

# IMPACT OF CORONAVIRUS ON INDIAN STOCK MARKET-AN EVENT STUDY WITH REFERENCE TO NIFTY 50

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## Abstract

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Most of the countries in the world are highly dependent on China for components and raw materials. Due to this over dependence the outbreak Coronavirus in China (on 13<sup>th</sup> January 2020) may have serious reverberation not just to the world economy but also to the Stock markets around the globe including that of in India. This research paper is trying to analyze the impact of Coronavirus on Indian Stock market. This study is using Event Study Methodology to analyze the stock market reaction by taking one of the major indexes of NSE i.e. Nifty 50. The study period was from 2<sup>nd</sup> January 2020 to 22<sup>nd</sup> January 2020. The outbreak of the event took place on 13<sup>th</sup> January 2020. The result is being observed from the comparison of both pre (-7 days) and post-event window (+ 7 days). Index values were observed and abnormal returns were calculated for the study period and the impact was evaluated. It was found that there is significant impact of Coronavirus on the stock market in India. The study also found that this short period downfall in the stock prices can be due to some other factors.

KEYWORDS: Event study, Stock Market, Nifty 50, Abnormal return

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## 1. Introduction:

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV), is a serious form of pneumonia. A novel Coronavirus (nCoV) is a new strain that has not been previously identified in humans. Coronaviruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that SARS-CoV was transmitted from civet cats to humans and MERS-CoV from dromedary camels to humans. Common signs of infection include respiratory symptoms, fever, and cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death [1].

The knock-on effects of the virus and China's dramatic response are daily making themselves felt, from disrupted air travel to rattled supply chains and plummeting

commodity prices that are dampening growth prospects from Southeast Asia to South America and beyond. Within China, the outbreak and the government's response—essentially firewalling off nearly 100 million people in central Hubei province, where the virus broke out—already have impacted a host of sectors, from hospitality and retail to airlines, insurance, and manufacturing. Numerous cities and towns have implemented their own quarantine measures. Among the most restrictive are those in Wenzhou, the city worst hit by the virus outside Hubei and a major cog in China's maritime trade.

To China, India exports iron ores, granite, aluminum, refined copper, raw cotton amongst other commodities – totaling to about \$10 billion. And yet, India imports roughly six times the amount. This includes virtually all manners of phones and electronics, solar panels, specialized steel amongst other manufactured goods – a lot of these goods manufactured using our raw materials exported to China. India's Smartphone, renewable energy and construction growth story is paying the Chinese working class for its success. India's economic relationship with China is characterized with an extremely high reliance on Chinese imports and capital from a Chinese industrial and investor class [3].

This mutual dependence has resulted in adverse affect to the Indian economy in general and also to the Indian Stock Market in particular. With the outbreak of Coronavirus in china the Indian stock prices saw substantial and volatile movements.

## **2. Literature Review and NIFTY 50**

Literature elucidates many studies exploring the impact of structural changes, political effects, dividend proclamations, oil shocks, etc on stock market [2] [4][5] [6] [7]. Event study techniques elucidates impact of any particular incident on the returns of stock market by designing a window both pre-event and post-event and computing abnormal returns during the period. The same technique is employed in literature for ascertaining efficiency of stock market as advocated by [4].

Fama's [7] original formulation of EMH recognized three forms of market efficiency namely weak, semi-strong and strong form of efficiency based on reflection of information in stock's price. EMH has been conceivably one of the most important paradigms in finance which has been expansively researched and yet remains inconclusive even to this day.

## **3. Objective of the study**

This study tries to evaluate the impact of outbreak of Coronavirus on the Indian stock market by taking NSE Nifty 50 index as a reference to indicate the overall movement of stock prices.

## **4. Research Methodology**

Event study methodology is used to capture the impact of Coronavirus outbreak on stock market returns (Brown & Warner, 1980; Bowman, 1983; Brown & Warner,1985).The event study will investigate the change in Index price(NIFTY 50) beyond expectation due to particular event, which we call the “abnormal return” (Strong, 1992). The objective of this study is to investigate the impact of outbreak of Coronavirus on the Indian Stock market index value of time called an event window (i.e. on 13<sup>th</sup> January 2020). Nifty 50 index data from 2<sup>nd</sup> January 2020 to 22<sup>nd</sup> January 2020 ( $t \pm 7$  days) was collected from the national stock exchange of India website <https://www.nseindia.com> [8] and the authenticity has been cross-verified from <https://www.google.com/finance> .

