
Csect T	-0.2561	-0.4926	-1.2755	-0.3079	0.9326	1.5692	-1.3078	-0.9005	0.7693	-0.6153	-0.0706	-0.512
StdCSect Z	-0.5722	-0.2459	-1.0995	-0.2939	0.6578	1.0604	-0.9767	-1.1441	0.2921	-0.6203	0.1123	-0.833
Adjusted Patell Z	-0.4728	-0.2334	-0.7532	-0.195	0.7126	0.6884	-0.6312	-0.9096	0.2358	-0.8883	0.1522	-0.8334
Adjusted StdC-Sect Z	-0.5586	-0.24	-1.0734	-0.287	0.6422	1.0352	-0.9536	-1.1169	0.2852	-0.6056	0.1097	-1.3436

* t-test 5% and df 8 2.306

** t-test 10% and df 8 1.806

*** t-test 5% and df 7 2.365

**** t-test 10% and df 7 1.895

^ Z-test significant at 10% 1.645

^ Z-test significant at 5% 1.96

^^ Z-test significant at 1% 2.58

The significant event here was Elections 2014. The individual AARs were most significant for election 2009 and 2014, with the significant AARs on the first day after the election showing negative returns. Negative returns were also seen after the Mumbai attacks. However, the tests were not significant, which indicated that the deviation from the expected was not noteworthy. The analysis showed that the elections in 2014 was an important event and impacted the market significantly.

FINDINGS AND DISCUSSION

According to the figures of average abnormal returns and cumulative abnormal returns across different sectors of the BSE Sensex, a negative impact had been observed in some of the preceded events, such as the 2009 and 2014 elections. The elections had a significant negative impact on the average abnormal returns. The impact was found to be more in average abnormal returns and also cumulative abnormal returns in the 2014 and 2009 elections. In the unprecedented events, Bihar floods had shown some level of significance across two stocks – HCL and TCS – as they had offices in Bihar, compared to the other seven stocks, which were found to be insignificant. Although the adjusted Patell statistics were not found to be significant in case of any natural disasters, such as the Uttarakhand floods, in the case of the Mumbai attacks some significance was observed in the average abnormal returns for a short event window of two days, three days, and five days, and no such significance had been found in the case of cumulative abnormal returns.

The 2009 elections impacted the abnormal returns of M&M stock in a significant manner on the day the results were declared. The impact was weak, and hence, no level of significance was found in cumulative abnormal returns (CAR) and the corresponding t-values. Similarly, the 2009 elections affected the abnormal returns of Maruti Suzuki stock in a significant manner, but again, no level of significance was observed in the case of cumulative abnormal returns (CAR) and the t-value. The 2009 elections impacted the abnormal returns of Hero Motor Corp. two days prior to the result declaration day. However, no significant impact was observed in the case of cumulative abnormal returns and the corresponding t-test. The 2009 elections also impacted the abnormal returns of Kotak Bank one day prior to the event, but no such significance was observed in CAR and the corresponding t-test.

The 2014 elections impacted the abnormal returns of M&M two days after the event, but no significant level was found in the case of CAR and t-test. The 2014 elections also impacted the abnormal returns of Infosys stock two days after the event, but no significance was observed in CAR and

t-test. The elections also impacted the cumulative abnormal returns of TCS stock in a significant manner. The impact was found to be negative as per the t-test of CAR values. The 2014 elections impacted the CAR values of HCL stock in a negative way. The 2014 elections impacted the abnormal returns of Kotak Bank on the day of the event. However, no significant impact was observed on the CAR value and the corresponding t-test.

The 2019 elections impacted the abnormal returns of ICICI Bank one day after the event, but no significant level was observed in CAR and t-test. Bihar floods, on the other hand, impacted the cumulative average returns (CAR) of TCS stocks in a significant manner. In addition, Uttarakhand floods impacted the M&M stocks' abnormal returns one day prior to the event, but no significance level was observed in the case of CAR and t-value. The preceded event of elections was found to be significant for a smaller event window of day 0, day 1, and day 2 prior to and after the event.

