

The impact of the Covid-19 outbreak on the Economy: An event-study approach

- **Dr. Kathakali Bandopadhyay**

Assistant Professor, Department of Geography, Subarnarekha Mahavidyalaya

- **Dr. Sonali Mukherjee**

Associate Professor, Department of Economics, Hiralal Mazumdar Memorial College For Women

- **Koushik Chatterjee**

Assistant Professor, Department of Commerce, St. Xavier's College [Autonomous], Kolkata

- **Muskaan Bhalotia**

Final semester student, B.Com., St. Xavier's College [Autonomous], Kolkata

ABSTRACT

The effects of the Covid 19 on economic activities across various sectors ranging from the FMCG sector to the Oil and Gas sector have distinctly impacted every citizen of every country. This paper seeks to use the Event Study Approach in order to find out which sectors were significantly affected by this outbreak, how different Indian sectors reacted to the changing global situations in the crisis, starting from the lockdowns in China to a halt in international trade and travel, and also to the domestic happenings from the discovery of the first case in the country, to crossing the 15000 mark in just 2 months.

The data used in this study are daily closing prices of the Nifty 50, the benchmark broad based stock market Index, by the National Stock Exchange of India and the different sectoral indices that portray the performances of the sectors and the sentiment of the market towards the same. The implication is, particularly, of interest for the portfolio managers who are engaged in devising diversification strategies for their portfolios and for analysing the aspects that cause firm specific and market specific variability in the stock returns.

1.1 Overview

India was successful in taking the bold step of a 21 day lockdown at the initial discovery of the outbreak, which has led to a control in the spread of the virus as much as the population of the country could have been prone to. This lockdown has reduced business activity and threatened the citizens of the country in terms of lack of business opportunities, a fall in the supply as well as demand of products, downsizing, and retraction of job offers and has impacted the daily wage earners, the most. The government of India is taking various measures such as, enhancement of facilities to work from home, Funds like the PM Fund to combat Covid-19, measures by the RBI, relief on essential items etc. The overall impact on the economy and factors that have impacted specific sectors , that has been discussed later in the study.

1.2 Research objectives

The objective behind this research, is

- to examine the degree of impact of the pandemic on the economy overall.
- It also seeks to identify and analyse the sector-specific factors that have caused the movement of returns on stocks of companies belonging to these sectors, and the sentiments of its consumers, to be in line with that of the broad based market return, or away from it.

The clouds of uncertainty and unpredictability surround the globe with this outbreak and this has led to changes in behavioural patterns of the consumers and a change in purchasing patterns.

1.3 Literature Review

The evolution of the new coronavirus, Covid-19 continues to be highly unpredictable and uncertain even after 4 months of discovery of the same while the wait for the vaccine does not seem to be nearing its end. It is highly difficult for analysts and policymakers to formulate strategies and plans, that can successfully combat the outbreak.

In a paper named ‘The Global Macroeconomic Impacts of Covid-19: Seven Scenarios’, the authors from the American National University, have explored the seven possible scenarios of what the future holds for the world as a whole. It shows the economic spending or scale of activities taken up by the statutory bodies in respect of the public health system, especially in underdeveloped economies like India, with a high population is an important means of combating the outbreak in the short run to reduce long term impacts. The Government of India has taken strict measures with respect of restrictions on activities like international trade, travel and domestic lock downs, but the measures and policies adopted, although causing high short term impacts, is expected to help the economy.

‘How will country-based mitigation measures influence the course of the COVID-19 epidemic?’, is an article published on The Lancet (Volume 395, Issue 10228) also supports the fact that measures taken to save lives will have short term impacts on the economic activities and the long run impacts will depend on the severity of the nearing future. It states that the reason behind the initial rapid spread of the disease is that the detection of the virus and the quarantine activities are being done after significant time, during which the compromised patient, unknowingly, becomes the transmitter to others. This rapid spread leads to panic among the consumers, causing anxiety, panic, behavioural changes, thus leading to a change in the consumption pattern of the consumers [As pointed out in ‘Immediate Psychological responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (Covid-9) Epidemic among the General Population in China’, research article in the International Journal of Environmental Research and Public Health].

Campbell et al, 1997, on an issue of the Princeton University Press, Princeton, NJ(1997) discusses the appropriateness and calculations involved in calculation of the impact of a certain event in the Financial Market performances, in its paper named ‘Event Study Analysis. The Econometrics of Financial Markets’, that adopts the measures introduced by Dodd and Warner

(1983) in the Journal of Financial Economics,11(1983). The methodology of this study is influenced by their work.

The 2019-20 coronavirus outbreak is an ongoing public health emergency of international concern. The virus mainly spreads between people via respiratory droplets produced in coughs and sneezes. Majority of the people infected with this virus show symptoms of slight to medium respiratory illness, whereas others, especially the ones with underlying medical problems, develop serious illness.

2.1 What are Sectoral Indices?

Sectoral Indices are released by the National Stock Exchange of India (NSE) and represents the movement of various stocks from companies belonging to a sector, and thus indicates its performance. The Indexes are calculated on the basis of free float market capitalisation method and takes into account the stocks that are traded and listed and traded but not listed, on NSE.

- **NIFTY Auto Index:** Is calculated on the basis of stocks (maximum 15) belonging to manufacturing of motorcycles, cars, heavy vehicles, auto ancillaries, etc.
- **NIFTY Bank Index:** Is calculated on the basis of stocks (maximum 12) belonging to large and liquid banks.
- **NIFTY FMCG Index:** The index comprises of maximum of 15 companies. Is calculated on the basis of stocks (maximum 15) belonging to companies manufacturing FMCG products, which include non-durables, and products that are mass produced and are available off the shelf like food products, beauty products, groceries, essential items etc..
- **NIFTY IT Index:** Is calculated on the basis of stocks (20 stock) belonging to companies that are in activities like IT education, infrastructure, software training and development, hardware, support and maintenance etc.
- **NIFTY Metal Index:** Is calculated on the basis of stocks (maximum 15) belonging to the Metals sector including mining.
- **NIFTY Pharma Index:** Is calculated on the basis of stocks (maximum 10) belonging to companies into manufacturing of pharmaceutical products.
- **NIFTY Oil & Gas Index:** Is calculated on the basis of stocks (maximum 15) belonging to the companies of the Oil, Gas and Petroleum industry.