Fama [7] in efficient market hypothesis advocated that it's not-possible for any market participant to outperform the market (i.e. earn abnormal returns) owing to the fact that all information which is publicly available is already reflected and incorporated into stock prices [9] [10]. Event-study technique is used in literature to investigate semi-strong form of market efficiency. In this study we strive to investigate efficiency of Indian stock market post embracing of event. We have considered daily closing values of nifty 50 index as given by NSE India. The length of the event window is 14 days (7 days before and 7 days after the event).

Returns of nifty 50 index are calculated in the following manner:

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

Where,

$P_t$  = Closing price of today.

$P_{t-1}$  = Previous closing price.

Average abnormal return (AAR) is the excess return that is obtained due to occurrence of an event.

$$\text{Average abnormal return} = \text{Actual return} - \text{Expected return} \quad (2)$$

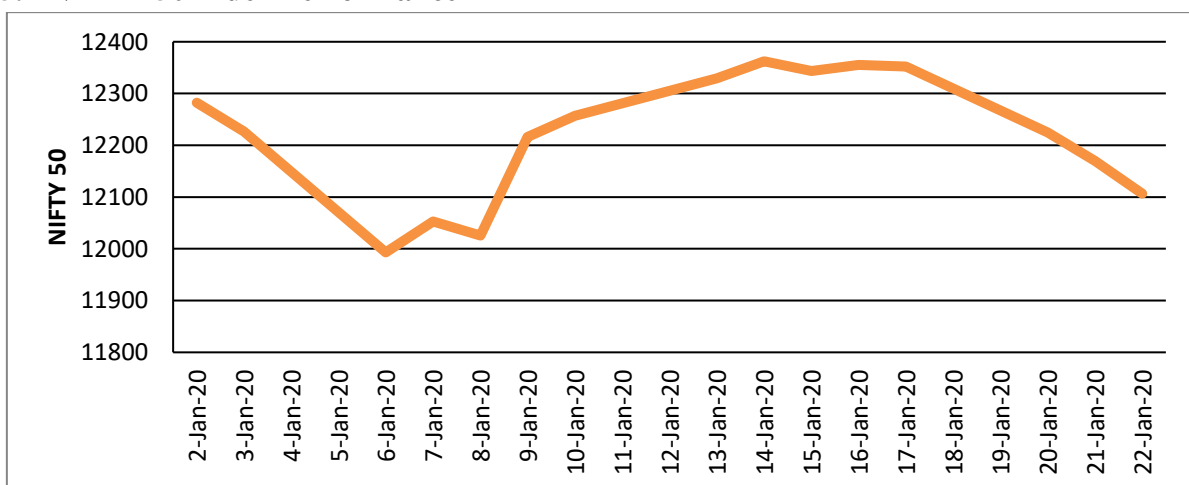
After calculating AAR for all the days of the sample window, it is summated to get the cumulative average abnormal return (CAAR). This is designed to find the total average abnormal return made by the nifty 50 index before and after the event. To empirically investigate the statistical significance of the results obtained, we execute T Test as follows:

$$T \text{ value (AAR)} = \text{AAR} / \text{Standard deviation of AAR} \quad (3)$$

$$T \text{ value (CAAR)} = \text{CAAR} / \text{Standard deviation of CAAR} \quad (4)$$

The cumulative average abnormal return (CAAR) is a useful statistical analysis in addition to the average abnormal return (AAR) since it helps us get a sense of the cumulative effect of the abnormal returns predominantly if the influence of the event during the event window is not wholly reflected on the event date itself [11].

## 5. NIFTY 50 Index Performance



**Figure 1.** Daily closing price of nifty 50 index of national stock exchange of India before and after outbreak of Coronavirus. **Source:** National Stock Exchange of India (NSE).

## 6. Data Analysis and Interpretation

Table No. 1 shows the average daily return of nifty 50 index in percentage along with daily average abnormal return (AAR), cumulative average abnormal return (CAAR) and also t-value calculated on AAR and CAAR on a day-to-day basis to check the significance of the event.

