

A STUDY ON THE IMPACT OF COVID-19 ON VARIOUS SECTORS OF THE INDIAN MARKETS

Submitted in partial fulfilment for the award of
Post Graduate Diploma in Management (PGDM)
(Approved by AICTE)

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2020-22

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DECLARATION

I, hereby declare that this Project Report submitted by me to N. L. Dalmia Institute of Management Studies and Research is a Bonafide work undertaken by me and it is not submitted to any other University or Institution for the award of any degree Diploma/Certificate or published any time before.

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ACKNOWLEDGEMENT

It has always been my sincere desire as a management student to get an opportunity to express my views, skills, attitude and talent in which I am proficient. A project is one such avenue through which a student who aspires to be a future manager does something creative. This project has given me the chance to get in touch with the practical aspects of finance.

I am extremely grateful to N.L. Dalmia Institute of Management Studies and Research for having prescribed this project work as part of the academic requirement in the Post Graduate Diploma in Management (PGDM) course. I wish to appreciate N.L. Dalmia Institute of Management Studies and Research for providing all the required facilities.

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I also appreciate all the support provided by the library staff and the teaching and non-teaching staff of N.L. Dalmia Institute of Management Studies and Research for providing all the necessary academic content and resources to enable the completion of my project.

I would like to extend my gratitude to my colleagues & all others friends and well-wishers who have helped me at various levels in completing this project successfully.

CERTIFICATE

This is to certify that project titled **A Study on the impact of COVID-19 on various sectors of the Indian Markets** is successfully completed by Mr. Ronak Shah during the IV Semester, in partial fulfilment of the Post Graduate Diploma in Management approved by AICTE for the academic year 2021-2022.

This project work is original and not submitted earlier for the award of any degree / diploma or Associate ship of any other University/ Institution.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO THE TOPIC

Coronavirus, or Covid-19, was first identified in Wuhan, China. Subsequently, various cases were followed and the World Health Organization announced it a worldwide pandemic on 11 March 2020. Unlike in developed economies, developing markets, like India with (i) generally unfortunate public wellbeing foundation, (ii) an upset and troubled financial area and security markets, and (iii) lull in monetary development face outrageous hardships while the impacts of the pandemic unfurl. On 24 March 2020, a cross country lockdown was declared in India to diminish the unfriendly results. Such social distancing measures and limitations on transportation contrarily affected firms' efficiency through expanding activity costs, diminishing income, and income challenges. In India the main instance of Coronavirus was accounted for in Kerala. On January 27, 2020, a 20year-old female introduced to the Emergency Department in General Hospital. The beginning of the COVID-19 pandemic and lockdown declarations by state run administrations have made vulnerability in business activities all around the world. Interestingly, a health shock has affected the securities markets powerfully. India, one of the major developing business sectors, has seen a gigantic fall of around 40% in its significant stock indices' value. All the areas were affected briefly, yet the financial sector confronted just terrible. Areas like pharma, consumer goods, and IT had positive or restricted effects. NIFTY quickly dropped almost 50% of its market value contrasted with its worth toward the beginning of the year. The unexpected fall in the indices impacted the individual portfolios of investors. Be that as it may, dynamic retail financial backers tracked down this as a potential chance to time the market, invest, and procure impressive returns. A sum of 10 million new Demat accounts were opened in 2020 attributable to the minimal expense of exchanges and an industry-wide shift to online trading. Reports show that the MSCI World Index, which incorporates stocks from 23 developed nations and 24 developing markets, lost 10.7% of its worth between 23 January and 6 March 2020. The episode of COVID-19 impacted economies all around the world and India was one of them. The pandemic made an exceptional worldwide shock, expanding the financial

market volatility. The worldwide economy crashed, joblessness expanded, and oil prices fell during the underlying stage yet expanded essentially at the later stage.

Since the Indian stock market is very much coordinated and reacts to worldwide circumstances, explaining the effect of COVID-19 on the Indian stock market is significant. One such strategy to quantify this effect is the utilization of event study methodology. An event study inspects the effect of a specific event on the financial performance of a security, for example, company stock. An event study analyses the impact of a particular event on an organization by taking a gander at the associated impact on the organization's stock.

1.2 INTRODUCTION TO THE INDUSTRIES

1. Nifty Bank, or Bank Nifty, is associate index of the foremost liquid and enormous capitalized Indian banking stocks. It provides investors with a benchmark that captures the capital market performance of Indian bank stocks. The index has twelve stocks from the banking sector. The top-ranking stocks of the index include HDFC Bank Ltd. 31.61%, ICICI Bank Ltd. 18.20%, Axis Bank Ltd. 13.02%, Kotak Mahindra Bank Ltd. 12.74% and State Bank of India 10.92%. Bank Nifty, like others, is computed using free float market capitalisation method. Its index variant includes NIFTY Bank Total Returns Index or Bank NIFTY TRI. The index was launched in 2003.
2. The NIFTY IT index captures the performance of the Indian IT corporations. The NIFTY IT Index includes ten corporations listed on the NSE. The top stocks in Nifty IT embrace Tata Consultancy Services Ltd. 27.43% weight, Infosys Ltd. 27.04%, HCL Technologies Ltd. 8.52%, Wipro Ltd. 8.46% and Tech Mahindra Ltd. 8.22%. The Nifty IT index variant is NIFTY IT Total Returns Index.
3. NIFTY Realty Index is formulated to replicate the behaviour and performance of Real Estate corporations. The Index comprises of ten companies listed on NSE. NIFTY Realty

Index is computed by exploiting free float market capitalization methodology, here the level of the index reflects the entire free float market value of all the stocks in the index relative to particular base market capitalization value. NIFTY Realty Index can be used for a spread of functions such as benchmarking fund portfolios, launching of index funds, ETFs and structured products.

4. NIFTY Infrastructure Index includes corporations belonging to Telecom, Power, Port, Air, Roads, Railways, shipping and other Utility Services providers. The Index comprises of maximum 30 companies listed on National Stock Exchange of India (NSE). NIFTY Infrastructure Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value. NIFTY Infrastructure Index can be used for a variety of purposes such as benchmarking fund portfolios, launching of index funds, ETFs and structured products.
5. NIFTY Energy sector Index incorporates organizations having a place with Petroleum, Gas and Power areas. The Index involves 10 organizations recorded on National Stock Exchange of India (NSE). NIFTY Energy Index is processed utilizing free float market capitalization strategy, wherein the level of the list mirrors the complete free float market worth of the multitude of stocks in the file comparative with specific base market capitalization esteem.
6. The NIFTY FMCG Index is designed to reflect the behaviour and performance of FMCGs (Fast Moving Consumer Goods) which are non-durable, mass consumption products and available off the shelf. The NIFTY FMCG Index comprises of 15 stocks from FMCG sector listed on the National Stock Exchange (NSE). NIFTY FMCG Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value.

7. NIFTY Pharma Index captures the performance of the pharmaceutical sector. The Index comprises 20 companies listed on National Stock Exchange of India (NSE). NIFTY Pharma Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value.
8. The NIFTY Auto Index is intended to mirror the conduct and execution of the Automobiles section of the financial market. The NIFTY Auto Index involves 15 tradable, exchange listed organizations. The index represents auto related areas like Automobiles 4 wheelers, Automobiles 2 and 3 wheelers, Auto Ancillaries and Tires. NIFTY Auto Index is processed utilizing free float market capitalization technique, wherein the index reflects the total free float market worth of the multitude of stocks in the record value of all the stocks in the index relative to particular base market capitalization value.
9. The Nifty Financial Services Index is designed to reflect the behaviour and performance of the Indian financial market which includes banks, financial institutions, housing finance, insurance companies and other financial services companies. The Nifty Finance Index comprises of 20 stocks that are listed on the National Stock Exchange (NSE). NIFTY Financial Services Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value.
10. The NIFTY Media Index is designed to reflect the behaviour and performance of the Media & Entertainment sector including printing and publishing. The NIFTY Media Index comprises of maximum 15 stocks from Media & Entertainment sector that are listed on the National Stock Exchange (NSE). NIFTY Media Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value.

11. The NIFTY Metal Index is intended to mirror the conduct and execution of the Metals area (counting mining). The NIFTY Metal Index includes 15 stocks that are recorded on the National Stock Exchange (NSE). Metal Index is figured utilizing free float market capitalization strategy, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value.

1.3 PROBLEM STATEMENT

Studying and understanding the to the impact of Covid-19 on stock prices of various companies from different sectors in the Indian Context.

1.4 OBJECTIVES

1. To understand the changes in equity markets of India due to COVID-19
2. To analyse the repercussions of Pandemic situation (COVID -19) on selected Indian stock prices from 11 different industries
3. To analyse the market capitalization correlation between the performances of shares and the growth of the share market
4. To make concrete and justifiable conclusions and recommendations based on the findings of the study

CHAPTER 2

RESEARCH METHODOLOGY

2.1 RESEARCH DESIGN

The secondary data is collected from yahoo finance and NSE website. The data of past indices also have been collected from NSE website. The secondary data has been collected to cover every aspect of the study. The secondary data shows the movement in the closing prices of companies of Indian stock market on a day to day basis, pre and post COVID-19. This data is used in combination as per need of the study. The data has different merits and demerits and serves our purpose of the research study.

2.2 DATA

This study uses event study approach to empirically test the movement of stock prices of select companies with largest market capitalization from various industries/sectors listed in the NSE. The improbable event that disrupted human activities and created havoc is the COVID-19. It is purely based on the secondary data. This paper uses the daily closing share prices of select companies with largest market capitalization from various industries/sectors from October 2018 to March 2020 considered as Pre-Corona period, and from March 2020 to September 2021 considered as Post Corona period and 31st March 2020 is selected as the Event Date.

2.3 SAMPLE

I used the data of Top 5 companies based on their Market Capital from the NIFTY Bank, Realty, Infra, Energy, FMCG, Pharma, IT, Auto, Financial Services, Media and Metal Index respectively, reflecting data of 55 companies and Nifty 50 and 200 Index over the period from 1st October, 2018 to 30th September, 2021. Data were obtained from Yahoo Finance and NSE website. Daily stock closing prices and market capitalization were obtained.

2.4 MODEL SPECIFICATION

In this study, the work depends on the event study method as we try to uncover how financial business sectors, especially the securities exchanges, act after the flare-up of the Covid news. An event study, also known as event-history analysis, employs statistical methods, using time as the dependent variable and then looking for variables that explain the duration of an event—or the time until an event occurs.

The event study methodology is viewed as quite possibly the most famous and reasonable technique to analyse the effect of an occasion on securities returns over an event period. For the most part, the event study methodology is utilized to analyse the connection between the performance of the financial exchange and the occurrence of corporate occasions, for example, consolidations and acquisitions, splits, dividends, bonus issues, amalgamations, and so forth. Various scientists utilize the event study methodology to concentrate on the effect of a non-corporate occasion like the episode of the sickness (outbreak of disease) on securities exchanges.

2.5 EVENT WINDOW

To examine the effect of COVID-19 on stock indices, the event window chosen is of 300 days, excluding the event date i.e. 31st March 2020. The impact of the COVID-19 pandemic on stock returns is longer as compared to that of corporate events since there were different waves of the virus that hit the market and hence to get a better understanding, the event window taken is of longer duration.

2.7 ESTIMATION MODEL

The initial step in an event analysis is to outline the event of interest and the event window. The Government of India imposed a cross-country lockdown on the evening of 24th March 2020. Since the effect of the declaration on the stock market was seen after some days and the financial year-end was close, 31st March 2020 was the event of interest. The event window is the time span during which the stock prices are affected by a particular event. The event window comprises of two parts—the anticipation window and the adjustment window. The day of effect or the event day is set as day 0. The 150 days before the event are called

the anticipation window and the 150 days after the event constitute the adjustment window. This study strayed from the usual practice of choosing small anticipation and adjustment window since the infection is tossing shocks daily and is still in the phase of being discovered around the globe, a 150day event window helps capture investor behaviour in a prominent manner. The subsequent stage is to define the estimation window. The estimation window is a pre-decided time span before the occurrence of an event. The estimation period is day -366, -151, i.e., it ends 150 days prior to the event day and covers a period of 300 trading days.

Once we have defined the event window, event date and window estimation period, Stock Returns and Market Returns is to be calculated using the formula: -

$$R = \ln \left(\frac{P_{xt}}{P_{x,t-1}} \right)$$

where, R is return of index; P_{xt} is the price of index x at t day; $P_{x,t-1}$ is the price of index x at t-1 day.

Normal Returns/ Expected Returns are calculated using the formula: -

$$E(R_{it}) = \alpha_i + \beta_i R_{mt}$$

where R_{mt} is the Market Return, Alpha(α) represents the intercept term of the company and in general the alpha of the companies will be close to 0 because in an equilibrium the companies cannot earn large alpha for any extended period of time. The Beta(β) represents the Slope function which helps us understand the sensitivity responsiveness to the general market movements.

The next stage is to Calculate abnormal returns. An abnormal return describes the unusually enormous profits or losses created by a given investment or portfolio over a predefined period. The performance wanders from the investors expected, or anticipated, Rate of Return (RoR)—the assessed risk-adjusted return based on an asset pricing model, or using a long-run historical average or multiple valuation techniques.

Step 4 is to calculate average abnormal returns. The daily average abnormal return (AAR) is given by:

$$AAR = \frac{\sum_{i=1}^N \xi_{i,t}}{N}$$

where N is the number of firms for which the average abnormal returns are being calculated.

To investigate the accumulated impacts of the event during a specified time period, cumulative average abnormal returns (CAARs) are obtained. CAAR refers to the aggregate of daily AARs for the predefined event window. CAAR for the pre-specified window is calculated using Equation: -

$$CAAR(t_0, t_1) = \sum_{t=t_0}^{t_1} AAR_t$$

where t_0 and t_1 indicate the event window.

CHAPTER 3

LITERATURE REVIEW

- **Bhanwar Singh, Rosy Dhall, Sahil Narang and Savita Rawat (2020)** concentrated on the effect of the COVID-19 flare-up on the securities exchanges of G-20 nations. They utilized occasion concentrate on technique to quantify unusual returns (ARs) and board information relapse to clarify the reasons for ARs. Their example comprised of files in G-20 nations.
- **Ahmed S. Baig and Mengxi Chen (2021)** stated that the anecdotal evidence seemed to suggest that the initial public offering (IPO) market performed remarkably well through the COVID-19 pandemic. They carried out a comprehensive analysis of IPOs during the pandemic vis-a-vis IPOs before the pandemic and their findings implied that IPOs during the pandemic experienced greater information uncertainty compared to those before the pandemic, and that greater uncertainty was mainly driven by the IPOs from the high-technology and the healthcare sectors. Also, they found that an average IPO firm experienced larger under-pricing and more post-IPO return volatility as the pandemic and the associated government responses increased in severity. Overall, their study indicated that the COVID-19 pandemic had an adverse impact on the IPO market.
- **Mieszko Mazur, Man Dang, and Miguel Vega (2020)** their paper investigated the US stock market performance during the crash of March 2020 triggered by COVID-19 and they found that natural gas, food, healthcare, and software stocks earned high positive returns, whereas equity values in petroleum, real estate, entertainment, and hospitality sectors fell dramatically. In addition to this, loser stocks exhibited extreme asymmetric volatility that correlated negatively with stock returns. They also investigated the implications for the stock price volatility and finally by using hand collected data they examined firms' immediate responses to COVID-19. Lastly, they also showed that a subset of poorest performers responded to the revenue shock adequately by cutting costs,

including remuneration for top management and board members, whereas other firms increased salaries and implemented new cash awards.

