

## The Upshot Of Covid -19 On Sensex & Sectoral Indices In Indian Stock Market – A Comparative Analysis During Pre Covid & Covid Period

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### Abstract

This paper focused on studying the impact of Covid-19 on stock market Index (BSE SENSEX), more specifically on sectoral Indices in Indian stock market. At the time of this research, there were millions of Covid cases taken place all over the world. The main aim of this system is to know the impact of Covid cases on sectoral performance specifically assist the investor for picking the stocks from each sector during the covid period. There are several other economic factors influence on the investment decisions and performance of the stock market indices in India during the covid period. In this research, contributing factors such as FII, Crude oil price, influence on stock market indices have been studied during the covid period. So this study found that Crude oil price is an important factor determining some sectoral Indices in Indian stock market during the covid period. This study also focused on performance of sensex and sectoral Indices during pre covid and covid period.

**Keywords:** Crude Oil, Gold Price, Covid-19

### Section I – Introduction

This Study provides the impact of covid 19 on the stock market and sectoral Indices of Indian stock market and throws light on the sectoral performance during this period. World Health Organization (WHO) explains the pandemic as “the worldwide spread of a new disease” named Covid-19. There was Spanish flu in the year 1918-1919 which has significant impact on the economy. Stock markets in the world reported the largest fall in the month of February 2020 since the 2008 financial crisis. Investors and Traders started to sell the shares due to the fear of Covid 19 crisis. The COVID-19 was first reported in Wuhan, China in December 2019 and quickly spreading around the world. Governments introduced measures such as restricting travel, ordering social distancing, and closing schools, bars, restaurants, and other businesses to prevent the spread of disease. As Covid-19 spreads important concerns are collapse of demand, increased uncertainty, and disruption in supply chains. The spread of the new corona virus (COVID-19) led to declines in stock prices, stock-price volatility, decreases in interest rates, and likely to contractions of real economic activity, as reflected in real GDP. This study focused on knowing the relationship of Covid 19 pandemic and the sensex prices and also specifically influence on the sectoral indices also. The study applied the regression approach to know the relationship of Covid 19 with the selected sectoral stock indices. It also focused on knowing the impact of FII, Crude oil price on Sensex and Sectoral Indices in stock market.

Indian & Global Economy was affected by the demand shock resulted in consumer spending. As part of analysis, first, the original data of each dataset such as Number of Covid cases, Crude oil, FII will be used as an input variable in order to know the impact on sectoral stock index and Sensex during the Covid period. This study also focused on knowing the significant difference in the performance of sensex and sectoral Indices during pre covid and covid period.

### Section II- Review of Literature

**Abhinanadan, Sanath Kumar K, Dr. Yatish Kumar** (2020) examines the impact of Coronavirus on Indian Stock market using Event Study. This study analyze the stock market reaction by taking one of the major indexes of NSE i.e. Nifty 50. It was found that there is significant impact of Coronavirus on the stock market in

India and short period downfall in the stock prices happened due to some other factors also. **Abhishek R, Dr.M.Gurusamy , Dr.Mohammed Arif Pasha (2020)** studied to analyse the impact happened over the Indian stock market by the cause of virus outbreak of covid-19 pandemic. Three months data for NSE, BSE was taken, both indices fell down sharply. It was concluded that sudden impact had made greater downfall in the stock market.

**Anuj Kumar (2020)** focused on studying the impact of Covid-19 on Indian stock market specifically, National Stock Exchange (NSE) and five sectoral indices. This study used percentage and average analysis to evaluate the performance of selected indices during and before the outbreak of the Covid-19 pandemic. The findings reveals that covid-19 have a negative impact on the different indexes of NSE initially for one month, then market recover and perform normally due to the liquidity driven market. **Arpita Gurbaxani, Rajani Gupte (2020)** studied the COVID-19 pandemic impact on investment and financial decisions of individuals in small towns in developing nations of India. Preventive measures taken by Government of India influenced on savings and investment behaviour of the people. It was also found the drop in SIP investments during the COVID-19 pandemic. **Badar Nadeem Ashraf (2020)** selected confirmed cases and deaths and stock market returns data from 64 countries over the period January 22, 2020 to April 17, 2020 and found that stock markets responded negatively to the growth in COVID-19 confirmed cases. It was also found that stock markets reacted more to the number of confirmed cases as compared to the number of deaths.