The 2009 elections had been found to show a statistically significant impact on the average abnormal returns (AAR) one day prior to the event, as per the Adjusted Patell test. The 2009 elections were also found to have a negative impact on the AAR one day after the event. The 2014 elections, on the other hand, showed a negative impact on the AAR one day after the event. Adjusted Patell z-test had been found to be statistically significant for CAR value and the impact had been found to be negative. Adjusted z-test and t-test were also found to give a statistically significant value for average abnormal returns one day after the event (the event being the result declaration date).

The 2014 elections were found to show a statistically significant impact, after one day, on the average abnormal returns and cumulative average abnormal returns in a few instances (Adjusted Patell statistics) across the BSE Sensex stocks, as per the Adjusted Patell test, z-test, and t-test in the event-wise analysis (Table 3). The impact of the 2014 elections on the average abnormal returns and cumulative average abnormal returns were found to be strongest compared to other election events considered for the study, in terms of Adjusted Patell, z-test, and t-test.

An evaluation of the 2019 elections reflects a negative significant impact on average abnormal returns two days prior to the event, as per Adjusted Patell test, t-test, and z-test. No significant impact of the overall event was found on the cumulative average abnormal returns on selected stocks.

In the overall event analysis, the Bihar floods (an unprecedented event) did not show any statistically significant impact on either the average abnormal returns

or the cumulative abnormal returns. Similarly, the Mumbai terrorist attacks showed a negative significant impact on average abnormal returns (AAR) two days after the event, as per both the Patell and Adjusted Patell tests. However, no significant impact was observed in the case of cumulative abnormal returns of the stock. The Uttarakhand floods did not show any statistically significant impact on the selected stocks' AAR and CAAR in the overall event analysis results.

An analysis of the 11-day event window further indicated that the 2009 elections impacted the abnormal returns of M&M in a significant manner for two days and one day prior to the event, and on the day of the event. Although, no statistically significant impact was observed in the cumulative abnormal returns of the stock. The election results were found to have a significant impact on the abnormal returns one day prior to the event and one day after the event for Maruti Suzuki. No statistically significant impact was observed in the case of CAR of the selected stock of Maruti Suzuki. The election also impacted the abnormal returns of Hero Motor Corp. two days prior to the event and one day prior to the event. However, no statistically significant impact was observed in the case of CAR of the stock. The election showed significant impact on the abnormal returns of TCS one day prior to the event; however, no statistically significant impact was observed in the case of CAR and the corresponding t-test. Similarly, the 2009 elections had impacted the abnormal returns of HCL stock one day prior to the event. No such significance was observed in the case of CAR and the corresponding t-test. The elections had a statistically significant impact on the abnormal returns of ICICI Bank's stocks one day prior to the event. No significant impact was observed on the cumulative abnormal returns of the stock. The elections impacted the abnormal returns of Kotak Bank one day prior to the event. No such significance was found in the case of CAR of the stock.

The 2014 elections were found to have a statistically significant impact on the abnormal returns of Mahindra & Mahindra two days prior to the event and two days after the event.

No such significance was observed in the case of CAR of the stock. The election also impacted the abnormal returns of Maruti Suzuki four days and five days after the event, and the corresponding CAR t-test in a significant manner. The 2014 elections impacted the abnormal returns of Hero Motor Corp. three days prior to the event and two days after the event. No such statistically significant impact was found in the case of CAR of the stock.

The 2014 elections impacted the abnormal returns of Infosys stocks in a significant manner on the event day, one day, and two days prior to the event, respectively. No such significance was found in the case of CAR of the stock. The impact of the election on the abnormal returns of TCS was one day after the event. No such significant impact was found on the CAR

of the stock. The election had a significant statistical impact on the abnormal returns of HCL on the event day and one day after the event. No significant impact was observed in the case of CAR. Also, the t-test on CAR value was found to be statistically significant for the selected stock of ICICI bank. The election had impacted the abnormal returns of HDFC bank in a significant manner three days prior to the event and five days after the event in a negative way. No significant impact was observed for the CAR of the stock of HDFC bank. The election impacted the abnormal returns of Kotak Bank in a significant manner four days prior to the event and five days after the event. No such significance was found in the case of CAR of the selected stock. The election had impacted the abnormal returns in a significant manner three days prior to the event and five days after the event in a negative way. No significant impact was observed for the CAR of the stock. The election impacted the abnormal returns of Kotak Bank in a significant manner four days prior to the event and five days after the event. No such significance was found in the case of CAR of the selected stock.

