Empirical Insights Into COVID-19 Impact on BSE Sectoral Returns

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Abstract

𝕿his paper studies the impact of COVID-19 on Indian stock market through examining the responses of BSE sector indices: Auto, Healthcare, IT, FMCG and Capital Goods sectors from the period of 1st January, 2019 to 16th January, 2021. This period is further divided into four time-windows; Comparison window, Pre-lockdown window, during Lockdown and Unlock phase window to thoroughly analyse COVID-19 impact. Conventional t-test is applied to analyse and compare the daily returns of sectors during different time windows. Our empirical results showed that (a) COVID-19 has a significant and negative impact on the Indian market, but that impact is short-lived only during the Pre-lockdown window. (b) In the Pre-lockdown window, all sectors' returns are significantly negative, while during the Lockdown returns are significantly positive. The results indicate that the fear among the investors impacted the returns during the Pre-lockdown window. However, during the Lockdown window, all sector returns significantly increased suggesting that investors are optimistic about the future growth of the economy once COVID-19 pandemic ends, and the whole economy returns to its normal pace. The positive returns of Auto and Capital goods sector indicate that investors are either over optimistic for Vaccine discovery or not taking the pandemic seriously. This paper suggests that stock market is not representing the real economy. The findings have implications for the investors and market regulators.

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1. Introduction

The world has experienced a number of epidemics in the past decades which have tumbled down both humanity and the economy, such as the Polio epidemic (1970-1990), SARS epidemic (2003), H1N1 Flu pandemic (2009), Nipa virus, Zika virus etc. However, none of the earlier outbreaks had reached 219 countries across the world like COVID-19 pandemic. COVID-19 was a one-of-a-kind, once-in-a-century pandemic due to its high mortality rate and highly contagious nature. The unexpected pandemic had been eroding the welfare gains earned over numerous decades (Guru & Das, 2021). The unprecedented COVID-19 had originally been started off in Wuhan, the city of China and spread to all over world. There was hardly a single country which remained untouched from COVID-19 disastrous impact. On 30th January, 2020, India reported its first confirmed case of COVID-19 in Kerala (Andrews et al., 2020). Since March,2020, the number of confirmed cases has continued to rise in India which is clearly evidenced in the following Figure 1. It is visible that India is at the 2nd place after U.S. in confirmed COVID-19 cases as of 9th April, 2021.
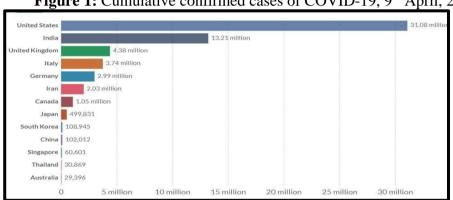
Figure 1: Cumulative confirmed cases of COVID-19, 9th April, 2021

Source: Reprinted from "CoronaVirus Pandemic (COVID-19)" by Ritchie et al. (2020)

Seeing the demand of the current situation, the Hon'ble Prime Minister of India, Shri Narendra Modi called for Janata Curfew on 22nd March, 2020 and later announced 21 day nationwide complete lockdown from 25th March, 2020 until 14th April, 2020 which was further extended to 31st May. Projecting the economic cost of lockdown, Motilal Oswal research suggested that a single day of a complete lockdown could potentially reduce annual/quarterly growth by 14-19bp/55-75bp. Furthermore, it may lead to India's first recession since after 1990's (Wadhwa, 2020). With the announcement of lockdown extension until May, the British bank, Barclays, suggested that this extended lockdown could increase the early estimated economic cost of lockdown from $120 billion to $234 billion (8.1% of GDP) (Sharma, 2020).

1.1 Impact of COVID-19 on Indian Stock Market

With the decelerating economy, the Indian market witnessed drastic fall in the stock prices. Even before the lockdown announcement, the Indian market plummeted three times due to fear and panic among the global investors regarding the increasing grip of Corona virus across the globe. The Indian market plunged drastically on 28 February, 9 March and 12 March in its history. The global investors were rattled when their expectations that the COVID-19 crisis would soon be ended in few weeks were shattered when WHO showed concerns over increasing numbers of Covid cases outside of China's territory on 28 February resulting free fall in global markets including India ("Market

Wrap, Feb 28",2020). Both major indices, Sensex and Nifty of India, fell by about 3.7%. India VIX, the indicator of investors sentiments, reached to 29%. Such fall in indices from their peaks caused erosion of investors wealth by about 12 lakh crores (Shah, 2020). Another drastic fall of about 5% in Indian market was on 9th March due to increasing Covid cases and oil crunch ("Market Wrap, March 9",2020). Investors' fear of COVID-19 of being turned into a pandemic became true on 11th March when WHO referred Covid as Pandemic in its press briefing while alerting the world about severeness of COVID-19 which spurred the panic and uncertainty among investors resulting in fierce fall by 8% in a single day on 12th March.

The biggest fall in Indian stock market history since Global financial crisis is on 23rd March, one day right after the Janata Curfew. In the next morning, the Indian stock market faced the biggest one day sell off. Trading on both BSE and NSE had to stop for a while as Sensex hit 10% lower circuit breaker within one hour of the market opening. After the trading was resumed, Sensex ended up at 25,981 points, a fall of 3,934 points, while Nifty fell 13% to 7,610 points making it the biggest one day fall ever (Dasgupta, 2020).

Azimli (2020) is of the view that there are mainly two reasons why the COVID-19 has made investors pessimistic. First, heightened economic policy, uncertainty on seeing how the COVID-19 rapidly engulfing the entire world, and the uncertainty about the future, which seems to be sombre, lead to low cash flow expectations, resulting in stock market distortion. Second, the sectors such as tourism, aviation, banks, manufacturing and capital goods sectors which are directly affected due to the restricted economic activities also bring the stock indices down.

