

Impact of Announcement of Lockdown on Sectoral Indices of Bombay Stock Exchange

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Abstract

The outbreak and the rapid spread of the Coronavirus have significantly impacted society and is inflicting rising cost of lives worldwide. Isolation and lockdowns are supposed to be the only measures to resistor the spread of the virus but it has turned the health crisis into a situation of severe economic distress. With increasing uncertainties in the economy, confusion and panic among investors and dramatic reaction of the financial markets, it is necessary to study the impact of the remedial measures on the stock market. The present study focuses on examining the performance of all the sectoral indices of the Bombay Stock Exchange based on the event study methodology. The results reveal that the sectors including Auto, Basic materials, CD&S, Realty, Power show negative abnormal returns on and after the day of announcement of the lockdown. While, sectors like Healthcare, FMCG, and Telecom showed positive abnormal returns in the post announcement period.

Keywords: *COVID 19, Nation Wide Lockdown, Bombay Stock Exchange, BSE Sectoral Indices, Event Study Methodology*

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Introduction

The sudden outbreak of the Coronavirus disease has adversely impacted lives, businesses, and the global economy at large. The first case of Coronavirus, also known as COVID-19, was identified in December, 2019 in Wuhan, China which in the following months has spread to several nations resulting in a global health crisis. The highly contagious nature of the disease posed serious challenges for the healthcare system all over the world to devise ways of controlling the spread. The WHO (World Health Organization) on 30th of January, 2020 declared the outbreak as Public Health Emergency of International Concern and it was declared as pandemic on 11th of March 2020 (Zhu et al., 2020). Millions of lives succumbed to this deadly virus and the most effective route available at that moment for slowing its spread was identifying, isolating and treating the patients. Thus, strict restrictions on travel, social events, public gathering were imposed which gradually slowed the spread of the virus but at the same time had serious negative impacts on the economy (Ashraf, 2020; Jones et al, 2021, Gogoi et al., 2022).

India being a highly populated country with a healthcare system not strong enough to handle the pressure of rapidly increasing number of coronavirus cases had to implement the world's strictest lockdown at the very onset of the pandemic (Ministry of Finance, 2021). These strict measures adopted by the government brought several sectors to a standstill and resulted in loss of livelihoods of hundreds of workers, disrupted education, and severely impacted the economy. Significant downfall and high volatility

was noticed in the share markets due to the uncertainty related to the coronavirus and billions of rupees were reported to be withdrawn from the Indian stock markets in the month of March (Singh & Neog, 2020; Nadkar, 2020). Moreover, a fall of 22.6% in the BSE SENSEX and 31% in the Nifty was observed during that period (Thomas et al., 2020; Mishra et al., 2020). Negative emotions among investors contribute to further rise in volatility in the market (Lee et al., 2002). Thus, it is important to study the impact of an event as rare as COVID-19 pandemic on the stock market for better understanding of investors' behaviour.

Review of Literature

The pandemic being an unforeseen event with grave consequences have attracted a lot of attention from researchers and there have been numerous studies on various aspects of the COVID-19 pandemic. Numerous studies have been conducted to understand the impact of the pandemic on the global economy and financial markets, thus the researcher looks into the existing literature to form a better understanding of the devastating effects of the pandemic on the stock markets and the findings are presented below:

Sahoo (2021) studied the impact of COVID-19 on Indian stock market and found that the day-of-the-week effect is present on the returns of all the indices for the period of COVID-19 health crisis. Whereas, for the period prior to the COVID-19 health crisis, the day-of-the-week effect is noticed on the returns of a few indices-, i.e., Nifty 100, Nifty Midcap 100 and Nifty Midcap 50. No day-of-the-week effect was found for the other indices during this period.

Bora & Basistha (2021) investigated the effect of COVID-19 on the volatility of the stock prices in the Indian stock market and further tries to record the changes in return in the stock markets for the pre- COVID-19 era and during the COVID-19 era. During the pre-COVID-19 era, positive return for both the markets (NSE and BSE) was observed, while the returns for the COVID-19 period were negative and volatile.

Mishra et al., (2020) compared the impact of COVID 19 with that of Demonetisation and GST and observed that During the COVID-19 phase, BSE Sensex stock prices show negative growth but it was positive during the period of demonetisation and GST.

Sinha et al., (2020) found that stock markets show downward trend from January to last week of march and after that gradually start showing upward movement. In the banking sector, all the banks except HDFC bank, the IT software sector, the power generation sector, housing sector also shows negative CAR, whereas the FMCG sector has shown positive impact.

Chaudhary et al., (2020) showed that during the crisis period, all the indices show negative return as compared to the pre- crisis period. Only the healthcare sector showed positive return during the crisis period. The banking sector index, capital goods index and the realty sector index did the poorest performance.

Singh et al., (2020) studied the impact of pandemic on stock market of G-20 countries and reported that the period post- COVID-19 outbreak reported negative return and also showed greater volatility. The stocks markets of the developing countries experienced a greater negative impact as compared to developed countries. Alam et al., (2020) studied the behaviour of the Australian stock market during COVID 19 pandemic and observed that the healthcare and pharmaceutical sector shows positive abnormal returns before and after the event as the event has positive impact on the return of these sectors.