**Daisy Basistha (2020)** investigates the impact of COVID-19 on the Indian stock market by taking closing prices of indices such as Nifty and Sensex. It also examines the volatility of these indices over the period septemeber 2019 to July 2020. Study also focused on comparative analysis of the return of the stock market in pre-COVID-19 and during the COVID19 situation. It was found that return on the indices is higher in the pre-COVID-19 period than during COVID-19. **Daniel S'tifanic (2020)** investigate the impact of COVID-19 on the global economy and also on the financial movement of Crude Oil price and three US stock indexes. Study found that crude Oil price and stock market indexes along with COVID-19 confirmed cases can be used as input variables for forecasting the Indices and share prices in US Market. **Dr Nikita Arora, Vaishnavi Gupta (2020)** studied the economic status of India in the time of covid 19 and economic fronts in the country. It was found that COVID-19 instigates some new challenges to market trends and economic activities. It was also observed that India was not resolve this condition in a systematic manner but there is need to put this issue on the highest priority.

**Kotishwar Amade (2020)** made an attempt to investigate the impact of covid-19 virus spread on six countries (USA, Spain, France, Italy, China and India) stock mrket. It was found that Covid-19 have significant negative long run relationship with all the selected countries stock indices. The CAAR model has been applied and observed that the all the selected countries indices are positively reacted more in post period compared with the pre period. It was also found that investors can use long-term strategy and investing at every low level in all these markets. **Mahbuba Aktar, Humaira Begum, Ashrafuzzaman Soha (2020)** determine the impact of COVID-19 on the stock market returns of Bangladesh. This study finds that stock market returns react negatively to the COVID-19 by analyzing DSEX and growth of daily confirmed case of COVID-19. **Ms. Avantika Jaiswal, Dr. Ruchi Arora (2020)** studied the impact of covid19 on Indian banking sector. It was found that banking sectors' performance in India will be going down mainly due to the link to the economy rather than any other sector.

**Nader Alber (2020)** attempts to investigate the effects of 2020 on stock markets of GCC countries. Coronavirus spread has been measured by cumulative cases, new cases, cumulative deaths and new deaths. It was observed that that have emerging financial markets have low level of infecton. **Parag Vermaresearch (2020)** analysed the impact of COVID-19 on the economic growth and stock market as well. This study developed a model using COVID-19 correlated with economic growth through gross domestic products (GDP). **Pratik Gupta (2020)** used regression and event study method for hypothesis testing to find out the influence of an event (Covid-19) on the change in stock prices of the company and reaction to information disclosure. **Rashmi Chaudhary (2020)** analyzed two composite indices (BSE 500 and BSE Sensex) and eight sectoral indices of Bombay Stock Exchange (BSE) (Auto, Bankex, Consumer Durables, Capital Goods, Fast Moving Consumer Goods, Health Care, Information Technology, and Realty) of India. It was found that Indian stock market has higher negative skewness and higher positive kurtosis of returns, making the market seem more volatile. **Dr. Sajjan Choudhuri (2020)** studied about the different phases of COVAID-19 and found that there are three phases, In short the phases are -i) Incubation phase ii) Outbreak Phase iii) Fever phase or Pandemic . In Incubation the financial Institutions started paying attention in Outbreak stage the stocks started falling.

**Scott R. Bake (2020)** suggests that government restrictions are the main reasons the U.S. stock market reacted more forcefully to COVID-19 than to previous pandemics in 1918-19, 1957-58 and 1968. **Sinha, Pankaj and Sawaliyao (2020)** examined the performance of stock markets of top ten countries severely affected by COVID-19. It was found that Sensex and Nifty were rising purely on the sentiments of the investors and the expectation of a better future. **Zaky Machmuddah (2020)** observed the stock prices of customer goods

before and after the COVID-19 pandemic using event study. It was suggested to investors to choose customer goods sector companies that provide products that are much needed by customers, for example, pharmacy, food, beverages, etc. **Heather Yan, Andy Tu** (2020) suggested to have short positions for the time being is a profitable strategy until we get clearer signals of the market stabilizing in the stock market

### Section III- Research Methodology

#### Objectives of the study

To study the impact of

1. To study the impact of Covid – 19 pandemic on sensex & sectoral Indices returns.
2. To examine the relation & influence of crude oil, FII on the sensex and sectoral Indices return during Covid -19 pandemic.
3. To compare the sensex return, sectoral return during Pre covid and Covid period.