Thus, Indian investors are reacting to COVID-19 announcements in line with global investors and are involved in a rigorous sell off. The main purpose of conducting this study is to measure the impact of COVID-19 on different selected sectors of the Indian market to have insights into how the selected sectoral indices reacted to different phases of COVID-19, such as Pre-lockdown, during Lockdown and Unlock phase. This study analyses whether the sectors react differently to each phase or not. For this purpose, returns of each sectoral indices have been compared with Comparison window's returns which cover the 2019 calendar year to gauge into returns of which time frame are affected by Covid pandemic. For this study, sectors such as IT, Auto, Healthcare, FMCG and Capital goods have been selected.

The results of the study are quite surprising because contrary to the expectation, all sectors gave negative returns during the Pre-lockdown window when the economy was not put on halt. While during Lockdown window, all sectors gave highly significant returns despite the struggling industries of Auto mobiles and Capital goods in lockdown. The results of the study are relevant for the investors, traders and policy makers. The results indicate that investors work on expectations about the future, which is depicted in their actions. IT, Healthcare and FMCG prove to be sectors of promising returns on which investors can rely on in such crisis time.

The remaining of the paper is structured as follows: Section 2 discusses related empirical literature, Section 3 outlines objective and hypothesis, Section 4 describes the data and methodology adopted, Section 5 provides the data analysis and interpretation, Section 6 discusses the findings and Section 7 concludes the paper.

2. Literature review

The unprecedented COVID-19 has changed the global outlook. It has caused the emergence of a new strand of literature studying the impact of COVID-19 on stock markets, their volatility, relationships among various countries affected by COVID-19. It is still being studied by researchers from different fields. A few of them have been studied and concluded here.

He, Liu, Wang, & Yu (2020) pointed out that when Lockdown was imposed in China on 23rd January, 2020 onwards, not only China' CSI 300 index but also the Korean and Nikkei indices dropped down. Although China was the first country to be knocked out by Coronavirus, it still managed to rebound soon after the initial drop. The COVID-19 had a negative and significant impact on all of the sample countries but it was a short-term impact. Bidirectional spill over was found from China to USA and Europe, and vice-versa. The panic and fear driven by COVID-19 among the individual and institutional investors are clearly reflected in the negative returns of China as well as Asian stock markets along with various industries but in a different manner. On one side, industries like medicine and IT industry were significantly benefited from COVID-19 as investors showed confidence in their future, while industries such as railway, air, water, hotels, and restaurants in which people used to gather were negatively affected (Liu, Wang, He, & Wang, 2020). Ichev & Marinč (2018) also reported that all industries were negatively affected, but industries such as healthcare equipment, pharmaceutical, biotechnology and food beverages benefitted because investors were optimistic about the future of these industries which drove their investment decisions during health crisis such as Ebola.

Furthermore, companies with intense media coverage were badly affected by Ebola outbreak than the ones with low intense media coverage. The authors suggested that both- occurrence of the Ebola event and intensive media coverage affected stock returns negatively. Funck & Gutierrez (2018) studied the impact of Ebola outbreak, media coverage and investor sentiment on the stock returns of 86 firms by applying the regression model with the controlling variable of falling crude oil price. They concluded that Ebola negative news did not affect the returns as much as the positive news did. Airline, cruise ships and restaurant stocks were negatively affected by negative news days, while pharma companies earned significant returns on negative news days. On positive news days, restaurant stock returns were positive because positive news indicated towards life coming back to normality. Ali, Alam, & Rizvi (2020) run a regression between returns and volatility of different securities of 9 most affected countries with surging COVID-19 deaths. Findings suggested that negative returns and high volatility were seen during the whole period except US treasury bonds. Although gold acted like safe haven, it gave negative returns which was less than other assets in the pandemic phase. Comparing with China markets, the European markets plunged drastically especially in the later phase when epicentre moved from China to Europe and then US. With motive to examine the response Ghana stock market to novel COVID-19 pandemic, (Insaidoo, Arthur, Amoako, & Andoh, 2021) used EGARCH model by taking daily returns from 2nd Jan,2015 to 13th October 2020 of the Ghana stock market. The study findings suggested that although there is no significant relationship between Ghana stock returns and COVID-19, stock return volatility increased by 8.23%. Furthermore, results confirmed that during COVID-19 period, there is volatility clustering and asymmetric impact. It means investors of Ghana stock market respond to the worthy news more than the unwelcome news of the equal size. Baker et al., (2020) reported that no infectious disease, including Spanish Flu, had shattered the US stock market like the

COVID-19. Using text-based methods, the authors tried to compare the effect of COVID-19 with large daily stock market moves back to 1900 and with overall stock market volatility back to 1985. While giving the explanation for the immense impact of COVID-19 on previous disease outbreaks in 1918-19, 1957-58 and 1968, Baker et al., (2020) said that the government restrictions on commercial activity and voluntary social distancing in such an interdependent and service-oriented economy are responsible.

In order to assess the investors sentiments and their behaviour during COVID-19, Parveen et al., (2021) got questionnaires filled by 401 investors trading in Pakistan stock exchange. Their study revealed that COVID-19 impacted investor sentiments, behaviour and, thus, trading volume in stock market. COVID-19 made the investors pessimistic, and a sense of uncertainty emerged in them. The results indicated that some of behavioural biases such as representative heuristics, disposition effect, anchoring effect and overconfidence bias negatively affected market participants decision while trading in PSX. Anh & Gan (2020) run a panel data regression to analyse the impact of confirmed COVID-19 cases on the daily stock returns of 723 listed companies of Vietnam during Pre-lockdown and Lockdown time. Findings of the study indicated that the Pre-lockdown period has a negative influence on the returns, while Lockdown period has a positive impact on the returns. The finance sector was worst hit by Covid outbreak.