Mishra & Mishra (2020) examined the behaviour of selected Asian countries during the COVID 19 pandemic and the results indicated that the Coronavirus pandemic has negative impact on all the selected stock markets. O'Donnell et al., (2021) on analysing

the stock markets of China, UK, USA, Spain, and Italy observed that the COVID-19 cases negatively impacted all the selected stock markets except that of China.

Zaremba et al., (2020) findings suggest that apart from the impact of the pandemic, strict measures adopted by the government result in higher volatility in the market. Among all the measures taken by government, campaigns with Coronavirus related information and cancellation of all public events are the policies responsible high volatility in the market Topcu & Gulal (2020) examined the behaviour of market indices for 26 emerging economies and show that Covid-19 has negative impact on all the emerging markets but the Asian markets have been most affected by the Coronavirus outbreak.

The existing literature consists of several studies on the impact of COVID-19 outbreak on the stock markets in different parts of the world including India which reveal that the COVID-19 outbreak had a negative impact on the stock markets. There are a very few studies examining the impact of the outbreak on the different sectors of the stock market, however, a dearth of studies depicting the reaction and also the performance of different sectors with reference to the announcement of the lockdown has been noticed. Thus, the present study has been under taken to understand the immediate impact of the lockdown on the different sectors of the Indian stock market.

Objective of the Study

The present study is undertaken in order to analyse the impact of the official announcement of the lockdown in India on different sectors of the stock market.

Research Methodology

Data Source: To study the impact of the lockdown announcement on the different sectors of the economy, all the 19 sectors under the Bombay Stock Exchange (BSE) of India are taken into consideration. The lockdown announcement was made on the 24th of March, 2020 at 8 pm and thus 25th of March, 2020 is taken as the event date and defined as $t=0$. The estimation period is from 4th July, 2019 to 31st December, 2019 i.e., 120 trading days (Peterson, 1989) and the event window considered here is 10 days prior to the event and 10 days post event i.e., from 11th March, 2020 to 13th April, 2020. All the data related to stock prices are collected from BSE India official website and BSE 500 is chosen as the proxy of Indian market.

Table 1: Sectors of Bombay Stock Exchange

1. Basic Material	2. Healthcare
3. AUTO	4. Industrials
5. BANKEX	6. IT
7. CAPITAL GOODS	8. Telecom
9. CDG&S	10. Utility
11. Energy	12. Consumer Durables
13. FMCG	14. Metal
15. Power	16. Oil & Gas
17. Realty	18. Teck
19. Finance	

Source: Author's Calculation

Tools and Techniques: The present study is an empirical work which relies on the event study methodology to analyse the impact of the lockdown announcement on the sectoral indices of the Indian stock market. The event study methodology developed by Fama (1969) is considered as one of the most popular and suitable method to study the impact of an event on security returns for a period of time.

Calculation of Return

To calculate the daily returns, a log return is used as it minimises the skewness and maintain the normality of the data. The following formula is used to calculate the daily stock returns-

$$R_{j,t} = \ln(P_{jt} / P_{j,t-1}) \dots\dots\dots 1$$

Where $R_{j,t}$ is the return of the security 'j' on time 't', P_{jt} is the price of the security 'j' on time 't' and $P_{j,t-1}$ is the price of the security 'j' on time 't-1'.

Calculation of expected return

Using the OLS market model developed by Sharpe (1963), the expected returns are calculated-

$$E(R_{j,t}) \dots\dots\dots = \alpha_j +$$

$$\beta_j R_{m,t} \dots\dots\dots 2$$

Where $E(R_{j,t})$ is the expected return of security 'j' on time 't', $R_{m,t}$ is the market return and α , β are estimated through OLS in estimation period.

Calculation of abnormal returns

Now the abnormal returns are calculated using the following formula-

$$AR_{j,t} = R_{j,t} - E(R_{j,t}) \dots\dots\dots 3$$

Where, $AR_{j,t}$ is the abnormal return of security 'j' on time 't', $R_{j,t}$ is the return of the security 'j' and $E(R_{j,t})$ is the expected return of the security 'j'.

To check if the abnormal returns are statistically significant, the following t-test is performed-

$$T\text{-test} =$$

$$AR_{j,t} / S.E. \dots\dots\dots$$

$$\dots\dots\dots 4$$

Where, $AR_{j,t}$ is the abnormal return and S.E is the standard error of the security 'j'.

Calculation of average abnormal return

Now the Average abnormal returns (AAR) are calculated by cross-sectional aggregation of the abnormal returns to understand the impact of the event on all the sectors-

$$AAR_t = \frac{1}{N} \sum_{j=1}^N AR_{j,t} \dots\dots\dots 5$$

Where, AAR_t is the average abnormal return for the day 't', AR_j is the abnormal return and N is the number of securities.

