

## **An investigative analysis of the impact of Covid 19 on the Indian share market**

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**Abstract:** *The share prices respond to the information available in the public domain at the same time. It is reflected in the indices of the stock exchanges. We can say that any action of a large scale taken by the government or any reputed institution has a direct impact on the share market, be it positively or negatively. In such a situation, it becomes inevitable for an investor to know, based on experience, how the market reacts to similar past events. To safeguard the financial loss which may arise as it becomes very much essential to study such events. Such an event is the declaration of coronavirus or Covid19 as a pandemic by the World Health Organisation; a pandemic implies that it has an impact on large geographical areas worldwide. Thus to study the risk of covid19 as a pandemic declaration on the Indian stock market, this study has been carried out. Four sectoral and two thematic indices were taken for the study. The event study methodology has been used for the study. The Average Abnormal Return and Cumulative Average Abnormal Return of the -20 trading days and +20 post and pre-event data have been studied. On AAR there is no difference in pre and post-event while in CAAR there is significance. While in the individual index Nifty Pharma and Nifty Energy have significance.*

**Keywords:** Covid 19, Event study, Indian, Pandemic, Share market, Sectoral index, Thematic index.

**JEL Codes:** C12, G1, G14

### **1. Introduction**

The financial market is the market where the trading of securities is carried out. Financial markets act as an economic barometer of the country. It shows the country's growth and the possibility of growth in the country. The share market is a part of the financial market; it is affected by both macro and microeconomic events. Some events have a positive impact on the share market which means there is growth in the index and share price, whereas some have a negative impact which implies there is a decline in the market index as well as in the share price. Studying the impact and market condition is of much importance for future forecasting and planning investment decisions in similar events in the future. A pandemic is also such an event; it is an outbreak of a disease which can impact a large population over a wide geographical area beyond national boundaries. In the financial world, such events are treated as systematic risks, like the risk of the disease cannot be diversified. After it was declared by the World Health Organization (WHO) as a pandemic, many steps were taken by the government, which caused fluctuation in the financial market. Covid19 or Novel Coronavirus is an infectious virus causing respiratory illness with symptoms such as fever, cough, and difficulty in breathing. It reported its first case in December 2019, in Wuhan city of Hubei Province of China. Till April 2020, our scientists are trying to develop the vaccine. But no permanent cure is available for the virus SARS-CoV-2. It has spread to many countries of the world. On 30<sup>th</sup> January 2020, India reported its first Covid19 positive case in the state of Kerala. To control the disease, many states and union territories have invoked the Epidemic Disease Act 1897. WHO- World

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Health Organization declared Covid19 as a pandemic on 11<sup>th</sup> March 2020. It becomes necessary to study how the market has been affected due to its declaration as a pandemic.

The financial market acts as a facilitator for the transfer of funds between borrowers and lenders. It acts as a transmission mechanism between the parties. The financial market is classified into two segments (a) Money Market and (b) Capital Market. The money market handles short-term credit, whereas; the money market handles medium and long-term credit. The capital market is further segmented into the primary and secondary markets. The secondary market is also called the stock market. In India, there are two major stock exchanges BSE- Bombay Stock Exchange and NSE- National Stock Exchange. BSE is the oldest exchange in Asia; it has existed since 1875. NSE was founded in 1992 and the exchange started trading in 1994. Both NSE & BSE follow the same trading hours, trading mechanism, and settlement process. As of February 2020, 5,518 firms are listed in BSE. 1,799 companies are listed in NSE as of 31st December 2019. In terms of volume traded, NSE is the largest stock exchange in India. The market is regulated under the supervision of the Securities and Exchange Board of India (SEBI).

