# Does the Covid-19 Coaxes Volatility in Indian Stock Market – An Empirical Study

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***Abstract:*** *The epidemic of COVID-19 has impacted the entire global stock market in an unforeseen manner. Due to the uncertainties that occurred in the global economy; the financial market of India also responded to the pandemic and experienced significant volatility. This study empirically explores the effect of COVID-19 on the Indian stock market, considering the COVID-19 scenario. This research explores, employing the regular closing prices of indices like Nifty, the volatility of these indices over the period from 3 September 2019 to 10 July 2020. In addition, the report sought to make a quantitative review of the stock market return in the pre-COVID-19 and COVID-19 situations. The volatility of the indexes is captured using the GARCH model. The results indicate that the Indian stock market has encountered uncertainty during the pandemic era. When c the findings are compared with those of the pre-COVID-19 phase, the author found that before the COVID-19 phase, the returns were higher than during COVID-19.During the first lockout period, from 24 March to 6 April, the returns of both stock markets touched the bottom line.*

***Keywords:*** *Volatility, Nifty, COVID-19, Pandemic*

## Introduction

The sudden propagation of the unforeseen COVID-19 outbreak has put the nations in risk and suddenly altered the global perspective. Initially, in December 2019, in Wuhan City, Hubei Province of China, the SARS-CoV-2 virus, which caused the COVID-19 epidemic, triggered it to spread globally over time. Not only is this pandemic a public health crisis, although it is a major global economic slowdown. Most notably, because of the formation of fear among them and induced business anomaly, customers and businesses have avoided their ordinary purchasing behaviour. Owing to this epidemic, instability and risk have produced major economic impacts around the world, impacting both mature and developing economies, like the US, Spain, Italy, Brazil and India. In this sense, the stock market has reacted significantly and has been negatively exaggerated. Owing to terror and confusion, investors incur major losses. For instance, the world share market plunged around US\$ 6 trillion in one week from 24 to 28 February, owing to the effects of this outbreak (Ozili and Arun, 2020). After the Covid-19 crisis, the share valuation of Standard & Poor (S&P 500 indices has decreased to 30 per cent. Increased volatility, as per Azimili (2020), influences the cost of capital and hence the existing market valuation of stocks. Even though available literature on the effect of COVID-19 on the stock market is minimal, current analytical study will be produced a promising finding.

## Literature Review

Martin Karlsson et al, in their study "The impact of the1918 Spanish flu epidemic on economic performance in Sweden: An investigation into the consequences of an extraordinary mortality shock" studied the force of the1918 flu virus on

short- and medium-term financial show in Sweden. The endemic was one of the worst diseases in creature times past, but it has up till now established only limited notice in the financial prose – regardless of in place of a supreme manpower upset.

Lars Jonung et al in "The Macroeconomic Effects of a Pandemic in Europe - a Model-Based Assessment" tale the likely major financial consequence of a deadly disease captivating position in the EU in 2006, a periodical monetary replica. The macroeconomic outlay of a virulent disease, that is the price in stipulations of making lost owing to sickness and fatality calculated as decline in GDP increase and/or turn down in the point of GDP, are compute in a mixture of virulent disease picture. The authors spotlight on two sectors of the European economy that are anticipated to be chiefly harshly hit visiting the attractions and deal.

Barker, Lee Anna et al in their paper "THE EBOLA OUTBREAK: A TEST OF MARKET EFFICIENCY" discussed that Thomas Duncan turn out to be the first human being to be detect with Ebola in the United States. Two sickbay workers who treated him also became tainted with the sickness, location off a countrywide attempt to hold the virus, and doubts of a bigger eruption. Human being crisis, such as that of Ebola, contain main effects on the financial system and capital market.

Alan Siu and Y. C. Richard Wong on, "Economic Impact of SARS: The Case of Hong Kong "established that SARS is the primary fatal communicable infection of the 21st century.

It started in the Chinese region of Guangdong in November 2002, and by August 2003, it had widened to 29 countries and 3 regions, with a snowballing total of 8,422 patients affected and 916 casualties. This paper explains the increase of the infection in Hong Kong and converse its blow on the financial system.

Baret et al., (2020), found that from the advert effect coming from COVID-19 pandemic bond, equity and oil prices were fell heavily all over the world. Jim, (2020), claimed of deterioration in the productivity of companies because of the strict observances of social distancing norms and it ultimately affected the profitability, increases the functional cost and put advert effect on the cash flows.

## Research Method

For this paper secondary sources have been taken into consideration. From the websites of both the BSE and NSE closing prices are taken on the daily basis. In this study both during Covid-19 period as well as Pre Covid-19 period has been included from 10th December 2019 to 20th August 2020. The data Covid-19 numbers has been collected from reliable websites of GOI. Therefore, to see the proper results time period is divided in to two parts that is pre and during Covid-19 period, so as to minimize the pragmatic skewness in the closing prices data series the author considers the log value of price data individually. Here, GARCH model is used to see the volatility of stock market with reference to Covid-19 impact in India. Imposing the symmetrical volatility regarding the shocks either positive or negative is the main constraint of the GARCH model. (Sakthivel et al, 2020).