To check if the average abnormal returns are statistically significant, the following t-test is performed-

$$T\text{-test} = \frac{AAR_t}{SE} \dots\dots\dots 6$$

$$SE \dots\dots\dots$$

Where AAR is the average abnormal return for day 't' and SE is the standard error of the estimation period.

Calculation of cumulative average abnormal returns

In order to observe the impact of the event over multiple days, the cumulative average abnormal returns are calculated using the following formula-

$$CAAR_{(t1,t2)} = \sum_{t=t1}^{t2} AAR_t \dots\dots\dots 7$$

Where, $CAAR_{t1,t2}$ is the cumulative average abnormal return for the period t1 to t2 and

AAR_t is the average abnormal return calculated for the time 't'.

In this study, CAAR is calculated for seven-time windows- [-2,0], [-1,0], [0,1], [0,2], [-1,1], [-2,2] and [-10,10].

To check if the cumulative average abnormal returns are significant, the following t-test is performed-

$$T\text{-test} = CAAR_{(t1,t2)} / SE * \sqrt{t1,t2} \dots\dots\dots 8$$

Where $CAAR_{(t1,t2)}$ is the cumulative average abnormal returns for the period t1 to t2 and SE is the standard deviation of the average abnormal returns.

Results and Discussion

Abnormal Returns of BSE sectoral indices

The abnormal returns show the impact of the announcement of the lockdown on the individual sectors during the event window. From the table 2, it can be seen that on the event day, the abnormal return of the basic material sector is negative and significant which clearly indicates the negative impact of the announcement on the index.

Table 2: Abnormal Returns and T-statistic for the Sectoral Indices

	Basic Material		AUTO		BANKEK		CAPITAL GOODS	
Day	AR	T-Stat	AR	T-Stat	AR	T-Stat	AR	T-Stat
ED-10	-0.012	-1.914	-0.008	-0.798	0.004	0.567	0.007	0.930
ED-9	0.015	2.325*	0.052	5.416*	0.024	3.694*	0.030	4.096*
ED-8	-0.010	-1.603	-0.028	-2.959*	-0.002	-0.244	-0.011	-1.464
ED-7	0.025	3.847*	0.056	5.881*	0.017	2.524*	0.032	4.422*
ED-6	0.012	1.812	0.030	3.195*	-0.014	-2.111*	0.020	2.724*
ED-5	0.026	3.973*	0.036	3.785*	0.007	0.994	0.033	4.555*
ED-4	-0.008	-1.279	-0.014	-1.451	0.017	2.597*	-0.022	-2.979*
ED-3	-0.004	-0.670	-0.043	-4.496*	-0.059	-9.012*	-0.044	-6.016*
ED-2	0.029	4.474*	0.071	7.501*	0.011	1.672	0.023	3.148*
ED-1	-0.030	-4.695*	-0.018	-1.845	-0.015	-2.276*	-0.033	-4.488*
ED -0	-0.028	-4.359*	-0.034	-3.582*	0.005	0.792	-0.016	-2.169*
ED+1	-0.028	-4.251*	-0.047	-4.977*	0.002	0.314	0.013	1.744
ED+2	-0.003	-0.539	-0.018	-1.881	0.015	2.242*	0.003	0.473
ED+3	0.022	3.469*	0.000	0.001	-0.010	-1.463	0.016	2.190*
ED+4	0.001	0.085	-0.042	-4.438*	-0.030	-4.633*	-0.032	-4.349*
ED+5	0.019	2.940*	0.037	3.905*	-0.007	-1.040	0.019	2.588*
ED+6	0.000	-0.047	0.000	-0.028	-0.029	-4.384*	0.018	2.416*
ED+7	-0.020	-3.110*	-0.026	-2.733*	-0.005	-0.692	-0.067	-9.160*
ED+8	-0.003	-0.408	0.017	1.761	-0.010	-1.556	0.010	1.358
ED+9	-0.006	-0.902	0.038	4.024*	0.000	0.009	-0.032	-4.392*
ED+10	0.030	4.637*	-0.006	-0.611	-0.006	-0.927	0.052	7.054*

Source: Author's calculation *Significant at 5% level (± 1.96)

Moreover, in the pre-announcement event window, day ED-1 shows significant negative abnormal return indicating leakage of some information and its early impact on the index. Significant negative abnormal returns are also observed on days ED+1 and ED+7, thus it shows that the announcement of the lockdown had negative impact on investors' behaviour. The negative performance may be due to the reason that the lockdown will result in disruption of the economic activities in the sector. Some positive abnormal returns are observed on days ED+7 and ED+10 along with negative abnormal returns which show the presence of volatility in the market.

In the auto sector, the announcement results in significant negative abnormal return on the event day which continues to the post-announcement window as is evident from the negative returns on days ED+1, ED+4 and ED+7. The negative performance is because of the disruption in the value chain of major industries in India and also due to the decline in demand for passenger vehicles due to COVID-19. In the pre-announcement window, significant negative abnormal returns on days ED-3 and ED-8 and positive abnormal returns on days ED-9, ED-7, ED-6 indicate the presence of a certain level of volatility due to COVID-19 related uncertainties.