#### Sources of data

**Data collection Methods:** In this research, historical data of covid confirmed cases, Crude oil price, Sensex Points, Sectoral Index points, FII are used. In the oil market, benchmarks serve as a pricing reference for Crude Oil. For the purpose of this research, only the closing points such as Sensex points, Sectoral Indices Points (Seven sectoral Indices- Auto, Health, Bankex, FMCG, Metal, Oil, Realty) are used. COVID- 19 confirmed cases are publicly available and operated by the Centre for systems and science engineering at Hopkins University and also the Health reports of Government of India.

#### Statistical Tools used for the study

The data analysis includes descriptive statistics, regression analysis, Correlation Matrix, Paired T test has been used.

#### **Descriptive Statistics**

Descriptive statistics used in this research are mean, maximum, minimum, standard deviation, kurtosis, and skewness. The results are summarized using descriptive statistics such as mean, standard deviation, median etc. for the sectoral Indices points. Skewness and kurtosis was included in the study to know about volatility.

#### **Multiple Regression Analysis**

The scope of this study is to analyse how the number of confirmed cases of COVID-19 impacts the Bombay stock exchange of India and its effect on its indices. Regression is used to examine the impact of covid 19 on each sector respectively. Multiple regression is also used to know the impact of crude oil price, FII on sensex and sectoral indices during the covid period.

#### **Correlation Test**

The test of correlation is used to measure the degree of interdependence or level of association between the multiple quantitative variables. The result of correlation is shown in a pair wise matrix where each result is described by the correlation coefficient (r). The “r” value ranges from -1 to +1. To interpret the results the significance of value is determined by checking the value closeness to -1 and +1. Where (-) sign determines negative correlation and (+) sign determines positive correlation. Correlation is also tested with the help of scatter diagram where the scattering in the diagram reflects the relationship between the variables.

#### **Paired T Test**

Paired ‘t’ test is used for comparing the Performance of Sectoral Index at Pre covid and Covid period.

#### **STATISTICAL SOFTWARE USED**

To analyse the data, Software Package for Social Sciences (SPSS 17.0) is used.

#### **Hypotheses of the Study**

**H01:** There is no significant difference in performance of sensex at pre covid and covid period.

**H02:** There is no significant difference in performance of sectoral index at pre covid and covid period.

**H02<sub>a</sub>:** There is no significant difference in performance of BSE Auto index at pre covid and covid period.

**H02<sub>b</sub>:** There is no significant difference in performance of BSE Health index at pre covid and covid period.

**H02<sub>c</sub>:** There is no significant difference in performance of BSE Bankex at pre covid and covid period.

**H02<sub>d</sub>:** There is no significant difference in performance of BSE FMCG index at pre covid and covid period.

**H02<sub>e</sub>:** There is no significant difference in performance of BSE Metal Index at pre covid and covid period.

H0<sub>f</sub>: There is no significant difference in performance of BSE Oil Index at pre covid and covid period

H0<sub>g</sub>: There is no significant difference in performance of BSE Realty Index at pre covid and covid period

**Limitations of the study**

- This study has only considered the number of cases of COVID 19 cases for short period.
- This study was not taken the number of Covid deaths, the number of positively tested individuals and the suspected cases of COVID 19. Study only taken Confirmed covid cases during the period.

**Section IV- Analysis**

This study shows the empirical results of the performance of sectoral indices in the Indian stock market during the Covid Period. Descriptive statistics of each sectoral indices detail are given below.