**Table No.1:** Average abnormal return (AAR) and cumulative average abnormal return (CAAR) for nifty 50 index of Indian stock exchange due to outbreak of Coronavirus.

Day	Daily Return (in %) (1)	Avg. Abnormal Return (in %) (2)	Cumulative Avg. Abnormal Return (in %)	t-Value of AAR (3)	t-Value of CAAR (4)
-7	0.68573724	0.833	0.8330	1.1785	1.1702
-6	-0.28096990	-0.134	0.6992	-0.1892	0.9823
-5	-1.45884344	-1.312	-0.6124	-1.8557	-0.8603
-4	-0.21648964	-0.069	-0.6817	-0.0980	-0.9576
-3	0.72241626	0.870	0.1880	1.2304	0.2641
-2	0.51632704	0.664	0.8515	0.9388	1.1963
-1	-0.11571999	0.032	0.8830	0.0446	1.2405
0	0.26714484	0.414	0.4144	0.5863	0.5821
+1	0.23676124	0.384	0.7984	0.5433	1.1216
+2	-0.04939511	0.098	0.8962	0.1384	1.2590
+3	0.06803217	0.215	1.1114	0.3046	1.5614
+4	0.19426690	0.341	1.4529	0.4832	2.0411
+5	-1.65681187	-1.510	-0.0566	-2.1358	-0.0796
+6	-0.20868695	-0.061	-0.1181	-0.0870	-0.1659
+7	-0.91215262	-0.765	-0.8830	-1.0822	-1.2405

**Source:** As computed and compiled by the author.

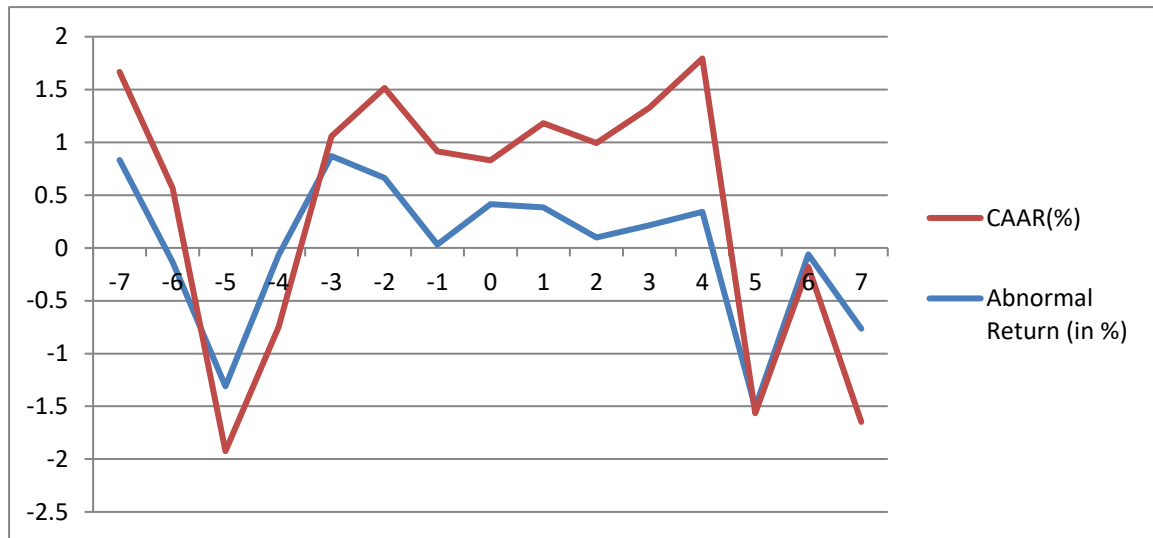
Table No.1 shows the average daily return of nifty 50 index in percentage along with daily average abnormal return (AAR), cumulative average abnormal return (CAAR) and also t-value calculated on AAR and CAAR on a day-to-day basis to check the significance of the event. The null hypothesis that there is no significant difference between the Average Abnormal Returns (AAR) before and after outbreak of coronavirus in nifty 50 index of India is tested using paired t-test and the t-Statistic value obtained is -0.284 implying that the null hypothesis is rejected at 5% significance level. This means that outbreak of Coronavirus did impact on nifty 50 index of India resulting in abnormal returns which are statistically significant.