Table 3: Abnormal Returns and T-statistic for the Sectoral Indices

	CDG&S		Energy		FMCG		Finance	
Day	AR	T-Stat	AR	T-Stat	AR	T-Stat	AR	T-Stat
ED-10	-0.004	-0.846	0.021	1.778	0.003	0.547	0.005	0.960
ED-9	0.027	5.548*	-0.019	-1.568	-0.009	-1.664	0.020	3.781*
ED-8	-0.031	-6.430*	0.014	1.186	-0.021	-3.879*	0.010	1.857
ED-7	0.024	4.907*	-0.014	-1.182	-0.005	-0.863	0.010	1.844
ED-6	0.015	3.002*	0.013	1.133	0.029	5.237*	-0.016	-3.034*
ED-5	0.009	1.850	0.013	1.060	0.009	1.646	-0.006	-1.190
ED-4	-0.011	-2.186*	-0.033	-2.794*	0.012	2.181*	0.014	2.667*
ED-3	-0.017	-3.425*	0.051	4.270*	0.040	7.273*	-0.040	-7.642*
ED-2	0.023	4.808*	-0.023	-1.914	-0.009	-1.699	0.006	1.122
ED-1	-0.016	-3.231*	0.024	2.020*	0.016	2.903*	-0.019	-3.649*
ED -0	-0.019	-3.912*	0.051	4.267*	-0.020	-3.564*	0.011	2.170*
ED+1	-0.020	-4.230*	-0.034	-2.888*	0.025	4.540*	0.006	1.138
ED+2	-0.004	-0.813	-0.003	-0.268	0.000	-0.013	0.004	0.811
ED+3	0.008	1.698	0.004	0.319	0.033	5.978*	-0.025	-4.765*
ED+4	-0.022	-4.599*	0.046	3.827*	0.030	5.507*	-0.021	-4.020*
ED+5	0.020	4.167*	0.001	0.049	-0.011	-1.913	0.006	1.070
ED+6	-0.004	-0.808	0.018	1.491	0.022	4.048*	-0.020	-3.776*
ED+7	-0.019	-3.946*	0.032	2.719*	0.025	4.460*	-0.021	-3.962*
ED+8	0.002	0.361	-0.010	-0.819	0.002	0.431	-0.003	-0.598
ED+9	0.015	3.010*	-0.009	-0.744	-0.024	-4.386*	0.006	1.190
ED+10	-0.011	-2.226*	-0.010	-0.833	-0.008	-1.409	-0.013	-2.485*

Source: Author's calculation *Significant at 5% level (± 1.96)

On the event day, the abnormal return of the bankex index is positive but statistically insignificant. However, on days ED+4 and ED+6, significant negative abnormal returns is observed which can be due to the reason that COVID-19-induced lockdown may adversely impact the asset quality and future income of the banks. In the pre-announcement event window, initially there is positive abnormal return on days ED-9, ED-7 and ED-6 but on days ED-1, ED-3 and ED-6 significant negative abnormal returns are observed. This again indicates that the market anticipated the event and was volatile.

The impact of the announcement on the capital goods sector is negative which is evident from the significant negative abnormal return on the event day. The negative performance may be because covid-19-induced lockdown will disrupt the normal functioning of the units and add to the working capital stress. Moreover, negative abnormal returns are observed on days ED-4, ED-3 and ED-1 in the pre-announcement time window indicating early reaction in the market due to leakage of some information related to the event.

The CDG&S sector yields significant negative abnormal return on the event day and it continues on days ED+1, ED+4, ED+7 and ED+10. This is possibly because the pandemic has disrupted supply chains and led to reduction in consumer demands. However, for a very few days in the post-announcement period, positive abnormal return is observed on days ED+5 and ED+9. In the pre-announcement window, on days ED-1, ED-3, ED-4 and ED-8 negative abnormal return is observed whereas positive abnormal return is observed on days ED-2, ED-6, ED-7 and ED-9 indicating volatility in the market.

On the event day, significant positive abnormal return is observed in the energy sector; however, on day ED+1, negative abnormal return can be noticed which is possibly

because the lockdown will result in a sharp fall in the demand for energy negatively impacting the sector. In the pre-announcement window, the abnormal returns are positive and significant on days ED-1 and ED-3.

In case of the FMCG sector, significant negative abnormal return is observed on the event day, however, the abnormal returns are positive on days ED+1, ED+3, ED+4, ED+6 and ED+7 which is possibly because in the initial stages of the lockdown there was high demand for such goods as people resorted to panic buying & hoarding. Negative return was observed only on day ED+9. Even in the pre-announcement window, the abnormal returns are mostly positive on days ED-6, ED-4, ED-3 and ED-1; return is negative only on day ED-8.