2.2 Global Scenario

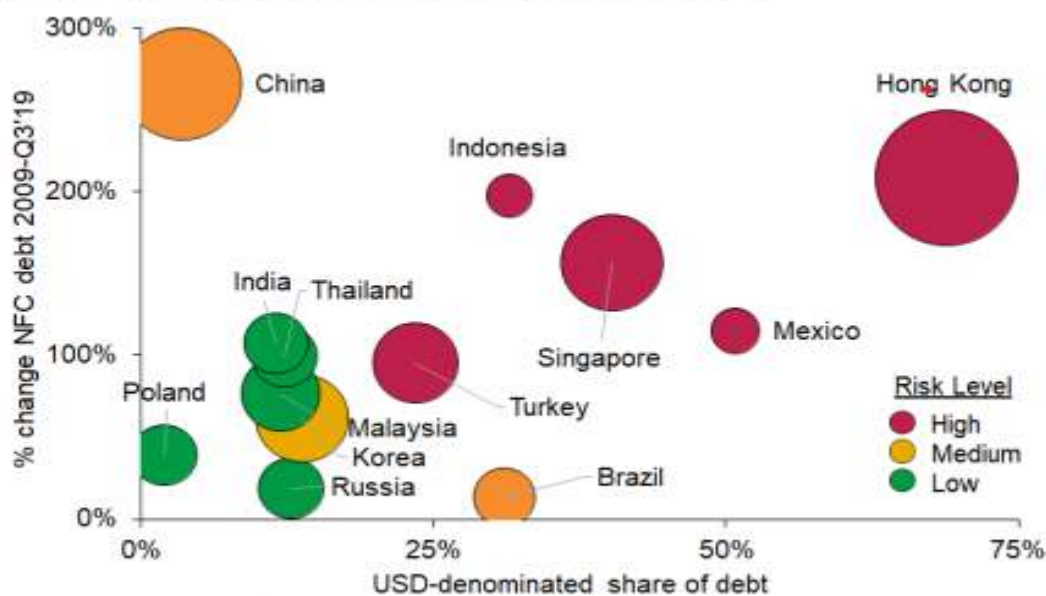
“Pandemic could cause deepest economic recession of our lifetimes.”

- WTO Chief, Roberto Azevedo

In the current unprecedented situation, the political and economic impacts continue to worry globally. As a measure to combat the spread of the virus, people are staying at home and this restriction to mobility has caused a pause in the economies that have a substantial impact on supply chains, collapse of industries, sporting events and movie releases being postponed, and extraction of job offers.

Global Trade is expected to plummet by up to a third in 2020 due to the new coronavirus pandemic, said the World Trade Organisation. It is expected to fall between 13 per cent and 32 per cent in 2020, while releasing its annual Trade Statistics and Outlook Report, adding that the decline would likely exceed the trade slump brought on by the global financial crisis of 2008-09, as the constant spread disrupts normal economic activity and life as a whole.

China debt grows to USD21 trillion over 10 years

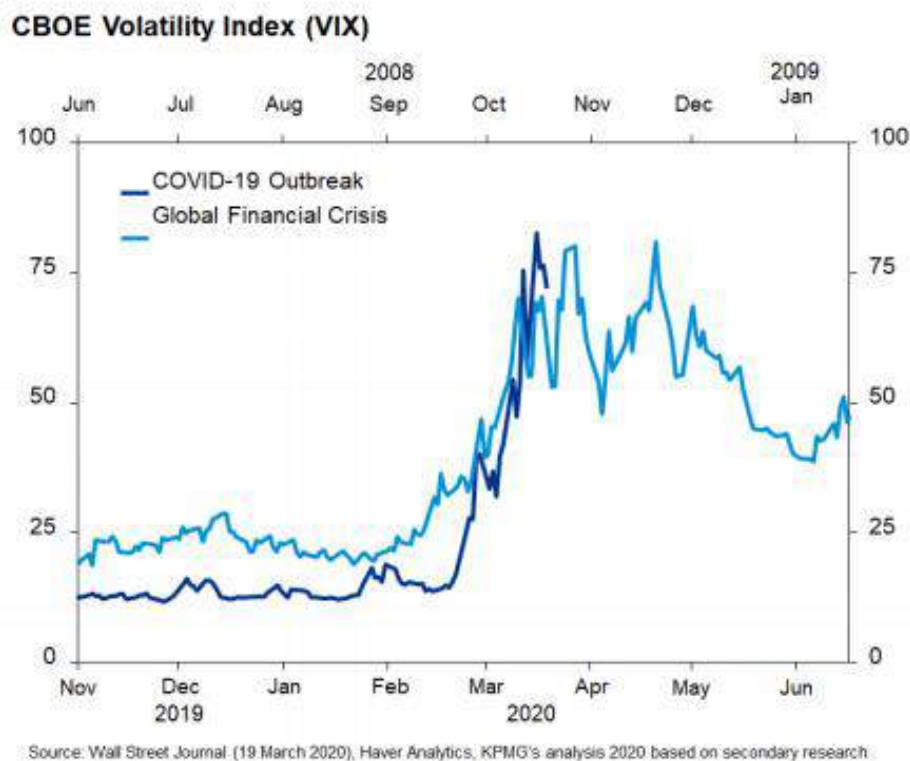


Source: IIF, Haver Analytics, KPMG's analysis 2020 based on secondary research

As per The United Nations, the global economy could shrink up to 1 per cent [world output was expected to expand at 2.5 per cent in 2020], or could contract more if the halt on production and trade continues without proper fiscal responses. The contraction could be even higher if governments do not provide proper income support and make efforts to boost consumer spending in the economies. The support from the government is being extended towards mitigation of the crisis by spending on healthcare and safety measures, as well as on providing financial relief to workers and businesses so as to protect livelihoods and support, particularly in significantly impacted sectors and developing countries.

According to IMF, The contraction in the global economy is worse than the global financial crisis of the years, 2008-09 .

The market volatile (VIX index) at Global Financial Crisis levels



The seriousness of the economic impact, all over the world, largely depends on - the duration of restrictions on the mobility of people, products, material and parts in major economies; and the extent and efficiency of the fiscal policies or support provided by the government. It is, therefore, essential to stimulate the economy, employment, provide support to the enterprises as they restart, and focus on the protection of the citizens. Social distancing requirements, including the prohibition of gatherings of large numbers of people, not just curtails consumption, but also negatively impacts the rate of recovery

2.3 Indian Scenario

As per World Bank's forecast, India's economic growth will be 1.5-2.8 per cent in 2020, IMF at 1.5 per cent and Barclays has projected zero growth for 2020. Nifty and Sensex continually plummet since the Indian government has started taking preventive measures like imposing restrictions to protect the citizens of the country from the widespread spread of the Covid-19. While, WHO and other experts congratulate the early measures adopted, the economy of the country responds rather drastically. From restrictions of travel to and from some affected international countries, to a complete ban to international travel in the form of a Lockdown, popularly termed as "Janata Curfew" from March 22nd, 2020, in 30 states and 1 Union Territory. The need for social distancing also led to a halt in manufacture and production as the

factories closed, a huge impact on business due to the disallowance of the gathering of large groups of people [more than 4-5], has brought the economy to a standstill. Stores and facilities of essential items continue to be exempt from this lockdown as this eases life of citizens and eliminates the need to hoard basic items unnecessarily. The three main contributors to the GDP of India, private consumption, investment and external trade have been hugely impacted.

The Indian economy was already in a precarious state as the real GDP of the economy was at its 6 year lowest in the third quarter of the fiscal year 2019-2020¹.