**Table No. 2.** Statistical test results of cumulative average abnormal return (CAAR) for nifty 50 index of Indian stock exchange due to outbreak of Coronavirus.

	Before Event	After Event
<b>CAAR</b>	0.8830	-0.8830
<b>t-Statistic</b>	-0.700**	0.436**

Note: \*\* indicates significance at 5% level.

The rationale behind calculating abnormal returns is the fact that if there is “no impact” of the event then there shouldn't be any abnormal returns before or after the event. However, in some cases, impact of the event may reflect in the prices after a few days. In such cases cumulative average abnormal return is a better indicator statistically [11].



**Figure 2:** Average abnormal return and CAAR of nifty 50 index of national stock exchange of India before and after outbreak of Coronavirus. Source: As computed and compiled by the author.

Table No.2 provides statistical test results of cumulative average abnormal return for nifty 50 index of Indian stock exchange due to outbreak of Coronavirus. The null hypothesis in this case is CAAR is equal to zero. As acknowledged earlier, CAAR is a useful statistical analysis in addition to AAR since it helps us get a sense of the cumulative effect of the abnormal returns predominantly if the influence of the event during the event window is not wholly reflected on the event date itself. The null hypothesis is rejected at 5% significance level implying that CAAR is not equal to zero which also highlights that Outbreak of Coronavirus impacted nifty 50 index negatively and it is statistically significant.

## 7. Conclusion

Even though authorities are trying to clamp down on the virus and contain the spread, the economic cost is not limited to China it economic cost to the trading Nations like India. China being the nerve centre of global production and the largest export economy in the world, the repercussions are being felt far and wide. In all the planning and forecasts that experts have been making about the global economy, the 'virus' certainly was never factored in but researches shows that it was one of the major factors for sudden fall in stock market prices. This is statistically proved that outbreak of Coronavirus negatively impacted on Indian Stock Market. And it single-handedly now threatens to change not just the extent but the very direction of the markets.

## References

1. <https://www.lysol.com/en/healthy-home/understanding-coronavirus/>
2. Singhania, K. and Girish, G.P. (2015) Impact of Macroeconomic Events on Shanghai Stock Exchange. *Asian Journal of Empirical Research*, 6, 64-76.  
[https://econpapers.repec.org/article/asiajoerj/2015\\_3ap\\_3a64-76.htm](https://econpapers.repec.org/article/asiajoerj/2015_3ap_3a64-76.htm)
3. <https://deputyprimeminister.gov.mt/en/health-promotion/idpcu/Documents/aaaanCoV%20Frequently%20asked%20questions.pdf>
4. Girish, G.P. and Rastogi, N. (2013) Efficiency of S&P CNX Nifty Index Option of the National Stock Exchange (NSE), India, Using Box Spread Arbitrage Strategy. *Gadjah Mada International Journal of Business*, 15, 269-285.  
<https://jurnal.ugm.ac.id/gamaijb/article/view/5473>
5. Singh, A.P. (2017) Merge or Acquire—A Strategic Framework. *Annals of the University Dunarea de Jos of Galati : Fascicle : XVII , Medicine*, 3, 125-139.
6. Kilian, L. and Park, C. (2009) The Impact of Oil Price Shocks on the U.S. Stock Market. *International Economic Review*, 50, 1267-1287.  
<https://doi.org/10.1111/j.1468-2354.2009.00568.x>
7. Fama, E.F. (1970) Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, 25, 383-417. <https://doi.org/10.2307/2325486>
8. National Stock Exchange of India. <https://www.nseindia.com/>
9. Fama, E.F. and French, K.R. (2015) A Five-Factor Asset Pricing Model. *Journal of Financial Economics*, 116, 1-22. <https://doi.org/10.1016/j.jfineco.2014.10.010>
10. Fama, E. (1991) Efficient Capital Markets: II. *Journal of Finance*, 46, 1575-1617.  
<http://www.bu.edu/econ/files/2011/01/Fama2.pdf>
11. Girish, G. P. "Impact of Implementation of Goods and Services Tax on Nifty 50 Index of National Stock Exchange of India." *Theoretical Economics Letters* (2019): 172-179.