Table 4: Abnormal Returns and T-statistic for the Sectoral Indices

	Healthcare		Industrials		IT		Telecom	
Day	AR	T-Stat	AR	T-Stat	AR	T-stat	AR	T-stat
ED-10	-0.011	-1.564	-0.002	-0.479	-0.015	-1.211	0.008	0.373
ED-9	-0.033	-4.812*	0.019	3.702*	-0.074	-5.951*	0.022	1.050
ED-8	0.013	1.937	-0.017	-3.258*	0.008	0.651	0.032	1.539
ED-7	0.006	0.835	0.026	5.012*	-0.070	-5.566*	0.003	0.133
ED-6	0.014	2.005*	0.018	3.479*	-0.026	-2.101*	-0.016	-0.784
ED-5	-0.013	-1.920	0.027	5.257*	-0.019	-1.525	-0.051	-2.480*
ED-4	0.000	0.052	-0.017	-3.312*	-0.010	-0.815	0.042	2.051*
ED-3	0.018	2.682*	-0.042	-8.253*	0.072	5.765*	0.007	0.318
ED-2	0.000	0.014	0.030	5.982*	-0.075	-5.985*	0.002	0.100
ED-1	0.010	1.494	-0.022	-4.320*	0.064	5.117*	-0.021	-1.012
ED -0	-0.020	-2.908*	-0.027	-5.399*	0.017	1.391	0.007	0.321
ED+1	-0.012	-1.828	-0.003	-0.557	0.031	2.451*	0.056	2.711*
ED+2	0.004	0.584	0.004	0.700	0.003	0.209	-0.051	-2.456*
ED+3	0.033	4.848*	0.019	3.815*	-0.019	-1.545	-0.009	-0.430
ED+4	0.011	1.610	-0.019	-3.723*	0.024	1.894	-0.006	-0.308
ED+5	0.006	0.889	0.018	3.560*	-0.052	-4.148*	-0.013	-0.618
ED+6	0.047	6.873*	0.012	2.401*	-0.026	-2.060*	0.023	1.119
ED+7	0.039	5.720*	-0.063	-12.331*	0.065	5.160*	0.023	1.115
ED+8	0.037	5.402*	0.014	2.773*	-0.015	-1.174	-0.012	-0.571
ED+9	0.013	1.932	-0.016	-3.224*	0.012	0.929	0.021	1.030
ED+10	0.021	3.176*	0.039	7.594*	-0.005	-0.429	0.056	2.713*

Source: Author's calculation *Significant at 5% level (± 1.96)

In the finance sector the abnormal returns are positive and significant on the event day, however the returns are negative on days ED+3, ED+4, ED+6, ED+7 and ED+10 indicating negative impact of the lockdown announcement on the index and no significant positive return can be observed in this period. This is possibly due to the reason that the normal operation of the companies in the financial sector will be adversely impacted due to the lockdown. In the pre-announcement period, negative abnormal returns are noticed on days ED-1, ED-3 and ED-6 and positive returns on days ED-9 and ED-4 are present representing the volatility in the market in this time period.

The healthcare sector experiences significant negative abnormal return on the day of the announcement but positive abnormal return is observed on days ED+3, ED+6, ED+7, ED+8 and ED+10 which is probably because of the positive impact of the lockdown by curbing the spread of the virus and also because the pandemic led to increase in demand for medical supplies and equipments will have positive impact on the index.

The industrial sector experiences significant negative abnormal return on the

event day and on the days ED-1, ED-3, ED-4 and ED-8 which continues to the post-announcement period as evident from the negative abnormal returns on days ED+3, ED+4, ED+7 and ED+9. This is possibly because the lockdown will cause disruption in normal functioning of the units resulting in heavy losses. Positive abnormal return is noticed on days ED-9, ED-7, ED-6, ED+8 and ED+10.

Table 5: Abnormal Returns and T-statistic for the Sectoral Indices

	Utility		Consumer Durables		Metal		Oil & Gas	
Days	AR	T-stat	AR	T-stat	AR	T-stat	AR	T-stat
ED-10	-0.009	-1.184	-0.008	-0.714	-0.014	-1.056	-0.018	-2.044*
ED-9	-0.036	-4.531*	0.005	0.460	0.031	2.311*	-0.012	-1.414
ED-8	0.014	1.753	-0.020	-1.719	0.008	0.621	0.020	2.245*
ED-7	-0.023	-2.860*	0.002	0.144	0.012	0.900	0.021	2.401*
ED-6	0.001	0.141	0.005	0.409	0.024	1.799	0.013	1.540
ED-5	-0.040	-5.123*	-0.003	-0.232	0.057	4.315*	0.025	2.916*
ED-4	0.004	0.510	-0.017	-1.452	-0.029	-2.172*	-0.015	-1.693
ED-3	0.033	4.159*	-0.031	-2.664*	0.000	0.019	0.032	3.705*
ED-2	0.010	1.216	-0.005	-0.458	0.078	5.868*	0.013	1.482
ED-1	-0.011	-1.380	-0.016	-1.342	-0.023	-1.716	-0.018	-2.103*
ED -0	-0.009	-1.165	0.012	1.008	-0.056	-4.219*	-0.022	-2.549*
ED+1	0.002	0.233	-0.001	-0.061	-0.063	-4.750*	-0.026	-2.972*
ED+2	0.002	0.261	0.006	0.550	0.011	0.827	-0.011	-1.268
ED+3	0.009	1.104	0.009	0.791	0.021	1.577	0.025	2.823*
ED+4	0.015	1.906	-0.014	-1.157	0.001	0.069	0.047	5.394*
ED+5	0.002	0.236	0.024	2.020*	0.029	2.160*	0.014	1.625
ED+6	0.020	2.591*	-0.008	-0.718	0.007	0.518	0.040	4.617*
ED+7	-0.007	-0.869	-0.013	-1.081	-0.032	-2.414*	-0.008	-0.866
ED+8	0.018	2.239*	-0.016	-1.334	-0.010	-0.732	0.003	0.296
ED+9	0.007	0.870	0.036	3.109*	-0.006	-0.425	-0.012	-1.407
ED+10	0.005	0.614	-0.028	-2.385*	0.038	2.860*	-0.003	-0.299