As the means to fight the spreading of the Covid-19, social distancing has been given top priority. In order to follow the same, the stop in the urban activity has caused a fall in a number of activities, such that, tourism, durables, hospitality and aviation are the most affected sectors. Closing of malls, schools, colleges, cinema halls, restaurants etc, have reduced the consumption expenditure of households and if the essential items were not made available in an efficient manner, the effect felt could be worsened. Another reason why the consumption and investment expenditure seems to stoop so low, is because of loss of jobs and a decrease in income levels especially for the wage earners on a daily basis due to a halt or slowing down in activities like construction, entertainment, the disallowance of a meeting of a large group of people at the same place, etc. The uncertainty of the situation is causing a delay in purchase decisions as the confidence level of consumers fall seeing travel plans, sporting events, movie releases, examinations etc getting cancelled in the country.

On the supply side, the disruption in production and transportation of intermediate goods as well as final products from China, is causing the business sentiment, production plans, and investment plans to go haywire. The halt in import of raw material and components for industries like pharmaceuticals, automobiles, electronics etc are majorly affecting not just production, but the GDP of the economy as a whole.

¹ Ministry of Statistics and Programme Implementation data on 28th February, accessed on 26th March

India's real GDP decelerated to its lowest in over six years in 3Q 2019-20¹, and the outbreak of the COVID-19 posed fresh challenges. Steps taken to contain its spread, such as nationwide restrictions for 21 days and a complete lockdown of states, have brought economic activity to a standstill and could impact both consumption and investment. While Indian businesses, barring a few sectors, can possibly insulate themselves from the global supply chain disruption caused by the outbreak due to relatively lower reliance on intermediate imports, their exports to COVID-19 infected nations could take a hit. In sum, **the three major contributors to GDP -- private consumption, investment and external trade -- will get affected.**



Source: Quarterly estimates of gross domestic product for the third quarter (Q3) of 2019-20, Ministry of Statistics and Programme Implementation (MoSPI), 28 February 2020, accessed on 24 March 2020

2.4. Methodology and data

To examine the impact of the Covid-19 outbreak on the performances of different Sectoral Indices of Nifty, I applied the event-study methodology, which is often used to accurately measure the impact of an economic crisis or a major economic change on the stock returns. I first estimated what returns on such indices would have been if the Covid-19 event had not occurred so as to eliminate the impact of general forces of the market. This model lets us differentiate between the components of index return movement due to firm-specific events and the ones due to market-wide movement. Abnormal Return (AR), is calculated as the difference between actual return and expected return in the time frame in and around the event, which tells us the change in such values due to firm specific events. If an occurrence of an event is advantageous [like the announcement of government subsidy for a sector], the AR is positive, indicating that the event will improve the stock's value. Whereas, when AR is negative, it indicates bad news as per the market which means, that firm's future profitability is going to fall. [like in case of a disaster attacking a particular sector].

The data used in the study, are the prices of Nifty 50 and Nifty Sectoral Indices⁽¹⁾, namely, Nifty Bank, Nifty Auto, Nifty FMCG, Nifty IT, Nifty Pharma, Nifty Metal, , Nifty Oil and Gas. The closing prices on the same have been taken from the official website of the National Stock Exchange.

Accordingly, mean abnormal return is calculated, along with the cumulative mean abnormal return on an event date and a few days following the same, so as to know the valuation impact of the pandemic on different sectors. Then, the statistical significance of the Cumulative Abnormal Returns is checked to show if the pandemic has significantly influenced the stock prices and to decipher the reasons for the same.

While the expected return represents the value that the index would have taken due to the market forces, the abnormal return shows the return exclusive to the sector. The firm's beta is the vulnerability of the index to the market index, and is calculated over an estimation period of 90 days prior [starting on 4th July, 2019] to event window. The actual return of the stock is measured over a period of 50 days prior and post the news of the first case of Covid-19 was announced in India [20th January, 2020] (event window of 101 days where the date of the first case's news report, is designated as day 0 in event window). The estimation window is spread over 50 days so as to eliminate an exceptional fall or rise in the return due to factors other than the threat of the pandemic.

To measure the Expected Return, we have adopted the Market Model which is the most widely used method in event study literature because the Market Model takes account of the risk associated with the market and mean returns. In order to calculate the returns, we use the formula,

$$R_{k,t} = \ln (P_{k,t} / P_{k,t-1}) \times 100$$

Where,

$P_{k,t}$ = the price at the end of the day, of index k on day t

$R_{k,t}$ = Return on a sectoral index (k) on day (t)

The regression equation used -

$$R_{k,t} = \alpha_k + \beta_k R_{m,t} + \varepsilon_{k,t} \dots\dots\dots (1)$$

Where,

$R_{k,t}$ = Return on a sectoral index (k) on day (t)

$R_{m,t}$ = Return on the market's index (m) on day (t)

β_k = the beta coefficient that portrays how sensitive the return on the dependent variable, the sectoral index, is to the market and calculates its risk

α_k = the mean return on the sectoral index that is independent of the market variability

$\varepsilon_{k,t}$ = the measure of statistical error, $\sum \varepsilon_{k,t} = 0$

The data used in this study has been taken from the historical database of the NSE website, and the estimation window [starting on the 4th of July, 2019] consists of a 90 trading days before the event window, $[-t_1, t_2]$ where, t_1 are the days just before the first case of Covid-19 was discovered in India [30th January, 2020], and t_2 are the trading days after the discovery. Estimated coefficients from the regression equation (1), are then used to calculate the *ER* of sectoral indices over the event window.

The *AR* in the window is calculated using:

$$AR_{k,t} = R_{k,t} - ER_{k,t} \dots\dots\dots (2)$$

$$ER_{j,t} = \alpha_k^\# + \beta_j^\# R_{m,t} \dots\dots\dots (3)$$

Using regression analysis (Ordinary Least Squares), that is in equation (3), the market model gives predicted return for an index for days in the event period.

where the coefficients, $\alpha_k^\#$ and $\beta_j^\#$ are estimates obtained using the actual return on market index obtained on actual day t

The Abnormal Return so obtained, contains the market and the sectoral component, representing the impact of the market and sector specific factors, respectively.

Consequently, the standardized abnormal return (*SAR*), also termed as the t-statistic of *AR*, can be determined by using the following statistic (as per the method used by Dodd and Warner, in the year 1983):

$$SAR_{k,t} = AR_{k,t} / s_{k,t} \dots\dots\dots (4)$$

Where,

$s_{j,t}$ = the estimated standard error of the abnormal returns of index k for the event period t

The *CAR* over the event period interval $t = [-t_1, t_2]$ is taken by the aggregate of the t-statistic of *AR*, i.e.

$$CAR_k = \frac{1}{\sqrt{m}} \sum_{t=-t_1}^{t_2} SAR_t \dots\dots\dots (5)$$

The expected *CAR* is zero when there are not any abnormal returns. To establish statistical significance of *CARs*, the test statistic on any day t in the event window for all sectoral indices:

$$T\text{-statistic} = CAR_k / (S.D.* \sqrt{m}) \dots\dots\dots (6)$$

Where, S.D. is the Standard Deviation of the returns.

The standard normal distribution is followed by the test statistic (Campbell et al., 1997). If the pandemic caused abnormal returns from the stocks, the t -statistic would not be zero. Thus, we test the **null hypothesis**:

H_0 : Covid-19 pandemic had no impact on the performance of the sector

H_1 : Covid-19 pandemic had an impact on the performance of the sector

4.1 Results and analysis

The Covid-19 outbreak has devastated a number of industries in the country. The impact on the oil and gas industry, has been the highest, as per the study. This study examines 6 sectors of India on the basis of returns on Sectoral indices and the formulas explained in the methodology.