The 2019 elections impacted the abnormal returns of Infosys stock four days and three days prior to the event. No level of significance was found in the case of CAR of the stock. The election impacted the abnormal returns of ICICI Bank one day after the event, but no significant impact was found in the case of CAR of the selected stock, and hence, the impact was found to be weak. The election impacted the abnormal returns of HDFC Bank in a significant manner on the day of the event. No such significant impact was observed in the case of CAR of the selected stock. The Bihar floods impacted the abnormal returns of HCL on the day of the event and two days after the event. No such level of significance was found in the case of CAR of the stock. The Bihar floods impacted the abnormal returns of ICICI Bank in a significant manner one day after the event. No such significance was found in the case of CAR of the stock. The Bihar floods impacted the abnormal returns of Kotak Bank four days prior to the event. No such observation was found in the case of CAR of Kotak Bank. The Mumbai attacks impacted the abnormal returns of Maruti Suzuki Ltd. stock two days after the event. No such significance was observed in the CAR of the selected stock. The Mumbai terrorist attacks impacted the abnormal returns of Hero Motor Corp. two days after the event. No such significance was found in the case of CAR of the stock. The Mumbai attacks impacted the abnormal returns of TCS one day after the event. No such statistically significant impact was observed in the CAR of the stock. The Mumbai attacks impacted the abnormal returns of HCL three days after the event. No such significance level was observed in the case of CAR of HCL. The Uttarakhand floods impacted the abnormal returns of M&M one day prior to the event and five days after the event. No such significance level was observed in the case of CAR of the stock. The Uttarakhand

floods impacted the t-statistics of CAR in a significant manner, whereas the unprecedented event impacted the average abnormal returns of ICICI Bank four to five days after the event. No significance had been observed in the case of CAR of the stock. The Uttarakhand floods impacted the abnormal returns of Kotak Bank four days and five days after the event. No such significance was found in the case of CAR of the stock.

The overall event analysis for an event window of 11 days had been carried out to examine the impact of preceded and unprecedented events. Patell Z-test and adjusted Patell test indicated a statistically significant impact on average abnormal returns one day prior to the event. A negative significant impact had been observed in the case of the 2009 elections on the average abnormal returns of the stock. No such significant impact was found on the cumulative average abnormal returns of the selected stocks. Z-test also showed a significant impact on the average abnormal returns five days and four days prior to the event. However, no such significance was found in the case of cumulative average abnormal returns (CAAR). The 2014 elections impacted the average abnormal returns in a significant manner five days prior to the event, as per the Adjusted Patell Z-test and Patell test. A negative significant impact had been found on cumulative average abnormal returns (CAAR), as per the Patell z-test, adjusted Patell z-test, of the selected stocks. The 2019 elections impacted the average abnormal returns in a negative manner two days prior to the event, as per the Patell z-test, and adjusted Patell test. No such significance was observed in the case of CAAR of the selected stocks. The Bihar floods did not impact the average abnormal returns and cumulative average abnormal returns in the event-wise analysis, as per the Patell z-test, adjusted Patell z-test, and t-test. The Mumbai terrorist attacks impacted the average abnormal returns two days, three days, and five days after the unprecedented event, as per the Patell z-test, t-test, and adjusted Patell z-test. No such significance was observed in the case of cumulative average abnormal returns of the selected stocks. The overall event analysis of the Uttarakhand indicated showed no significant impact on the average abnormal returns and cumulative average abnormal returns of the selected stocks.

CONCLUSION AND IMPLICATION

This paper employed the event study measure to examine the impact of three preceded and three unprecedented events on the selected stocks from three sectors, that is, the automobile, technology, and banking sectors. Event window of five days and 11 days were taken for the study, and Patell, Adjusted Patell, t-test, and z-test were applied to examine the significant impact on the abnormal returns and cumulative abnormal returns. In addition, event-wise analysis was carried out to analyse the impact of these events on the

overall three sectors of Sensex by looking at the significant impact on average abnormal returns and cumulative average abnormal returns.