- **Abdullah M. Al-Awadhi, Khaled Alsaifi, Ahmad Al-Awadhi, and Salah Alhammadi (2020)** investigated whether contagious infectious diseases affected the stock market outcomes. As a natural experiment, they used panel data analysis to test the effect of the COVID-19 virus on the Chinese stock market. After analysing all the stocks of Hang Seng Index and Shanghai Stock Exchange Composite Index during the COVID-19, they found that the pandemic disease interacted negatively with stock market returns and more specifically stock returns are significantly negatively related to both the daily growth in total confirmed cases and the daily growth in total cases of death caused by COVID-19.
- **Sharif Mazumder and Pritam Saha (2021)** analysed the relationship between COVID-19 related fear and short-term IPO performance. Though the average market-adjusted initial return of IPOs in the year 2020 was higher than that of the last four decades, it decreased if fear of pandemic increased. The evidence was robust when they used matching firm-adjusted initial returns. They also analyzed the persistence of performance after the IPO date and the results showed that the performance of IPO firms was more sensitive to the fear of the pandemic than the performance of similar existing firms.
- **Dhananjay Ashri, Bibhu Prasad Sahoo, Ankita Gulati, and Irfan UL Haq (2021)** determined the repercussions of the coronavirus on the Indian financial markets by taking the eight sectoral indices into account. Their study deduced the impact of virus outbreak on the various sectoral indices of the Indian stock market. They empirically analysed the daily returns of eight sectoral indices: Nifty Auto, Nifty FMCG, Nifty IT, Nifty Media, Nifty Metal, Nifty Oil and Gas, Nifty Pharma, and Nifty Bank and the results unveiled that pandemic had a negative impact on the automobile, FMCG, pharmaceuticals, and oil and gas sectors in the short run. Whereas, in the long run,

automobile, oil and gas, metals, and the banking sector have suffered enormously. In addition to this, the results unveiled that no selected indices had underperformed the domestic average, except NIFTY Auto.

- **Sharif Mazumder and Pritam Saha (2021)** investigated the link between COVID-19-related fear and IPO performance in the short term. They found out IPO initial returns in 2020 were expected to be roughly 9.30 percent greater than in the previous 40 years. Given the outperformance of the initial return, they looked at whether initial returns were responsive to fear of a pandemic. They discovered that the initial return was adversely associated with pandemic fear using the fear index. When they compared the IPO firms to the IPO firms from the prior year, the results were strong. Furthermore, even after entropy balancing, public fear and sentiment affected newer firms more than older firms for post-IPO early returns.
- **Khushboo Gupta, Seshanwita Das, and Kanishka Gupta (2021)** evaluated the impact of novel COVID-19 on the returns and volatility of Indian stock markets with special reference to equity investment strategies of the Bombay Stock Exchange. The GARCH model was used in this research to investigate the volatility of various strategies. During the crisis, total volatility increased for all strategies except dividend stability and low volatility indices, according to the findings. Investors that pursued the IPO, SME-IPO, enhanced value, quality, and momentum strategies were probably even more prepared for market uncertainty. COVID-19 had the greatest impact on IPO. IPO investors were advised to exercise extreme caution.
- **Philip Reilly (2020)** stated that the biotech sector would have a valuation that was equal to or greater than that of late 2019. The preclinical research would be extensive. Clinical trials will be about the same as they were a year ago. Clinical trial regulatory review would be more efficient. New biotech businesses will seek funding, and the number of new IPOs will be like that of 2019. As large pharmaceutical corporations acquire smaller companies (for example, Alexion's announcement on May 5 that it would acquire Portola

at a far lower valuation than the company's value in mid-2019), M&A activity will pick up.

- **Pushpa A, Raju V, Jagadheesh K K and Gaadha B (2021)** examined the effects of the pandemic crisis (COVID -19) on selected Indian stock prices. The research was carried out using an event study that looked at the daily closing share prices of selected pharmaceutical businesses listed on the BSE stock exchange in India from June 2019 to December 2019 (pre-Corona) and January 2020 to June 2020 (during the Corona crisis).
- **M. Praveen Kumar & N.V. Manoj Kumara (2020)** studied the influence of COVID-19 on the Indian stock market and share performance is the subject of this research paper. In other words, the paper evaluated stock market data from Jan'20 to Jun'20 to examine the market capitalization link between share performance and share market growth. It also stated that it would be unrealistic to expect a speedy economic recovery from the current effects of the pandemic unless a medical vaccine or other medical remedy for the Covid-19 was discovered. Normalcy would return to the business and economy after the epidemic was finished, the stock market would begin to move in a favourable direction, and, as in the past, recovery would be faster than projected.

CHAPTER 4

DATA ANALYSIS & INTERPRETATIONS

4.1 NIFTY BANK

Nifty Bank	Market cap
SBI	448640.22
HDFC Bank	843374.98
Kotak	357701.06
Axis	218576.54
ICICI	558655.78

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.1.A: Group Information

Descriptive Statistics	SBIN		HDFC BANK		KOTAK BANK		ICICI BANK		AXIS BANK	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	300.777	294.889	1137.298	1305.782	1432.014	1620.479	419.534	509.230	692.393	598.926
Std. Dev	34.756	102.535	104.101	228.524	181.225	265.396	67.898	134.910	84.036	145.110
25th Quartile	280.925	191.987	1057.487	1080.063	1258.475	1342.462	363.500	368.725	657.025	443.688
50th Quartile	300.250	275.425	1143.600	1407.075	1471.300	1732.850	409.000	526.650	716.900	627.925
75th Quartile	324.150	406.763	1227.800	1495.050	1600.925	1815.013	464.350	632.363	746.650	738.488
100th Quartile	372.400	463.700	1302.400	1626.650	1729.500	2068.200	372.400	730.000	822.800	812.150

Table 4.1.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	SBIN	HDFC Bank	Kotak Bank	Axis Bank	ICICI Bank
INTERCEPT (α)	0.000159111	0.00040213	0.001362891	0.001313998	0.000576
BETA (β)	1.42770059	0.76294918	0.917675892	1.194789072	1.125506

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cumulative Abnormal Return (-151 to +151 days)				
SBIN	HDFC Bank	Kotak Bank	Axis Bank	ICICI Bank
-40.91%	6.47%	-26.28%	-30.40%	-12.02%

Cumulative Average Abnormal Return	-37.12%
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Table 4.1.C: Abnormal Return

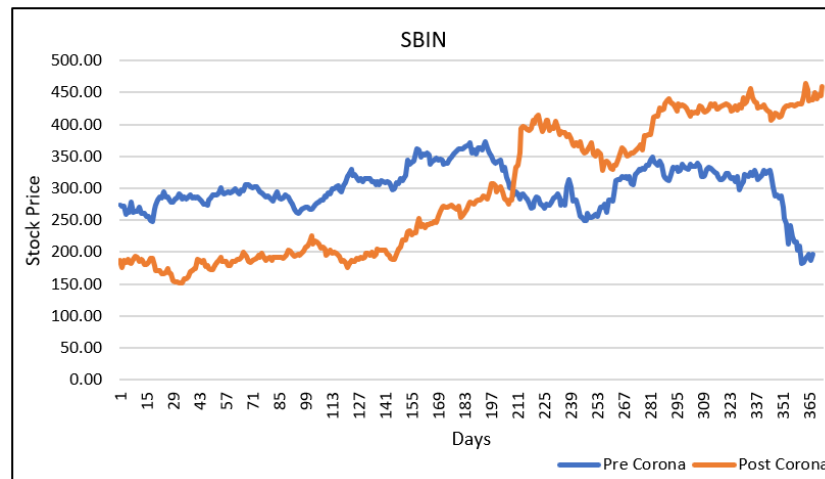


Fig. 4.1.1: SBI Stock Price

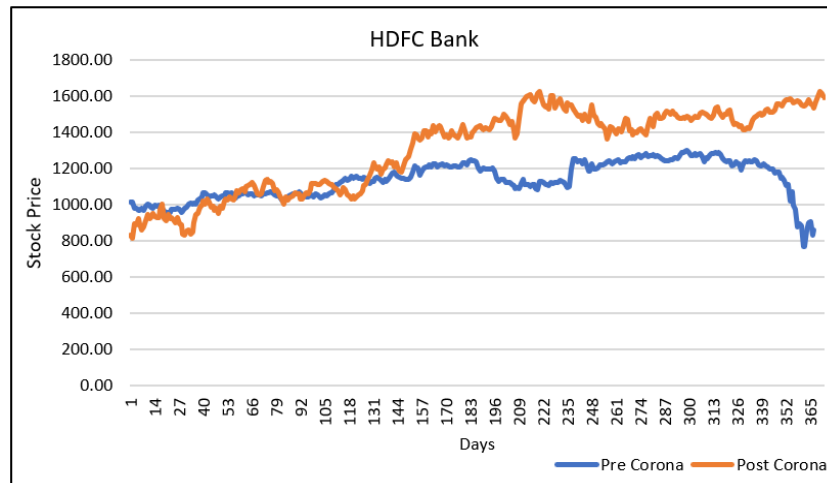


Fig. 4.1.2: HDFC Bank Stock Price

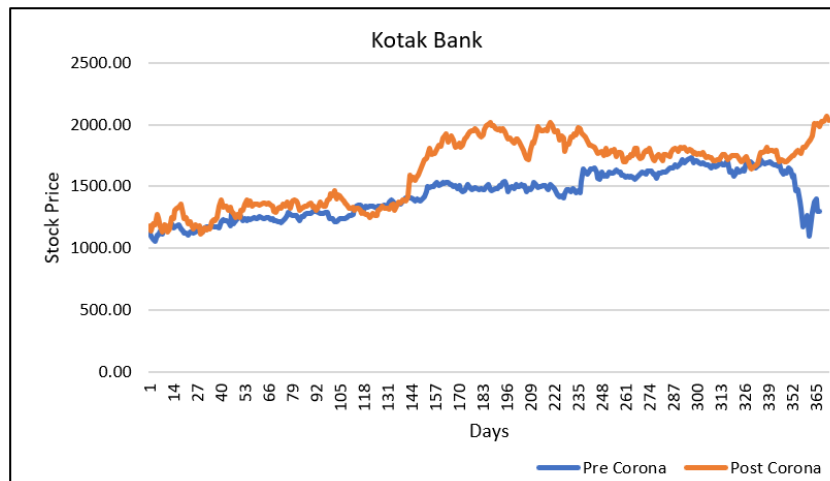


Fig. 4.1.3: Kotak Bank Stock Price

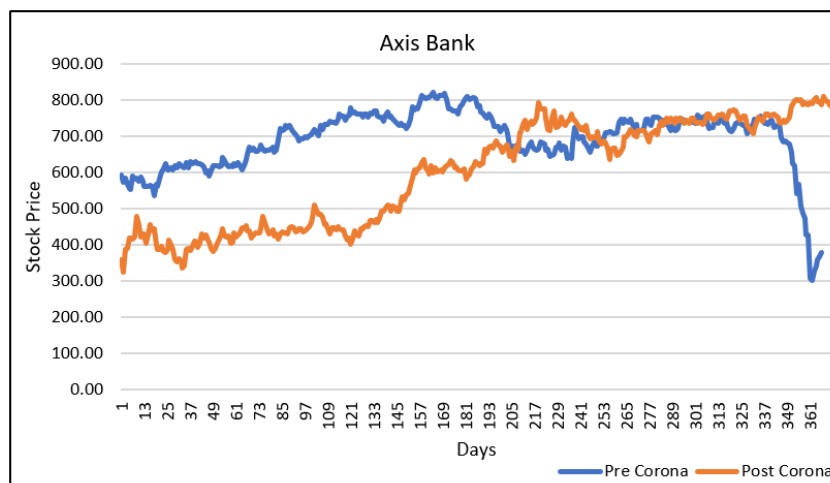


Fig. 4.1.4: Axis Bank Stock Price

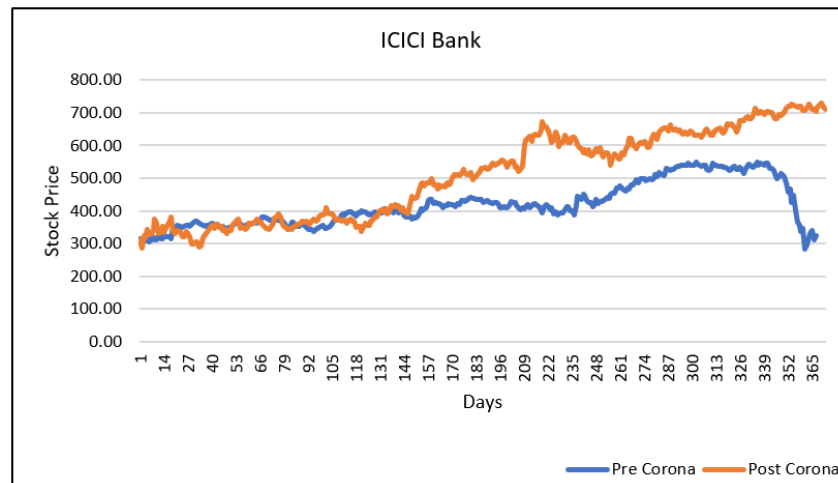


Fig. 4.1.5: ICICI Bank Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: SBI, HDFC Bank, Kotak Bank, ICICI Bank, and Axis Bank of pre and during corona pandemic periods are analyzed from the results in Table 4.1.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the bank sector we have taken 5 bank, off which SBI, HDFC, and ICICI have shown a positive impact and an upward trend in the post COVID time period, but we do have the outliers i.e. Axis and Kotak Bank which have shown a sideways trend in both the period for a certain period of time. So, we can conclude that new investors in the markets had a good impact on the banking sector overall. Many people had followed herd mentality and had invested money where others were investing.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the investors had higher expectations from the banking sector in the pre-corona period but the sector was not able to deliver those returns and hence the CAR and CAAR of the banking sector is Negative.