We examined the CAR value in the event window period and the significant shift of its value from 0, shows the impact of the outbreak on the respective sectors. The CARs have been examined for a period of 20 and 50 days post the first patient being discovered in India, that show the impact of not just the outbreak of the virus, but the impact of the lockdown so imposed. Overall, there was a negative CAR in all the sectors before and after the lockdown was announced, which shows that the outbreak, and not just the resultant lockdown, has impacted consumer sentiments and hence, the market outbreak. At the 5 per cent level, CAR is significant if the value of T-Statistics of CARS is greater than positive or negative 1.96, since the data follows normal distribution.

- **Oil and Gas Sector**

India is the third largest consumer of energy in the world, therefore the impact of the Covid-19 pandemic and therefore the impact of the economic and financial crisis will further be felt as the days pass by, even after the economic activities in the economy resume. The prices of Crude [a raw material for the same] had been at a precarious state due to price and supply wars before the Covid-19 was discovered in the Indian Subcontinent, hence we see that the owing to the supply, this sector had been noticing significant hits before the announcement date, and much before the lockdown was announced. At a global level, the lockdowns have hugely impacted the import and export of oil which has impacted India in both forums as an important importer [India imported oil worth INR 7659.5 billion between April, 2019 to January 2020]² as well as an exporter to neighbouring countries. Since the lockdown, the demand for oil has hugely fallen due to reduced retail demand because of restrictions on passenger movement and domestic and international travel being shut.

² Export and Import database from the Ministry of Commerce, accessed on 25th March

PNG, CNG and fertilisers(most common forms of Natural Gas) and LPG, largely used in urban areas, are mostly imported and therefore the supply being cumbersome, has impacted the supply of the same. The unpredictability of the situation and lack of a clear prediction of the future of this pandemic, has resulted in a significant impact on this sector, as seen in **Table 1** where we assess the CAR of 20 and 40 days³ before and after the first case in India. The statistical significance of the outbreak on the stock returns are significant not just because on the case in India, but more so due to global restrictions. The downward sloping graph in **Chart 1**, shows the fall in prices of the Nifty Oil Index. The Chart indicates that the prices of the sector were affected even before the first case in India because of high dependency on global trade and the lockdowns in other country influenced the price in India.

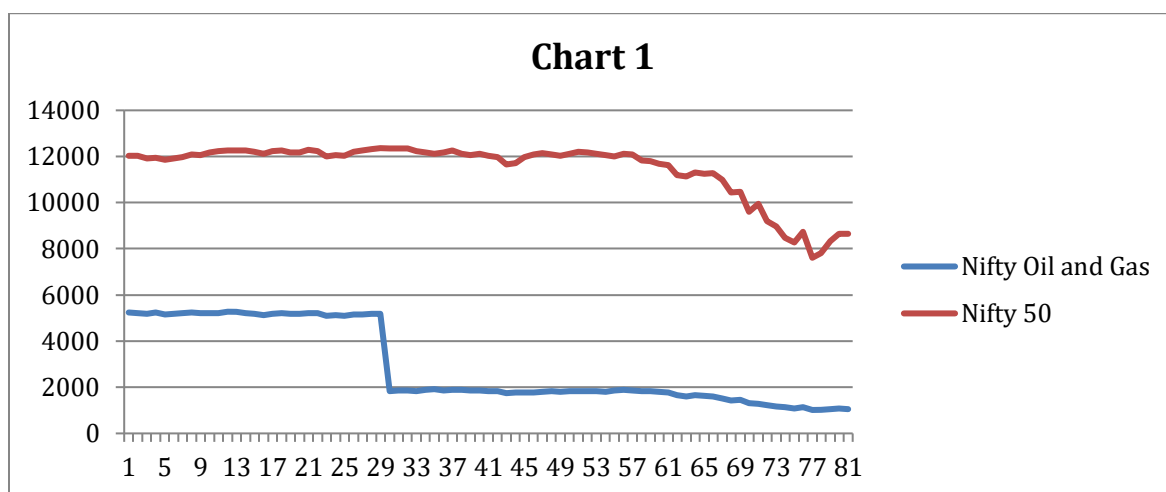


Table 1

Window	CAR	t (No of days in window)	t- stats of CAR
-40	-1.066668088	40	-14.28798073
-20	-1.023191795	20	-19.38266993
20	-0.028876042	20	-0.547008687
40	-0.198870562	40	-2.663864036

- **Banking Sector**

As per the S&P Global Ratings, the Chinese Banking Sector is expected to have an increase in the Non Performing Asset Ratio by 2 per cent in the year 2020, and India is expected to have a similar ratio as China, and is also expected to have the credit cost ratios to increase by approximately 130 basis points. Although the strain on the banking sector due to the pandemic

³ 40 days instead of 50 due to lack of availability of data on the NSE website, as on 15th April

has not been as much as the corporate sectors in the initial stages, the impact seems to be slow but long because of indirect impacts from other sectors.

RBI has taken some steps to help the situation. The RBI has announced a cut in repo rate by 75 basis points to 4.4 per cent while reverse repo rate was reduced by 115 basis points to 3.75 per cent to increase liquidity in the banking system, has Reduced CRR by 100 basis points [expected to release Rs 1,37,000 crore across banking system] and has made accommodation under Marginal Standing Facility till June 30 [expected to release Rs 1.37 lakh crore into the system]. At the same time, the special refinance facilities for an amount of Rs 50,000 crores is being provided to NABARD, SIDBI, NHB. The 90-day NPA norm was removed from the moratorium granted on existing loans by banks and Liquidity Coverage Ratio (LCR) requirement for scheduled commercial banks (SCB) was brought down from 100 per cent to 80 per cent to help banks maintain sufficient high-quality liquid assets in the wake of the economic crisis. For the next three months, no EMI would be deducted from the account of anyone who has a loan outstanding, without any hit on credit score. The 3-month moratorium will apply to corporate loans, home loans and car loans. RBI had auctioned targeted long term repo operations (TLTRO) of 3-year tenor for a total amount of Rs 1,00,000 crore at floating rate and conducted a second round of TLTRO for an initial amount of Rs 50,000 crore which was aimed at helping in refinancing NBFCs and MFIs to maintain healthy cash flow to the small and medium enterprises.

Such measures have helped the banking sector. The different banks seem to be digitalising their operations and services, especially payments, to provide some relief to the customers, that allows this sector to accelerate digitised services in the future. The Bank's profitability seems to be under pressure due to reduced off take of the amount lent out, in the recessionary market, reduced income on operations, and drop in fee of income from the sale of wealth products. The risk of potential defaults and insolvencies, for both, individuals and corporates, has become very high due to the slowing down of the business activities. The measure taken by RBI has cushioned the acute liquidity crisis and the moratorium allowances have benefitted the common man for the time being, this along with the continuity of functions from home, is why the impact of the pandemic hasn't been significant over all, as seen by the t-statistic of CAR in **Table 2. Chart 2** that the major fall in prices posts the lockdown.