(Patel.M et.al. 2016) analyzed the efficiency of the Indian stock market related to the budget announcement by the Union government. The event study methodology was applied in the study for the analysis of the market data. AARs, CAARs, and t-value were analyzed during the study event period of -20 and +20 days of the event. It was found that except for +3 days, the statistics were not significant. The study shows that the investors were not able to earn an abnormal return for the targeted companies. (Gakhar. D.V et.al. 2015) reports the impact of the Union Budget on the Indian Stock Market and tries to measure the volatility and average return over short, medium, and long-term periods for pre and post-budget. The study was carried on for five budget years. The researcher uses paired T-test and F-test. Researchers conclude that the budget has the most impact in a short period. In the medium period, it has less impact, and it diminishes in the long run. The study implies that investors should act cautiously near the budget declaration period. (Gautami, 2017) reports the demonetization call by the central government and its impact on the Nifty index fund. The researcher compares the fund performance with the benchmark using Mean, Standard deviation, Beta, and t-test. The researcher concludes that there is a significant difference in the Nifty index fund during the pre and post-demonetization period. (Divya. & Sophia, 2017) studies the impact of demonetization on the stock price of the top ten software companies in India for three months. Event methodology and time-series technique are used to capture the market behaviour and movement for market index and share price. The researcher comments that demonetization is a prime event because the whole economy is disrupted. The study shows that the market was very volatile in the initial days of demonetization. Then after it started growing, the growth did not extend to all the companies under study. (Sharma & Sain, 2017) explains the impact of GST on Indian stock exchanges. The researcher studies the selected stock. The researcher reflects the stock price before and after the event. The study reflects that microfinance, ascent finance, and lone finance have negative returns after the GST, demonetization, and waving of agricultural loans. Researchers proposed that GST implementation is a half-hearted attempt by the central government to rationalize the indirect tax structure. (Raja. & Sudhahar, 2010) conducted an empirical test of Indian stock market efficiency in respect of bonus announcements by IT companies. The test run by the researchers showed that security prices have a positive reaction to the announcement of bonus issues. It can be concluded that the Indian IT sector is efficient but not perfectly efficient in the announcement of a bonus issue of shares. (Darmayanti, 2015) explained whether there is any direct effect of return on equity, earning per share, and systematic risk on the stock price. The study suggests that Return on Equity and earnings per share have a dominant influence on the stock price. A systematic risk t-test shows there is significantly no effect on the company's stock price of food and beverage as the result of a systematic risk significance of 0.757. Values of r partial profitability for Systematic Risk of -0.046, which shows there is a negative relationship between Systematic Risk of the selected stock price by 4.6%.

## 2. Research Methodology

The study is carried out by taking into study the following indices of NSE; Nifty50 is indices used as the benchmark for products traded on NSE 50 stocks, are taken into the study for calculating the index. Four sectoral indices and two thematic indices are taken into consideration for the study. The indices are Nifty Auto which constitutes 15 companies related to the manufacturing of cars, motorcycles, heavy vehicles, and tires. Nifty Bank consists of 12 banking companies engaged in the banking business, Nifty Commodities consists of 30 companies engaged in producing durable products, Nifty FMCG constitutes of 15 companies associated with producing fast-moving commercial goods, Nifty Pharma consists of 10 companies associated with manufacturing and marketing medicines and allied products and Energy constitutes of 9 companies related with production and distribution of petroleum and gas products. The study is carried out keeping the indices of different sectors like banking, auto, consumer durables, pharmaceuticals, and Energy; a total of 91 companies are there in the selected six sectoral indices. Covid19 was declared a pandemic on 11<sup>th</sup> March, 2020 by the World Health Organisation. So the declaration day will be day 0, the event window (-20,+20) pre-event period is -20 days, and +20 days post-event of the trading days are considered for the study. The estimation period is 150 days 170-20=150 trading days, as there is no fixed rule for determining the estimation period. The general rule is 120 to 200 days. So it is assumed that 150 days estimation period will give an unbiased and true picture, a total of 191 days is studied. The data set is from 3rd July, 2019 to 13th April, 2020.

### 2.1 Objectives of the Study

- To study the impact of the Covid19 pandemic declaration on the selected stock indices of NSE.
- To analyze the pre and post-period fluctuations on the selected index of NSE.
- To study the correlation of the pre-event period and post-event period of the selected indices.

### 2.2 Hypothesis of the Study

1.  $H_0$ : There is no significant difference between AAR before and after the declaration of a pandemic.
2.  $H_0$ : There is no significant difference between CAAR of pre and post-event periods.