## Data Analysis and Discussion

In the paper to get the closing price and return on daily basis both NSE and BSE websites are taken in to consideration. Initially descriptive statistics is applied to evaluate the returns and prices of Indian stock market by following the indices. As per the descriptive statistics mean of the returns are negative which reflect advert profitable situation and loss in the share value. Similarly, Kurtosis value is high whereas Skewness is minus in both the indices representing high losses. Meanwhile Table-2 represents the before and during the Covid-19 period of returns. As per the analysis in Table-2 in case of pre Covid-19 period, the mean return was positive whereas it is opposite in the case of during the Covid-19 era reflecting advert return of stocks and as well as their falling market value. During the Covid-19 era the volatility of stock returns is high as the indices S.D. is also increased in the study.

## Table-1: Descriptive statistics of BSE and NSE data

| Statistical values | BSE Sensex | | NSE Nifty | |
|---|---|---|---|---|
| | Price | Return | Price | Return |
| Observations | 220 | 219 | 220 | 219 |
| Mean | 487.9213 | -0.00021 | 10879.09 | -4.63E-05 |
| Median | 587.6 | -0.00024 | 11303.3 | 0.0004 |
| Maximum | 652.42 | 0.042333 | 12362.3 | 0.0364 |
| Minimum | 310.2 | -0.03542 | 7610.25 | -0.0603 |
| Std. Dev | 79.1809 | 0.020378 | 1269.041 | 0.00929 |
| Skewness | -0.70842 | -0.87251 | -0.52245 | -1.42432 |
| Kurtosis | 1.238812 | 5.285872 | 1.194758 | 14.15163 |
| JB | 13.27277 | 33.71363 | 19.39496 | 2024.211 |

**Source:** Author's calculation and data from BSE and NSE

## Table-2: Descriptive statistics of BSE and NSE returns

| Statistical values | BSE Sensex | | NSE Nifty | |
|---|---|---|---|---|
| | Pre Covid-19 | During COVID-19 | Pre-COVID-19 | During COVID-19 |
| Mean | 7.73E-04 | -0.000148 | 0.000501 | -0.000337 |
| Median | -0.000216 | 0.000183 | 0.000529 | 1.89E-04 |
| Maximum | 0.010003 | 0.028212 | 0.019416 | 0.029593 |
| Minimum | -0.021223 | -0.039534 | -0.007969 | -0.071172 |
| Std. Dev | 0.00547 | 0.020011 | 0.002847 | 0.021221 |
| Skewness | 0.210531 | -0.088237 | 1.735101 | -1.138896 |
| Kurtosis | 2.532326 | 2.61552 | 11.00274 | 7.64148 |
| JB | 2.354231 | 1.586579 | 401.2514 | 200.1422 |

**Source:** Author's calculation and data from BSE and NSE

To make the data from collected from both the BSE and NSE, stationary tests PP and ADF test has been applied. It is found that at the level most of the log indices were not stationary. Therefore, the null hypothesis is accepted. As the all data are significant at 1st difference in the analysis as well as indices, it can be concluded that there is no unit root at first difference in the data series.

## Table-3: Stationary test of BSE and NSE data

| Variables | ADF (At Level) | ADF in 1st difference | PP in Level | PP in 1st difference |
|---|---|---|---|---|
| BSE | -2.178327 | -11.143829* | -2.375488 | -11.58617* |
| | -0.5941 | (0.0000) | -0.4528 | (0.0000) |
| NSE | -1.72241 | -15.59397* | -1.112314 | -15.52921* |
| | -0.3615 | (0.0000) | -0.5834 | (0.0000) |

**Source:** E-VIEWS and data from BSE and NSE

*5% significance level

The Table-4 shows the GJR-GARCH model which epitomizes BSE Sensex. From the results it is found that BSE SENSEX influenced by the effect of ARCH as the á1 is significant but negative. Similarly, it is found that BSE SENSEX was volatile as the GARCH effect is significantly positive. As the asymmetric effect is significant and positive, it is clear that bad news put higher negative effect on stock market than the positive shocks and effects. In the analysis both the mean and variance inculcate a dummy variable that is D1 to arrest the volatility. Correspondingly for the pre-era D1 takes 0 value and for post era it takes 1. The result exhibits that the coefficient of the dummy variable for BSE Sensex As the mean equation D1 is insignificant and negative and the variance equation is significantly positive, It is contingent that BSE SENSEX in the short run was highly volatile during the COVID-19 period.