STATISTIC S	Auto	Health	Bankex	FMCG	Metal	Oil	Realty
Mean	17436.3	15483.4	30930.55	11448.7	9378.47	13643.9	1962.71
Maximum	23358.0	21681.2	36671.50	12691.8	11997.95	15734.7	2610.81
Minimum	10746.1	12148.5	22050.02	10254.8	5713.28	10020.8	1353.65
Std. Dev.	2543.11	3041.4	4865.70	549.46	1716.11	1412.69	340.73
Skewness	-.423	.931	-.618	.412	-.367	-.479	-.028
Kurtosis	1.572	-.560	-1.099	.800	-.715	.152	-.550
Observations	25	25	25	25	25	25	25

The mean of BSE Bankex is highest among all the Index. Auto, Health indices and Bank indices are highly volatile during this period. But the realty indices were not volatile during the Covid Period. It was found that, in strange manner, realty stocks performed like defensive stocks during the covid period. Extreme level of standard deviation of bankex , health index and auto index presents more variations in prices of these sectoral stocks. This analysis is helpful to understand the sectoral performance and choose the sectors for investment purpose. To check the normality of the frequency distribution in each indices series, the skewness and kurtosis are considered. The result of descriptive statistics reveals that distributions of all indices are skewed. It can be observed that the skewness is also highly skewed in Health and FMCG with 931 & .412 as its value, while the rest of the indices value are negative, so we can conclude that the distribution is symmetric in nature.

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Sensex	.057	-.037	32181.77	.450
Auto	.183	.102	29956.68	.533
Health	.442	.386	24758.15	.631
Bankex	.042	-.053	32438.26	.389
FMCG	.023	-.075	32769.63	.425
Metal	.043	-.053	32435.15	.428
Oil	.034	-.063	32584.47	.444
Realty	.018	-.080	32839.51	.388

Regression was the test conducted to know the impact of COVID-19 on Sensex and Sectoral Indices. Through this test, it is found that R<sup>2</sup> which shows the goodness of fit -.037 which shows that the independent variable (COVID-19 cases) functions low as an indicator for the dependent variable (Sensex). This proves that COVID-19 confirmed cases adversely affect on sensex returns during 8 months only, after that sensex recovered & posted attractive returns in the month of september , October, novemebr & December-2020.

.Drops in BSE sensitive index was temporary for the first 8 months in 2020, and each dip provides investors an opportunity to enter the market and earn a higher return especially for those with long term horizon. Covid impacts the economy, but historically, such crisis has not lasted long, markets bounced back soon the crisis reduced in the last 4 months of 2020.

Regression was run for the same data to find the extent of impact on all sectoral indices. Through this test it is found that R<sup>2</sup> which shows that the independent variable (COVID-19 cases) functions highly as an indicator for the dependent variable for BSE Health Index. In the model summary, R square value is 44.2% and adjusted R square value is 38.6% for health index. It means 38.6 % of variation in the Health indices (Dependent Variable) is explained by the Covid 19 confirmed cases. Durbin Watson value indicates that the values are independent and there is no problem of auto correlation. R<sup>2</sup> for auto Index .102 which shows that the independent variable (COVID-19 cases) functions positively as an indicator for the dependent variable (Sensex auto index). This proves that 10.2% change happens because of COVID-19 confirmed cases on Sensex Auto Index.

Table 1.3 shows the correlation matrix for all sensex , sectoral indices, and economic variables such as crude oil price and FII to know the relationship between all these variables.

Variable	BSE Sensex	BSE Auto	BSE Bank	BSE FMCG	BSE Health	BSE Metal	BSE Oil	BSE Realty	Covid Case	FII	Crude Oil
<b>BSE Sensex</b>	1										
<b>BSE Auto</b>	.958* (.000)	1									
<b>BSE Bank</b>	.846* (.001)	.723* (.008)	1								
<b>BSE FMCG</b>	.894* (.000)	.894* (.000)	.722* (.008)	1							
<b>BSE Health</b>	.720* (.008)	.797* (.002)	.248 (.437)	.661* (.019)	1						
<b>BSE Metal</b>	.984* (.000)	.948* (.000)	.858* (.000)	.918* (.000)	.675* (.016)	1					
<b>BSE Oil</b>	.837* (.001)	.848* (.000)	.738* (.006)	.900* (.000)	.524 (.080)	.846* (.001)	1				
<b>BSE Realty</b>	.844* (.001)	.752* (.005)	.967* (.000)	.757* (.004)	.259 (.416)	.870* (.000)	.774* (.003)	1			
<b>Covid Case</b>	.240 (.453)	.428 (.165)	-.206 (.521)	.151 (.641)	.665* (.018)	.206 (.520)	.183 (.568)	<b>-.136 (.674)</b>	1		
<b>FII</b>	-.489 (.107)	-.593* (.042)	-.330 (.294)	-.593* (.042)	-.381 (.222)	-.508 (.092)	-.807* (.001)	-.445 (.148)	-.420 (.174)	1	
<b>Crude Oil</b>	.774**	.824* (.001)	.729* (.007)	.765* (.004)	.416 (.179)	.802* (.002)	.837* (.001)	.800* (.002)	.230 (.472)	-.675*	1