4.2 NIFTY REALTY

Nifty Realty	Market cap
DLF	97799.57
Godrej Prop	50005.8
Oberoi Realty	33902.27
Prestige	20231.49
Phoenix mills	17063.15

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.2.A: Group Information

Descriptive Statistics	DLF		GODREJ PROP		OBEROI REALTY		PRESTIGE		PHOENIX MILLS	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	184.836	229.310	846.917	1180.031	500.011	510.387	263.779	267.445	671.922	705.169
Std. Dev	28.302	76.100	153.394	333.860	52.631	136.902	56.218	65.192	97.097	120.318
25th Quartile	165.500	154.375	713.225	885.862	460.500	379.500	209.800	235.062	600.900	588.950
50th Quartile	178.100	234.350	894.350	1277.975	511.500	533.200	267.450	271.900	648.000	729.225
75th Quartile	196.350	297.700	955.025	1428.125	537.950	590.200	299.725	292.150	721.175	809.125
100th Quartile	262.850	420.000	1168.800	2309.500	623.750	948.800	262.850	494.600	933.850	982.450

Table 4.2.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	DLF	GODREJ PROP	OBEROI REALTY	PRESTIGE	PHOENIX MILLS
INTERCEPT (α)	0.000658833	0.002000036	0.001291999	0.001539547	0.000874034
BETA (β)	1.744693987	1.178041011	0.84470706	0.978313489	0.457063079

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cumulative Abnormal Return (-151 to +151 days)				
DLF	GODREJ PROP	OBEROI REALTY	PRESTIGE	PHOENIX MILLS
-51.17%	-29.19%	-21.06%	-15.19%	-32.47%

Cumulative Average Abnormal Return	-58.89%
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Table 4.2.C: Abnormal Return

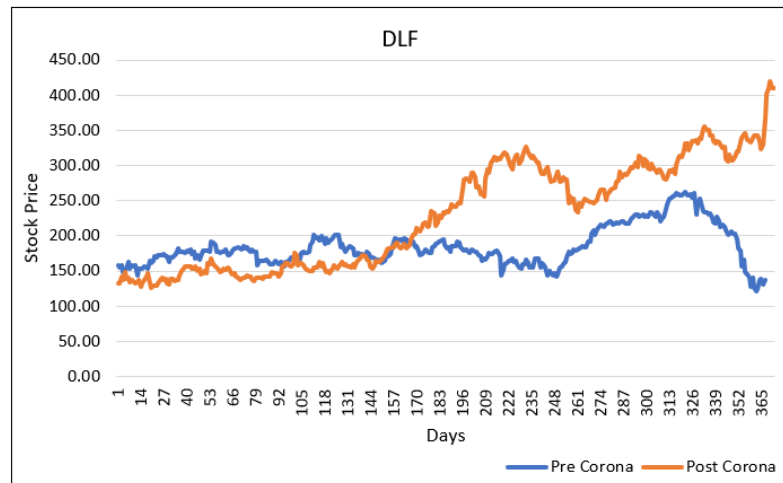


Fig. 4.2.1: DLF Stock Price

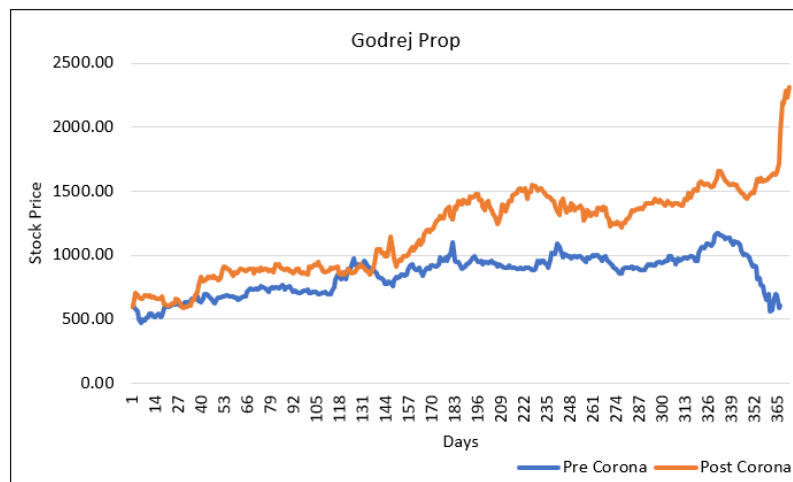


Fig. 4.2.2: Godrej Prop Stock Price

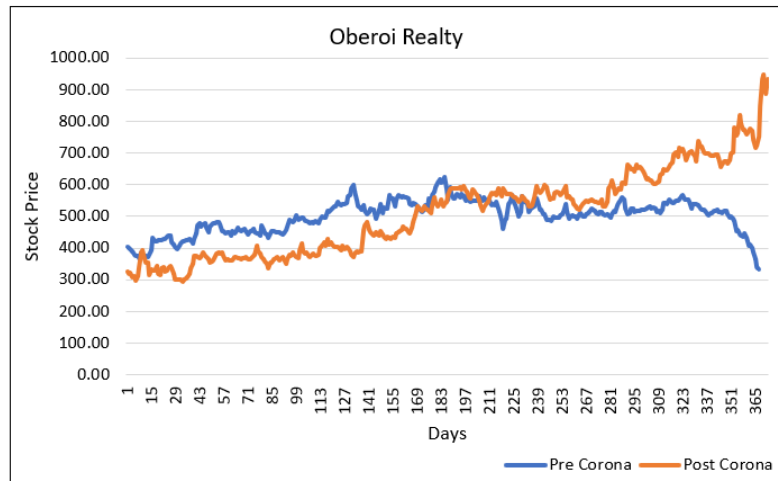


Fig. 4.2.3: Oberoi Realty Stock Price

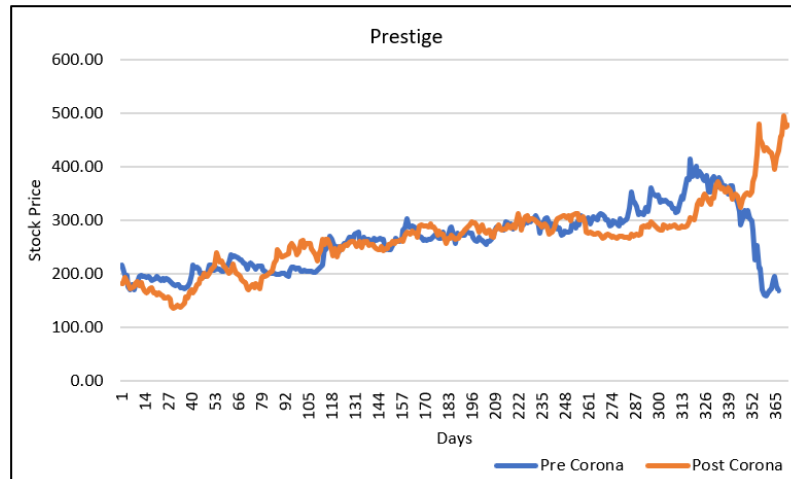


Fig. 4.2.4: Prestige Stock Price

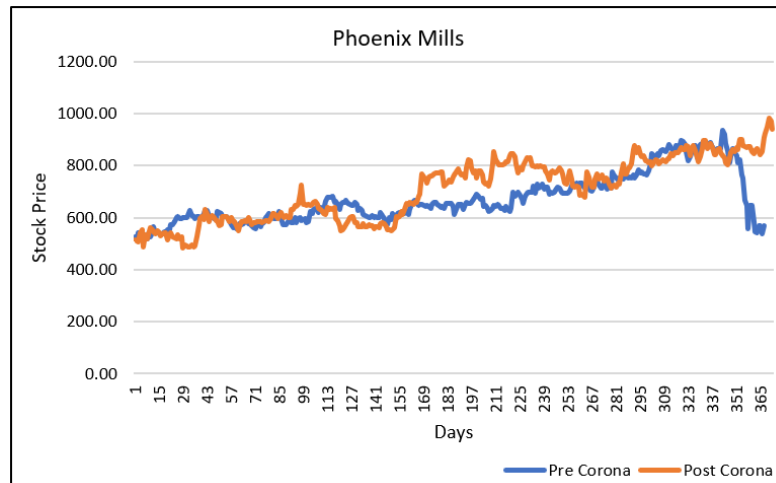


Fig. 4.2.5: Phoenix Mills Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: DLF, Godrej Prop, Oberoi Realty, Prestige and Phoenix Mills of pre and during corona pandemic periods are analyzed from the results in Table 4.2.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the realty sector we have taken 5 companies, off which DLF and Godrej Prop have shown a recovery in the fallen stock prices, and a further upward trend in the post COVID time period resulting in more than 2times of what the prices where on the event date, whereas Oberoi Realty, Prestige and Phoenix Mills have recovered the fallen prices while moving sideways for a certain period of time. The real estate sector registered a solid bounce back in 2021. The pandemic-infused patterns combined with low-interest rates, affordability, and other ideal variables prompted the extension in the realty sector.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the investors had higher expectations from the Realty sector specially from DLF and Phoenix Mills in the pre-corona period but the lack of employment and recession led to a slowdown in the demand of the residential segment which led to shortened housing sales, project launches, and price growth in India's residential realty sector thus the sector was not able to deliver those returns and hence the CAR and CAAR of the Realty sector is Negative.

4.3 NIFTY INFRA

Nifty Infra	Market Cap
Reliance	1676037.42
Bharti Airtel	388651.65
Larsen	274800.55
Ultra TechCement	212390.08
ONGC	205876.27

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.3.A: Group Information

Descriptive Statistics	RELIANCE		BHARTI AIRTEL		LT		ULTRA TECH		ONGC	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	1280.593	1984.042	361.313	540.004	1345.250	1227.732	4102.343	5417.510	138.688	95.105
Std. Dev	151.855	271.228	77.236	59.950	131.202	293.832	360.962	1455.488	24.291	19.646
25th Quartile	1155.943	1925.425	297.329	512.875	1300.025	928.150	3902.375	3939.137	126.925	77.850
50th Quartile	1268.476	2029.125	345.100	536.600	1358.750	1288.500	4100.150	5252.950	142.800	93.150
75th Quartile	1379.523	2139.288	408.275	567.338	1417.100	1499.837	4395.075	6694.775	155.125	114.063
100th Quartile	1594.833	2548.050	565.000	725.774	1596.000	1769.700	1594.833	8026.250	181.450	144.750

Table 4.3.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	Reliance	Bharti Airtel	Larsen	Ultra TechCement	ONGC
INTERCEPT (α)	0.000159355	0.000818194	0.000335235	0.000104043	-0.00167233
BETA (β)	1.30936664	1.176204477	1.057771823	1.167356939	1.11272018

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
Reliance	Bharti Airtel	Larsen	Ultra TechCement	ONGC
9.86%	-49.01%	-24.37%	-6.36%	-14.15%

Cumulative Average Abnormal Return	-12.30%
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Table 4.3.C: Abnormal Return

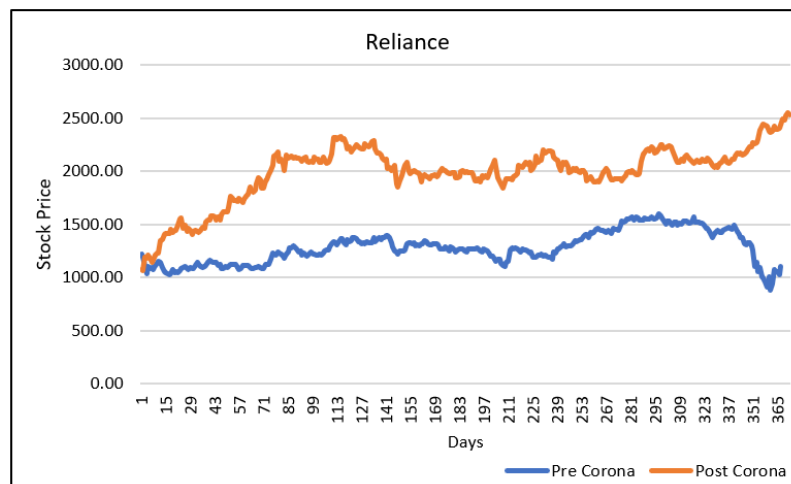


Fig. 4.3.1: Reliance Stock Price

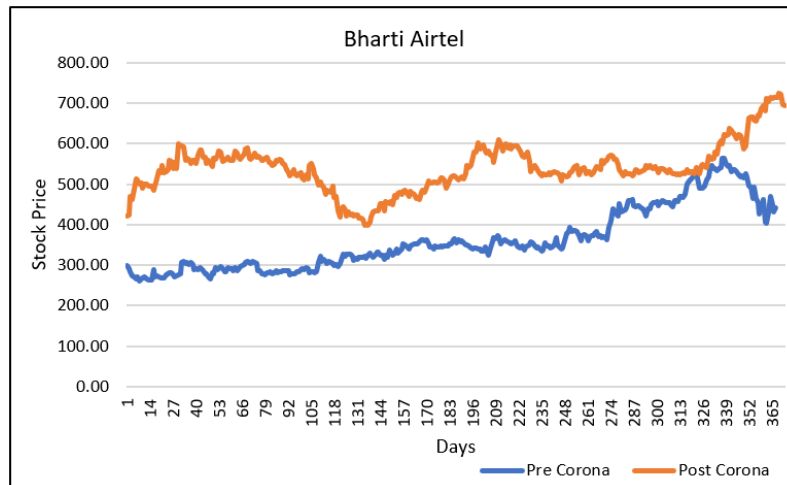


Fig. 4.3.2: Bharti Airtel Stock Price

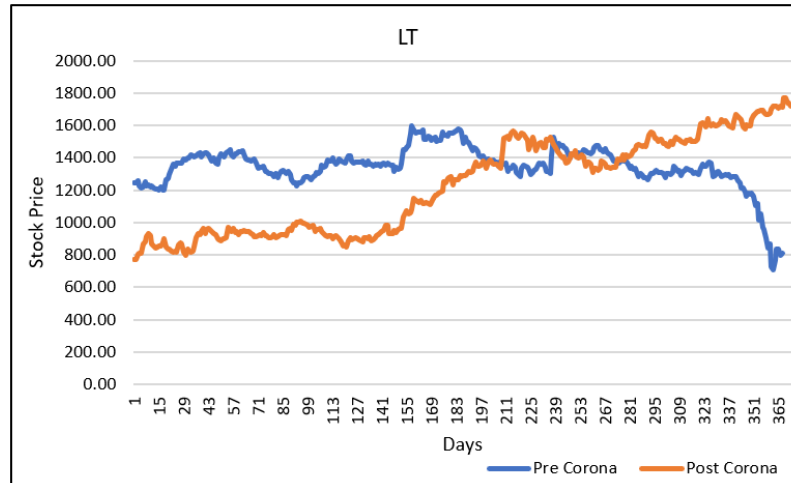


Fig. 4.3.3: LT Stock Price

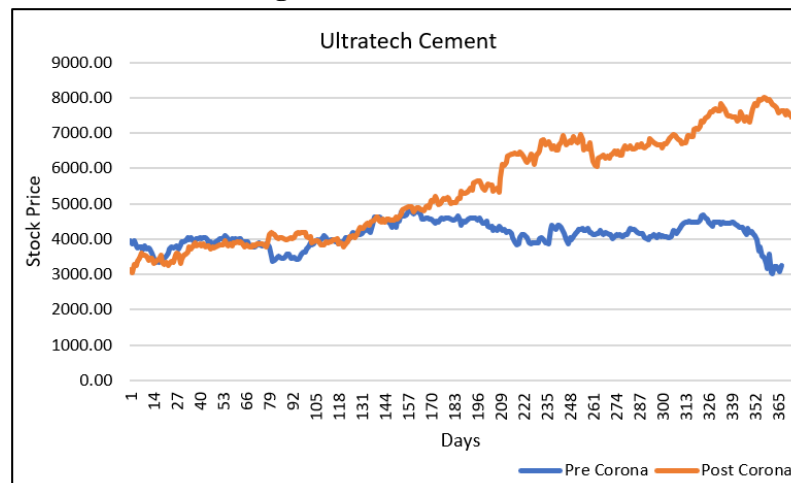


Fig. 4.3.4: Ultratech Cement Stock Price

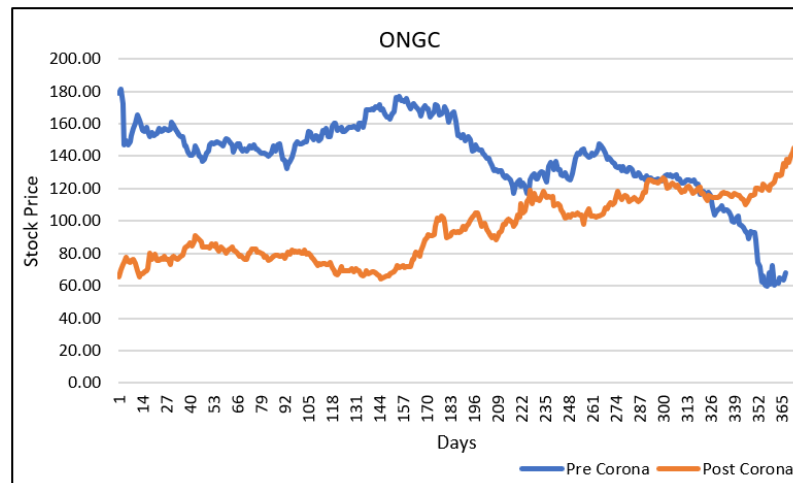


Fig. 4.3.5: ONGC Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Reliance, Bharti Airtel, LT, Ultratech Cement, and ONGC of pre and during corona pandemic periods are analyzed from the results in Table 4.3.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the Infrastructure sector we have taken 5 companies, off which Reliance, Bharti Airtel, and Ultratech Cement showed an upward trend in the post COVID time period resulting in positive returns to the investors, whereas ONGC took a huge hit and saw continuous fall in prices in pre-corona period and gradual recovery post the event date. The Infra sector registered a bounce back in 2021 which can be attributed to increased government focus and spending in this sector.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the investors had higher expectations from the Infrastructure sector specially from Bharti Airtel in the pre-corona period but the activity in Infrastructure sector declined by almost 43% in FY20 thus the sector was not able to deliver those returns and hence the CAR and CAAR of this sector is Negative.