### 2.3 Tools of Analysis

#### A. Event Study Methodology

In studying economic events like budget announcements, elections, pandemics, and interest rate fluctuations, a market crash is of great interest to researchers in India as well as across the globe. For this kind of research, event study methodology is widely used. For carrying out event study methodology, the following is applicable

Daily Return is calculated using the logarithm method

$$R_t = \log \frac{P_t}{P_{t-1}} \quad (1)$$

Where,

$R_t$  = Market return of the period  $t$

$P_t$  = Closing price of Index at day  $t$

$P_{t-1}$  = Closing price of index at day  $t-1$

Log = Natural Log

Daily expected return is estimated using Market Model for each index as follows

$$E(R_{it}) = \alpha + \beta (r_m) \quad (2)$$

Where,

$E(R_{it})$  = Expected return on index  $i$  on day  $t$

$\alpha$  = Alpha Value

$\beta$  = Beta Value

$r_m$  = return on the market on day  $t$

To analyze the market reaction to the announcement of abnormal return it is calculated on the day of the announcement

$$AR_{it} = R_{it} - E(R_{it}) \quad (3)$$

Where,

$AR_{it}$  = abnormal rate on index  $i$  on day  $t$

$R_{it}$  = return on share  $i$  on day  $t$

The abnormal rate is the percentage change in index value below and above what would normally expect to occur. To make the study more informative, the average abnormal return has been taken for all the observations.

$$AAR_t = \frac{1}{N} = \sum_{i=1}^N AR_{it} \quad (4)$$

Where,

$AAR_t$  = Average Abnormal Return at day  $t$

$AR_{it}$  = Abnormal return for index  $i$  at day  $t$

$N$  = Number of events in the sample

In order to draw conclusions and overall inferences for market fluctuations to the event, the Cumulative Abnormal Return rate is also analyzed for the 150 days event window

$$CAAR_t = \sum_i^K AAR_t \quad (5)$$

Where,

$CAAR_t$  = Cumulative Abnormal Return on day  $t$

$\sum_i^K AAR_t$  = Sum of Average Abnormal return on day  $t-20$  days to  $t+20$  days

The statistical significance of  $AAR_t$  is measured through student  $t$ - statistics as below

$$t(AAR) = \frac{AAR}{\sigma/\sqrt{N}} \quad (6)$$

Where,

$t(AAR)$  = Average Abnormal return on day  $t$

$\sigma/\sqrt{N}$  = Standard Error

$N$  = Number of sample index

## B. Correlation of Coefficient

For calculating the correlation in this study, Pearson's Correlation is used, which is also known as Pearson's  $R$ . It is most commonly used in linear regression. To study the correlation of various indices, the equation given below is used.

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}} \quad (7)$$

Where,

$N$  = number of paired score

$\sum XY$  = Number of product paired score

$\sum X$  = Sum of  $X$  score

$\sum Y$  = Sum of  $Y$  score

$\sum X^2$  = Sum of Squared  $X$  score

$\sum Y^2$  = Sum of Squared  $Y$  score

## C. Normality Test

It is used to check whether the data is normally distributed or not so that it can be determined whether parametric or non-parametric tests can be used. In the study, Kolmogorov-Smirnov and Shapiro-Wilk are used to check the normality of the data. The data is said to be normally distributed if the significance value is more than 0.05 at 95 % confidence level. In this study, the significance value of calculated indices is less than 0.05; thus it signifies that data is not normally distributed. Hence parametric test cannot be used to test the hypothesis of the study.

#### D. Wilcoxon Signed Ranked Test

If the data set is not normally distributed then for a single sample or paired sample of the independent variable, Wilcoxon Signed Ranked Test is used for testing the hypothesis.

$$ET = \frac{W - n(n+1)/4}{\sqrt{n(n+1)(2n+1)/24}} \quad (8)$$

Where,

n= number of observation

w= min (W<sup>-</sup>, W<sup>+</sup>)