	(.003)	)	)		)	)	)		(.016)
<p>Note: Results obtained by using SPSS 17.1                  **: Correlation is significant at the 0.01 level (2-tailed).</p>									

It is found that the correlation between COVID-19 and Sensex is .240 with significance level of .453. It is found that correlation between sensex and Metal Index & Auto Index is .984, .958 respectively with a significance level of .000 shows that both of these index moovers are highly correlated with Sensex.. It is found that the correlation between COVID-19 and Health Index is .665 with a significance level of .018 which is less than .05. Through this we get to know that there is relationship between the COVID-19 cases and Health Indices. Investors earned attractive return from Health sectoral stocks during the Covid period. The crude oil is positively and significantly correlated to Sensex & sectoral indices such as BSE auto, BSE Banex, BSE FMCG, BSE Metal, BSE Oil and BSE Realty. Crude oil is not significantly & positively correlated with BSE Health Index. So crude oil is one of the significant factor determining the stocks in the Auto, Netak, Oil and realty Index. FII is negatively correlated with Sensex and sectoral indices. As no two independent variables are highly correlated, there exists no multi-collinearity problem

**Does Crude oil or FII determine the stock returns during Covid Period - An Analysis**

Influence of the COVID-19 pandemic and the oil conflict between Russia and Saudi Arabia, oil prices have exhibited sudden changes in the market. The petroleum market is currently going through one of the most volatile times in its history. The volatilities of crude oil prices are affected not only by macroeconomic and microeconomic variables but also by the coronavirus disease 2019 (COVID-19) and the conflict between Russia and Saudi Arabia. Covid-19 was declared by WHO as a ‘pandemic’ on March 11, 2020, and the very next day the Indian stock market crashed heavily. This was primarily due to maasive selling by foreign institutional investors in Indian stock market. Sector-wise movement in FII flow signals which sectors will grow or shrink in the coming years in Indian stock market. Crude oil is considered as a significant factor determining the stock prices of moost of the sectors during the covid period.

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Sensex	.598	.558	3324.74	.969
Auto	.679	.647	5.96	1.22
Health	.173	.090	9.57	1.04
Bankex	.531	.484	7.20	1.16
FMCG	.585	.543	6.78	1.35
Metal	.644	.608	6.28	1.25
Oil	.700	.670	5.76	2.23
Realty	.640	.604	6.31	1.24

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Sensex	.239	.163	4576.72	.314
Auto	.352	.287	12665.40	1.32
Health	.145	.060	14542.42	1.42
Bankex	.109	.020	14846.81	1.30
FMCG	.352	.287	12666.14	1.31
Metal	.258	.184	13550.04	1.28



Oil	.652	.617	9279.53	1.20
Realty	.198	.117	14089.86	1.25

Most of the sectors face adverse experience due to Covid-19, there are sectors where the negative impact could be low for Health care sector due to low negative demand shock. Foreign investors have pulled out more than ₹34,000 crore from Indian equities and bonds in March leading to a crash in the stock market (The Hindu, March 13, 2020). So an investor should be cautious in determining the relation of other macro indicators such as Crude oil price, FII on Sectoral indice performance. In the model summary of Crude oil, R square value is 70.0% and adjusted R square value is 67.0% for the Oil Index. It means 67.0 % of variation in the Oil Indice (Dependent Variable) is explained by the chosen independent variable (Crude Oil Price) . Durbin Watson value of 2.23 indicates that the values are independent and there is no problem of auto correlation. In Crude oil Model summary, R square value and adjusted R square value is above 60.0% for the Metal Index, Auto Index, Realty Index respectively. So it was found that crude oil is the significant factor determining the Oil index, Metal Index, Auto Index, Realty index respectively. In the model summary of FII, R square value is 65.2% and adjusted R square value is 61.7% for the Oil Index. It means 61.7 % of variation in the Oil Indice (Dependent Variable) is explained by the chosen independent variable (FII). In FII Model summary, R square value and adjusted R square value is above 25.0% for the Auto Index, FMCG Index respectively. So it was found that FII focused and pumped more money on Oil sector, Auto sector and FMCG sector during the covid period.