Source: Author's calculation, *Significant at 5% level (± 1.96)

On the event day, the IT sector yields positive but insignificant abnormal return. Significant positive abnormal returns on days ED-1, ED-3 and negative on days ED-2, ED-6, ED-7, ED- 9 indicate volatility and leakage of some information. However, in the post-announcement window, positive return is seen on days ED+1 and ED+7, and negative returns on days ED+5, ED+6.

Similarly, even in the telecom sector the return on the event day is positive but insignificant. The analysis also shows significant negative abnormal return on days ED-5 and ED+2.

However, in case of utility sector, the abnormal return on the event date is negative but insignificant. Also, no significant negative return can be seen in the post announcement period but significant positive abnormal return is observed on days ED+6 and ED+8 as there is no decline in demand for basic necessities like water etc. due to the pandemic.

The data analysis also brings to our notice that the consumer durables sector experienced insignificant positive abnormal return on the event date. However, on ED-3, negative abnormal return is seen and there has been no significant positive abnormal return in this period. These negative returns can be because of leakage of information.

Negative and statistically significant abnormal return is observed on the event

date in the metal sector. This indicates negative reaction of the index. Moreover, significant volatility can be noticed as the abnormal returns in the post-announcement period are positive on days ED+5 and ED+10 but negative on days ED+1 and ED+7.

Table 6: Abnormal Returns and T-statistic for the sectoral indices

	Power		Realty		Teck	
Days	AR	T-stat	AR	T-stat	AR	T-stat
ED-10	0.002	0.186	-0.019	-1.681	-0.010	-0.884
ED-9	-0.030	-3.602*	0.007	0.641	-0.061	-5.257*
ED-8	0.009	1.101	-0.017	-1.448	0.012	1.069
ED-7	-0.018	-2.180*	0.005	0.428	-0.058	-5.059*
ED-6	0.011	1.346	0.002	0.187	-0.027	-2.375*
ED-5	-0.030	-3.595*	0.006	0.539	-0.021	-1.820
ED-4	0.009	1.111	0.009	0.799	-0.002	-0.162
ED-3	0.015	1.795	-0.034	-3.024*	0.063	5.489*
ED-2	0.012	1.469	0.058	5.088*	-0.065	-5.624*
ED-1	-0.009	-1.050	-0.045	-3.989*	0.051	4.442*
ED -0	-0.015	-1.861	-0.041	-3.619*	0.016	1.384
ED+1	0.002	0.263	0.005	0.418	0.035	3.058*
ED+2	0.006	0.725	-0.003	-0.283	-0.007	-0.574
ED+3	0.009	1.117	-0.028	-2.489*	-0.018	-1.592
ED+4	0.002	0.245	-0.024	-2.103*	0.019	1.636
ED+5	-0.005	-0.644	0.019	1.635	-0.048	-4.154*
ED+6	0.008	0.930	0.022	1.954	-0.018	-1.549
ED+7	-0.018	-2.169*	-0.032	-2.825*	0.061	5.276*
ED+8	0.016	1.910	-0.018	-1.600	-0.014	-1.217
ED+9	0.003	0.362	-0.015	-1.322	0.014	1.206
ED+10	0.009	1.082	-0.037	-3.226*	0.003	0.299

Source: Author's calculation *Significant at 5% level (± 1.96)

Similar negative abnormal return on the event date is observed in the oil & gas sector, where the return is negative on the day ED-1 and continues to be so on the day ED+1 representing the immediate negative reaction to the announcement. This is because of the decline in the price of oil due to oversupply and also demand contraction due to pandemic.

The power sector also reacts negatively on the event day and significant negative returns are observed in both pre and post-announcement period. This is possibly due to the decline in demand for power as a result of closed businesses and industries.

Even the realty sector shows similar impact with significant negative return on the event day and also on days ED-1, ED-3, ED+3, ED+4, ED+7 and ED+10. The reason can be that during the lockdown there were no transactions in the realty sector.

However, a positive but statistically insignificant return is observed in the teck sector on the event day. In the pre-announcement period, there has been negative abnormal returns on days ED-2, ED-6, ED-7 and ED-7 indicating leakage of information and early reaction of investors' due to anticipation of the event. Again, on day ED+5, negative abnormal return is present which is may be because due to the implementation of the lockdown the companies had to be closed for a particular time period.