Al-Qudah & Houcine (2021) also analysed the impact of daily increase of Covid cases from 1st March to 1st August, 2020 on the daily stock returns of the leading stock markets of the six major affected WHO regions; Africa, Americas, Eastern Mediterranean, Europe, South-East Asia and Western Pacific. Event study method and panel data regression models were used for this purpose. The results of their study revealed that daily increasing number of covid cases have a negative influence on the daily stock returns of all the markets. However, the responses were strong only during the early stage of the pandemic such as during 26th to 35th days of the confirmed cases. Out of all selected markets, western markets responded more aggressively and gave highly negative abnormal returns. Their results confirmed that fear in the investors acted as the transition channel for the response of the stock markets to COVID-19. Mushafiq (2021) studied the impact of COVID-19 on the emerging markets, such as Pakistan, by taking 79 firms from 26 industries of KSE-100 Index. The results of the study showed that the overall impact of COVID-19 is negative for all industries, but, somehow, FMCG and pharmaceutical industries gave positive response to COVID-19. Gupta et al. (2021) found that during the phase 1st January, 2020 to 23rd January, 2020 and 24th January,2020 to 12th February, 2020, only China showed negative and significant returns, while other selected countries such as China, Japan, UK, Germany, US and India showed positive returns because during this time period Covid was emerging only in China. However, during March and April, other markets gave negative returns, while China showed positive returns. Due to the stimulus packages announced by various countries to support their economy, all the selected stock markets started showing positive returns.

The announcement of lockdowns around the world, along with massive media coverage, might be the reason for this effect, as lockdowns had put the whole economic activities on halt. Moreover, the returns were negatively and highly correlated to death, while the volatility was positively related. The impact of COVID-19 was so severe that it left investors with negative sentiment and uncertain about future returns in such a way that the companies that are unlucky enough to have similar names or products to the Coronavirus have faced highly elevated negative returns, increased volatility, a lower customer base, and a drop in sales since the outbreak of the COVID-19 pandemic, while they have nothing to do with the Coronavirus (Corbet, Hou, Hu, Lucey, & Oxley, 2021). Findings suggested that the prices of these companies dropped beyond the expectation of

market driven forces. While comparing severeness of COVID-19 with the most recent financial sub-prime crisis, Bhatia and Gupta (2020) found that financially, the subprime crisis had a more powerful impact on the financial sectors of India than the COVID-19 impact. Nifty banks and private sector banks turn out to be good sources of hedging to mitigate the risk during COVID-19. Zhang et. al (2020) examined that both increasing volatility and negative return are in consistent with surging death cases in the 9 most affected countries. The Indian stock markets have been experiencing various kinds of shocks since 2015, ranging from the Chinese stock market crash of 2015-16, demonetization, Brexit announcement, GST reform, PNB scam, and the COVID-19 pandemic since 2015. Although all events had significantly increased volatility, the severeness of COVID-19 was much higher due to the amplified uncertainty and refrained economic activities (Guru & Das, 2021).

Hence, COVID-19 has impacted various countries to varying degrees and also get spilled over to their counterparts to make the situation worse. Various countries have experienced negative returns and high volatility during this period. In line with the above literature, the objective of this paper is further defined.

3. Objective and Hypothesis

The main purpose of this paper is to analyse how COVID-19 affects Indian market sectors. To achieve this objective, on the basis of the above literature, following hypotheses have been developed.

H1: The outbreak of COVID-19 has significantly affected Auto Sector Returns.

H2: The outbreak of COVID-19 has significantly affected Healthcare Sector Returns.

H3: The outbreak of COVID-19 has significantly affected IT Sector Returns.

H4: The outbreak of COVID-19 has significantly affected FMCG Sector Returns.

H5: The outbreak of COVID-19 has significantly affected Capital Goods Sector Returns.

4. Data and Methodology

To examine the impact of COVID-19 on BSE sector returns, following indices have been selected; S&P BSE Auto, S&P BSE Healthcare, S&P BSE IT, S&P BSE FMCG and S&P BSE Capital Goods, to represent Auto industry, Pharma and Healthcare industries, Information Technology industries, Fast moving consumer goods producing industries, and the Capital goods producing industries. The data of daily closing value of each index for the period of 1st January, 2019 to 16th January, 2021 was obtained from the BSE official website. To examine the impact of COVID-19 on the Indian markets thoroughly, the whole period was divided into four subperiods on the basis of main announcements made to restrain COVID-19 spread in India. One of the big announcements in this direction was 'Announcement of Lockdown'. Although it was announced to be implemented from 25th March, a 14-hour long Janata curfew was imposed on 22nd March, 2020 which affected the sentiments of investors negatively as other countries were already in Lockdown. So, for this paper, Lockdown period is considered from 23rd March,2020 onwards. Bifurcation of period is given in Table 1. For the purpose of analyses, each time window's mean returns were compared with Comparison window's mean returns. The significance of mean differences of both windows is checked with student's t- test at 5 % level of significance.

Table 1: Bifurcation of Period in Different Comparison Windows

Time Period	Window name	Announcement
1 Jan, 2019 to 31 Dec, 2019	Comparison	The period when there is no such COVID-19 related news. And the entire humankind and economy is going on normally.
30 Jan, 2020 to 20 Mar, 2020	Pre-lockdown	WHO declares COVID-19 as 'PHIEC' and further on the same day, the first positive case was reported in Kerala, state of India. During this period, the cases of COVID-19 started increasing rapidly outside China countries but still at its infancy stage.
23 Mar, 2020 to 7 June, 2020	During Lockdown	Prime Minister of India declared nationwide Lockdown which continued to be extended with lesser restrictions until 7th June.
8 Jun, 2020 to 16 Jan, 2021	Unlock phase	Implemented Unlock phase 1.0 on 8th June.

Source: Compiled by the authors.