### 3. Results and Discussion

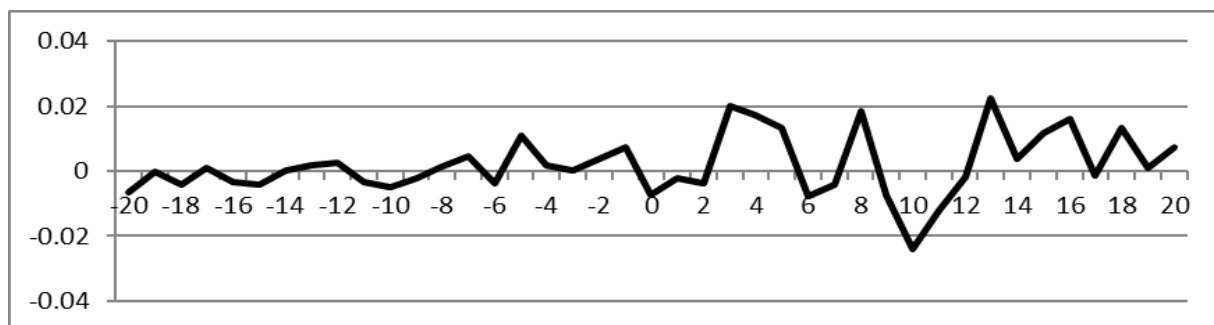
Table No- 1: Showing AARs, CAARs and t-AARs during Pre and Post Event Period

| Days                        | AAR %     | CAAR %    | t-statistics | Days | AAR %     | CAAR %    | t-statistics |
|-----------------------------|-----------|-----------|--------------|------|-----------|-----------|--------------|
| -20                         | -0.006455 | -0.006455 | -1.81151     | 1    | -0.002034 | -0.006580 | -0.57084     |
| -19                         | -0.000319 | -0.006773 | -0.08942     | 2    | -0.003810 | -0.010389 | -1.06916     |
| -18                         | -0.004034 | -0.010808 | -1.13219     | 3    | 0.019927  | 0.009538  | 5.59256**    |
| -17                         | 0.001015  | -0.009793 | 0.284825     | 4    | 0.017248  | 0.026786  | 4.840471**   |
| -16                         | -0.003360 | -0.013153 | -0.943       | 5    | 0.013285  | 0.040071  | 3.72841**    |
| -15                         | -0.004132 | -0.017284 | -1.15951     | 6    | -0.007776 | 0.032295  | -2.18238**   |
| -14                         | 0.000263  | -0.017021 | 0.073839     | 7    | -0.004264 | 0.028031  | -1.19655     |
| -13                         | 0.001943  | -0.015078 | 0.545286     | 8    | 0.018361  | 0.046392  | 5.153095**   |
| -12                         | 0.002413  | -0.012666 | 0.677095     | 9    | -0.007485 | 0.038907  | -2.10066**   |
| -11                         | -0.003316 | -0.015982 | -0.93064     | 10   | -0.023911 | 0.014997  | -6.71051**   |
| -10                         | -0.005077 | -0.021059 | -1.42493     | 11   | -0.012135 | 0.002861  | -3.40573**   |
| -9                          | -0.002143 | -0.023202 | -0.60139     | 12   | -0.001788 | 0.001073  | -0.50191     |
| -8                          | 0.001333  | -0.021868 | 0.374223     | 13   | 0.022269  | 0.023342  | 6.249756**   |
| -7                          | 0.004548  | -0.017320 | 1.276427     | 14   | 0.003788  | 0.027130  | 1.063022     |
| -6                          | -0.003777 | -0.021097 | -1.05993     | 15   | 0.011663  | 0.038792  | 3.273099**   |
| -5                          | 0.010820  | -0.010277 | 3.036704**   | 16   | 0.016100  | 0.054893  | 4.518543**   |
| -4                          | 0.001942  | -0.008335 | 0.544947     | 17   | -0.001354 | 0.053539  | -0.37997     |
| -3                          | 0.000290  | -0.008045 | 0.081508     | 18   | 0.013308  | 0.066847  | 3.734917**   |
| -2                          | 0.003706  | -0.004339 | 1.04003      | 19   | 0.000913  | 0.067761  | 0.256319     |
| -1                          | 0.007251  | 0.002913  | 2.035033**   | 20   | 0.007346  | 0.075106  | 2.061601**   |
| 0                           | -0.007458 | -0.004546 | -2.09309**   |      |           |           |              |
| ** Significant at 5% level. |           |           |              |      |           |           |              |

Source: Author Calculation.