The examination of results indicated that the preceded event had a significant impact for a period of time prior to or post the event, thus leading to the acceptance of the alternate hypothesis, whereas the unprecedented event did not have much of a significant impact on the returns of selected stocks, indicating the strength of the Indian markets to events like natural disasters and terrorist attacks, thus leading to the rejection of the alternate hypothesis. The abnormal returns indicated a significant impact for a short period of time; a weak impact was also observed in many instances. Moreover, the 2014 elections had the highest impact on the returns compared to the elections in 2009 and 2019. Similarly, the Bihar floods and the Mumbai terrorist attacks had some impact on the returns of selected stocks; however, not much of a significant impact was observed in the case of the cumulative abnormal returns and the cumulative average abnormal returns.

Some of the studies conducted in the past across different parts of the world measured the impact of the event on the stock market returns and supported the results of the present study conducted on the Indian market from 2007 to 2019. Worthington and Valadkhani (2004) evaluated the impact of natural disasters on the Australian stock market. The conclusion was that natural disasters had a mixed impact on market returns. Luo (2012), in his paper, evaluated the impact of natural disasters on the Global Stock Market – the case of the Japanese 2011 earthquake on six representative stock markets of the world. The impact on some stocks in these markets were found to be significant. Overall, the impact on these stock markets were largely insignificant. Liargovas (2010), in his paper, highlighted the impact of three unprecedented events on banks in Greece, which include global terrorist attacks such as the New York twin tower attack, and Madrid and London train bombings. Positive and negative excess returns indicated that the Athens Stock Exchange (ASE) had overreacted to the unprecedented events; pre-event negative excess returns might also be caused by expectations of some impending anomaly. Nazir et al. (2014), in their paper, analysed the impact of political events on the Karachi Stock Exchange from May 1999 to December 2011. The stock exchange was inefficient for a short span of time. It also absorbed information after 15 days. Kampol (2020) studied the impact of an unprecedented pandemic on the stock market, with reference to volatility and reactions of stock prices in Thailand. It was found that the cumulative abnormal volatility was considerably higher during the COVID event window. This showed varied response across different stocks from diversified sectors of the economy. The study conducted by Bouoiyour and Selmi

(2019) analysed the impact of the US Presidential elections on various sectors of the US economy. The study found that the effect of the overall political uncertainty is caused by the Presidential election and is sector specific. Some sectors, such as utilities and technology, were not impacted, whereas others, like oil and gas, healthcare, and consumer goods, were impacted more.

Ruiz and Barrero (2014), in their study, evaluated the impact of the 2010 Chilean disaster (earthquake and tsunami) on the stock price of a sample of 42 firms from various sectors. The study concluded that the market volatility increased by 240 per cent after the natural disaster, and some sectors showed negative returns as well.

Future studies may also include a greater number of stocks and indices to see the wider impact of global, national, and regional events on stock returns. The contagion impact and sectoral difference could also be a good research avenue in the future.

Implication of Study

The retail participation has been rising in the stock market and this study will facilitate investors to take more informed decisions while investing in the market, and also in intra-day trading in the short term. The application of this study provides clarity to retail investors for the short run, when the market may be volatile in terms of prices and returns. Some of the investors may be swayed by projections of election outcomes or other unprecedented events and may try to time the market during that time period. The long-term investor may look at their financial goal and risk profile in choosing stocks in their portfolio, rather than being influenced by swings in the markets. The market performance is impacted by a number of factors, which consists of both global and national level macroeconomic factors. So, it becomes difficult to prove the impact of a single event on the market performance.

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ANNEXURE 1: EVENT AND SELECT STOCK

Event ID	Event Description	Company
21	Elections held in the month of March and April, 2009	Mahindra and Mahindra
22	Elections held in the month of March and April, 2009	Maruti Suzuki
23	Elections held in the month of March and April, 2009	Hero Motor Corp.
25	Elections held in the month of March and April, 2009	TCS
26	Elections held in the month of March and April, 2009	HCL
27	Elections held in the month of March and April, 2009	ICICI
28	Elections held in the month of March and April, 2009	HDFC
29	Elections held in the month of March and April, 2009	Kotak Bank
30	Elections held in the month of March and April, 2014	Mahindra and Mahindra
31	Elections held in the month of March and April, 2014	Maruti Suzuki
32	Elections held in the month of March and April, 2014	Hero Motor Corp.
33	Elections held in the month of March and April, 2014	Infosys
34	Elections held in the month of March and April, 2014	TCS
35	Elections held in the month of March and April, 2014	HCL
36	Elections held in the month of March and April, 2014	ICICI
37	Elections held in the month of March and April, 2014	HDFC
38	Elections held in the month of March and April, 2014	Kotak Bank
39	Elections held in the month of March and April, 2019	Mahindra and Mahindra