5. Data Analysis and Interpretation

5.1 Descriptive Analysis

Table 2 gives the descriptive analysis of all selected sectors for the chosen time windows for comparing the returns before and during COVID-19. During the Comparison window (time before the emergence of COVID-19), all sectors gave negative returns except IT sector and Banking sector although the negative returns were not so high, they ranged from -0.014% to -0.047%. The scare due to declining GDP hitting a six-year low, falling consumer demand, and the global economic recession might be the reasons for these sectors' giving negative returns. Overall, 2019 remained the eventful year in the history of Indian markets, both Sensex and Nifty surged by 14.4% and 12% respectively giving double digit returns to the investors. However, with the starting of 2020, the market started dwindling. In the Pre-lockdown window, all sectors gave high negative returns ranging from -0.761% to -1.158%. Auto sector (-1.158%) was the worst hit sector which was already struggling with the dampening auto vehicle sales followed by Banking (-1.155%) and Capital goods (-1.131%), while the IT, FMCG and Health care sector managed to remain at -0.761%, -0.572% and -0.487% respectively. Pre-lockdown period was the period when the corona cases were proliferated in the world, but in India, cases were in one-digit number. Such enormous returns indicated the fear and uncertainty prevailing in Indian market investors. Surprisingly, after the announcement of the lockdown which put the whole economy and social life on a standstill, all sectors rebounded remarkably. In both Lockdown and Unlock phase windows, all sectors gave highly positive returns, relatively higher than the pre- Covid level. In Lockdown period, Healthcare sector gave the highest mean returns (0.609%), followed by Auto sector (0.428%), IT sector (0.339%) and FMCG sector (0.267%) respectively.

Having analysed the return behaviour of all sector indices, the S.D. (primary measure of Volatility) in Table 2 uncovers that the Indian Markets were very volatile amid the uncertainty and anxiety spread among the public about the impact of COVID-

19 on the economic, financial and social health of the country. Heightened uncertainty in Pre-lockdown increased the volatility of all sectors by 2-3 times more than the Comparison window. The volatility slightly increased in Lockdown period along with positive returns which was a positive sign. Even during Unlock phase, volatility remained higher than the pre-Covid level although lower than the Pre-lockdown and Lockdown period.

Table 2: Descriptive Statistics for Each Selected Sector

Sectors	Window	Mean (%)	Median	SD (%)
IT	Comparison	0.037%	0.098%	1.096%
	Pre-lockdown	-0.761%	-0.148%	2.930%
	Lockdown	0.339%	0.604%	3.032%
	Unlock phase	0.377%	0.227%	1.497%
Healthcare	Comparison	-0.016%	0.061%	0.884%
	Pre-lockdown	-0.487%	-0.244%	2.464%
	Lockdown	0.609%	0.371%	2.213%
	Unlock phase	0.198%	0.239%	1.288%
Auto	Comparison	-0.047%	-0.184%	1.505%
	Pre-lockdown	-1.158%	-0.758%	2.479%
	Lockdown	0.428%	0.847%	3.882%
	Unlock phase	0.271%	0.314%	1.358%
FMCG	Comparison	-0.014%	-0.020%	0.798%
	Pre-lockdown	-0.572%	-0.470%	2.353%
	Lockdown	0.267%	0.304%	2.724%
	Unlock phase	0.092%	0.178%	0.881%
Capital Goods	Comparison	-0.044%	-0.094%	1.298%
	Pre-lockdown	-1.131%	-0.513%	2.548%
	Lockdown	0.193%	0.143%	3.449%
	Unlock phase	0.267%	0.378%	1.260%

Source: Calculated and compiled by the authors.

5.2 Hypothesis testing

In the following sections, the detailed description of Auto, Healthcare, IT, FMCG and Capital Goods sector returns for each selected time window along with their

Comparison to comprehend the impact of COVID-19 outbreak on each sector has been provided.

5.2.1 H1: The outbreak of COVID-19 has significantly affected Auto Sector Returns.
Table 3 reveals that during Comparison window, the Auto sector returns are negative, suggesting that in 2019, the whole global economy went through the tough time. Indian economy also gets affected the global economic slowdown. In Pre-Lockdown window, there is a steep fall in returns (from -0.047% to -1.158%). The Pre-lockdown window's returns are negative and significantly different from the Comparison window. The announcement of lockdown in China on 23rd January, 2020 and declaring COVID-19 as 'PHIEC' by WHO might have spread the fear and uncertainty among the international investors.

Table 3: Comparison of Auto Sector Returns for Selected Time Windows

Particulars	Comparison window	Pre-lockdown window	Lockdown window	Unlock Phase
No. of Observations	244	36	48	156
Mean Return (%)	-0.047	-1.158	0.428	0.271%
t-value	---	3.7507	-1.4511	-2.1424
p value		0.0002*	0.1478	0.0328*
Note: *Significant at the 5% level.				

Source: Calculated and complied by the authors.

Notably, intense negative returns turned into positive returns during the Lockdown window despite the losses of more than Rs 2,300 Crore in turnover the auto industry had to suffer for every single day of the Lockdown ("Covid-19 hit Auto sector", 2020). Sachdeva (2020) also mentioned the bizarre situation happening in the whole world, especially in India, as the stock market bounced back at a very rapid speed comparing to the pre-Covid level. He also suggested that such situation could be due to ignorance at the investors level to the severity of COVID-19 impact over economy, or they were highly enthusiastic about the vaccine discovery. During the Lockdown window, returns were not significantly different from the Comparison window returns at 5 % level of significance but positive. Unlock phase window's returns are also positive and significantly different from the Comparison window. Hence, the hypotheses H1 is accepted that the outbreak of COVID-19 has significantly affected the Auto sector's returns at 5% level of significance.

5.2.2 H2: The outbreak of COVID-19 has significantly affected Healthcare Sector Returns.
Table 4 shows that during the Comparison window, healthcare sector returns were negative which might be due to the global economic slowdown as well as what Indian economy were facing in 2019. In the Pre-lockdown period, returns dropped more intensively (from -0.012% to -0.43 %). Hence, the Pre-lockdown window's returns were significantly negative and different from the Comparison window. The impacts of COVID-19 all over the world left the investors with more uncertainty and caused rigorous sell off. As the economies are integrated due to globalization, the fear created by imposed lockdown in other countries, especially in China, spilled over to the Indian market which was evident from the negative returns when the lockdown was not even imposed in India. Bhatia and Gupta (2020) acknowledged that the interdependence among the global markets had been escalating in such a manner that any type of event or news whether positive or negative would have a ripple effect upon other connected economies.