Table No-1 shows the event day generated an AAR of -0.007458 percent, which was significant at a 5 percent level. The AARs before the pandemic declaration period from -20 days to -1 days are positive for 11 days out of 20 days and are negative for the other 9 days. The AAR is significant at a 5 percent level on -1 day and -5 days, having a positive return of AAR 0.007251 and 0.010820. On the event day of the declaration of Corona as a pandemic, the AAR of the selected company indices consisted of a negative return -0.007458 at a 5 percent level of significance.

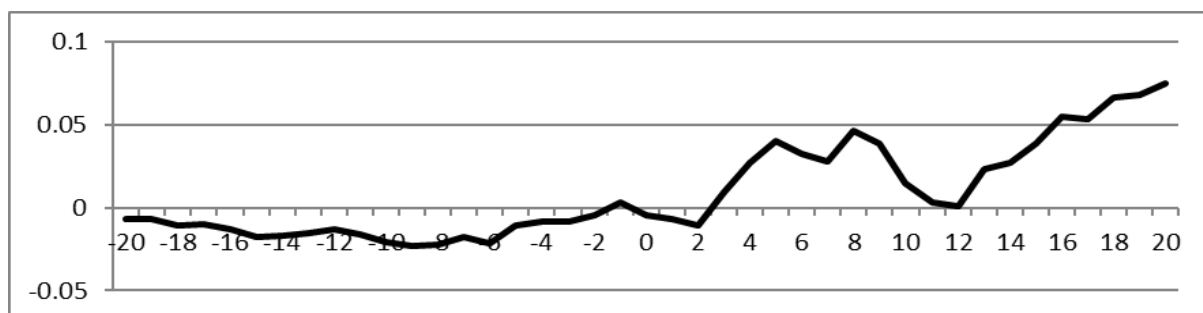
The post-event day AARs after the pandemic declaration period from +1 day to + 20 days at 5 percent significance level is a positive return for 11 days out of 20 days and negative for the other 9 days. The AAR is significant at 5 percent having positive return on the following days +3 at 0.019927, +4 at 0.017248, +5 at 0.013285, +8 at 0.018361, +13 at 0.022269, +15 at 0.011663, +16 at 0.016100, +18 at 0.013308 and +20 at 2.061601. On +6 day it has negative return -0.007776, +9 at -0.007485, +10 at -0.023911 and on day +11 at -0.012135.



Source: Author Calculation. Chart No- 1: Showing the AAR of Pandemic Declaration

Chart No-1, during the event window to 41 days, the AAR was positive for 22 days while it was negative for 19 days during the 41 days event window. After the event day, 13 days were significant to earn an abnormal return due to the event. Statistical significance shows that among the indices studied, some variations have occurred.

Chart No-2, the CAAR was negative for 22 days out of 41 days' event window and positive for 19 days. After the event beyond +3 days of the event, CAAR is positive for all the subsequent days till +20 days. The indices adjustment has taken quickly just after 3 days of the event.



Source: Author Calculation. Chart No- 2: Showing CAAR of Pandemic Declaration

Table No-2: Wilcoxon Signed Ranks Test for pre and post-event of AAR and CAAR

|                                 |                | N  | Mean Rank | Sum of Ranks |
|---------------------------------|----------------|----|-----------|--------------|
| Pre Event AAR<br>Post Event AAR | Negative Ranks | 11 | 12.27     | 135.00       |
|                                 | Positive Ranks | 9  | 8.33      | 75.00        |
|                                 | Ties           | 0  |           |              |

|                                   |  |                |    |       |        |
|-----------------------------------|--|----------------|----|-------|--------|
|                                   |  | Total          | 20 |       |        |
| Pre Event CAAR<br>Post Event CAAR |  | Negative Ranks | 18 | 11.50 | 207.00 |
|                                   |  | Positive Ranks | 2  | 1.50  | 3.00   |
|                                   |  | Ties           | 0  |       |        |
|                                   |  | Total          | 20 |       |        |

Source: Author Calculation.

Table No-3: Test Statistics

|                        | Pre Event AAR<br>Post Event AAR | Pre Event CAAR<br>Post Event CAAR |
|------------------------|---------------------------------|-----------------------------------|
| Z                      | -1.120                          | -3.808                            |
| Asymp. Sig. (2-tailed) | .263                            | .000                              |

Source: Author Calculation.