4.4 NIFTY ENERGY

Nifty Energy	Market Cap
Reliance	1676037.42
ONGC	205876.27
Power Grid Cop	150041.99
NTPC	130032.29
IOC	114570.31

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.4.A: Group Information

Descriptive Statistics	RELIANCE		ONGC		POWER GRID		NTPC		IOC	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	1280.593	1984.042	138.688	95.105	143.943	148.617	121.723	100.972	135.469	93.384
Std. Dev	151.855	271.228	24.291	19.646	7.935	21.148	11.454	11.860	17.409	12.017
25th Quartile	1155.943	1925.425	126.925	77.850	139.950	129.750	116.375	91.038	126.050	84.987
50th Quartile	1268.476	2029.125	142.800	93.150	144.300	145.106	121.292	98.950	136.100	91.175
75th Quartile	1379.523	2139.288	155.125	114.063	148.931	170.634	129.800	111.438	147.925	103.600
100th Quartile	1594.833	2548.050	181.450	144.750	160.500	195.050	1594.833	140.650	169.700	127.450

Table 4.4.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	RELIANCE	ONGC	POWER GRID	NTPC	IOC
INTERCEPT (α)	0.000159355	-0.00167233	0.000316729	-0.0008438	-0.00100437
BETA (β)	1.30936664	1.11272018	0.563941958	0.704123346	1.524011559

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
RELIANCE	ONGC	POWER GRID	NTPC	IOC
9.86%	-14.15%	-12.30%	-8.48%	-39.56%

Cumulative Average Abnormal Return	-12.99%
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Table 4.4.C: Abnormal Return

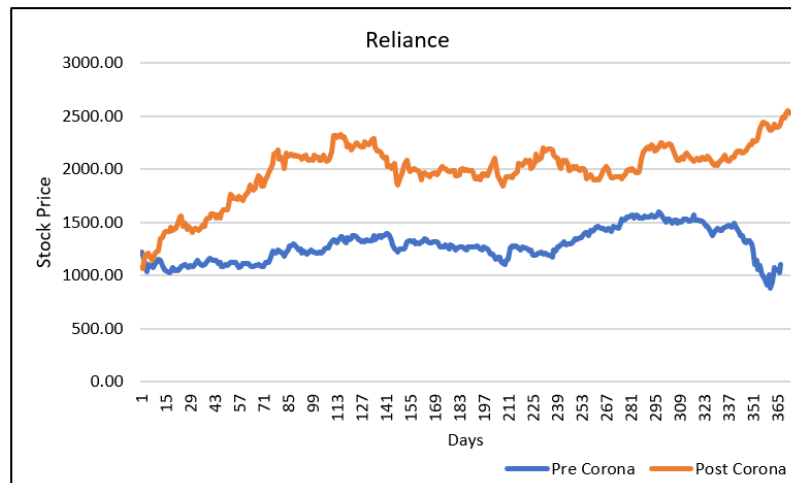


Fig. 4.4.1: Reliance Stock Price

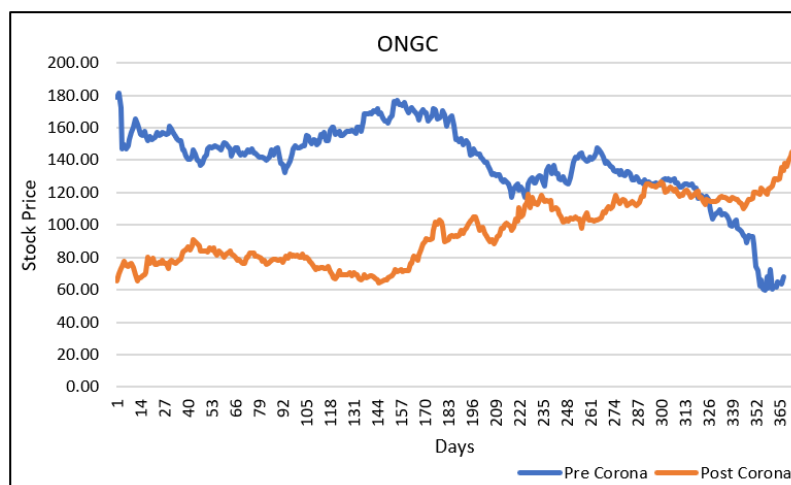


Fig. 4.4.2: ONGC Stock Price

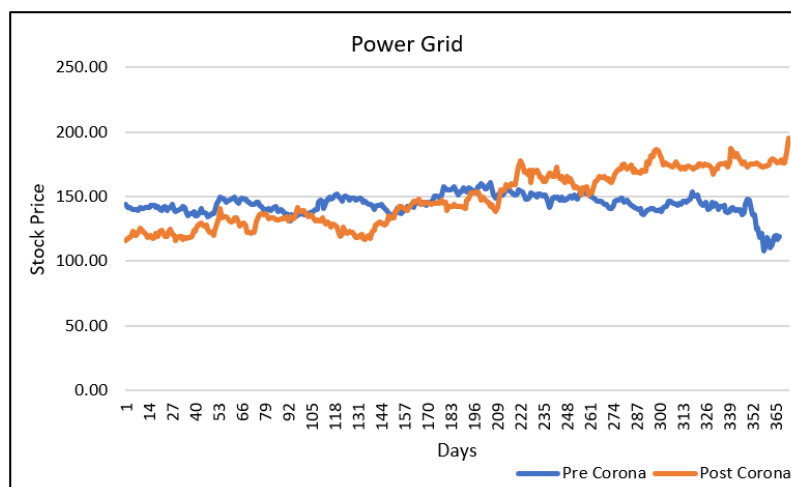


Fig. 4.4.3: Power Grid Stock Price

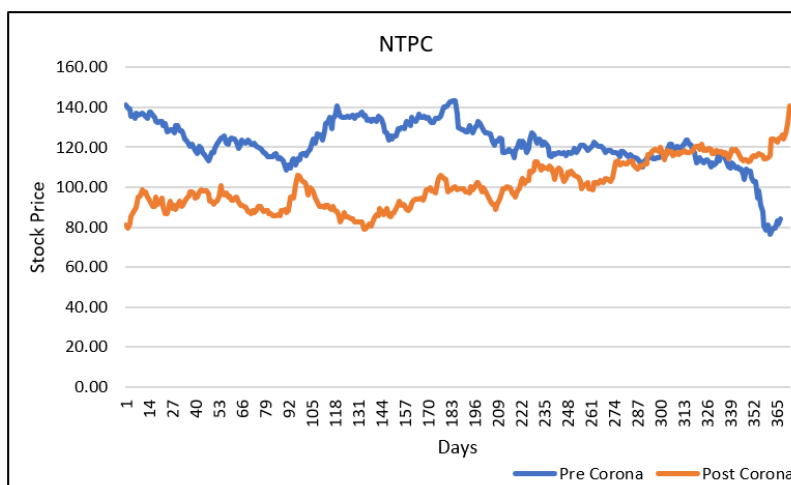


Fig. 4.4.4: NTPC Stock Price

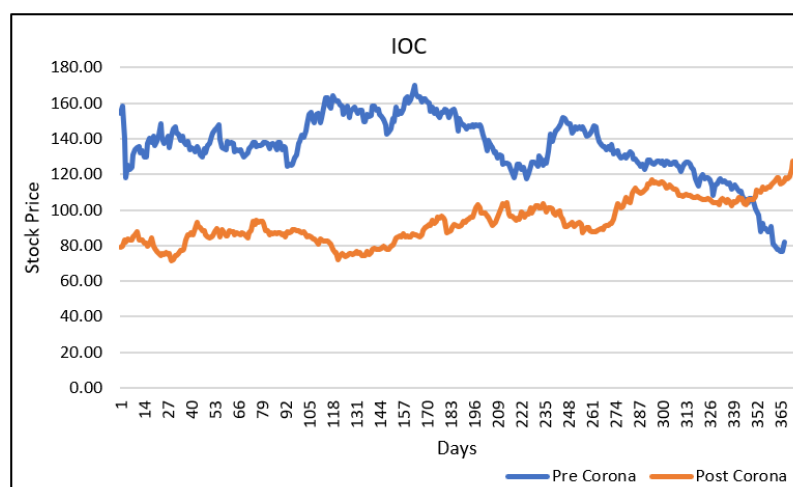


Fig. 4.4.5: IOC Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Reliance, ONGC, Power Grid, NTPC, and IOC of pre and during corona pandemic periods are analyzed from the results in Table 4.4.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As seen in line charts the overall Energy industry was not able to perform well and was hardly able to meet up with its pre-corona closing prices whereas Reliance has shown an upward trend in the post COVID time period resulting in more than 2times of what the prices were on the event date, other 4 company's prices were moving sideways for a certain period of time and were able to give some positive returns.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that there were higher expectations from the Energy sector in the pre-corona period but refiners were forced to slash crude processing in 2020 after the lockdown decimated fuel demand since power consumption growth was negative and the demand for energy was low as businesses started operations from home. As the value of CAAR is not close to 0 we conclude that the market is not efficient in the Semi Strong form.

4.5 NIFTY FMCG

Nifty FMCG	Market Cap
HUL	546373.95
ITC	267465
Nestle	182941.59
Dabur India	97506.12
Godrej Consumer	91132.43

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.5.A: Group Information

Descriptive Statistics	HUL		ITC		NESTLE		DABUR		GODREJ CP	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	1859.734	2291.856	260.561	199.297	12409.348	17290.234	433.939	525.528	683.384	754.292
Std. Dev	177.882	181.660	33.473	16.742	2019.711	1053.913	34.582	48.935	64.646	142.249
25th Quartile	1734.725	2154.200	243.250	189.288	10784.950	16554.087	407.300	494.575	648.025	680.550
50th Quartile	1809.600	2264.575	273.200	203.200	11622.950	17171.649	430.650	519.425	683.250	708.000
75th Quartile	2010.675	2392.037	282.225	209.863	14290.200	17692.813	457.650	546.613	721.000	816.800
100th Quartile	2298.500	2812.450	307.200	243.500	16785.051	20457.199	2298.500	653.950	842.950	1126.900

Table 4.5.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	HUL	ITC	NESTLEIND	DABUR	GODREJCP
INTERCEPT (α)	0.000535106	-0.00087136	0.001019325	-8.3036E-05	-0.00109921
BETA (β)	0.590107387	0.805615054	0.587472994	0.798415748	0.804755683

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
HUL	ITC	NESTLEIND	DABUR	GODREJCP
-37.21%	-12.83%	-29.97%	-11.81%	13.92%

Cumulative Average Abnormal Return	4.11%
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Table 4.5.C: Abnormal Return