Table 4: Comparison of Healthcare Sector Returns for Selected Time Windows

Particulars	Comparison window	Pre-lockdown window	Lockdown window	Unlock Phase
No. of Observations	244	36	48	156
Average Return (%)	-0.016	-0.487	0.609	0.198
t-value	---	2.1928	-3.3001	-1.966
p value	---	0.0291*	0.0011*	0.0498*
Note: *Significant at the 5% level.				

Source: Calculated and complied by the authors.

Seemingly, during the Lockdown window, intense negative returns turned into highly positive returns (-0.487% to 0.609%) suggesting the optimism among the investors regarding the Healthcare industry. Lockdown window's returns were significantly different from the Comparison window's returns at 5 % level of significance matched with the results of (Funck & Gutierrez, 2018; Ichev & Marinč, 2018; Liu et al., 2020; Mushafiq, 2021). Unlock phase window's returns were also positive and significantly different from the Comparison window. Hence, the hypotheses H2 has been accepted that the outbreak of COVID-19 has significantly affected the Healthcare sector's returns at 5% level of significance.

5.2.3 H3: The outbreak of COVID-19 has significantly affected IT Sector Returns
Table 5 uncovers that During Comparison window IT sector returns comes out to be positive despite the fact that the Indian GDP had went down to five-year low. This shows emerging trend of Indian IT Industry. In Pre-lock down period, positive returns have dropped down steeply and become negative (from 0.037% to -0.761%) clearly indicating the spillover of panic and fear among international investors in crisis time. Youssef, Mokni, & Ajmi (2021) stated in this regard that during the period of heightened uncertainty global stock market would move in the same direction and the event which is bad for one market would also be bad for other markets depending upon the prevailing economic condition of the other country. Hence, the Pre-lockdown window's return is negative and significantly different from the Comparison window.

Table 5: Comparison of IT Sector Returns for Selected Time Windows

Particulars	Comparison window	Pre-lockdown window	Lockdown window	Unlock Phase
No. of Observations	244	35	48	156
Mean Return (%)	0.037	-0.761	0.339	0.377
t-value	----	2.9823	-2.1948	-2.6245
p value	----	0.0031*	0.0289*	0.0090*
Note: *Significant at the 5% level.				

Source: Calculated and complied by the authors.

Notably, during the Lockdown window negative returns elevated to highly positive returns (-0.761% to 0.339%) suggesting the optimism among the investor for the IT Industry. As IT industry had played a substantial role to mitigate the effect of COVID-19 on the general public by enabling them to access the software for attending classes or holding meetings and any other kind of activities. During Lockdown window's returns are significantly different

from the Comparison windows returns at 5 % level of significance matched with results of (Funck & Gutierrez, 2018; Ichev & Marinč,2018; Liu et al., 2020). Unlock phase window's returns are also positive and significantly different from the Comparison window. Thus, the hypotheses H3 has been accepted that the outbreak of COVID-19 has significantly affected the IT sector's returns at 5% level of significance.

5.2.4 H4: The outbreak of COVID-19 has significantly affected FMCG Sector Return

FMCG sector also succumbed to the panic created by the novel corona virus as the Pre-lockdown window showed significant different and negative returns while comparing with Comparison window at p value 0.0055. Such immense negative returns indicate only one thing: the investors and traders in Indian markets are reacting to responses of global markets worst hit by the coronavirus because COVID-19 is still in its infant stage in India. However, the Lockdown (0.267%) and Unlock Phase (0.092%) returns are not significantly different from the Comparison window. Surprisingly, returns are positive and even higher than the returns of Comparison window returns (-0.014%).

Table 6: Comparison of FMCG Sector Returns for Selected Time Windows

Particulars	Comparison window	Pre-lockdown window	Lockdown window	Unlock Phase
No of Observations	244	36	49	156
Mean Return (%)	-0.014%	-0.572%	0.267%	0.092%
t value	----	2.7936	-1.3543	-1.2457
p value	----	0.0055*	0.1767	0.2136
Note: * Significance at 5 % level				

Source: Calculated and complied by the authors.

Sudden announcement of lockdown restricting all the activities from social to economic activities made the public to do panic buying and hoarding of food products which supported FMCG sector during this turbulent period (Alam, Wei, & Wahid, 2020). Thus, H4 has been partially accepted that the outbreak of COVID-19 has significantly affected the FMCG sector since only pre-covid returns are significantly different from the Comparison window.

5.2.5 H5: The outbreak of COVID-19 has significantly affected Capital Goods Sector Return

In the Pre-lockdown window, returns turned out to be intensively negative with the mean returns -1.131% which is significantly different from the Comparison window's returns (-0.044%). Although the Capital goods sector is already battling with the sluggish global economy and low demand from governments as well as private consumers, the outbreak of COVID-19 has made the situation even worse, as reflected in massive negative returns. Such massive negative returns clearly indicate that bad news spreads like wildfire. Investors started getting horrified to the coming news of Coronavirus being highly contagious and severeness to the level of being declared as pandemic. They were expecting that COVID-19 would have a very bad impact on this sector's growth due to the disruption of the international supply chain and low demand.

Table 7: Comparison of Capital Goods Sector Returns for Selected Time Windows

Particulars	Comparison window	Pre-lockdown window	Lockdown window	Unlock Phase
No of observation	244	36	49	157
Mean	-0.044%	-1.131%	0.193%	0.267%
t value	-----	4.0219	-0.8231	-2.3690
p value	-----	7.44E-05**	0.4111	0.0183**

Source: Calculated and complied by the authors.