**Comparative Analysis during Pre Covid and Covid Period**

Table 1.6 shows the paired T test results of sesex return, sectoral index return during pre covid and covid period.

<b>Table 1.6. Paired T test of Sensex &amp; Sectoral Indices during Pre covid period and Covid Period</b>				
<b>Tests</b>	<b>Df</b>	<b>t-Stat</b>	<b>P value</b>	<b>Conclusion</b>
H01= Sensex Return during Pre covid vs Covid Period	11	.547	.595	Accepted
H02 a= BSE Auto Index Return during Pre covid vs Covid Period	11	1.782	.102	Accepted
H02 <sub>b</sub> = BSE Health Index Return during Pre covid vs Covid Period	11	3.974	.002	Rejected
H02 <sub>c</sub> = BSE Bankex Return during Pre covid vs Covid Period	11	3.179	.009	Rejected
H02 <sub>d</sub> = BSE FMCG Index Return during Pre covid vs Covid Period	11	-3.677	.004	Rejected
H02 <sub>e</sub> = BSE Metal Index Return during Pre covid vs Covid Period	11	1.407	.187	Accepted
H02 <sub>f</sub> = BSE Oil Index Return during Pre covid vs Covid Period	11	3.324	.007	Rejected
H02 <sub>g</sub> = BSE Realty Index Return during Pre covid vs Covid Period	11	1.469	.170	Accepted

*Note: Results computed using SPSS 17.1*

Table, 1.6 shows the ‘t’ test results for comparing the performance of sensex and seven sectoral indices between pre covid period and covid period . One could observe from the results of Paired t test which was applied to find out the impact of Covid-19 as global pandemic on the different sectoral indices such as Health Index, Bank Index, FMCG Index and Oil Index null hypothesis has rejected at 5 percent level of significance. So it was inferred that there is significant difference in the performance of all these sectoral indices during pre covid and covid period. Indian stock market to be more volatile in the crisis period than in the pre-crisis period. The

standard deviation of return of all the indices has gone up during the crisis compared to the pre-crisis period. With COVID-19 situation intensifying in the country and higher chances of the lockdown, the investors avoid banking stocks on concerns that these events will lead to higher bad loans. It could be found from the results of Paired t test that the announcement of 21 days lock down by Indian Government has impacted on the prices of shares on most of the sectors. As the p value is less than 0.01, the null hypothesis for Health Index, Bank Index, FMCG Index and Oil Index is rejected. Thus, there is significant difference between the performance of these sectors for the Pre covid and covid period. But, As the p value is higher than 0.01, the null hypothesis for Auto Index, Metal Index and Realty index is accepted. Thus, there is no significant difference between the performance of the sectors during the pre covid and covid period. Realty index had stable movements during the crisis and auto index, metal index recovered after the crisis and posted higher returns in the stock market for last few months in the year 2020.

## Conclusion

Results of the study show that the impact of Covid-19 on Sectoral Indices of Sensex varied among various sectors. Most of the sectors have reported negative performance during covid-19 pandemic for first seven months (Jan 2020- July 2020). It was found that, in strange manner, realty stocks performed like defensive stocks during the covid period (Jan 2020- Decemver 2020). After the major announcements, stock markets started rising from july -2020 onwards mainly due to the stimulus packages announced by the Government.. Fall in Sensex was temporary for the first 8 months in 2020, and each fall provides investors an opportunity to enter into the market by picking value stocks. It was also found that crude oil is the significant factor determining the Oil index, Metal Index, Auto Index, Realty index respectively during the covid period. It was also inferred that FII invested more money on Oil sector, Auto sector and FMCG sector during the covid period

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