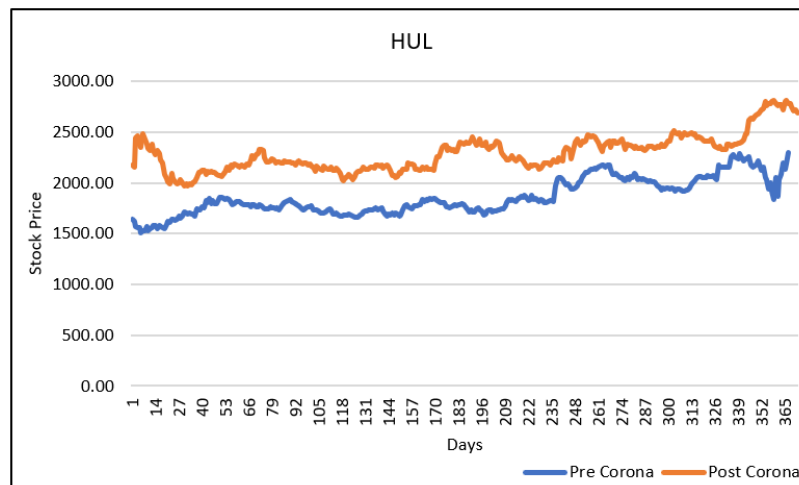


Fig. 4.5.1: HUL Stock Price

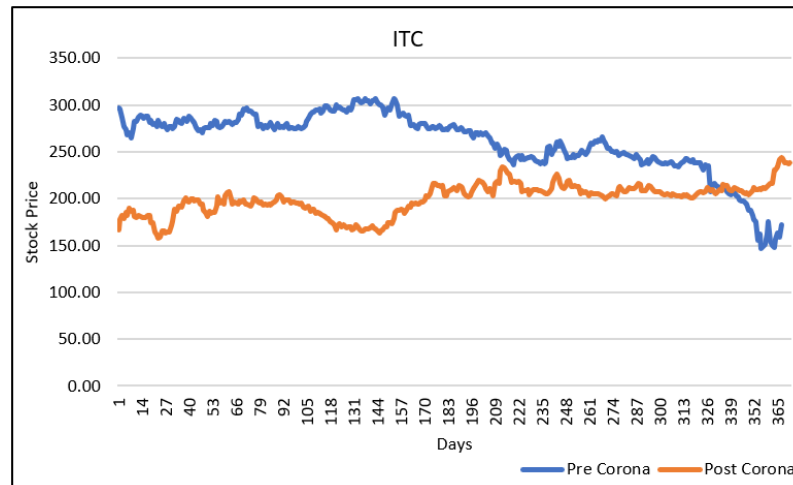


Fig. 4.5.2: ITC Stock Price

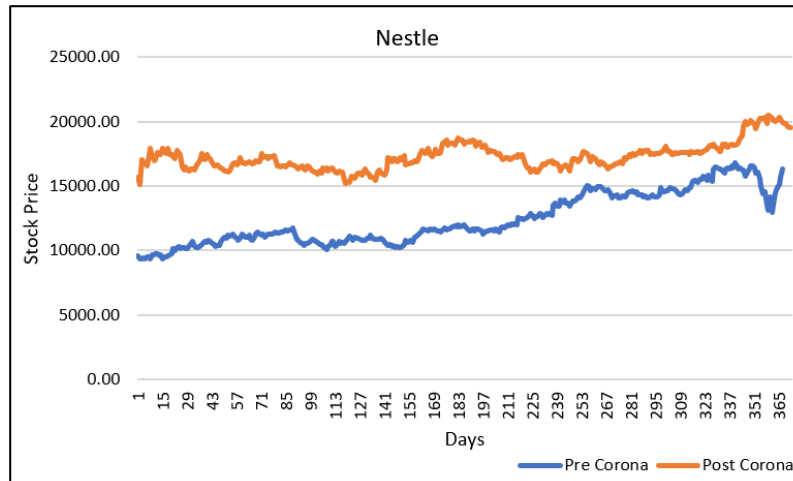


Fig. 4.5.3: Nestle Stock Price

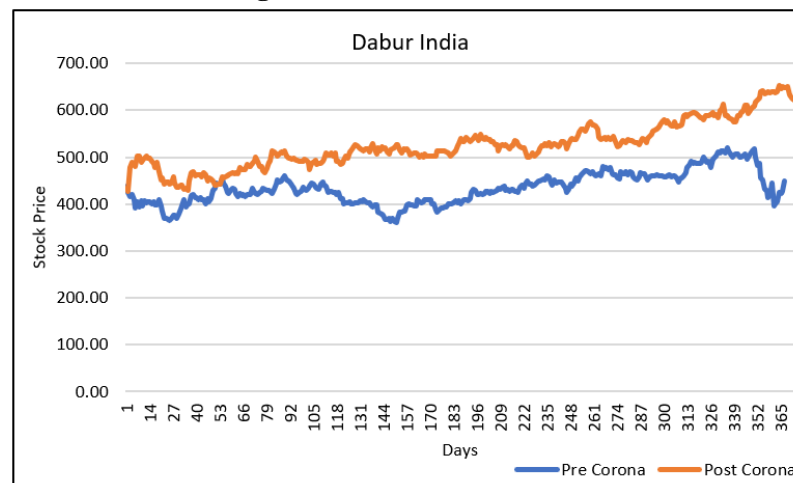


Fig. 4.5.4: Dabur India Stock Price

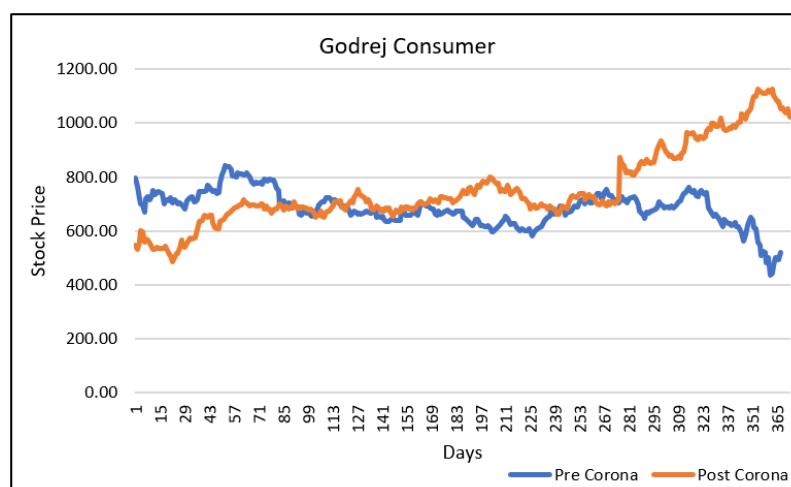


Fig. 4.5.5: Godrej Consumer Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: HUL, ITC, Nestle, Dabur India, Godrej Consumer of pre and during corona pandemic periods are analyzed from the results in Table 4.5.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the FMCG sector all the companies except ITC showed an upward trend in the post COVID time period resulting in positive returns to the investors. The FMCG sector registered a promising pattern from 2020 as there was growing awareness, easier access and changing lifestyles.

Looking at CAR and CAAR we can say that the overall sector outperformed investors' expectations from the FMCG sector where the actual return over expected return increased. As the value of CAAR is close to 0 we can conclude that the market is efficient in the Semi Strong form.

4.6 NIFTY PHARMA

Nifty Pharma	Market Cap
Sun Pharma	194046.22
Divis Labs	110949.94
Dr Reddys Labs	74823.53
Cipla	69986.82
Torrent Pharma	53561.53

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.6.A: Group Information

Descriptive Statistics	SUN PHARMA		DIVIS LABS		DR REDDYS LAB		CIPLA		TORRENT PHARMA	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	438.963	585.735	1672.498	3520.218	2733.766	4696.630	506.238	796.104	1765.892	2686.418
Std. Dev	53.562	101.790	192.871	862.015	193.182	508.648	56.146	120.518	156.436	231.792
25th Quartile	411.500	499.563	1541.750	3064.150	2596.750	4373.787	464.725	727.362	1659.125	2499.038
50th Quartile	428.400	576.425	1646.650	3514.475	2684.650	4783.225	514.300	792.375	1768.750	2690.200
75th Quartile	450.250	668.550	1761.550	4073.700	2861.050	5112.087	546.450	909.100	1861.300	2833.713
100th Quartile	634.700	811.300	2240.050	5212.100	3324.600	5575.700	634.700	987.600	2251.100	3189.650

Table 4.6.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	SUN PHARMA	DIVISLAB	DRREDDY	CIPLA	TORNTPHARM
INTERCEPT (α)	-0.001913149	0.000660877	8.34156E-05	-0.001454785	1.72798E-05
BETA (β)	0.721288378	0.894416665	0.299320656	0.65327902	0.38098534

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
SUN PHARMA	DIVISLAB	DRREDDY	CIPLA	TORNTPHARM
41.41%	7.20%	34.77%	62.33%	14.48%

Cumulative Average Abnormal Return	61.30%
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Table 4.6.C: Abnormal Return

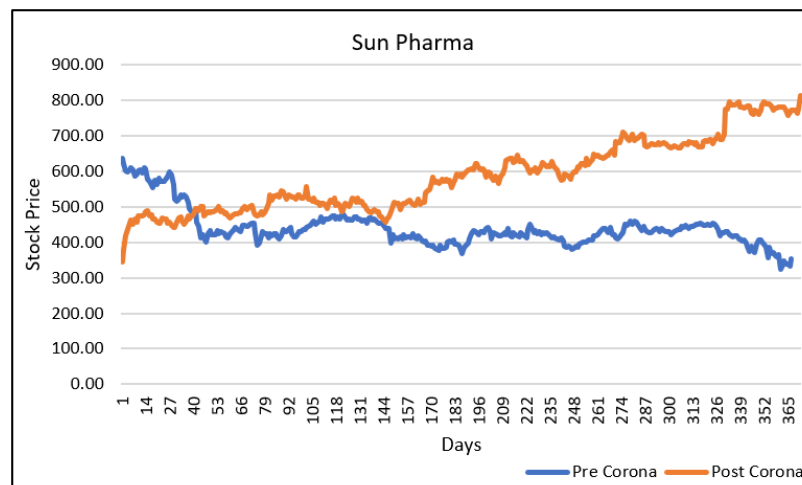


Fig. 4.6.1: Sun Pharma Stock Price

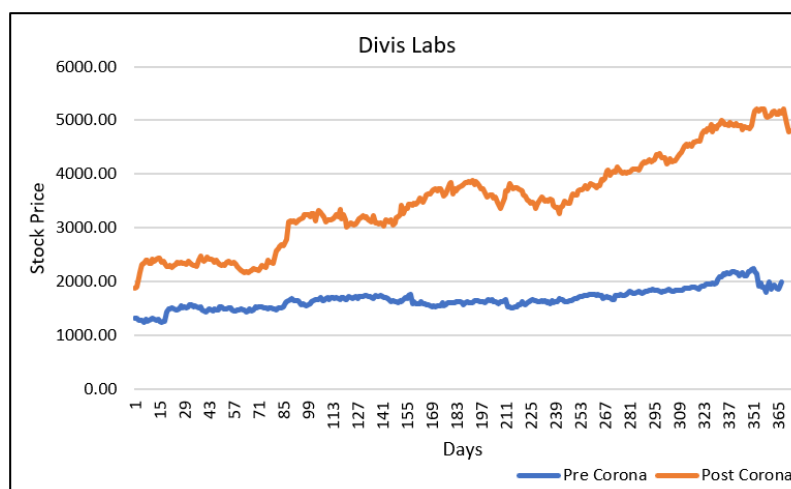


Fig. 4.6.2: Divis Labs Stock Price

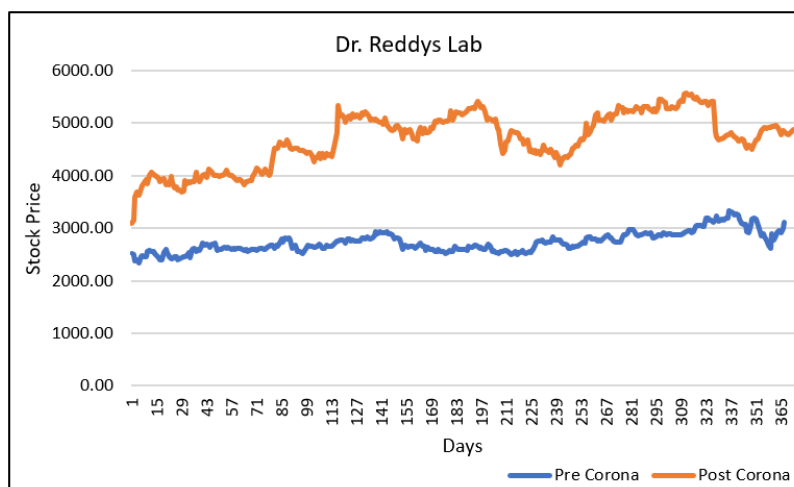


Fig. 4.6.3: Dr. Reddy's Labs Stock Price

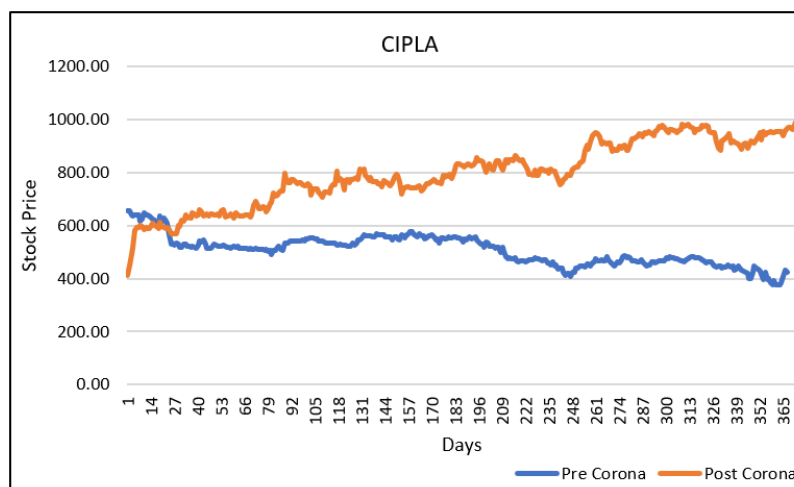


Fig. 4.6.4: CIPLA Stock Price

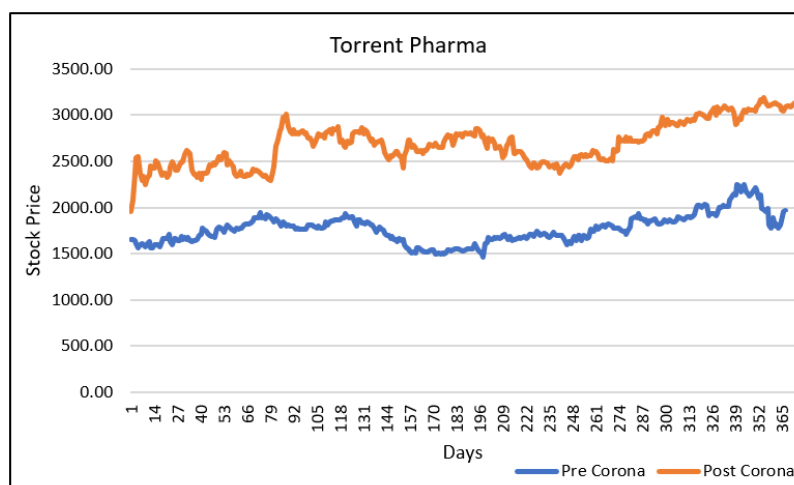


Fig. 4.6.5: Torrent Pharma Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Sun Pharma, Divis Labs, Dr. Reddy's Labs, Cipla, and Torrent Pharma of pre and during corona pandemic periods are analyzed from the results in Table 4.6.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the Pharma sector we have taken 5 companies, off which all the companies showed an upward trend in the post COVID time period resulting in positive returns to the investors. The Pharma sector registered a bounce back in 2020 as the pandemic had improved the outlook as investor focus shifted to covid-19 related opportunities. What has also helped is that the sector was under-valued at the beginning of 2020, as this pandemic had reported multiple casualties, pharma businesses came up with all sorts of immune strengthening medicines & vaccines which was ultimately the way out for all of us.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the index has outperformed investors' expectations from the pharma sector specially from Cipla & Sun pharma where the activity increased by 62% & 41% respectively.

4.7 NIFTY IT

Nifty IT	Market cap
TCS	1418031.3
Infosys	750997.2
Wipro	331646.81
HCL Tech	316942.51
Tech Mahindra	154683.95

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.7.A: Group Information

Descriptive Statistics	TCS		INFOSYS		WIPRO		HCL TECH		TECH MAHINDRA	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	2068.330	2796.012	727.327	1186.802	254.233	395.330	533.002	853.506	734.993	901.417
Std. Dev	132.234	555.491	53.170	322.689	23.296	141.594	38.552	201.733	60.872	255.064
25th Quartile	1984.700	2262.275	698.225	948.450	243.469	277.000	509.363	705.850	698.550	719.050
50th Quartile	2081.750	2909.325	731.300	1248.550	251.213	385.275	534.350	908.550	735.150	946.425
75th Quartile	2174.925	3196.800	767.475	1387.163	265.625	513.250	560.525	980.513	779.775	1020.450
100th Quartile	2277.950	3954.550	840.150	1763.850	299.150	686.450	2277.950	1358.200	840.900	1521.500

Table 4.7.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	TCS	INFY	WIPRO	HCLTECH	TECHM
INTERCEPT (α)	-0.00014622	0.000276427	0.000104068	-6.3478E-05	-0.00059325
BETA (β)	0.581720963	0.607070916	0.423659842	0.570998881	0.579425962

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
TCS	INFY	WIPRO	HCLTECH	TECHM
20.79%	29.30%	40.19%	47.17%	28.65%

Cumulative Average Abnormal Return	27.61%
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Table 4.7.C: Abnormal Return