Further, the Lockdown window returns (0.193%) are not significantly different from the Comparison window, but they positively indicate the recovery of the market despite the losses of the capital goods industry that have been occurring during the entire tenure of the lockdown. As per the IIP use based classification, the Capital goods sector contracted unprecedently by more than 60% year-on-year in May 2020 although the extent of negative growth was lower in May 2020 than in April 2020. The import and export of capital goods have also been reduced a lot compared to the corresponding period in FY 20 (Rawat, 2020).

Hence, such returns show the frenzy behaviour of investors. Moreover, the Unlock phase returns are even higher than the Lockdown period as well as the Pre-lockdown period. The Unlock phase returns are positive and significantly different from the Comparison window. Hence, the hypothesis H5 has been accepted that the outbreak of COVID-19 has significantly affected the Capital goods sector.

6. Findings and Discussion

The empirical analysis of the above Indian market sectors inferred that the COVID-19 had an impact on the Indian Market and the investors' sentiments. However, the impact was short but severe on Indian market. Further, if one dives into a deep analysis, he seems to find that the Indian markets start reacting to the news of COVID-19 much before the Lockdown, when the COVID-19 cases were relatively very low. Each selected sector showed massive negative mean returns in the Pre-lockdown window (i.e., 30th January to 20th March, 2020). Auto sector was the worst hit, followed by Capital Goods, IT, FMCG and Health care sector. Even before the lockdown announcement, the Indian market plummeted three times due to fear and panic among the global investors regarding the increasing grip of Corona across the globe. Hence, the outbreak drove anxiety and panic among investors regarding the economic impact of COVID-19, which made them reluctant to take any position in the stock market, leading to a decline in stock market returns (Liu et al., 2020). Individual investors tend to be affected by group psychology developed from their doubts and perceptions about the future which gets transmitted across the market during a period of heightened uncertainty (Meng, Meng and Hu, 2016 as cited in Liu et al. (2020).

During the Lockdown window, all selected sector indices fell dramatically on 23rd March, the starting of the Lockdown in India, making this day a black day in the history of the Indian Market. IT and Healthcare sector somehow managed to fall only by -9.690% and -8.568%, while Auto, Capital goods and FMCG sector fell by -14.334%, -16.185% and -11.007% respectively. However, the memory of this black day started to die away soon, as reflected in the results of the study. During the Lockdown window, all selected sectors showed positive mean returns. IT, Healthcare and Auto give positive and significantly different from the Comparison window which indicates optimism among the investors regarding the recovery of the Indian market when this lockdown would be

lifted. The startling recovery of the IT, Healthcare and FMCG sectors from their lowest lows in March is backed by increasing revenue in these sectors during this period. One plausible explanation for such a recovery might be due to the role these sectors played in the Corona Period. When social distancing was both necessary and required, the IT sector enabled people to stay in touch. Due to the Lockdown of the whole country, reliance upon this information technologies increased a lot for doing every kind of work whether it was a work from home, online classes, webinars, online health check-up, religious activities or staying in touch with dear ones in such a horrified time. In addition, the Healthcare sector became the frontline sector to battle the war with novel coronavirus followed by the FMCG sector. Thus, the investors and traders were very optimistic about the future growth and the opportunities of these three sectors which the COVID-19 gave to them. Same optimism can be seen for these three sectors during the Unlock phase as well. IT and Healthcare showed positive returns and was significantly different comparing with the pre-Covid time frame. These sectors have shown their strength by giving positive revenues and returns even when the whole economy is staggering. For example, "If we consider our everyday utilities despite a slowdown, we won't stop consuming toothpaste or shampoo. This is exactly where companies like Hindustan Unilever and Colgate come into the picture since they will continue to create wealth as they have been in the past" (Modi, 2020).

However, the positive returns of Auto and capital goods sector, including significant results during Lockdown period, are surprising. When they were already struggling with a sluggish economy and a global economy slow down, the COVID-19 and resultant Lockdown made the situation worse for them. According to a parliamentary panel report submitted to Rajya Sabha, Chairman M Venkaiah Naidu said that due to the ongoing COVID-19 pandemic and resultant global Lockdowns, all the major original equipment manufacturers have cut down their production by 18-20 % due to slumping demand for auto vehicles which caused an estimated job loss in the auto sector of 3.45 lakh jobs. The automotive industry suffered a loss of Rs 2300 cr. per day. The actual picture of this loss still depends on the Lockdown extent, intensity and severeness of the COVID-19 spread ("Lockdown Effect", 2020). The picture of Capital goods sector, which is the "mother" of the entire manufacturing sector, is as gloomy as the auto mobile sector. According to the CARE report titled 'Industry Research', cumulative imports and exports of capital goods fell dramatically in May-June amid weak global demand due to COVID-19 (Rawat, 2020). Despite such huge losses both sectors give positive and significant returns which needs an explanation.

One of the explanations for such behaviour might be the liquidity driven by the cheap money available worldwide due to the stimulus packages announced by various countries to support their economies and stabilize the market such as the USA's announced stimulus package worth 2.3 trillion dollars, Japan's 1.09 trillion dollars, UK's 496.23 billion dollars, Germany's 383.96 billion dollars, China's 169.7 billion dollars and India's 26.92 billion dollars. Low interest rates in developed markets made the FIIs to divert their investment to emerging countries like India. India manged to attract the FIIs investments from the China market during this period. According to NSDL data until December 20th, 2020, FIIs had bought shares worth over $20.59 billion which was the highest ever invested money by FIIs in a calendar year in the Indian stock market since 2010. Not only FIIs, Mr. Piyush Goyal (Indian Commerce and Industry Minister) said that when COVID-19 was at its peaks in India, FDIs was worth $ 40 Billion which was about 13% higher than what had been poured into the Indian market (Vasudev, 2020). Along with FIIs, the jumping of large numbers of retail investors into the stock market in Lockdown time with the hope of earning some extra income also propelled the stock market to some extent. The Indian market succeeded in attracting the FIIs due to the

reforms taken by the Indian government in an effort to make India business friendly such as GST, low corporate tax rates, business friendly policies during the pandemic etc. However, Chandrasekhar and Ghosh (2021) called such speculative behaviour of investors as 'Irrational Exuberance' as they were riding on the speculative boom defying the contraction of the economy. They also stated that India stock market had shown a speedier recovery than its Asian neighbours such as China, Indonesia, Malaysia, Thailand, Singapore and the Philippines which clearly reflected a heady boom in the Indian market. Further, a ban on short selling is held responsible by Chakraborty (2020) for this recovery. In this regard, he said that the Indian government had banned short selling in the stock market since March 23rd for the purpose of stabilizing the stock market which was needed at the time to maintain investors' confidence in the market. The ban on short selling stayed in force until May 28th, which helped the Sensex and Nifty recover around 30% from their lows on March 23rd.