40	Elections held in the month of March and April, 2019	Maruti Suzuki
41	Elections held in the month of March and April, 2019	Hero Motor Corp.
42	Elections held in the month of March and April, 2019	Infosys
43	Elections held in the month of March and April, 2019	TCS
44	Elections held in the month of March and April, 2019	HCL
45	Elections held in the month of March and April, 2019	ICICI
46	Elections held in the month of March and April, 2019	HDFC
47	Elections held in the month of March and April, 2019	Kotak Bank
48	Bihar Floods	Mahindra and Mahindra
49	Bihar Floods	Maruti Suzuki
50	Bihar Floods	Hero Motor Corp.
52	Bihar Floods	TCS
53	Bihar Floods	HCL
54	Bihar Floods	ICICI
55	Bihar Floods	HDFC
56	Bihar Floods	Kotak Bank
57	Mumbai Terrorist Attack	Mahindra and Mahindra
58	Mumbai Terrorist Attack	Maruti Suzuki
59	Mumbai Terrorist Attack	Hero Motor Corp.
61	Mumbai Terrorist Attack	TCS
62	Mumbai Terrorist Attack	HCL
63	Mumbai Terrorist Attack	ICICI
64	Mumbai Terrorist Attack	HDFC
65	Mumbai Terrorist Attack	Kotak Bank
66	Uttarakhand Floods	Mahindra and Mahindra
67	Uttarakhand Floods	Maruti Suzuki
68	Uttarakhand Floods	Hero Motor Corp.
69	Uttarakhand Floods	Infosys
70	Uttarakhand Floods	TCS
71	Uttarakhand Floods	HCL
72	Uttarakhand Floods	ICICI
73	Uttarakhand Floods	HDFC
74	Uttarakhand Floods	Kotak Bank

ANNEXURE 2: ABNORMAL RETURNS AND CUMULATIVE ABNORMAL RETURNS

Event ID	AR(-2)	AR(-1)	AR(0)	AR(1)	AR(2)	CAR Value	CAR T-Test
21	-0.0813	0.0846	0.0989***	-0.0103	-0.05	0.0419	0.4615
22	-0.0161	0.0727	0.0534***	-0.0578	-0.0199	0.0323	0.5492
23	0.0776**	-0.042	-0.0244	-0.0203	0.0147	0.0056	0.1193
25	0.001	-0.0871	0.0199	-0.0266	-0.0324	-0.1252	-2.0287
26	-0.1038	0.006	0.0694	0.0094	0.0136	-0.0054	-0.0627
27	-0.0207	0.0504	-0.0412	-0.0164	0.0279		
28	0.0227	0.0202	-0.0095	0.0144	-0.007	0.0408	0.9169