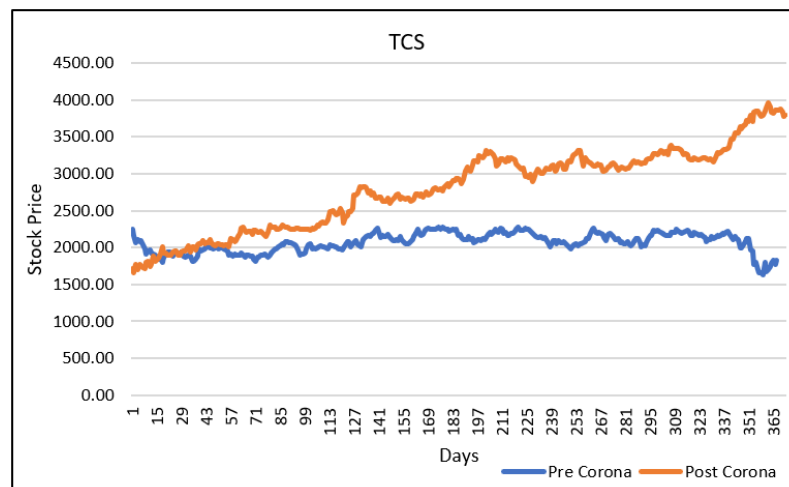


Fig. 4.7.1: TCS Stock Price

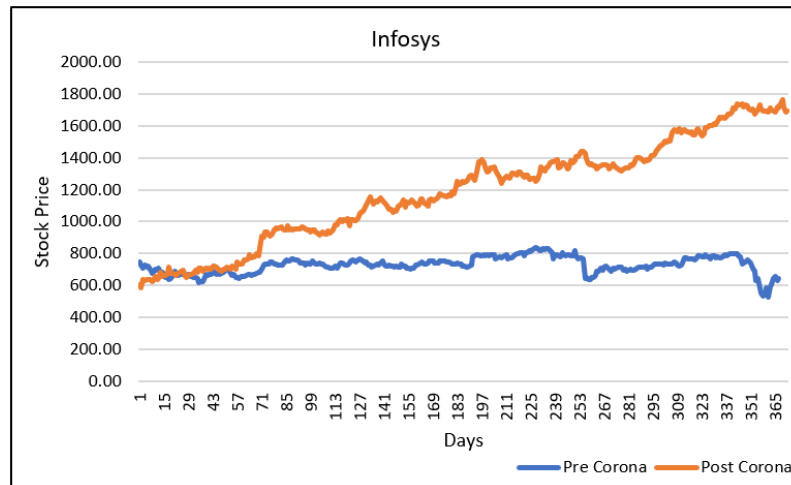


Fig. 4.7.2: Infosys Stock Price

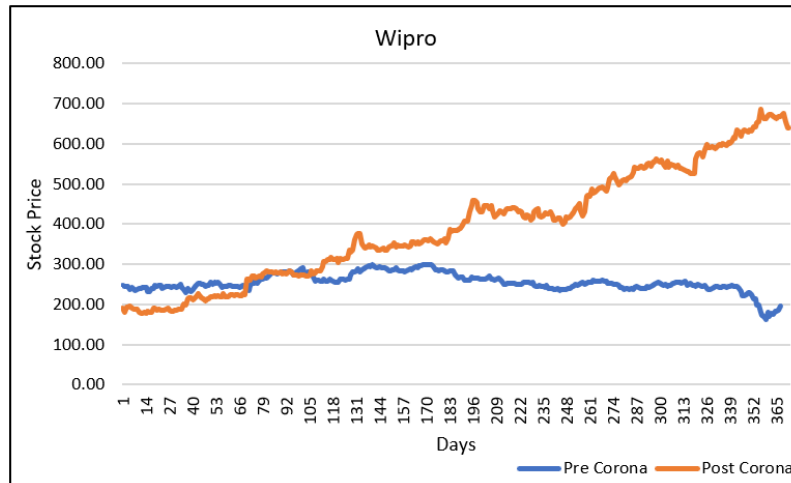


Fig. 4.7.3: Wipro Stock Price

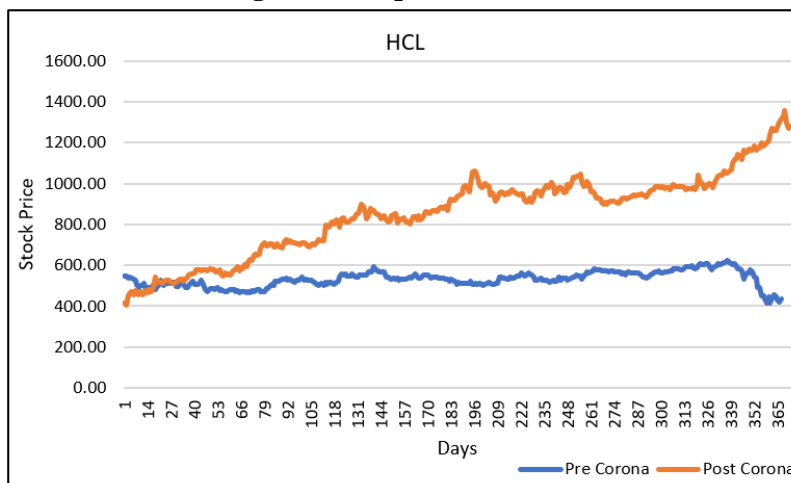


Fig. 4.7.4: HCL Stock Price

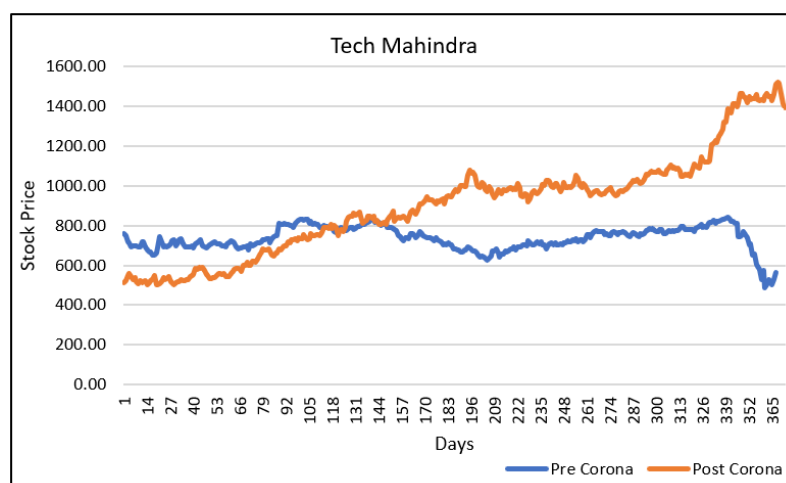


Fig. 4.7.5: Tech Mahindra Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: TCS, Infosys, Wipro, HCL Tech, and Tech Mahindra of pre and during corona pandemic periods are analyzed from the results in Table 4.7.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the IT sector we have taken 5 companies, off which all the companies (i.e. TCS, Wipro, Infosys, Tech Mahindra and HCL) showed an upward trend in the post COVID time period resulting in positive returns to the investors. The IT sector registered a bullish pattern in the post covid times and there were no outliers in the IT sector. All the companies showed an upward trend.

Looking at the CAR and CAAR we can say that the sector has outperformed the investors expectation from the IT sector specially from Wipro and HCL Tech where the actual return over expected return increased by 40% & 47% respectively.

4.8 NIFTY AUTO

NiftyAuto	Market cap
Maruti Suzuki	247391.49
TATA Motors	166644.65
M & M	108804.21
Bajaj Auto	98957.73
Eicher Motors	74126.71

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.8.A: Group Information

Descriptive Statistics	MARUTI SUZUKI		TATA MOTORS		M&M		BAJAJ AUTO		EICHER MOTORS	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	6815.383	6751.776	163.808	213.344	615.839	679.740	2860.965	3386.347	2015.563	2328.373
Std. Dev	614.108	792.158	31.310	96.165	104.560	145.354	253.404	550.888	230.775	437.008
25th Quartile	6534.225	6548.375	153.600	123.775	544.875	602.212	2711.075	2951.550	1889.820	2112.128
50th Quartile	6971.750	6917.050	170.900	184.500	624.700	737.100	2868.700	3434.750	2040.980	2478.075
75th Quartile	7235.300	7214.250	181.675	307.412	683.350	790.775	3060.325	3837.725	2170.903	2664.900
100th Quartile	7936.000	8232.750	236.250	355.950	847.600	928.400	7936.000	4295.050	2489.710	2972.600

Table 4.8.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	MARUTI SUZUKI	TATA MOTORS	M&M	BAJAJ AUTO	EICHER MOTORS
INTERCEPT (α)	-0.000874447	-0.002872409	-0.00220835	1.87086E-05	-0.002064806
BETA (β)	1.278378602	1.759360491	1.397260765	0.852299435	1.493270215

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cumulative Abnormal Return (-151 to +151 days)				
MARUTI SUZUKI	TATA MOTORS	M&M	BAJAJ AUTO	EICHER MOTORS
19.54%	48.81%	59.96%	8.18%	27.86%

Cumulative Average Abnormal Return	49.90%
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Table 4.8.C: Abnormal Return

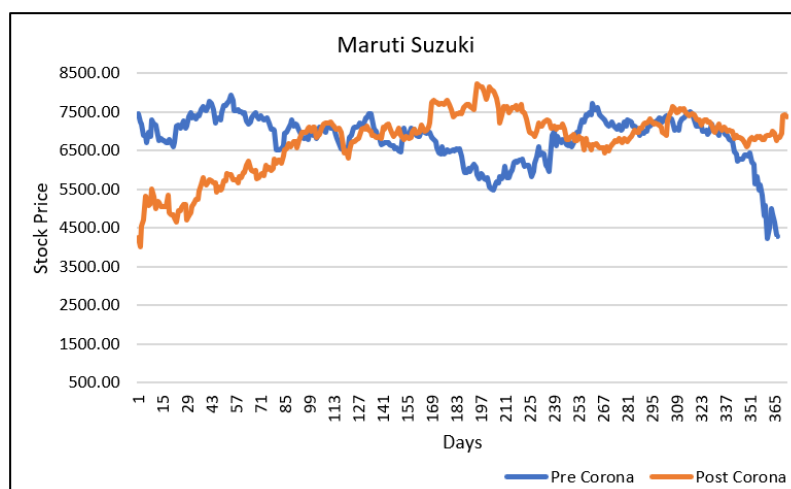


Fig. 4.8.1: Maruti Suzuki Stock Price

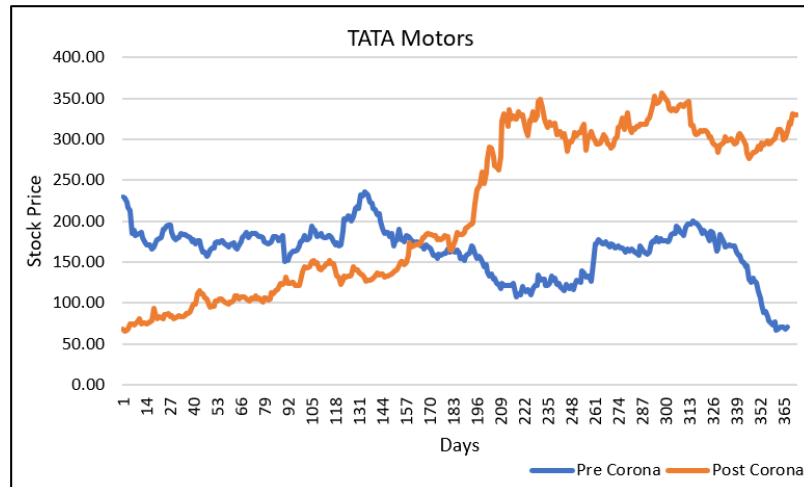


Fig. 4.8.2: TATA Motors Stock Price

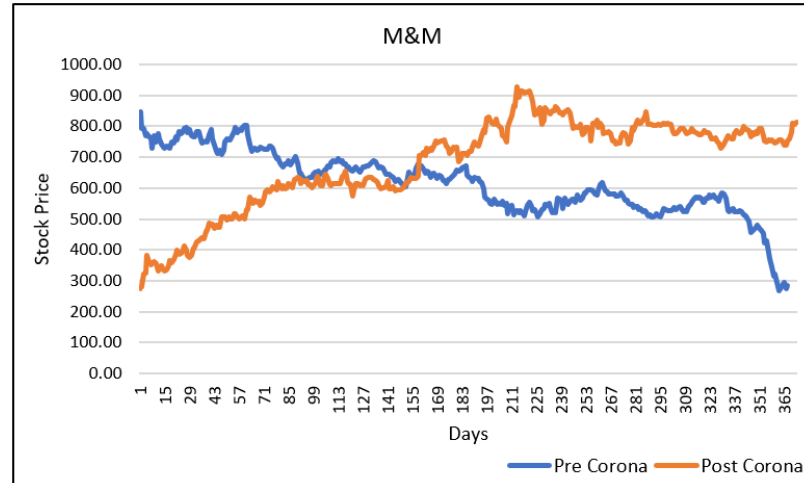


Fig. 4.8.3: M&M Stock Price

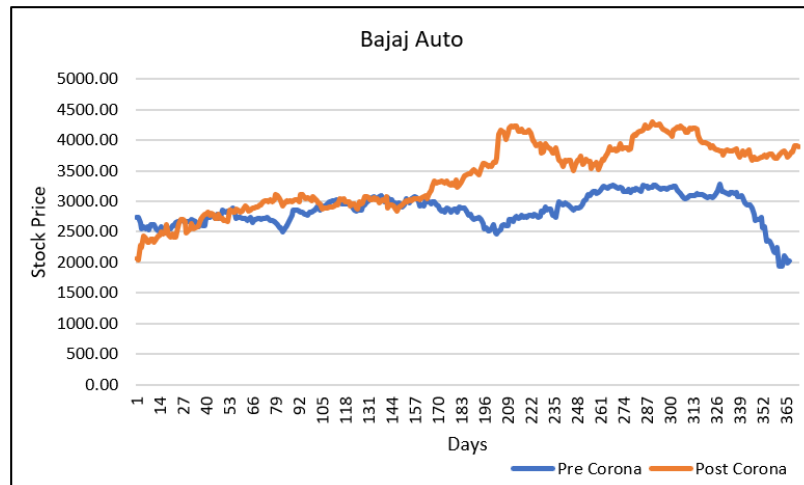


Fig. 4.8.4: Bajaj Auto Stock Price

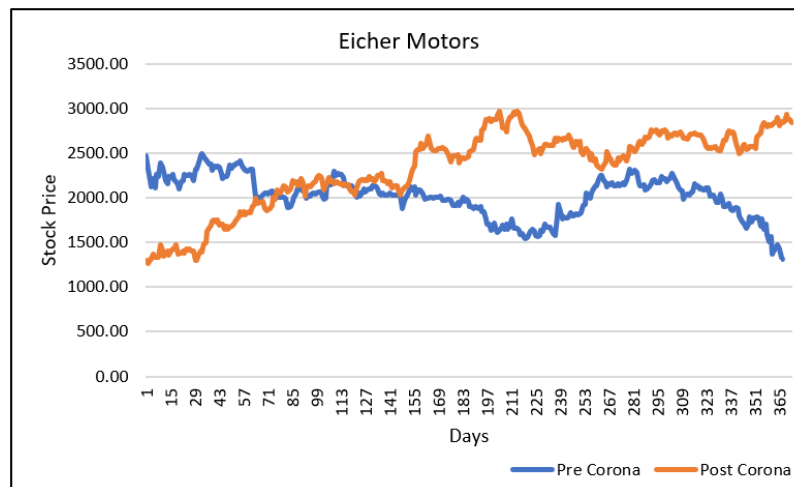


Fig. 4.8.5: Eicher Motors Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Maruti Suzuki, TATA Motors, M&M, Bajaj Auto, and Eicher Motors of pre and during corona pandemic periods are analyzed from the results in Table 4.8.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the metal sector we have taken 5 companies, off which TATA Motors, Eicher Motors showed an upward trend in the post COVID time period resulting in positive returns to the investors whereas Maruti Suzuki and M&M showed a sideways trend and were just able to maintain their stock prices. Overall volume in the domestic market, which was hauled down by two wheelers, moved the business back by six years. Also, a lack of consumer spending, more private investments, weak monsoon season led to a weak start for the auto sector.

Looking at the CAR and CAAR we can say that the sector has met investors expectations from the Auto sector specially from TATA Motors and M&M where the actual return over expected return exceeded by 60% & 49% respectively and hence the CAR and CAAR was positive.