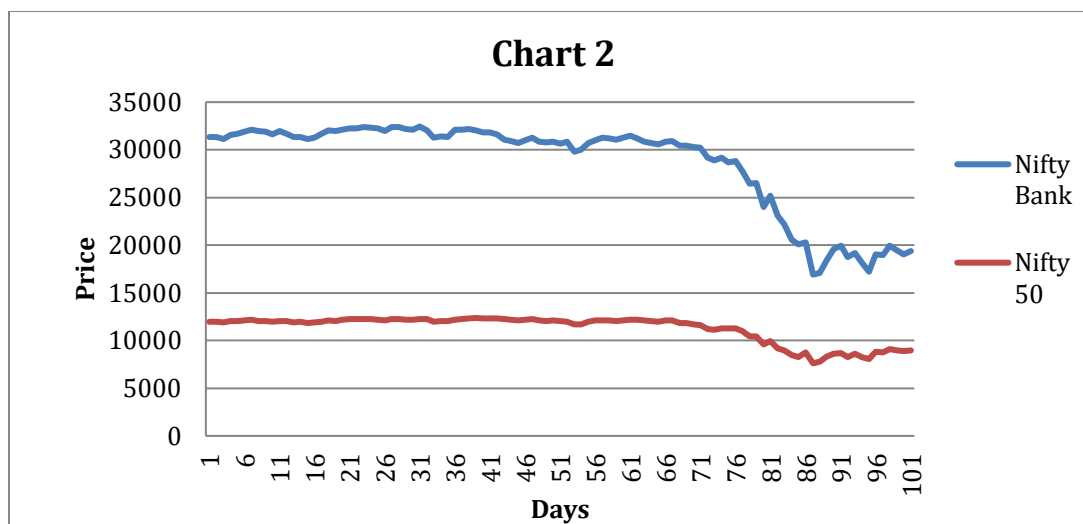


Table 2

Window	CAR	t (No of days in window)	t- stats of CAR
-50	-0.030541281	50	-0.311274296
-20	-0.031154207	20	-0.502045077
20	0.008271759	20	0.133298075
50	-0.033116443	50	-0.337520138

- **Automobile Sector**

The automobile industry had been experiencing a low demand even before the crisis hit. Hubei, in China accounts for 27 per cent of India's automotive parts imports. This is why the sector has been experiencing the hit since the beginning of the year. This is caused by restrictions on international import and export, lockdowns across the globe, slowing down production of intermediate goods or parts that are imported by India. The production in the economy is at a halt because of the lack of mobility of contract labour for performing the functions and carrying out the supply.

Demand for the products have fallen significantly because the sector is highly impacted by the market conditions and purchasing power. This slowdown in business seems to impact not just the present but also the near future of this sector. The uncertainty of the fatality of the Covid-19 also makes the investors uncertain and apprehensive. The present lockdown scenario seems to have reduced the prices majorly as seen in **Chart 3** this sector as seen in negative abnormal returns because of the outbreak as we see that the value of CAR is not 0 in **Table 3**.

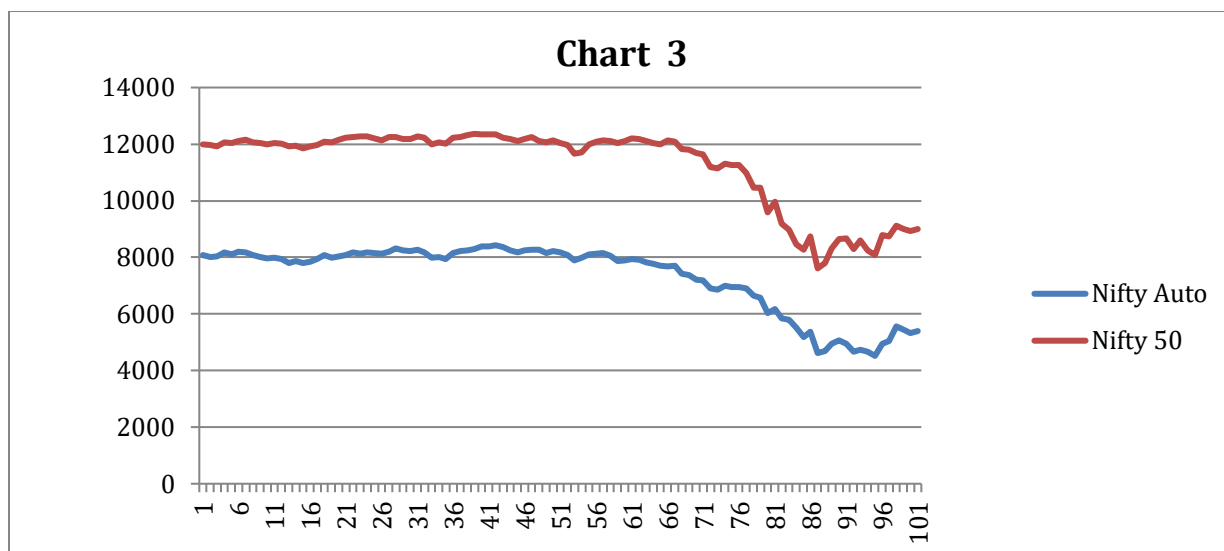


Table 3

Window	CAR	t (No of days in window)	t- stats of CAR
-50	-0.005073390	50	-0.045299749
-20	0.008271252	20	0.116772035
20	-0.052086114	20	-0.735342287
50	-0.041584330	50	-0.371301999

- **FMCG**

The Retail sector in India, alone contributes 10 percent to the GDP of India. The closing down of malls, theatres, restrictions on travel etc has made consumers aversive towards discretionary spending on luxury items, restaurants, apparel, or order from ecommerce websites. The uncertainty of the situation has led to people stocking up on essentials to an extent that shops are out of stock. This seems to balance out the loss of companies due to import restrictions, production slowdown and lack of demand by consumers as consumers continue purchasing essentials and postponing the expenditure on non-essentials. The supply chain of products have been bearing downfalls, along with the availability of labour to continue the same level of production as before. The flow of cash in the sector seems to least affect grocery and food items, while items requiring higher spending, can be seen to result in a disadvantage to the sector. Another reason behind the fall in the performance of this sector is social distancing as it deprives the consumers of the opportunities that cause the purchase demand to fall. The prices of this sector also seemed to fall post lock down as before that the activities in households were more or less, not affected majorly, as seen in **Chart 4**. The prices then saw a significant rise because of increased demand in households as the uncertainty of the situation made consumers hoard and pile up necessities at home. The **Table 4** shows that this sector, unlike others, saw an increased statistical significance of the outbreak in the stock returns because of consumer behaviour and market behaviour.