Event ID	AR(-2)	AR(-1)	AR(0)	AR(1)	AR(2)	CAR Value	CAR T-Test
29	-0.0469	0.1111**	0.0113	-0.0353	0.0281	0.0683	0.9228
30	-0.0287	0.0083	-0.0026	-0.0205	0.0312***	-0.0123	-0.3986
31	-0.0028	0.0101	0.0082	0.0172	-0.0108	0.0219	0.5597
32	0.0029	0.0009	-0.0249	0.0116	-0.0317	-0.0412	-1.4395
33	-0.0043	0.0063	-0.0317	-0.0534	0.0317***	-0.0514	-1.7414
34	0.0032	-0.0119	-0.0216	-0.0643	0.0135	-0.0811***	-2.3399
35	-0.0171	-0.0078	-0.0337	-0.0518	0.0006	-0.1098**	-3.2305
36	0.01	-0.0196	0.0316***	-0.0163	-0.0159	-0.0102	-0.3801
37	-0.0124	0.0121	0.0103	-0.0029	0.0042	0.0113	0.5054
38	0.0017	0.0065	0.029***	-0.0011	-0.0146	0.0215	0.8361
39	-0.0103	0.0019	0.009	0.022	0.0139	0.0365	1.2461
40	-0.0217	0.0042	0.0133	0.0079	-0.0101	-0.0064	-0.1921
41	-0.0073	0.0135	0.0252	0.0163	-0.0073	0.0404	1.0754
42	-0.0109	-0.0029	-0.0054	-0.001	-0.0055	-0.0257	-0.8841
43	-0.007	-0.0158	-0.0085	-0.0147	-0.0032	-0.0492	-1.5829
44	-0.0063	-0.0008	0.0122	-0.0165	-0.0027	-0.0141	-0.4095
45	-0.0064	0.0085	0.022	0.0304***	0.001	0.0555	2.0179
46	-0.0051	-0.0032	-0.0246	0.0024	0.009	-0.0215	-1.3542
47	-0.0014	0.0008	0.0099	-0.0083	0.0009	0.0019	0.0616
48	0.0237	-0.0015	-0.0108	0.0164	-0.0048	0.023	0.6636
49	-0.0113	-0.0007	-0.0089	0.0062	-0.0042	-0.0189	-0.617
50	0.0029	0.004	0.0215	0.01	-0.0186	0.0198	0.4685
52	0.0207	0.0048	0.0201	0.0075	0.0141	0.0672***	2.1777
53	0.0144	0.0003	0.0361	0.0013	0.0395	0.0916***	2.156
54	-0.011	-0.0206	-0.0139	0.0246	-0.0085	-0.0294	-0.9886
55	0.0003	0.0051	-0.0017		-0.0046	-0.0009	-0.025
56	0.0123	0.0184	-0.0116	-0.0229	-0.0313	-0.0351	-0.8218
57	-0.0304	-0.0552	-0.0636	0.0365	-0.0055	-0.1182	-1.5547
58	0.0363	0.0266	-0.0332	0.0008	-0.0781	-0.0476	-0.8003
59	0.0297	0.0182	0.0302	0.0292	-0.0486	0.0587	1.0715
61	0.03	-0.0117	0.0138	0.0519	0.037	0.121	1.9535
62	0.0412	-0.0548	0.0016	-0.0461	0.0101	-0.048	-0.6408
63	-0.0384	0.0289	0.0298	-0.0102	-0.0304	-0.0203	-0.3767
64	-0.0302	0.0268	0.0424	0.0051	0.0041	0.0482	0.9057
65	0.012	0.0253	-0.0094	0.0217	-0.0101	0.0395	0.5419
66	0.0075	0.0354***	-0.0014	-0.0058	-0.0115	0.0242	0.8455
67	0.0202	0.0049	0.0068	0.0022	0.0167	0.0508	1.3523
68	-0.0163	0.0086	0.0143	-0.013	0.0074	0.001	0.0324
69	-0.0095	0.0047	0.0162	-0.0044	-0.0038	0.0032	0.0519
70	-0.0051	-0.003	-0.0014	-0.015	-0.0064	-0.0309	-1.0967
71	-0.0074	0.0131	0.0058	-0.0008	-0.0051	0.0056	0.1585
72	0.0037	-0.0115	-0.0015	-0.0058	0.0032	-0.0119	-0.4668
73	-0.0038	-0.0045	-0.0098	0.0101	-0.0165	-0.0245	-1.1656
74	0.0008	-0.0083	0.0128	0.0018	-0.0132	-0.0061	-0.2414

*Significant at 1%; t value for df 4 and 1% 4.604.