**Table-4: GJR-GARCH model analysis of BSE data**

| Mean Equation | Coefficients | Z-statistics | P-value |
|---|---|---|---|
| | | | |
| Constraints | | | |
| $\beta 0$ | -0.001621 | -1.677327 | 0.0935 |
| $\gamma 1$ | -0.000705 | -0.235801 | 0.8136 |
| Variance Equation | | | |
| $\alpha 0$ | 1.23E-05 | 10.86474* | 0 |
| $\beta 1$ | 1.024974 | 329.0440* | 0 |
| $\lambda 1$ | 0.040947 | 1.893853** | 0.0542 |
| $\alpha 1$ | -0.089238 | 10.86474* | 0 |
| $\delta 2$ | 4.16E-05 | 4.248481* | 0 |

**Source:** E-VIEWS and data from BSE

Table: 5 reflects the consequence of GJR-GARCH with NSE Nifty that volatility in NSE Nifty during the Covid-19 as the GARCH model results are significantly positive. Where the ARCH model results was not significant but positive, it is clear that currently NSE Nifty is not influenced or affected by the past news. Meanwhile it is also seen that variance and mean equation are positive and negative but insignificant considering the D1. So, it can be derived from the analysis that volatility in NSE Nifty's stock price is not affected by the Covid-19 impact as the both the equations are not significant

**Table-5: GJR-GARCH model analysis of NSE data**

| Mean Equation | Coefficients | Z-statistics | P-value |
|---|---|---|---|
| | | | |
| Parameters | | | |
| $\beta 0$ | 0.000659 | 0.983215 | 0.3255 |
| $\gamma 1$ | -0.000945 | -0.526764 | 0.5984 |
| Variance Equation | | | |
| $\alpha 0$ | 2.82E-06 | 1.687363 | 0.0915 |
| $\beta 1$ | 0.822061 | 30.55926* | 0 |
| $\lambda 1$ | 0.35785 | 4.805764* | 0 |
| $\alpha 1$ | 0.000418 | 1.687363 | 0.9887 |
| $\delta 2$ | 7.83E-06 | 1.070103 | 0.2846 |

**Source:** E-VIEWS and data from NSE

## Conclusion

In this paper, the author analyzed how the Indian stock market is affected by Covid-19 pandemic by observing the NSE and BSE performance through the use of GJH GARCH model where two time period such as pre-Covid-19 and during Covid-19 period were taken to find the real volatility. In this study Indian stock market has been taken as dependent variable and Covid-19 period has been taken as independent variable. As per the findings Covid-19 period has been affected the BSE SENSEX more but shows no significant impact on NSE means BSE was highly volatile during the Covid-19 period than the NSE. There is no volatility found in case of NSE stock prices. When the author compared the mean return of both the Covid-19 period, it was found that in case of Pre-Covid-19 era the mean return was positive but during the Covid-19 period stock prices were highly volatile and faced losses due to the negative mean return. Similarly, it is found that during the Covid-19 era standard deviation was high in comparison to the Pre-Covid-19 period. Likewise, as per the results up to the first lockdown during the Covid-19 era the stock prices were going down up to a certain extent but after that again the prices were increasing whereas before the pandemic period the stocks were on rising note. The stock prices were increased after the first lockdown is the results of relaxation in the government policy and restrictions. This pandemic affected each sector and each country unprecedently. So, it is clear as per the finding that Covid-19 pandemic significantly infected in the form of putting negative effect on stock market in India by increasing the volatility. Consequently, this study attempts to deliver an actual, modest but original statistical analysis of the COVID-19 impact on Indian stock market.

## References

Azimili A, (2020) The impact of COVID-19 on the degree of dependence and structure of risk-return relationship: A quintile regression approach. Finance Research Letters.

Baker S R, Bloom N, Davis S J, (2020) The unprecedented stock market impact of COVID-19. NBER working Paper No. 26945

Baret S, Celner A, O'Reilly M, Shilling M, (2020) COVID-19 potential implications for the banking and capital market sector. Deloitte insights.

Cakmakl C, Demiralp S, Kalemli-Ozcan S, Yesiltas S, (2020) COVID-19 and emerging markets: An epidemiological model with international product networks and capital flows, NBER working Paper No. 27191.

Cepoi C O, (2020) Assymetric dependence between stock market returns ad news during COVID-19 financial turmoil. Finance research Letters.

Deloach J, (2020) How is COVID-19 affecting your financial statements? Forbes

Georgieva K, (2020) IMF Managing Director Kristalina Georgieva's Statement Following a G20 Ministerial Call on the Coronavirus Emergency.

Glosten L, Jagannathan R, Runkle D, (1993) On the relation between expected value and the

volatility of the nominal excess return on stocks. Journal of Finance, 48, 1779-1801.

Herfero A G, (2020) COVID-19 and emerging economies: What to expect in the short- and

medium- term. Raisina Debates.

Jung B, (2020) S. Korea's economy faces tipping point as COVID-19 pandemic persists.

ThejakartapostIgwe P A, (2020) Corona virus with Looming Global Health and Economic Doom. African Development Institute of research methodology, *1*(1),1-6

Leduc S, Liu Z, (2020) The Uncertainty Channel of the Corona virus. FRBSF Econ. Lett. Mondal S, (2020) Impact of Covid-19 on Indian Stock Market. Adamas Univer