In a nutshell, the stock market tends to recover speedily after big crashes ended; for example, the same happened after the swine flu crisis in 2009 and the Zika virus in 2016 when the market rebounded immensely (Modi, 2020).

It means the memory of crashes will soon fade away, and the market will make a new beginning just like COVID-19, where all sector indices will make new highs. In the case of COVID-19 the fuel for the rally to higher highs is provided by FIIs, FDI, liquidity abundance, the low interest rate across the global economy. Although Auto and Capital goods sectors give positive and significant returns, IT, Healthcare and FMCG sectors prove to be defensive sectors which help the investors gain fair returns and ride the roller coaster ride of the volatile market safely in time of such a pandemic era.

7. Conclusion

This paper studies the impact of COVID-19 on the Indian stock market through examining the responses of BSE sector indices: Auto, Healthcare, IT, FMCG and Capital Goods sectors from the period of 1st January, 2019 to 16th January, 2021. This period is further divided into four-time windows named as Comparison window, Pre-lockdown window, during Lockdown and Unlock phase window to thoroughly analyse the COVID-19 impact. Conventional t-test is applied to analyse and compare the daily returns of sectors during different time windows. Our empirical results showed that (a) COVID-19 had a significant and negative impact on the Indian market but that impact is short lived, only during the Pre-lockdown window. (b) In the pre-lockdown window, all sectors' returns turned out to be significantly negative, indicating that the fear of COVID-19 had spread, and panic spilled over among investors from many countries who were financially and economically affected due to the Corona virus. Uncertainty and panic created by COVID-19 spread like a wildfire. (c) During the Lockdown time window, each sector's returns significantly increased, suggesting that investors were optimistic about the future growth of the economy once COVID-19 ended, and the whole economy would come to its normal pace. The significant and positive returns of Healthcare, IT and FMCG sectors reflect the strength of these sectors to stay strong during the pandemic. By betting on these sectors, investors can also safely cover the journey through such a crisis time period in the future. The positive returns of Auto and Capital goods sector indicate that the investors are either over optimistic for Vaccine discovery or not taking the pandemic seriously.

In conclusion, the stock market is not reflecting the real economy because when the economy is contracted, and sectors, such as Auto and capital goods sectors, are directly affected due to COVID-19 and subsequent Lockdown, the stock market is touching new record highs daily. The Reserve Bank of India also showed concern for

overvalued equity market and said that such overvalued Indian stock market are far away the real economy (Mondal, 2021).

The findings of the study have significant implication for investors, traders and market regulators of the Indian stock market. As a recommendation to investors, it can be said that it is right to grab the opportunity and earn good returns, but they should also start hedging their position to safeguard their capital.

References

Alam, M. M., Wei, H., & Wahid, A. N. M. (2020). COVID-19 outbreak and sectoral performance of the Australian stock market: An event study analysis. *Australian Economic Papers*, *60(3),* 482-495.

Ali, M., Alam, N., & Rizvi, S. A. R. (2020). Coronavirus (COVID-19) - An epidemic or pandemic for financial markets. *Journal of Behavioral and Experimental Finance*, *27*, 1-6.

Al-Qudah, A. A., & Houcine, A. (2021). Stock markets' reaction to COVID-19: Evidence from the six WHO regions. *Journal of Economic Studies*, *49(2),* 274-289.

Andrews, M. A., Areekal, B., Rajesh, K., Krishnan, J., Suryakala, R., Krishnan, B., … Santhosh, P. (2020). First confirmed case of COVID-19 infection in India: A case report. *The Indian Journal of Medical Research*, *151*(5), 490-492.

Anh, D. L. T., & Gan, C. (2020). The impact of the COVID-19 Lockdown on stock market performance: Evidence from Vietnam. *Journal of Economic Studies*, *48*(4), 836–851.

Azimli, A. (2020). The impact of COVID-19 on the degree of dependence and structure of risk-return relationship: A quantile regression approach. *Finance Research Letters*, *36*.

Baker, S. R., Bloom, N., Davis, S. J., Kost, K., Sammon, M., & Viratyosin, T. (2020). The unprecedented stock market reaction to COVID-19. *Review of Asset Pricing Studies*, *10*(4), 742–758.

Bhatia, P., & Gupta, P. (2020). Sub-prime crisis or COVID-19: A comparative analysis of volatility in Indian banking sectoral indices. *FIIB Business Review*, *9*(4), 286–299.

Chakraborty, I. (2020). Impact of COVID-19 on the stock market and corporate firms in India. IDSK Special Series on COVID. Retrieved from https://www.idsk.edu.in

Chandrasekhar, C., & Ghosh, J. (2021). Irrational exuberance: The rise and rise of stock markets. The Hindu Business Line. Retrieved from https://www.thehindubusinessline.com/opinion/columns/c-p chandrasekhar/irrational-exuberance-the-rise-and-rise-of-stock-markets/article33784964.ece

Corbet, S., Hou, Y., Hu, Y., Lucey, B., & Oxley, L. (2021). Aye Corona! The contagion effects of being named Corona during the COVID-19 pandemic. *Finance Research Letters*, *38*, 1-9.