**Significant at 5%; t value for df 4 and 5% 2.776.

***Significant at 10%; t value for df 4 and 10% 2.132.

ANNEXURE 3: ABNORMAL RETURNS AND CUMULATIVE ABNORMAL RETURNS FOR 11-DAY EVENT

ID	AR(-5)	AR(-4)	AR(-3)	AR(-2)	AR(-1)	AR(0)	AR(1)	AR(2)	AR(3)	AR(4)	AR(5)	CAR Value	CAR T-Test
21	-0.011	0.013	-0.022	-0.0813***	0.0846***	0.0989**	-0.010	-0.050	0.004	-0.009	-0.022	-0.0053	-0.0394
22	-0.021	0.014	-0.013	-0.016	0.0727**	0.0534***	-0.0578***	-0.020	0.008	-0.001	-0.007	0.0123	0.141
23	-0.001	0.016	0.000	0.0776*	-0.042***	-0.024	-0.020	0.015	0.017	0.021	-0.004	0.0542	0.7782
25	-0.016	0.005	0.021	0.001	-0.0871**	0.020	-0.027	-0.032	-0.007	0.005	0.003	-0.1144	-1.2497
26	-0.024	0.035	0.012	-0.1038**	0.006	0.069	0.009	0.014	-0.017	0.009	0.046	0.0565	0.4425
27	0.002	-0.005	0.030	-0.021	0.0504***	-0.041	-0.016	0.028	-0.001	-0.017	0.006	0.0147	0.1738
28	-0.013	0.012	-0.003	0.023	0.020	-0.010	0.014	-0.007	-0.009	0.005	0.021	0.0545	0.8257
29	0.020	0.048	-0.017	-0.047	0.1111*	0.011	-0.035	0.028	0.060	-0.046	-0.005	0.1289	1.1742
30	0.012	0.001	-0.020	-0.0287***	0.008	-0.003	-0.021	0.0312**	0.014	-0.017	0.009	-0.0134	-0.2928
31	0.013	0.016	0.008	-0.003	0.010	0.008	0.017	-0.011	-0.009	0.0396**	0.0388***	0.1272	2.1916 ***
32	0.016	0.021	0.0421*	0.003	0.001	-0.0249***	0.012	-0.0317**	-0.009	-0.018	0.008	0.019	0.4476
33	0.003	0.014	0.022	-0.004	0.006	-0.032	-0.053	0.032	0.012	-0.015	-0.018	-0.032	-0.7309
34	-0.018	-0.014	0.016	0.003	-0.012	-0.022	-0.0643*	0.014	0.010	0.012	0.001	-0.0749	-1.457
35	0.010	0.002	0.023	-0.017	-0.008	-0.0337***	-0.0518*	0.001	0.018	-0.012	0.005	-0.0641	-1.2715
36	0.005	-0.0321**	-0.0256***	0.010	-0.020	0.0316**	-0.016	-0.016	0.000	0.002	-0.021	-0.082	-2.0603 ***
37	0.018	0.017	-0.0219***	-0.012	0.012	0.010	-0.003	0.004	-0.003	-0.013	-0.0317*	-0.0235	-0.7086
38	0.009	-0.0329**	-0.006	0.002	0.007	0.029**	-0.001	-0.015	-0.003	-0.009	-0.0317**	-0.0517	-1.3555
39	-0.012	0.010	0.013	-0.010	0.002	0.009	0.022	0.014	-0.008	0.012	-0.023	0.0283	0.6514
40	-0.008	0.021	0.018	-0.022	0.004	0.013	0.008	-0.010	-0.002	-0.016	-0.012	-0.0043	-0.087
41	0.002	0.028	-0.006	-0.007	0.014	0.025	0.016	-0.007	-0.026	-0.001	-0.009	0.0276	0.4953
42	0.018	-0.0256***	-0.0309**	-0.011	-0.003	-0.005	-0.001	-0.006	0.023	0.006	0.002	-0.0335	-0.777
43	0.001	-0.018	-0.009	-0.007	-0.016	-0.009	-0.015	-0.003	0.009	0.019	0.012	-0.0348	-0.7549
44	0.000	-0.022	-0.018	-0.006	-0.001	0.012	-0.017	-0.003	0.006	0.015	-0.013	-0.0461	-0.9026
45	0.004	0.005	-0.001	-0.006	0.009	0.022	0.0304**	0.001	-0.004	-0.019	-0.002	0.0386	0.9462
46	0.004	0.008	-0.001	-0.005	-0.003	-0.0246*	0.002	0.009	0.001	0.004	0.002	-0.0031	-0.1316
47	0.004	0.017	-0.010	-0.001	0.001	0.010	-0.008	0.001	-0.011	0.006	0.003	0.0101	0.2207
48	0.001	-0.028	-0.007	0.024	-0.002	-0.011	0.016	-0.005	0.018	-0.012	0.024	0.0181	0.3521
49	0.018	0.017	0.008	-0.011	-0.001	-0.009	0.006	-0.004	0.016	-0.007	0.010	0.0433	0.953
50	0.016	-0.031	0.004	0.003	0.004	0.022	0.010	-0.019	-0.008	-0.007	0.011	0.0055	0.0877
52	0.000	-0.020	-0.006	0.021	0.005	0.020	0.008	0.014	-0.016	-0.002	0.003	0.0258	0.5637
53	-0.015	-0.003	-0.006	0.014	0.000	0.0361***	0.001	0.0395***	-0.015	0.008	0.008	0.0684	1.0854
54	0.010	0.007	0.005	-0.011	-0.021	-0.014	0.0246***	-0.009	0.000	0.005	0.000	-0.0018	-0.0408
55	0.012	-0.012	-0.012	0.000	0.005	-0.002		-0.005	-0.008	0.011	-0.001	-0.0107	-0.2004
56	-0.003	0.0681*	-0.018	0.012	0.018	-0.012	-0.023	-0.031	-0.033	-0.015	-0.027	-0.0627	-0.9898
57	0.029	0.032	-0.029	-0.030	-0.055	-0.0636***	0.037	-0.006	-0.0739***	-0.029	-0.008	-0.1972	-1.7488
58	0.021	-0.040	0.017	0.036	0.027	-0.033	0.001	-0.0781**	-0.046	0.0514***	-0.035	-0.0787	-0.8921
59	0.042	-0.040	-0.021	0.030	0.018	0.030	0.029	-0.0486**	0.010	-0.023	-0.015	0.0133	0.1637
61	0.014	0.011	0.029	0.030	-0.012	0.014	0.0519***	0.037	-0.042	0.001	-0.019	0.1146	1.2474