4.9 NIFTY FINANCIAL SERVICES

Nifty Financial Services	Market cap
HDFC Bank	843374.98
ICICI Bank	558655.78
HDFC	469586.31
SBI	448640.22
Bajaj Finance	445075.38

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.9.A: Group Information

Descriptive Statistics	HDFC BANK		ICICI BANK		HDFC		SBIN		BAJAJ FINANCE	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	1137.298	1305.782	419.534	509.230	2074.745	2244.285	300.777	294.889	3318.168	4564.383
Std. Dev	104.101	228.524	67.898	134.910	209.453	398.826	34.756	102.535	725.827	1533.708
25th Quartile	1057.487	1080.063	363.500	368.725	1945.300	1818.550	280.925	191.987	2621.850	3302.575
50th Quartile	1143.600	1407.075	409.000	526.650	2048.700	2419.175	300.250	275.425	3299.300	4866.250
75th Quartile	1227.800	1495.050	464.350	632.363	2216.350	2555.650	324.150	406.763	4020.075	5620.975
100th Quartile	1302.400	1626.650	549.400	730.000	2492.300	2860.450	1302.400	463.700	4880.450	7899.050

Table 4.9.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	HDFC BANK	ICICI BANK	HDFC	SBIN	BAJAJ FINANCE
INTERCEPT (α)	0.000402129	0.001313998	0.000674382	0.000159111	0.001854008
BETA (β)	0.762949181	1.194789072	1.153774392	1.42770059	1.528705532

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
HDFC BANK	ICICI BANK	HDFC	SBIN	BAJAJ FINANCE
6.47%	-30.40%	-24.56%	-40.91%	-28.04%

Cumulative Average Abnormal Return	-36.99%
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Table 4.9.C: Abnormal Return

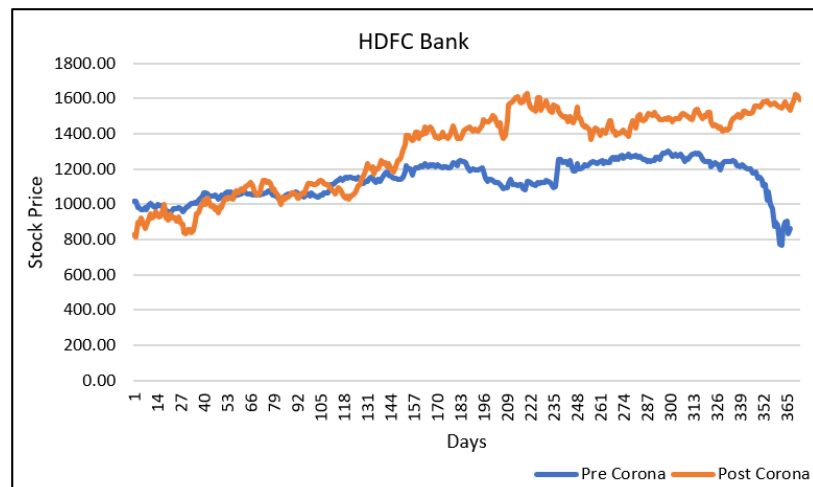


Fig. 4.9.1: HDFC Bank Stock Price

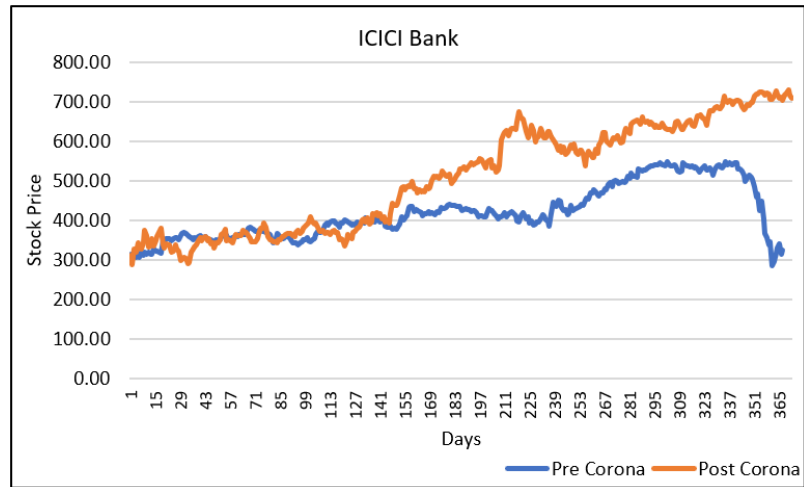


Fig. 4.9.2: ICICI Bank Stock Price

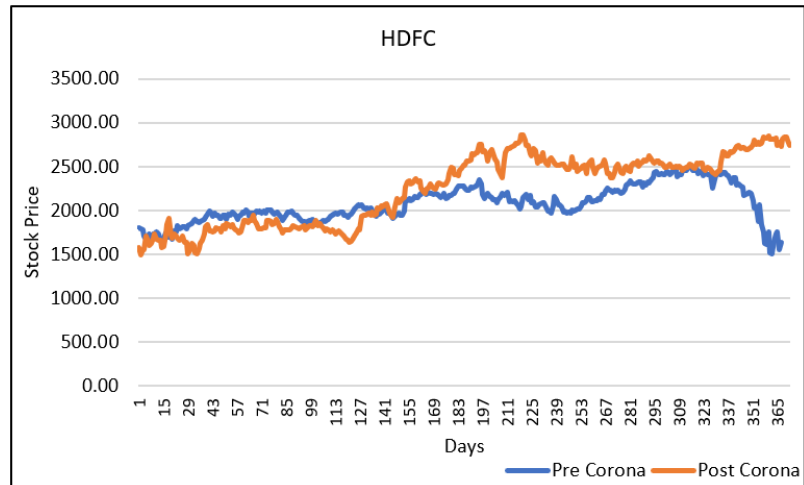


Fig. 4.9.3: HDFC Stock Price

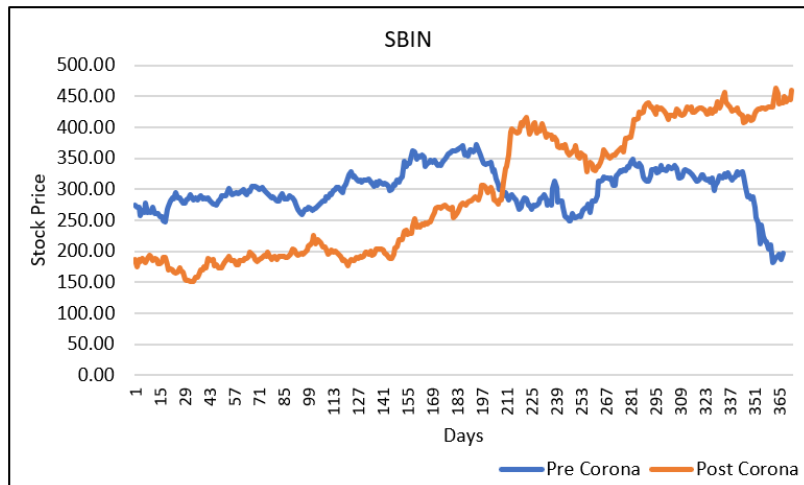


Fig. 4.9.4: SBI Stock Price

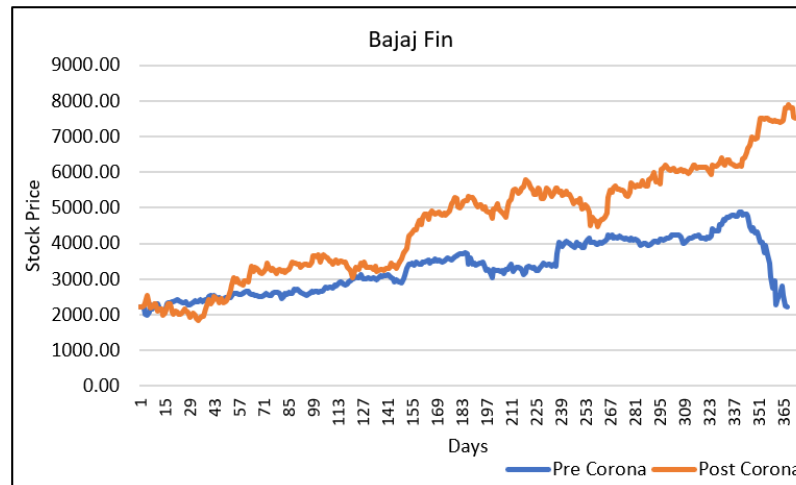


Fig. 4.9.5: Bajaj Finance Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: HDFC Bank, ICICI Bank, HDFC, SBI, and Bajaj Finance of pre and during corona pandemic periods are analyzed from the results in Table 4.10.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are almost less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the Fin Services sector we have taken 5 companies, off which all the companies showed an upward trend in the post COVID time period and outperformed their previous benchmarks. The Fin Services sector registered a bullish pattern from 2020 as there are moderately rising interest rates. As rates rise, financial services companies can earn more on the money they have and on credit they issue to their customers, other reasons are Reducing regulations in the sector and lower consumer debt levels.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the investors had higher expectations from this sector in the pre-corona period but the sector was not able to deliver those returns and hence the CAR and CAAR of the sector is Negative.

4.10 NIFTY MEDIA

Nifty Media	Market cap
Zee Entertain	27792.52
Sun TV Network	19509.16
PVR	9370.85
TV 18 Broadcast	9077.54
Network 18	9045.64

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.10.A: Group Information

Descriptive Statistics	ZEE ENTERTAIN		SUN TV NETWORK		PVR		TV 18 BROADCAST		NETWORK 18	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	351.961	195.993	351.961	464.487	1645.612	1249.930	27.931	32.316	29.940	39.063
Std. Dev	87.067	30.511	87.067	57.644	198.978	179.959	6.591	6.415	7.115	8.303
25th Quartile	281.850	176.362	281.850	416.925	1505.498	1111.875	22.325	29.150	24.100	35.375
50th Quartile	352.600	198.125	352.600	477.500	1657.900	1294.525	26.450	32.150	28.900	38.275
75th Quartile	435.250	215.900	435.250	512.438	1782.625	1391.137	34.700	36.213	35.625	44.012
100th Quartile	501.850	336.800	501.850	579.600	2089.750	1612.500	501.850	47.400	45.550	55.450

Table 4.10.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	ZEE ENTERTAIN	SUN TV NETWORK	PVR	TV 18 BROADCAST	NETWORK 18
INTERCEPT (α)	-0.000968752	-0.000968752	0.000851739	-0.002304002	-0.003225911
BETA (β)	0.993656063	0.993656063	0.921990476	1.44670762	1.216206996

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cummulative Abnormal Return (-151 to +151 days)				
ZEE ENTERTAIN	SUN TV NETWORK	PVR	TV 18 BROADCAST	NETWORK 18
23.32%	106.88%	-39.75%	43.63%	65.53%

Cumulative Average Abnormal Return	32.97%
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Table 4.10.C: Abnormal Return

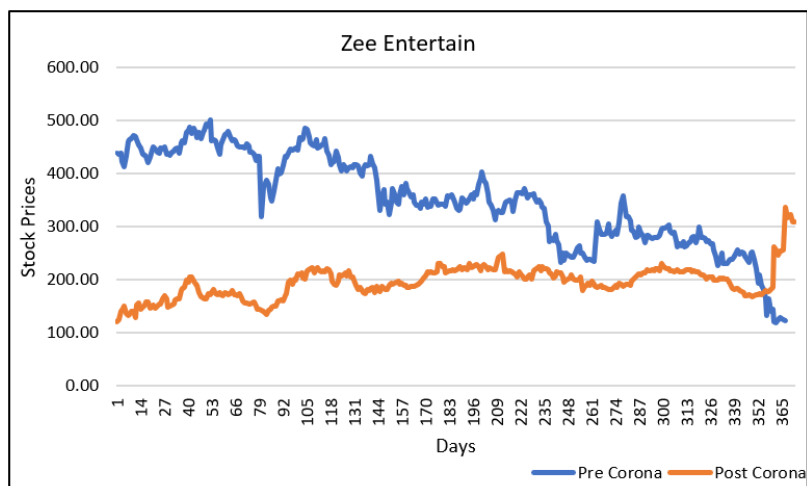


Fig. 4.10.1: Zee Entertain Stock Price

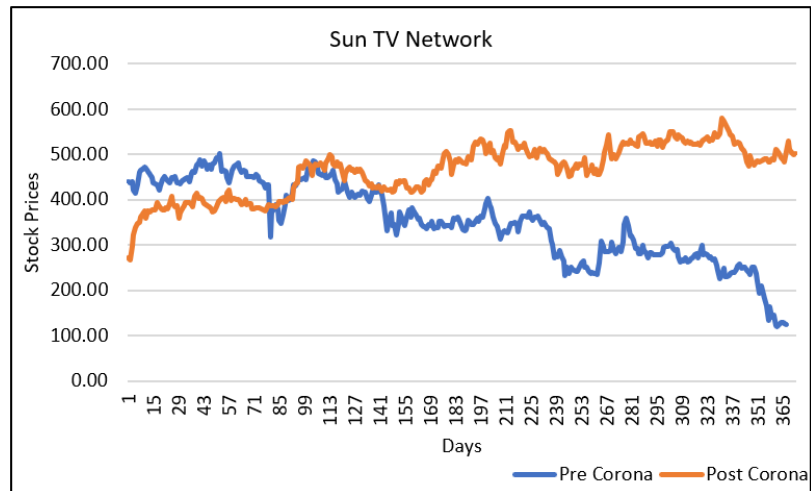


Fig. 4.10.2: Sun TV Network Stock Price

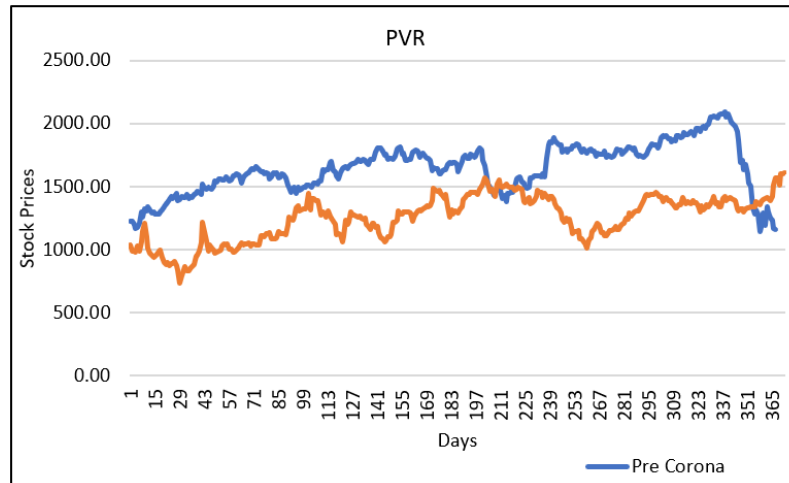


Fig. 4.10.3: PVR Stock Price

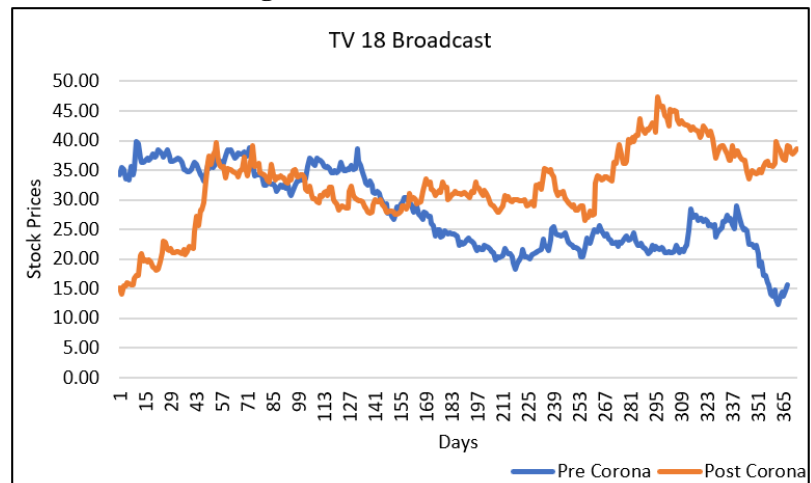


Fig. 4.10.4: TV 18 Broadcast Stock Price

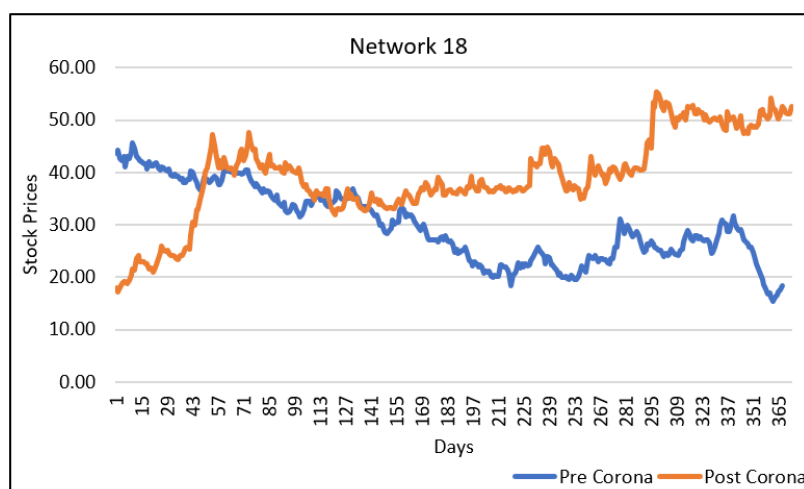


Fig. 4.10.5: Network 18 Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Zee Entertain, Sun TV Network, PVR, TV 18 Network, and Network 18 of pre and during corona pandemic periods are analyzed from the results in Table 4.10.B. An inference can be drawn that the data is dependable as the Standard Deviations of all the values are less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the media sector we have taken 5 companies, off which Sun TV & TV18 showed a phenomenal upward trend in the post COVID time period resulting in positive returns to the investors, The media sector turned bullish post 2020 and there are numerous reasons for the increase, inclusive of the stock market's ordinary power(oversold conditions) and the reopening of an economic system, along with this Investors also have been seeking out undervalued shares to diversify their holdings.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the sector has met investors' expectations from the media sector specially from Sun TV & Network 18 where the actual returns over expected returns increased to 107% & 65% respectively, the sector was able to deliver those returns as well as exceeded the expectations and hence the CAR and CAAR of this sector is positive.