Conclusion

In the present study the impact of the lockdown announcement on the sectoral indices of BSE have been studied using event study methodology. In the present study, the lockdown announcement has been considered as the event and 25th of March, 2020 is

taken as the event date. Estimation period of 120 trading days and an event window of 21 days i.e. 10 days prior to the event and 10 days post event has been considered.

The study shows the instant reaction and the short-term fluctuations experienced in the market due to the official announcement of the lockdown. The results reveal that the sectors like Auto, Basic materials, CD&S, Realty, Power show negative abnormal returns after the announcement of the lockdown. However, some sectors like Healthcare, FMCG, and Telecom show positive abnormal returns in the period post announcement. The healthcare sector experiences positive returns as a strong rise in demand for medical supplies and medical equipments is experienced due to the pandemic whereas due to panic among consumers, hoarding of consumer goods have resulted in significant returns for the FMCG sector. Similarly, greater dependence on telecommunications for distance learning and remote working has resulted in positive returns for the telecom sector. But certain other sectors like CD&S, Bankex, Financial services and Industrials experience negative returns post announcement as the consumers postpone their consumption of non-essential goods, the companies providing banking & financial services face several challenges due to deterioration of asset quality & uncertainty related to future income and most of the industries suffer due to the unavailability of working capital and inability of completing orders on time.

References

- Alam, M. M., Wei, H., & Wahid, A. N. (2020). COVID-19 outbreak and sectoral performance of the Australian stock market: An event study analysis. *Australian Economic Papers*.
- Bora, D., & Basistha, D. (2021). The outbreak of COVID-19 pandemic and its impact on stock market volatility: Evidence from a worst-affected economy. *Journal of Public Affairs*.
- Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14(1), 3-31.
- Chaudhary, M., Sodani, P. R., & Das, S. (2020). Effect of COVID-19 on Economy in India: Some Reflections for Policy and Programme. *Journal of Health Management*, 22(2), 169-180.
- Chaudhary, R., Bakshi, P., & Gupta, H. (2020). The Performance of the Indian Stock Market During Covid-19. *Investment Management and Financial Innovations*, 17(3), 133-47.
- Chen, M.-P., Lee, C.-C., Lin, Y.-H., & Chen, W.-Y. (2018). Did the S.A.R.S. epidemic weaken the integration of Asian stock markets? Evidence from smooth time-varying cointegration analysis. *Economic Research*, 31(1), 908-926.
- Chiang, T. C., Jeon, B. N., & Li, H. (2007). Dynamic Correlation Analysis of Financial Contagion: Evidence from Asian Markets. *Journal of International Money and Finance*, 26(7), 1206-1228.
- Dhall, R., & Singh, B. (2020). The COVID-19 Pandemic and Herding Behaviour: Evidence from India's Stock Market. *Millennial Asia*, 11(3), 366-390.
- Donadelli, F., Kizys, R., & Riedel, M. (2016). Dangerous infectious diseases: Bad news for Main Street, good news for Wall Street. *Journal of Financial Markets*, 35.
- Dornbusch, R., Park, Y. C., & Claessens, S. (2000). Contagion: Understanding How It Spreads. *The World bank Research Observer*, 15(2), 177-197.
- Dyckman, T., Philbrick, D., & Stephan, J. (1984). A comparison of event study methodologies using daily stock returns: A simulation approach. *Journal of Accounting Research*, 22, 1-30.
- Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The Adjustment of stock prices to New Information. *International Economic Review*, 10(1), 1-21.
- Gogoi, M., Buragohain, P. P., Gogoi, P., & Hazarika, A. (2022). An Analysis of Economic