ID	AR(-5)	AR(-4)	AR(-3)	AR(-2)	AR(-1)	AR(0)	AR(1)	AR(2)	AR(3)	AR(4)	AR(5)	CAR Value	CAR T-Test
62	0.007	0.046	0.002	0.041	-0.055	0.002	-0.046	0.010	-0.0644***	-0.045	-0.044	-0.1465	-1.3185
63	-0.008	-0.023	-0.041	-0.038	0.029	0.030	-0.010	-0.030	0.010	0.031	-0.004	-0.054	-0.6756
64	-0.016	-0.039	-0.016	-0.030	0.027	0.042	0.005	0.004	-0.006	-0.007	-0.023	-0.0579	-0.7335
65	-0.019	0.036	-0.012	0.012	0.025	-0.009	0.022	-0.010	0.039	0.002	0.005	0.09	0.8324
66	-0.016	0.013	-0.022	0.008	0.0354**	-0.001	-0.006	-0.012	-0.002	-0.004	0.0264***	0.0195	0.4593
67	-0.004	-0.003	-0.005	0.020	0.005	0.007	0.002	0.017	0.015	0.006	-0.003	0.0572	1.0266
68	0.009	-0.020	0.007	-0.016	0.009	0.014	-0.013	0.007	0.014	-0.018	-0.001	-0.0076	-0.166
69	0.009	-0.015	-0.008	-0.010	0.005	0.016	-0.004	-0.004	0.020	-0.004	-0.005	0.0009	0.0098
70	-0.012	-0.019	-0.012	-0.005	-0.003	-0.001	-0.015	-0.006	0.011	-0.005	-0.014	-0.0829	-1.984 ***
71	0.015	0.011	-0.001	-0.007	0.013	0.006	-0.001	-0.005	-0.003	0.010	-0.016	0.021	0.4007
72	-0.015	0.013	0.004	0.004	-0.012	-0.002	-0.006	0.003	-0.007	0.0247***	-0.0227***	-0.0146	-0.3861
73	-0.002	0.004	-0.003	-0.004	-0.005	-0.010	0.010	-0.017	-0.004	-0.004	0.009	-0.0244	-0.7826
74	0.007	-0.003	0.004	0.001	-0.008	0.013	0.002	-0.013	-0.016	-0.0378*	0.0226***	-0.0293	-0.7818

*significant at 1%; t value for df 10 and 1% 3.169.

**Significant at 5%; t value for df 10 and 5% 2.228.

***Significant at 10%; t value for df 10 and 10% 1.812.