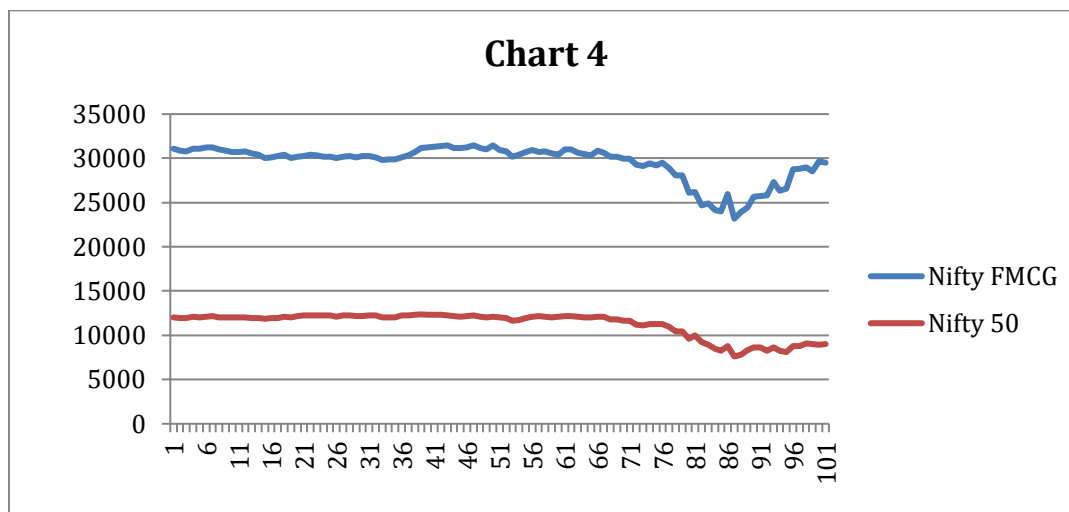


Table 4

Window	CAR	t (No of days in window)	t- stats of CAR
-50	-0.017111077	50	-0.238934615
-20	0.033885382	20	0.74814216
20	-0.012479177	20	-0.275522889
50	0.148228621	50	2.069825848

- **IT**

According to the rating agency ICRA, Indian IT services industry is expected to see a fall in growth to 3-5 per cent in this financial year as compared to the expected growth rate of 6-8 per cent before the crisis struck. The pandemic has impacted all the big corporates around the world which will have an indirect impact on the level of work or services needed by them and the revenue paid for such services. There was a significant impact on the sector in the Global Financial Crisis, which is why the impact of this economic recession is also being predicted as rather threatening. The initial impact of the lockdown has restricted the service providers from traveling to the client office and has differed a number of projects, which is impacting their cash flows. Although the work from home facility and advanced digitalisation in the sector that the impact felt due to the pandemic is not directly major. The fall in prices show the falling confidence in the sector and is also causing a large number of job offers being retracted and downsizing taking place, which again affects the consumer sentiments.

These add up to a fall in the prices of stocks in this sector, as seen in **Chart 5**, and there is a significant impact on the returns post lockdown, as seen in **Table 5**.

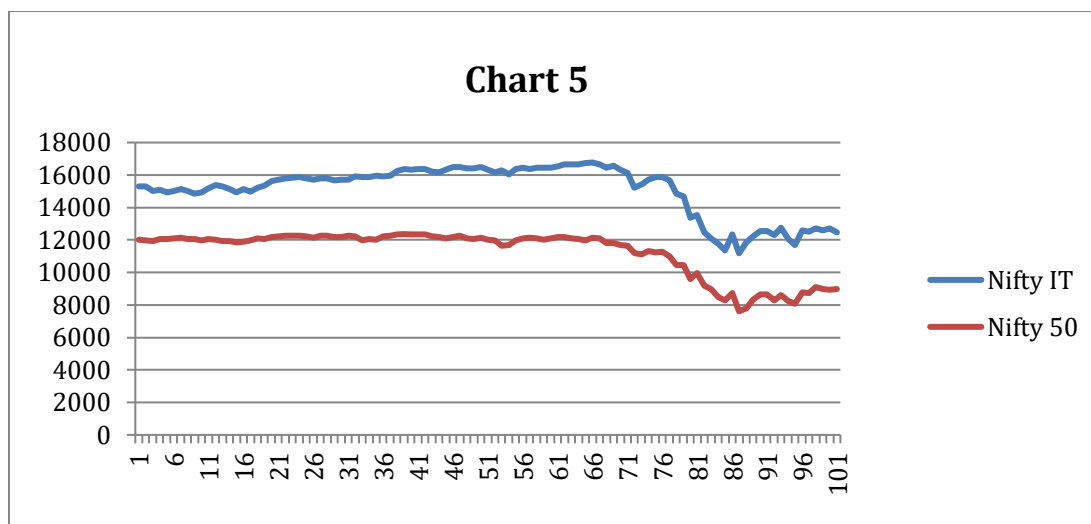


Table 5

Window	CAR	t (No of days in window)	t- stats of CAR
-50	0.093531294	50	1.226404251
-20	0.056916369	20	1.180005123
20	0.014696794	20	0.304697806
50	-0.191552051	50	-2.511675394

- **Pharma**

India manages around 80 per cent of the global demand for generic drugs, and 80 per cent of the drug related to AIDS globally. Although as an essential item, the production and transport of drugs is not restricted, the lack of labourers and the fall in availability of raw materials that are imported (around 70 per cent of raw materials are imported from China and as the production and import of the same has paused, the country seems to rely on the inventory of the piled up stock). The supply, distribution of essential medicines, sanitizers and other essential healthcare items like gloves, masks etc seem to impact the sector immensely, although the lack of raw materials has slowed down the same. High demands of export of essential items, testing kits etc to developed nations like the U.S.A seem to open up opportunities for the sector to experience positive actions from the investors.

The stock prices of this sector fell due to incapacity to internationally trade, but post the initial decline the prices began to increase because of increased purchase of medicines and drugs not just by households, but also by the increased use for treatment purposes in hospitals and health centres. The export of Hydroxychloroquine by India also acted as a major booster to the returns on Pharma stocks. The Pharma sector is another Sector that experienced significant impact on its returns, as seen in **Table 6** that the statistical impact in case of 50 days post the first case, has been significantly positive. **Chart 6** shows that the prices have been on a rise.

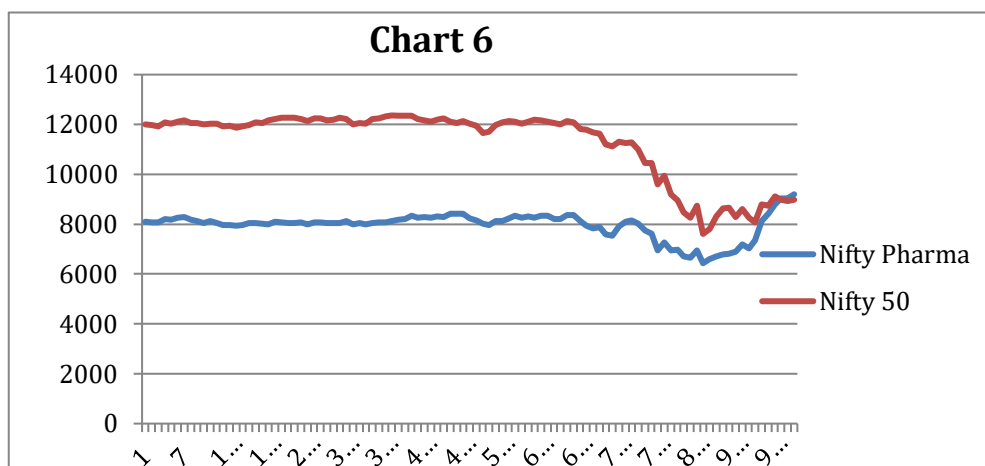


Table 6

Window	CAR	t (No of days in window)	t- stats of CAR
-50	0.073909075	50	0.920061498
-20	0.052227182	20	1.027982412
20	-0.001394848	20	-0.027454654
50	0.283809418	50	3.533018352

Conclusion

An event study of the Covid-19, provides the investors, managers, owners, etc an idea of the impact of a pandemic on the different sectors of an economy. The lockdowns in different countries and restrictions on international trade and travel did not just have an impact on the aviation sector and tourism sector, but also impacted production around the globe which has further impacted consumer sentiments in the market taking a huge toll on international prices and domestic prices, across sectors. Social distancing being an important means to combat the virus, it hampers manufacture, trade, business practices and hence causes the investors to change their purchasing patterns and their speculation of poor performances, leading to changes in the stock prices.