- Issues During First and Second Wave of Covid-19 Pandemic in India: A Literature Survey. *Journal of Economic Research & Reviews*, 2(3), 252-256.
- IMF. (2020). World Economic Outlook Update: A Crisis Like No other, An Uncertain Recovery. *Washington, D.C.: International Monetary Fund*.
- International Monetary Fund. (2020). World Economic Outlook Update: Tentative Stabilization, Sluggish Recovery? Washington, D.C.: International Monetary Fund. Retrieved from <https://www.imf.org/en/Publications/WEO/Issues/2020/01/20/weo-update-january2020>.
- Jones, L., Palumbo, D., & Brown, D. (2021). Coronavirus: How the pandemic has changed the world economy. BBC NEWS.
- Kishore, R. (2020). India's economy was facing worst-ever deceleration before Covid-19 hit. *Hindustan Times*.
- Lee, W. Y., Jiang, C. X., & Indro, D. C. (2002). Stock market volatility, excess returns, and the role of investor sentiment. *Journal of Banking & Finance*, 26, 2277-2299.
- Loh, E. (2006). The impact of SARS on the performance and risk profile of airline stocks. *International Journal of Transport Economics*, 33(3), 401-422.
- MacKinlay, A. C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, 35(1), 13-39.
- Ministry of Finance. (2021). Economic Survey 2020-21. Volume-1. New Delhi: Government of India.
- Mishra, A. K., Rath, N. B., & Dash, K. A. (2020). Does the Indian Financial Market Nosedive because of the COVID-19 Outbreak, in Comparison to after Demonetisation and the GST? *Emerging Markets Finance and Trade*, 56(10), 2162-2180.
- Mishra, P. K., & Mishra, S. K. (2020). Corona Pandemic and Stock Market Behaviour: Empirical Insights from Selected Asian Countries. *Millennial Asia*, 11(3), 341-365.
- Mulenga, M. (2018). Review of Accounting Variables Affecting Stock Price Movements. *Amity Business Review*, 19(1), 91-105.
- Nadkar, N. (2020). FPI withdraw funds from capital markets in March 2020. Centre for Monitoring Indian Economy- *Economic Outlook*.
- O'Donnell, N., Shannon, D., & Sheehan, B. (2021). Immune or at-risk? Stock markets and the significance of the COVID-19 pandemic. *Journal of Behavioral and Experimental Finance*, 30, 100477.
- OECD. (2020). OECD Interim economic Assessment- Coronavirus: The World Economy at Risk. OECD. Retrieved from <https://doi.org/10.1787/7969896b-en>
- Pendell, D. L., & Cho, C. (2013). Stock Market Reactions to Contagious Animal Disease Outbreaks: An Event Study in Korean Foot-and-Mouth Disease Outbreaks. *Agribusiness- An International Journal*, 29(4), 455-468.
- Peterson, H. E. (2020). India becomes country with second highest number of Covid cases. *The Guardian*.
- Peterson, P. P. (1989). Event Studies: A Review of Issues and Methodolgy. *Quarterly Journal of Business and Economics*, 28(3), 36-66.
- Ramakumar, R., & Kanitkar, T. (2021). Impact of COVID-19 Pandemic on the Indian Economy: A Critical Analysis. *Investigación Económica*, 80(315), 3-32.
- RBI. (2020). Reserve bank of India Annual Report 2019-20. New Delhi: Reserve bank of India.
- Sahoo, M. (2020). Even before Covid19, India's economy was slumping. *Deccan Chronicle*.
- Sahoo, M. (2021). COVID-19 impact on stock market: Evidence from the Indian stock

- market. *Journal of Public Affairs*. doi: <https://doi.org/10.1002/pa.2621>
- Sahoo, P., & Ashwani. (2020). COVID-19 and Indian Economy: Impact on Growth, Manufacturing, Trade and MSME Sector. *Global Business Review*, 21(5), 1159-183.
- Sharma, M. (2020). Over 15,000 frontline workers tested positive for coronavirus in India. *India Today*.
- Sharpe, W. F. (1963). A Simplified Model for Portfolio Analysis. *Management Science*, 9(2), 277-293.
- Singh, B., Dhall, R., Narang, S., & Rawat, S. (2020). The Outbreak of COVID-19 and Stock Market Responses: An Event Study and Panel Data Analysis for G-20 countries. *Global Business Review*, 1-26. doi:10.1177/0972150920957274
- Singh, M. K., & Neog, Y. (2020). Contagion effect of COVID-19 outbreak: Another recipe for disaster on Indian economy. *Journal of Public Affairs*, 20(4).
- Singhal, T. (2020). A Review of Coronavirus Disease-2019 (COVID-19). *Indian Journal of Pediatrics*, 87(4), 281-286.
- Sinha, P., Sawaliya, P., & Sinha, P. (2020, November 03). Surviving coronavirus scare - A journey of stock market amid slowdown in Indian economy. *MPRA Paper No. 103902*. Retrieved from <https://mpra.ub.uni-muenchen.de/103902/>
- Stankeviciene, J., & Akelaitis, S. (2014). Impact of public announcements on stock prices: relation between values of stock prices and the price changes in Lithuanian stock market. *Procedia- Social and Behavioral Sciences*, 156, 538-542.
- Thomas, T., Sankararaman, G., & Suresh, S. (2020). Impact of COVID-19 announcement on NIFTY stocks. *Journal of Critical Reviews*, 7(13).
- Topcu, M., & Gulal, O. S. (2020). The impact of COVID-19 on emerging stock markets. *Finance Research Letters*, 36.
- World bank. (2020). Global Economic Prospects Slow growth, Policy Challenges. *Washington, D.C: World Bank Publications*.
- World Bank. (2020). Global Economic Prospects. June 2020. *Washington, D.C.: World bank*. Retrieved from <http://hdl.handle.net/10986/33748>
- Zaremba, A., Kizys, R., Aharon, D. Y., & Demir, E. (2020). Infected Markets: Novel Coronavirus, Government Interventions, and Stock Return Volatility around the Globe. *Finance Research Letters*, 35.
- Zhu, N., Zhang, D., Wang, W., Li, X., & Yang, B. (2020). A Novel Coronavirus from Patients with Pneumonia in China, 2019. *Massachusetts Medical Society*.

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