Table no-2 & 3 shows the results of the Wilcoxon Signed-Rank test and test statistics. This test is used because the data fails in the normality test, so parametric tests cannot be used to check the significance of the hypothesis. As data of each index is one sample having a matched pair of the same data set divided into pre and post-event. In this situation, the Wilcoxon signed test is suitable. It is used in the study to check whether there is a statistically significant difference between the AAR and CAAR of 20 days pre-event and 20 days after the event. The results of AAR were not significant,  $p=.263$ ,  $P>0.05$ . Thus the Null Hypothesis is Accepted; there is no impact of pre and post-event in the AAR of the selected indices. The results of CAAR were significant,  $p=.000 < 0.05$ . Thus the Alternative hypothesis is accepted there is a difference in Pre and post-event of CAAR. The mean rank of pre-event AAR is 12.27, and the post-event is 8.33, whereas the CAAR mean rank of pre-event is 11.50 and the post-event is 1.50. The research retains the first Null hypothesis, **H<sub>0</sub>**: There is no significant difference between AAR before and after the declaration of the event. While the research rejects the second null hypothesis, **H<sub>0</sub>**: There is no significant difference between the CAAR of pre and post-event periods.

Table No-4: Wilcoxon Signed Ranks Test of Sectoral and Thematic Indices

| Sector                                                      |                | N  | Mean Rank | Sum of Ranks |
|-------------------------------------------------------------|----------------|----|-----------|--------------|
| Nifty Auto Pre Event<br>Nifty Auto Post Event               | Negative Ranks | 10 | 10.70     | 107.00       |
|                                                             | Positive Ranks | 10 | 10.30     | 103.00       |
|                                                             | Ties           | 0  |           |              |
|                                                             | Total          | 20 |           |              |
| Nifty Bank Pre Event<br>Nifty Bank Post Event               | Negative Ranks | 8  | 10.88     | 87.00        |
|                                                             | Positive Ranks | 12 | 10.25     | 123.00       |
|                                                             | Ties           | 0  |           |              |
|                                                             | Total          | 20 |           |              |
| Nifty Commodities Pre Event<br>Nifty Commodities Post Event | Negative Ranks | 12 | 10.42     | 125.00       |
|                                                             | Positive Ranks | 8  | 10.63     | 85.00        |
|                                                             | Ties           | 0  |           |              |
|                                                             | Total          | 20 |           |              |
| Nifty FMCG Pre Event<br>Nifty FMCG Post Event               | Negative Ranks | 11 | 12.73     | 140.00       |
|                                                             | Positive Ranks | 9  | 7.78      | 70.00        |
|                                                             | Ties           | 0  |           |              |
|                                                             | Total          | 20 |           |              |

|                                                   |                |    |       |        |
|---------------------------------------------------|----------------|----|-------|--------|
| Nifty Pharma Pre Event<br>Nifty Pharma Post Event | Negative Ranks | 16 | 11.00 | 176.00 |
|                                                   | Positive Ranks | 4  | 8.50  | 34.00  |
|                                                   | Ties           | 0  |       |        |
|                                                   | Total          | 20 |       |        |
| Nifty Energy Pre Event<br>Nifty Energy Post Event | Negative Ranks | 13 | 12.15 | 158.00 |
|                                                   | Positive Ranks | 7  | 7.43  | 52.00  |
|                                                   | Ties           | 0  |       |        |
|                                                   | Total          | 20 |       |        |

Source: Author Calculation.

Table No-5: Test Statistics

|                               | Nifty Auto<br>Pre & Post<br>Event | Nifty Bank<br>Pre & Post<br>Event | Nifty<br>Commodities<br>Pre & Post<br>Event | Nifty FMCG<br>Pre & Post<br>Event | Nifty Pharma<br>Pre & Post<br>Event | Nifty Energy<br>Pre & Post<br>Event |
|-------------------------------|-----------------------------------|-----------------------------------|---------------------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| Z                             | -.075                             | -.672                             | -.747                                       | -1.307                            | -2.651                              | -1.979                              |
| Asymp.<br>Sig. (2-<br>tailed) | .940                              | .502                              | .455                                        | .191                              | .008                                | .048                                |

Source: Author Calculation.