The pandemic has impacted the economy in a matter of 3 months and if the disease was to spread further and the lockdowns were to continue, the impact on the economy would worsen and this study could help the investors take their investment decisions in the stock market.

A major impact on these sectors is that the negative cash flows of the corporate impose a threat to the recovery of the businesses. The effect of the disruption to the supply chain also seems to have long term and worsening impacts on the same.

The annexure contains of the tables of different sectors, showing the t-statistics of the abnormal returns on particular dates. This helps in analysing the period in which the impact was majorly felt. As seen in the annexure attached, we see that the impact of the pandemic is majorly because of domestic restrictions although sectors like Oil and Gas had shown significant changes due to international severity if the situation.

Work from home facilities have been beneficial for only some sectors and many sectors have realised the importance of digitalising work in the modern era. For some companies, especially the ones relating to manufacture and production, physical presence to operate machines is needed while in case of IT and Banks, it poses security threats.

Although, the government is taking considerable steps, the uncertainty of the future makes it difficult to predict what the stock performances will be in the future. Although, in the current scenario, Oil and Gas sector seems to have felt the impact the highest and can further worsen if the virus imposes more international restrictions and domestic lockdowns. The pharmaceutical industry is experiencing positive returns and that is expected to continue in the near future, especially owing to India's export. Once the economy resumes operations, things will take time to come to square one and the correct policies and actions by the government and diligent execution of the same, can help the economy to reduce harms.

Further study can be conducted on the change in impact of the coronavirus as and when the scenarios change, changes when the vaccine is found, changes in the impact when important and significant decisions are taken by international authorities and central banks across the globe. The impact of the current disasters can be compared to the epidemics in the past to know the degree of the same, relatively.

References

- 'Event Study Analysis. The Econometrics of Financial Markets' by Campbell et al, 1997, An issue of the Princeton University Press, Princeton, NJ(1997)
- Dodd and Warner (1983) , Journal of Financial Economics,11(1983)
- 'Immediate Psychological responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID_19)Epidemic among the General Population in China', Article in the International Journal of Environmental Research and Public Health
- 'How will country-based mitigation measures influence the course of the COVID-19 epidemic?', The Lancet (Volume 395, Issue 10228)
- 'The Global Macroeconomic Impacts of Covid-19: Seven Scenarios', From the American National University
- The Impact of the severe acute respiratory syndrome on hotels: a case study of Hong Kong, by the International Journal of Hospitality Management,22 (2003)
- FICCI Report on Covid-19 Impact on Indian Industries, issues and suggestions, issued on 23re March,2020
- Report by the Scottish American Investment Company, Volume 22/Issue 15/ SHARES
- The Dalal Street Investment Journal, issued on12th April, 2020
- The Bloomberg Markets Report, Volume 29, Issue 2

- The Indian Economy & Market, Volume 4, Issue 10
- KPMG's Report on the Potential Impact of Covid-19 on the Indian Economy
- Sixth Edition of the Guide to Economic Indicators, by the Economist
- Closing Bell, a Daily news reporting series, by the Economic Times [Retrieved between 19th of December, 2020 to the 15th of April, 2020]
- BBC News, 2020 Covid-19: Global hotspots [Retrieved on 15th of April]
- Coronavirus' business impact: Evolving perspective, a report by Mclnsey
- Understanding COVID_!(s impact on the technology sector, a report by Deloitte
- India's situation report by WHO[Till the 15th of April,2020]
- Daily news articles from the Economic Times, The Hindu, Times of India, The Telegraph and other local newspapers were also referenced to, till the 15th of April, 2020

Annexure

1-Oil and Gas

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
15-Jan-20	-1.03985536	-0.001538113	-0.001043059	-1.038812306	-114.0666806
21-Jan-20	0.021982459	-0.004484643	-0.003881897	0.025864356	2.84003306
22-Jan-20	0.017171205	-0.005186044	-0.004557662	0.021728867	2.38593606
23-Jan-20	-0.0196523	0.006048459	0.006266234	-0.025918532	-2.845981765
01-Feb-20	-0.04422641	-0.025420488	-0.024052562	-0.020173848	-2.215187354
04-Feb-20	0.001684731	0.022945549	0.022545755	-0.020861024	-2.290642646
05-Feb-20	-0.00986785	0.009098979	0.009205261	-0.019073112	-2.094321192
07-Feb-20	0.019284496	-0.003267828	-0.002709555	0.021994052	2.415054629
18-Feb-20	0.018397796	-0.004434597	-0.003833680	0.022231476	2.441125
27-Feb-20	-0.02432473	-0.003877869	-0.003297300	-0.021027428	-2.308914575
02-Mar-20	-0.04655707	-0.006178801	-0.005514136	-0.041042934	-4.506715221
06-Mar-20	-0.05053014	-0.025119871	-0.023762932	-0.026767212	-2.939171016
09-Mar-20	-0.06881048	-0.050194997	-0.047921592	-0.020888883	-2.293701703
11-Mar-20	0.019931907	0.000664758	0.001079300	0.018852607	2.070108624
12-Mar-20	-0.1089732	-0.086668953	-0.083062470	-0.025910728	-2.845124873
13-Mar-20	-0.01685716	0.037358498	0.036431928	-0.053289083	-5.851402406
16-Mar-20	-0.04489671	-0.079174192	-0.075841633	0.030944921	3.397903915
17-Mar-20	-0.06130029	-0.025364087	-0.023998223	-0.037302069	-4.095949906

18-Mar-20	-0.01059226	-0.057167926	-0.054639669	0.044047412	4.836621628
19-Mar-20	-0.04857546	-0.024546646	-0.023210658	-0.025364805	-2.785179892
23-Mar-20	-0.10600537	-0.139037542	-0.133517050	0.027511676	3.020916864
25-Mar-20	0.022759289	0.064145468	0.062239867	-0.039480577	-4.335160834
26-Mar-20	0.01135225	0.038166585	0.037210480	-0.025858230	-2.839360388