COVID-19 hit Auto sector make the change to 2021 with cautious optimism. (2021) Business TodayIn. Retrieved from https://www.businesstoday.in/auto/story/covid-19-hit-auto-sector-make-the-change-to-2021-with-cautious-optimism-282067-2020-12-20

Dasgupta, S. (2020). In biggest market crash ever, Sensex collapses about 4,000 points in a day. *Mint.* Retrieved from https://www.livemint.com/news/india/sensex-suffers-biggest-fall-ever-nearly-4-000-point-loss-in-a-day-11584957827501.html

Funck, M., & Gutierrez, J. A. (2018). Has Ebola infected the market: A contagious reaction to a (media) health care crisis? *Journal of Business Strategies, 35(2),*55-75.

Gupta, H., Chaudhary, R., & Gupta, S. (2021). COVID-19 Impact on Major Stock markets. *FIIB Business Review,* 1-11.

Guru, B. K., & Das, A. (2021). COVID-19 and uncertainty spillovers in Indian stock market. *MethodsX*, *8*, 1-8.

He, Q., Liu, J., Wang, S., & Yu, J. (2020). The impact of COVID-19 on stock markets. *Economic and Political Studies*, *8*(3), 275–288.

Ichev, R., & Marinč, M. (2018). Stock prices and geographic proximity of information: Evidence from the Ebola outbreak. *International Review of Financial Analysis*, *56*, 153–166.

Insaidoo, M., Arthur, L., Amoako, S., & Andoh, F. K. (2021). Stock market performance and COVID-19 pandemic: Evidence from a developing economy. *Journal of Chinese Economic and Foreign Trade Studies*, *14*(1), 60–73.

Liu, H., Wang, Y., He, D., & Wang, C. (2020). Short term response of Chinese stock markets to the outbreak of COVID-19. *Applied Economics*, *52*(53), 5859–5872.

Lockdown effect: Indian automotive industry suffered Rs 2,300 crore loss daily (2020). The Financial Express. Retrieved from https://www.financialexpress.com/auto/industry/Lockdown-effect-indian-automotive-industry-suffered-rs-2300-crore-loss-daily-oems-shutdown-factories-production-facility-cars-bikes-scooters/2150591/

Market wrap, Feb 28: Here's all that happened in the markets today (2020). Business Standard News. Retrieved from https://www.business-standard.com/podcast/markets/market-wrap-feb-28-here-s-all-that-happened-in-the-markets-today-120022800898_1.html

Market wrap, March 9: Sensex dips 1942 pts, Nifty at 10,451 (2020). Business Standard News. Retrieved from https://www.business-standard.com/podcast/markets/market-wrap-march-9-sensex-dips-1942-pts-nifty-at-10-451-120030900898_1.html

Modi, J. (2020). Coronavirus outbreak: The current crisis can be a great opportunity for stock market investors. *Business Today.In.* Retrieved from https://www.businesstoday.in/opinion/columns/story/coronavirus-outbreak-covid-19-stock-market-current-crisis-great-opportunity-for-investors-253773-2020-04-02

Mondal, D. (2021). RBI expresses concern on India's equity market 'bubble'. The New Indian Express. Retrieved from https://www.newindianexpress.com/business/2021/may/27/rbi-expresses-concern-on-indias-equity-market-bubble-2308237.html

Mushafiq, M. (2021). Industry-level analysis of COVID-19's impact in emerging markets - Evidence from Pakistan. *International Journal of Emerging Markets*. Retrieved from https://www.emerald.com/insight/content/doi/10.1108/IJOEM-11-2020-1417/full/html

Parveen, S., Satti, Z. W., Subhan, Q. A., Riaz, N., Baber, S. F., & Bashir, T. (2021). Examining investors' sentiments, behavioral biases and investment decisions during COVID-19 in the emerging stock market: A case of Pakistan stock market. *Journal of Economic and Administrative Sciences.* Retrieved from https://www.emerald.com/insight/content/doi/10.1108/JEAS-07-2021-0130/full/html?skipTracking=true

Rawat, R. (2020). Industry Research. Retrieved from https://www.careratings.com/uploads/newsfiles/Capital%20Goods%20Sector%20-%20August%202020.pdf

Ritchie, H., Mathieu, E., Rodés-Guirao, L., Appel, C., Giattino, C., Ortiz-Ospina, E., & Roser, M. (2020). Coronavirus Pandemic (COVID-19). Retrieved from https://ourworldindata.org/coronavirus

Sachdeva, S. (2020). COVID-19 and the Indian stock market movement. Retrieved from https://www.investindia.gov.in/team-india-blogs/COVID-19-and-indian-stock-market-movement

Shah, P. (2020). Sensex sinks 1,448 points as coronavirus scare grows. The Hindu BusinessLine. Retrieved from https://www.thehindubusinessline.com/markets/stock-markets/sensex-sinks-1448-points-as-coronavirus-scare-grows/article30944998.ece

Sharma, A. (2020). Coronavirus: Barclays says Indian economy to lose Rs 17.78 lakh crore; cuts GDP growth to zero. BusinessToday. Retrieved from https://www.businesstoday.in/latest/economy-politics/story/coronavirus-barclays-cuts-india-2020-gdp-forecast-to-zero-over-Lockdown-extension-254664-2020-04-14

Vasudev, A. (2020). Year 2020: Foreign investors not deterred by COVID-19, pour record amount in equities. Retrieved from https://www.ndtv.com/business/year-

2020-foreign-investors-not-deterred-by-COVID-19-pour-record-amount-in-equities-2339577

Wadhwa, P. (2020). With 75% economy under Lockdown, analysts see sharp fall in GDP. Business Standard News. Retrieved from https://www.business-standard.com/article/economy-policy/with-75-economy-under-Lockdown-analysts-see-sharp-fall-in-gdp-120032600231_1.html

Youssef, M., Mokni, K., & Ajmi, A. N. (2021). Dynamic connectedness between stock markets in the presence of the COVID-19 pandemic: Does economic policy uncertainty matter? *Financial Innovation*, *7*(1), 1-27.

Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*, *36*.