4.11 NIFTY METALS

Nifty Metals	Market cap
Adani Enterprise	201083.78
JSW Steel	161047.31
TATA Steel	142900.34
HIND Zinc	137745.4
Vedanata	120177.04

Pre Corona Dates	1-10-2018 to 31-03-2020
Post Corona Dates	1-04-2020 to 30-09-2021
Event Date	31-03-2020
Stock Exchange	NSE

Table 4.11.A: Group Information

Descriptive Statistics	ADANI ENTERPRISE		JSW STEEL		TATA STEEL		HIND ZINC		VEDANTA	
	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona	Pre Corona	Post Corona
Mean	163.178	709.353	270.128	423.880	458.358	714.514	233.895	258.063	163.134	179.281
Std. Dev	35.100	530.229	42.248	202.419	75.537	385.714	36.720	58.169	31.092	77.163
25th Quartile	137.375	210.462	248.675	267.488	402.575	373.112	210.200	209.012	145.250	109.925
50th Quartile	151.650	486.675	271.900	375.825	473.100	633.975	230.750	243.200	161.950	161.325
75th Quartile	195.650	1302.150	289.200	673.675	513.575	1101.625	269.125	316.250	185.375	262.350
100th Quartile	258.650	1700.950	383.400	763.250	589.350	1519.400	258.650	347.650	240.100	336.500

Table 4.11.B: Descriptive Statistics

Event Window or Window Period (-150, +150) 151 days

Window Estimation 216 days
(366-150=216)

	ADANI ENTERPRISE	JSW STEEL	TATA STEEL	HIND ZINC	VEDANTA
INTERCEPT (α)	-6.47942E-05	-0.0024562	-0.0022712	-0.00158543	-0.00228809
BETA (β)	1.868667336	1.405882755	1.277752325	0.750678386	1.320615427

Normal Return = $\alpha + (\beta * \text{Market Return})$

Abnormal Return = Stock Return - Normal Return

Cumulative Abnormal Return (-151 to +151 days)				
ADANI ENTERPRISE	JSW STEEL	TATA STEEL	HIND ZINC	VEDANTA
30.95%	69.25%	35.82%	30.65%	26.59%

Cumulative Average Abnormal Return	62.23%
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Table 4.11.C: Abnormal Return

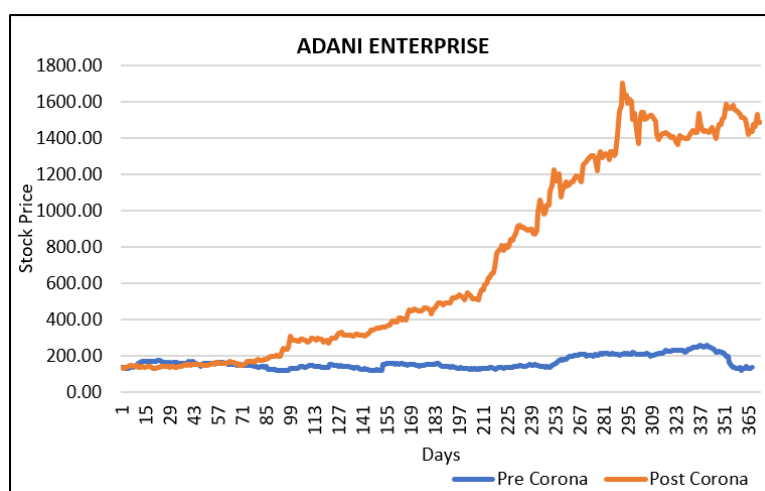


Fig. 4.11.1: Adani Enterprise Stock Price

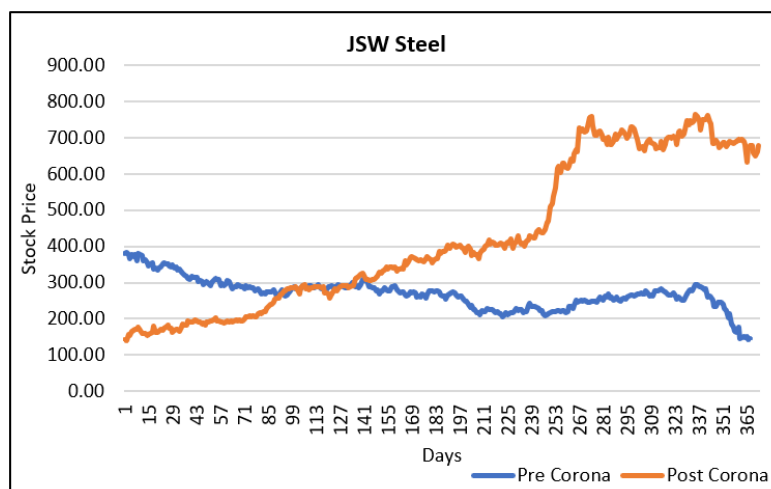


Fig. 4.11.2: JSW Steel Stock Price

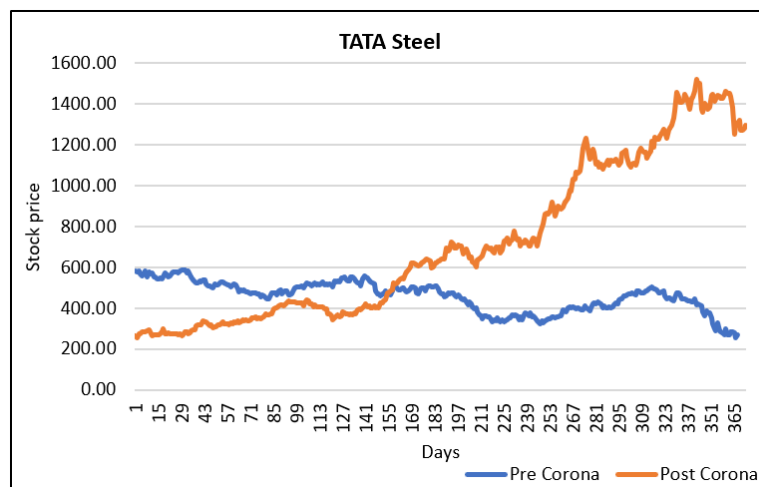


Fig. 4.11.3: TATA Steel Stock Price

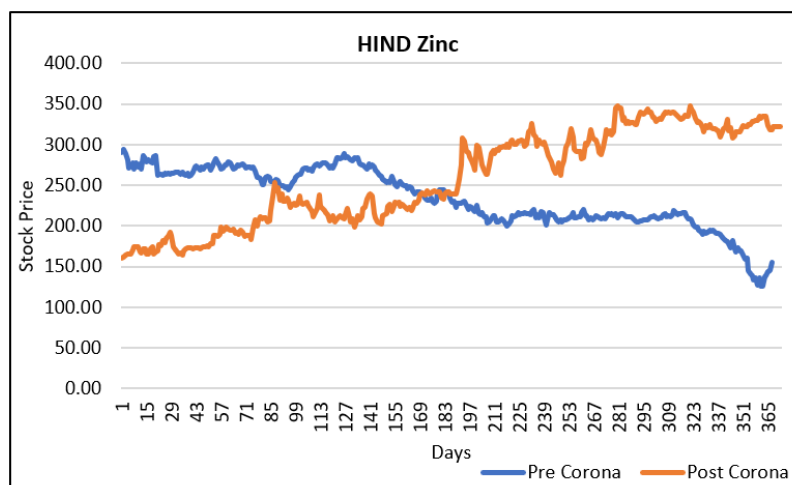


Fig. 4.11.4: HIND Zinc Stock Price

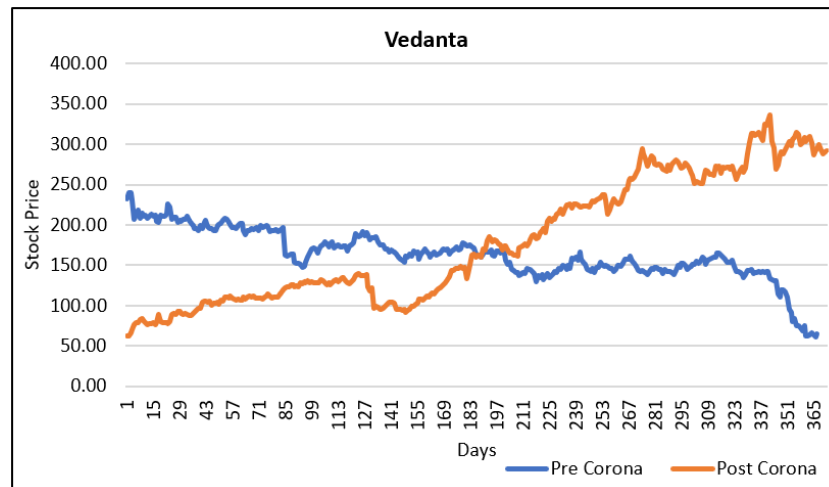


Fig. 4.11.5: Vedanta Stock Price

The grouped descriptive statistics of the share prices of the 5 companies: Adani Enterprise, JSW Steel, TATA Steel, HIND Zinc and Vedanta of pre and during corona pandemic periods are analyzed from the results in Table 4.11.B. An inference can be drawn that the pre-corona data is dependable as the Standard Deviations of all the values is less than 1/3rd the values of their Means. However, the Standard Deviations of the share prices indicate an increase during the corona period, reflecting that the volatility of the prices had increased during the same period, as compared to that of pre-COVID timeframe.

As we see, in the metal sector we have taken 5 companies, off which all the companies (i.e. Adani Enterprise, JSW Steel, TATA Steel, HIND Zinc and Vedanta) showed an upward trend in the post COVID time period resulting in positive returns to the investors. The metal sector registered a bullish pattern from 2020 as Economies around the arena opened up after lockdown shortages of both base metals and ferrous led to prices hitting multi year highs and that helped domestic companies to file awesome ordinary earnings in previous few quarters.

Looking at Cumulative Abnormal Returns (CAR) and Cumulative Average Abnormal Returns (CAAR) we can say that the sector has outperformed investors' expectations from the metal sector specially from JSW Steel & Tata Steel where the actual return over expected return increased by 69% & 35% respectively.

CHAPTER 5

FINDINGS AND RECOMMENDATIONS

5.1 FINDINGS

The Covid-19 pandemic put the global exchange, business, and related ventures into a halt. The monetary business sectors and financial markets reacted to something very similar with incredible developments. Among this, few industries profited though couple of enterprises endured radically. To understand how the Indian stock market and companies from various sectors reacted this study was taken up. For getting an in-depth look at the impact of COVID-19 and its variants 11 sectors of NIFTY were looked at from which 5 companies with highest market capital in each sector were selected and observed. Data considered for observation was divided into 2 parts, pre-corona and post corona period dating from 1st October,2018 to 30th March,2020 and 1st April,2020 to 30th September, 2021 respectively and 31st March, 2020 is selected as the event date. Government of India announced nationwide lockdown on 24th March,2020 which started disruptions in the financial markets of the country, the effect of which could be seen from 31st March,2020 and it was also the financial year end and so the event date considered was 31st March,2020. Using Event Study Methodology, Stock Returns, Market Returns, Normal Return/Expected Return, Abnormal Return, Average Abnormal Return and Cumulative Average Abnormal Return was calculated.

With the use of a couple of basic statistical tools, this paper gives a unique induction that the pandemic has positively affected the share costs of Pharma, IT, FMCG, Metal, Financial Services sectors which saw a great pitch as compared to the pre-corona period. Discoveries of this study add to the conversation and examination on the financial repercussions of the COVID-19 pandemic circumstance by giving real proof that the pandemic has confining effects on the share market exercises. Additionally, the review adds to the current empirical exploration and gives proof of pandemic effect on stock markets to explicit areas. The study additionally gives premise to surveying patterns in stock prices of different sectors too.

5.2 LIMITATIONS

The event study methodology relies upon the assumption of an efficient market. This supposition is not substantial in many situations. The time span required for individual investors to react to event signals is arbitrary and hence, the implication is that markets could display market inefficiencies since prices do not instantly or fully reflect all available information. The consequences of the event studies are sensitive to changes in the research design. A difference in choice of Market Return (R_m) eg. S & P 500, NIFTY, SENSEX, or other company-specific customized stock indices will bring about incomprehensibly various outcomes for the abnormal returns. Likewise, an adjustment in the estimation window will give different alphas and betas, which will also affect the outcomes. The selection of sample size will also result in differences in the results of the study. The sensitivity of event studies will bring about different conclusions being drawn by researchers studying the same event, thereby making it hard for us to choose which result to believe in.

5.3 RECOMMENDATIONS

As the entire world is yet wrestling with the obliteration brought about by COVID-19 and the world economies are trying to recuperate from the downturn of 2020, the Indian securities exchanges benchmark, NIFTY 50, touched 15,000 mark in February 2021, without precedent for its set of experiences. The domestic markets rallied because of sectors like IT, Finance, Metal, Pharma and Auto performing particularly well. The result of the study can guide investors, brokers, market analyst and policy makers to make better decisions.

In spite of the commitments made by the current review, it experiences a few restrictions which open entryways for future review. The review is restricted to Indian economy, a cross-country examination can be directed to comprehend which nation's financial exchange is the most impacted. Also, this study looked only at the 5 companies that had highest market capital in their respective sector, the future researchers can take all companies from all sectors of NIFTY into consideration for an in-depth research, also other emerging instruments like Cryptocurrency, NFTs, Mutual Funds etc. can be combined with stock markets to get a broader prospective on the impact of COVID.

CHAPTER 6

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