2- Banking

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
31-Jan-20	0.006057174	-0.0061422	-0.008775858	0.014833032	2.196205516
24-Feb-20	-0.015888487	-0.0210336	-0.030023919	0.014135432	2.092917571
28-Feb-20	-0.03505423	-0.0378017	-0.053949774	0.018895544	2.797708327
09-Mar-20	-0.049355762	-0.050195	-0.071633463	0.022277700	3.298476556
12-Mar-20	-0.099833226	-0.086669	-0.123677077	0.023843851	3.530363626
16-Mar-20	-0.085629358	-0.0791742	-0.112983023	0.027353665	4.050032976
20-Mar-20	0.011588923	0.0566914	0.080879574	-0.069290650	-10.25929881
23-Mar-20	-0.18313005	-0.1390375	-0.198400274	0.015270224	2.260936957
24-Mar-20	0.011147817	0.0247623	0.035320921	-0.024173104	-3.579113373
25-Mar-20	0.07724061	0.0641455	0.091515579	-0.014274969	-2.113577701
27-Mar-20	0.017942573	0.0021732	0.003089172	0.014853401	2.199221331
31-Mar-20	0.019069089	0.0375247	0.054054479	-0.034985389	-5.013672197
03-Apr-20	-0.054108717	-0.0208116	-0.03009515	-0.024013567	-3.441326731
07-Apr-20	0.099951491	0.0840029	0.121098776	-0.021147285	-3.030566626

3-Automobile

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
04-Feb-20	0.013978592	0.022945549	0.035570554	-0.021591962	-2.007966814
06-Mar-20	-0.008484571	-0.025119871	-0.039365672	0.030881100	2.871819884
09-Mar-20	-0.038867476	-0.050194997	-0.078458958	0.039591482	3.68185083
12-Mar-20	-0.084967185	-0.086668953	-0.135323551	0.050356367	4.682942442
13-Mar-20	0.024331144	0.037358498	0.058041010	-0.033709866	-3.134883835
16-Mar-20	-0.056277686	-0.079174192	-0.123638871	0.067361185	6.264323094
17-Mar-20	-0.006842667	-0.025364087	-0.039746416	0.032903748	3.059918135
18-Mar-20	-0.050777889	-0.057167926	-0.089330078	0.038552189	3.585200719
19-Mar-20	-0.062842025	-0.024546646	-0.038471987	-0.024370037	-2.266316854
20-Mar-20	0.035954264	0.056691389	0.088181887	-0.052227622	-4.856961788
23-Mar-20	-0.149055198	-0.139037542	-0.216968616	0.067913418	6.315678563
24-Mar-20	0.01434597	0.024762317	0.038402979	-0.024057009	-2.237206414
25-Mar-20	0.050439062	0.064145468	0.099803142	-0.049364080	-4.590663706
26-Mar-20	0.025037692	0.038166585	0.059300856	-0.034263163	-3.186338331

27-Mar-20	-0.024521229	0.002173198	0.003185492	-0.027706720	-2.576615137
31-Mar-20	0.013222964	0.037524731	0.058920514	-0.04569755	-4.096683488
01-Apr-20	-0.015710447	-0.040826841	-0.064123217	0.04841277	4.340096897

4-FMCG

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
14-Jan-20	0.013965892	0.002652699	0.002200721	0.011765172	2.035261887
12-Feb-20	0.018622445	0.007676175	0.005931200	0.012691245	2.195463758
13-Mar-20	0.004780947	0.037358498	0.027973561	-0.023192615	-4.012099934
17-Mar-20	0.008952968	-0.025364087	-0.018604798	0.027557767	4.767229389
18-Mar-20	-0.03027125	-0.057167926	-0.042222616	0.011951362	2.067471037
20-Mar-20	0.078627965	0.056691389	0.042330341	0.036297624	6.279140875
24-Mar-20	0.031889814	0.024762317	0.018619523	0.013270291	2.295633098
25-Mar-20	0.022162991	0.064145468	0.047865808	-0.025702817	-4.446340806
26-Mar-20	0.048199025	0.038166585	0.028573654	0.019625371	3.395001016
30-Mar-20	0.003532929	-0.044767781	-0.032679768	0.036212696	5.997368459
31-Mar-20	0.055993139	0.037524731	0.028128151	0.027864988	4.614862161
03-Apr-20	0.006766063	-0.020811641	-0.014978	0.021744062	3.601144517
07-Apr-20	0.079906028	0.084002906	0.062471992	0.017434036	2.88733914
09-Apr-20	0.003920888	0.040670419	0.030452575	-0.026531686	-4.394047267
15-Apr-20	0.040457914	-0.00765107	-0.005253336	0.04571125	7.570472228
16-Apr-20	-0.00590043	0.007534317	0.005967511	-0.011867941	-1.965509949

5- IT

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
04-Feb-20	0.017954402	0.022945549	0.004342014	0.013612388	1.264304006
09-Mar-20	-0.0530002	-0.050194997	-0.011637172	-0.041363024	-3.841753334
12-Mar-20	-0.09246165	-0.086668953	-0.019605722	-0.072855929	-6.766780675
16-Mar-20	-0.08375274	-0.079174192	-0.017968324	-0.065784420	-6.109986492
17-Mar-20	-0.02868558	-0.025364087	-0.006212305	-0.022473278	-2.087294024
19-Mar-20	-0.03577223	-0.024546646	-0.006033717	-0.029738512	-2.762081137
20-Mar-20	0.086404197	0.056691389	0.011714546	0.074689650	6.937094712
23-Mar-20	-0.10064981	-0.139037542	-0.031046810	-0.069602996	-6.464651697
24-Mar-20	0.059506415	0.024762317	0.004738928	0.054767488	5.086745571
31-Mar-20	0.035474736	0.037524731	0.006744226	0.02873051	2.610752714
01-Apr-20	-0.05788108	-0.040826841	-0.008282077	-0.049599008	-4.507081297
03-Apr-20	-0.03083794	-0.020811641	-0.004443552	-0.026394392	-2.398468744
07-Apr-20	0.074937187	0.084002906	0.015657834	0.059279353	5.386738057

6-Pharma

Date	Return	Market Return	Normal Return	Abnormal Return	t Stats of AR
03-Mar-20	0.049894857	0.015203504	0.008923977	0.040970881	3.77864453

04-Mar-20	0.020735227	-0.004637705	-0.002755801	0.023491028	2.166520338
12-Mar-20	-0.09350741	-0.086668953	-0.051044531	-0.042462879	-3.916247938
13-Mar-20	0.045812008	0.037358498	0.021965793	0.023846215	2.19927834
25-Mar-20	0.012700635	0.064145468	0.037734281	-0.025033646	-2.308792212
30-Mar-20	0.012101643	-0.044767781	-0.024820801	0.036922444	3.403514926
03-Apr-20	0.046560122	-0.020811641	-0.011683001	0.058243123	5.368857433
07-Apr-20	0.098649966	0.084002906	0.045798405	0.052851561	4.871862704
08-Apr-20	0.034755767	-0.004954132	-0.002986575	0.037742342	3.4790932
09-Apr-20	0.045119823	0.040670419	0.022034411	0.023085413	2.128015876
13-Apr-20	0.027337397	-0.013040241	-0.007421083	0.03475848	3.204040481