**3. H<sub>0</sub>:** There is no significant difference between AR before and after the declaration of a pandemic  
 Table No- 4 & 5 show the Wilcoxon Signed Ranks Test of Sectoral and Thematic Indices. In the pre and post-event of Nifty Auto  $p=.940$ ,  $P>0.05$ , Nifty Bank  $p=.502$ ,  $P>0.05$ , Nifty Commodities  $p=.455$ ,  $P>0.05$ , Nifty FMCG  $p=.191$ ,  $P>0.05$  the p-value is greater than the z value, thus it implies that there is no significant impact at 95% confidence interval. Thus it implies that the null hypothesis stands accepted for the mentioned indices. The mean ranks and the sums of ranks are depicted in table no-4, whereas table no-5 it shows the test results. The Nifty Pharma  $p=.008<0.05$  and Nifty Energy  $p=.048<0.05$  have significant values; thus, the Alternative hypothesis is accepted that there is a difference in Pre and post-event of AR.

Table No-6: Showing Correlation of various indices of NSE

|                   | Nifty 50 |      | Nifty Auto |      | Nifty Bank |       | Nifty Commodities |      | Nifty FMCG |      | Nifty Pharma |       | Nifty Energy |      |
|-------------------|----------|------|------------|------|------------|-------|-------------------|------|------------|------|--------------|-------|--------------|------|
|                   | P        | P1   | P          | P1   | P          | P1    | P                 | P1   | P          | P1   | P            | P1    | P            | P1   |
| Nifty 50          | 1        | 1    | .958       | .869 | .981       | .896  | .990              | .948 | .989       | .429 | .759         | .384  | .990         | .752 |
| Nifty Auto        | .958     | .869 | 1          | 1    | .917       | .932  | .980              | .887 | .943       | .053 | .816         | .162  | .968         | .475 |
| Nifty Bank        | .981     | .896 | .917       | .932 | 1          | 1     | .966              | .845 | .970       | .011 | .646         | -.007 | .967         | .406 |
| Nifty Commodities | .990     | .948 | .980       | .887 | .966       | .845  | 1                 | 1    | .974       | .974 | .800         | .474  | .995         | .788 |
| Nifty FMCG        | .989     | .429 | .943       | .053 | .970       | .011  | .974              | .447 | 1          | 1    | .755         | .755  | .976         | .878 |
| Nifty Pharma      | .759     | .384 | .816       | .162 | .646       | -.007 | .800              | .474 | .755       | .897 | 1            | 1     | .976         | .853 |
| Nifty Energy      | .990     | .752 | .968       | .475 | .967       | .406  | .995              | .788 | .976       | .878 | .976         | .853  | 1            | 1    |

Source: Author Calculation. (P = Pre-Event, P1 = Post-Event)

Table No-6, the correlation of different sectoral and thematic indices of the National stock exchange shows how one index is related to other indices. The table shows the correlation between pre and post-event of -20 and +20 days' event window. The pre-event correlation is shown in the P column and the post-event correlation is shown in the P1 column. With nifty 50 all the other indexes are positively correlated during the pre and post-event period. In the post-event period, the correlation is not similar to the pre-event period

of Nifty FMCG, Nifty Pharma, and Nifty Energy. Nifty Bank is negatively correlated with nifty pharma with  $-0.007$  in the P1 while it was  $.646$  in P. Nifty FMCG is also less least correlated with the nifty bank in P1. From table 4, it can be witnessed that many of the indices in the post-event period do not have a strong correlation compared to the pre-event period.

#### 4. Conclusions

The results show that the event does not have a significant impact on the AAR of the selected different sectoral and thematic indices. However, it has an impact on the CAAR, and the result was found using the t-test for the event window of  $-20 +20$  days. The study result shows that investors have not earned abnormal returns in the sample indices. In the individual sectoral and thematic index, Nifty Pharma and Nifty Energy have a difference, thus implying that in two indexes have earned abnormal returns. Overall the market is efficient enough to absorb information and react accordingly. In a time frame of 20 trading day's market adjusts itself. Further study will be required for a very short, medium, and long-term period to see the impact on all three stages. For a longer duration, the buy and sell carried out by the broker and investor make the market in check. The correlation among the index is positive among all except between the bank and Pharma index, which is negatively correlated. There is also some significant impact on the correlated values of the pre and post-event period. This study can be extended to the individual company to know if investors can earn abnormal returns.

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